iram
Institut de
Radioastronomie
Millimétrique

Annual Report 2018

IRAM Annual Report 2018

Published by IRAM © 2019

Director of publication Karl-Friedrich Schuster
Edited by Cathy Berjaud, Frédéric Gueth

With contributions from:

Sébastien Blanchet, Edwige Chapillon, Antonio Córdoba, Isabelle Delaunay, Paolo Della Bosca, Eduard Driessen, Bertrand Gautier, Olivier Gentaz, Frédéric Gueth, Carsten Kramer, Bastien Lefranc, Santiago Navarro, Roberto Neri, Juan Peñalver, Jérôme Pety, Francesco Pierfederici, Christophe Risacher, Miguel Sánchez Portal, Karl-Friedrich Schuster

Contents

Introduction

Writing the annual report is a very instructive exercise which requires to detach from the daily business and to step back for a moment in order to consider what has happened and been accomplished during the last 12 months. For IRAM, 2018 was an incredibly rich year with many important events and achievements. The most important ones were the international visiting committee which took place in May 2018, the completion of NOEMA Phase I in September and finally the official agreement among the IRAM partners in November to launch full NOEMA Phase II.

IRAM's visiting committees are milestone evaluations which are spaced by 5 to 8 years and carried out by eminent international scientists who analyse and comment upon the strategic plans of IRAM and IRAM's science productivity as well as future perspectives. In 2018, the visiting committee was also charged by the stakeholders to evaluate IRAM's operation and to comment on general organizational questions. I am happy to say that the resulting report was extremely positive with maybe the only warning being that, with all the enthusiasm and engagement of the IRAM staff, we should not try to go through walls when manpower is naturally limited.

When antenna 10 was successfully completed and commissioned in summer 2018 it was high time to conclude with a well-deserved official event on closure of NOEMA Phase I. Building one new antenna per year for 4 years in a row in the foreseen time frame and budget, developing a completely new and revolutionary backend, upgrading receivers with technology of unrivaled performance and finally keeping the observatory operational during the commissioning of all these changes has been the bold promise of the project, a promise which was fulfilled with flying flags despite multiple unforeseen challenges along the path. IRAMs combination of very proactive stakeholders and a highly motivated and competent staff were key in this success. We were thus more than happy to gather our partners and friends for a joyful day at the NOEMA site and the IRAM headquarter to celebrate this achievement.

On the basis of the previous points, IRAMs partners were then able to find a way to give green light for full NOEMA Phase II which includes the construction of 2 more antennas and the doubling of the baseline length during the next two years. While we can observe every day the spectacular output of NOEMA already today, the improved sensitivity and angular resolution after completion of Phase II will yet add another very important dimension to NOEMAs performance.

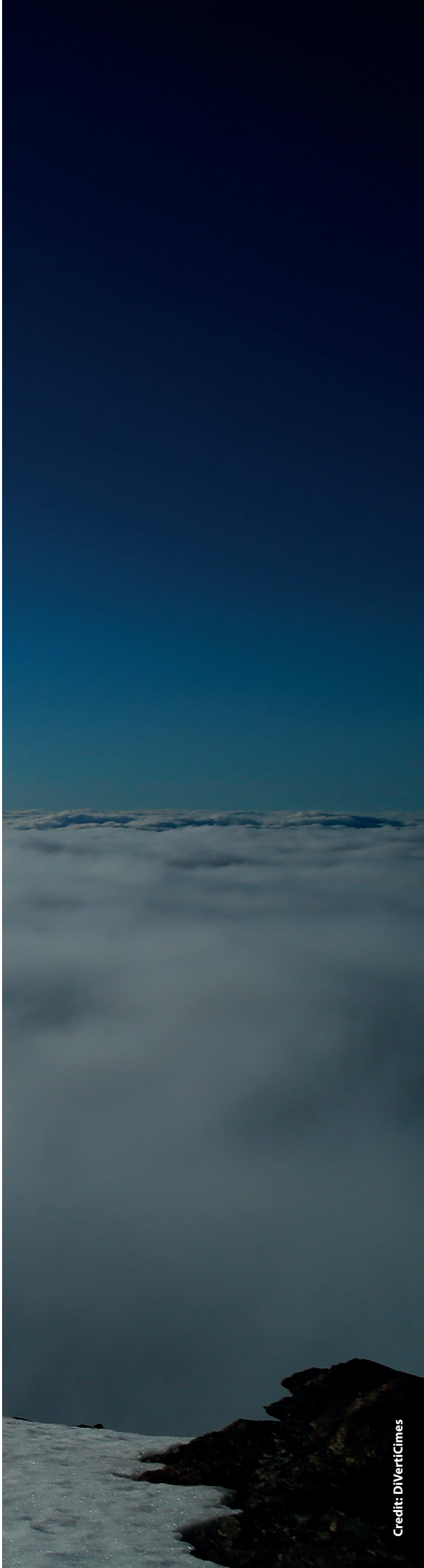
The IRAM 30-meter telescope has been as productive as ever in particular with the rapidly increasing use of NIKA2.The plan to perform a major refurbishment has considerably progressed both technically and politically.

You will find in this report a selection of the many spectacular science results which both, the IRAM 30-meter telescope and NOEMA have produced and at the same time reporting about the ongoing technical developments. With more than 180 IRAM publications per year such a selection gives necessarily an incomplete picture but allows a grasp of the scientific importance and beauty of what can be achieved with our observatories and laboratories.

My warmest thanks to our partners for their valuable support, but also to my colleagues for their commitment and work of highest quality.

With best regards

Karl-Friedrich Schuster
Director



Credit: DiVertiCimes

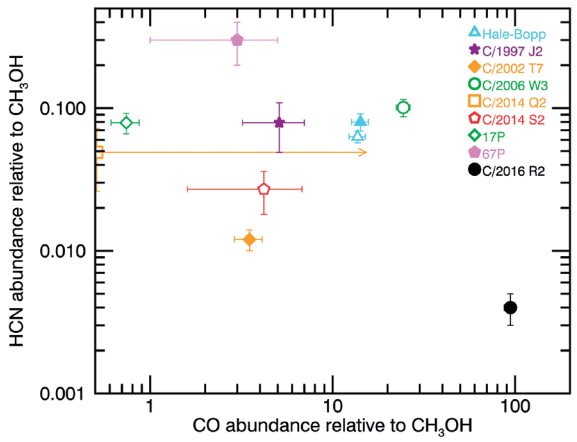
Highlights of research with the IRAM telescopes

THE EXTRAORDINARY COMPOSITION OF THE BLUE COMET C/2016 R2 (PANSTARRS)

Comets are the most pristine remnants of the formation of the solar system 4.6 billion years ago. Investigating the composition of cometary ices may provide clues to the physical conditions and chemical processes at play in the primitive solar nebula. Comets may also have played a role in the delivery of water and organic material to the early Earth. Understanding the diversity in composition and isotopic ratios of the comet material is therefore essential for the assessment of such a scenario. In this framework, comets are regularly observed with both IRAM observatories.

In 2018, Nicolas Biver (LESIA, Paris) and collaborators targeted comet C/2016 R2 (PanSTARRS) on two nights with the IRAM 30-meter telescope. This comet is of particular interest since it belongs to a category of comets of which only very few examples are known: while most comets show a dust tail and a coma of neutral or yellowish color when approaching the Sun, C/2016 R2 exhibited a deep blue coma and tail, engendered by the presence of strong CO^+ lines in the optical spectrum and very little dust or other emission lines.

The IRAM 30-meter spectra confirm that C/2016 R2 is very different from most other comets observed so far. On the one hand, several molecules like HCN, CH_3OH, H_2CO appear to be depleted by more than an order of magnitude with respect to other comets, on the other hand the CO (2–1) line is found to be one order of magnitude stronger than expected. Complementary observations at optical wavelength revealed a large abundance of another volatile species, N_2.



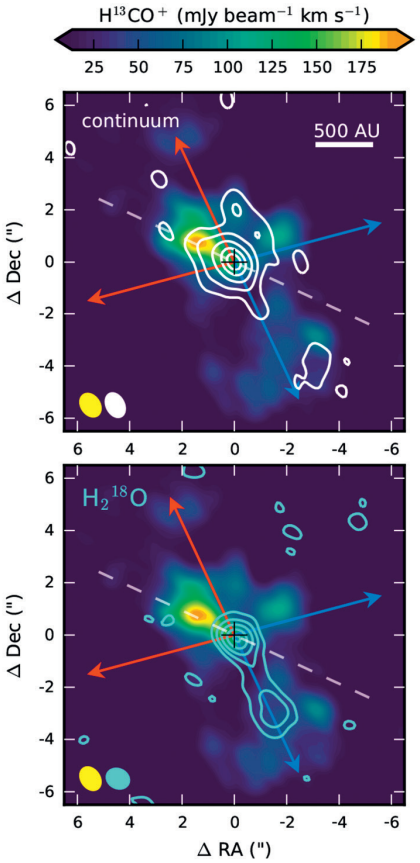
HCN/CH_3OH and CO/CH_3OH abundance ratios observed in comets at distances between 2.3 and 3.3 AU from the Sun. Work by Biver et al. 2018, A&A, 619, A127.

Two scenarios are considered to explain the unusual composition of comet C/2016 R2. In the first one, the comets nucleus appears to be the agglomeration of dust grains formed at an extremely low temperature, favoring the trapping of high quantities of N_2. In the second scenario, the comet is a volatile-enriched fragment of a large, differentiated, Kuiper Belt object. In such objects, gases released from the innermost layers by radiogenic heating refreeze at different depth according to their volatility. Most volatile species like N_2 or CO are expected to freeze closer to the surface. This scenario is in agreement with dynamical studies of the trans-Neptunian population, which predict a rich collisional history in the Kuiper Belt.

IMAGING THE WATER SNOWLINE IN A PROTOSTELLAR ENVELOPE

Water is one of the most abundant molecules in the interstellar medium, an important coolant of the warm gas, and a major constituent of icy grain mantles deep inside planet-forming disks. The transition from water molecules being frozen out onto dust grains to being ejected into the gas phase occurs at the so-called water snowline. Since the selective freeze-out of the major oxygen carrier alters the elemental C/O-ratio in both the gas and ice phases, the bulk chemical composition of forming planets depends on their location with respect to the water snowline. Though its location and time evolution in protostellar systems is playing thus a crucial role in the formation of planets, the $H_2{}^{16}O$ snowline is very difficult to observe from the ground.

With these goals in mind, Merel van't Hoff (Leiden Observatory) and collaborators have used the subarcsecond resolution of NOEMA and the optically thin emission lines of the $H_2{}^{18}O$ and $H^{13}CO^+$ isotopologues to chemically trace the location of the snowlines in the Class 0 protostar NGC1333-IRAS2A. The researchers were able to locate the $H^{13}CO^+$ snowline at 360 AU from the protostar. Based on quantitative chemical considerations they showed that a decrease in the $H^{13}CO^+$ abundance by at least a factor of six is needed in the inner 360 AU to reproduce the observed emission profile. The steep increase in HCO^+ just outside the water snowline places the water snowline at 225 AU. These observations showed that the $H^{13}CO^+$ abundance increases just outside the water snowline, and confirmed previous results of radiative transfer calculations and chemical models that predict that the abundance of HCO^+ strongly decreases with an increasing abundance of H_2O in the gas phase. According to the authors, the next step would be to corroborate the H_2O/HCO^+ abundance relation for more protostellar systems in order to establish $H^{13}CO^+$ as a good tracer of the water snowline when its direct detection becomes very difficult.



Integrated intensity map for the $H^{13}CO^+$ (3-2) transition (color) toward IRAS2A, with the 1.2 mm continuum overlaid in white contours (top) and the $H_2{}^{18}O$ transition in blue contours (bottom).
Work by van't Hoff et al. 2018, A&A, 613, 29.

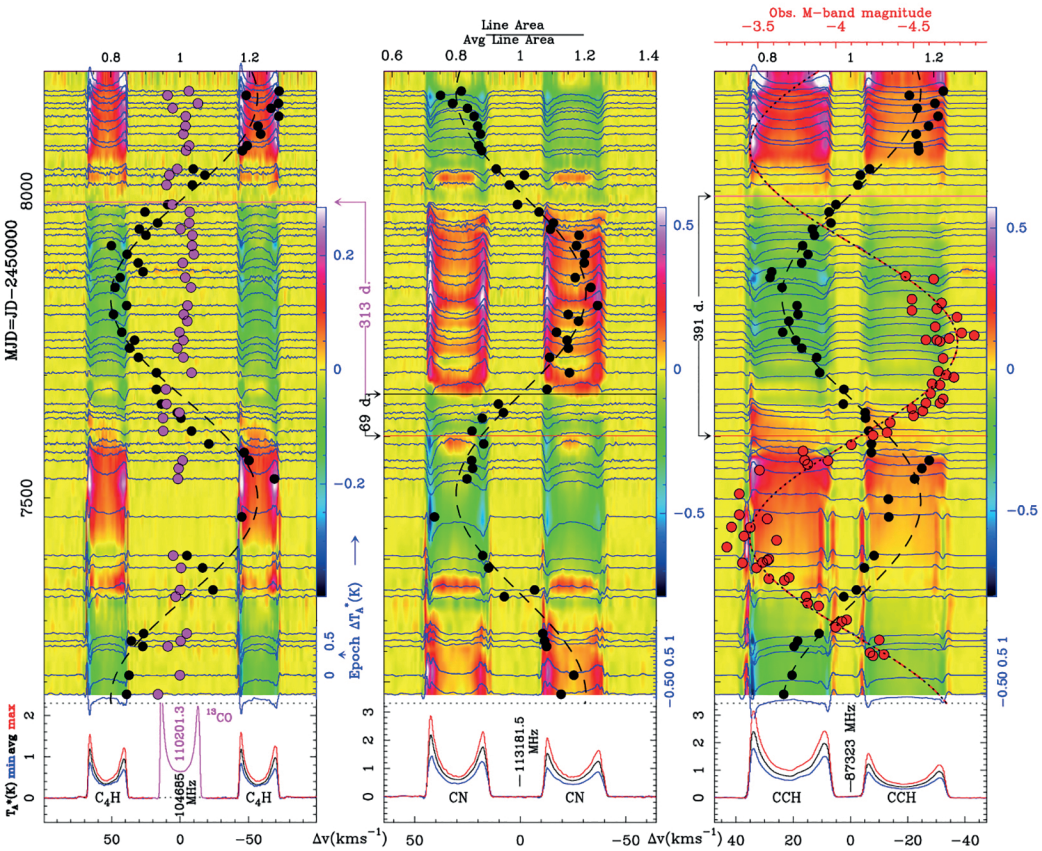
TIME VARIABLE MOLECULAR EMISSION OF THE PROTOTYPICAL AGB STAR IRC+10216

Asymptotic Giant Branch stars (AGBs) are cold stars that have left the Red Giant (RG) stage. These are variable stars with masses similar to the Sun that show winds driven by radial pulsations propagating in the stellar interior. At the tip of the AGB, the winds become very strong and expand to form a circumstellar envelope (CSE) composed of molecular gas and dust grains. The high gas density 10^4-10^{10} cm^{-3} and the low temperatures of 30-3000 K, along with the high abundances of chemical elements produced in the stellar nucleus during its life, favor the development of a rich chemistry. This is the case of IRC+10216, a nearby (130 pc) AGB star where more than 80 different molecules have been found to date.

To analyze the impact of stellar pulsations on the molecular emission of AGB stars, a research group led by Jose Pablo Fonfría (CSIC, Madrid) and Juan Ramón Pardo (CSIC, Madrid) conducted an ambitious time monitoring program of the molecular emission in IRC+10216 with the IRAM 30-meter telescope. The monitoring spanned more than one stellar pulsation period (P = 635 days) with an unusually high average sampling rate of 16 days.

A careful analysis of these observations revealed how the time variations of the stellar emission together with the kinematical properties of the expanding gas affect the molecular emission. The authors found that the emission of some molecules like CO and SiC_2 are not affected but that the lines of some molecules like SiS or CCH are highly variable. The emission of the latter molecules follows the star light-curve but with noticeable time delays and short period irregularities. For instance, the observed SiS lines show delays of 0.2 P while those of CCH are delayed by 0.7 P.

One of the most interesting molecules is SiS, which shows thermal and maser emission. The maser emission is particularly sensitive to the stellar illumination conditions, displaying a time dependence tightly coupled to the light-curve. The shorter period irregularities probably indicate complex excitation conditions driven by the radiative connection existing between different parts of the CSE. The authors expect to have new results soon that may shed more light on the time dependence of the circumstellar gas emission in AGB stars.



Light curves of C_4H, ^{13}CO, CN obtained with the IRAM 30-meter telescope in IRC+10216. Each panel also displays the average spectrum (bottom) through the monitoring, minimum (blue) and maximum (red) spectra. The right panel shows the IR Band M light curve (red-blue dashed sinus curve, red upper X-axis) obtained from fitting data.
Work by Fonfría et al. 2018, ApJ, 860, 162 and Pardo et al. 2018, A&A, 615, L4.

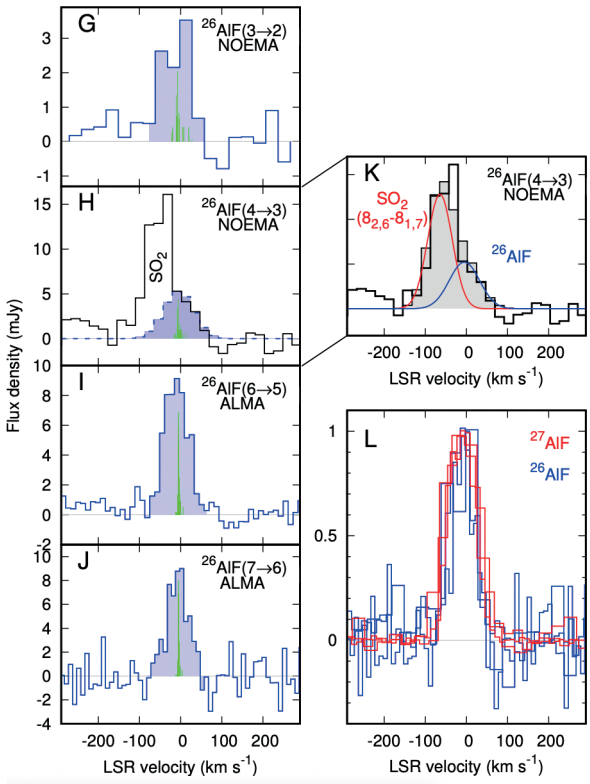
FIRST DETECTION OF A RADIOACTIVE MOLECULE IN INTERSTELLAR SPACE

^{26}Al, an unstable radioactive isotope of aluminum, is a major source of diffuse galactic γ-ray emission at 1.809 MeV. The presence of ^{26}Al in the interstellar medium is known since decades but the origins of the emission have never been directly identified, mainly because of the insufficient angular resolution and sensitivity of the γ-ray observatories.

Tomasz Kamiński (MPIfR, Bonn) and collaborators have now been able to bring in new insights into this issue by using NOEMA, ALMA, the IRAM 30-meter telescope and APEX. The authors report observations of ^{26}AlF, a radioactive isotopologue of aluminum monofluoride toward CK Vul, a remnant of a stellar merger. ^{26}AlF is detected in a small region of the remnant and is likely a chemical effect related to the formation and destruction of AlF. Observations of the AlF molecule in circumstellar media are rare but suggest that AlF forms close to stellar photospheres at relatively high densities. According to the authors, the synthesis of AlF is likely limited by the elemental abundance of fluorine, not aluminum. The remnant can therefore contain other atomic and molecular forms of aluminum, some possibly depleted into dust. Thus, these AlF observations constrain only a lower limit on the content of ^{26}Al in CK Vul. A search of other possible molecular carriers of aluminum like AlCl, AlO, AlOH, and AlCN, has been performed but none of them has been detected, suggesting a small reservoir of Al bearing molecules other than AlF.

With Kamiński's estimates on the ^{26}Al mass in CK Vul, one would need ~1100 mergers like CK Vul going off every year to explain the entire Galactic content of ^{26}Al. This figure is unrealistic as current rates of red novae suggest 1–2 such energetic transients per decade and the rates are probably even lower for eruptions more characteristic of CK Vul. On the other hand, if the mass of ^{26}Al in CK Vul is underestimated by a factor of 1100, objects like CK Vul may be important contributors to the galactic production of this radioactive nuclide.

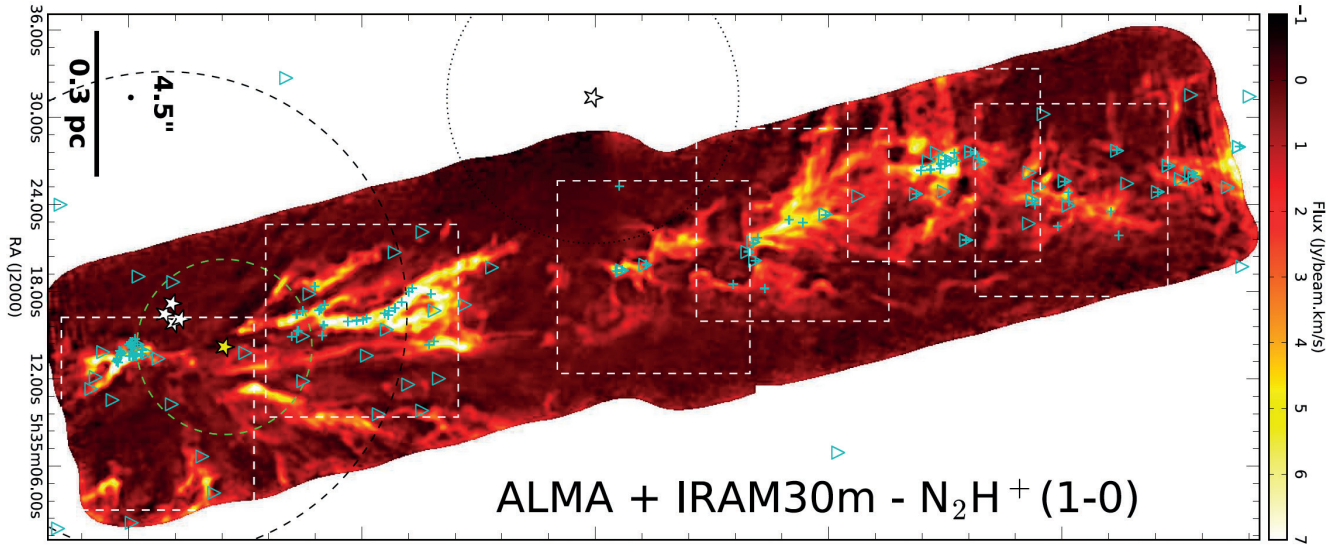
More observations and realistic models of the ionization and chemical structure of the remnant are necessary to investigate this issue further. The constraints on the production of ^{26}Al combined with the estimates on the merger rate make it unlikely that objects similar to CK Vul are major producers of galactic ^{26}Al. However, the observation may be a stepping-stone for unambiguous identification of other galactic sources of ^{26}Al.



Different transitions of ^{26}AlF (left) obtained using the NOEMA and ALMA interferometers. Green vertical lines identify the hyperfine structure of the transitions. The grey shaded area (right) shows the blend of SO_2 and ^{26}Al, and the normalized profiles of the unblended ^{27}AlF (red) and ^{26}AlF (blue) transitions aligned in velocity. Work by Kamiński et al. 2018, Nature, 2, 778.

MULTIPLE FIBERS IN THE HEART OF THE ORION STAR-FORMING REGION

An international team led by Alvaro Hacar (Leiden Observatory) has investigated the formation of stars in the vicinity of the famous Orion Nebula Cluster. Located only 1300 light-years away, Orion is one of the nearest star-forming regions, and the only one containing massive stars. As prototype of its class, the Orion Nebula Cluster is often used as a benchmark to test most current star-formation theories. This new work is part of the ORION-4D project, an ambitious observational program aimed at characterizing the formation mechanisms within this star-forming region.



Total N_2H^+ integrated intensity mosaic obtained by the combination of ALMA 12-meter and IRAM 30-meter data. For reference, the positions of the Trapezium (white stars in OMC-1), the Orion BN source (yellow stars) and the size of the Orion BN/KL explosion (green dashed circle) are shown.
Work by Hacar et al. 2018, A&A, 610, A77.

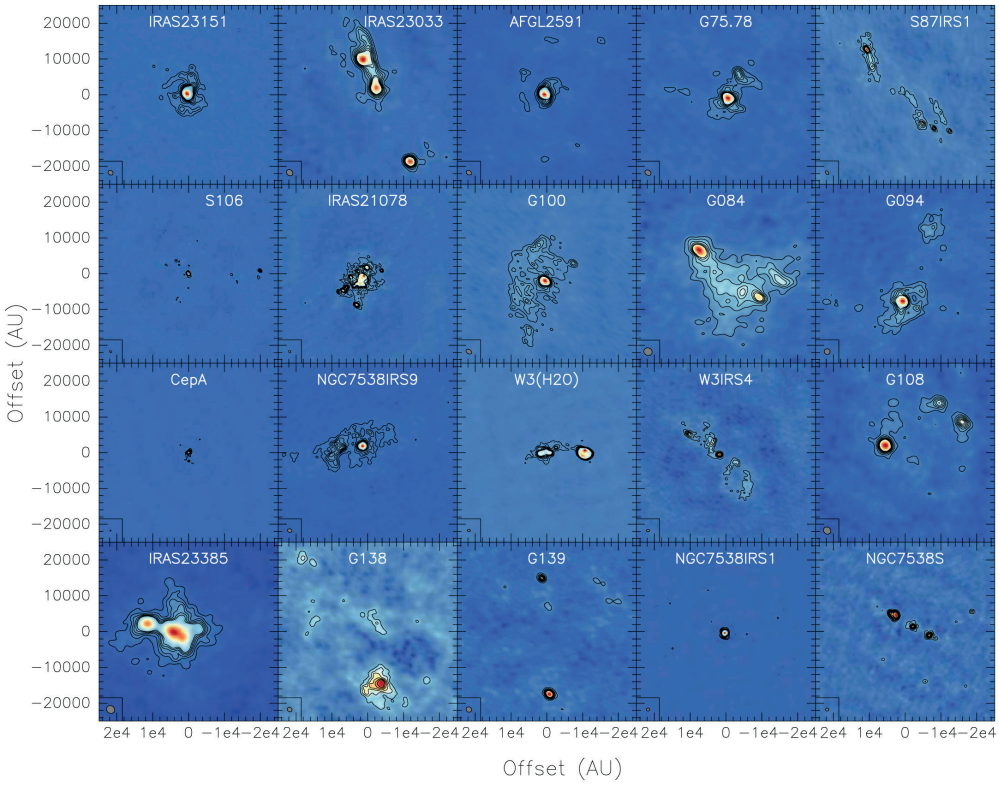
The new study used complementary observations from the IRAM 30-meter telescope in Spain and the ALMA interferometer in Chile. The authors combined the improved resolution provided by ALMA together with the high-sensitivity of the IRAM 30-meter observations to produce one of the largest high-resolution maps obtained so far with this technique. The combined ALMA plus IRAM 30-meter data show that the gaseous material in this star cradle is highly organized forming a wispy network of filamentary structures prior to the formation of stellar embryos. Hacar and collaborators investigated the cold and dense gas in the Orion Nebula Cluster using observations of the emission of diazenylium molecules (N_2H^+) at millimeter wavelengths. This molecular species was used for the study because a large and varying fraction of CO and its isotopologues is frozen on dust grains in these cold, dense filaments and cores. In their analysis, the authors identified a total of 55 dense fiber-like gas structures forming a complex network.

These new results provide crucial information to interpret the formation of both solar-like and massive stars in our Galaxy. Using previous IRAM 30-meter observations, the same team identified similar networks of fibers in more quiescent clouds forming stars in isolation. There, Hacar and collaborators demonstrated that the fragmentation and collapse of these fibers give rise to most of the new solar-like stars. The new detection of fibers in Orion suggests that a similar mechanism operates in the formation of the more massive stars.

INVESTIGATING THE FRAGMENTATION PROPERTIES OF HIGH-MASS STAR FORMING REGIONS

The central questions in high-mass star formation research focus on the fragmentation properties of the initial gas clumps that ultimately result in the final clusters, and the disk formation and accretion processes around the most massive young stars within these clusters. Since high-mass star formation proceeds in a clustered mode at distances mostly of several kpc, and since much of the future evolution is likely to have been set during the earliest and still cold molecular phase, millimeter observations at high-spatial resolution are mandatory to understand how fragmentation processes work and evolve with time.

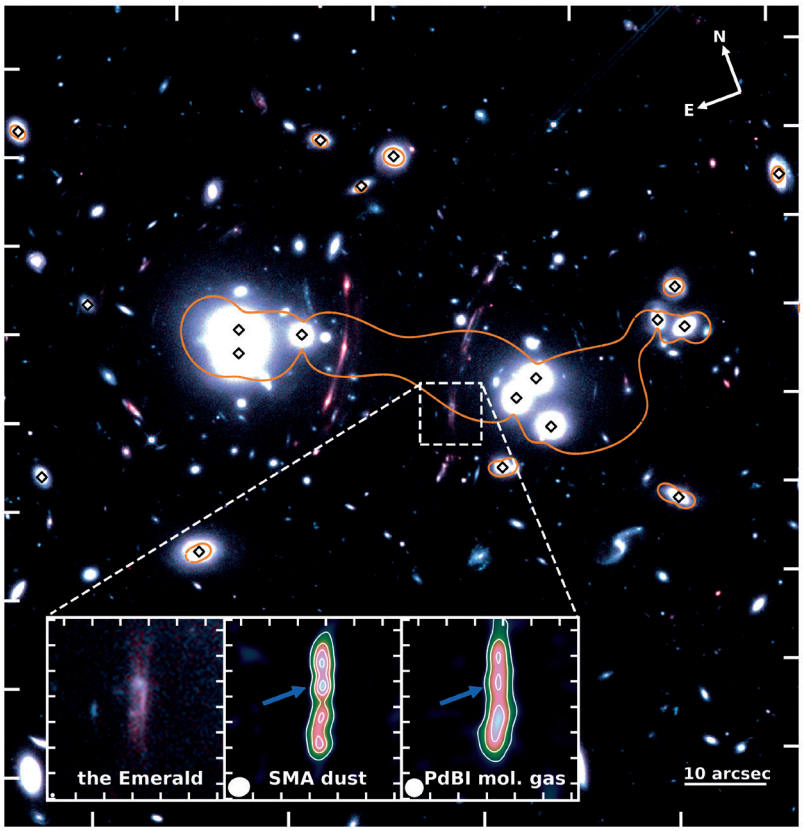
In the frame of CORE, an IRAM Large Program, Henrik Beuther (MPIA, Heidelberg) and collaborators used the NOEMA interferometer to observe a sample of 20 high-mass star-forming regions at high angular resolution (0.3"-0.4") in the 1.37 mm continuum and spectral line emission. The authors observed diverse fragmentation morphologies ranging from regions that are dominated by single high-mass cores to regions that fragment into up to 20 cores. Since the sample contains mainly high-mass protostellar objects, although in different stages of evolution, larger-scale evolutionary effects are unlikely to explain all the differences. The typical nearest neighbor separations peak below the thermal Jeans length determined from estimates of the initial average cloud density, indicating that thermal gravitational fragmentation is sufficient to explain the main observed core separations, and that additional turbulent contributions to the Jeans analysis are not needed for this sample of high-mass star forming regions. The diversity between regions with few or only one fragment versus those with many fragments may be explained by differences in the initial density structures of the maternal gas clumps. Environmental effects like global gas infall from a surrounding envelope potentially cause these differences, so for variations in the initial magnetic field configurations. Since the nearest neighbor separation peaks around NOEMA's spatial resolution limit, it is likely that further fragmentation takes place on even smaller spatial scales. To address such questions, the researchers' plan is to re-observe this sample of star-forming regions with NOEMA as soon as the available baseline lengths are doubled.



1.37 mm continuum images for the 20 high-mass star-forming regions observed with NOEMA in the frame of CORE. Contours are in 5σ. The sources are labeled in each panel, and the synthesized beams are shown at the bottom-left of each panel.
Work by Beuther et al. 2018, A&A, 617, 100.

THE DISCOVERY OF INTRA-CLUMP WINDS IN AN EARLY MASSIVE GALAXY

HST/WFC3 two-color image of PLCK_G165.7+49.0 and the surrounding field of view. The lower inset shows the stellar (left), dust (middle) and molecular (right) emission in "the Emerald". The blue arrow shows the host of the molecular wind arising from an intensely star-forming clump, and detected with the NOEMA observatory.
Work by R. Cañameras, 2018, A&A, 620, A60.



The most massive galaxies experienced their most rapid period of growth when the Universe was only about 20% of its current age. Immense amounts of dust and gas gave rise to veritable fireworks of star formation, which have no peer in the Universe today. Most of these stars formed in giant, gaseous clumps, which were as massive as small galaxies today, but formed stars at rates that were a hundred times greater than those in the entire Milky Way. The relationship of these clumps with their surrounding host galaxies has so far been largely unexplored.

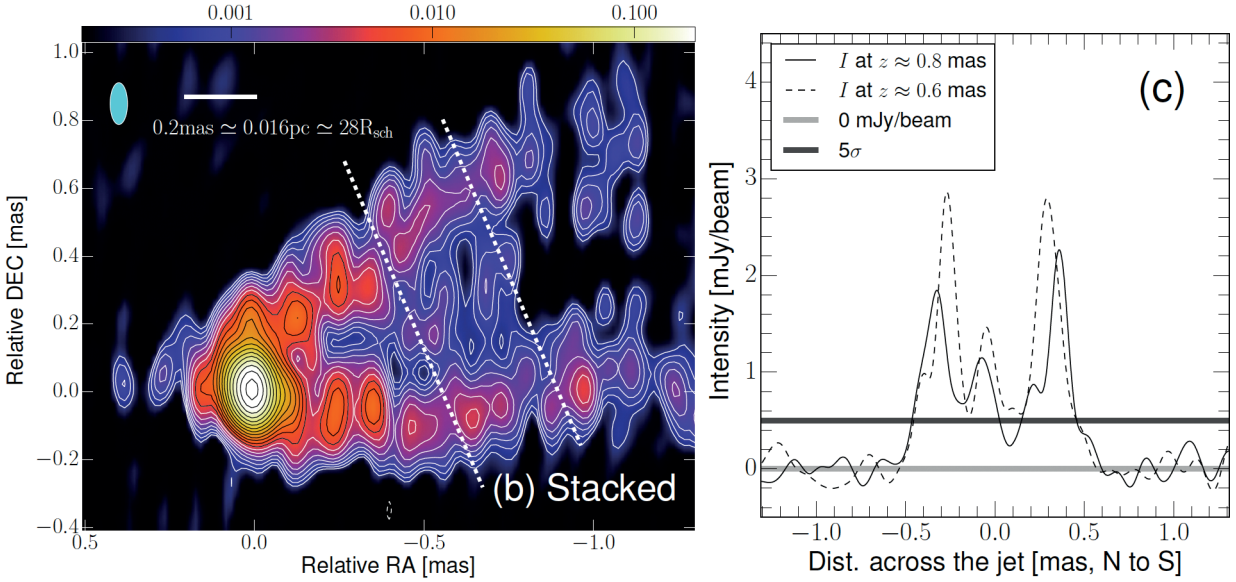
Using the combined capabilities of NOEMA and the IRAM 30-meter telescope, Raoul Cañameras (IAS, Paris) and collaborators report the wind signature from a massive star-forming clump in the strongly gravitationally lensed submillimeter galaxy, "the Emerald" (PLCK_G165.7+49.0) at z=2.236. The researchers witnessed for the first time that these clumps do not form their stars in isolation, but must be in constant gas exchange with their surroundings.

By characterizing the foreground lensing mass distribution, they were able to study the star-forming regions on scales of a few hundred light years. They found that the majority of the star formation is taking place within two massive star-forming clumps which are marginally gravitationally bound and embedded in a 9×10^{10} $M_{\odot}$ fragmented disk with 20% gas fraction. The mass outflow rates were found to be high enough to suspect that one of the clumps might become unbound within a few tens of Myr, unless the outflowing gas can be replenished by gas accretion from the surrounding disk. The velocity offset of –200 km s^{-1} is above the escape velocity of the clump, but not of the galaxy overall, suggesting that much of this material might ultimately rain back onto the galaxy and contribute to fueling subsequent star formation. This suggests that clumps are no long-lasting, separate objects, but temporary structures within a rapidly evolving galaxy.

THE LIMB-BRIGHTENED JET OF M87 DOWN TO 7 SCHWARZSCHILD RADII SCALE

The formation and initial acceleration of relativistic jets in Active Galactic Nuclei (AGN) is still one of the open fundamental questions in modern astrophysics. From a theoretical point of view, there is a general agreement that hot accretion flows spiraling inwards towards central supermassive black holes can produce collimated streams of highly magnetized plasma. Observational constraints on theoretical models are best obtained from imaging of inner jet regions through high resolution VLBI imaging. In this regard and owing to its proximity, the nearby giant elliptical galaxy M87 is an ideal laboratory for the study of jet launching and the coupling of the jet to the accretion flow and the central black hole.

To investigate the physical conditions near the jet base, Jae-Young Kim (MPIfR, Bonn) and collaborators used data at 86 GHz obtained during five Global Millimeter VLBI Array (GMVA) campaigns in the years 2004-2015. These observations provide an angular resolution of ~50 µas, which at the distance of M87 corresponds to a spatial resolution of only 7 Schwarzschild radii (R_s). The authors stacked the images in time to improve sensitivity and better characterize the overall shape of the jet-launching region. The resulting image, which provides the deepest and highest resolution view of the jet structure in M87 to date, reveals an expanding limb-brightened jet emanating from a resolved VLBI core of 8-13 R_s size, and with an apparent opening angle of 127° at the jet base. The observed brightness temperature of the core at any epoch is estimated to 1-3 10^{10} K, which suggests magnetic energy dominates at the jet base. The authors estimate the diameter of the jet at its base to 5 R_s assuming a self-similar jet structure. This suggests that the sheath of the jet may be anchored in the very inner portion of the accretion disk.

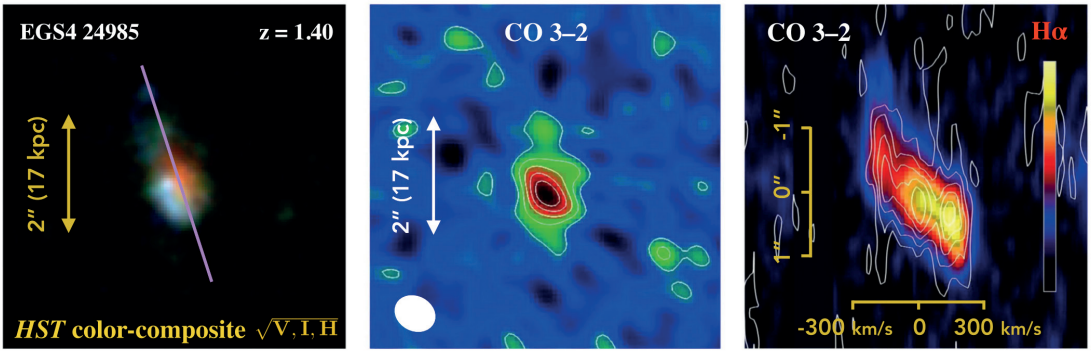


The most sensitive highest-resolution maps of the jet in M87 (left) and transverse intensity profiles (right). The colored wedge indicates total intensities in units of Jy/beam. The white dashed lines (left) denote the position of the slices in the panel (right). The light gray line is the zero intensity level and the dark thick gray line indicates the 5σ-level. Work by Kim et al. 2018, A&A, 616, 188.

LOW DARK MATTER FRACTIONS AT HIGH REDSHIFT CONFIRMED THROUGH MOLECULAR KINEMATICS

The distribution and velocity of gas provides important clues to the dynamical structure of galaxies. Though the dynamical layout of star forming galaxies (SFG) at z<2 is characterized by well-ordered disk rotation, there is also strong evidence from kinematics that massive galaxies at z>1 are baryon-dominated within their half-light radii, in contrast to the lower mass, local SFGs. However, the ionized gas used to measure kinematics at z>0 is often highly turbulent, raising concerns that this gas phase indeed traces the disk rotation. A key question is, therefore, how the kinematics of ionized gas compare with that of neutral or molecular gas, which make up the bulk of the gas mass of star-forming regions.

To challenge the tenet that optical lines originating from relatively unobscured star-forming regions are a good proxy of the overall cold interstellar medium, in terms of distribution and kinematics, a group of researchers led by Hannah Übler (MPE, Garching) used NOEMA to observe EGS 24985, a massive SFG at z=1.4, in the CO (3-2) line. The result of their observations show that the kinematics of the ionized and molecular gas agree well within the uncertainties, and therefore are very likely subject to the same gravitational potential. The researchers best-fitting mass model for the galaxy shows the central region is indeed strongly baryon-dominated with a dark matter fraction of 18% within the half-light radius. This result also is consistent



Left: HST color-composite image of EGS4-24985. The magenta line shows the morphological position angle. Middle: uniformly weighted CO (3–2) image. The white ellipse shows the clean beam. Right: Hα (intensity color scale) and CO (white intensity contours) position–velocity (PV) diagram.
Work by Übler et al. 2018, ApJL, 854, 24.

with the interpretation that the low central dark matter fractions observed during the peak epoch of cosmic star formation rate density might be preserved over the rest of cosmic history, during which massive, high-redshift SFGs evolve into local early-type galaxies.

The agreement of the deep Hα and CO data, especially in the outer disk, helps to alleviate concerns that ionized gas kinematics at high redshift might be unrepresentative of the galaxy kinematics. Future studies with high-quality resolved kinematics traced through multiple gas phases in SFGs at similar redshifts will be important to statistically corroborate this result.

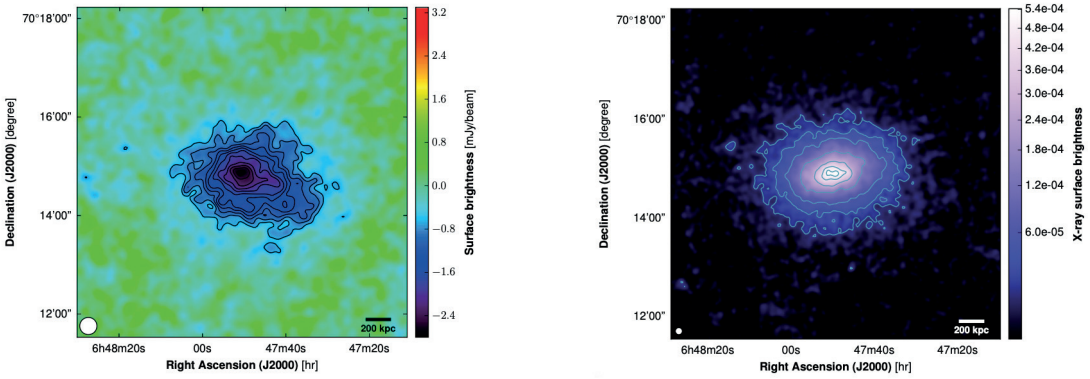
FIRST MAPPING OF THE THERMAL SUNYAEV-ZEL'DOVICH EFFECT WITH NIKA2

The thermal Sunyaev-Zel'dovich (tSZ) effect is known to be a sensitive probe of the electron gas pressure in clusters of galaxies. In very recent years, however, spatially resolved observations of the tSZ effect in combination with X-ray and optical data, have enabled the means to characterize with much higher accuracy the structure and the thermodynamic properties of the clusters of galaxies, and to investigate the tSZ-cluster-mass scaling relation with redshift. To improve understanding on this subject, Florian Ruppin (LPSC, Grenoble) and collaborators envisaged NIKA2 tSZ, an IRAM 30-meter Large Program aimed at characterizing a tSZ-selected sample of 50 clusters in the 0.5 to 0.9 redshift range.

As a direct result of this study, the researchers reported first high angular resolution observations of the tSZ effect towards PSZ2 G144.83+25.11, a galaxy cluster at redshift z=0.58. By combining the NIKA2 observations to previous data obtained with MUSTANG, Bolocam, AMI and Planck, Ruppin and collaborators performed a non-parametric extraction of the pressure profile observed towards the intra-cluster medium, and thereby obtained stringent constraints on the pressure distribution from the center to the outskirts of PSZ2 G144.83+25.11. Their analysis showed that the south-western region of the ICM is characterized by a thermal pressure excess in the electron gas. The presence of local perturbations in the ICM clearly showed that the use of generic 'universal pressure profiles' is most likely not appropriate in many cases, and that high angular resolution data are key for a precise characterization of the cluster pressure profile and the tSZ-mass scaling relation.

The results presented in this study show that over-pressure regions within the ICM are to be expected and that they are likely to induce substantial uncertainties on the estimate of the Compton parameter (Y_{500}). While no conclusion can be drawn from a single cluster, the authors note that their estimate on Y_{500} remains consistent within the uncertainties with the scaling relation established by the Planck Collaboration.

The authors conclude that the high angular resolution capabilities and the large field of view of NIKA2 will help to improve understanding of the impact of hitherto unidentified substructures within the ICM of galaxy clusters on the characterization of both the scaling relation and the universal pressure profile for a representative cluster sample at intermediate and high redshift.



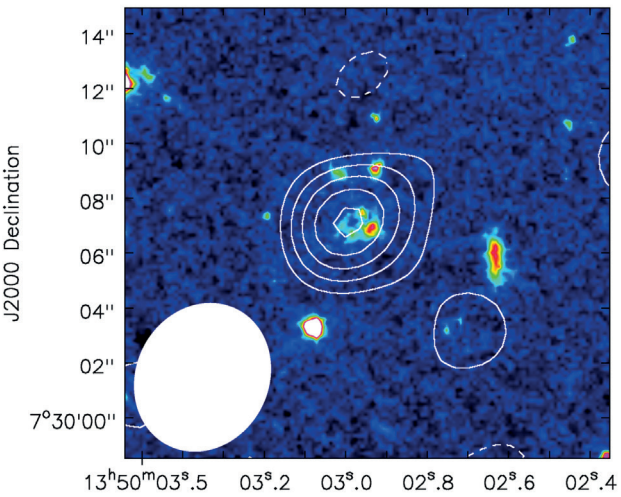
NIKA2 surface brightness map at 150 GHz (left) and XMM-Newton X-ray photon count map (right) towards PSZ2 G144.83+25.11.
Work by Ruppin et al. 2018, A&A, 615, 112.

A MOLECULAR GAS-RICH GRB HOST GALAXY AT THE PEAK OF COSMIC STAR FORMATION

Long-duration gamma-ray bursts (LGRBs) are believed to originate in massive stars. The detectability of these extremely bright and dust-penetrating explosions is independent of the brightness and dust content of their host galaxies. Hence, they provide a unique method for sampling star forming galaxies (SFG) throughout the Universe without a luminosity bias, and thereby are challenging the deepest flux limited galaxy surveys. By contrast, the low success rate in detecting the reservoirs of molecular gas in these galaxies, a strong indicator of star formation activity, shows these SFGs generally have low metallicity. Indeed, of the three LGRB host galaxies detected in molecular lines, all three are reported to be deficient in molecular gas and with short molecular-gas-depletion times, thereby suggesting LGRBs form towards the end of the star formation episodes of their host galaxies.

GRB 080207 at z=2.09 is the very first case of an LGRB event occurred in a highly star-forming (260 $M_{\odot}$/yr) and massive (1.1×10^{11} $M_{\odot}$) galaxy. This event may thus have pinpointed to a young object building its first generations of stars at much higher rate than the field, or an evolved galaxy with rejuvenating star formation from recently accreted pristine gas.

Maryam Arabsalmani (LCEG, Saclay) and collaborators report the detection of the CO (3-2) emission line towards GRB 080207 using NOEMA. This is the first detection of molecular gas in emission from a GRB host galaxy beyond redshift 1. The galaxy appears to be rich in molecular gas, about half the baryonic mass of the galaxy, typical of star-forming galaxies (SFGs) with similar stellar masses and redshifts. The authors measure a molecular gas depletion time-scale of 0.43 Gyr, which is near the peak of the depletion time-scale distribution of SFGs at similar redshifts. These findings are therefore in contradiction with the proposed molecular gas deficiency in galaxies hosting the LGRB event. The authors argue that the molecular gas deficiency reported for other host galaxies could result from an improper use of empirical relations between molecular and atomic gas, and inaccuracies in the estimate of the CO-to-molecular-gas conversion factor for low metallicity galaxies.



The velocity-integrated CO(3-2) map (in contours) overlaid on the HST image of the host galaxy of GRB 080207.
Work by Arabsalmani et al. 2018, MNRAS, 476, 2332.

30-meter Telescope

2018 was a very successful year for the astronomical observations performed with the 30-meter telescope. The EMIR receiver continues to be the most widely used instrument, while the HERA multichannel receiver is used for some selected projects. Observation time with the NIKA2 receiver is constantly increasing. Scientific runs, which have already demonstrated the outstanding capabilities of the instrument, are shared with commissioning sessions which are still necessary for the preparation and fine tuning of new capabilities of the instruments. One such capability is the polarimetry mode which is being commissioned.

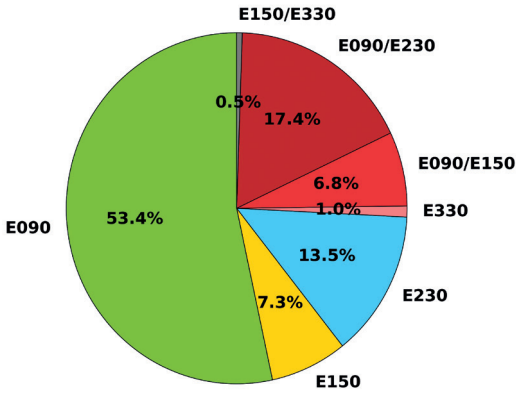
In 2018, the 30-meter telescope was recognized again as one the facilities within the Spanish Map of Singular Scientific and Technical Infrastructures (ICTS). These are large installations, resources, facilities and services that are dedicated to cutting edge research and technological development. This important recognition allows the access to European Union funds for the improvement and development of the facilities. This is particularly important to support the current plans of upgrade of the 30-meter telescope in the areas of servo system and antenna surface.

A major event during 2018 was the meeting of the Visiting Committee in May. After a first meeting in Grenoble, the committee travelled to Spain and visited the IRAM Granada premises and the 30-meter telescope. The feedback from the committee was extremely positive.

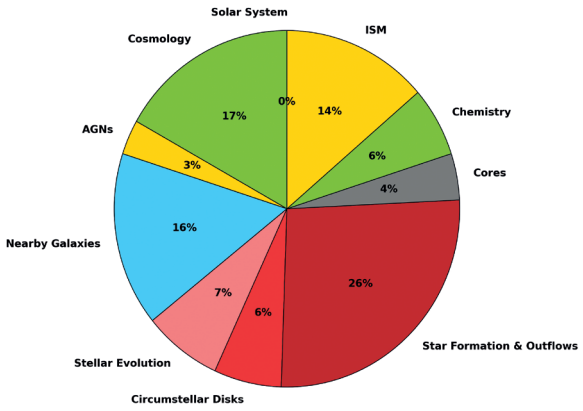
IRAM Visiting Committee at the 30-meter telescope. From left to right: A. Kaufer, R. Kennicutt, C. Mc Kee, L. Page, P. Ho. Missing on the picture: E. van Dishoeck.

ASTRONOMICAL PROJECTS

During the year 2018, a total of 177 projects were observed at the 30-meter telescope. This number includes five large programs with EMIR, three with NIKA2, and six Director's time projects. About 23% of these proposals were scheduled in pool weeks, and 22% of the scheduling units were observed remotely. Galactic topics were addressed by about 63% of the scheduled projects, while 37% were devoted to nearby galaxies and more distant objects. EMIR was used during almost 80% of the observing hours, while HERA was used for 4% of the time, and NIKA2 usage has increased to 17%. During more than half of the EMIR time, its 3mm band E090 was used in single-band mode. The 3mm band was used an additional 24% in dual-band mode, i.e. together with the 2 and 1mm bands E150, E230. The 1mm band E230 was used during 31% of the EMIR time, both in single and double-band mode. During the scheduling year, 181 astronomers visited the telescope to support projects, 64 of which came to support the observing pools. Three groups of master students and their tutors visited the telescope to observe short projects as part of their training courses.



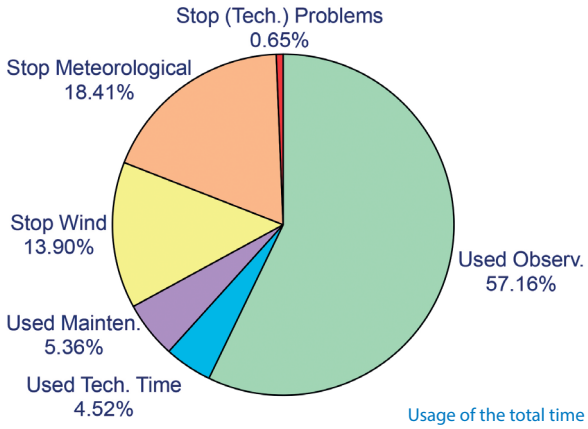
Usage of EMIR bands in 2018.



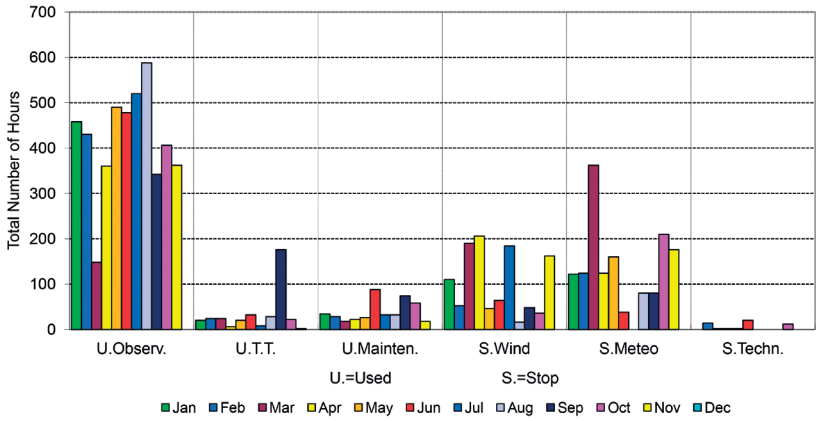
Time distribution of scientific categories observed in 2018.

OBSERVATORY OPERATION

During 2018, 57% of the total available time was allocated to scientific observations with either EMIR, HERA or NIKA2. This fraction is slightly smaller than in previous years, even though the overall time fraction spent in maintenance and technical activities, around 10%, has been reduced. The reason is a larger fraction of time loss due to poor weather conditions, overall 32%. The time loss due to technical problems remains extremely low, less than 1%.



Usage of the total time at the 30-meter telescope.



Monthly time distribution of observing time, technical projects (T.T.), maintenance, time lost due to weather conditions (wind, snow etc.) and technical problems.

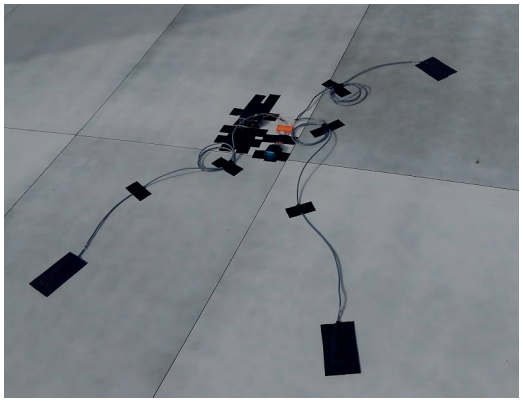
As for previous years, the main activities carried out by the telescope group are related to the daily operation of the observatory, including maintenance of the observatory systems and equipments, troubleshooting of incidences in the operation and repair of faulty equipments.

Additionally, some other activities have been carried out by the telescope group during 2018, as for example the installation of a new maser unit for VLBI observations (iMaser 110, arrived at the observatory in January).

Replacement of fibre cement panels (Eternit) in the 30-meter antenna tower.

Several fibre cement (Eternit) plates covering the antenna tower, broken due to the strong winter storms, have been replaced. Previous analysis of the plates have shown 50 % of asbestos, so the work has been made by a qualified company for this hazardous activity. Temperature measurements of the antenna panels surface have been carried out aiming to quantify the thermal stress daily suffered by the panels. Results are collected in an internal working document. A new program to monitor the wobbler activity, using new software facilities, has been developed by the telescope team. It is now installed and operational. Some modifications have been done in the temperature control of the antenna replacing the glycol quadrupod pump by another one consuming less electrical power, enough for the good temperature control of the legs, but being lighter and therefore easier to replace in case of failure. Modifications of the electrical installation in the computer room have been done to improve the power supply to computers and peripherals. Additionally, new light panels have been installed. A new contract for the supply of electricity to the observatory during the following two years has been signed with the company EDP. Also, a new

contract for the revision and maintenance of the high voltage station at the observatory has been signed with the company Eigra. Five windows of the observatory building broken by strong ice storms have been replaced. The other windows have been revised. The telescope group also collaborated in the preparation of the documentation for the recognition of the 30-meter telescope as an ICTS.

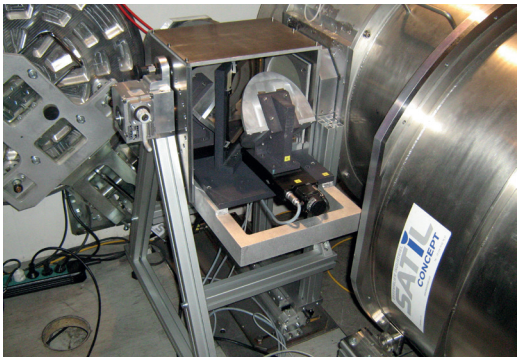


Temperature measurements in the antenna surface.

INSTRUMENTS

NIKA2

Some previous hardware problems are now under much better control. The rotary pump, used for 3He gas circulation, has been replaced by a dry type pump with a low maintenance cycle; in this way, the risk of contamination of the oil in the dilution circuit and oil filter blockage is completely eliminated. The mechanical vibrations induced by the cryogenic pulse tubes seem to be completely canceled and are not seen again after the careful adjustment made almost a year ago. A Martin-Pupplet interferometer (PIMP) has been designed and built in Grenoble. The installation in the telescope in June 2018 allowed, for the first time, to measure the bandpass response of the KID elements. The operation and maintenance of the cryogenic system are now almost entirely in the hands of the local staff. In collaboration with the Neel Institute team, complete documentation on standard cool down and warm-up procedures, as well as more specialized ones, has been prepared.



The Martin-Pupplet interferometer placed in front of the NIKA2 instrument.

EMIR

The multi-band EMIR receiver continues to serve the scientific community almost flawlessly. There were no significant upgrades in the cryostat lately, the main improvements were due to the expansion of the IF band to 4-9 GHz and the replacement of the whole batch of problematic warm IF amplifiers by an in-house designed model.

Future instruments

In preparation for the future installation of two new multibeam systems, the receivers' cabin will have to be reorganized to a large extent. The space between EMIR and HERA, now occupied by VLBI equipment, is already moving to a different area. Space is being prepared for the coming instruments. The 3D model of the receiver's cabin has been updated to help distribute the space that future instruments will occupy.

VLBI

The 30-meter telescope continues to be actively involved in VLBI activities. Two successful campaigns within the Global 3mm VLBI Array (GMVA) were carried out in April and September/October. The 30-meter also participated again in the activities of the Event Horizon Telescope (EHT) at 1.3mm, together with ten other millimeter/submillimeter observatories in North and South America, on Hawaii, the South Pole and on Greenland, but as the only telescope participating in Europe. As in April 2017, the 30-meter observatory participated again successfully in the global April 2018 campaign. Good fringes detected in one of the baselines, the one formed by the 30-meter and ALMA, raise the hope to be able to image the event horizons of the massive black holes in the center of the Milky Way and in M87. A VLBI test at 0.8 mm with few selected observatories, including one NOEMA' antenna, was performed in October. At the end of 2018, data are still analyzed, however it is clear that VLBI at these very short wavelengths is extremely challenging.

Regarding VLBI equipments, the 64Gbps EHT Backend has been fully implemented, including down-converter (2units), R2DBE backend (4units) and Mark6 recorders (4 units). A control computer to manage access to all the EHT backend components, including remote control/monitoring capability has been installed. The splitter/amplifiers needed for the EHT standard (5-9) GHz IF system, compatible with 30-meter standard (4-8) GHz, has been installed and tested. The new Maser model i3000 has been installed, including new coaxial cables for the References (5,10 and 100 MHz) to receivers' Cabin and back-end room. The quality and stability of the new maser was tested in the April Global 3mm session, giving as result fringes of an extraordinary signal-to-noise ratio. Finally, a Pulsar back-end was installed at the 30-meter with the collaboration of the Pulsar Group of MPIfR-Bonn to carry out special observations of pulsars.

Backends

Aside from regular maintenance (mostly replacement of failing power supplies), the cause of occasional lockups of the Wilma correlator was finally found and fixed. Regarding development activities, the design of a barycentric reference was finalized, the implementation was done in Grenoble and the prototype was received towards the end of the year.

The program for the on-board FPGA is now under development. Finally, regarding prospective activities, an evaluation board for a new kind of FPGA featuring built-in high speed ADCs was purchased. A prototype IF processor to adapt these chips to the EMIR IF is in the final design stage; the most critical components for this project have been ordered and delivered.

COMPUTERS & SOFTWARE

2018 has been a busy year for the Granada Computer Group: several upgrades and a number of new developments. The main highlight of the year has been the delivery of an EU-funded 10 Gigabits fibre link between the Spanish academic network, the IRAM Granada offices and the 30-meter telescope site. The fibre link between the observatory and the first access point in the ski resort in Pradollano is redundant (two separate lines) in order to take the difficult access in winter time into consideration. The network equipment at both IRAM locations already makes use of the new fibre link (initially at a speed of 1 Gbps, but being upgraded to 10 Gbps at the time of writing this report -early 2019). The old radio links are left in place as backups. New network equipment has been purchased to establish a high-speed network backbone for critical communication and data transfers.

The infrastructure both at the observatory and the Granada offices has seen some significant improvements as well. New NetApp high-performance storage systems were put into operation as backends of our virtualization infrastructure as well as user and visitor home directories. The virtualization solution

was upgraded to VMWare from OpenNebula gaining in stability and resilience. The first step towards the establishment of a 30-meter telescope data archive was completed with the installation of a 0.5 PB scalable storage system at the observatory. The storage system, based on the DELL / EMC Isilon architecture is easily scalable to accommodate future data growth. A second identical system will be purchased in 2019 in order to create a data mirror in Granada. A new fast server for data analysis based on AMD EPIC processors was purchased and installed. This powerful machine will help scientists in their data processing needs.

Preparation of a much needed refurbishment work of the Granada data center was carried out. Work will be realized in the first quarter of 2019.

Regarding the operations software, PaKo (the observer's user interface to the New Control System) has been adapted to the latest GILDAS version and is now available via the GILDAS repositories. Observers can now download and compile/link PaKo so that they can debug their scripts. There is at present only one version of PaKo for all frontends, namely V2.01. This version has been tested at the 30-meter and it is planned to switch over early 2019. MRTCAL has been in operation for the whole year: few problems have been detected and solved. In addition, some improvements have been implemented in the on-line display: for OTF-maps, the integrated spectrum is now shown if the mouse cursor enters the box of the spectrum being displayed. Finally, regarding the NIKA2 operations software, substantial progress in the on-line generation of IMBFits has been achieved. The produced data have been mirrored to IRAM Grenoble on their new Isilon Storage Server. A first version of the PIIC (formerly MOPSIC) monitor entered operations. The software facilitates a quick look of a OTF-map and reduced pointing and focus scans.

SAFETY

Radon measurements have been carried out at the observatory. Unacceptably high values initially measured in the water room have been corrected with the modification of the draining system. Radon levels at the observatory continue being monitored.

A fire extinguishing training course for the IRAM Granada staff was organized with the Granada fire brigade on June 7th.

Regarding documentation, the official safety documents "Occupational Risk Assessment" and Emergency and Evacuation Plan" have been updated. The latter has been distributed to the staff.

Fire extinguishing training course for the IRAM Granada staff (June 2018).

MISCELLANEOUS

The accumulated data obtained with the tau-meter instrument have allowed the creation of a database of atmospheric transmission in the observatory. A six-year statistical compilation is now available where the summer/winter and day/night variations are quantified. This information will help to schedule future observations / proposals, assigning the best time during the year.

Several civil work activities have been carried out in 2018. At the telescope, the kitchen has been refurbished to meet current hygiene and safety standards. In the observatory bedrooms, the old bathtubs have been replaced by showers, tray and screen. At the Granada offices, the library has been renewed by changing chairs, tables, lighting and replacing the old carpet for a new floor. Books and paper journals that were never used have been packaged and placed in an external store. At the Granada Guest House, bathrooms have been completely refurbished. The renewal of the 30-meter telescope car fleet started in 2018, with the arrival of a new Volkswagen Caddy light van. A second car will be purchased in 2019.

The fifty participants of the 14th European VLBI Network (EVN) Symposium and Users Meeting held in Granada in October 8-11 visited the 30-meter telescope in October, 10th. The event was very successful thanks to the support provided by the IRAM Granada staff.

Attendees to the 14th EVN Symposium & Users' Meeting photographed in front of the 30-meter telescope during the visit held in October, 10th.

NOEMA

The observatory has passed a very important milestone in 2018: the end of NOEMA Phase I. IRAM was engaged for more than five years in the first phase of the NOEMA project, which included the construction of four new antennas, ten wideband millimeter receivers, the PolyFiX correlator, as well as a number of less visible upgrades of key equipment and infrastructure. The installation of PolyFiX in the late 2017 was followed by an extensive commissioning period and regular science operations with nine antennas.

First fringes with antenna 10 were obtained on August 29 towards the Orion maser, and on September 9, first science verification observations were already running on NOEMA with all ten antennas. By the end of September, antenna 10 was performing according to full expectations and was made available for first scientific observations, hence allowing regular astronomical observations with all 10 antennas during the winter semester 2018/2019.

An opening ceremony that marked the full completion of NOEMA Phase I, and the move on to NOEMA Phase II, was held on September 19 at the observatory in the presence of representatives from the IRAM partner organizations and the IRAM visiting committee.

Inauguration of Antenna 10 marking the completion of NOEMA Phase 1 by the IRAM partners. From left to right: Alain Schuhl (CNRS), Markus Schleier (MPG), José Antonio López Fernández (IGN).

The observatory was also preparing in 2018 for the challenges of NOEMA Phase II: (1) construction of antenna 11 for delivery in the spring of 2020, (2) retrofitting the six antennas of the former Plateau de Bure interferometer to bring all antennas to the same technological and operational standards, (3) verification and validation of a new 14-channel water vapor radiometer with improved sensitivity and accuracy to atmospheric phase fluctuations, and (4) the installation of a prototype dual-band receiver on one NOEMA antenna in the summer of 2019. Work in these areas was progressing according to schedule by the end of the year.

OBSERVATIONS

As in previous years, observing conditions were on average very good until the end of April, reasonably good from spring to summer, and excellent toward the end of the year. The interferometer reached its most extended configuration (A) in early February where it was operated with all nine antennas. The antennas were rearranged into the intermediate configuration (C) at the end of March and into the most compact configuration (D) in early May. Observations continued with eight antennas during the antenna maintenance period (May-September) and stopped by early September to take on the commissioning of antenna 10. By early September, this antenna was already included in the array for first science operations.

First work on the retrofitting of antenna 1 started by early October. It achieved completion four weeks later when the antenna was handed over to the commissioning teams. Further work to complete the retrofitting of the antenna will continue in 2019. By the end of November, NOEMA was ready to start regular astronomical observations and to enter the winter semester 2018/2019 with all ten antennas.

Snow groomers clearing the western track on a cold winter evening.

NOEMA operated well throughout the year. As usual, all observations were performed exclusively in the service-observing mode. The combination of high system reliability and lower number of commissioning activities compared to 2017 has resulted in a good scientific productivity. As usual, to maximize the exploitation of best weather conditions and achieve the highest scientific productivity in NOEMA's most extended configuration (A), no technical activities were scheduled during wintertime. The percentage of observing time invested in 2018 on science programs for the user community was on average 47% of the total time, or equivalently, 171 days. An additional 15% were for technical operations and developments: software work, commissioning and science verification operations (8%), installation of new equipment (3%), receiver tunings for user projects (2%), array reconfigurations (2%); the remaining 38% were lost due to weather constraints.

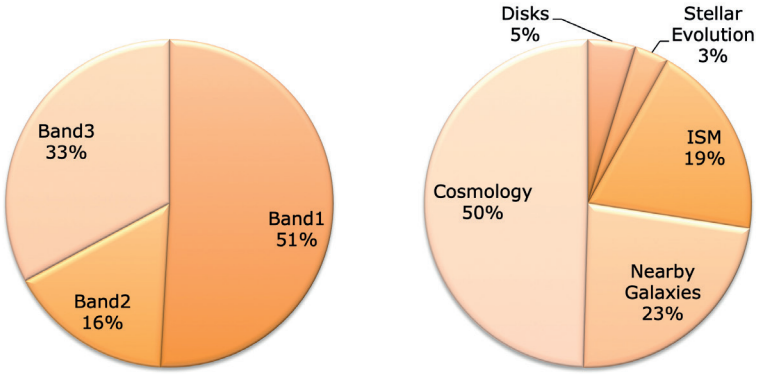
The program committee met twice during the year, around four weeks after the deadlines for the submission of proposals. It reviewed 242 regular proposals (23% more compared to 2017) and recommended 154 of them (27% more). Over the year, NOEMA also received 2 Director's Discretionary Time (DDT) proposals and 7 IRAM internal science demonstration and verification projects. The latter were selected to validate the technical and scientific capabilities of the upgraded NOEMA array, to inform the astronomical community, and to reward efforts and contributions made by the NCSO team.

Including the backlog of projects from 2017, science goals from 119 proposals were scheduled at the NOEMA Observatory, including science from 3 Large Programs, 3 DDT proposals and 6 science demonstration programs. This corresponds to

191 individual sub-projects that received time on the interferometer (12% more compared to 2017). All proposals were submitted and evaluated through PMS, the web-based Proposal Management System. The proposals to which time was granted in the course of the year are listed at the end of the annual report. After a pause from winter 2015 until summer 2018, Large Programs were again accepted for the interferometer starting with the winter 2018/2019 deadline.

Though NOEMA did not participate in the VLBI sessions, it joined in October, in an experimental single-dish mode, an intercontinental 0.8 mm test campaign with SMA, GLT, APEX and the IRAM 30-meter telescope. The aim of the test was to check the phased array capabilities of ALMA at 347 GHz. Further tests with NOEMA are planned, and it is foreseen that the single dish mode will be only an intermediate step to a full phased array mode whose implementation is planned for 2019.

NOEMA continued to provide unique and exciting scientific results and to demonstrate its effectiveness at exploring the interstellar medium in galaxies in the high-redshift Universe. As in previous years, the observing time requested to carry out galactic research was below the level of time requested for extragalactic science. This testifies to the enduring and widespread interest of the extragalactic community, which has been persistently growing over the past years. The largest amount of observing time was invested in the compact and intermediate configurations of the interferometer between spring and autumn. As it was not clear that the characterization and quality of the data obtained with the newly installed PolyFiX would meet the standards expected for full scientific operations, all projects of the winter semester 2017/2018, including A-rated projects, were observed on a best effort basis only. The scientific section of the annual report presents some of the most relevant results obtained in 2018 with the NOEMA interferometer.



Requested observing time by receiver band and science category.

COMMISSIONING WORK

The integration of antenna 10 into the array was the most significant event and the most exciting and intense activity of the NOEMA commissioning and science operations team (NCSO) in 2018. The start of the NCSO phase of antenna 10 began on September 4 with the delivery of the antenna to the commissioning team. The goal of the NCSO team was to take the new antenna from the stage reached at the end of construction to an instrument that meets the science requirements, and to deliver quantitative information in terms of sensitivity, image quality and accuracy. The vast majority of the NCSO investigations are aimed at finding those characteristics that are not within the specifications.

To achieve this objective, the NCSO team ran specific test procedures, carried out measurements and processed data to identify and solve problems in close collaboration with the computing, engineering and construction teams. The NCSO activities include single-antenna verifications such as pointing and tracking, surface accuracy and receiver qualification measurements, and verification of the overall interferometer performance. First images from the commissioning and science verification operations of antenna 10 revealed the power of the new interferometer and helped to identify areas where work had to be done to improve operation. By the end of the year, those efforts have resulted in a

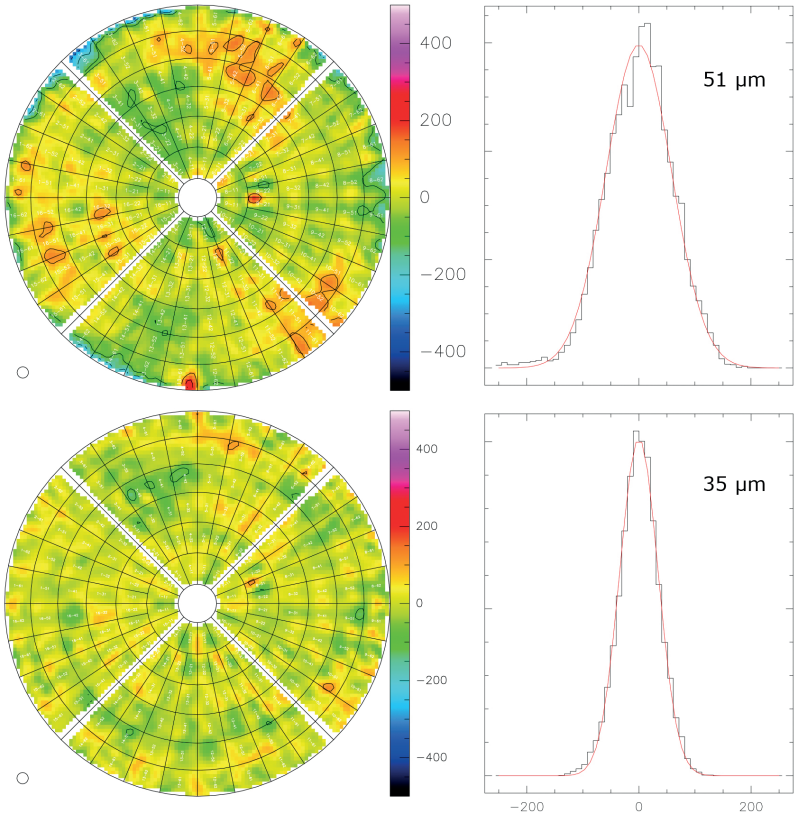
greater awareness of the instrument's capabilities and a much-improved operational performance. Further work on improving the capabilities of NOEMA will continue in 2019.

Results from the commissioning and science verification operations show that antenna 10 is among the best NOEMA antennas. The surface quality of the antenna was improved from 51 µm RMS at delivery to about 35 µm by means of holographic measurements. The surface panels of all other antennas were also readjusted where necessary, and iteratively improved by holographic observations. All in all, the primary surfaces of all antennas are showing excellent mechanical stability over the years, and a median surface RMS better than 40 µm.

Within the scope of the commissioning of antenna 10, work was also necessary to assess the performance of the 2SB receiver in each sideband and polarization, and over the entire 8 GHz IFs. Like for the receivers of the other antennas, noise measurements were performed to identify and correct instability issues and remove losses due to tuning parasites and self-generated interferences. While the noise performance figures were much improved by the end of the year, monitoring is done to proactively correct for performance changes and ensure the highest level of operational reliability for astronomical observations.

The construction of antenna 11, the first antenna in the frame of NOEMA Phase II, is on schedule to be delivered to the NCSO team in April 2020. First science observations with the antenna are planned for summer 2020.

As the NOEMA interferometer has grown to 10 antennas, the 7 dedicated 22 GHz 3-channel water vapor radiometers are used to correct the atmospheric phases of all 10 antennas by copying the data stream of an equipped antenna to the closest neighbor without a radiometer. Work continued on the development of a new multi-channel water vapor radiometer with improved stability and sensitivity to atmospheric phase fluctuations. The first 2nd generation radiometer was installed in November on antenna 8 and is since then undergoing extensive testing and evaluation.



Surface accuracy achieved on antenna 10 since Sep 02, 2018 and after two holography iterations. Left panels: surface RMS; right: surface error distribution relative to the ideal paraboloid.

USER SUPPORT

As in previous years, the NOEMA Science Operations Group (SOG) managed to meet the objectives and overcome organizational and technical development challenges in the NOEMA project. The SOG is part of the Astronomy and Science Support Group, a group of astronomers and software engineers with a wide range of expertise and technical knowledge in millimeter wave astronomy and associated techniques.

One of the central missions of the SOG is to ensure that the NOEMA Observatory provides the users with the means to conduct cutting-edge research. The SOG astronomers regularly act as astronomers on duty to optimize the scientific return of the instrument, directly on the site or remotely from Grenoble. The SOG also provides technical support and expertise on the interferometer to investigators and visiting astronomers for questions related to instrumental performance, observing procedures, data reduction and calibration, pipeline-processing, and archiving of NOEMA data. The SOG interacts with the scientific software development group for developments related to the long-term future of the interferometer, performs the technical reviewing of the science proposals, collaborates with technical groups to ensure that operational requirements are being met, and keeps documentation up to date. Providing the best science data is at the core of the SOG's mission.

Several new features and performance improvements were made on the automated pipeline for the end-to-end processing of science data. The current version of the pipeline produces science ready products for almost every project within less than a couple of hours from the end of an observing track. Much time was also invested on the pipeline to improve the day-to-day monitoring of key performance indicators in order to optimize system performance and prevent technical downtime.

The IRAM headquarters hosts a regular stream of visiting astronomers from all around the world who stay at the institute for periods between a few days and a few months. While most of the visiting astronomers come to calibrate and analyze data from the NOEMA interferometer, some are part of our visiting astronomers program aimed at training research scientists and postgraduate students in interferometry techniques, instrumentation and data reduction, and at strengthening science collaborations. In 2018, advice and assistance was given to 41 investigators from Europe and overseas, visiting IRAM Grenoble for a total of 153 days to reduce and analyze data from the interferometer. Further assistance was provided to astronomers from Observatoire de Paris and University of Michigan for a total of 14 days, to calibrate and analyze 3 NOEMA projects remotely from their home institutes. In total 42 science projects received support and advice. Compared to previous years, and despite a steady increase in support provided to users, the IRAM team was able to assist all users in a very satisfactory way. IRAM astronomers have been leading or collaborating on 42 projects in which they were directly involved.

DATA ARCHIVES

The data headers of observations carried out with the NOEMA and the former Plateau de Bure interferometer are conjointly archived at the CDS, and are available for viewing via the Centre de Données astronomiques de Strasbourg (CDS) search tools. Among other parameters, the archive contains coordinates, on-source integration time, frequencies, observing modes, array configurations, and project identification codes, for observations carried out in the period from December 1991 to September 2017. The archive is updated at the CDS every 6 months (May and October) and with a delay of 12 months from the end of the scheduling semester in which a project was observed in order to keep some pieces of information confidential until that time.

Access to the science data is initially limited to the principal investigators of the observing programs and to their delegates. While the proprietary period of Large Programs is set to end 18 months after the end of the last scheduling semester in which the program was observed, the proprietary period of science data

from standard NOEMA observing programs is set to end 36 months after the end of the last scheduling semester. While a web-based tool will be made available to the user community to access the raw data, no support will be provided in the coming years for the data reduction and analysis.

The IRAM Large Program Archive is the collection point for research carried out at the IRAM observatories in the framework of the Large Programs. The goal is to provide images, data cubes, and calibrated visibility data from the 30-m telescope, NOEMA, and the former Plateau de Bure interferometer. These science-ready products are made available to the astronomical community at the end of the regular data proprietary period. The archive is the result of a joint effort between IRAM, the principal investigators of the Large Programs and their collaborators. The archive is also populated with data from large science programs observed with the Plateau de Bure interferometer.

10TH MILLIMETER INTERFEROMETRY SCHOOL

The Tenth IRAM Millimeter Interferometry School took place from October 1 to 5, 2018, at the IRAM headquarters in Grenoble. The school focused on both theoretical and observational aspects of millimeter interferometry. The program of the school was structured to ground the participants with the fundamentals of millimeter interferometry, provide them with a broad base knowledge of the operation of the NOEMA interferometer and share insights into ongoing and future upgrades. During five days in-house experts delivered lectures and training sessions. An additional session was held on the use of ALMA. Participants had the opportunity to present posters on their own work, discuss results obtained with millimeter facilities, share knowledge, and learn from each other's experience. The school was limited to a total of 65 researchers from Europe and overseas, and welcomed participants from France (21), Germany/ESO (14), Spain (7), China (4), Italy (4), United Kingdom (4), Denmark (3), Hungary (3), Japan (2), India (1), Sweden (1) and Russia (1). The lectures of the Interferometry School and the proceedings from previous Interferometry Schools are available on the IRAM website. The school received financial support from the RadioNet/H2020 initiative of the European Commission. No school fees were charged to participants.

Participants at the 10th Millimeter Interferometry School.

RADIONET TRANSNATIONAL ACCESS

The European Union's Horizon 2020 research program has been reestablished in 2017, and financial support was thus available in 2018 to facilitate access to the NOEMA interferometer for European astronomers from the non-IRAM partner countries. The financial support is provided to cover expenses of astronomers visiting IRAM headquarters (Grenoble) to calibrate and reduce data from the NOEMA interferometer. For the year 2018, the IRAM Program Committee recommended 21 European-led eligible proposals for observations with the NOEMA interferometer. Taking into account proposals accepted in 2017 but continued in 2018, time was allocated to 5 eligible proposals corresponding to a total of 78 hours of observing time.

User responses to questionnaires of the European Commission show that IRAM continues to maintain an excellent reputation concerning the assistance and service given by scientists and support staff to visiting astronomers.

ANTENNAS MAINTENANCE AND CONSTRUCTION

As in previous years, maintenances were carried out jointly with the construction of the new NOEMA antennas.

21 weeks were devoted to the curative and preventive maintenance of the 9 available antennas, which were successively moved into the maintenance hall (in the order A1-A4-A3-A2-A5-A6-A7-A8-A9) for a period of 2 to 3 weeks each, depending on their specific needs.

As every year, the antennas have been carefully revised by the technical teams, both on electro-technical (maintenance and upgrade of control system) and mechanical (motorization, sealing…) aspects.

After this period of maintenance, an important upgrade ("retrofit") of Antenna 1 has been performed, with a new "quadrupode + hexapode" system being installed. This rather complex operation was successfully carried out by the technical staff on site, over a period of 4 weeks.

The construction of Antenna 10 was completed on June 14th when it successfully joined the interferometer for its first tests. The construction of Antenna 11 started immediately after.

Antenna 10 (left) and start of construction of Antenna 11 (right).

DEVELOPMENT AND MAINTENANCE OF THE SITE

East-West Track extension

2018 was dedicated to the completion and validation by the administrative authorities *(Préfecture)* of the environmental file. The investigation of the case led to the formal authorization to start the works on the Plateau de Bure, with some compensatory measures, as usual for such installation on high mountain sites.

The compensatory measures were immediately implemented in order to guarantee the start of the works as rapidly as possible. A first survey ORCHAMP *(Observatoire des Relations Climat-Homme-milieux Agrosylvopastoraux du Massif alPin)* was conducted along the snowfields of the Plateau de Bure, with a complete inventory of animal and vegetal species, as well as a collection of DNA samples along a line starting from the Plateau de Bure, down to the base of the Plateau 1000 meters below.

Poa Glauca plant.

Similarly, it was decided to move out of the endangered area samples of "Poa Glauca", a protected grass which grows on the area where the track extension will be built. The grass is now monitored in order to check its ability to recolonize the new site where it has been moved.

It was decided to realize a new model of the Plateau de Bure using photogrammetry. Thanks to this new method, a more precise technical and financial estimate of the excavation works will be made possible and used for the calls for tender. A measurement campaign led to a model covering the entire NOEMA site with high accuracy (250 million pixels with an altimetry accuracy < 10 cm).

Maintenance of the antennas stations

The drains of the antenna stations allow ensuring that the water which infiltrates into the central part of the stations is correctly evacuated. The accumulation of deposits brought by the rains and the melting of the snow gradually plug the drains which are then no longer able to play their protective role. After observing accumulations of water in some stations, 5 of them underwent a drilling of the bottom slab. These drillings, 10 meters deep, reached fractured zones of the rock forming the base of the stations and thus enabled to correct the problem.

Lower station buildings

The study aiming at modifying and closing the old lower station of the cable-car continued this year and resulted in a combined solution, creating:

- A 320 m^2 storage area for IRAM equipment.
- A 160 m^2 workshop area, to cover the needs for the cable car operation.
- A 110 m^2 office area / waiting room for the IRAM staff.

The construction permit was obtained in December 2018. The tender documents are being prepared and the call for tenders is scheduled to be issued in Spring 2019.

Thermal study, Correlator Room

The deployment of new equipment for NOEMA (Polyfix correlator, Isilon Data Servers, Polyfix 2 in the future) and the increase of the activity considerably boosts the power consumption of the Correlator Room. Ultimately, it is expected to move from a consumption of 13kW before NOEMA Phase 1 to an estimated consumption of more than 40kW.

It is therefore critical to improve the air conditioning system of the correlator room, which currently can absorb at best 20 kW of dissipated power. A complete thermal study of the room and its hot spots was thus started end of 2018, in order to better determine modifications and improvements to be made in this room and to find ways to optimize the energy consumption. The result is expected for the first quarter of 2019.

Restoration work of the Control room

After more than 30 years of service, it was decided to redesign and refurbish the interferometer control room. The wall coverings and furniture are aging and the permanent activity of the antennas maintenance hall, in the vicinity of this central room, requires redesigning this room.

A complete ergonomic investigation of the control room was performed. Following this study and the inputs from the array operators, a call for tenders is scheduled for Spring 2019, and start of works is foreseen during the summer.

MISCELLANEOUS

Site access

The area between the ski station and the observatory is critical for IRAM. It hosts the pedestrian access for IRAM staff while the cable-car is not in operation. In addition, both the electrical cables providing the energy needed for the observatory operations and the fiber optic cables necessary for communication and data transfer go through this area, which is therefore a true "umbilical cord" for NOEMA operation.

Threatened by significant rock instabilities, *"La Fenêtre"* was purged to ensure the safety of people and facilities. Hazardous areas were mined in May 2018 (under municipal project management, with a financial contribution from IRAM), the pedestrian route was re-cut so as to allow easy access to NOEMA for the staff, and the entire path was then equipped with handrails to ensure increased safety during trips that occur in both summer and winter.

New path across *"La Fenêtre"* passage.

Purchase of a 4x4 tracked vehicle

4 wheels Traxter vehicule, with its classical wheels.

As the distances to be driven under any type of weather will increase in the near future due to the extension of the East-West tracks, a new 4-wheels vehicle was purchased in order to replace the aging Mazda car available on site. The new means of transport (Traxter Can-Am HD10-Pro), lighter than a classical 4 wheels pickup, can be used both in summer and winter, either with 4 standard wheels, or with its tracked system.

SECURITY

In cooperation with the Fire & Rescue Department of Gap SDIS *(Service Départemental d'Incendie et de Secours des Hautes-Alpes),* rescue exercises were carried out with the 3 NOEMA teams.

3 groups of 7 people were formed during a 2-day training focused on the rescue and evacuation of an injured person.

In case of a real accident, the first objective for the NOEMA staff is to be extremely reactive for first aid; this requires an excellent knowledge of the whole rescue equipment available in the Observatory.

It is highly important for the SDIS to have a good knowledge of the available equipment and to regularly train the staff to use it at best.

Other security exercises like fire extinguishing or evacuations are regularly performed throughout the year at the NOEMA observatory.

SDIS and IRAM team in the NOEMA first-aid room.

Exercise transport of an injured person in the IRAM infirmary.

Credit: Robert Hunter

Backend Group

THE POLYFIX DIGITAL CORRELATOR

After more than 12 months of operation, The PolyFiX correlator system has provided full support for 10 antennas with a good reliability (only 4 boards changed out of 220, with 24 Hours/365 Days operations).

In order to reinforce the design robustness, to consolidate FPGA timings and enhance system monitoring, some modifications have been introduced into the firmware (FW). This has been the opportunity to make the very first use of the remote programming sub-system which was developed in view of performing remote upgrades of the firmware running into the numerous PolyFiX FPGAs.

These FW changes have also paved the way toward the future introduction of new operation modes, in particular Phased-Array VLBI & 250KHz resolution modes. These developments should ramp up by next year.

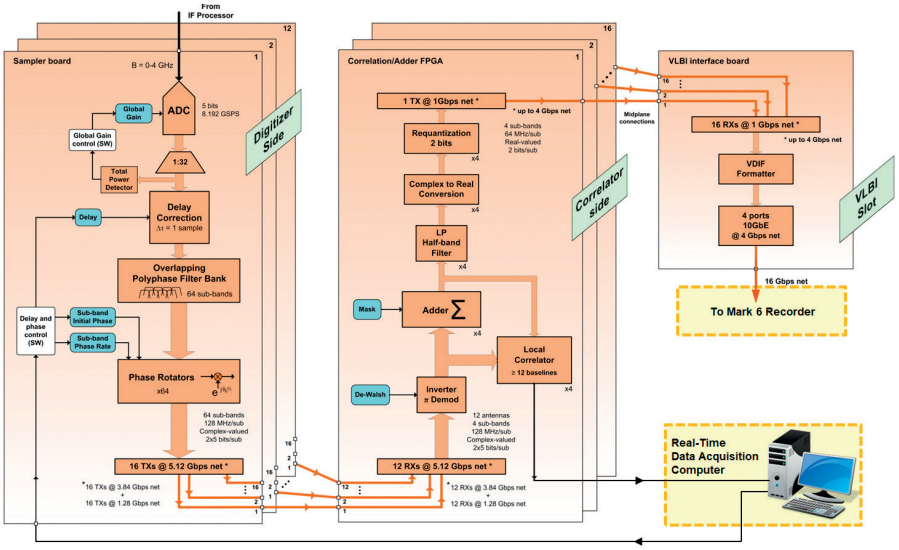
In parallel, a reinforcement of the air cooling system has been tested to get a more homogeneous temperature distribution within the different cabinets of PolyFiX. It will be installed during the 2019 summer period together with a cold aisle designed to accommodate the future second correlator system aimed at dual-band observations.

VLBI WITH NOEMA

With the installation of PolyFiX, NOEMA had lost its ability to participate to the GMVA and EHT VLBI campaigns. Re-enabling a VLBI mode with NOEMA is a priority, and new development started early 2018 for that purpose.

The first development is a mode of operation called "phased array". In fact, to take full advantage of the collecting area of the current ten 15-meter antennas (twelve in a near future), the received signals from each antenna have to be "phased"

prior to summation. This requires the geometrical, instrumental and atmospheric delays to be corrected in real-time so that the maximum sensitivity can be reached. These operations will be performed in the PolyFiX digitizer and correlator cards thanks to a new set of complex firmware.

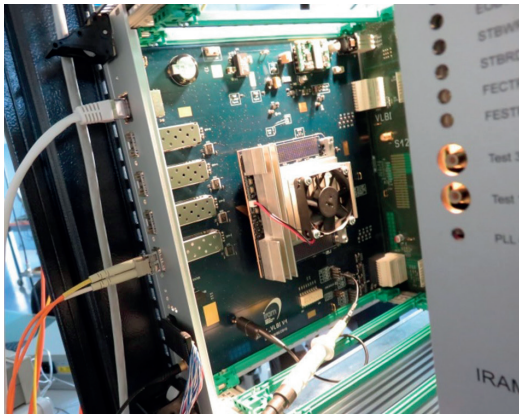


Block diagram of a PolyFiX unit configured as a "beamforming" unit (VLBI mode).

Once the digital samples have been coherently summed and filtered, they have to be formatted into VLBI standard digital frames for transmission to a Mark6 high-speed recorder, and further off-line processing in a correlation facility (MIT Haystack in Westford or MPIfR in Bonn). This formatting operation will be carried out by a VLBI formatter board, which hardware and firmware design started by mid-2018. Very-high data rates are involved: 16x 1Gbps in, 2x 8Gbps out and possibly up to 16x4Gbps in, 4x 16Gbps out to support future evolution of the Mark6 sustained recording rate.

Pending the end of the phased-array mode development, it was decided to start a parallel development to enable NOEMA to run as a VLBI single-dish station. To support broadband VLBI observations over 2x4GHz with 2 polarizations (64Gbps aggregate recording rate), 4 Mark6 recorders have been purchased together with several "Roach 2" digital backends (R2DBE) to allow fast deployment of the single-dish VLBI capability. A first test of the single-dish VLBI system was conducted in October during a VLBI test session at 345GHz frequency.

All of this ongoing work is supported by the Black Hole Cam (BHC) European ERC-funded consortium and is part of the Event Horizon Telescope (EHT) project.



Left: A 2GHz two polar VLBI setup under lab test.

Right: The VLBI formatter board under test into the PolyFiX unit. (10GbE data link to the Mark6 through SFP+ optical transceivers on front, Intel Arria10 FPGA at the center of the board).

OPTICAL TRANSPORT OF THE PHASE REFERENCE

With the interferometer's future extended baselines, the LO reference of the antenna receiver will have to be transported from the central building over nearly 2 km. Over such a distance, the currently operating LO transport system would have to be deeply reshaped to compensate for the attenuation of the coax cable media ending up to the farthest antenna stations. Time has come to go over an optical fiber media that will break up this distance barrier.

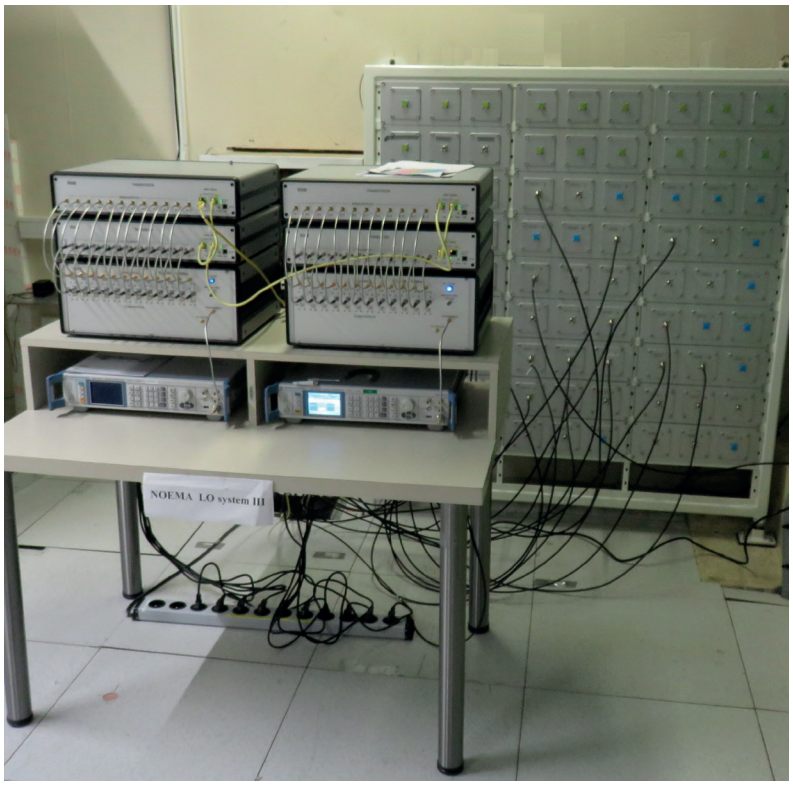
Several analog optical transceiver products have been selected and a 10^{-2} degree phase resolution measurement unit has been built for lab and on-site system evaluation

First tests in lab have shown suitable performances with a mono wavelength bidirectional transmission system. The power levels driving the RF input of the laser transmitter must be carefully controlled within a tight range to avoid phase noise degradation resulting from AM to PM noise conversion. For this purpose, an automatic level control (ALC) circuit has been implemented.

To determine whether the round-trip control system can compensate for the phase variations due to alternation of day and night temperatures, but also due to the cable bending within the antenna cable roller during antenna source tracking, an on-site measurement campaign is currently being prepared.

INSTALLATION OF THE NEW PATCH PANEL FOR HiQ CABLES

In order to improve connection reliability and facilitate the regular changes in the antenna array configuration, the installation of a new HiQ cable patch panel has been finalized in April 2018. It is now located in the correlator room, next to the control room from where operators are setting up the changes in the antenna array configuration. They can thus interact much more quickly in case of a connection issue.



View of the NOEMA LO Control System (foreground) connected to the HiQ coax cable patch panel (background).

Frontend Group

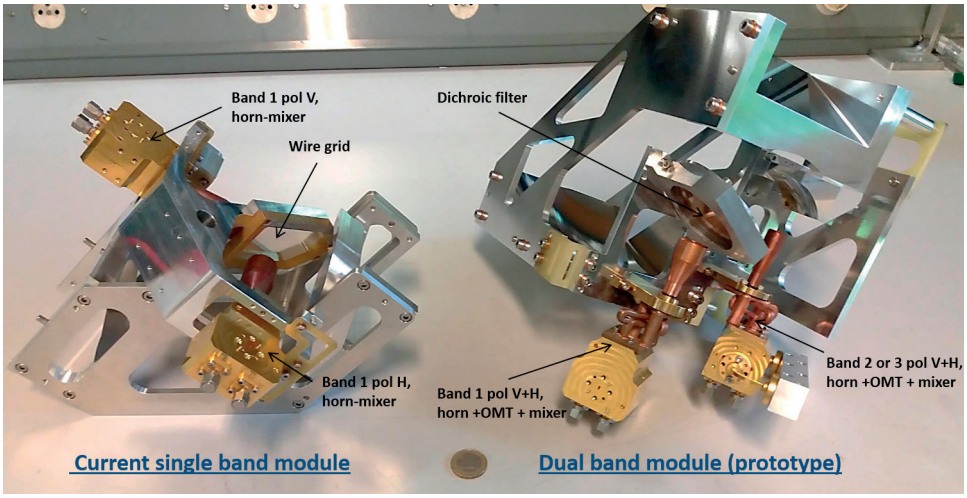
NOEMA RECEIVERS

An additional receiver was fully assembled, tested and installed on the 10th NOEMA antenna in June 2018 with excellent performance. The assembly and integration also started for the 11th antenna receiver.

In parallel, continuous receiver upgrades are ongoing. A new generation of YIG-based local oscillators is being finalized to replace the aging Gunn-oscillator technology. Also, a new generation EtherCat-based electronics card to control the SIS junction biases was finalized and successfully validated with the receiver on the 10th antenna, showing improved performance. All of the older model bias modules will be replaced in 2019.

DUAL-BAND NOEMA RECEIVERS

The next step for NOEMA will be to gain capabilities to observe simultaneously with two receiver bands. The receiver optics have to be modified in order to ensure that the two selected bands are looking at the same position in the sky. Design studies and fabrication have started to investigate the different possibilities to perform the frequency separation, at ambient or at cryogenic temperature, using fixed or movable optics. Several prototypes have been manufactured and the first tests are scheduled to be performed by mid-2019 on one NOEMA antenna.



The left module shows the current NOEMA band 1 cryogenic module. The right module shows a possible configuration for bands 1 and 2 using a dichroic filter and OMTs for polarization separation.

NOEMA WATER VAPOR RADIOMETERS

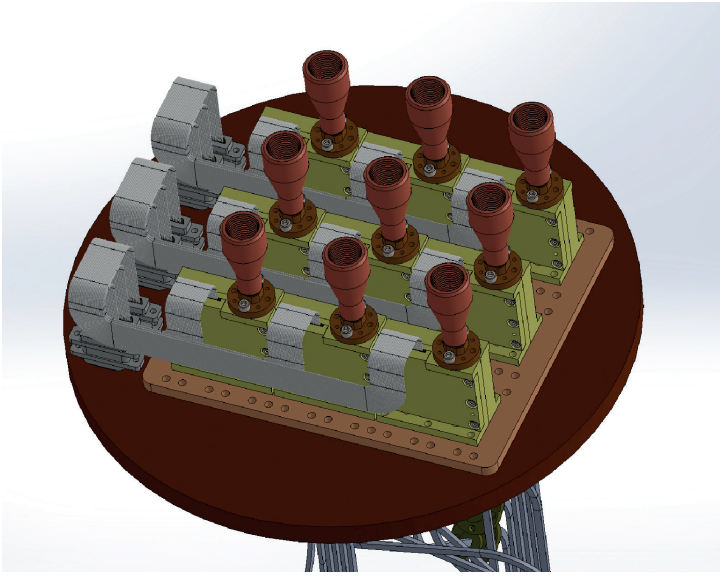
Water Vapor Radiometers (WVR) are a central element in the phase calibration process of the array. For the NOEMA project, a prototype of a new WVR centered at 22 GHz has been assembled and fully characterized in the laboratory in 2018. Its main improvement compared to the previous generation is having 14 channels instead of 3, to better sample the atmospheric water line, allowing a more precise derivation of the phase offsets introduced on the signal by the water line. This phase offset is then corrected in real-time by the correlator system. The prototype WVR was installed on site (NOEMA antenna 8) in December 2018 for final evaluation. If successful, a series production will be started in order to equip all current and future 12 NOEMA antennas with 2nd new generation WVRs.

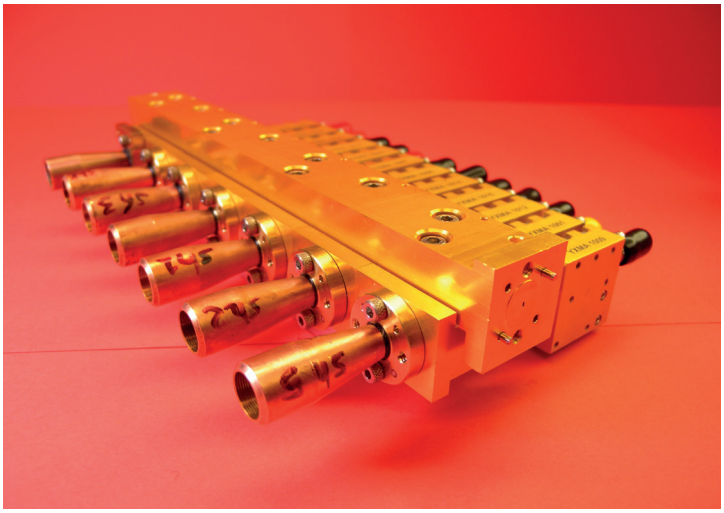
PHASE MONITORING PROJECT

This project done in close collaboration with the SMA group from the Center for Astrophysics (Harvard, USA), aims at providing a permanent monitoring system of the atmospheric conditions at the NOEMA interferometer. This system would make observations more efficient, for example by being able to choose the optimum observing band right away and/or anticipate on whether to start or stop observing. The system demonstrator is based on a dual off- axis aluminum satellite dishes interferometer that receives a broadband signal at 11.85 GHz from a geostationary satellite. After signal processing, it provides as final output an estimate of the atmospheric phase front distortion (experienced at the same time by the NOEMA interferometer). After initial tests carried out on the roof of IRAM Grenoble headquarters, the system was moved to the observatory to make first onsite data acquisition at the end of October 2018, with very promising results. Possible next steps would be the implementation of a permanent system with 3 antennas and prepare the infrastructure on-site.

View of one of the two small commercial satellite dishes used for the phase monitoring project, installed at the Plateau de Bure, next to one of the NOEMA antennas.

AETHRA RADIONET





As part of the European Union's Horizon 2020 funded program RadioNet, IRAM is heavily involved in the Joint Research Activity (JRA) AETHRA (Advanced European Technologies for Heterodyne Receivers for Astronomy), which gathers research and development activities in more than 10 leading institutes across Europe in the field of sub-mm receiver technologies. AETHRA started in 2017 for a 3-year duration period. IRAM is specifically working on two projects:

• Development of a receiver using direct amplifiers (LNAs) in the 67-116 GHz frequency range for a small size array.

• Prototyping of a multi-beam receiving system at 230 GHz, with mixers, amplifiers, and LO distribution mechanical blocks integrated in the most compact geometry. First testing was performed in 2018 with the goal of integrating it into a cryostat and testing it at the 30-meter telescope in 2020.

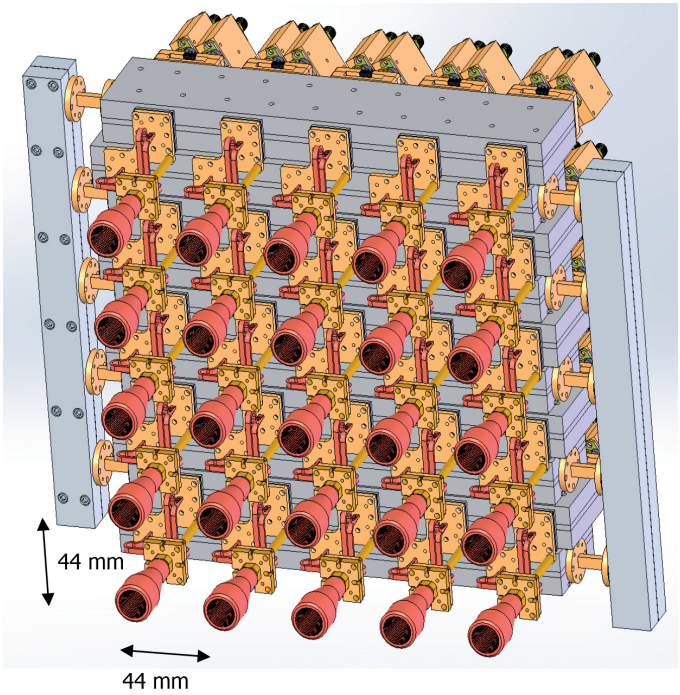
Both projects are very ambitious and are paving the way for future developments, in particular for the 100 GHz and 230 GHz multi-beam arrays to be installed at Pico Veleta.

Task 1: Proposed design to build a small 3x3 3mm array using LNAs for the 67-115 GHz band.
Task 2: Prototype for a 1x7 pixel arrays based on 2SB SIS mixers, for the 210-270 GHz band.

MULTIBEAM ARRAYS

Two large multibeam arrays are planned for the Pico Veleta 30-meter telescope. The 3 mm band, dual polarization, array will include 5x5 pixels per polarization. Mixers will be of the latest IRAM 2SB SIS mixer technology, with all integrated components, using orthomode transducers to separate polarization, and with cryogenic amplifiers directly connected to the SIS mixers without the need of using cryogenic isolators. The multibeam array at 1.3 mm will be the successor of HERA, and will have 7x7 pixels, dual polarization 2SB SIS mixers, with a similar highly integrated design as the 3mm array. Polarization splitting will be performed by a grid. Progress was done in 2018 in the optics and cryogenic designs and first measurements of a 1x7 sub-array at 230 GHz demonstrated already very promising results (done in the AETHRA framework).

Possible implementation for the dual polarization 5x5 pixels for the 3mm band. Orthomode transducers are used to separate polarization.



OPERATIONS SUPPORT

In addition to the design and construction of the previously described receiving systems, the IRAM Frontend Group is also responsible for the maintenance and repairs of the receivers installed on both NOEMA and the 30-m telescope.

As NOEMA has now 10 operational antennas, this translates into an increased continuous effort, involving several interventions on site, a critical task to support smooth operations of the observatories.

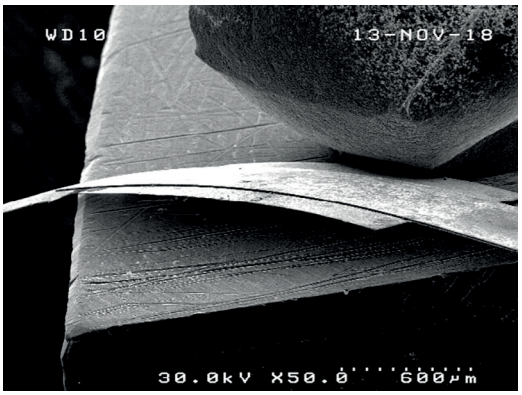
Superconducting Devices Group

The work of the Superconducting Devices Group has focused around the three main themes: SIS junction devices, KID development, and other nanofabricated microwave components. As in 2017, this year the group has been able to invest part of its resources in research and development projects, while preparing for future demands for production that will start in 2019. This has resulted in several exciting new results.

NEW WAFER DICER

January 2018 marked the arrival of a new wafer dicer. This machine replaces an old machine that has been of good service for more than 25 years, but could not be serviced anymore. Among the many new options of the new machine, the group benefits most from the possibility to do automatic alignment of wafers, significantly reducing the overhead time.

SIS JUNCTIONS ON 10 MICROMETER THICK SILICON

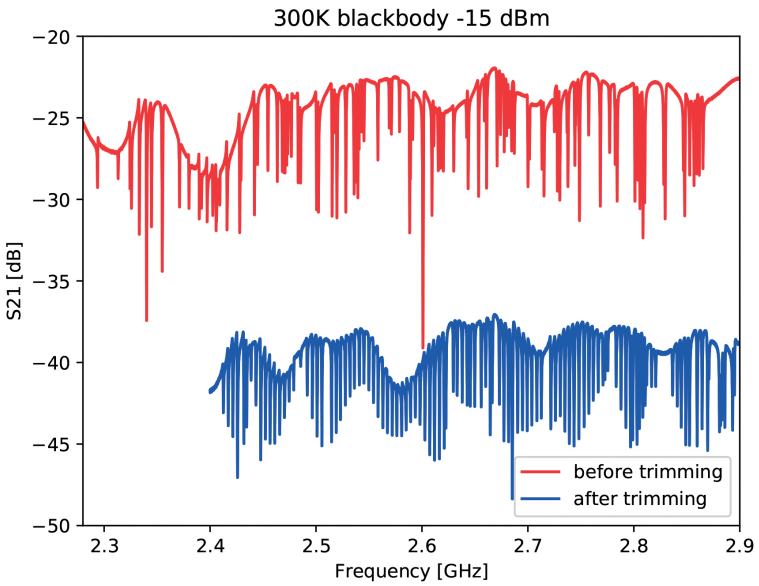


Scanning Electron Micrograph of the back side of a 10 micrometer thick silicon SIS junction fabricated using newly developed SOI technology. The gold plated beam leads are seen to extend beyond the silicon chip and facilitate the packaging of the device.

The major research focus for the Superconducting Devices Group in 2018 has been the development of SIS junction technology on 10 micrometer thick silicon substrates. This new technology, based on silicon-on-insulator technology, has several advantages over the classical approach, most importantly the possibility to design junctions with a wider IF bandwidth, and the use of beam lead technology for advanced packaging, and in the future advanced integration of functionality on chip. First devices have been produced (see image), and are currently being tested. This development will continue at full speed in 2019.

IMPROVED MULTIPLEXING OF KINETIC INDUCTANCE DETECTORS

For long, frequency scatter of large Kinetic Inductance Detector arrays, due to fabrication inhomogeneity, has been a major problem. A non-uniform frequency distribution, such as shown in the figure, needs a larger readout bandwidth, gives rise to pixel loss due to cross talk, and instabilities at different sky loads. After a first successful demonstration at NIST in 2017, we have adapted a post-processing step of a KID array, which allows us to precisely tune the resonance frequency of each individual pixel, recovering 97% of all pixels as usable. The process has been shown on a prototype array, and will be used in 2019 to produce telescope-ready arrays for the NIKA2 1.2 mm band.



Frequency scan of a prototype kinetic-inductance detector array, before (red) and after (blue) post-processing. Each spike corresponds to a single detector. The adaptation leads to a more compact and more uniform detector spacing, which will facilitate science operation of such an array.

OTHER DEVELOPMENT

Besides the major developments outlined above, the group has advanced on several other important development projects, ranging from dichroic filters, to flat silicon optics, to improved superconducting materials for KIDs. All these developments will continue in 2019.

With respect to the ageing machine park in our clean room, we have established a long-term investment plan to renew and improve the machine park, which will help us to consolidate the group's world leadership in superconducting mm-wave detectors.

Mechanical Group

The IRAM mechanical workshop has dealt with a total of 112 requests for components, 90 of which were handled internally, and 22 were subcontracted to outside companies.

After more than 20 working years at IRAM, our workshop manager retired end of September and has been replaced through an internal promotion.

MECHANICAL WORKSHOP

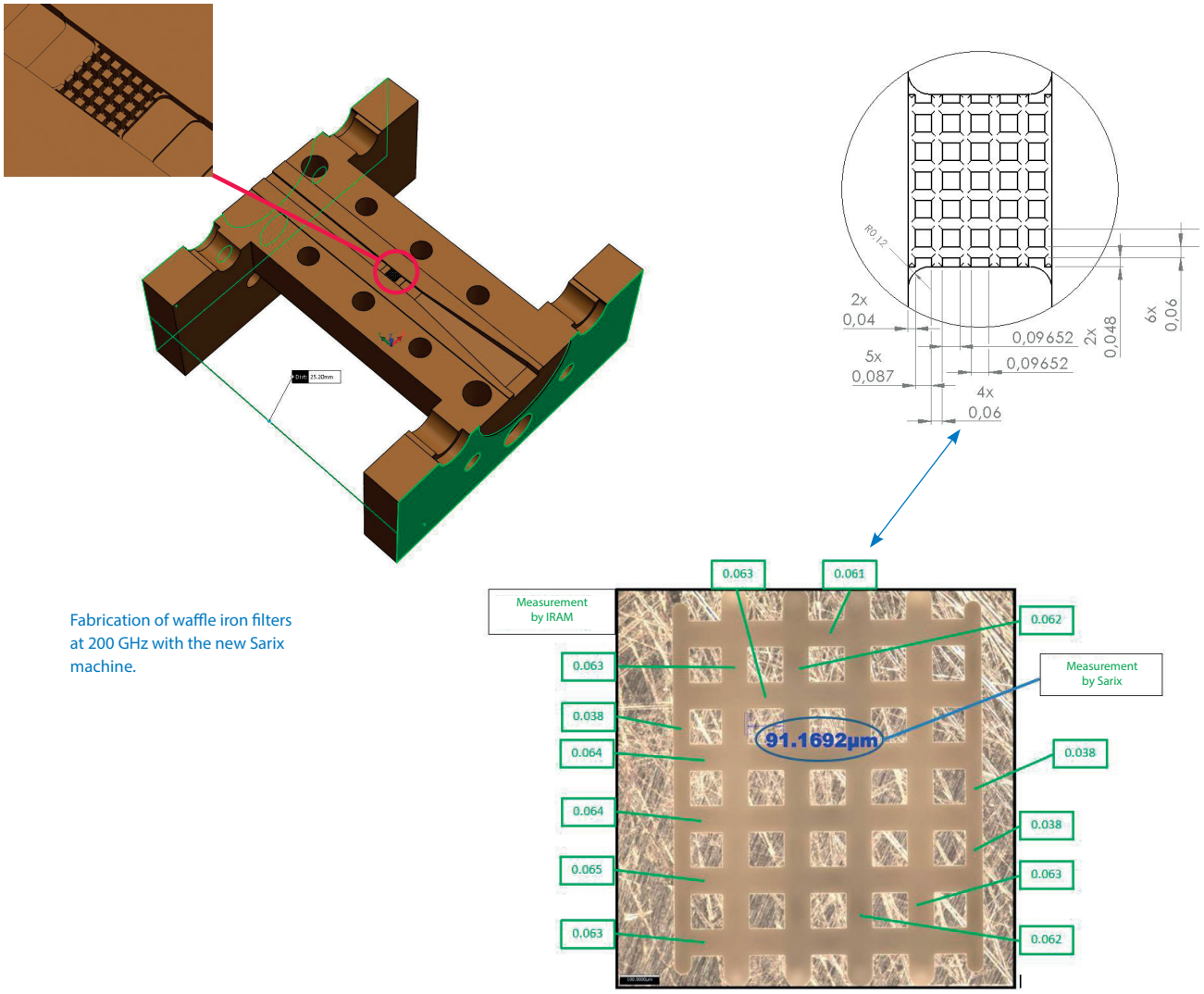
The major activity was the production of a large number of microwave components, mixers, couplers, horns for NOEMA, NIKA II and many prototypes in collaboration with the engineers from the Frontend group.

As new generation of microwave parts are more and more complex and accurate and in order to offer a wider internal expertise, IRAM decided to invest in the last generation of Electrical Discharge Machining dedicated to micro milling, SARIX Sx 200 Hpm.

Thanks to this new machine, the mechanical workshop has now a complete internal expertise to produce all the current and future wave guides on microwave components.

The machine has been delivered in September; after a training and testing phase, technicians succeeded to make the first parts as early as December.

New Sarix electro-erosion machine
Technical specifications:
Travel Axis: X=350, Y=200, Z=150
Positioning precision: +/- 2 um
Resolution =0,1 um
Axis feed rade X-Y-Z=1200 mm/min
Table size: L=700, d=300mm
Maxi Load: 50 kgs
Dimensions: L 1600, d 2200, h 2300 mm
Weight: 1600 kgs



Fabrication of waffle iron filters at 200 GHz with the new Sarix machine.

ENGINEERING OFFICE

First astronomical tests of the antenna 10.

The 2 main tasks have been dedicated to the construction of Antenna 10 and Antenna 1 retrofit, in close collaboration with the NOEMA technical team.

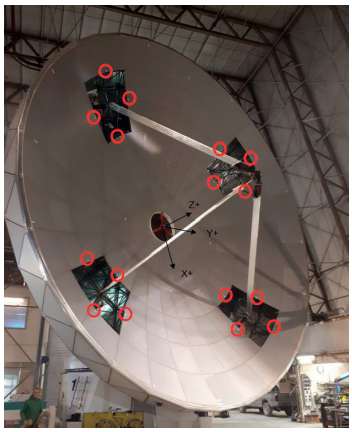
Antenna 10 has been delivered to final reception phase in July and final approval has been given in September 2018.

The objectives of the Antenna 1 retrofit were :

• Replacement of old quadrupodes legs by new ones

• Integration of the new generation hexapod that has been developed for the NOEMA project and is installed on Antennas 7 to 10.

The major risk for this project was removing old quadrupodes and install new ones without degrading the quality of the surface RMS. After many months of preparation and a complete month of work on the antenna, we succeeded to replace all the parts without any trouble. We have started retrofit of Antenna 1 on October 2018 and final approval of the upgraded antennas has been given mid of November 2018.



Location of control points during Antenna 1 upgrade.

Computer Group

UPGRADING THE MAIL SERVER

Since 2005, IRAM relies on the Postfix open source mail server to deliver more than one million of emails per year. Unlike many other companies, IRAM has no interest to outsource its mail server in the cloud or external companies because the institute will continue in any case to operate a substantial on-premise computing infrastructure to support its scientific activities. Therefore, the Computer Group did not succumb to the cloud computing sirens and, on the contrary, has upgraded its open-source mail server to match the latest standards. Now the IRAM staff benefits from a new webmail (SOGo) and can read their professional emails on their personal smartphones with BlueMail.

UPGRADING THE VIRTUALIZATION CLUSTER

To improve its recovery procedures, the Computer Group has decided to purchase Veeam Backup & Replication because this software has many interesting features, in particular, it can automatically check backups inside a virtual isolated laboratory. Nevertheless Veeam does not support Citrix XenServer, so the Computer Group has also decided to switch to VMware as its new hypervisor.

To store the backups, a 260 TB FreeNAS storage server has been purchased from iXsystems. It is the ideal target for Veeam backups because it is based on ZFS, that opens more possibilities that traditional filesystems. For example, IRAM protects its backups against ransomware attacks with ZFS snapshots and a long retention period.

WORKSTATIONS FOR DATA REDUCTION

An IRAM astronomer and her visitor, working on data reduction of a project.

The workstations to reduce NOEMA data have been upgraded to high-end models to support the large datasets that are daily recorded at the observatory. The new computers are Dell Precision T7920 with dual Intel Xeon Platinium 8168 processors, 1 TB of RAM. They connect directly to the IRAM scientific archive through dedicated 10 GbE fiber optic connections. Finally, the workspace that hosts these workstations has been refurbished and the furniture has been also renewed to offer a better working environment to the scientific visitors.

RADIOMETER CONTROL SYSTEM

The Computer Group has developed the control system for the 2nd generation of water vapor radiometer. This new control system is setup as a 1U chassis that is installed in the antenna and that connects on one side to the radiometer through fiber optics, and on the other side to the observatory network.

The controller is based on a DE0-Nano-SoC board from Terasic. It is a compact computer board, very similar to a Raspberry Pi computer but with a System-On-Chip which combines an ARM processor and a FPGA. The system runs Linux that has direct access to the FPGA registers. To simplify the controller maintenance at the observatory, a network boot has been setup, so that all softwares, including the operating system and the FPGA firmware can be upgraded from a central point. The controller prototype has been installed with success at the NOEMA Observatory in November 2018, and the production of the other units can start. As a conclusion of this project, the Computer Group can assert that using pre-assembled FPGA boards to build quickly tailored controllers is an effective way to reduce development cycles and costs.

Science Sofware Activities

NOEMA SCIENCE PIPELINE

The association of wide bandwidth capabilities (2 polarizations time 16 GHz) with the requirement to simultaneously acquire continuum and spectroscopic data at two different spectral resolutions (2 MHz over the full band and 62.5 kHz over a quarter of the band spread over up to 128 high resolution windows) makes PolyFiX, the NOEMA correlator, an extremely versatile and powerful spectrometer. The associated data rate increased by a factor of up to 30 compared to the previous correlator system. After the successful integration of this correlator in the online acquisition software of NOEMA in 2017, the science software team worked to resume completely standard operation by end of 2018. The versatility and increased data rate required a major upgrade and a thorough optimization of the offline calibration engines in CLIC and thus of the heuristics of the science pipeline. For instance, going from single sideband (LSB or USB) to dual sideband (delivering simultaneously both the LSB and USB bands) receivers required new ways of applying the flux calibration. Another example is the new possibility

offered by PolyFiX to simultaneously record the auto-correlations and the cross-correlations of the interferometer. All this work on the pipeline was done with additional requirements: 1) to be able to process 8 hours of observations in less than one hour; 2) to be backward compatible, i.e. to be able to handle indifferently data acquired either before or after the installation of PolyFiX; and 3) to run the pipeline with the same functionalities at the observatory and IRAM headquarters in Grenoble.

UPDATED MAPPING USER INTERFACE

The advent of PolyFiX triggered a series of changes in MAPPING over the last five years in collaboration with the Observatoire de Bordeaux. To close this cycle of developments and lay out the path to handling the unprecedented wide bandwidth with high spectral resolution windows of the NOEMA project, a new version of the user interface was developed. The goals were to fully incorporate the recent developments with the minimum of changes in user habits and to ensure the possibility to process archival data. This new interface fully uses the parallelization possibilities of the imaging and deconvolution algorithms to optimize the use of the new data reduction machines that have up to 88 cores. It also uses the new mosaic format (i.e., all fields in a single uv-table instead of one field per mosaic uv-table), a change triggered by the increase in the number of wide-field imaging projects with NOEMA. Last but not least, it eases the interactive definition of the regions that the user wishes to deconvolve based on a priori knowledge.

PIIC, A NEW SOFTWARE FOR NIKA2 DATA REDUCTION

PIIC is the name of the IRAM reduction package for NIKA2. It stands for ***Pointing and Imaging In Continuum***. This software includes a "monitor", which performs on-the-fly (simplified) processing of pointing, focus, and maps to provide quick-look results. This monitor has been regularly used during NIKA2 observations at the telescope since September 2018. It uses the tau-meter values at 225 GHz to perform a first absolute flux calibration. This development required several updates of the IMBFITS raw data format.

OBSERVATORY MANAGEMENT SYSTEM (OMS)

The Observatory Management System (OMS) is foreseen as a web-based set of independent tools with similar look and feel in order to handle observation projects from proposal submission to distribution of the data to the principal investigator. The first two tools, i.e., the handling of proposals and creation of observing setups, are now available. In 2018, much work was invested to use the feedback from the first observations with the PolyFiX correlator in order to improve the user experience when dealing with NOEMA projects. For instance, the handling of a new observing mode, namely track-sharing, was introduced in both tools. The principal investigators can also define a tuning frequency slightly out of the frequency range that meets NOEMA noise and rejection specifications with a clear warning that the hardware is then sub-optimally used. This enables them to propose unconventional and outstanding science ideas. Finally, the NOEMA sensitivity estimator was refurbished to yield more accurate results: 1) an improved scheme that interpolates the system temperature in both observing frequency and source elevation was developed; 2) the range of system temperatures over the observed IF bandwidth is now also tabulated as a function of the local oscillator frequency in order to get an idea of the way the

sensitivity varies over the band; 3) a "continuum system temperature" that depends on the local oscillator frequency is now pre-computed to get an accurate continuum estimation; 4) overheads were better taken into account in the wide-field imaging mode. Less visible to the end user, the handling of units in OMS was completely overhauled. The conversion is now automatically made at input/output from/to the user-desired unit to a conventional internal unit. All fields of the same kind are thus stored using the same unit. This considerably simplifies the computations and other bookkeeping tasks.

GILDAS

All previous software developments are based on the common GILDAS services, e.g., a set of common low-level libraries, collectively named GILDAS kernel, which take care of the scripting and plotting capabilities of GILDAS. In 2018, a particular effort was made to ease the handling and visualization of the position-position-velocity cubes that are produced by other observatories. In particular, the science software team ensured that such a cube could be processed transparently (i.e., without the need of an explicit filler) when it is complying with the FITS format standard.

IRAM ARC Node

IRAM is a node of the European ALMA Regional Center (ARC) network. While the central ARC at ESO Garching is responsible for the scientific operations of the ALMA observatory, the nodes are more specifically in charge of supporting users, in particular during the data reduction phase. IRAM's involvement in the ARC is part of a long-term, global involvement in the ALMA design, construction, and support. One of the main goals of the IRAM ARC node is to provide a common support for the IRAM and ALMA facilities to the astronomical community, hence maximizing the scientific synergies between the observatories.

ALMA USERS SUPPORT

The ARC node staff acts as "Contact Scientists" for the accepted ALMA projects, providing help and expertise to check and validate the Scheduling Blocks that are created from the initial proposals. The IRAM ARC node supports projects from the French, German, and Spanish communities. In 2018 (Cycle 6), this amounted to 66 new projects, plus 7 Cycle 5 projects that were carried over (including 2 Large Programs).

A major service provided by the ARC node is the face-to-face support for data reduction: users can obtain direct help from an IRAM astronomer for the data reduction, in a way similar to the support provided for the NOEMA projects. Travel funding is available for users affiliated to the IRAM funding agencies, and through the European MARCUs initiative. In 2018, 14 projects were supported during face-to-face visits in Grenoble. In addition, 5 projects were supported remotely. A workshop dedicated to imaging was organised in the frame of the support of one large program.

A data filler to transfer calibrated data between CASA and GILDAS allows the user to do the imaging in their favorite software, and do specific processing like combining 30-meter and ALMA dataset.

Personnel & Finance

ADMINISTRATION

In 2018, IRAM employed 115,5 Full Time Equivalent (FTE) positions: 33,3 in Spain and 82,2 in France.

IRAM confirmed its commitment for the development of its staff skills, as shown by the human and financial investment in training actions. 57 employees attended a training program (44% of the whole staff) and IRAM dedicated the equivalent of more than 1% of its payroll to training, which is exceeding legal obligations.

On a budgetary point of view, the financial closing demonstrates IRAM's ability to finance its projects while keeping the daily operating situation balanced. Investment was dominated by the NOEMA project, in particular by orders for the construction of Antenna 11.

Financial results

Income in k€	Actual 2018
Contributions from Associates	14 075
Other income including reserve	3 141
Total income	**17 216**

Expenditure in k€	Actual 2018
Operation	13 142
Investment	5 790
Total Expenditure	**18 932**

IRAM STAFF LIST

IRAM Headquarters, Grenoble, France

Direction	**SCHUSTER Karl-Friedrich**	Director
	GUETH Frédéric	Deputy Director
	DELLA BOSCA Paolo	
	MOREAU Sonja	
	ZACHER Karin	
Administration	**DELAUNAY Isabelle**	Head of Administration
	DAMPNE Maryline	
	FERREIRA Dina	
	MAIRE Béatrice	
	MANFREDI Marilyne	
	MARCOUX Stéphane	
	PALARIC Laurent	
	SIMON Lauriane	
	SIMONE Jeannine	
Astronomy & Science Support Group	**NERI Roberto**	Head of Astronomy & Science Support Group
	BARDEAU Sébastien	
	BERJAUD Catherine	
	BERTA Stefano	
	BOISSIER Jérémie	
	BREMER Michael	
	BROGUIERE Dominique	
	CASTRO CARRIZO Arancha	
	CHAPILLON Edwige	
	CUNNINGHAM Nichol	
	DE SOUZA MAGALHAES Victor	
	DOWNES Wilfriede	
	FEHER Orsolya	
	HERRERA CONTRERAS Cinthya	
	KRAMER Carsten	
	KRMKRIPS Melanie	
	LEFEVRE Charlène	
	LÓPEZ SEPULCRE Ana	
	ORKISZ Jan	
	PETY Jérôme	
	PIETU Vincent	
	REYNIER Emmanuel	
	WINTERS Jan Martin	
	WONG Ka Tat	
	ZYLKA Robert	
Frontend Group	**RISACHER Christophe**	Head of Frontend Group
	BERTON Marylène	
	BORTOLOTTI Yves	
	FONTANA Anne-Laure	
	GARNIER Olivier	
	LECLERCQ Samuel	
	MAHIEU Sylvain	
	MAIER Doris	
	MOUTOTE Quentin	
	PARIOLEAU Magali	
	PERRIN Guillaume	
	PISSARD Bruno	
	REVERDY Julien	
	SERRES Patrice	
Backend Group	**GENTAZ Olivier**	Head of Backend Group
	BALDINO Maryse	
	CHAVATTE Philippe	
	GARCÍA Roberto	
	GEOFFROY Daniel	
	SASSELLA Rémi	
Superconducting Devices Group	**DRIESSEN Eduard**	Head of Superconducting Devices Group
	BARBIER Arnaud	
	BILLON-PIERRON Dominique	
	SHU Shibo	

Mechanical Group	**LEFRANC Bastien**	Head of Mechanical Group
	COUTANSON Laurent	
	DANNEEL Jean-Marc	
	JUBARD Vincent	
	LAZARO Gaëtan	
	ORECCHIA Jean-Louis	
Computer Group	**BLANCHET Sébastien**	Head of Computer Group
	CHALAIN Julien	
	DUMONTROTY Patrick	
	REYGAZA Mickaël	
	ROCHE Jean-Christophe	

NOEMA, Plateau de Bure, France

	GAUTIER Bertrand	Station Manager
	AZPEITIA Jean-Jacques	
	CASALI Julien	
	CAYOL Alain	
	CHAUDET Patrick	
	CONSEIL Yann	
	CONVERS Bruno	
	DAN Michel	
	DI LEONE Cécile	
	GROSZ Alain	
	KINTZ Philippe	
	LAPEYRE Laurent	
	LEONARDON Sophie	
	MASNADA Lilian	
	MOURIER Yvan	
	RAMBAUD André	
	SALGADO Emmanuel	
	SARRAZIN Jérémy	
	ZANINELLO Pierre	

IRAM 30-meter Telescope, Granada, Spain

	SÁNCHEZ PORTAL Miguel	Station Manager
	PENALVER Juan	Deputy Station Manager
	AMAYA Sergio	
	CÓRDOBA Antonio	
	DAMOUR Fréderic	
	ESPAÑA Gloria	
	GÁLVEZ Gregorio	
	GARCÍA José	
	GARCÍA Verónica	
	JOHN David	
	KIM Wonju	
	KRAMER Carsten	
	LADJELATE Bilal Smain	
	LARA María	
	LOBATO Enrique	
	MELLADO Pablo	
	MORENO GARCIA Laura	
	MORENO María	
	MUÑOZ GONZÁLEZ Miguel	
	NAVARRO Santiago	
	PAUBERT Gabriel	
	PEULA Víctor	
	PIERFEDERICI Francesco	
	RITACCO Alessia	
	RUIZ Carmen	
	RUIZ Ignacio	
	RUIZ Manuel	
	SÁNCHEZ Antonio	
	SÁNCHEZ Rosa María	
	SÁNCHEZ Salvador	
	SANTAREN Juan Luis	
	SANTIAGO Joaquín	
	SERRANO David	
	SIEVERS Albrecht	
	TORNE Pablo	
	UNGERECHTS Hans	


Credit: Air Libre Prod


Credit: DVertiCimes

Telescope schedules

30-METER TELESCOPE

Project	Title	Authors
122-16	NIKA2 GT-LP set 1: Galactic Star Formation with NIKA2 - GASTON	Nicolas Peretto, Philippe Andre, Alexandre Beelen, Alain Benoit, Aurelien Bideaud, Nicolas Billot, O. Bourrion, M. Calvo, A. Catalano, Gregoire Coiffard, Barbara Comis, Francois-Xavier Desert, S. Doyle, Carsten Kramer, Samuel Leclercq, Juan Macias-Perez, Frederic Mayet, A. Monfardini, Francois Pajot, Enzo Pascale, Laurence Perotto, Giampaolo Pisano, Nicolas Ponthieu, Vincent Reveret, Alessia Ritacco, Louis Rodriguez, Charles Romero, Florian Ruppin, Karl-Friedrich Schuster, Albrecht Sievers, Robert Zylka, Remi Adam, Peter Ade, Frederique Motte, Aurore Bacmann, Andrew Rigby, Isabelle Ristorcelli, Pablo Garcia, Anaelle Maury, Jean-Francois Lestrade, Yoshito Shimajiri, Andrea Bracco, Bilal Ladjelate, Ana Duarte Cabral, Sarah Ragan, Jane Greaves
124-16	ORION B: The anatomy of a Giant Molecular Cloud	Jerome Pety, Maryvonne Gerin, Emeric Bron, Viviana Guzman Veloso, Jan Orkisz, Sebastien Bardeau, Javier R. Goicoechea, Pierre Gratier, Franck Le Petit, Francois Levrier, Harvey Liszt, Karin Oberg, Nicolas Peretto, Evelyne Roueff, Albrecht Sievers, Pascal Tremblin
192-16	The NIKA2 Cosmological Legacy Survey (NIKA2 GT-LP Set1 -- N2CLS)	Guilaine Lagache, Alexandre Beelen, Nicolas Ponthieu, Remi Adam, H. Aussel, Matthieu Bethermin, Veronique Buat, Frederic Boone, Emanuele Daddi, David Elbaz, Daizhong Liu, Morgane Cousin, Francois-Xavier Desert, Juan Macias-Perez, Denis Burgarella, Herve Dole, Peter Ade, Philippe Andre, Alain Benoit, Aurelien Bideaud, Nicolas Billot, O. Bourrion, M. Calvo, A. Catalano, Gregoire Coiffard, Barbara Comis, S. Doyle, Carsten Kramer, Samuel Leclercq, Frederic Mayet, A. Monfardini, Francois Pajot, Enzo Pascale, Laurence Perotto, Giampaolo Pisano, Vincent Reveret, Alessia Ritacco, Louis Rodriguez, Charles Romero, Florian Ruppin, Karl-Friedrich Schuster, Albrecht Sievers, Robert Zylka
199-16	NIKA2 GT-LP set 1: High-resolution tSZ observations of a large sample of clusters of galaxies (NI-KA2SZ)	Frederic Mayet, Barbara Comis, Remi Adam, Peter Ade, Nabila Aghanim, Philippe Andre, Monique Arnaud, Rafael Barrena Delgado, Iacopo Bartalucci, Alexandre Beelen, Alain Benoit, Aurelien Bideaud, Nicolas Billot, O. Bourrion, M. Calvo, A. Catalano, Nicolas Clerc, Gregoire Coiffard, Marco De Petris, Francois-Xavier Desert, Marian Douspis, S. Doyle, Chiara Ferrari, Carsten Kramer, Samuel Leclercq, Juan Macias-Perez, Jean-Baptiste Melin, A. Monfardini, Francois Pajot, Enzo Pascale, Laurence Perotto, Giampaolo Pisano, Etienne Pointecouteau, Nicolas Ponthieu, Gabriel Pratt, Vincent Reveret, Alessia Ritacco, Louis Rodriguez, Charles Romero, Jose Alberto Rubino Martin, Florian Ruppin, Karl-Friedrich Schuster, Albrecht Sievers, Robert Zylka, H. Aussel
006-17	Gas phase elemental abundances in molecular clouds (GEMS)	Asuncion Fuente, Evelyne Roueff, Paola Caselli, Mario Tafalla, Jose Cernicharo, Rafael Bachiller, Maryvonne Gerin, Jacob Laas, Nuria Marcelino, Javier R. Goicoechea, Marcelino Agundez, Izaskun Jimenez-Serra, Alvaro Hacar, Guillermo M. Munoz Caro, Belen Tercero, Tomas Alonso-Albi, Valentine Wakelam, Jean-Christophe Loison, Valerio Lattanzi, Thomas H. G. Vidal, Benoit Commercon, Pierre Gratier, Barbara Michela Giuliano, Rafael Martin-Domenech, Derek Ward-Thompson, Jason Kirk, Jaime Pineda, Santiago Garcia-Burillo, Carsten Kramer, Octavio Roncero, J. Malinen, Pablo Riviere-Marichalar, Bertrand Lefloch, Rachel Friesen
055-17	Carbon and Oxygen Isotopic Ratios in M51	Kazimierz Sliwa, Eva Schinnerer, Antonio Usero, Adam Leroy, Jerome Pety, Frank Bigiel, Andreas Schruba, Maria Jesus Jimenez Donaire, David Wilner, Toshiki Saito, Annie Hughes, Brent Groves

Project	Title	Authors
071-17	Tending the Fire: A Legacy Survey of Molecular Gas in Powerful Nearby AGN	Thomas Taro Shimizu, Dieter Lutz, Michael Koss, Amelie Saintonge, David Rosario, Linda Tacconi, Reinhard Genzel, Ezequiel Treister, Richard Davies
084-17	Imaging the Shadows of Supermassive Black Holes	Ciriaco Goddi, Pablo Torne, Thomas Krichbaum, Eduardo Ros, Michael Kramer, Luciano Rezzolla, Anton Zensus, Karl-Friedrich Schuster, Michael Bremer, Freek Roelofs, Monika Moscibrodzka, H. Rottmann, Remo Tilanus
087-17	Probing the sub-surface thermal emission from Saturn's moons	Emmanuel Lellouch, Raphael Moreno, Cedric Leyrat, Jean-Francois Lestrade, Juan Macias-Perez, Gabriel Paubert, Lea E Bonnefoy, Alice Le Gall
088-17	Characterizing the dark cloud in front of LkHα 101	Goran Sandell, William Vacca
089-17	Exploring the origin of nitrogen isotope fractionation in a prestellar core	Kenji Furuya, Yoshimasa Watanabe, Yuto Sato, Takeshi Sakai, Yuri Aikawa, Satoshi Yamamoto
090-17	Ortho-to-para ratio as a tool to constrain H_2CO formation	Aurore Bacmann, Alexandre Faure, Pierre Hily-Blant, Claire Rist, Jurgen Steinacker
091-17	FIR dust emissivity in L183 and L134	Laurent Pagani, Charlene Lefevre, Hiroyuki Hirashita, Michiel Min
092-17	The density profile of the L1498 prestellar core	Pierre Hily-Blant, Alexandre Faure, Victor de Souza Magalhaes, Aurore Bacmann, Nicolas Ponthieu
093-17	Direct measurement of the CN/$C^{15}N$ isotopic ratio in the L1498 prestellar core	Pierre Hily-Blant, Alexandre Faure, Victor de Souza Magalhaes, Joel Kastner, Thierry Forveille, Francois Lique
096-17	Survey of Sulfur-bearing Species in Low-Mass Protostellar Sources	Yoko Oya, Nami Sakai, Yoshimasa Watanabe, Ana Lopez-Sepulcre, Cecilia Ceccarelli, Bertrand Lefloch, Satoshi Yamamoto
097-17	Phosphorus-bearing molecules in a protosolar analog	Jennifer Bergner, Karin Oberg, Viviana Guzman Veloso, Amy Cohn
098-17	Tracing Ambipolar Diffusion in a Protostellar Clump	Elena Redaelli, Felipe Alves, Paola Caselli, Alvaro Hacar, Luca Bizzocchi, Jaime Pineda
100-17	Deuterated molecules toward the early-stage pre-stellar core L1521E	Zsofia Nagy, Silvia Spezzano, Paola Caselli, Mario Tafalla
101-17	A 3 mm line survey of L483	Marcelino Agundez, Nuria Marcelino, Jose Cernicharo, Mario Tafalla
102-17	A 3 mm line imaging survey toward an unusual filament	Yan Gong, Karl M. Menten, Christian Henkel, Friedrich Wyrowski, Ruiqing Mao
103-17	Probing the velocity field of the Serpens-Main filament	Yoshito Shimajiri, Philippe Andre
104-17	Constraining global cloud emission properties with sampling	Mario Tafalla, Antonio Usero, Alvaro Hacar
105-17	Constraining the physical structure of the solar-type protostar IRAS16293-2422 with NIKA2	Sandrine Bottinelli, Emmanuel Caux, Laurent Loinard, Antonio Hernandez, Isabelle Ristorcelli
108-17	Complex organic molecules in UV irradiated gas: The Horsehead PDR	Viviana Guzman Veloso, Jerome Pety, Javier R. Goicoechea, Maryvonne Gerin, Pierre Gratier, Evelyne Roueff, Franck Le Petit, Emeric Bron, John Carpenter
109-17	Understanding a Molecular Gas Enigma: Spatial Variation of the HNC/HCN Ratio in the Helix Nebula	Joel Kastner, Miguel Santander-Garcia, Jesse Bublitz, Thierry Forveille, Pierre Hily-Blant, Javier Alcolea, Valentin Bujarrabal
110-17	The very extended FUV-irradiated skin of Orion	Javier R. Goicoechea, Nuria Marcelino, Jose Cernicharo, Alexander Tielens, David Teyssier, Cornelia Pabst, O. Berne, Ronan Higgins, Mark Wolfire, Jurgen Stutzki, Slawa Kabanovic, Christof Buchbender, Sumeyye Suri
111-17	CN (2-1) observations in Orion: searching the total magnetic field in a high-mass filament	Nacho Anez, Gemma Busquet, Amelia Stutz, Josep Miquel Girart, Carmen Juarez, Qizhou Zhang, Thushara Pillai
114-17	On the origin of massive clusters	Alvaro Hacar, Mario Tafalla, Simon Portegies Zwart, Paula Teixeira
115-17	Initial star-forming activities towards the high-mass, low luminosity-to-mass ratio clumps	Siyi Feng, Henrik Beuther, Paola Caselli, Qizhou Zhang, Izaskun Jimenez-Serra, Olli Sipila, Ken'ichi Tatematsu, Di Li, Yuxin Lin, Jaime Pineda, Ke Wang, Tie Liu, Jinghua Yuan, HauYu Baobab Liu, Patricio Sanhueza, Xing Lu, Sarolta Zahorecz, Guang-Xing Li, Yuan Wang, Zhiyu Zhang
116-17	Constraining the $^{14}N/^{15}N$ gradient in the outer Galaxy	Francesco Fontani, Laura Colzi, Victor Rivilla, Leonardo Testi, Maria Teresa Beltran, Paola Caselli, Davide Elia, Alvaro Sanchez-Monge, Laura Magrini

Project	Title	Authors
120-17	CO molecular outflows in proto-brown dwarfs	Basmah Riaz, Mario Tafalla
121-17	The molecular mass of post-common-envelope planetary nebulae	Miguel Santander-Garcia, Javier Alcolea, Valentin Bujarrabal, David Jones
122-17	Molecular clouds created by interaction between jet and interstellar medium - CO observation toward SS 433/W50	Qiancheng Liu, Yang Chen, Ping Zhou, Bing Jiang
123-17	Zero spacing data for L1448 ALMA observations	Mario Tafalla, Rafael Bachiller
124-17	Protostellar outflows and turbulence in the Cepheus dense clumps	Stephane Corbel
125-17	Master2 Internship : Herbig-Haro Jets in Star-Forming Regions	Bertrand Lefloch
128-17	A Multi-Wavelength View of the Sgr A Complex	Martin Steinke, Robert Simon, Pablo Garcia
129-17	Removal of the extended emission in the IRAM 30m beam through simultaneous observations of Sgr A* with KVN	Ivan Agudo, Ilje Cho, Clemens Thum, Helmut Wiesemeyer, Bong Won Sohn, Guangyao Zhao
130-17	Cold dust and the search for gas in the debris disc of HD 36546	Nicole Pawellek, Yao Liu, Yuan Wang, Thomas Henning, Hendrik Linz, Claudia Marka
131-17	The search for missing debris discs around M-stars	Nicole Pawellek, Yao Liu, Attila Moor, Thomas Henning, Hendrik Linz
132-17	The Spectral Slopes of the Brightest Debris Discs Measured at Long Wavelengths to Determine their Grains Size Distributions.	Jean-Francois Lestrade, Mark Booth, Philippe Thebault, Wayne Holland
133-17	NIKA2 Science Verification : A Large Debris Disk or a High-z Pro-to Cluster towards the star GJ526 ?	Jean-Francois Lestrade, Guilaine Lagache
135-17	S-bearing molecules around young stars: a clue to S chemistry.	Thomas Vidal, Valentine Wakelam, Edwige Chapillon, Anne Dutrey, Stephane Guilloteau, Sacha Gavino, Pierre Gratier
136-17	Probing Dust Growth and Settling in Taurus Disks	Yao Liu, Yuan Wang, Hendrik Linz, Thomas Henning, Nicole Pawellek, Chin-Fei Lee, Hongchi Wang, Miaomiao Zhang
137-17	Completing the Carbon Inventory of the Remarkable Planetary Nebula K4-47	Deborah Rose Schmidt, Lucy Ziurys
139-17	The gas-phase precursors of dust in the envelopes of oxygen-rich stars	Sarah Massalkhi, Marcelino Agundez, Jose Cernicharo, Luis Velilla Prieto
140-17	Search for SiO maser emission towards magnetic evolved stars.	Fabrice Herpin, Agnes Lebre, Renada Konstantinova-Antova, Eric Josselin, Helmut Wiesemeyer, Philippe Mathias, Arturo Lopez Ariste, Laurence Sabin
141-17	A Search for AlC_2 in the Circumstellar Envelope of IRC+10216	DeWayne Halfen, Lucy Ziurys
142-17	Large scale emission of Si-C bearing molecules in IRC+10216	Luis Velilla Prieto, Jose Cernicharo, Jose Pablo Fonfria, Guillermo Quintana-Lacaci, Arancha Castro-Carrizo, Marcelino Agundez, Michel Guelin, Carmen Sanchez Contreras
143-17	Time variability monitoring of molecular emission in IRC+10216	Juan R. Pardo, Jose Cernicharo, Michel Guelin, David Teyssier, Marcelino Agundez, Guillermo Quintana-Lacaci, Claudia Marka, Luis Velilla Prieto, Pedro Garcia-Lario
144-17	Keplerian disks around evolved stars	Valentin Bujarrabal, Javier Alcolea, Hans Van Winckel, Miguel Santander-Garcia, Arancha Castro-Carrizo, Devika Kamath
145-17	Monitoring of the Galactic Centre Magnetar SGR J1745-2900 at millimetre wavelengths (continuation)	Pablo Torne, Gregory Desvignes, Kuo Liu, Ralph Eatough, Gabriel Paubert, Clemens Thum, Olaf Wucknitz, Norbert Wex, Michael Kramer
146-17	A Pilot NIKA2 Mapping for M31	Yuxin Lin, HauYu Baobab Liu
147-17	The giant HII region NGC 588 in M33	Carsten Kramer, Alessia Ritacco, Jonathan Braine, Helene Roussel, Frank Israel, Bhaswati Mookerjea, Fatemeh Tabatabaei, Monica Relano, Christof Buchbender, Simon Verley
148-17	Dense Gas in Subsolar Metallicity Galaxies	Jonathan Braine, John M. Cannon, Carsten Kramer
149-17	Search for Deuterated Molecules in the Spiral Arm Region of M51	Yoshimasa Watanabe, Yuri Nishimura, Nanase Harada, Kazuo Sorai, Nami Sakai, Satoshi Yamamoto
150-17	Further Observations of the IMEGIN Sample Galaxy M99	Ruth Evans, Christopher Clark, Jonathan Davies, Juan Macias-Perez, Carsten Kramer, Israel Hermelo, Helene Roussel, Francois-Xavier Desert, Annie Hughes, Matthew Smith, Suzanne Madden

Project	Title	Authors
151-17	IRAM 30m high angular follow-up observations on the large scale molecular outflows in NGC 3628	An-Li Tsai, Chorng-Yuan Hwang, Edwige Chapillon
152-17	A Pilot Study for Nearby Galaxy Observations with NIKA2	Christopher Clark, Annie Hughes, Jonathan Davies, Ruth Evans, Francois-Xavier Desert, Suzanne Madden, Carsten Kramer, Matthew Smith
155-17	The molecular gas content of HI-selected blue ultra-diffuse galaxies	Monica Rodriguez, David Valls-Gabaud, Francoise Combes, Brisa Mancillas
156-17	The Kinematics and Star Formation Efficiency of Ultra Diffuse Galaxies	Rhys Taylor, Pavel Jachym
157-17	Molecular gas content of the most active compact group in the local Universe	Miguel Angel Perez-Torres, Ruben Herrero-Illana, B. Husemann, Alessandra De Rosa, Tamara Bogdanovic, Nora Loiseau, Enrico Piconcelli, Zsolt Paragi, Stefano Bianchi, Cristian Vignali, Roberto Decarli, Kevin Schawinski
159-17	Unraveling the nature of jet-mode AGN in galaxies with active star formation	Reinier Janssen, Nicole Nesvadba, Huub Rottgering, Jarle Brinchmann, Philip Best
162-17	Molecular Gas in the Central Dominant Galaxies of Cooling-Flow groups	Ewan O'Sullivan, Laurence P. David, Jan M. Vrtilek, Francoise Combes, Jeremy Lim, William R. Forman, Christine Jones Forman, Philippe Salome, Scott Randall
163-17	MAPI: Monitoring AGN with Polarimetry at the IRAM 30m Telescope	Ivan Agudo, Carolina Casadio, Jae-Young Kim, Ioannis Myserlis, Efthalia Traianou, Thomas Krichbaum, Emmanouil Angelakis, Eduardo Ros, Helmut Wiesemeyer, Anton Zensus, Clemens Thum, Alessia Ritacco, Sol N. Molina, Antonio Fuentes, Jose L. Gomez, Venkatessh Ramakrishnan, Alan Marscher, Svetlana Jorstad
167-17	NIKA2 Observations of the JWST Time Domain Field	Seth Cohen, Rogier Windhorst, Rolf Jansen, Sean Bryan, P. Mauskopf
170-17	Probing Physical Diagnostics of SF via CO SLEDs Out to the Highest -J Transitions in Strongly Lensed z > 1 HyLIRGs	Kevin Harrington, Axel Weiss, Dominik A. Riechers, Min Yun, Benjamin Magnelli, Alexander Karim, Amit Vishwas, Eric Faustino Jimenez-Andrade, Frank Bertoldi, James Lowenthal, Patrick Kamieneski, Q. Daniel Wang, David Frayer, Toma Badescu, Daizhong Liu, Derek Berman
171-17	Confirming a Planck starbursting proto-cluster candidate using 30m/EMIR	Clement Martinache, Melanie Krips, Guilaine Lagache, Matthew Lehnert, Alain Omont, Alexandre Beelen, Martin Giard, Douglas Scott, Herve Dole, Mari Polletta, Emanuele Daddi, Brenda Frye, Emeric Le Floc'h, Ranga-Ram Chary, Ruediger Kneissl, Etienne Pointecouteau, Matthieu Bethermin, Ricardo Demarco, Ryley Hill, Alessandro Rettura, Benjamin Clarenc, Helmut Dannerbauer
172-17	High-Resolution Measurement of the Shock and Sub-cluster Peculiar Velocity in a Potential Line of Sight Bullet-like Cluster	Tony Mroczkowski, Francois-Xavier Desert, Brian Mason, Steve Eales, Etienne Pointecouteau, Remi Adam, M. Calvo, A. Catalano, P. Mauskopf, Frederic Mayet, Laurence Perotto, Juan Macias-Perez, Tracy Clarke, Craig Sarazin, Charles Romero, Heather McCarrick
173-17	Searching for evidence of cooling in CLASH clusters	Mamta Pommier, Stephen Leslie Hamer, Francoise Combes, Bruno Guiderdoni, Johan Richard
176-17	Deep SZ imaging of merger shocks in the Toothbrush relic galaxy cluster	Kaustuv Basu, Charles Romero, Marcus Brueggen, Jens Erler, Reinout van Weeren, Frank Bertoldi, Martin Sommer, Franco Vazza, Karl M. Menten
177-17	A Comprehensive Study of Shocks and ICM physics in Abell 2146	Charles Romero, Massimo Gaspari, Tony Mroczkowski, Florian Ruppin, Juan Macias-Perez, Helen Russell, Frederic Mayet, Craig Sarazin, Brian Mason, Tracy Clarke, Eugene Churazov, Heather McCarrick
178-17	Measuring the mass distribution with unprecedented accuracy in the CLASH cluster MACSJ1206	Stefano Ettori, Mauro Sereno, Sandra Burkutean, Piero Rosati
179-17	Sunyaev-Zel'dovich follow-up of XXL galaxy clusters at z~1 with NIKA2	Marina Ricci, Remi Adam, Bruno Altieri, Christophe Benoist, Mark Birkinshaw, Malcolm Bremer, Alberto Cappi, Dominique Eckert, Lorenzo Faccioli, Chiara Ferrari, Sotiria Fotopoulou, Fabio Gastaldello, Oliver Hahn, Cathy Horellou, Elias Koulouridis, Adam Mantz, Ben Maughan, Sophie Maurogordato, Florian Pacaud, Marguerite Pierre, Emanuela Pompei, Mauro Sereno

Project	Title	Authors
180-17	tSZ observations of the most massive IR detected galaxy cluster MOO J1142+1527 at z = 1.2	Florian Ruppin, Remi Adam, Monique Arnaud, Mark Brodwin, Marco De Petris, Anthony Gonzalez, Juan Macias-Perez, Frederic Mayet, Laurence Perotto, Etienne Pointecouteau, Gabriel Pratt, Charles Romero, Adam Stanford, Francois-Xavier Desert, Nicolas Ponthieu
181-17	The first intermediate-mass cluster observed at the key epoch of excess entropy growth	Stefano Andreon, Anand Raichoor, Ginevra Trinchieri
183-17	LEGO: Studying Milky Way Line Emission to assess Galaxy Observations	Jens Kauffmann, Paul F. Goldsmith, Karl M. Menten, Frank Bigiel, Friedrich Wyrowski, Simon Glover, Susanne Aalto, Andres Guzman, Dario Colombo, Nina Brinkmann, Laszlo Szucs, Carsten Kramer, Neal Evans, Serena Viti, Valentine Wakelam, Wonju Kim
184-17	Resolving the gamma-ray emission region and the jet collimation profile in TeV blazar Mrk 501	Shoko Koyama, Keiichi Asada, Motoki Kino, Eduardo Ros, Masanori Nakamura, Marcello Giroletti, Gabriele Giovannini, Monica Orienti, Kazunori Akiyama, Kazuhiro Hada, Hiroshi Nagai, Kotaro Niinuma, Wen-Ping Lo, Rocco Lico
185-17	Probing the polarized innermost structure of the relativistic jet of 4C +01.28	Antonio Alberdi Odriozola, Eduardo Ros, Thomas Krichbaum, Alan Marscher, Svetlana Jorstad, Jose L. Gomez, Anton Zensus, Anne-Kathrin Baczko, Sera Markoff, Remo Tilanus, Rebecca Azulay, Miguel Angel Perez-Torres, Juan-Maria Marcaide, Ivan Marti-Vidal, Roberto Angioni, Michael Kreter
186-17	Imaging a unique massive binary BH candidate in OJ287 with the EHT+ALMA	Jose L. Gomez, Thomas Krichbaum, Alan Marscher, Gabriele Bruni, Svetlana Jorstad, Yuri Kovalev, Carolina Casadio, Jae-Young Kim, Rusen Lu, Eduardo Ros, Anton Zensus, Silke Britzen, Tuomas Savolainen, Keiichi Asada, Masanori Nakamura, Kazunori Akiyama, Makoto Inoue, Kazuhiro Hada, Yosuke Mizuno, Mauri Valtonen, Achamveedu Gopakumar, Sunil Chandra, Sera Markoff, Ivan Marti-Vidal, Venkatessh Ramakrishnan, Geoffrey Crew, Cornelia Mueller, Hiroshi Nagai, Monika Moscibrodzka, Christian Fromm, Manel Perucho, Ivan Agudo, Sol N. Molina, Laura Vega-Garcia, Staszek Zola, Alexander Tchekhovskoy, Adam Ingram, Matthew Liska, Michiel van der Klis, Antonio Fuentes, Luciano Rezzolla, Antonio Alberdi Odriozola, Michael Johnson, Sheperd Doeleman
187-17	Hunting for unambiguous signatures of molecular cloud interactions in IRDCs	Jonathan Henshaw, Izaskun Jimenez-Serra, Giuliana Cosentino, Paola Caselli, Ashley Barnes, Benjamin Wu, Francesco Fontani, Serena Viti
188-17	A comprehensive study of D/H and $^{14}N/^{15}N$ spatial signatures around a low-mass protostar	Susanne Wampfler, Jes Jorgensen, Audrey Coutens
189-17	Constraining the initial conditions of star formation with chemistry	Thomas Vidal, Neil Vaytet, Valentine Wakelam, Pierre Gratier
190-17	Probing dynamics of a protostellar envelope and disk	Lee Hartmann, Marina Kounkel, Cecile Favre, David Quenard
191-17	Exploring the envelope-disk interface around young eruptive stars	Orsolya Feher, Peter Abraham, Agnes Kospal, Fernando Cruz-Saenz de Miera
192-17	The kinematics of cold gas in the earliest phases of massive star-formation	Ashley Thomas Barnes, Vlas Sokolov, Paola Caselli, Izaskun Jimenez-Serra, Jonathan Henshaw, Francesco Fontani, Jaime Pineda, Anna Punanova, Jonathan Tan, Shuo Kong, S. Longmore
193-17	Investigating the evolution of internal structure of massive star-forming clumps in the northern sky: from 1 pc to 0.04 pc	Yuxin Lin, Friedrich Wyrowski, Timea Csengeri, HauYu Baobab Liu, Andrea Giannetti, Adam Ginsburg, Roberto Galvan-Madrid, Xindi Tang, Siyi Feng, Zhiyu Zhang, Yuan Wang, Carmen Juarez
194-17	Deuterated molecules in early stages of high-mass star-formation	Friedrich Wyrowski, Karl M. Menten, Timea Csengeri, Rolf Gusten, Thushara Pillai
195-17	Chemical layers of the high-mass disk candidate NGC7538 IRS9	Siyi Feng, Henrik Beuther, Dmitry Semenov, Aida Ahmadi, Joseph C. Mottram, Yuan Wang, HauYu Baobab Liu
196-17	What is the role of molecular gas when galaxies transition from blue to red?	Ute Lisenfeld, Pierre Guillard, Phil Appleton, Katherine Alatalo, Theodoros Bitsakis, Michael Jones, Lourdes Verdes-Montenegro
197-17	Probing the molecular gas content of galaxies in an over-dense group at z ~ 0.7: a test case for environmental quenching	Thierry Contini, Jonathan Freundlich, Benoit Epinat, Philippe Salome, Avishai Dekel, Fangzhou Jiang, G. Soucail, Nicolas Bouche, Leo Michel-Dansac, Hayley Finley, Jarle Brinchmann, Sandro Tacchella, Leindert Boogaard

Project	Title	Authors
D04-17	Centaur object 174P/Echeclus in out-burst! Search for gas emission	Emmanuel Lellouch, Nicolas Biver, Raphael Moreno, Gabriel Paubert, Dominique Bockelee-Morvan
D06-17	The driver of the activity of comet C/2016 R2 at 3 AU	Nicolas Biver, Dominique Bockelee-Morvan, Jacques Crovisier, Raphael Moreno, Gabriel Paubert, Anita Cochran, Adam McKay, Neil Dello Russo, Michael A. Disanti, James Bauer, Mike Kelley
D07-17	mm & submm monitoring in support of MAGIC TeV observations of the radio galaxy 3C 264	Roberto Angioni, Giulia Migliori, Paola Grandi, Eleonora Torresi, Cristian Vignali, Eduardo Ros, Matthias Kadler, Karl Mannheim, Daniela Dorner, Axel Arbet-Engels, Pablo Torne, David Paneque
D08-17	NIKA2 imaging of the Sausage radio relic in March 2018	Kaustuv Basu, Tony Mroczkowski, Charles Romero, Jens Erler, Heather McCarrick, Juan Macias-Perez, Remi Adam
D09-17	A unique opportunity for a simultaneous polarimetric observation of Sgr A* with ALMA and the 30m Telescope	Ivan Agudo, Farhad Yusef-Zadeh, Clemens Thum, Rainer Schoedel, Helmut Wiesemeyer, Ilje Cho, Bong Won Sohn, Taehyun Jung, Guangyao Zhao
D10-17	A massive protoplanetary disk in Cygnus X ?	Nicola Schneider, Markus Roellig, Fernando Comeron, Robert Simon, Sylvain Bontemps, Nick Wright, Ronan Higgins, Christof Buchbender, Mario Guarcello
D11-17	Absorption in the blazar 4C+15.05 at z=0.833	Francoise Combes, Tommy Wiklind
D01-18	A mysterious origin of the CCH and CH_3OH line emission in the OMC-2/3 filament	Mathilde Bouvier, Ana Lopez-Sepulcre, Cecilia Ceccarelli, Claudine Kahane
001-18	Identification of the Activity Driver in Near-Earth Object Don Quixote	Nicolas Biver, Michael Mommert, Matthew Knight, Maria Womack, Kacper Wierzchos, Olga Harrington Pinto, Mike Kelley, David Trilling, Joseph Hora
002-18	Composition of comet 21P/Giacobini-Zinner and its long term evolution	Dominique Bockelee-Morvan, Jacques Crovisier, Raphael Moreno, Jeremie Boissier, Neil Dello Russo, Boncho Bonev, Gabriel Paubert, Katia Hadraoui, Pierre Colom, Nathan Roth, Martin Cordiner, Ronald Vervack, Nicolas Biver
003-18	The formation of molecules due to phase transitions in diffuse translucent clouds	Rainer Mauersberger, Jurgen Kerp, Nicola Schneider, Charitarth Vyas, Sac Nicte Medina, Yik Ki Ma, Laure Bouscasse, Kevin Harrington, Marilyn Cruces, Madhuri Gaikwad
004-18	Constraining the $^{14}N/^{15N}$ gradient in the outer Galaxy	Francesco Fontani, Laura Colzi, Victor Rivilla, Leonardo Testi, Maria Teresa Beltran, Paola Caselli, Davide Elia, Alvaro Sanchez-Monge, Laura Magrini, Luca Bizzocchi
005-18	FIR/mm dust emissivity in L183 and L134	Charlene Lefevre, Laurent Pagani, Hiroyuki Hirashita, Michiel Min
006-18	The first steps of Interstellar Phosphorus Chemistry	Johanna Chantzos, Victor Rivilla, Paola Caselli, Elena Redaelli, Luca Bizzocchi
007-18	Spectral scan below 83 GHz in B1b and TMC-1	Nuria Marcelino, Jose Cernicharo, Evelyne Roueff, Belen Tercero, Maryvonne Gerin, Asuncion Fuente
008-18	Detectability of complex organic molecules in the Galactic cold cores catalog (a pilot study)	Charlotte Vastel, Julien Montillaud, Isabelle Ristorcelli, Mika Juvela, Jorma Harju, Tie Liu, L. Viktor Toth, Karine Demyk
009-18	Methanol emission around starless cores	David Quenard, Izaskun Jimenez-Serra, Serena Viti, Paola Caselli, Anton Vasyunin, Silvia Spezzano
010-18	$HC^{17}O^+$ Hyperfine Emission in L1544	Aonghus Mullins, Silvia Spezzano, Paola Caselli
011-18	A study of complex organic species in the prestellar core L694-2	Charlotte Vastel, Paola Caselli, Silvia Spezzano, Izaskun Jimenez-Serra, Luca Bizzocchi
012-18	Direct measurement of the $CN/C^{15}N$ isotopic ratio in the L1498 prestellar core	Pierre Hily-Blant, Francois Lique, Alexandre Faure, Thierry Forveille, Joel Kastner, Victor de Souza Magalhaes, Guillaume Pineau des Forets
013-18	Distribution of methanol towards the dense cores of the L1495 filament	Anna Punanova, Paola Caselli, Yancy Shirley, Anton Vasyunin, Samantha Scibelli
014-18	Deuterated molecules toward the early-stage pre-stellar core L1521E	Zsofia Nagy, Silvia Spezzano, Paola Caselli, Mario Tafalla
015-18	Distribution of NS+ emission in cold clouds	Nuria Marcelino, Jose Cernicharo, Belen Tercero, Marcelino Agundez
016-18	Probing the gas and dust evolution in the prototypical starless cores TMC1-C2 and TMC1-CP	Sandra Trevino-Morales, Asuncion Fuente, Jason Kirk, J. Malinen, Carsten Kramer, Bilal Ladjelate, Valentine Wakelam, Paola Caselli, Jaime Pineda, Alvaro Hacar, Izaskun Jimenez-Serra, David Navarro Almaida, Pierre Gratier, Belen Tercero, Rafael Bachiller, Pablo Riviere-Marichalar, Santiago Garcia-Burillo, Tomas Alonso-Albi, Valerio Lattanzi

Project	Title	Authors
017-18	New sulfur species in the Horsehead nebula	Pablo Riviere-Marichalar, Asuncion Fuente, Javier R. Goicoechea, Jerome Pety, Maryvonne Gerin, Evelyne Roueff, Viviana Guzman Veloso, Romane Le Gal, Jean-Christophe Loison, Valentine Wakelam, Pierre Gratier, Thomas Vidal
018-18	Do hot corinos age from Class 0 to Class I?	Eleonora Bianchi, Cecilia Ceccarelli, Ana Lopez-Sepulcre, Claudio Codella, Claudine Kahane, Bertrand Lefloch, Joan Enrique-Romero, Charlene Lefevre, Mathilde Bouvier, Juan Ospina-Zamudio, Fanny Vazart, Rafael Bachiller
020-18	Tracing Ambipolar Diffusion in a Protostellar Clump	Elena Redaelli, Paola Caselli, Jaime Pineda, Felipe Alves, Alvaro Hacar, Luca Bizzocchi, Bo Zhao
021-18	A survey of the HCN and HNC C and N isotopic ratios in nearby star formation regions	Victor de Souza Magalhaes, Pierre Hily-Blant, Alexandre Faure
022-18	The spatial distribution of $N^{15}NH^+$: the next step to unveil the chemistry of ^{15}N fractionation	Elena Redaelli, Paola Caselli, Luca Bizzocchi, Ana Chacon-Tanarro
023-18	Supplementary CO observations of the collision region in L1188	Yan Gong, Xindi Tang, Ruiqing Mao
024-18	How to explain the extremely narrow linewidth in G157.25?	Chuanpeng Zhang, Yuan Wang, Guang-Xing Li, Xiao-Lan Liu, Jin-Long Xu
026-18	The magnetic field in photodissociation regions	Marta Alves, Paolo Pilleri, Edith Falgarone, Katia Ferriere, Berne Olivier, Richard Crutcher, Jose Cernicharo, Javier R. Goicoechea, Asuncion Fuente, Gabriel Paubert, Carsten Kramer
027-18	Hydrocarbons in molecular gas irradiated by O and B-type stars	Dmitry Semenov, Anna Punanova, Maria S. Kirsanova
028-18	M43 and M17SW: A multi-wavelength CO comparison against [^{12}CII] and [^{13}CII]	Cristian Guevara, Jurgen Stutzki
029-18	Origin of HCO as precursors of complex organic molecules toward dust clumps	Wonju Kim, Thushara Pillai, Friedrich Wyrowski, James Urquhart, Min-Young Lee, Carsten Kramer
031-18	California as a laboratory for filament evolution	Law Chi Yan, Hongli Liu, Ralf Klessen, Rodrigo Hernan Alvarez Gutierrez, Stefan Reissl, Amelia Stutz
033-18	Sampling Orion A and California	Mario Tafalla, Antonio Usero, Alvaro Hacar
034-18	Characterizing the dust properties in a high-mass star forming region: a wide-field of NGC 7538	Alessia Ritacco, Yoshito Shimajiri, Anaelle Maury, Frederique Motte
035-18	Early phases of high-mass star formation: kinematics and chemistry in different environments	Siju Zhang, Jinghua Yuan, Annie Zavagno, Yuefang Wu, Siyi Feng, Tie Liu, Chang Zhang, Hongli Liu
037-18	Kinetic Temperature Structure of Massive Dense Clumps	Xindi Tang, Christian Henkel, Karl M. Menten, Yan Gong, Yuxin Lin, Xingwu Zheng, Jarken Esimbek, Jian-Jun Zhou, Da-Lei Li, Yu-Xin He
038-18	Mass accretion flows in the high-mass star-forming complex NGC6334	Alvaro Sanchez-Monge, Mahya Sadaghiani, Atefeh Aghababaei, Peter Schilke
040-18	A pilot study to investigate the enigma of the correlation between virial parameter and clump mass	Alessio Traficante, Sergio Molinari, Gary Fuller, Nicolas Peretto, Thushara Pillai, Manuel Merello, Eugenio Schisano, Davide Elia, Stefano Pezzuto, Milena Benedettini, Peter Schilke, Brian Svoboda, Ana Duarte Cabral, Patrick Hennebelle, Javier Ballesteros-Paredes, Enrique Vazquez-Semadeni
041-18	Widespread SiO Emission in the Filamentary Infrared Dark Cloud G034.77-00.55	Giuliana Cosentino, Izaskun Jimenez-Serra, Serena Viti, Paola Caselli, Jonathan Henshaw, Ashley Thomas Barnes, Jonathan Tan
043-18	The signatures of SN-triggered star formation in the CMa OB1 association	Beatriz Fernandes, Bertrand Lefloch, Jane Gregorio-Hetem
045-18	Exploring the molecular environment of SNR VRO42.05.01	Maria Arias, Ping Zhou, Jacco Vink
046-18	A Multi-Wavelength View of the Sgr A Complex	Pablo Garcia, Martin Steinke, Robert Simon, Markus Roellig
048-18	Density profiles of outer halos of PNe and their implications for mass-loss histories	Juan Luis Verbena, Valentin Bujarrabal, Javier Alcolea
050-18	The Millimeter Spectral Slope of the Brightest Debris Discs to Determine their Collisional State	Jean-Francois Lestrade
051-18	A Possible Source of ^{15}N: Observations of Planetary Nebulae with Potential J-Type Progenitors	Deborah Rose Schmidt, Lucy Ziurys
052-18	Exploring the Chemical Inventory of the Remarkable Planetary Nebula K4-47: Confirmation of ScS	Deborah Rose Schmidt, Lucy Ziurys

Project	Title	Authors
053-18	Molecular gas associated with LBV HD168625	Cristobal Bordiu, Jose Ricardo Rizzo, Alessia Ritacco, Christian Henkel
054-18	Millimeter observations of the binary system V773 Tau A	Sac Nicte Medina, Sergio Dzib, Gisela Ortiz Leon, Maria Massi, Karl M. Menten, Laurent Loinard, Luis Felipe Rodriguez
056-18	The gas-phase precursors of dust in the envelopes of oxygen-rich stars	Sarah Massalkhi, Marcelino Agundez, Jose Cernicharo, Luis Velilla Prieto
057-18	The formation of methanol in post-AGB shocks	Rebeca Soria-Ruiz, Javier Alcolea, Valentin Bujarrabal, J.-F. Desmurs, Guillermo Quintana-Lacaci, Carmen Sanchez Contreras
058-18	Mapping Jet-ISM Interaction Zones near Black Hole X-ray Binaries with HERA	Alexandra Tetarenko, Erik Rosolowsky, Gregory Sivakoff, James Miller-Jones
059-18	Compact Gas Clumps in M31	Sihan Jiao, HauYu Baobab Liu, Yuxin Lin, Zhiyu Zhang, Di Li, Jingwen Wu
060-18	Dense Gas in Subsolar Metallicity Galaxies	Jonathan Braine, John M. Cannon, Carsten Kramer
061-18	Deriving dense gas optical depth and carbon abundance for the first time in a normal disk galaxy: NGC 6946	Maria Jesus Jimenez Donaire, Diane Cormier, Antonio Usero, Adam Leroy, Frank Bigiel, Johannes Puschnig, Glen Petitpas, Amanda Kepley, Dimitris Chatzigiannakis
063-18	Spatially resolved observations of molecular gas along the disk of the CHANGES galaxies	Li Jiangtao
064-18	Do the most MASSIVE galaxies lack cold gas?	Timothy Davis, Chung-Pei Ma, Jenny Greene, John Blakeslee
065-18	Probing the effect of the cluster environment on molecular gas of distant brightest cluster galaxies	Gianluca Castignani, Francoise Combes, Philippe Salome
067-18	IRAM 30m high angular follow-up observations on large scale molecular outflows in NGC 3628	An-Li Tsai, Edwige Chapillon, Chorng-Yuan Hwang
069-18	Molecular gas in HI detected Ultra-diffuse galaxies (UDGs)	Kai Yang, Yong Shi, Zhiyu Zhang, Fei Li, Juan Li, Junzhi Wang, Wu Yajun
070-18	Characterizing the millimeter emission in nearby galaxies using NIKA02	Isabella Lamperti, Amelie Saintonge, Christine Wilson, Ilse De Looze, Matthew Smith, Mark T. Sargent, Elias Brinks, Ting Xiao, Ho Seong Hwang, Christopher Clark, Lihwai Lin
071-18	Unraveling the nature of jet-mode AGN in galaxies with active star formation	Reinier Janssen, Nicole Nesvadba, Huub Rottgering, Jarle Brinchmann, Philip Best
072-18	Molecular gas in post-starbust Quasar hosts	Peng Wei, Qiusheng Gu, Yong Shi, Hao Chen, Michael Brotherton
073-18	A candidate for the largest radio-loud quasar of 8.3 Mpc size (z = 1.636)	Francoise Combes, Pratik Dabhade, Joydeep Bagchi, Philippe Salome, Huub Rottgering
077-18	Stephan's Quintet and the effect of interactions on galaxy evolution	Madeleine Yttergren, S. Elaheh Hosseini, Alvaro Sanchez-Monge, Andreas Eckart
078-18	MAPI: Monitoring AGN with Polarimetry at the IRAM 30m Telescope	Ivan Agudo, Carolina Casadio, Jae-Young Kim, Ioannis Myserlis, Efthalia Traianou, Thomas Krichbaum, Emmanouil Angelakis, Eduardo Ros, Helmut Wiesemeyer, Anton Zensus, Clemens Thum, Alessia Ritacco, Sol N. Molina, Antonio Fuentes, Jose L. Gomez, Venkatessh Ramakrishnan, Alan Marscher, Svetlana Jorstad
080-18	The molecular gas of low-redshift submm galaxies	Ivan Oteo
082-18	NIKA2 Observations of the JWST Time Domain Field	Seth Cohen, Rogier Windhorst, Rolf Jansen, Sean Bryan, P. Mauskopf, Bilal Ladjelate
083-18	A NIKA2 survey of dusty starbursts in the early Universe	Ivan Oteo
085-18	A Pilot Cosmological NIKA2 Survey in The North Ecliptic Pole Field ("A PiCNik in the NEP Field")	Denis Burgarella, Stephen Serjeant, Firas Mazyed, Samuel Boissier, David Clements, Gianfranco De Zotti, Tomo Goto, Michal J. Michalowski, Kouichiro Nakanishi, Alain Omont, M. Ouchi, Chris Pearson, Tsutomu Takeuchi, M. Vaccari, I. Valtchanov, Paul van der Werf, Glenn White, Fangting Yuan, Nicolas Ponthieu
086-18	Confirming two bright lensed Dusty Starbursts at z=2	Helmut Dannerbauer, Susana Iglesias-Groth, Rafael Rebolo Lopez, Anastasio Diaz-Sanchez
087-18	[Continuation] Spectroscopic red-shifts of four z > 4 HerBS sources in NGP and GAMA	Tom Bakx, Paul van der Werf, Helmut Dannerbauer, Rob Ivison, Stephen Serjeant, David Clements, Gianfranco De Zotti, Andrea Lapi, Steve Eales, Pasquale Temi, Michal J. Michalowski, Joaquin Gonzalez-Nuevo, Ivan Oteo, Matthew Smith

Project	Title	Authors
088-18	Searching for evidence of cooling in CLASH clusters	Mamta Pommier, Francoise Combes, Stephen Leslie Hamer, Johan Richard, Bruno Guiderdoni
089-18	A Rich Background of SMGs associated with a SZ candidate in the Direction of the Star GJ526 initially Searched for a Large Debris Disk	Jean-Francois Lestrade, Guilaine Lagache, Alexandre Beelen, Juan Macias-Perez, Matthieu Bethermin
090-18	NIKA2 High-Resolution Measurement of the Shock and Sub-cluster Peculiar Velocity in a Potential Line of Sight Bullet-like Cluster	Tony Mroczkowski, Remi Adam, M. Calvo, Tracy Clarke, Francois-Xavier Desert, Luca Di Mascolo, Steve Eales, Juan Macias-Perez, Brian Mason, P. Mauskopf, Frederic Mayet, Heather McCarrick, Laurence Perotto, Etienne Pointecouteau, Charles Romero, Craig Sarazin
091-18	NIKA2 Sunyaev-Zel'dovich Imaging of the AGN-driven X-ray Cavities in MS 0735.6+7421	Tony Mroczkowski, Luca Di Mascolo, Remi Adam, Zubair Abdulla, Paola Andreani, Monique Arnaud, Kaustuv Basu, Elizabeth Blanton, Esra Bulbul, John Carlstrom, Jens Chluba, Eugene Churazov, Tracy Clarke, Mark Devlin, Simon Dicker, Jens Erler, Kristian Ehlert, Torsten Enszlin, Robert Laing, Juan Macias-Perez, Adam Mantz, Daniel Marrone, Brian Mason, Heather McCarrick, Daisuke Nagai, Frederic Mayet, Jeff McMahon, Brian McNamara, P. Nulsen, Christine O'Donnell, Frits Paerels, Laurence Perotto, C. Pfrommer, Etienne Pointecouteau, Gabriel Pratt, Helen Russell, Florian Ruppin, Charles Romero, Craig Sarazin, Jack Sayers, J. Sievers, Sara Stanchfield, Rashid Sunyaev, Adrian Vantyghem, Norbert Werner, Michael Wise
092-18	A Comprehensive Study of Shocks and ICM physics in Abell 2146	Charles Romero, Sara Stanchfield, Brian Mason, Helen Russell, Frederic Mayet, Juan Macias-Perez, Tony Mroczkowski, Tracy Clarke, Craig Sarazin, Massimo Gaspari, Florian Ruppin, Heather McCarrick, Eugene Churazov, Stefano Andreon, Simon Dicker, Mark Devlin, Luca Di Mascolo
093-18	Thermodynamic profiles of the first matter-selected clusters	Stefano Andreon, Ginevra Trinchieri, Bilal Ladjelate, Charles Romero, Pranjal RS
094-18	Sunyaev-Zel'dovich follow-up of XXL galaxy clusters at z~1 with NIKA2	Marina Ricci, Remi Adam, Bruno Altieri, Christophe Benoist, Mark Birkinshaw, Malcolm Bremer, Alberto Cappi, Dominique Eckert, Lorenzo Faccioli, Sotiria Fotopoulou, Fabio Gastaldello, Oliver Hahn, Cathy Horellou, Elias Koulouridis, Adam Mantz, Ben Maughan, Sophie Maurogordato, Florian Pacaud, Marguerite Pierre, Emanuela Pompei, Mauro Sereno
095-18	High Angular Resolution tSZ Mapping of the Most Massive Galaxy Clusters at z > 0.9	Mark Brodwin, Marshall Bautz, Bandon Decker, Peter Eisenhardt, Anthony Gonzalez, Daniel Marrone, Michael McDonald, Wenli Mo, Christine O'Donnell, Alexandra Pope, Florian Ruppin, Adam Stanford, Dominika Wylezalek
096-18	Dynamic and Radiative Feedback of Massive Stars	Javier R. Goicoechea, Nuria Marcelino, O. Berne, Alexander Tielens, David Teyssier, Cornelia Pabst, Ronan Higgins, Jurgen Stutzki, Mark Wolfire, Slawa Kabanovic, Sumeyye Suri, Christof Buchbender, Alvaro Hacar, Carsten Kramer, Sara Cuadrado
097-18	Investigating the kinematic imprints of an interstellar collision	Jonathan Henshaw, Izaskun Jimenez-Serra, Giuliana Cosentino, Paola Caselli, Benjamin Wu, Francesco Fontani, Serena Viti, Ashley Thomas Barnes, Jonathan Tan, Juan Diego Soler
098-18	The efficiency of formation of dense cores in IRDCs	Andrew Rigby, Nicolas Peretto, Gary Fuller
099-18	A survey of the circumstellar environment of eruptive young stars: Mapping the envelopes of northern FUors on a thousand au scale	Orsolya Feher, Agnes Kospal, Peter Abraham, HauYu Baobab Liu, Fernando Cruz-Saenz de Miera, M. Dunham, Michihiro Takami
100-18	Constraining the initial conditions of star formation with chemistry	Thomas Vidal, Neil Vaytet, Valentine Wakelam, Pierre Gratier, Audrey Coutens
101-18	A comprehensive study of D/H and $^{14}N/^{15}N$ spatial signatures around a low-mass protostar	Susanne Wampfler, Jes Jorgensen, Audrey Coutens
102-18	Are fibres involved in the earliest stages of low-mass filament fragmentation?	Jan Orkisz, Nicolas Peretto, Evelyne Roueff, Harvey Liszt, Maryvonne Gerin, Jerome Pety, Javier R. Goicoechea, Albrecht Sievers, Karin Oberg, Pierre Gratier, Viviana Guzman Veloso, Sebastien Bardeau, Franck Le Petit, Francois Levrier, Pascal Tremblin, Emeric Bron, Annie Hughes, David Languignon, Jouni Kainulainen

Project	Title	Authors
103-18	A survey of the circumstellar environment of eruptive young stars: Multi-wavelength and multi-scale study of the envelope and disk structure around FUors	Orsolya Feher, Agnes Kospal, Peter Abraham, HauYu Baobab Liu, Fernando Cruz-Saenz de Miera, M. Dunham, Michihiro Takami
104-18	Chemical layers of the high-mass disk candidate NGC7538 IRS9	Yuan Wang, Siyi Feng, Henrik Beuther, Dmitry Semenov, Aida Ahmadi, Joseph C. Mottram, HauYu Baobab Liu, Vivien Chen
105-18	Investigating the evolution of internal structure of massive star-forming clumps in the northern sky: from 1 pc to 0.04 pc	Yuxin Lin, Friedrich Wyrowski, Timea Csengeri, HauYu Baobab Liu, Andrea Giannetti, Adam Ginsburg, Roberto Galvan-Madrid, Xindi Tang, Zhiyu Zhang, Yuan Wang, Carmen Juarez, Siyi Feng
106-18	Understanding the chemical complexity in massive star-forming regions: the case of AFGL 2591	Caroline Gieser, Henrik Beuther, Dmitry Semenov, Aida Ahmadi, Joseph C. Mottram, Hendrik Linz, Siyi Feng
107-18	Characterising outflows from High Mass Stars	Nichol Cunningham, Luke Maud, Stuart Lumsden, Katharine Johnston, Toby Moore, Joseph C. Mottram, Simon Purser
108-18	Deuterated molecules in early stages of high-mass star-formation	Friedrich Wyrowski, Karl M. Menten, Timea Csengeri, Thushara Pillai, Andrea Giannetti, Stefano Bovino
109-18	Dense gas depletion time in the interacting galaxy NGC 2276	Neven Tomicic, Eva Schinnerer, Annie Hughes, Kathryn Kreckel, Miguel Querejeta, Jerome Pety, Santiago Garcia-Burillo, Florent Renaud, S. Meidt, Toshiki Saito, Christopher Faesi
110-18	What is the role of molecular gas when galaxies transition from blue to red?	Ute Lisenfeld, Phil Appleton, Katherine Alatalo, Pierre Guillard, Theodoros Bitsakis, Lourdes Verdes-Montenegro, Michael Jones
GMVA-17B-203-MG004	Understanding jet formation and testing the binary SMBH model in OJ287	Jose L. Gomez, Thomas Krichbaum, Andrei Lobanov, Alan Marscher, Gabriele Bruni, Svetlana Jorstad, Stefanie Komossa, Yuri Kovalev, Antonio Fuentes, Carolina Casadio, Jae-Young Kim, Laura Vega-Garcia, Ivan Marti-Vidal, Jeffrey Hodgson, Kazunori Akiyama, Ivan Agudo, Sol N. Molina, Uwe Bach, Yosuke Mizuno, Jose M. Marti, Manel Perucho, Eduardo Ros, Anton Zensus, Marshall Cohen
GMVA-17B-260-MJ001	Imaging the Global Accretion and Outflow of Sgr A*: 3mm VLBI with GMVA+ALMA	Michael Johnson, Christiaan Brinkerink, Thomas Krichbaum, Freek Roelofs, Sera Markoff, Sheperd Doeleman, Lindy Blackburn, Cornelia Mueller, Geoffrey Bower, Heino Falcke, V. Fish, Monika Moscibrodzka, Jason Dexter, Keiichi Asada, Dimitrios Psaltis, Roman Gold, Hotaka Shiokawa, Michael Janssen, Sara Issaoun, Rebecca Azulay, David Hughes, Gopal Narayanan, Atish Kamble, Laurent Loinard, Antonio Hernandez, Remo Tilanus, Gisela Ortiz, Avery Broderick, Raquel Fraga-Encinas, Ciriaco Goddi, Anton Zensus, Grant Wilson, Kazuhiro Hada, Motoki Kino, Jonathan McKinney, Andrew Chael, Katherine Bouman, Mareki Honma, Kazunori Akiyama, Rusen Lu, Michael Kramer, James Cordes, John Wardle, Dick Plambeck, Feryal Ozel, James Moran, Daniel Marrone, Junhan Kim, Lia Medeiros, Chi-kwan Chan, Eduardo Ros, Shami Chatterjee, Scott Ransom, Robert Wharton
GMVA-17B-304-ML005	Lifting the Curtain in M87: From Accretion to Jet Formation	Rusen Lu, Keiichi Asada, Kazuhiro Hada, Thomas Krichbaum, Kazunori Akiyama, Walter Alef, Rebecca Azulay, Lindy Blackburn, Geoffrey Bower, Silke Britzen, Michael Bremer, Avery Broderick, Vivek Dhawan, Sheperd Doeleman, Akihiro Doi, Heino Falcke, V. Fish, Gabriele Giovannini, Jose L. Gomez, Marcello Giroletti, Paul Ho, Mareki Honma, David Hughes, Makoto Inoue, Michael Johnson, Jae-Young Kim, Motoki Kino, Shoko Koyama, Michael Lindqvist, Andrei Lobanov, Ivan Marti-Vidal, Alan Marscher, Satoki Matsushita, Monika Moscibrodzka, Jonathan McKinney, Shin Mineshige, Cornelia Mueller, Hiroshi Nagai, Masanori Nakamura, Gopal Narayanan, Scott Noble, Monica Orienti, Hung-Yi Pu, Eduardo Ros, H. Rottmann, Tuomas Savolainen, Karl-Friedrich Schuster, Hotaka Shiokawa, Pablo de Vicente, R. Craig Walker, John Wardle, Anton Zensus

Project	Title	Authors
GMVA-17B-324-ML006	Magnetic field in the vicinity of central black holes in 3C273 and 3C279	Andrei Lobanov, Jose L. Gomez, Kazunori Akiyama, Keiichi Asada, Ivan Agudo, Rebecca Azulay, Gabriele Bruni, V. Fish, Antonio Fuentes, Denise Gabuzda, Svetlana Jorstad, Jae-Young Kim, Yuri Kovalev, Thomas Krichbaum, Rusen Lu, Alan Marscher, Ivan Marti-Vidal, Eduardo Ros, Tuomas Savolainen, Kirill Sokolovsky, Efthalia Traianou, Laura Vega-Garcia, Anton Zensus
GMVA-18A-206-MK007	GMVA Survey of TeV-Blazars as a Legacy for the CTA Era	Matthias Kadler, Eduardo Ros, Roberto Angioni, Rebecca Azulay, Anne-Kathrin Baczko, Stefan Funk, Thomas Krichbaum, Karl Mannheim, Roopesh Ojha, Robert Schulz, Anton Zensus
GMVA-18A-214-MM013	Millimeter-wave Imaging of the Gamma-Ray Emitting Regions of Blazar Jets	Alan Marscher, Thomas Krichbaum, Carolina Casadio, Efthalia Traianou, Jae-Young Kim, Jeffrey Hodgson, Nicholas MacDonald, Jose L. Gomez, Ivan Agudo, Antonio Fuentes, Svetlana Jorstad, Bong Won Sohn, Michael Bremer
GMVA-18A-266-MV001	Search for an intermediate-mass gravitational lens towards PKS1413+135: Epoch 2	Harish Vedantham, A. C. S. Readhead, Talvikki Hovatta, Walter Max-Moerbeck, Timothy J. Pearson, Preeti Kharb
GMVA-18A-335-MB009	Probing the jet formation region in NGC 315	Biagina Boccardi, Thomas Krichbaum, Anton Zensus
GMVA-18B-046-MB10	Probing the jet formation region in NGC 315	Biagina Boccardi, Thomas Krichbaum, V. Karamanavis, Anton Zensus
GMVA-18B-225-MB11	A high resolution multi-frequency study of the jet launching region in Cygnus A	Uwe Bach, Biagina Boccardi, Thomas Krichbaum, Andrei Lobanov, Efthalia Traianou, Eduardo Ros, Yurii Pidopryhora, Yuri Kovalev
GMVA-18B-145-MM15	Millimeter-wave Imaging of the Gamma-Ray Emitting Regions of Blazar Jets	Alan Marscher, Thomas Krichbaum, Carolina Casadio, Efthalia Traianou, Jeffrey Hodgson, Nicholas MacDonald, Jose L. Gomez, Ivan Agudo, Antonio Fuentes, Svetlana Jorstad, Biagina Boccardi, Jae-Young Kim, Bong Won Sohn, Michael Bremer
GMVA-18B-051-MK8	High-resolution Observations of TeV-Blazars as a Legacy for the CTA Era	Matthias Kadler, Eduardo Ros, Roberto Angioni, Anne-Kathrin Baczko, Stefan Funk, Thomas Krichbaum, Karl Mannheim, Roopesh Ojha, Robert Schulz, Anton Zensus

NOEMA INTERFEROMETER

Projet	Title	Authors
I17AA	Deuterium fractionation in Class I L1455 IRS1	Charlene Lefevre
I17AB	The first full mosaic of pre-biotic formamide in the L1157 shock laboratory	Ana Lopez-Sepulcre
I17AC	Isotopologue ratio in a protoplanetary disk	Vincent Pietu, Edwige Chapillon
I17AD	Spectral survey of the young Planetary Nebula NGC7027	Michael Bremer
I17AG	A spatially resolved 3mm Line Survey of the metal-poor dwarf galaxy IC10: Studying starburst under 'extreme' conditions	Melanie Krips, Cinthya Herrera Contreras, Roberto Neri
D17SA	A 3mm spectral survey of a bright z=5.2 lensed submillimeter galaxy	Karl Schuster, Cinthya Herrera Contreras, Roberto Neri
E17AF	Probing the shocked gas origin of the remarkable QSO host galaxy Q2349+12	Scott Chapman, Melanie Krips, Ian Smail, Frank Bertoldi, Arif Babul, Axel Weiss
E17AH	The nucelus of comet C/2016 R2 (PanSTARRS)	Jeremie Boissier, Nicolas Biver, Dominique Bockelee-Morvan, Emmanuel Lellouch, Raphael Moreno, Jacques Crovisier, Gabriel Paubert
L14AB	Fragmentation and disk formation during high-mass star formation	Henrik Beuther, Thomas Henning, Hendrik Linz, Siyi Feng, Katharine Johnston, Rolf Kuiper, Sarah Ragan, Dmitry Semenov, Frederic Gueth, Jan Martin Winters, Karl M. Menten, James Urquhart, Timea Csengeri, Pamela Klaassen, Joseph C. Mottram, Peter Schilke, Melvin Hoare, Luke Maud, Stuart Lumsden, Maria Teresa Beltran, Riccardo Cesaroni, Malcolm Walmsley, Alvaro Sanchez-Monge, Qizhou Zhang, Cornelis Dullemond, Frederique Motte, Philippe Andre, Gary Fuller, Nicolas Peretto, Roberto Galvan-Madrid, S. Longmore, Sylvain Bontemps, Th. Peters, Aina Palau, R. Pudritz, Hans Zinnecker
L15AA	Seeds Of Life in Space	Cecilia Ceccarelli, Paola Caselli, Francesco Fontani, Claudio Codella, Bertrand Lefloch, Charlotte Vastel, Jaime Pineda, Andy Pon, Pierre Hily-Blant, Roberto Neri, Luca Bizzocchi, Izaskun Jimenez-Serra, Felipe Alves, Rafael Bachiller, Sandrine Bottinelli, Emmanuel Caux, Gaelle Dumas, Robert Lucas, Linda Podio, Anna Punanova, Nami Sakai, Satoshi Yamamoto, Serena Viti, Anton Vasyunin, Francois Dulieu, Alexandre Faure, Silvia Spezzano, Laurent Wiesenfeld, Nadia Balucani, Ali Jaber, Albert Rimola, Ian Sims, Patrice Theule, Piero Ugliengo, Ana Chacon-Tanarro, Rumpa Choudhury, Vianney Taquet
M18AB	A Comprehensive NOEMA Redshift Survey of the Brightest Herschel Galaxies	Pierre Cox, Tom Bakx, Helmut Dannerbauer, Roberto Neri, Alain Omont, Steve Eales, Rob Ivison, Matthew Lehnert, R. Gavazzi, Stephen Serjeant, Lucia Marchetti, Mattia Negrello, Simon Dye, Dominik A. Riechers, Melanie Krips, Asantha Cooray, Guilaine Lagache, Ismael Perez-Fournon, Ivan Oteo, David Hughes, Hugo Messias, Veronique Buat, Andrew Baker, Catherine Vlahakis, Paul van der Werf, L. Dunne, Chentao Yang, Stefano Berta, Alexandre Beelen, Axel Weiss
W17AC	Constraining the Nitrogen Abundance Towards Class 0 Protostars: A Limited Survey	Kamber Schwarz, Edwin A. Bergin, Sebastien Maret, Sibylle Anderl, Philippe Andre, Arnaud Belloche, Claudio Codella
W17AG	Constraining the initial conditions of star formation with chemistry	Thomas Vidal, Neil Vaytet, Valentine Wakelam, Pierre Gratier
W17AI	Diving into the centre of a pre-stellar core	Ana Chacon-Tanarro, Paola Caselli, Jaime Pineda, Luca Bizzocchi, Silvia Spezzano, Bo Zhao
W17AO	Catching the missing: NOEMA survey of massive cold cores in Cygnus-X	Keping Qiu, Yuwei Wang, Yue Cao, Qizhou Zhang
W17AQ	Chemical differentiation of high-mass protostellar envelopes: clues about the accretion mechanism?	Timea Csengeri, Sylvain Bontemps
W17AV	Radiation-driven Molecular Chemistry in the Planetary Nebula NGC 7027	Joel Kastner, Pierre Hily-Blant, Valentin Bujarrabal, Miguel Santander-Garcia, David Wilner, Jesse Bublitz, Javier Alcolea, Isabel Aleman, R. Montez, Young Sam Yu, Thierry Forveille

Projet	Title	Authors
W17AX	A warm molecular cloud connecting to the progenitor problem of Tycho's supernova remnant	Ping Zhou, Yang Chen
W17AZ	Does CO depletion happen within the first Myr of disk formation?	Ke Zhang, Edwin A. Bergin, Kamber Schwarz
W17BB	A chemical survey of a proto-planetary disk around a low mass star	Stephane Guilloteau, Liton Majumdar, Anne Dutrey, Edwige Chapillon, Vincent Pietu, Dmitry Semenov, Thomas Henning, Richard Teague, Valentine Wakelam
W17BC	Probing the dust trap in AB Aur (II): gas kinematics	Pablo Riviere-Marichalar, Clement Baruteau, Asuncion Fuente, Roberto Neri, Andres Carmona, Marcelino Agundez, Javier R. Goicoechea, Jose Cernicharo, Berne Olivier
W17BF	Measuring the Emission from Altair's Stellar Atmosphere	Jacob White, Jason Aufdenberg, Aaron Boley, Peter Hauschildt, Meredith Hughes, Brenda Matthews, David Wilner
W17BI	Probing the Complex Circumstellar Environment of the Yellow Hypergiant IRC+10420	Ka Tat Wong, Karl M. Menten, Tomasz Kaminski, Nimesh Patel
W17BJ	M1-92 revisited: the chemistry of an ejected common envelope	Javier Alcolea, Valentin Bujarrabal, Carmen Sanchez Contreras, Arancha Castro-Carrizo, Marcelino Agundez, Miguel Santander-Garcia, J.-F. Desmurs
W17BM	Characterizing Rapid Millimeter Frequency Variability in X-ray Binaries	Alexandra Tetarenko, Gregory Sivakoff, Michael Bremer, James Miller-Jones, Thomas Russell
W17BN	Constraining Jet Formation and Evolution with Transient X-ray Binaries	Alexandra Tetarenko, Gregory Sivakoff, Michael Bremer, James Miller-Jones, Dipankar Maitra, Sera Markoff, Simone Migliari, Dave Russell, Thomas Russell
W17BP	Extragalactic Cloud Scale Observations of High Critical Density Tracers - Bridging the Gap to the Milky Way	Frank Bigiel, Antonio Usero, Adam Leroy, Jerome Pety, Eva Schinnerer, Cinthya Herrera Contreras, Maria Jesus Jimenez Donaire, Diane Cormier, Molly Jean Gallagher, Santiago Garcia-Burillo, Diederik Kruijssen, S. Meidt
W17BV	Environment effect in cosmic filaments: mapping CO in HI-deficient galaxies	Gianluca Castignani, Francoise Combes, Pascale Jablonka, Vandana Desai, Rose Finn, Gregory Rudnick
W17BW	A Search for Class I Methanol Masers in Gas Rich Galaxies	Christian Henkel, Xindi Tang, Yan Gong, Silvia Leurini, Karl M. Menten, Andrey Sobolev
W17BX	AGN jet-ISM interaction in the nuclear regions of NGC 3079	Ming-Yi Lin, Richard Davies, Thomas Taro Shimizu, Leonard Burtscher
W17CB	Mapping CO in the nearest clumpy disk galaxy	David Fisher, Alberto D. Bolatto, Karl Glazebrook, Danail Obreschkow
W17CC	What is the role of molecular gas when galaxies transition from blue to red?	Ute Lisenfeld, Phil Appleton, Katherine Alatalo, Theodoros Bitsakis, Michael Jones, Lourdes Verdes-Montenegro
W17CD	Starvation or inefficient star formation: the crucial role of molecular gas in Green Valley galaxies	Francesco Belfiore, Stefano Carniani, Roberto Maiolino, Lihwai Lin, Matthew Bothwell
W17CE	Absorption and emission in a quasar/galaxy pair at z=0.0519	Francoise Combes, Neeraj Gupta, Gyula I. G. Jozsa, Emmanuel Momjian
W17CM	A hidden dusty core and dense jet in the merger Arp299A?	Susanne Aalto, Sabine Konig, Sergio Martin Ruiz, Sebastien Muller, Naim Ramirez-Olivencia, Miguel Angel Perez-Torres
W17CP	Structure of the III Zw 035 molecular outflow	Dieter Lutz, Eckhard Sturm, Sylvain Veilleux, Richard Davies, Linda Tacconi, Reinhard Genzel
W17CR	Mapping the molecular gas in IRAS17020+4544: a multi-phase AGN outflow in a Seyfert galaxy	Victor Manuel Patino Alvarez, Santiago Garcia-Burillo, Anna Lia Longinotti, Asuncion Fuente, Olga Vega, Chiara Feruglio, Yair Krongold, Francesca Panessa
W17CS	Tracing the Molecular Outflow in F13342+3932 to Test Quasar Feedback Models	Jessie Runnoe, Kayhan Gultekin, David Rupke
W17DB	CO or CI? A comparison of gas tracers at z=1	Nathan Bourne, Michal J. Michalowski, James Simpson, James Dunlop, James Geach, Kate Rowlands
W17DD	CO Rotation Curves in the Outer Disks of z~1-2 Massive Star Forming Galaxies	Reinhard Genzel, Karl-Friedrich Schuster, Linda Tacconi, Sirio Belli, Natascha Forster Schreiber, Dieter Lutz, Erica Nelson, Roberto Neri, Hannah Uebler
W17DG	Detecting the Host Galaxies of Damped Lyman Alpha Systems at z~2	Marcel Neeleman, Nissim Kanekar, J. Xavier Prochaska, Fabian Walter
W17DK	Clarifying the nature of the brightest sub-mm galaxy in the z~2 cluster Cl J1449+0856	Rosemary Coogan, Veronica Strazzullo, Francesco Valentino, Raphael Gobat, Mark T. Sargent, Emanuele Daddi
W17DL	The Gas Content and Excitation Conditions in a Typical Galaxy at the Peak of Cosmic Star Formation Activity	Rodrigo Herrera-Camus, Linda Tacconi, Dieter Lutz, Natascha Forster Schreiber, Reinhard Genzel

Projet	Title	Authors
W17DM	Redshift determination of high-redshift Herschel lensed galaxies	Alain Omont, Roberto Neri, Alexandre Beelen, Steve Eales, Tom Bakx, Raphael Gavazzi, Simon Dye, Rob Ivison, Ismael Perez-Fournon, Ivan Oteo, Helmut Dannerbauer, Frank Bertoldi, Matthew Lehnert, Chentao Yang, Zhiyu Zhang, Gianfranco De Zotti, Dominik A. Riechers, David Clements, Lucia Marchetti, Joshua Greenslade, Melanie Krips, Catherine Vlahakis, Michal J. Michalowski, Andrew Baker, Paul van der Werf
W17DN	Birth of the giants: Molecular gas in two exceptional star-bursting Planck proto-clusters at z=2.15 and z=2.75	Clement Martinache, Herve Dole, Douglas Scott, Benjamin Clarenc, Ryley Hill, Matthew Lehnert, Brenda Frye, Alessandro Rettura, Martin Giard, Mari Polletta, Guilaine Lagache, Alexandre Beelen, Melanie Krips, Emanuele Daddi, Emeric Le Floc'h, Ranga-Ram Chary, Alain Omont, Etienne Pointecouteau, Ruediger Kneissl, Matthieu Bethermin, Ricardo Demarco, Helmut Dannerbauer
W17DT	Molecular gas reservoirs in hyper-luminous QSOs at the cosmic noon	Gabriele Bruni, Manuela Bischetti, Valentina D'Odorico, Chiara Feruglio, Thomas Krichbaum, Enrico Piconcelli, Efthalia Traianou
W17EG	Solving the mystery of a Hyper-Luminous z=4.7 SMG: lensed by an ultra baryon poor halo or a star-bursting cluster at formation?	Laure Ciesla, Emanuele Daddi, Johan Richard, Matthieu Bethermin, Tanio Diaz-Santos, Mark T. Sargent, Chentao Yang, David Elbaz, Mederic Boquien, Tao Wang
W17EH	Giant infants in the early Universe: PolyFiX redshift scans for massive dusty galaxies at z~6	Shuowen Jin, Emanuele Daddi, Daizhong Liu, Vernesa Smolçic, Eva Schinnerer, Qiusheng Gu, Yu Gao, Frank Bertoldi, Antonello Calabro
W17EK	Gas fractions and spectroscopic redshifts of massive main sequence galaxies at z~4-6	Daizhong Liu, Emanuele Daddi, Mark Dickinson, Eva Schinnerer, Frazer Owen, Shuowen Jin, Yu Gao
W17EL	Redshift and ISM Properties of faint NIKA2 z>5 candidates	Nicolas Ponthieu, Remi Adam, Alexandre Beelen, Matthieu Bethermin, Guilaine Lagache, Juan Macias-Perez, Roberto Neri, Alain Omont
W17EM	Measuring the redshift of a very red Herschel galaxy in the North Ecliptic Pole (NEP-L)	Denis Burgarella, Firas Mazyed, Veronique Buat, Javier Alvarez Marquez, Stephen Serjeant, Hideo Matsuhara
W17EQ	Young Quasars in the Early Universe	Anna-Christina Eilers, Chiara Mazzucchelli, Emanuele Paolo Farina, Joseph Hennawi, Fabian Walter, Frederick Davies, Roberto Decarli, Bram Venemans
W17ES	Redshift identification of a z>6 candidate SMG	Soh Ikarashi, Rob Ivison, Karina Caputi, Kotaro Kohno, William Cowley
W17EW	Witnessing the formation of the first large-scale structures in the universe	Roberto Decarli, R. Gilli, M. Mignoli, Cristian Vignali, Eros Vanzella, Marcella Brusa, Andrea Comastri
W17EX	A line scan in the archetypal z=6.42 quasar J1148+5251	Fabian Walter, Dominik A. Riechers, Bade Uzgil, Bram Venemans, Roberto Decarli
W17FA	Redshift and ISM properties of faint NIKA2 z>5 candidates	Nicolas Ponthieu, Remi Adam, Alexandre Beelen, Matthieu Bethermin, Guilaine Lagache, Juan Macias-Perez, Roberto Neri, Alain Omont
W17FB	Confirmation of the [CII] Emission Line from an Ultra-Luminous Source in the Heart of Cosmic Reionization	Pascal Oesch, Fabian Walter, Roberto Decarli, Daniel Schaerer, Frederic Boone, Rychard Bouwens, Miroslava Dessauges-Zavadsky, Richard Ellis, Yoshinobu Fudamoto, Garth Illingworth, Guido Roberts-Borsani, Renske Smit
W17FD	Continued Exploration of [CII] and Dust Emission in a Bright Galaxy at z=11.09	Fabian Walter, Pascal Oesch, Roberto Decarli, Daniel Schaerer, Paul van der Werf, Dominik A. Riechers, Chris L. Carilli, Miroslava Dessauges-Zavadsky, Yoshinobu Fudamoto, Gabriel Brammer, Pieter van Dokkum, Garth Illingworth, Rychard Bouwens, Stephane de Barros
W17FF	A precision test of gamma-ray burst afterglow models	Antonio de Ugarte Postigo, Christina Thone, Daniel Perley, Steve Schulze, Sergio Martin Ruiz, Michael Bremer, Michal J. Michalowski, Sam Kim, David Alexander Kann, Luca Izzo, Katarzyna Bensch, Zach Cano, Daniele Malesani, Ruben Sanchez-Ramirez, Itziar de Gregorio-Monsalvo
S18AA	Investigating the kinematic imprints of an interstellar collision	Jonathan Henshaw, Izaskun Jimenez-Serra, Giuliana Cosentino, Paola Caselli, Benjamin Wu, Francesco Fontani, Serena Viti, Ashley Thomas Barnes, Jonathan Tan, Juan Diego Soler
S18AD	Blow-up on turbulent dissipation in the Polaris Flare	Edith Falgarone, Pierre Hily-Blant, Cinthya Herrera Contreras, Andrew Lehmann, Pierre Lesaffre, Benjamin Godard, Guillaume Pineau des Forets

Projet	Title	Authors
S18AE	A survey of the circumstellar environment of eruptive young stars: Mapping the envelopes of northern FUors on a thousand au scale	Orsolya Feher, Agnes Kospal, Peter Abraham, HauYu Baobab Liu, Fernando Cruz-Saenz de Miera, M. Dunham, Michihiro Takami
S18AG	Constraining disk formation: specific angular momentum from Core to Disk	Jaime Pineda, Paola Caselli, Bo Zhao, Dominique Segura-Cox
S18AJ	Diving into the centre of a pre-stellar core	Ana Chacon-Tanarro, Paola Caselli, Jaime Pineda, Luca Bizzocchi, Silvia Spezzano, Bo Zhao
S18AK	Are fibres involved in the earliest stages of low-mass filament fragmentation?	Jan Orkisz, Nicolas Peretto, Evelyne Roueff, Harvey Liszt, Maryvonne Gerin, Jerome Pety, Javier R. Goicoechea, Albrecht Sievers, Karin Oberg, Pierre Gratier, Viviana Guzman Veloso, Sebastien Bardeau, Franck Le Petit, Francois Levrier, Pascal Tremblin, Emeric Bron, Annie Hughes, David Languignon, Jouni Kainulainen
S18AL	Exploring the kinematics of a subsonic dense core	Jaime Pineda, Anika Schmiedeke, Paola Caselli, Alyssa Goodman, Gary Fuller, Stella Offner
S18AN	Linking large and small scales for two high-mass protostars in NGC7538	Joseph C. Mottram, Henrik Beuther, Aida Ahmadi, Siyi Feng, Hendrik Linz, Thomas Henning
S18AO	Chemical layers of the high-mass disk candidate NGC7538 IRS9	Yuan Wang, Siyi Feng, Henrik Beuther, Dmitry Semenov, Aida Ahmadi, Joseph C. Mottram, HauYu Baobab Liu, Vivien Chen
S18AQ	Is nitrogen fractionation in nitrile bearing species and N2H+ related in massive star-forming cores?	Laura Colzi, Francesco Fontani, Paola Caselli, Luca Bizzocchi, Silvia Leurini
S18AS	Anatomy of a massive and quiescent filament feeding massive star formation	Keping Qiu, Yuwei Wang, Yue Cao, Junhao Liu
S18AT	Characterizing outflows from High Mass Stars	Nichol Cunningham, Luke Maud, Stuart Lumsden, Katharine Johnston, Toby Moore, Joseph C. Mottram, Simon Purser
S18AX	Measuring Millimeter Variability in Young Stars Undergoing Large Accretion Outbursts	Lee Hartmann, Catherine Espaillat, Enrique Macias, Zhaohuan Zhu
S18AY	A chemical survey of a proto-planetary disk around a low mass star	Stephane Guilloteau, Liton Majumdar, Anne Dutrey, Edwige Chapillon, Vincent Pietu, Dmitry Semenov, Thomas Henning, Richard Teague, Valentine Wakelam
S18BA	Pre-transitional disks in the Orion OB1a and 1b subassociations	Nuria Calvet, Karina Mauco, Enrique Macias, Ramiro Franco Hernandez, Jesus Hernandez, Cesar Briceno, Catherine Espaillat, Melissa McClure
S18BH	Testing the Magnetar-Powered Scenario for Super-Luminous Supernovae with NOEMA	Conor Omand, Kazumi Kashiyama, Hiroshi Nagai, Kohta Murase, Casey Law, Geoffrey Bower
S18BM	A Search for Class I Methanol Masers in Gas Rich Galaxies at mm-Wavelengths	Christian Henkel, Simon Ellingsen, Yan Gong, Xindi Tang, Silvia Leurini, Tiege McCarthy, Xi Chen
S18BN	The properties of star formation and post-starburst in a S0 galaxy	Xue Ge, Mengyuan Xiao, Qiusheng Gu, Ruben Garcia-Benito
S18BO	Dense gas depletion time in the interacting galaxy NGC 2276	Neven Tomicic, Eva Schinnerer, Annie Hughes, Kathryn Kreckel, Miguel Querejeta, Jerome Pety, Santiago Garcia-Burillo, Florent Renaud, S. Meidt, Toshiki Saito, Christopher Faesi
S18BT	Searching for HCN Around the Nucleus of the Archetypal Seyfert 1 galaxy NGC 4151	Junfeng Wang, Junzhi Wang
S18BW	The AGN-wind impact on the molecular gas in host galaxies: hunting for multi-phase outflows	Anelise Audibert, Francoise Combes, Kalliopi Dasyra, Philippe Salome
S18BY	Catching AGN Feedback in Action in Extreme Outflows with NOEMA	Edmund Hodges-Kluck, Roberto Decarli, Jong-Hak Woo
S18CA	Probing molecular outflow in the ultra-luminous infrared QSO IRAS F07599+6508 through CO (1-0) observations	Qinghua Tan, Yu Gao, Xiaoyang Xia, Kotaro Kohno, Alain Omont, Caina Hao
S18CD	Environment effect in cosmic filaments: mapping CO in HI-deficient galaxies	Gianluca Castignani, Francoise Combes, Pascale Jablonka, Vandana Desai, Gregory Rudnick
S18CE	Connecting Damped Ly-alpha Systems and Galaxies	Marcel Neeleman, Nissim Kanekar, J. Xavier Prochaska
S18CG	A Redshift Survey of Bright ALMA Identified Sub-millimeter Galaxies in the UDS	Axel Weiss, Mark Swinbank, Fabian Walter, Ian Smail, Stuart Stach, Julie Wardlow, Ugne Dudzeviciute, Bitten Gullberg, Scott Chapman
S18CK	A pilot search for CO emission from the host galaxies of dusty absorbers	Marcel Neeleman, Jingzhe Ma, J. Xavier Prochaska

Projet	Title	Authors
S18CL	An extremely star-forming brightest cluster galaxy (BCG) at z=1.7	Francoise Combes, Gianluca Castignani, Philippe Salome
S18CQ	NOEMA Observations of of a Possible Hyper-luminous Galaxy of LIR ~5 1014 Lsolar at Redshift ~2.1	Yinghe Zhao, Nanyao Lu, Yu Gao, Cong Kevin Xu
S18CR	Redshift determination of high-redshift Herschel lensed galaxies	Alain Omont, Roberto Neri, Alexandre Beelen, Steve Eales, Tom Bakx, Raphael Gavazzi, Simon Dye, Rob Ivison, Ismael Perez-Fournon, Ivan Oteo, Helmut Dannerbauer, Frank Bertoldi, Matthew Lehnert, Chentao Yang, Zhiyu Zhang, Gianfranco De Zotti, Dominik A. Riechers, David Clements, Lucia Marchetti, Joshua Greenslade, Melanie Krips, Catherine Vlahakis, Michal J. Michalowski, Andrew Baker, Paul van der Werf, Pierre Cox
S18CT	Probing the gas conditions in high-redshift submillimeter galaxies with the fine structure lines of neutral atomic carbon	Chentao Yang, Alexandre Beelen, Alain Omont, Roberto Neri, Dominik A. Riechers, Thomas Bisbas, Pierre Cox, Zhiyu Zhang, Paola Andreani, Edwin Retana-Montenegro, Rob Ivison, Yu Gao, Eduardo Gonzalez-Alfonso, Qian Jiao, Melanie Krips, Ivan Oteo, Simona Vegetti, Paul van der Werf, Yinghe Zhao
S18CV	CO (3-2) in the brightest spectroscopically-identified SMGs from SMA followup of the S2CLS survey	Ryley Hill, Douglas Scott, James Geach, Ian Smail, Mark Swinbank, Fabian Walter, Scott Chapman
S18CW	Molecular Gas from an Enormous Lyα Nebula in an Extreme Overdense Field at z=2.3	Helmut Dannerbauer, Ran Wang, Qiong Li, Fabrizio Arrigoni Battaia, Roberto Neri, J. Xavier Prochaska, Xiaohui Fan
S18DA	Understanding the nature of an early population of star forming galaxy clusters at z=3	Emanuele Daddi, Shuowen Jin, Veronica Strazzullo, Tao Wang, Mark T. Sargent, Raphael Gobat, Eva Schinnerer, Vernesa Smolçic, Daizhong Liu, Francesco Valentino, Rosemary Coogan, Antonello Calabro, David Elbaz, Qiusheng Gu, James Neill
S18DB	Confirmation of a candidate group of submillimeter galaxies at z~3	Soh Ikarashi, Rob Ivison, Karina Caputi, William Cowley, Nobunari Kashikawa
S18DC	Probing the gas content and star formation in a z = 3.6 strongly lensed submillimeter galaxy using dense gas tracers and C/O isotopes	Alain Omont, Chentao Yang, Cecilia Ceccarelli, Michel Guelin, Roberto Neri, Alexandre Beelen, Pierre Cox, Yu Gao, Melanie Krips, Zhiyu Zhang, Dominik A. Riechers, Matthew Lehnert, Rob Ivison, R. Gavazzi, Helmut Dannerbauer, Sebastien Muller, Paul van der Werf
S18DG	Rise of the Titans: Identifying Hyper-Luminous Starbursts back to the First Billion Years	Dominik A. Riechers, Ivan Oteo, Rob Ivison, Ismael Perez-Fournon, Roberto Neri, Alain Omont, David Clements, Steven Duivenvoorden
S18DI	PolyFiX redshift scans for massive dusty galaxies at z~6	Emanuele Daddi, Shuowen Jin, Daizhong Liu, Vernesa Smolçic, Eva Schinnerer, Qiusheng Gu, Yu Gao, Frank Bertoldi, Antonello Calabro
S18DK	Investigating CO excitation to trace the evolutionary path of an ultra-luminous, dusty starburst at z=5.7	Riccardo Pavesi, Dominik A. Riechers, Chris L. Carilli, Chelsea Sharon, Nick Scoville, Vernesa Smolçic, Eva Schinnerer
S18DM	A systematic survey of molecular gas in z>6 quasars	Bade Uzgil, Roberto Decarli, Fabian Walter, Bram Venemans, Chris L. Carilli, Jan-Torge Schindler, Dominik A. Riechers
S18DO	FIR properties of the most luminous quasar host at z > 6	Bram Venemans, Jinyi Yang, Xiaohui Fan, Feige Wang, Fabian Walter, Roberto Decarli, Xue-Bing Wu, Fuyan Bian, Ran Wang, Minghao Yue
S18DQ	The ionized gas and dust around an AGN at the epoch of reionization	Frederic Boone, Nicolas Laporte, David Quenard, Pascal Oesch, Richard Ellis, Dan Stark, Guido Roberts-Borsani, Adi Zitrin
S18DR	A precision test of gamma-ray burst afterglow models	Antonio de Ugarte Postigo, Christina Thone, Daniel Perley, Steve Schulze, Sergio Martin Ruiz, Michael Bremer, Michal J. Michalowski, David Alexander Kann, Luca Izzo, Katarzyna Bensch, Daniele Malesani, Ruben Sanchez-Ramirez, Itziar de Gregorio-Monsalvo
D18AA	Probing dynamics of a protostellar envelope and disk	Lee Hartmann, Marina Kounkel, Cecile Favre, David Quenard
W18AB	The nucleus and inner coma of comet 46P/Wirtanen	Jeremie Boissier, Dominique Bockelee-Morvan, Nicolas Biver, Jacques Crovisier, Raphael Moreno, Katia Hadraoui
W18AC	Collapse and fragmentation at the onset of high-mass star formation	Henrik Beuther, Hendrik Linz
W18AS	The Origins of Complex Organic Molecule Emission in Protostars	Dominique Segura-Cox, Paola Caselli, Jaime Pineda, Cecilia Ceccarelli, Ana Lopez-Sepulcre

Projet	Title	Authors
W18BC	Dust at the edges of an extreme environment: The case of Cygnus X-3's "Little Friend"	Lia Corrales
W18BF	Accretion flows in S106	Nicola Schneider, Robert Simon, Timea Csengeri, Fernando Comeron, Markus Roellig, Sylvain Bontemps
W18BN	Gas mass in circumstellar disks younger than 1Myr	Ke Zhang, Edwin A. Bergin, Kamber Schwarz
W18BO	Morphology of gas emission in AB Aur: a Rosetta stone for transition discs	Pablo Riviere-Marichalar, Asuncion Fuente, Clement Baruteau, Roberto Neri, Andres Carmona, Marcelino Agundez, Javier R. Goicoechea, Jose Cernicharo, Rafael Bachiller, Sandra Trevino-Morales
W18CF	Charting the Evolving Molecular Flows Feeding the Eye of the Medusa	Sabine Konig, Susanne Aalto, Sebastien Muller, John Gallagher, Rob Beswick, Melanie Krips, Eva Jutte
W18CV	Tracing the Molecular Outflow in IRAS11598-0112 to Test Quasar Feedback Models	Jessie Runnoe, Kayhan Gultekin, David Rupke
W18DB	Testing AGN feedback models: The CO-rich, dust enshrouded QSO in the heart of cool-core cluster CL 09104+4109	Ewan O'Sullivan, Francoise Combes, Philippe Salome, Somak Raychaudhury, Arif Babul, Raymond Oonk
W18EE	The physical conditions of molecular gas in the earliest quasar host galaxies	Jianan Li, Ran Wang, Roberto Neri, Xiaohui Fan, Dominik A. Riechers, Chris L. Carilli, Fabian Walter, Frank Bertoldi, Michael A. Strauss, Desika Narayanan, Alain Omont, Jeff Wagg, Yali Shao, Qiong Li, Eduardo Banados, Pierre Cox, Roberto Decarli, Karl M. Menten
W18EF	Young Quasars in the Early Universe	Anna-Christina Eilers, Fabian Walter, Roberto Decarli, Bram Venemans, Chiara Mazzucchelli, Emanuele Paolo Farina, Eduardo Banados, Joseph Hennawi, Frederick Davies
W18EI	Characterizing the ISM and gas excitation in the most FIR luminous quasar at z > 6	Bram Venemans, Jinyi Yang, Xiaohui Fan, Feige Wang, Fabian Walter, Roberto Decarli, Xue-Bing Wu, Fuyan Bian, Ran Wang, Minghao Yue
W18EJ	A Comprehensive Study of Quasar Host Galaxy and Cosmic Reionization with a Large Statistical Quasar Sample at z>6.5	Bram Venemans, Jinyi Yang, Feige Wang, Xiaohui Fan, Fabian Walter, Roberto Decarli, Xue-Bing Wu, Ran Wang, Fuyan Bian, Minghao Yue
W18EN	Extremely UV-luminous star-forming galaxies: unveiling the very early phase of SMGs	Ismael Perez-Fournon, Rui Marques-Chaves, Yiping Shu, Camilo E. Jimenez Angel
W18FI	An extreme protocluster at the epoch of reionization	Ivan Oteo, Rob Ivison

Publications

IRAM USERS' COMMUNITY

2338	Rotational spectrum of methoxyamine up to 480 GHz: a laboratory study and astronomical search	Kolesniková L., Tercero B., Alonso E. R., Guillemin J.-C., Cernicharo J., Alonso J. L.	2018, A&A 609, A24
2339	Laboratory measurements and astronomical search for cyanomethanimine	Melosso M., Melli A., Puzzarini C., Codella C., Spada L., Dore L., Degli Esposti C., Lefloch B., Bachiller R., Ceccarelli C., Cernicharo J., Barone V.	2018, A&A 609, A121
2340	Nitrogen and hydrogen fractionation in high-mass star-forming cores from observations of HCN and HNC	Colzi L., Fontani F., Caselli P., Ceccarelli C., Hily-Blant P., Bizzocchi L.	2018, A&A 609, A129
2341	Submillimeter wave spectroscopy of ethyl isocyanide and its searches in Orion	Margulès L., Tercero B., Guillemin J. C., Motiyenko R. A., Cernicharo J.	2018, A&A 610, A44
2342	An ALMA study of the Orion Integral Filament. I. Evidence for narrow fibers in a massive cloud	Hacar A., Tafalla M., Forbrich J., Alves J., Meingast S., Grossschedl J., Teixeira P. S.	2018, A&A 610, A77
2343	Detection of interstellar HCS and its metastable isomer HSC: new pieces in the puzzle of sulfur chemistry	Agúndez M., Marcelino N., Cernicharo J., Tafalla M.	2018, A&A 611, L1
2344	Abundance of SiC_2 in carbon star envelopes	Massalkhi S., Agúndez M., Cernicharo J., Velilla Prieto L., Goicoechea J. R., Quintana-Lacaci G., Fonfría J. P., Alcolea J., Bujarrabal V.	2018, A&A 611, A29
2345	Discovery of the elusive radical NCO and confirmation of H_2NCO^+ in space	Marcelino N., Agúndez M., Cernicharo J., Roueff E., Tafalla M.	2018, A&A 612, L10
2346	First detection of cyanamide (NH_2CN) towards solar-type protostars	Coutens A., Willis E. R., Garrod R. T., Müller H. S. P., Bourke T. L., Calcutt H., Drozdovskaya M. N., Jørgensen J. K., Ligterink N. F. W., Persson M. V., Stéphan G., van der Wiel M. H. D., van Dishoeck E. F., Wampfler S. F.	2018, A&A 612, A107
2347	Deep millimeter spectroscopy observations toward NGC 1068	Qiu J., Wang J., Shi Y., Zhang J., Fang M., Li F.	2018, A&A 613, A3
2348	Imaging the water snowline in a protostellar envelope with $H^{13}CO^+$	van 't Hoff M. L. R., Persson M. V., Harsono D., Taquet V., Jørgensen J. K., Visser R., Bergin E. A., van Dishoeck E. F.	2018, A&A 613, A29
2349	Depletion of ^{15}N in the center of L1544: Early transition from atomic to molecular nitrogen?	Furuya K., Watanabe Y., Sakai T., Aikawa Y., Yamamoto S.	2018, A&A 615, L16
2350	Molecular gas in AzTEC/C159: a star-forming disk galaxy 1.3 Gyr after the Big Bang	Jiménez-Andrade E. F., Magnelli B., Karim A., Jones G. C., Carilli C. L., Romano-Díaz E., Gómez-Guijarro C., Toft S., Bertoldi F., Riechers D. A., Schinnerer E., Sargent M., Michałowski M. J., Fraternali F., Staguhn J. G., Smolčić V., Aravena M., Harrington K. C., Sheth K., Capak P. L., Koekemoer A. M., van Kampen E., Swinbank M., Zirm A., Magdis G. E., Navarrete F.	2018, A&A 615, A25
2351	Unveiling the remarkable photodissociation region of Messier 8	Tiwari M., Menten K. M., Wyrowski F., Pérez-Beaupuits J. P., Wiesemeyer H., Güsten R., Klein B., Henkel C.	2018, A&A 615, A158
2352	Extended ammonia observations towards the integral-shaped filament	Wu G., Qiu K., Esimbek J., Zheng X., Henkel C., Li D., Han X.	2018, A&A 616, A111
2353	SMA observations of polarized dust emission in solar-type Class 0 protostars: Magnetic field properties at envelope scales	Galametz M., Maury A., Girart J. M., Rao R., Zhang Q., Gaudel M., Valdivia V., Keto E., Lai S.-P.	2018, A&A 616, A139
2354	The second-closest gamma-ray burst: sub-luminous GRB 111005A with no supernova in a super-solar metallicity environment	Michałowski M. J., Xu D., Stevens J., Levan A., Yang J., Paragi Z., Kamble A., Tsai A.-L., Dannerbauer H., van der Horst A. J., Shao L., Crosby D., Gentile G., Stanway E., Wiersema K., Fynbo J. P. U., Tanvir N. R., Kamphuis P., Garrett M., Bartczak P.	2018, A&A 616, A169

2355	Millimeter wave spectra of ethyl isocyanate and searches for it in Orion KL and Sagittarius B2	Kolesniková L., Alonso E. R., Tercero B., Cernicharo J., Alonso J. L.	2018, A&A 616, A173
2356	$^{14}N/^{15}N$ ratio measurements in prestellar cores with N_2H^+: new evidence of ^{15}N-antifractionation	Redaelli E., Bizzocchi L., Caselli P., Harju J., Chacón-Tanarro A., Leonardo E., Dore L.	2018, A&A 617, A7
2357	Mapping the $^{13}CO/^{18}CO$ abundance ratio in the massive star-forming region G29.96-0.02	Paron S., Areal M. B., Ortega M. E.	2018, A&A 617, A14
2358	Kinematics of dense gas in the L1495 filament	Punanova A., Caselli P., Pineda J. E., Pon A., Tafalla M., Hacar A., Bizzocchi L.	2018, A&A 617, A27
2359	Detection of the blazar S4 0954+65 at very-high-energy with the MAGIC telescopes during an exceptionally high optical state	MAGIC Collaboration, Ahnen M. L., Ansoldi S., Antonelli L. A., Arcaro C., Baack D., Babić A., Banerjee B., Bangale P., Barres de Almeida U., Barrio J. A., Bednarek W., Bernardini E., Berse R. C., Berti A., Bhattacharyya W., Biland A., Blanch O., Bonnoli G., Carosi R., Carosi A., Ceribella G., Chatterjee A., Colak S. M., Colin P., Colombo E., Contreras J. L., Cortina J., Covino S., Cumani P., da Vela P., Dazzi F., de Angelis A., de Lotto B., Delfino M., Delgado J., di Pierro F., Domínguez A., Dominis Prester D., Dorner D., Doro M., Einecke S., Elsaesser D., Fallah Ramazani V., Fernández-Barral A., Fidalgo D., Fonseca M. V., Font L., Fruck C., Galindo D., García López R. J., Garczarczyk M., Gaug M., Giammaria P., Godinović N., Gora D., Guberman D., Hadasch D., Hahn A., Hassan T., Hayashida M., Herrera J., Hose J., Hrupec D., Ishio K., Konno Y., Kubo H., Kushida J., Kuveždić D., Lelas D., Lindfors E., Lombardi S., Longo F., López M., Maggio C., Majumdar P., Makariev M., Maneva G., Manganaro M., Mannheim K., Maraschi L., Mariotti M., Martínez M., Masuda S., Mazin D., Mielke K., Minev M., Miranda J. M., Mirzoyan R., Moralejo A., Moreno V., Moretti E., Nagayoshi T., Neustroev V., Niedzwiecki A., Nievas Rosillo M., Nigro C., Nilsson K., Ninci D., Nishijima K., Noda K., Nogués L., Paiano S., Palacio J., Paneque D., Paoletti R., Paredes J. M., Pedaletti G., Peresano M., Persic M., Prada Moroni P. G., Prandini E., Puljak I., Garcia J. R., Reichardt I., Rhode W., Ribó M., Rico J., Righi C., Rugliancich A., Saito T., Satalecka K., Schweizer T., Sitarek J., Šnidarić I., Sobczynska D., Stamerra A., Strzys M., Surić T., Takahashi M., Takalo L., Tavecchio F., Temnikov P., Terzić T., Teshima M., Torres-Albà N., Treves A., Tsujimoto S., Vanzo G., Vazquez Acosta M., Vovk I., Ward J. E., Will M., Zarić D., Becerra González J., Tanaka Y., Ojha R., Finke J., Lähteenmäki A., Järvelä E., Tornikoski M., Ramakrishnan V., Hovatta T., Jorstad S. G., Marscher A. P., Larionov V. M., Borman G. A., Grishina T. S., Kopatskaya E. N., Larionova L. V., Morozova D. A., Savchenko S. S., Troitskaya Y. V., Troitsky I. S., Vasilyev A. A., Agudo I., Molina S. N., Casadio C., Gurwell M., Carnerero M. I., Protasio C., Acosta Pulido J. A.	2018, A&A 617, A30
2360	Revisiting the case of R Monocerotis: Is CO removed at R < 20 au	Alonso-Albi T., Riviere-Marichalar P., Fuente A., Pacheco-Vázquez S., Montesinos B., Bachiller R., Treviño-Morales S. P.	2018, A&A 617, A31
2361	Anatomy of the massive star-forming region S106. The [O I] 63 μm line observed with GREAT/SOFIA as a versatile diagnostic tool for the evolution of massive stars	Schneider N., Röllig M., Simon R., Wiesemeyer H., Gusdorf A., Stutzki J., Güsten R., Bontemps S., Comerón F., Csengeri T., Adams J. D., Richter H.	2018, A&A 617, A45
2362	Molecular gas in two companion cluster galaxies at z = 1.2	Castignani G., Combes F., Salomé P., Andreon S., Pannella M., Heywood I., Trinchieri G., Cicone C., Davies L. J. M., Owen F. N., Raichoor A.	2018, A&A 617, A103
2363	Probability distribution functions of gas surface density in M 33	Corbelli E., Elmegreen B. G., Braine J., Thilker D.	2018, A&A 617, A125
2364	Submillimeter-wave emission of three Galactic red novae: cool molecular outflows produced by stellar mergers	Kamiński T., Steffen W., Tylenda R., Young K. H., Patel N. A., Menten K. M.	2018, A&A 617, A129
2365	Sulphur-bearing molecules in AGB stars. II. Abundances and distributions of CS and SiS	Danilovich T., Ramstedt S., Gobrecht D., Decin L., De Beck E., Olofsson H.	2018, A&A 617, A132
2366	Molecular gas masses of gamma-ray burst host galaxies	Michałowski M. J., Karska A., Rizzo J. R., Baes M., Castro-Tirado A. J., Hjorth J., Hunt L. K., Kamphuis P., Koprowski M. P., Krumholz M. R., Malesani D., Nicuesa Guelbenzu A., Rasmussen J., Rossi A., Schady P., Sollerman J., van der Werf P.	2018, A&A 617, A143
2367	Cold gas in a complete sample of group-dominant early-type galaxies	O'Sullivan E., Combes F., Salomé P., David L. P., Babul A., Vrtilek J. M., Lim J., Olivares V., Raychaudhury S., Schellenberger G.	2018, A&A 618, A126

2368	86 GHz SiO maser survey of late-type stars in the Inner Galaxy. IV. SiO emission and infrared data for sources in the Scutum and Sagittarius-Carina arms, 20°< l <50°	Messineo M., Habing H. J., Sjouwerman L. O., Omont A., Menten K. M.	2018, A&A 619, A35
2369	Multi-wavelength characterization of the blazar S5 0716+714 during an unprecedented outburst phase	MAGIC Collaboration, Ahnen M. L., Ansoldi S., Antonelli L. A., Arcaro C., Baack D., Babić A., Banerjee B., Bangale P., Barres de Almeida U., Barrio J. A., Becerra González J., Bednarek W., Bernardini E., Ch Berse R., Berti A., Bhattacharyya W., Biland A., Blanch O., Bonnoli G., Carosi R., Carosi A., Ceribella G., Chatterjee A., Colak S. M., Colin P., Colombo E., Contreras J. L., Cortina J., Covino S., Cumani P., da Vela P., Dazzi F., de Angelis A., de Lotto B., Delfino M., Delgado J., di Pierro F., Domínguez A., Dominis Prester D., Dorner D., Doro M., Einecke S., Elsaesser D., Fallah Ramazani V., Fernández-Barral A., Fidalgo D., Fonseca M. V., Font L., Fruck C., Galindo D., Gallozzi S., García López R. J., Garczarczyk M., Gaug M., Giammaria P., Godinović N., Gora D., Guberman D., Hadasch D., Hahn A., Hassan T., Hayashida M., Herrera J., Hose J., Hrupec D., Ishio K., Konno Y., Kubo H., Kushida J., Kuveždić D., Lelas D., Lindfors E., Lombardi S., Longo F., López M., Maggio C., Majumdar P., Makariev M., Maneva G., Manganaro M., Mannheim K., Maraschi L., Mariotti M., Martínez M., Masuda S., Mazin D., Mielke K., Minev M., Miranda J. M., Mirzoyan R., Moralejo A., Moreno V., Moretti E., Nagayoshi T., Neustroev V., Niedzwiecki A., Nievas Rosillo M., Nigro C., Nilsson K., Ninci D., Nishijima K., Noda K., Nogués L., Paiano S., Palacio J., Paneque D., Paoletti R., Paredes J. M., Pedaletti G., Peresano M., Persic M., Prada Moroni P. G., Prandini E., Puljak I., Garcia J. R., Reichardt I., Rhode W., Ribó M., Rico J., Righi C., Rugliancich A., Saito T., Satalecka K., Schweizer T., Sitarek J., Šnidarić I., Sobczynska D., Stamerra A., Strzys M., Surić T., Takahashi M., Takalo L., Tavecchio F., Temnikov P., Terzić T., Teshima M., Torres-Albà N., Treves A., Tsujimoto S., Vanzo G., Vazquez Acosta M., Vovk I., Ward J. E., Will M., Zarić D., Fermi-Lat Collaboration, Bastieri D., Gasparrini D., Lott B., Rani B., Thompson D. J., MWL Collaborators, Agudo I., Angelakis E., Borman G. A., Casadio C., Grishina T. S., Gurwell M., Hovatta T., Itoh R., Järvelä E., Jermak H., Jorstad S., Kopatskaya E. N., Kraus A., Krichbaum T. P., Kuin N. P. M., Lähteenmäki A., Larionov V. M., Larionova L. V., Lien A. Y., Madejski G., Marscher A., Myserlis I., Max-Moerbeck W., Molina S. N., Morozova D. A., Nalewajko K., Pearson T. J., Ramakrishnan V., Readhead A. C. S., Reeves R. A., Savchenko S. S., Steele I. A., Tornikoski M., Troitskaya Y. V., Troitsky I., Vasilyev A. A., Zensus J. A.	2018, A&A 619, A45
2370	Laboratory rotational spectrum and astronomical search for methoxyacetaldehyde	Kolesniková L., Peña I., Alonso E. R., Tercero B., Cernicharo J., Mata S., Alonso J. L.	2018, A&A 619, A67
2371	A unique distant submillimeter galaxy with an X-ray-obscured radio-luminous active galactic nucleus	Shu X. W., Xue Y. Q., Liu D. Z., Wang T., Han Y. K., Chang Y. Y., Liu T., Huang X. X., Wang J. X., Zheng X. Z., da Cunha E., Daddi E., Elbaz D.	2018, A&A 619, A76
2372	Molecular gas content in obscured AGN at $z > 1$	Perna M., Sargent M. T., Brusa M., Daddi E., Feruglio C., Cresci G., Lanzuisi G., Lusso E., Comastri A., Coogan R. T., D'Amato Q., Gilli R., Piconcelli E., Vignali C.	2018, A&A 619, A90
2373	The millimeter-wave spectrum of methyl ketene and the astronomical search for it	Bermúdez C., Tercero B., Motiyenko R. A., Margulès L., Cernicharo J., Ellinger Y., Guillemin J.-C.	2018, A&A 619, A92
2374	Planck's dusty GEMS. V. Molecular wind and clump stability in a strongly lensed star-forming galaxy at z = 2.2	Cañameras R., Nesvadba N. P. H., Limousin M., Dole H., Kneissl R., Koenig S., Le Floc'h E., Petitpas G., Scott D.	2018, A&A 620, A60
2375	Planck's dusty GEMS. VI. Multi-J CO excitation and interstellar medium conditions in dusty starburst galaxies at z = 2-4	Cañameras R., Yang C., Nesvadba N. P. H., Beelen A., Kneissl R., Koenig S., Le Floc'h E., Limousin M., Malhotra S., Omont A., Scott D.	2018, A&A 620, A61
2376	Physical properties and chemical composition of the cores in the California molecular cloud	Zhang G.-Y., Xu J.-L., Vasyunin A. I., Semenov D. A., Wang J.-J., Dib S., Liu T., Liu S.-Y., Zhang C.-P., Liu X.-L., Wang K., Li D., Wu Z.-Z., Yuan J.-H., Li D.-L., Gao Y.	2018, A&A 620, A163
2377	Does the Compact Radio Jet in PG 1700+518 Drive a Molecular Outflow?	Runnoe J. C., Gültekin K., Rupke D. S. N.	2018, ApJ 852, 8
2378	An UXor among FUors: Extinction-related Brightness Variations of the Young Eruptive Star V582 Aur	Ábrahám P., Kóspál Á., Kun M., Fehér O., Zsidi G., Acosta-Pulido J. A., Carnerero M. I., García-Álvarez D., Moór A., Cseh B., Hajdu G., Hanyecz O., Kelemen J., Kriskovics L., Marton G., Mező G., Molnár L., Ordasi A., Rodríguez-Coira G., Sárneczky K., Sódor Á., Szakáts R., Szegedi-Elek E., Szing A., Farkas-Takács A., Vida K., Vinkó J.	2018, ApJ 853, 28

2379	Discovery of the Ubiquitous Cation NS^+ in Space Confirmed by Laboratory Spectroscopy	Cernicharo J., Lefloch B., Agúndez M., Bailleux S., Margulès L., Roueff E., Bachiller R., Marcelino N., Tercero B., Vastel C., Caux E.	2018, ApJ 853, L22
2380	The Origin of Molecular Clouds in Central Galaxies	Pulido F. A., McNamara B. R., Edge A. C., Hogan M. T., Vantyghem A. N., Russell H. R., Nulsen P. E. J., Babyk I., Salomé P.	2018, ApJ 853, 177
2381	Complex Organic Molecules in Taurus Molecular Cloud-1	Soma T., Sakai N., Watanabe Y., Yamamoto S.	2018, ApJ 854, 116
2382	The Dual Role of Starbursts and Active Galactic Nuclei in Driving Extreme Molecular Outflows	Gowardhan A., Spoon H., Riechers D. A., González-Alfonso E., Farrah D., Fischer J., Darling J., Fergulio C., Afonso J., Bizzocchi L.	2018, ApJ 859, 35
2383	Discovery of Interstellar Isocyanogen (CNCN): Further Evidence that Dicyanopolyynes Are Abundant in Space	Agúndez M., Marcelino N., Cernicharo J.	2018, ApJ 861, L22
2384	Dust-Gas Scaling Relations and OH Abundance in the Galactic ISM	Nguyen H., Dawson J. R., Miville-Deschênes M.-A., Tang N., Li D., Heiles C., Murray C. E., Stanimirović S., Gibson S. J., McClure-Griffiths N. M., Troland T., Bronfman L., Finger R.	2018, ApJ 862, 49
2385	Dense Molecular Gas in the Nearby Low-metallicity Dwarf Starburst Galaxy IC 10	Kepley A. A., Bittle L., Leroy A. K., Jiménez-Donaire M. J., Schruba A., Bigiel F., Gallagher M., Johnson K., Usero A.	2018, ApJ 862, 120
2386	The Chemistry of Phosphorus-bearing Molecules under Energetic Phenomena	Jiménez-Serra I., Viti S., Quénard D., Holdship J.	2018, ApJ 862, 128
2387	Carbon Chain Molecules toward Embedded Low-mass Protostars	Law C. J., Öberg K. I., Bergner J. B., Graninger D.	2018, ApJ 863, 88
2388	A Study of the c-C_3HD/c-C_3H_2 Ratio in Low-mass Star-forming Regions	Chantzos J., Spezzano S., Caselli P., Chacón-Tanarro A., Bizzocchi L., Sipilä O., Giuliano B. M.	2018, ApJ 863, 126
2389	ALMA [C I] $^3P_1$ - $^3P_0$ Observations of NGC 6240: A Puzzling Molecular Outflow, and the Role of Outflows in the Global α_{CO} Factor of (U)LIRGs	Cicone C., Severgnini P., Papadopoulos P. P., Maiolino R., Feruglio C., Treister E., Privon G. C., Zhang Z.-y., Della Ceca R., Fiore F., Schawinski K., Wagg J.	2018, ApJ 863, 143
2390	Molecular Gas Filaments and Star-forming Knots Beneath an X-Ray Cavity in RXC J1504-0248	Vantyghem A. N., McNamara B. R., Russell H. R., Edge A. C., Nulsen P. E. J., Combes F., Fabian A. C., McDonald M., Salomé P.	2018, ApJ 863, 193
2391	"Super-deblended" Dust Emission in Galaxies. II. Far-IR to (Sub)millimeter Photometry and High-redshift Galaxy Candidates in the Full COSMOS Field	Jin S., Daddi E., Liu D., Smolčić V., Schinnerer E., Calabrò A., Gu Q., Delhaize J., Delvecchio I., Gao Y., Salvato M., Puglisi A., Dickinson M., Bertoldi F., Sargent M., Novak M., Magdis G., Aretxaga I., Wilson G. W., Capak P.	2018, ApJ 864, 56
2392	SOFIA/HAWC+ Detection of a Gravitationally Lensed Starburst Galaxy at z = 1.03	Ma J., Brown A., Cooray A., Nayyeri H., Messias H., Timmons N., Staguhn J., Temi P., Dowell C. D., Wardlow J., Fadda D., Kovacs A., Riechers D., Oteo I., Wilson D., Perez-Fournon I.	2018, ApJ 864, 60
2393	Molecular Gas toward Supernova Remnant Cassiopeia A	Zhou P., Li J.-T., Zhang Z.-Y., Vink J., Chen Y., Arias M., Patnaude D., Bregman J. N.	2018, ApJ 865, 6
2394	Submillimeter Array Observations of Extended CO (J=2–1) Emission in the Interacting Galaxy NGC 3627	Law C. J., Zhang Q., Ricci L., Petitpas G., Jiménez-Donaire M. J., Ueda J., Lu X., Dunham M. M.	2018, ApJ 865, 17
2395	The Spatially Resolved Dust-to-metals Ratio in M101	Chiang I.-D., Sandstrom K. M., Chastenet J., Johnson L. C., Leroy A. K., Utomo D.	2018, ApJ 865, 117
2396	The Molecular Gas Content and Fuel Efficiency of Starbursts at $z\sim1.6$ with ALMA	Silverman J. D., Rujopakarn W., Daddi E., Renzini A., Rodighiero G., Liu D., Puglisi A., Sargent M., Mancini C., Kartaltepe J., Kashino D., Koekemoer A., Arimoto N., Béthermin M., Jin S., Magdis G., Nagao T., Onodera M., Sanders D., Valentino F.	2018, ApJ 867, 92
2397	The Physical and Chemical Properties of the ρ Ophiuchi A Dense Core	Chen Y.-C., Hirano N.	2018, ApJ 868, 80

2398	The Effect of Galaxy Interactions on Molecular Gas Properties	Pan H.-A., Lin L., Hsieh B.-C., Xiao T., Gao Y., Ellison S. L., Scudder J. M., Barrera-Ballesteros J., Yuan F., Saintonge A., Wilson C. D., Hwang H. S., De Looze I., Gao Y., Ho L. C., Brinks E., Mok A., Brown T., Davis T. A., Williams T. G., Chung A., Parsons H., Bureau M., Sargent M. T., Chung E. J., Kim E., Liu T., Michałowski M. J., Tosaki T.	2018, ApJ 868, 132
2399	The Evolution of Molecular Gas Fraction Traced by the CO Tully-Fisher Relation	Isbell J. W., Xue R., Fu H.	2018, ApJ 869, L37
2400	Physical and Chemical Conditions of the Protostellar Envelope and the Protoplanetary Disk in HL Tau	Wu C.-J., Hirano N., Takakuwa S., Yen H.-W., Aso Y.	2018, ApJ 869, 59
2401	Where is OH and Does It Trace the Dark Molecular Gas (DMG)?	Li D., Tang N., Nguyen H., Dawson J. R., Heiles C., Xu D., Pan Z., Goldsmith P. F., Gibson S. J., Murray C. E., Robishaw T., McClure-Griffiths N. M., Dickey J., Pineda J., Stanimirović S., Bronfman L., Troland T., PRIMO Collaboration	2018, ApJS 235, 1
2402	High spectral resolution observations of HNC_3 and HCCNC in the L1544 pre-stellar core	Vastel C., Kawaguchi K., Quénard D., Ohishi M., Lefloch B., Bachiller R., Müller H. S. P.	2018, MNRAS 474, L76
2403	Widespread SiO and CH_3OH emission in filamentary infrared dark clouds	Cosentino G., Jiménez-Serra I., Henshaw J. D., Caselli P., Viti S., Barnes A. T., Fontani F., Tan J. C., Pon A.	2018, MNRAS 474, 3760
2404	Nitrogen oxide in protostellar envelopes and shocks: the ASAI survey	Codella C., Viti S., Lefloch B., Holdship J., Bachiller R., Bianchi E., Ceccarelli C., Favre C., Jiménez-Serra I., Podio L., Tafalla M.	2018, MNRAS 474, 5694
2405	Similar complex kinematics within two massive, filamentary infrared dark clouds	Barnes A. T., Henshaw J. D., Caselli P., Jiménez-Serra I., Tan J. C., Fontani F., Pon A., Ragan S.	2018, MNRAS 475, 5268
2406	A search for cyanopolyynes in L1157-B1	Mendoza E., Lefloch B., Ceccarelli C., Kahane C., Jaber A. A., Podio L., Benedettini M., Codella C., Viti S., Jimenez-Serra I., Lepine J. R. D., Boechat-Roberty H. M., Bachiller R.	2018, MNRAS 475, 5501
2407	On the origin of phosphorus nitride in star-forming regions	Mininni C., Fontani F., Rivilla V. M., Beltrán M. T., Caselli P., Vasyunin A.	2018, MNRAS 476, L39
2408	xGASS: total cold gas scaling relations and molecular-to-atomic gas ratios of galaxies in the local Universe	Catinella B., Saintonge A., Janowiecki S., Cortese L., Davé R., Lemonias J. J., Cooper A. P., Schiminovich D., Hummels C. B., Fabello S., Geréb K., Kilborn V., Wang J.	2018, MNRAS 476, 875
2409	A molecular gas-rich GRB host galaxy at the peak of cosmic star formation	Arabsalmani M., Le Floc'h E., Dannerbauer H., Feruglio C., Daddi E., Ciesla L., Charmandaris V., Japelj J., Vergani S. D., Duc P.-A., Basa S., Bournaud F., Elbaz D.	2018, MNRAS 476, 2332
2410	Galaxy pairs in the SDSS - XIII. The connection between enhanced star formation and molecular gas properties in galaxy mergers	Violino G., Ellison S. L., Sargent M., Coppin K. E. K., Scudder J. M., Mendel T. J., Saintonge A.	2018, MNRAS 476, 2591
2411	Gravitational instability and star formation in NGC 628	Marchuk A. A.	2018, MNRAS 476, 3591
2412	Detection of $HOCO^+$ in the protostar IRAS 16293-2422	Majumdar L., Gratier P., Wakelam V., Caux E., Willacy K., Ressler M. E.	2018, MNRAS 477, 525
2413	The young star cluster population of M51 with LEGUS - II. Testing environmental dependences	Messa M., Adamo A., Calzetti D., Reina-Campos M., Colombo D., Schinnerer E., Chandar R., Dale D. A., Gouliermis D. A., Grasha K., Grebel E. K., Elmegreen B. G., Fumagalli M., Johnson K. E., Kruijssen J. M. D., Östlin G., Shabani F., Smith L. J., Whitmore B. C.	2018, MNRAS 477, 1683
2414	3D modelling of HCO^+ and its isotopologues in the low-mass proto-star IRAS16293-2422	Quénard D., Bottinelli S., Caux E., Wakelam V.	2018, MNRAS 477, 5312
2415	Cross-calibration of CO- versus dust-based gas masses and assessment of the dynamical mass budget in Herschel-SDSS Stripe82 galaxies	Bertemes C., Wuyts S., Lutz D., Förster Schreiber N. M., Genzel R., Minchin R. F., Mundell C. G., Rosario D., Saintonge A., Tacconi L.	2018, MNRAS 478, 1442
2416	Complex organic molecules in the Galactic Centre: the N-bearing family	Zeng S., Jiménez-Serra I., Rivilla V. M., Martín S., Martín-Pintado J., Requena-Torres M. A., Armijos-Abendaño J., Riquelme D., Aladro R.	2018, MNRAS 478, 2962
2417	Nitrogen fractionation in high-mass star-forming cores across the Galaxy	Colzi L., Fontani F., Rivilla V. M., Sánchez-Monge A., Testi L., Beltrán M. T., Caselli P.	2018, MNRAS 478, 3693

2418	Molecular scale height in NGC 7331	Patra N. N.	2018, MNRAS 478, 4931
2419	Sulphur chemistry in the L1544 pre-stellar core	Vastel C., Quénard D., Le Gal R., Wakelam V., Andrianasolo A., Caselli P., Vidal T., Ceccarelli C., Lefloch B., Bachiller R.	2018, MNRAS 478, 5514
2420	The star formation law at GMC scales in M33, the Triangulum galaxy	Williams T. G., Gear W. K., Smith M. W. L.	2018, MNRAS 479, 297
2421	The unusual ISM in blue and dusty gas-rich galaxies (BADGRS)	Dunne L., Zhang Z., De Vis P., Clark C. J. R., Oteo I., Maddox S. J., Cigan P., de Zotti G., Gomez H. L., Ivison R. J., Rowlands K., Smith M. W. L., van der Werf P., Vlahakis C., Millard J. S.	2018, MNRAS 479, 1221
2422	The nitrogen isotopic ratio of HC_3N towards the L1544 prestellar core	Hily-Blant P., Faure A., Vastel C., Magalhaes V., Lefloch B., Bachiller R.	2018, MNRAS 480, 1174
2423	The nature of the variable millimetre-selected AGN in the brightest cluster galaxy of Abell 851	Cheale R. A., Geach J. E., Edge A. C., Perrott Y. C., Cantwell T.	2018, MNRAS 481, L54
2424	Protonated CO_2 in massive star-forming clumps	Fontani F., Vagnoli A., Padovani M., Colzi L., Caselli P., Rivilla V. M.	2018, MNRAS 481, 79
2425	Chemical tracers in proto-brown dwarfs: CN, HCN, and HNC observations	Riaz B., Thi W.-F., Caselli P.	2018, MNRAS 481, 4662
2426	Methyl cyanide (CH_3CN) and propyne (CH_3CCH) in the low-mass protostar IRAS 16293-2422	Andron I., Gratier P., Majumdar L., Vidal T. H. G., Coutens A., Loison J.-C., Wakelam V.	2018, MNRAS 481, 5651
2427	The Abundance of SiC_2 in Carbon Star Envelopes	Massalkhi S., Agúndez M., Cernicharo J., Fonfría J. P., Santander-García M.	2018, IAUS 332, 261
2428	The first detections of the key prebiotic molecule PO in star-forming regions	Rivilla V. M., Fontani F., Beltrán M., Vasyunin A., Caselli P., Martín-Pintado J., Cesaroni R.	2018, IAUS 332, 409
2429	The upGREAT Dual Frequency Heterodyne Arrays for SOFIA	Risacher C., Güsten R., Stutzki J., Hübers H.-W., Aladro R., Bell A., Buchbender C., Büchel D., Csengeri T., Duran C., Graf U. U., Higgins R. D., Honingh C. E., Jacobs K., Justen M., Klein B., Mertens M., Okada Y., Parikka A., Pütz P., Reyes N., Richter H., Ricken O., Riquelme D., Rothbart N., Schneider N., Simon R., Wienold M., Wiesemeyer H., Ziebart M., Fusco P., Rosner S., Wohler B.	2018, Journal of Astron. Instrumentation 7, 1840014
2430	The HI- and H2-to-Stellar Mass Correlations of Late- and Early-Type Galaxies and their Consistency with the Observational Mass Functions	Calette A. R., Avila-Reese V., Rodríguez-Puebla A., Hernández-Toledo H., Papastergis E.	2018, Revista Mexicana de Astron. y Astrofisica 54, 443
2431	A coordinated ground- and space-based observing campaign to measure CO2 and CO emission in C/2016 R2 (PANSTARRS)	Harrington Pinto O., McKay A., DiSanti M. A., Kelley M. S., Cochran A., Dello Russo N., Womack M., Wierzchos K., Biver N., Bauer J., Vervack R. J., Bonev B., Gibb E., Roth N., Kawakita H.	2018, DPS 50, 204.04
2432	Systematic Characterization and Monitoring of Potentially Active Asteroids: The Case of Don Quixote	Mommert M., Trilling D., Knight M. M., Hora J., Biver N., Womack M., Wierzchos K., Polishook D., Veres P., Gustafsson A., McNeill A., Skiff B., Wainscoat R., Kelley M. S., Moskovitz N., Harrington O.	2018, DPS 50, 505.05
2433	Molecular gas in Low Luminosity Radio Galaxies in (proto-)clusters at z ~ 0.4-2.6	Castignani G., Combes F., Salomé P., Benoist C., Chiaberge M., Freundlich J., De Zotti G.	2018, AGN13, Milano, Italy, id. 24
2434	AGN & host galaxy scaling relations	Feruglio C., D'Odorico V., Fiore F., Cristiani S., Pallottini A., Gallerani S., Ferrara A., Carniani S., Piconcelli E., Bischetti M., Malizia A., Molina M., Marconi A., Maiolino R., et al.	2018, AGN13, Milano, Italy, id. 59
2435	A kinematic study of the integral shaped filament: what roles do filaments play in forming young stellar clusters?	Wu G., Jarken E., Baan W., Zhou J.-J., Zhou D.-D., Han X.-H., Agishev A.	2018, RAA 18, 077
2436	Study of the filamentary infrared dark cloud G192.76+00.10 in the S254-S258 OB complex	Ryabukhina O. L., Zinchenko I. I., Samal M. R., Zemlyanukha P. M., Ladeyschikov D. A., Sobolev A. M., Henkel C., Ojha D. K.	2018, RAA 18, 095
2437	A search for evidence of small-scale inhomogeneities in dense cores from line profile analysis	Pirogov L.	2018, RAA 18, 100

2438	Probing gas reservoirs in galaxies throughout the history of the Universe	Freundlich J.	2018, SF2A, 289
2439	UV radiation around protostars in NGC 1333 using the IRAM telescope	Gładkowski M., Karska A., Kristensen L., Mirocha A., Żółtowski M.	2018, Proc. Polish Astron. Soc. 7, 210
2440	IRAM 30 m observations of Serpens Main and Barnard 1b: gas temperatures and UV radiation around low-mass protostars	Mirocha A., Karska A., Gładkowski M., Żółtowski M., Kristensen L.	2018, Proc. Polish Astron. Soc. 7, 187
2441	The chemical link between comet 67P/C-G and low mass protostar IRAS 16293-2422: Integrative Studies in Observational Astronomy and Chemical-Dynamical Modeling	Majumdar L., Wakelam V., Gratier P., Caux E., Loison J.-C., Willacy K.	2018, 42nd COSPAR Sci. Assembly, B1.3-15-18
2442	Linking the nitrogen isotopic composition of star-forming regions with comet 67P	Wampfler S., Rubin M., Altwegg K., Jørgensen J. K., Calcutt H., Coutens A.	2018, 42nd COSPAR Sci. Assembly, B1.3-21-18
2443	First detection of cyanamide (NH2CN) towards solar-type protostars	Willis E., Coutens A., Garrod R., Müller H., Bourke T., Calcutt H., Drozdovskaya M., Jørgensen J. K., Ligterink N., Persson M., Stephan G., Van der Wiel M., Van Dishoeck E., Wampfler S.	2018, 42nd COSPAR Sci. Assembly, F3.2-4-18
2444	Possibility of protostellar inheritance of organics to Jupiter-family comet 67P/C-G	Majumdar L., Wakelam V., Gratier P., Caux E., Loison J.-C., Willacy K.	2018, 42nd COSPAR Sci. Assembly, F3.5-10-18
2445	The Spatial-Kinematic Structure of the Region of Massive Star Formation S255N on Various Scales	Zemlyanukha P. M., Zinchenko I. I., Salii S. V., Ryabukhina O. L., Liu S.-Y.	2018, Astronomy Reports 62, 326
2446	Narrow Line Seyfert 1s in the IBISCO Sample	Molina M., Malizia A., Fiore F., Feruglio C.	2018, Revisiting narrow-line Seyfert 1 galaxies, Padova, Italy, id. 36
2447	Multiwavelength study of the North Ecliptic Pole Field and Identification of candidate high-redshift galaxies	Mazyed F., Burgarella D., Yuan F.-T., Oi N., Goto T., AKARI-NEP Team	2018, The Cosmic Wheel and the Legacy of the AKARI archive, 197
2448	The evolution and formation of the SDC13 Infrared Dark Cloud hub filament system	Williams G. M.	2018, PhDT
2449	The NIKA2 Large Field-of-View Millimeter Continuum Camera for the 30-M IRAM Telescope	Monfardini A.	2018, Atacama Large-Aperture Submm/mm Telescope, Garching, Germany, id. 25
2450	Tending the Fire, A Legacy Survey of Molecular Gas Fueling in Powerful Nearby AGN	Koss M., BASS Team	2018, AAS 231, 343.03
2451	Using CO as a Physical Probe of the SF Activity in the Planck-Herschel Selected Hyper Luminous Infrared Galaxies	Harrington K.	2018, AAS 231, 257.17
2452	A New Radio Spectral Line Survey of Planetary Nebulae: Exploring Radiatively-driven Heating and Chemistry of Molecular Gas	Bublitz J., Kastner J. H., Santander-García M., Montez R., Alcolea J., Balick B., Bujarrabal V.	2018, AAS 231, 241.07
2453	Measuring the ISM Content of Optically Luminous Type 2 Quasars	Marshall J., Petric A., Flagey N., Lacy M., Omont A.	2018, AAS 231, 222.01
2454	ZINGRS: CO 2-1 observations of strong C^+ emitters at z ~ 2	Scrabeck A., Ferkinhoff C., Brisbin D., Lamarche C., Vishwas A., Nikola T., Stacey G. J., Higdon J. L., Higdon S., Walter F., Decarli R.	2018, AAS 232, 218.08

IRAM (CO) AUTHORS

2292	The NIKA2 large-field-of-view millimetre continuum camera for the 30 m IRAM telescope	Adam R., Adane A., Ade P. A. R., André P., Andrianasolo A., Aussel H., Beelen A., Benoît A., Bideaud A., Billot N., Bourrion O., Bracco A., Calvo M., Catalano A., Coiffard G., Comis B., De Petris M., Désert F.-X., Doyle S., Driessen E. F. C., Evans R., Goupy J., Kramer C., Lagache G., Leclercq S., Leggeri J.-P., Lestrade J.-F., Macías-Pérez J. F., Mauskopf P., Mayet F., Maury A., Monfardini A., Navarro S., Pascale E., Perotto L., Pisano G., Ponthieu N., Revéret V., Rigby A., Ritacco A., Romero C., Roussel H., Ruppin F., Schuster K., Sievers A., Triqueneaux S., Tucker C., Zylka R.	2018, A&A 609, A115
2293	IRC +10 216 in 3D: morphology of a TP-AGB star envelope	Guélin M., Patel N. A., Bremer M., Cernicharo J., Castro-Carrizo A., Pety J., Fonfría J. P., Agúndez M., Santander-García M., Quintana-Lacaci G., Velilla Prieto L., Blundell R., Thaddeus P.	2018, A&A 610, A4
2294	Clustering the Orion B giant molecular cloud based on its molecular emission	Bron E., Daudon C., Pety J., Levrier F., Gerin M., Gratier P., Orkisz J. H., Guzman V., Bardeau S., Goicoechea J. R., Liszt H., Öberg K., Peretto N., Sievers A., Tremblin P.	2018, A&A 610, A12
2295	VLBA polarimetric monitoring of 3C 111	Beuchert T., Kadler M., Perucho M., Großberger C., Schulz R., Agudo I., Casadio C., Gómez J. L., Gurwell M., Homan D., Kovalev Y. Y., Lister M. L., Markoff S., Molina S. N., Pushkarev A. B., Ros E., Savolainen T., Steinbring T., Thum C., Wilms J.	2018, A&A 610, A32
2296	A multi-instrument non-parametric reconstruction of the electron pressure profile in the galaxy cluster CLJ1226.9+3332	Romero C., McWilliam M., Macías-Pérez J.-F., Adam R., Ade P., André P., Aussel H., Beelen A., Benoît A., Bideaud A., Billot N., Bourrion O., Calvo M., Catalano A., Coiffard G., Comis B., de Petris M., Désert F.-X., Doyle S., Goupy J., Kramer C., Lagache G., Leclercq S., Lestrade J.-F., Mauskopf P., Mayet F., Monfardini A., Pascale E., Perotto L., Pisano G., Ponthieu N., Revéret V., Ritacco A., Roussel H., Ruppin F., Schuster K., Sievers A., Triqueneaux S., Tucker C., Zylka R.	2018, A&A 612, A39
2297	Circumstellar ammonia in oxygen-rich evolved stars	Wong K. T., Menten K. M., Kamiński T., Wyrowski F., Lacy J. H., Greathouse T. K.	2018, A&A 612, A48
2298	Properties and rotation of molecular clouds in M 33	Braine J., Rosolowsky E., Gratier P., Corbelli E., Schuster K.-F.	2018, A&A 612, A51
2299	Exploring the inner parsecs of active galactic nuclei using near-infrared high resolution polarimetric simulations with MontAGN	Grosset L., Rouan D., Gratadour D., Pelat D., Orkisz J., Marin F., Goosmann R.	2018, A&A 612, A69
2300	Radio outburst from a massive (proto)star. When accretion turns into ejection	Cesaroni R., Moscadelli L., Neri R., Sanna A., Caratti o Garatti A., Eisloffel J., Stecklum B., Ray T., Walmsley C. M.	2018, A&A 612, A103
2301	Spatially resolving the dust properties and submillimetre excess in M 33	Relaño M., De Looze I., Kennicutt R. C., Lisenfeld U., Dariush A., Verley S., Braine J., Tabatabaei F., Kramer C., Boquien M., Xilouris M., Gratier P.	2018, A&A 613, A43
2302	The convective photosphere of the red supergiant CE Tauri. I. VLTI/PIONIER H-band interferometric imaging	Montargès M., Norris R., Chiavassa A., Tessore B., Lèbre A., Baron F.	2018, A&A 614, A12
2303	High-resolution observations of IRAS 08544-4431. Detection of a disk orbiting a post-AGB star and of a slow disk wind	Bujarrabal V., Castro-Carrizo A., Winckel H. V., Alcolea J., Contreras C. S., Santander-García M., Hillen M.	2018, A&A 614, A58
2304	Substructure and merger detection in resolved NIKA Sunyaev-Zel'dovich images of distant clusters	Adam R., Hahn O., Ruppin F., Ade P., André P., Arnaud M., Bartalucci I., Beelen A., Benoît A., Bideaud A., Billot N., Bourrion O., Calvo M., Catalano A., Coiffard G., Comis B., D'Addabbo A., Désert F.-X., Doyle S., Ferrari C., Goupy J., Kramer C., Lagache G., Leclercq S., Lestrade J.-F., Macías-Pérez J. F., Martinez Aviles G., Martizzi D., Maurogordato S., Mauskopf P., Mayet F., Monfardini A., Pajot F., Pascale E., Perotto L., Pisano G., Pointecouteau E., Ponthieu N., Pratt G. W., Revéret V., Ricci M., Ritacco A., Rodriguez L., Romero C., Roussel H., Schuster K., Sievers A., Triqueneaux S., Tucker C., Wu H.-Y., Zylka R.	2018, A&A 614, A118
2305	A NIKA view of two star-forming infrared dark clouds: Dust emissivity variations and mass concentration	Rigby A. J., Peretto N., Adam R., Ade P., André P., Aussel H., Beelen A., Benoît A., Bracco A., Bideaud A., Bourrion O., Calvo M., Catalano A., Clark C. J. R., Comis B., De Petris M., Désert F.-X., Doyle S., Driessen E. F. C., Goupy J., Kramer C., Lagache G., Leclercq S., Lestrade J.-F., Macías-Pérez J. F., Mauskopf P., Mayet F., Monfardini A., Pascale E., Perotto L., Pisano G., Ponthieu N., Revéret V., Ritacco A., Romero C., Roussel H., Ruppin F., Schuster K., Sievers A., Triqueneaux S., Tucker C., Zylka R.	2018, A&A 615, A18
2306	Abundance of HCN and its C and N isotopologues in L1498	Magalhães V. S., Hily-Blant P., Faure A., Hernandez-Vera M., Lique F.	2018, A&A 615, A52

2307	First Sunyaev-Zel'dovich mapping with the NIKA2 camera: Implication of cluster substructures for the pressure profile and mass estimate	Ruppin F., Mayet F., Pratt G. W., Adam R., Ade P., André P., Arnaud M., Aussel H., Bartalucci I., Beelen A., Benoît A., Bideaud A., Bourrion O., Calvo M., Catalano A., Comis B., De Petris M., Désert F.-X., Doyle S., Driessen E. F. C., Goupy J., Kramer C., Lagache G., Leclercq S., Lestrade J.-F., Macías-Pérez J. F., Mauskopf P., Monfardini A., Perotto L., Pisano G., Pointecouteau E., Ponthieu N., Revéret V., Ritacco A., Romero C., Roussel H., Schuster K., Sievers A., Tucker C., Zylka R.	2018, A&A 615, A112
2308	Major impact from a minor merger. The extraordinary hot molecular gas flow in the Eye of the NGC 4194 Medusa galaxy	König S., Aalto S., Muller S., Gallagher J. S., III, Beswick R. J., Varenius E., Jütte E., Krips M., Adamo A.	2018, A&A 615, A122
2309	Time-dependent molecular emission in IRC + 10216	Pardo J. R., Cernicharo J., Velilla Prieto L., Fonfría J. P., Agúndez M., Quintana-Lacaci G., Massalkhi S., Tercero B., Gómez-Garrido M., de Vicente P., Guélin M., Kramer C., Marka C., Teyssier D., Neufeld D.	2018, A&A 615, L4
2310	High-velocity hot CO emission close to Sgr A. Herschel/HIFI submillimeter spectral survey toward Sgr A	Goicoechea J. R., Santa-Maria M. G., Teyssier D., Cernicharo J., Gerin M., Pety J.	2018, A&A 616, L1
2311	High-resolution observations of the symbiotic system R Aqr. Direct imaging of the gravitational effects of the secondary on the stellar wind	Bujarrabal V., Alcolea J., Mikołajewska J., Castro-Carrizo A., Ramstedt S.	2018, A&A 616, L3
2312	First detection of H_2S in a protoplanetary disk. The dense GG Tauri A ring	Phuong N. T., Chapillon E., Majumdar L., Dutrey A., Guilloteau S., Piétu V., Wakelam V., Diep P. N., Tang Y.-W., Beck T., Bary J.	2018, A&A 616, L5
2313	NIKA 150 GHz polarization observations of the Crab nebula and its spectral energy distribution	Ritacco A., Macías-Pérez J. F., Ponthieu N., Adam R., Ade P., André P., Aumont J., Beelen A., Benoît A., Bideaud A., Billot N., Bourrion O., Bracco A., Calvo M., Catalano A., Coiffard G., Comis B., D'Addabbo A., De Petris M., Désert F.-X., Doyle S., Goupy J., Kramer C., Lagache G., Leclercq S., Lestrade J.-F., Mauskopf P., Mayet F., Maury A., Monfardini A., Pajot F., Pascale E., Perotto L., Pisano G., Rebolo-Iglesias M., Revéret V., Rodriguez L., Romero C., Roussel H., Ruppin F., Schuster K., Sievers A., Siringo G., Thum C., Triqueneaux S., Tucker C., Wiesemeyer H., Zylka R.	2018, A&A 616, A35
2314	New detections of (sub) millimeter hydrogen radio recombination lines towards high-mass star-forming clumps	Kim W.-J., Urquhart J. S., Wyrowski F., Menten K. M., Csengeri T.	2018, A&A 616, A107
2315	The limb-brightened jet of M87 down to the 7 Schwarzschild radii scale	Kim J.-Y., Krichbaum T. P., Lu R.-S., Ros E., Bach U., Bremer M., de Vicente P., Lindqvist M., Zensus J. A.	2018, A&A 616, A188
2316	Water and interstellar complex organics associated with the HH 212 protostellar disc. On disc atmospheres, disc winds, and accretion shocks	Codella C., Bianchi E., Tabone B., Lee C.-F., Cabrit S., Ceccarelli C., Podio L., Bacciotti F., Bachiller R., Chapillon E., Gueth F., Gusdorf A., Lefloch B., Leurini S., Pineau des Forêts G., Rygl K. L. J., Tafalla M.	2018, A&A 617, A10
2317	Molecular gas in the northern nucleus of Mrk 273: Physical and chemical properties of the disc and its outflow	Aladro R., König S., Aalto S., González-Alfonso E., Falstad N., Martín S., Muller S., García-Burillo S., Henkel C., van der Werf P., Mills E., Fischer J., Costagliola F., Krips M.	2018, A&A 617, A20
2318	Chemistry in disks. XI. Sulfur-bearing species as tracers of protoplanetary disk physics and chemistry: the DM Tau case	Semenov D., Favre C., Fedele D., Guilloteau S., Teague R., Henning T., Dutrey A., Chapillon E., Hersant F., Piétu V.	2018, A&A 617, A28
2319	Search for high-mass protostars with ALMA revealed up to kilo-parsec scales (SPARKS). I. Indication for a centrifugal barrier in the environment of a single high-mass envelope	Csengeri T., Bontemps S., Wyrowski F., Belloche A., Menten K. M., Leurini S., Beuther H., Bronfman L., Commerçon B., Chapillon E., Longmore S., Palau A., Tan J. C., Urquhart J. S.	2018, A&A 617, A89
2320	Fragmentation and disk formation during high-mass star formation. IRAM NOEMA (Northern Extended Millimeter Array) large program CORE	Beuther H., Mottram J. C., Ahmadi A., Bosco F., Linz H., Henning T., Klaassen P., Winters J. M., Maud L. T., Kuiper R., Semenov D., Gieser C., Peters T., Urquhart J. S., Pudritz R., Ragan S. E., Feng S., Keto E., Leurini S., Cesaroni R., Beltran M., Palau A., Sánchez-Monge Á., Galvan-Madrid R., Zhang Q., Schilke P., Wyrowski F., Johnston K. G., Longmore S. N., Lumsden S., Hoare M., Menten K. M., Csengeri T.	2018, A&A 617, A100

2321	Detection of a high-mass prestellar core candidate in W43-MM1	Nony T., Louvet F., Motte F., Molet J., Marsh K., Chapillon E., Gusdorf A., Brouillet N., Bontemps S., Csengeri T., Despois D., Nguyen Luong Q., Duarte-Cabral A., Maury A.	2018, A&A 618, L5
2322	IRC +10216 as a spectroscopic laboratory: improved rotational constants for SiC_2, its isotopologues, and Si_2C	Cernicharo J., Guélin M., Agúndez M., Pardo J. R., Massalkhi S., Fonfría J. P., Velilla Prieto L., Quintana-Lacaci G., Marcelino N., Marka C., Navarro S., Kramer C.	2018, A&A 618, A4
2323	High-speed molecular cloudlets around the Galactic center's supermassive black hole	Goicoechea J. R., Pety J., Chapillon E., Cernicharo J., Gerin M., Herrera C., Requena-Torres M. A., Santa-Maria M. G.	2018, A&A 618, A35
2324	Core fragmentation and Toomre stability analysis of W3(H_2O). A case study of the IRAM NOEMA large program CORE	Ahmadi A., Beuther H., Mottram J. C., Bosco F., Linz H., Henning T., Winters J. M., Kuiper R., Pudritz R., Sánchez-Monge Á., Keto E., Beltran M., Bontemps S., Cesaroni R., Csengeri T., Feng S., Galvan-Madrid R., Johnston K. G., Klaassen P., Leurini S., Longmore S. N., Lumsden S., Maud L. T., Menten K. M., Moscadelli L., Motte F., Palau A., Peters T., Ragan S. E., Schilke P., Urquhart J. S., Wyrowski F., Zinnecker H.	2018, A&A 618, A46
2325	First hot corino detected around an isolated intermediate-mass protostar: Cep E-mm	Ospina-Zamudio J., Lefloch B., Ceccarelli C., Kahane C., Favre C., López-Sepulcre A., Montarges M.	2018, A&A 618, A145
2326	Through the magnifying glass: ALMA acute viewing of the intricate nebular architecture of OH 231.8+4.2	Sánchez Contreras C., Alcolea J., Bujarrabal V., Castro-Carrizo A., Velilla Prieto L., Santander-García M., Quintana-Lacaci G., Cernicharo J.	2018, A&A 618, A164
2327	A catalogue of dense cores and young stellar objects in the Lupus complex based on Herschel. Gould Belt Survey observations	Benedettini M., Pezzuto S., Schisano E., André P., Könyves V., Men'shchikov A., Ladjelate B., Di Francesco J., Elia D., Arzoumanian D., Louvet F., Palmeirim P., Rygl K. L. J., Schneider N., Spinoglio L., Ward-Thompson D.	2018, A&A 619, A52
2328	The extraordinary composition of the blue comet C/2016 R2 (PanSTARRS)	Biver N., Bockelée-Morvan D., Paubert G., Moreno R., Crovisier J., Boissier J., Bertrand E., Boussier H., Kugel F., McKay A., Russo N. D., DiSanti M. A.	2018, A&A 619, A127
2329	Detection of persistent VHE gamma-ray emission from PKS 1510-089 by the MAGIC telescopes during low states between 2012 and 2017	MAGIC Collaboration, Acciari V. A., Ansoldi S., Antonelli L. A., Arbet Engels A., Arcaro C., Baack D., Babić A., Banerjee B., Bangale P., Barres de Almeida U., Barrio J. A., Bednarek W., Bernardini E., Berti A., Besenrieder J., Bhattacharyya W., Bigongiari C., Biland A., Blanch O., Bonnoli G., Carosi R., Ceribella G., Cikota S., Colak S. M., Colin P., Colombo E., Contreras J. L., Cortina J., Covino S., D'Elia V., da Vela P., Dazzi F., de Angelis A., de Lotto B., Delfino M., Delgado J., di Pierro F., Do Souto Espiñera E., Domínguez A., Dominis Prester D., Dorner D., Doro M., Einecke S., Elsaesser D., Fallah Ramazani V., Fattorini A., Fernández-Barral A., Ferrara G., Fidalgo D., Foffano L., Fonseca M. V., Font L., Fruck C., Galindo D., Gallozzi S., García López R. J., Garczarczyk M., Gaug M., Giammaria P., Godinović N., Guberman D., Hadasch D., Hahn A., Hassan T., Herrera J., Hoang J., Hrupec D., Inoue S., Ishio K., Iwamura Y., Kubo H., Kushida J., Kuveždić D., Lamastra A., Lelas D., Leone F., Lindfors E., Lombardi S., Longo F., López M., López-Oramas A., Maggio C., Majumdar P., Makariev M., Maneva G., Manganaro M., Mannheim K., Maraschi L., Mariotti M., Martínez M., Masuda S., Mazin D., Minev M., Miranda J. M., Mirzoyan R., Molina E., Moralejo A., Moreno V., Moretti E., Munar-Adrover P., Neustroev V., Niedzwiecki A., Nievas Rosillo M., Nigro C., Nilsson K., Ninci D., Nishijima K., Noda K., Nogués L., Paiano S., Palacio J., Paneque D., Paoletti R., Paredes J. M., Pedaletti G., Peñil P., Peresano M., Persic M., Prada Moroni P. G., Prandini E., Puljak I., Garcia J. R., Rhode W., Ribó M., Rico J., Righi C., Rugliancich A., Saha L., Saito T., Satalecka K., Schweizer T., Sitarek J., Šnidarić I., Sobczynska D., Somero A., Stamerra A., Strzys M., Surić T., Tavecchio F., Temnikov P., Terzić T., Teshima M., Torres-Albà N., Tsujimoto S., van Scherpenberg J., Vanzo G., Vazquez Acosta M., Vovk I., Ward J. E., Will M., Zarić D., Fermi-Lat Collaboration, Becerra González J., Raiteri C. M., Sandrinelli A., Hovatta T., Kiehlmann S., Max-Moerbeck W., Tornikoski M., Lähteenmäki A., Tammi J., Ramakrishnan V., Thum C., Agudo I., Molina S. N., Gómez J. L., Fuentes A., Casadio C., Traianou E., Myserlis I., Kim J.-Y.	2018, A&A 619, A159
2330	ALMA observations of the young protostellar system Barnard 1b: Signatures of an incipient hot corino in B1b-S	Marcelino N., Gerin M., Cernicharo J., Fuente A., Wootten H. A., Chapillon E., Pety J., Lis D. C., Roueff E., Commerçon B., Ciardi A.	2018, A&A 620, A80
2331	The luminous host galaxy, faint supernova and rapid afterglow rebrightening of GRB 100418A	de Ugarte Postigo A., Thöne C. C., Bensch K., van der Horst A. J., Kann D. A., Cano Z., Izzo L., Goldoni P., Martín S., Filgas R., Schady P., Gorosabel J., Bikmaev I., Bremer M., Burenin R., Castro-Tirado A. J., Covino S., Fynbo J. P. U., Garcia-Appadoo D., de Gregorio-Monsalvo I., Jelínek M., Khamitov I., Kamble A., Kouveliotou C., Krühler T., Leloudas G., Melnikov S., Nardini M., Perley D. A., Petitpas G., Pooley G., Rau A., Rol E., Sánchez-Ramírez R., Starling R. L. C., Tanvir N. R., Wiersema K., Wijers R. A. M. J., Zafar T.	2018, A&A 620, A190

2332	Large Magneto-ionic Variations toward the Galactic Center Magnetar, PSR J1745-2900	Desvignes G., Eatough R. P., Pen U. L., Lee K. J., Mao S. A., Karuppusamy R., Schnitzeler D. H. F. M., Falcke H., Kramer M., Wucknitz O., Spitler L. G., Torne P., Liu K., Bower G. C., Cognard I., Lyne A. G., Stappers B. W.	2018, ApJ 852, L12
2333	Pillars of Creation among Destruction: Star Formation in Molecular Clouds near R136 in 30 Doradus	Kalari V. M., Rubio M., Elmegreen B. G., Guzmán V. V., Zinnecker H., Herrera C. N.	2018, ApJ 852, 71
2334	First Measurement of the $^{14}N/^{15}N$ Ratio in the Analog of the Sun Progenitor OMC-2 FIR4	Kahane C., Jaber Al-Edhari A., Ceccarelli C., López-Sepulcre A., Fontani F., Kama M.	2018, ApJ 852, 130
2335	PHIBSS: Unified Scaling Relations of Gas Depletion Time and Molecular Gas Fractions	Tacconi L. J., Genzel R., Saintonge A., Combes F., García-Burillo S., Neri R., Bolatto A., Contini T., Förster Schreiber N. M., Lilly S., Lutz D., Wuyts S., Accurso G., Boissier J., Boone F., Bouché N., Bournaud F., Burkert A., Carollo M., Cooper M., Cox P., Feruglio C., Freundlich J., Herrera-Camus R., Juneau S., Lippa M., Naab T., Renzini A., Salome P., Sternberg A., Tadaki K., Übler H., Walter F., Weiner B., Weiss A.	2018, ApJ 853, 179
2336	Ionized and Molecular Gas Kinematics in a z = 1.4 Star-forming Galaxy	Übler H., Genzel R., Tacconi L. J., Förster Schreiber N. M., Neri R., Contursi A., Belli S., Nelson E. J., Lang P., Shimizu T. T., Davies R., Herrera-Camus R., Lutz D., Plewa P. M., Price S. H., Schuster K., Sternberg A., Tadaki K., Wisnioski E., Wuyts S.	2018, ApJ 854, L24
2337	Chemical and Physical Picture of IRAS 16293-2422 Source B at a Sub-arcsecond Scale Studied with ALMA	Oya Y., Moriwaki K., Onishi S., Sakai N., López-Sepulcre A., Favre C., Watanabe Y., Ceccarelli C., Lefloch B., Yamamoto S.	2018, ApJ 854, 96
2338	A Model for the Onset of Self-gravitation and Star Formation in Molecular Gas Governed by Galactic Forces. I. Cloud-scale Gas Motions	Meidt S. E., Leroy A. K., Rosolowsky E., Kruijssen J. M. D., Schinnerer E., Schruba A., Pety J., Blanc G., Bigiel F., Chevance M., Hughes A., Querejeta M., Usero A.	2018, ApJ 854, 100
2339	Seeds of Life in Space (SOLIS). III. Zooming Into the Methanol Peak of the Prestellar Core L1544	Punanova A., Caselli P., Feng S., Chacón-Tanarro A., Ceccarelli C., Neri R., Fontani F., Jiménez-Serra I., Vastel C., Bizzocchi L., Pon A., Vasyunin A. I., Spezzano S., Hily-Blant P., Testi L., Viti S., Yamamoto S., Alves F., Bachiller R., Balucani N., Bianchi E., Bottinelli S., Caux E., Choudhury R., Codella C., Dulieu F., Favre C., Holdship J., Jaber Al-Edhari A., Kahane C., Laas J., LeFloch B., López-Sepulcre A., Ospina-Zamudio J., Oya Y., Pineda J. E., Podio L., Quenard D., Rimola A., Sakai N., Sims I. R., Taquet V., Theulé P., Ugliengo P.	2018, ApJ 855, 112
2340	Chemical Complexity in Local Diffuse and Translucent Clouds: Ubiquitous Linear C_3H and CH_3CN, a Detection of HC_3N and an Upper Limit on the Abundance of CH_2CN	Liszt H., Gerin M., Beasley A., Pety J.	2018, ApJ 856, 151
2341	Exploring the Connection between Parsec-scale Jet Activity and Broadband Outbursts in 3C 279	Rani B., Jorstad S. G., Marscher A. P., Agudo I., Sokolovsky K. V., Larionov V. M., Smith P., Mosunova D. A., Borman G. A., Grishina T. S., Kopatskaya E. N., Mokrushina A. A., Morozova D. A., Savchenko S. S., Troitskaya Y. V., Troitsky I. S., Thum C., Molina S. N., Casadio C.	2018, ApJ 858, 80
2342	Dense Gas, Dynamical Equilibrium Pressure, and Star Formation in Nearby Star-forming Galaxies	Gallagher M. J., Leroy A. K., Bigiel F., Cormier D., Jiménez-Donaire M. J., Ostriker E., Usero A., Bolatto A. D., García-Burillo S., Hughes A., Kepley A. A., Krumholz M., Meidt S. E., Meier D. S., Murphy E. J., Pety J., Rosolowsky E., Schinnerer E., Schruba A., Walter F.	2018, ApJ 858, 90
2343	NOEMA Observations of a Molecular Cloud in the Low-metallicity Galaxy Kiso 5639	Elmegreen B. G., Herrera C., Rubio M., Elmegreen D. M., Sánchez Almeida J., Muñoz-Tuñón C., Olmo-García A.	2018, ApJ 859, L22
2344	SOLIS IV. Hydrocarbons in the OMC-2 FIR4 Region, a Probe of Energetic Particle Irradiation of the Region	Favre C., Ceccarelli C., López-Sepulcre A., Fontani F., Neri R., Manigand S., Kama M., Caselli P., Jaber Al-Edhari A., Kahane C., Alves F., Balucani N., Bianchi E., Caux E., Codella C., Dulieu F., Pineda J. E., Sims I. R., Theulé P.	2018, ApJ 859, 136
2345	Multiple Stellar Flybys Sculpting the Circumstellar Architecture in RW Aurigae	Rodriguez J. E., Loomis R., Cabrit S., Haworth T. J., Facchini S., Dougados C., Booth R. A., Jensen E. L. N., Clarke C. J., Stassun K. G., Dent W. R. F., Pety J.	2018, ApJ 859, 150
2346	The Maser-emitting Structure and Time Variability of the SiS Lines J = 14-13 and 15-14 in IRC+10216	Fonfría J. P., Fernández-López M., Pardo J. R., Agúndez M., Sánchez Contreras C., Velilla Prieto L., Cernicharo J., Santander-García M., Quintana-Lacaci G., Castro-Carrizo A., Curiel S.	2018, ApJ 860, 162
2347	Cloud-scale Molecular Gas Properties in 15 Nearby Galaxies	Sun J., Leroy A. K., Schruba A., Rosolowsky E., Hughes A., Kruijssen J. M. D., Meidt S., Schinnerer E., Blanc G. A., Bigiel F., Bolatto A. D., Chevance M., Groves B., Herrera C. N., Hygate A. P. S., Pety J., Querejeta M., Usero A., Utomo D.	2018, ApJ 860, 172

2348	Star Formation Efficiency per Free-fall Time in nearby Galaxies	Utomo D., Sun J., Leroy A. K., Kruijssen J. M. D., Schinnerer E., Schruba A., Bigiel F., Blanc G. A., Chevance M., Emsellem E., Herrera C., Hygate A. P. S., Kreckel K., Ostriker E. C., Pety J., Querejeta M., Rosolowsky E., Sandstrom K. M., Usero A.	2018, ApJ 861, L18
2349	First Detection of the Simplest Organic Acid in a Protoplanetary Disk	Favre C., Fedele D., Semenov D., Parfenov S., Codella C., Ceccarelli C., Bergin E. A., Chapillon E., Testi L., Hersant F., Lefloch B., Fontani F., Blake G. A., Cleeves L. I., Qi C., Schwarz K. R., Taquet V.	2018, ApJ 862, L2
2350	A 50 pc Scale View of Star Formation Efficiency across NGC 628	Kreckel K., Faesi C., Kruijssen J. M. D., Schruba A., Groves B., Leroy A. K., Bigiel F., Blanc G. A., Chevance M., Herrera C., Hughes A., McElroy R., Pety J., Querejeta M., Rosolowsky E., Schinnerer E., Sun J., Usero A., Utomo D.	2018, ApJ 863, L21
2351	Sub-arcsecond Kinematic Structure of the Outflow in the Vicinity of the Protostar in L483	Oya Y., Sakai N., Watanabe Y., López-Sepulcre A., Ceccarelli C., Lefloch B., Yamamoto S.	2018, ApJ 863, 72
2352	Rotation in the NGC 1333 IRAS 4C Outflow	Zhang Y., Higuchi A. E., Sakai N., Oya Y., López-Sepulcre A., Imai M., Sakai T., Watanabe Y., Ceccarelli C., Lefloch B., Yamamoto S.	2018, ApJ 864, 76
2353	Spatially Resolved ^{12}CO(2-1)/^{12}CO(1-0) in the Starburst Galaxy NGC 253: Assessing Optical Depth to Constrain the Molecular Mass Outflow Rate	Zschaechner L. K., Bolatto A. D., Walter F., Leroy A. K., Herrera C., Krieger N., Kruijssen J. M. D., Meier D. S., Mills E. A. C., Ott J., Veilleux S., Weiss A.	2018, ApJ 867, 111
2354	Do Spectroscopic Dense Gas Fractions Track Molecular Cloud Surface Densities?	Gallagher M. J., Leroy A. K., Bigiel F., Cormier D., Jiménez-Donaire M. J., Hughes A., Pety J., Schinnerer E., Sun J., Usero A., Utomo D., Bolatto A., Chevance M., Faesi C., Glover S. C. O., Kepley A. A., Kruijssen J. M. D., Krumholz M. R., Meidt S. E., Meier D. S., Murphy E., Querejeta M., Rosolowsky E., Saito T., Schruba A.	2018, ApJ 868, L38
2355	A SOFIA Survey of [C II] in the Galaxy M51. I. [C II] as a Tracer of Star Formation	Pineda J. L., Fischer C., Kapala M., Stutzki J., Buchbender C., Goldsmith P. F., Ziebart M., Glover S. C. O., Klessen R. S., Koda J., Kramer C., Mookerjea B., Sandstrom K., Scoville N., Smith R.	2018, ApJ 869, L30
2356	Two Orders of Magnitude Variation in the Star Formation Efficiency across the Premerger Galaxy NGC 2276	Tomičić N., Hughes A., Kreckel K., Renaud F., Pety J., Schinnerer E., Saito T., Querejeta M., Faesi C. M., Garcia-Burillo S.	2018, ApJ 869, L38
2357	Deuterium Fractionation Survey Toward Protostellar Sources in the Perseus Molecular Cloud: HNC Case	Imai M., Sakai N., López-Sepulcre A., Higuchi A. E., Zhang Y., Oya Y., Watanabe Y., Sakai T., Ceccarelli C., Lefloch B., Yamamoto S.	2018, ApJ 869, 51
2358	Chemical Survey toward Young Stellar Objects in the Perseus Molecular Cloud Complex	Higuchi A. E., Sakai N., Watanabe Y., López-Sepulcre A., Yoshida K., Oya Y., Imai M., Zhang Y., Ceccarelli C., Lefloch B., Codella C., Bachiller R., Hirota T., Sakai T., Yamamoto S.	2018, ApJ Supp. Series 236, 52
2359	POLAMI: Polarimetric Monitoring of Active Galactic Nuclei at Millimetre Wavelengths - III. Characterization of total flux density and polarization variability of relativistic jets	Agudo I., Thum C., Ramakrishnan V., Molina S. N., Casadio C., Gómez J. L.	2018, MNRAS 473, 1850
2360	POLAMI: Polarimetric Monitoring of Active Galactic Nuclei at Millimetre Wavelengths - II. Widespread circular polarization	Thum C., Agudo I., Molina S. N., Casadio C., Gómez J. L., Morris D., Ramakrishnan V., Sievers A.	2018, MNRAS 473, 2506
2361	Massive 70 µm quiet clumps - II. Non-thermal motions driven by gravity in massive star formation?	Traficante A., Fuller G. A., Smith R. J., Billot N., Duarte-Cabral A., Peretto N., Molinari S., Pineda J. E.	2018, MNRAS 473, 4975
2362	POLAMI: Polarimetric Monitoring of AGN at Millimetre Wavelengths - I. The programme, calibration and calibrator data products	Agudo I., Thum C., Molina S. N., Casadio C., Wiesemeyer H., Morris D., Paubert G., Gómez J. L., Kramer C.	2018, MNRAS 474, 1427
2363	Full-disc ^{13}CO(1-0) mapping across nearby galaxies of the EMPIRE survey and the CO-to-H_2 conversion factor	Cormier D., Bigiel F., Jiménez-Donaire M. J., Leroy A. K., Gallagher M., Usero A., Sandstrom K., Bolatto A., Hughes A., Kramer C., Krumholz M. R., Meier D. S., Murphy E. J., Pety J., Rosolowsky E., Schinnerer E., Schruba A., Sliwa K., Walter F.	2018, MNRAS 475, 3909
2364	Deuterium and ^{15}N fractionation in N_2H^+ during the formation of a Sun-like star	De Simone M., Fontani F., Codella C., Ceccarelli C., Lefloch B., Bachiller R., López-Sepulcre A., Caux E., Vastel C., Soldateschi J.	2018, MNRAS 476, 1982

2365	Jets, arcs, and shocks: NGC 5195 at radio wavelengths	Rampadarath H., Soria R., Urquhart R., Argo M. K., Brightman M., Lacey C. K., Schlegel E. M., Beswick R. J., Baldi R. D., Muxlow T. W. B., McHardy I. M., Williams D. R. A., Dumas G.	2018, MNRAS 476, 2876
2366	Infall and outflow motions towards a sample of massive star-forming regions from the RMS survey	Cunningham N., Lumsden S. L., Moore T. J. T., Maud L. T., Mendigutía I.	2018, MNRAS 477, 2455
2367	Astrochemical evolution along star formation: overview of the IRAM Large Program ASAI	Lefloch B., Bachiller R., Ceccarelli C., Cernicharo J., Codella C., Fuente A., Kahane C., López-Sepulcre A., Tafalla M., Vastel C., Caux E., González-García M., Bianchi E., Gómez-Ruiz A., Holdship J., Mendoza E., Ospina-Zamudio J., Podio L., Quénard D., Roueff E., Sakai N., Viti S., Yamamoto S., Yoshida K., Favre C., Monfredini T., Quitián-Lara H. M., Marcelino N., Boechat-Roberty H. M., Cabrit S.	2018, MNRAS 477, 4792
2368	De-projection of radio observations of axisymmetric expanding circumstellar envelopes	Nhung P. T., Hoai D. T., Tuan-Anh P., Darriulat P., Le Bertre T., Winters J. M., Diep P. N., Phuong N. T.	2018, MNRAS 480, 3324
2369	The ALMA Phasing System: A Beamforming Capability for Ultra-high-resolution Science at (Sub)Millimeter Wavelengths	Matthews L. D., Crew G. B., Doeleman S. S., Lacasse R., Saez A. F., Alef W., Akiyama K., Amestica R., Anderson J. M., Barkats D. A., Baudry A., Broguière D., Escoffier R., Fish V. L., Greenberg J., Hecht M. H., Hiriart R., Hirota A., Honma M., Ho P. T. P., Impellizzeri C. M. V., Inoue M., Kohno Y., Lopez B., Martí-Vidal I., Messias H., Meyer-Zhao Z., Mora-Klein M., Nagar N. M., Nishioka H., Oyama T., Pankratius V., Perez J., Phillips N., Pradel N., Rottmann H., Roy A. L., Ruszczyk C. A., Shillue B., Suzuki S., Treacy R.	2018, PASP 130, 015002
2370	A Search for Molecular Gas in the Host Galaxy of FRB 121102	Bower G. C., Rao R., Krips M., Maddox N., Bassa C., Adams E. A. K., Law C. J., Tendulkar S. P., van Langevelde H. J., Paragi Z., Butler B. J., Chatterjee S.	2018, AJ 155, 227
2371	An 800-million-solar-mass black hole in a significantly neutral Universe at a redshift of 7.5	Bañados E., Venemans B. P., Mazzucchelli C., Farina E. P., Walter F., Wang F., Decarli R., Stern D., Fan X., Davies F. B., Hennawi J. F., Simcoe R. A., Turner M. L., Rix H.-W., Yang J., Kelson D. D., Rudie G. C., Winters J. M.	2018, Nature 553, 473
2372	The unexpectedly large proportion of high-mass star-forming cores in a Galactic mini-starburst	Motte F., Nony T., Louvet F., Marsh K. A., Bontemps S., Whitworth A. P., Men'shchikov A., Nguyen Luong Q., Csengeri T., Maury A. J., Gusdorf A., Chapillon E., Könyves V., Schilke P., Duarte-Cabral A., Didelon P., Gaudel M.	2018, Nature Astronomy 2, 478
2373	Astronomical detection of radioactive molecule ^{26}AlF in the remnant of an ancient explosion	Kamiński T., Tylenda R., Menten K. M., Karakas A., Winters J. M., Breier A. A., Wong K. T., Giesen T. F., Patel N. A.	2018, Nature Astronomy 2, 778
2374	The ALMA view of UV-irradiated cloud edges: unexpected structures and processes	Goicoechea J. R., Cuadrado S., Pety J., Aguado A., Black J. H., Bron E., Cernicharo J., Chapillon E., Fuente A., Gerin M., Joblin C., Roncero O., Tercero B.	2018, IAUS 332, 210
2375	Pulsar observations at millimetre wavelengths	Torne P.	2018, IAUS 337, 92
2376	Long-term observations of pulsars in the globular clusters 47 Tucanae and M15	Ridolfi A., Freire P. C. C., Kramer M., Bassa C. G., Camilo F., D'Amico N., Desvignes G., Heinke C. O., Jordan C., Lorimer D. R., Lyne A., Manchester R. N., Pan Z., Sarkissian J., Torne P., van den Berg M., Venkataraman A., Wex N.	2018, IAUS 337, 251
2377	Morphology of the ^{13}CO(3-2) millimetre emission across the gas disc surrounding the triple protostar GG Tau A using ALMA observations	Phuong N. T., Diep P. N., Dutrey A., Chapillon E., Darriulat P., Guilloteau S., Hoai D. T., Tuyet Nhung P., Tang Y.-W., Thao N. T., Tuan-Anh P.	2018, Research in Astron. and Astrophys. 18, 031
2378	Prototype High Angular Resolution LEKIDs for NIKA2	Shu S., Calvo M., Leclercq S., Goupy J., Monfardini A., Driessen E. F. C.	2018, JLTP 193, 141
2379	Microfabrication Developments for Future Instruments Using KID Detectors	Goupy J., Benoit A., Bideaud A., Bourrion O., Calvo M., Catalano A., Driessen E. F. C., Gomez A., Leclercq S., Levy-Bertrand F., Macias-Perez J. F., Monfardini A., Schuster K. F.	2018, JLTP 193, 739
2380	The NIKA2 Instrument at 30-m IRAM Telescope: Performance and Results	Catalano A., Adam R., Ade P. A. R., André P., Aussel H., Beelen A., Benoît A., Bideaud A., Billot N., Bourrion O., Calvo M., Comis B., De Petris M., Désert F.-X., Doyle S., Driessen E. F. C., Goupy J., Kramer C., Lagache G., Leclercq S., Lestrade J.-F., Macías-Pérez J. F., Mauskopf P., Mayet F., Monfardini A., Pascale E., Perotto L., Pisano G., Ponthieu N., Revéret V., Ritacco A., Romero C., Roussel H., Ruppin F., Schuster K., Sievers A., Triqueneaux S., Tucker C., Zylka R., Barria E., Bres G., Camus P., Chanthib P., Donnier-Valentin G., Exshaw O., Garde G., Gerardin A., Leggeri J.-P., Levy-Bertrand F., Guttin C., Hoarau C., Grollier M., Mocellin J.-L., Pont G., Rodenas H., Tissot O., Galvez G., John D., Ungerechts H., Sanchez S., Mellado P., Munoz M., Pierfederici F., Penalver J., Navarro S., Bosson G., Bouly J.-L., Bouvier J., Geraci C., Li C., Menu J., Ponchant N., Roni S., Roudier S., Scordillis J. P., Tourres D., Vescovi C., Barbier A., Billon-Pierron D., Adane A., Andrianasolo A., Bracco A., Coiffard G., Evans R., Maury A., Rigby A.	2018, JLTP 193, 916

2381	A Proposed Heterodyne Receiver for the Origins Space Telescope	Wiedner M. C., Mehdi I., Baryshev A., Belitsky V., Desmaris V., DiGiorgio A. M., Gallego J.-D., Gerin M., Goldsmith P., Helmich F., Jellema W., Laurens A., Risacher C., Cooray A., Meixner M.	2018, IEEE Trans. on THz Sci. and Technology 8, 558
2382	Optical Response of Lumped-Element Kinetic-Inductance Detector Arrays	Shu S., Calvo M., Goupy J., Catalano A., Bideaud A., Monfardini A., Leclercq S., Driessen E. F. C.	2018, IEEE Trans. on THz Sci. and Technology 8, 605
2383	Increased multiplexing of superconducting microresonator arrays by post-characterization adaptation of the on-chip capacitors	Shu S., Calvo M., Goupy J., Leclercq S., Catalano A., Bideaud A., Monfardini A., Driessen E. F. C.	2018, Applied Physics Letters 113, 082603
2384	High Resolution Imaging with MUSTANG-2 on the GBT	Stanchfield S., Ade P., Aguirre J., Brevik J. A., Cho H.-M., Datta R., Devlin M., Dicker S. R., Dober B., Duff S. M., Egan D., Ford P., Hilton G., Hubmayr J., Irwin K., Knowles K., Marganian P., Mason B. S., Mates J. A. B., McMahon J., Mello M., Mroczkowski T., Romero C., Sievers J., Tucker C., Vale L. R., Vissers M., White S., Whitehead M., Ullom J., Young A.	2018, AAS 231, 322.05
2385	IRAM Proposal Tools	Boissier J.	2018, Proposal Submission Tools Workshop, Garching, Germany, id. 7
2386	The Physics and Chemistry of Oxygen-rich Circumstellar Envelopes as Traced by Simple Molecules	Wong, Ka Tat	2018, Thesis
2387	Ionized and Photodissociation Regions toward a New Sample of Massive Star-forming Clumps	Kim, Wonju	2018, Thesis
2388	Non-Equilibrium Chemistry of O-Rich AGB Stars as Revealed by ALMA	Wong K. T.	2018, Imaging of Stellar Surfaces, Garching, Germany, id. 41
2389	Gildas and Class	Pety J.	2018, Sub-mm SD Data Reduction and Array Combination Techniques, Garching, Germany, id. 11
2390	Applicable Lessons from the IRAM 30m Telescope	Schuster K.-F.	2018, Atacama Large-Aperture Submm/mm Telescope, Garching, Germany, id. 35
2391	Lessons Learned from Six Decades of Radio Polarimetry	Wiesemeyer H., Güsten R., Kreysa E., Menten K. M., Morris D., Paubert G., Pillai T., Sievers A., Thum C.	2018, Atacama Large-Aperture Submm/mm Telescope, Garching, Germany, id. 43
2392	NOEMA Sub-millimetre Detection of MAXI J1820+070	Tetarenko A. J., Bremer M., Bright J., Sivakoff G. R., Miller-Jones J. C. A., Russell T. D., Jacpot Xrb Collaboration	2018, Astron. Tel. 11440
2393	AT2018cow: NOEMA millimetre detection	de Ugarte Postigo A., Bremer M., Kann D. A., Izzo L., Thoene C. C., Schulze S., Perley D., Martin S., Malesani D. B., Michalowski M., de Gregorio-Monsalvo I., Bensch K., Blazek M., Sanchez-Ramirez R., Kim S., Krips M.	2018, Astron. Tel. 11749

Committees

STEERING COMMITTEE

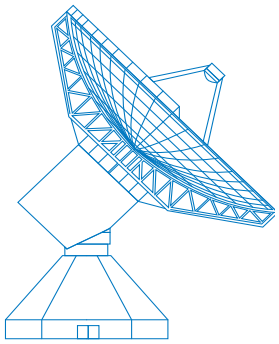
Rafael Bachiller, OAN, Madrid, Spain
Gabriel Chardin, CNRS, Paris, France
Reinhard Genzel, MPE, Garching, Germany
Mónica Groba López, IGN, Madrid, Spain
José Antonio López Fernández, IGN, Madrid, Spain
Karl Menten, MPIfR, Bonn, Germany
Guy Perrin, INSU, Paris, France
Jean-Loup Puget, IAS, Orsay, France
Markus Schleier, MPG, Munich, Germany

SCIENTIFIC ADVISORY COMMITTEE

Santiago Garcìa Burillo, OAN, Madrid, Spain
Maryvonne Gerin, LERMA/ENS, Paris, France
Guilaine Lagache, LAM, Marseille, France
Raphaël Moreno, LESIA, Observatoire de Paris, France
Gordon J. Stacey, Cornell University, Ithaca, USA
Linda Tacconi, MPE, Garching, Germany
Mario Tafalla, OAN, Alcalá de Henares, Spain
Fabian Walter, MPIA, Heidelberg, Germany
Friedrich Wyrowski, MPIfR, Bonn, Germany

PROGRAM COMMITTEE

Peter Abraham, Konkoly Observatory, Budapest, Hungary
Marcelino Agúndez, ICMM/CSIC, Madrid, Spain
Javier Alcolea, OAN, Madrid, Spain
Alexandre Beelen, LAM, Marseille, France
Elias Brinks, Univ Hertfordshire, Hatfield, United Kingdom
Nathalie Brouillet, LA, Bordeaux, France
Bruce Emelgreen, Thomas J. Watson Research Center, Yorktown Heights, USA
Natascha Förster Schreiber, MPE, Garching, Germany
Yu Gao, CAS Purple Mountain Observatory, Nanjing, China
Lee Hartmann, Univ. of Michigan, Ann Arbor, USA
François Levrier, LERMA/ENS, Paris, France
Amélie Saintonge, Univ. College London, United Kingdom
Dimitri Semenov, MPIA, Heidelberg, Germany
Antonio Usero, OAN, Madrid, Spain
Axel Weiss, MPIfR, Bonn, Germany



30-meter telescope, Pico Veleta

10 x 15-meter Interferometer, NOEMA

The Institut de Radioastronomie Millimétrique (IRAM) is a multi-national scientific institute covering all aspects of radio astronomy at millimeter wavelengths. IRAM operates two observatories – the 30-meter Telescope on Pico Veleta in the Sierra Nevada and NOEMA, an interferometer of ten 15-meter antennas on the Plateau de Bure in the French Alps.

IRAM was founded in 1979 by two national research organizations: the CNRS and the Max-Planck-Gesellschaft – the Spanish Instituto Geográfico Nacional, initially an associate member, became a full member in 1990.

The technical and scientific staff of IRAM develops instrumentation and software for the specific needs of millimeter radioastronomy and for the benefit of the international astronomical community.

IRAM scientists conduct forefront research in several domains of astrophysics, from nearby star-forming regions to objects at cosmological distances.

IRAM Partner Organizations:
Centre National de la Recherche Scientifique (CNRS) – Paris, France
Max-Planck-Gesellschaft (MPG) – München, Deutschland
Instituto Geográfico Nacional (IGN) – Madrid, España

iram
Institut de
Radioastronomie
Millimétrique