and found that they are much larger than the numerical diffusion, especially for initially trans-Alfvénic clouds, ensuring that the detected magnetic flux removal is due to to the action of the RD rather than to numerical diffusivity.

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MODELING THE CIRCUMSTELLAR ENVIRONMENT OF AB AUR USING THE Hα LINE

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AB Aurigae is the brightest Ae Herbig star in the northern hemisphere and it shows evidence of accretion and ejection processes in its circumstellar region. Moreover the Hα line shows a P-Cygni type profile which is a common indication of wind. Its Hα line is very variable, and most of this variation occurs in its blue-shifted side. One of the processes that can be used to explain this variation is a disk wind similar to those of the classical T Tauri stars. AB Aurigae has been observed using spectral interferometry in the optical region, by the VEGA spectrometer in the CHARA-array, which can resolve details of milliseconds of arc in size: in the case of AB Aur represent sizes smaller than 1 AU. With this resolution, it's possible to observe the region where the wind is being ejected. Using a radiative transfer code that already had been used to model the Hα line profiles in classical T Tauri stars, and adapting it to model the Hα line in AB Aur, we calculate an intensity map showing the region where this line is being formed, and then we compare it with data from the interferometric observations. This work will give us a better understanding of the ejection and accretion mechanism that are responsible for the formation of the Hα line around AB Aur and in some of the Herbig Ae/Be stars, and whether a disk wind mechanism can explain or not this line in these objects.

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STEADY-STATE ACCRETION DISK MODELS WITH VARIABLE α

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We present solutions for the radial and vertical structure of standard accretion disks (Shakura & Sunyaev). In these disks, the accretion and distribution of the angular momentum are controlled by the viscosity parameter, α. Self-similarity solutions for accretion disks predict that α must be constant on the disk, if the viscosity can be described by a power law $\nu \propto R^{\gamma}$ with $\gamma = 1$. Recently, Isella et al. (2009) showed that for a sample of 14 young stellar objects, $-0.8 \leq \gamma \leq 0.8$, indicating that $\alpha = \alpha(R)$. Based on these evidences, we have computed the structure for 11 of these objects, using $\alpha(R)$ as prescribed by Isella et al. (2009). We compare our results with the solutions of the same disks for $\alpha = 10^{-3}$ to 10^{-1}, constant. Our results show that the disks (as expected) are lighter, cooler and thinner in its inner regions, when compared with the disks with α constant. We make a qualitative analysis of the solutions obtained with the JED + SAD models (Jet Emitting Disk + Standard Accretion Disk), which also predict the same behavior for the central part of the accretion disks. We show that the height scale maps the age of the objects: the disks become thinner overall to the extent as the objects become older. As the stars studied have different masses and accretion rates, the results appear to be independent of the specific characteristics of the disk+star system.

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THE SONYC SURVEY: TOWARDS A COMPLETE CENSUS OF BROWN DWARFS IN STAR FORMING REGIONS

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Deep surveys of star forming regions are the backbone of observational studies on the origin of stars and planets: On one side, they provide large and homogeneous object samples required to study disks,

accretion, and multiplicity. On the other side, such surveys determine the shape and the low-mass limit of the Initial Mass Function (IMF), which are fundamental constraints on star formation theory.

SONYC, short for "Substellar Objects in Nearby Young Clusters", is an ongoing project to provide a census of the substellar population in nearby star forming regions. We have conducted deep optical and near-infrared photometry, combined with proper motions, and followed by extensive spectroscopic follow-up campaigns with Subaru and VLT, in which we have obtained more than 700 spectra of candidate objects in NGC1333, ρ Ophiuchi, Chamaeleon-I, Upper Sco, and Lupus-3. We have identified and characterized more than 60 new substellar objects, among them a handful of objects with masses close to, or below the Deuterium burning limit. Thanks to the SONYC survey and the efforts of other groups, the substellar IMF is now well characterized down to $\sim 5-10\mathrm{M}_J$, and we find that the ratio of the number of stars with respect to brown dwarfs lies between 2 ad 6. Another important piece of information for the star formation theories is that, down to $\sim 5\mathrm{M}_J$, the free-floating objects with planetary masses are 20–50 times less numerous than stars, so that their total contribution to the mass budget of the clusters can be neglected.

In this contribution we will present the status of the SONYC survey, discuss its main results, and focus on the latest findings in NGC1333, Lupus-3 and Upper-Sco.

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A SURVEY OF EXTENDED H_2 EMISSION TOWARDS A SAMPLE OF MASSIVE YSOS

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Very few massive stars in early formation stages were clearly identified in the Milky Way and moreover, the processes of formation of such objects lacks of observational evidences. Two theories predict the formation of massive star: *i*) by merging of low mass stars or *ii*) by an accretion disk. One of the most prominent evidences for the accretion scenario is the presence of bipolar outflows associated to the central sources. Those structures were found on both intermediate and low-mass YSOs, but there are no evidences for associations with MYSOs. Based on that, a survey was designed to investigate the earliest stages of massive star formation through the molecular hydrogen transition at 2.12 μm. A sample of ~ 300 MYSOs candidates was selected from the Red MSX Source program and the sources were observed with the IR cameras Spartan (SOAR, Chile) and WIRCam (CFHT, Hawaii). Extended H_2 emission was found toward 55% of the sample and 30% of the positive detections (50 sources) have bipolar morphology, suggesting collimated outflows. These results support the accretion scenario, since the merging of low mass stars would not produce jet-like structures.

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STUDY OF TRIGGERED STAR FORMATION IN A BRIGHT-RIMMED CLOUD

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Bright-rimmed clouds (BRCs) are small and dense molecular clouds located in the periphery of the evolved HII regions. The illumination of these dark clumps by nearby OB stars might be responsible for triggered collapse and subsequent star formation through the mechanism known as radiation-driven implosion (RDI). We carried out a multi-wavelength study of a BRC located in the periphery of the evolved HII region G52.85-0.55. From the evaluation of the pressure balance between the ionized gas located at the illuminated border of the clump and the molecular gas, we show that shocks are being driven in the external layers of the BRC. On the other hand the pressure balance suggests that the birth of young stellar objects embedded in the BRC could have been initiated by the RDI mechanism.

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