

Resultados Concurso Apex 2009-B

Propuestas seleccionadas

Propuesta: 2009B-474

Investigador Principal: L. Bronfman

Universidad: Universidad de Chile

Título: ATLASGAL - The APEX Telescope Large Area Survey of the Galaxy

Resumen: Dust continuum emission in the submillimeter range is the best tracer of the earliest phases of (high-mass) star formation since it is directly probing the material from which the stars form. Only a large unbiased survey can provide the statistical base to study the scarce and short-living protostars or protoclusters at the origin of the massive stars and the richest clusters in the Galaxy. We (MPG, ESO, and U. Chile) started in 2007 a systematic survey of the Galactic Plane at 870 μ m with LABOCA: The APEX Telescope Large Area Survey of the Galaxy (ATLASGAL). Observations have been conducted during 2008 and should continue during 2009A. Here we ask for 15 hours of telescope time for 2009B, to complement the time allocated by ESO and MPG, in order to finish the survey in 2009. When complete, this survey will be the first Galaxy-wide submillimeter continuum survey. Combining ATLASGAL with existing and planned Galactic surveys such as GLIMPSE, MIPS GAL, VLA-NVSS, Herschel and NANTEN2, will allow us to answer several open questions about the origin of massive stars. The large number of high-mass protostars and protoclusters identified with ATLASGAL will provide an excellent sample for high-angular resolution observations using ALMA.

Tiempo asignado: 15 Horas

Propuesta: 2009B-472

Investigador Principal: J. M. Rathborne

Universidad: Universidad de Chile

Título: Evolutionary state of cores within a very filamentary Infrared Dark Cloud

Resumen: Infrared Dark Clouds (IRDCs) are cold, dense molecular clouds seen as extinction features against the bright Galactic infrared background. Many IRDCs are filamentary and they all contain one or many cores, some of which are undergoing the earliest stages of high-mass star formation. We hypothesize that a fluid instability may be the mechanism that drives star formation within filamentary IRDCs. In order to better characterize the various stages of high-mass star formation, as well as the timescales and physical conditions during the collapse into protostellar cores, we propose to obtain spectra toward a sample of high-mass star forming cores within a very filamentary IRDC. Combined with the optically thin sub-millimeter continuum emission from ATLASGAL and GLIMPSE/MIPSGAL images, these spectra will provide information to determine many properties such as masses, chemistry and evolutionary states of the cores.

Tiempo asignado: 10 Horas

Propuesta: 2009B-475

Investigador Principal: D. Mardones

Universidad: Universidad de Chile

Título: Pre-stellar cores: the initial conditions for star formation

Resumen: Protostars form as a consequence of the gravitational contraction of dense gas in cores, and it is this dense gas that serves as the primary mass reservoir of a forming star. Pre-stellar cores, dense condensations in molecular clouds with infall motions and no obvious stellar source, represent the initial conditions of star formation. Studying this initial phase is crucial to fully understand the star formation process. Here we propose to conduct a multi-line survey of four pre-stellar cores to study the physical and chemical properties of the dense gas at the pre-star formation stage. We will observe different molecular lines that trace the infall motions, the core column density, and the chemical composition of the core. Our results will provide an important contribution to the study of how cores form, evolve, and form stars, and will also place constraints on models of the physical and chemical evolution of cores.

Tiempo asignado: 13 horas

Propuesta: 2009B-476

Investigador Principal: Gaspar Galaz

Universidad: Pontificia Universidad Católica de Chile

Título: The interstellar medium of the Local Volume Legacy galaxies: Constraining dust properties

Resumen: We propose to observe with LABOCA 4 low- and 2 high- surface brightness galaxies from the Local Volume Legacy survey (LVL). The LVL is a Spitzer Space Telescope legacy program that surveys a volume-limited region of the local universe out to 11 Mpc, built upon a foundation of UV, H_α, and HST imaging from 11 HUGS and ANGST surveys. By combining fluxes in 870 μm with those measured in the IR (Spitzer) we will constrain dust properties like temperature and mass, correlating such measures with other features obtained with the wealth of multiwavelength data of the LVL. These include signatures of ongoing stellar formation from the H_α emission and UV, and PAH emission in the 6 to 15 μm window. The requested telescope time is 11 hours. The remaining telescope time for next semesters, for this programme, depends on results of this proposal, since these data are fundamental to decide whether APEX/LABOCA is well suited to study galaxies of LVL with fainter IR fluxes. These data will be complemented in the future with CO observations using APEX and eventually ALMA.

Tiempo asignado: 11 horas

Propuesta: 2009B-473

Investigador Principal: A. Roman-Lopes

Universidad: Universidad de La Serena

Título: SHFI APEX observations of two southern massive star formation regions.

Resumen: In this work we want to study the physics and kinematics of the molecular gas associated with the RCW95 and RCW116B star forming regions. To achieve these goals, we plan to use some of the several molecular line transitions that can be observed with the SHFI APEX-1 (230GHz) and APEX-2 (345GHz) receivers. In this proposal and as a first step, we initially want to obtain CO(2-1) and CO(3-2) molecular line transitions maps of the complexes. The primary aim is to find where the bulk mass of the molecular mass resides. With these data, and with support from our previously taken data, we will be able to derive basic results regarding the properties of the molecular gas (density, temperature, etc). Later, a follow up study will target some specific regions with observations of CO isotopomers and other molecular species to reveal further information about the state of the gas. The large number of available molecular transitions (CO, CS, CH₃OH, HCO⁺, ...) and the excellent spatial resolution and sensitivity of these APEX instrumental configurations, make them well suitable to provide the tools needed to derive some of the physical properties of the molecular gas that belong to the structures detected in our previous near-IR imaging and 43 GHz continuum observations.

Tiempo asignado: 10 horas

Propuesta: 2009B-481

Investigador Principal: Simon Casassus

Universidad: Universidad de Chile

Título: Dusty sub-mm haloes around PNe.

Resumen: Does stardust survive the planetary nebula phase? The meteoritic evidence suggests some AGB dust reaches the protoplanetary disks. However the bulk of AGB ejecta surrounding PNe has escaped detection so far. Our long term objective is to detect the cold AGB dust surrounding PNe. ALMA sensitivities are required to map the cold dust halo. But SABOCA may detect the warm ~ 50 K dust greybody which would be a starting point for ALMA followup. Our immediate objective is to sample the radio spectrum of PNe. The relatively unexplored frequency range at 200-300 GHz is the region where free-free and dust emission occur in comparable intensities. Sub-mm data at SABOCA frequencies are crucial to inform the level of greybody emission at 250 GHz. For this study we have chosen a sample of compact and IR-bright PNe with previous 250 GHz data. APEX+SABOCA can provide the required angular resolution at unprecedented sensitivities to complement the coarse Planck minimaps.

Tiempo asignado: 12 horas

Propuesta: 2009B-478

Investigador Principal: D. Mardones

Universidad: Universidad de Chile

Título: Gas Evolution in Protoplanetary Disks

Resumen: We propose to carry out observations in CO(3-2), H₁₃CO+(4-3), HCO+(4-3) and DCO+(4-3) in a sample of isolated HAeBe and Vega-type stars with disks in different evolutionary stages to study the evolution of the gaseous component of their protoplanetary disks. In those sources where molecules are highly depleted, we expect an enhancement of the deuterated molecule DCO+ that allows us to detect the gas component at the midplane of the disks. We will derive information about kinematics, temperature, column density, size and inclination of the disks, as well as level of depletion and deuteration fraction [D]/[H]. We will be able to model these spectra with a 3-d refined-mesh monte-carlo radiative transfer code currently under development by the PI. These surveys are important as a complement of future Herschel observations, as well as to provide good candidates for future ALMA projects. The proposed work completes the observations done in 2008A when we completed most of the CO and HCO+ and some DCO+ observations in the first 10 sources in our sample.

Tiempo asignado: 18 horas

Propuesta: 2009B-468

Investigador Principal: G. Garay

Universidad: Universidad de Chile

Título: Modeling the continuum emission of the supersonically contracting star forming core ahead of HH 80N

Resumen: Although the standard theory of protostellar collapse may provide a good zeroth-order description of the star formation process, usually more dynamical models are needed to explain peculiar cases. The dense core ahead of HH 80N, that is contracting with a supersonic infall velocity (0.6 km s⁻¹), seems to be one of these special cases. We propose to observe the 350 μ m continuum emission of this core that, in combination with continuum observations at other wavelengths (e.g. mid-IR data from VLT), will allow us to complete its SED determination. From the well-sampled SED we will intend to perform a detailed modeling by using sophisticated models. This is required to obtain an assessment of the physical properties and evolutionary status of the HH80N core, probably related with its striking dynamical properties. Our ultimate goal is to gauge the influence of the external medium (i.e. the HH 80/81/80N flow) in triggering the star formation process in the HH 80N core.

Tiempo asignado: 2 horas

Propuesta: 2009B-482

Investigador Principal: G. A. Romero

Universidad: Universidad de Valparaíso

Título: Transition Circumstellar Disks in Taurus and Serpens regions: obtaining disk masses.

Resumen: Circumstellar disks around Pre-Main-Sequence (PMS) stars are the sites of planet formation. Spectacular candidates for disks perhaps presently forming planets are so-called transition disk systems with their optically thin inner disks and optically thick outer disks. However, several mechanisms have been proposed to explain the inner opacity holes, i.e. planet formation, grain growth, photoevaporation, tidal truncation in close binaries, and their relative importance is currently completely unconstrained. These mechanisms, all very relevant to disk evolution, can be distinguished when *disk masses*, accretion rates and multiplicity information are available. This proposal is part of a large coordinated program aiming to collect information of newly discovered transition disks in order to (i) establish the relative importance of the mechanisms potentially responsible for their inner holes and (ii) identify systems with strong evidence for ongoing planet formation to be followed-up with *Herschel* and *ALMA*. Here we propose to perform Apex/LABOCA observations to derive constraints on the masses of 23 transition disk objects situated in Serpens and Taurus Auriga regions.

Tiempo asignado: 10 horas

Propuesta: 2009B-479

Investigador Principal: Mónica Rubio

Universidad: Universidad de Chile

Título: Observations of star forming regions linked to the ring nebulae RCW52 and RCW78

Resumen: We would like to observe the environs of young stellar object candidates probably associated with the stellar wind bubbles RCW52 excited by the O-type star LSS 1887 and RCW78 around WR55. Our aims are to identify and characterize the dense molecular clumps related to the YSO candidates in the region. To perform this project we propose to observe a region of 15×15 arcmin centered approximately at the stellar position in RCW52 and of 8×8 arcmin towards RCW78, in the continuum at 0.8 mm and in the 13CO(2-1) line at 220 GHz, using the LABOCA bolometer array and the APEX-1 SHFI instrument, respectively, at the APEX telescope. CS(5-4) line data will be obtained towards the detected dense clumps. The proposed observations will allow to detect the high density clumps where the protostars are immersed, determining their masses and kinematics. Kinematical information will help to confirm the association of the young stellar objects with the dense envelopes that surround the nebulae. These observations will help to analyze whether the RDI or the 'collect and collapse' process are taking place in the environs of the bubbles, and finally, to disentangle the star forming history.

Tiempo asignado: 21,1 horas
