# POSTER SESSION :

**[A board, size : 0.70m wide and 1.00m high is available for each poster]**

## List of posters, Title, Authors & Abstract

1. Detection of the gaseous disk around the BO star R Mon
   T. Alonso-Albi, A. Fuente, R. Bachiller, A. Natta, L. Testi, R. Neri, P. Planesas
   **Abstract :**
   We present high angular resolution observations of the circumstellar disk around the massive Herbig Be star R Mon (M = 8 Msun) in the continuum at 2.7mm and 1.3mm and the 12 CO 1-0 and 2-1 rotational lines. Based on the new 1.3mm continuum image we estimate a disk mass (gas+dust) of 0.007 Msun and an outer radius of r<150 AU. Our CO images are consistent with the existence of a Keplerian rotating gaseous disk around this star. Up to our knowledge, this is the most clear evidence for the existence of Keplerian disks around massive stars reported thus far. The mass and physical characteristics of this disk are similar to those of the more evolved T Tauri stars and indicate a shorter timescale for the evolution and dispersal of circumstellar disks around massive stars which lose most of their mass before the star becomes visible.

**2.**
   E. Andres Vidal Perez
   **Abstract :**
   Circumstellar dusty discs seem to be a ubiquitous feature around stars in different phases of their evolution, including post-AGB stars. We present 3D radiative transfer simulations of circumstellar discs with an inhomogeneous dust distribution to investigate the effect of a clumpy medium on the dust temperature distribution. Our initial results indicate that the structure of the dust temperature distribution is rather insensitive to the structure of the ISM, but nevertheless we find a systematic dependence on the parameters describing the structure of the clumpiness of the dust medium.

**3.** Hydrogen Recombination Lines as SFR Indicator
   K. Basu, K. Menten, F. Bertoldi
   **Abstract : Not available**

**4.** Star formation thresholds derived by THINGS
   F. Bigiel
   **Abstract :**
   We will present first results from THINGS (The HI Nearby Galaxy Survey), which consists of high quality HI maps obtained with the VLA of 34 galaxies across a wide range of galaxy parameters (like e.g. Hubble type, mass or luminosity). We compare the HI with other multiwavelength data and in particular present radial profiles of the HI distribution, which traces the neutral interstellar medium, and compare these profiles to those corresponding to emission seen at other wavelengths. In a first analysis, azimuthally averaged HI profiles are used to derive the observed, average gas surface density, which is compared to the predicted critical density above which organized large-scale star formation is believed to start (this threshold is based on the Toomre-Q parameter, which in turn is a measure for local gravitational instability).

**5.** Detection of water vapour in the stratosphere of Jupiter with the Odin Space Telescope

Th. Cavalié, E. Lellouch, N. Biver, M. Dobrijévic, F. Billebaud, A. Lecacheux, A. Hjalmarson, A. Sandqvist, U. Frisk, M. Olberg, The Odin Team

**Abstract :**

The Infrared Space Observatory (ISO) has detected water vapor in the stratospheres of the giant planets and Titan and $CO_2$ on Jupiter, Saturn and Neptune (Feuchtgruber et al. 1997, 1999, Lellouch et al. 1999). The presence of the atmospheric cold trap implies an external origin for $H_2O$ (interplanetary dust, sputtering from the satellites and /or rings, large meteoritic impacts). The $H_2O$ submillimeric line at 557 GHz was detected by the Submillimeter-Wave Astronomy Satellite (SWAS) in 1999 and 2001 (Bergin et al. 2000, Lellouch et al. 2002), but the vertical profile and the column density derived from the observations are different from the one obtained from ISO mesurements (Lellouch et al. 2002).The swedish sub-millimeter satellite Odin carries out a long lasting monitoring of Jupiter's $H_20$ (110-101) 557 GHz line, since its launch in 2001. As an example, the high resolution $H_2O$ spectrum obtained on November 8th, 2002, will be presented and discussed here. Spectral analysis combined with the use of our photochemical model (Ollivier et al. 2000, adapted for Jupiter) provides new clues which help understanding the discrepancy between the ISO and SWAS results.

**6.** The Methanol Multibeam Survey

**UK** : J. Cohen, A. Chrysostomou, P. Diamond, G. Fuller, M. Gray, M. Hoare, M. Masheder, M. Pestalozzi, M. Thompson, D. Ward-Thompson, D. wong-McSweeney, J. Yates. **Australia** : J. Caswell, K. Brooks, M. Burton, S. Ellingsen, N. McClure-Griffiths, C. Phillips, M. Voronkov, A. Walsh

**Abstract :**

The methanol multibeam (MMB) survey is an Anglo-Australian project to survey the Galaxy for methanol masers, which trace the formation of massive stars. The 6.7-GHz methanol maser is particularly strong and is found only in star-forming regions, sometimes in association with ultracompact HII regions, but more commonly with the earlier hot core phase. Most 6.7-GHz methanol masers have been found by searching known star-forming regions. We are carrying out the first systematic survey of the whole galactic plane.

**7.** Sequential star formation in IRAS 00213+6530

G. Busquet, R. Estalella, A. Palau, J. M. Girart, G. Anglada, I. Sepulveda

**Abstract :**

IRAS 00213+6530 belongs to the molecular cloud M120.1+3.0 in the Cepheus OB4 star-forming region at a distance of 850 pc and has a luminosity of 12.9 Lsun. We present the results of VLA 3.6 cm and 7 mm continuum observations as well as NH3 (J,K)=(1,1) and (2,2) inversion transitions toward the low-mass star forming region IRAS 00213+6530. The centimeter emission reveals two sources, VLA 9 and VLA 10, which present different radio and IR properties, and the 7 mm observations resolve VLA 10 in two components. In NH3 we detect a high-density structure associated with the radio source VLA 10 and we find evidence of local heating and line broadening around this source, suggesting the true association of these objects with the molecular gas. Thus, IRAS 00213+6530 is a particularly interesting region because it contains YSOs in different evolutionary stages whose spatial distribution is suggestive of sequential star formation.

**8.** Main beam and antenna efficiency analysis for the ALMA band 9
M. Candotti, A. Baryshev, N.A. Trappe
**Abstract :**
We present the electromagnetic analysis and predictions for the quasi-optical front-end for ALMA band 9 developed and tested at SRON(The Netherlands). The quasi-optical coupling system has been studied by means of accurate electromagnetic software simulations together with experimental near-field measurement for both the orthogonal polarization beams. The aim of this work is to assess the quasi-optical mirror system design and its optical coupling with the ALMA 12m Cassegrain antenna. The antenna efficiency and beam size of the main beam at the far field are obtained from the theoretical model and from the near-field beam pattern at the Cassegrain focus used as input source for the antenna electromagnetic model. This analysis has been carried outfor both the orthogonal polarisation signals, with emphasis on the characterisation of the main beam deviation angle between the two polarisation main beams.

**9.** OVRO/N2H+ Observations towards Protostars : Observational Constrains on the Formation of Binary Stars
X. Chen, R. Launhardt
**Abstract :**
To understand the formation process of binary stars, high angular resolution studies of the earliest stages of star formation are required. We have, therefore, started a program to study multiplicity among low- and intermediate-mass protostars, conducted at OVRO, ATCA and IRAM arrays. Based on these data, we will analyze the mass ratios and kinematics of these binary systems and compare these results with theoretical models. In this poster, we present the results of 9 protostellar cores observed with OVRO array. The observations provide the structure and kinematics of these sources, and reveal some binary protostellar systems. We analyze the distributions of angular momentum in these cores as well as in binary protostellar systems.

**10.** Optical Interferometry Observations of Evolved Stars
O. Chesneau
**Abstract : Not available**

**11.** The Dust Content and Temperature Distribution in the Local Universe
S. Falony
**Abstract :**
The best way to determine the dust content of galaxies is by measuring their emission in the FIR and submm regions. Unfortunately, there is a strong degeneracy between dust mass and temperature; in order to determine the amount and temperature distribution of dust in a reliable way, a good spectral coverage of the entire FIR-submm SED is necessary. We use a dataset extracted from the Extended 12 Micron Galaxy Sample, for which the spectral energy distribution has been measured out to 200 μm with IRAS and ISO. This sample consists of representative subsamples of Seyfert 1, Seyfert 2, starburst and normal disc galaxies in the the Local Universe, and hence is ideal to study the dust content of galaxies of different classes. We extended some of the SEDs with additional 450 and 850 μm fluxes, measured with SCUBA on the JCMT. We apply several methods to measure the dust content and temperature distribution from the observed SEDs. We find clear evidence for cold dust in our galaxy sample. Additional long wavelength data are particularly important for constraining the dust content and temperature distribution in these galaxies.

**12.** Star Formation in Merging Galaxy clusters
C. Ferrari, Maurgordato, Benoist, Feretti, Cappi, Hunstead, Slezak
**Abstract : Not available**

**13.** mm-VLBI Observations of Mrk 501
M. Giroletti, G. Giovannini
**Abstract :**
We report on observations of the TeV blazar Mrk 501 using the Global mm-VLBI Array at 86 GHz. A ~130 mJy compact component is detected on the baselines between Effelsberg, Pico Veleta, and Plateau de Bure. This discovery has important bearings on both current science and future technology. It provides information on the physics of the radio core of this blazar on scales of a few 100's Schwarzschild radii; moreover, it is a promising starting point for further improvements at higher frequencies and lower flux densities, with the goal of studying the region of the jet formation.

**14.** Constraints for the Earth's Water from Isotopic Abundances
A.L Graps, J.I. Lunine, A. Coradini
**Abstract :**
Here we summarize the current geo-chemical constraints that, together with published dynamical models, constrain the abundance of water delivered to the Earth. We find that no single source satisfies all of the known constraints, including carbonaceous chondrites. however ordinary chondrites, (really, their parent bodies) are promising as the primary source of Earth?s water. Conclusion: The primordial inner asteroid belt is a good source for the Earth's water.

**15.** Gas Dynamics in AGN Galaxies
S. Haan, E. Schinnerer, S. Garcia-Burillo, F. Combes, C. Mundell
**Abstract :**
Active Galactic Nuclei (AGN) galaxies are generally known as very luminous galaxies where a small emitting region is associated with gas accretion onto a central supermassive black hole. Up to now the process of fueling the AGN with material (gas or stars) generally far away from the gravitational influence of the central black hole is controversial and not understood. Since the required material has to remove its high angular momentum in order to fall into the center, various mechanisms may play a role, including m = 2 perturbations (bars and spirals), m = 1 perturbations (spirals, warps, lopsidedness), tidal interactions between galaxies, and galaxy mergers. In order to study the gas transport from the outskirts to the centers of AGN galaxies, we are carrying out a key project, named NUGA (Nuclei of Galaxies), which is a high spectral and angular resolution CO and HI survey of low luminosity AGN in nearby galaxies (Seyferts, LINERs and transition objects). The complete dataset provides us with the unique opportunity to understand and ultimately model the whole disk kinematics on spatial scales ranging over several orders of magnitude. Here, we will present observations of 15 galaxies recently obtained in the 21 cm emission of neutral hydrogen using the Very Large Array. First results on the HI gas and velocity distribution of these galaxies are summarized and discussed. The derived properties will be presented and compared with the AGN activity types in order to search for possible dependences. Additionally, effects of satellites and tidal disturbances onto the HI disk as well as their correlation with AGN type and dynamical modes probed by CO (inner kpc) will be examined.

**16.** IRS 63 : A Rotating Disk in a Class-I YSO ?
Lommen, Jorgensen, van Dishoeck, van Longevelde, Hogerheïjde, Crapsi, Myers
**Abstract :**
IRS 63 is an isolated Class-I young stellar object, meaning that it is a young star, surrounded by a disk and emerging from its parental cloud. IRS 63 is an ideal source for observations, since it is one of the few isolated sources in the busy ρ-Ophiuchus region. We observed this source with submillimeter array in 1-mm continuum and in the HCO+ (3-2) rotational lines. The HCO+ (3-2) line is clearly detected and shows a distinct double-peaked shape, indicative of a rotating disk. Mapping the source in HCO+ reveals that IRS 63 may indeed contain a rotating disk, and the map shows some traces of infall as well. Combining our new observations with Owen's-Valley observations at longer wavelengths and mid-infrared Spitzer observations, we can model this interesting source, of which the results are presented here.

17. SMA Observations of 12CO, 13CO, and C18O J=2-1 of the Keplerian Disk around HD169142
O. Panic', Hogerheijde, Wilner, & Qi
**Abstract :**
We present SMA observations of 13CO and C18O 2-1 of the disk around the pre-main-sequence A5 star HD169142 (d=145 pc). Together with previously published 12CO 2-1 imaging, our data reveal the Keplerian velocity field in this disk, suggesting a central mass of 2 solar masses and an inclination of 13 degrees for the disk. The CO emission extends to 275 AU from the star. From the broad-band spectral energy distribution we deduce the physical structure of the disk, using the models of D'Alessio et al. We then calculate the excitation and line formation of the observed CO transitions, and present conclusions about the physical regions in the disk where the emission arises.

**18.** Neutral Hydrogen in six southern compact groups of galaxies
E. Pompei, M. Dahlem, A. Iovino
**Abstract :**
The removal of metals and energy from galaxies in the process of gravitational interactions is one of the most efficient ways to distribute metals in intergalactic space. Therefore, understanding what is going on when galaxies interact is important for a better understanding of the chemical evolution of the Universe. Groups of galaxies are the best-suited laboratories for studies of strong galaxy interactions in the absence of massive elliptical galaxies and their associated gravitationally heated X-ray-emitting intergalactic envelope, as found in massive clusters. Amongst groups of galaxies, compact groups are of special significance because of the proximity of galaxies within them. Tidal interactions occur frequently, often involving more than two galaxies, which leads to a large number of targets for investigations of the effects tidal forces have on the member galaxies…

**19.** HCN, CS and SiO molecules around carbon star IRAS 06238+0904
M. Pulecka, M.R. Schmidt, R. Szczerba, J.H. He
**Abstract :**
We have observed and detected rotational transitions of HCN J=1-0, CS J=3-2, CS J=5-4, SiO J=3-2 with the IRAM radio-telescope in two carbon stars: IRAS 04130+3918 and IRAS 06238+0904 with OH maser emission towards them. Physical model of the envelope was established by modelling of the spectral energy distribution. Chemical model was developed to determine the of molecular distribution in circumstellar shell assuming that IRAS 04130+3918 and IRAS 06238+0904 are genuine carbon stars. Observed emissions were fitted with the non-LTE code. The radiative transfer problem in molecular lines was solved assuming Large Velocity Gradient (LVG). The aim of the work was to examine if the observed abundance of the SiO molecule can be explained by chemistry in envelopes around C-stars or rather by existence of the reservoir of O-based material (known to be

present in silicate C-stars) is necessary. Modelling two transition of CS molecule test our chemical and physical model.

**20.** Observations of Massive, Pre-stellar Cores

S. Ragan

**Abstract :**

Over the past decades, significant progress has been made in our understanding of star formation. Key to the advancement in this field has been the identification of several phases of the process, including the earliest stages -- the pre-stellar cores. While numerous pre-stellar cores have been identified in nearby clouds forming low-mass stars, such a sample of their massive counterparts has been more difficult to find. Using Spitzer, we have isolated a unique sample of high-mass pre-stellar and star-forming cores, many of which show sub-structure in absorption at 8 and 24 microns, taken as evidence of fragmentation. With high-resolution, molecular follow-up, we plan to characterize the temperature and velocity structure of these objects, serving as an observational test of current models of high-mass star formation and cloud fragmentation.

**21.** The Physics and Chemistry of Circumstellar Envelopes of S-type AGB Stars

S. Ramstedt, H. Olofsson, F.L. Schoeier

**Abstract :**

The S-stars have been suggested to be a brief transitional phase as stars evolve from oxygen-rich M-type stars into carbon stars, through the dredge up of carbon from He-shell burning. According to equilibrium chemistry, the molecular setup and grain types in circumstellar envelopes (CSEs) is, to a large extent, determined by the C/O-ratio in the photosphere of the central star. However, recent results (eg. Schoier etal. 2006) suggest that equilibrium chemistry is not telling the whole story. As possible transition objects, S-stars might very well help achieve a deeper understanding of the chemical evolution as a star ascends the AGB, as well as shed light on the mass-loss mechanism, which is not yet fully understood. A good circumstellar model is basic to abundance estimates and we will here present the results from the radiative transfer modelling of the CO radio line emission towards a sample of 40 S-stars.

**22.** HCN and [CI] Line Emission in APM 08279+5255 at z=3.91

J. Wagg, D.J. Wilner, R. Neri, D. Downes, T. Wiklind

**Abstract :**

Even after correcting for amplification by gravitational lensing, the ultraluminous quasar APM 08279+5255 at z=3.91 remains one of the most luminous objects known in the Universe. It has been detected in various transitions of CO line emission (up to the J=11-10 transition), and more recently detected in HCO+ J=5-4. The PdBI has been instrumental in
detecting nearly all of these molecular emission lines, and here we present the PdBI detection of [CI] J=1-0, and the first detection of redshifted HCN J=5-4 line emission. We discuss the potential for redshifted [CI] line emission to act as a molecular gas mass indicator, and the implications of the extreme HCN line luminosity for the molecular gas excitation.