SEARCHING FOR PROTOPLANETARY DISKS AROUND YOUNG STARS

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It is well known that the detection of planets around other stars is exceedingly difficult. An alternative approach has been to search for evidence of protoplanetary disks around young stars. There is considerable indirect evidence in the literature supporting that young stars are surrounded by disks of radius ~ 100 AU. Our goal is a direct detection of these circumstellar disks.

We made observations at 1.3 cm continuum of HL Tau, as well as NH_3 (1,1) and (2,2) observations of HL Tau and L1551-IRS5, using the VLA in its B configuration. This provides an angular resolution of ~ 0.4″ (~ 50 AU at 140 pc). The continuum observations (Rodríguez et al. 1992, ApJ, 393, L29) reveal an elongated structure (~ 1.4″ × 0.6″, or ~ 200 × 80 AU) surrounding HL Tau. The dimensions and the flux density of this source (2.9±0.4 mJy) suggest that the 1.3 cm continuum emission arises from dust in a protoplanetary disk. However, the different orientation of the structure with respect to previously studied outflow phenomena and proposed disks in the region does not allow a definitive determination of its nature.

No ammonia emission is detected in either HL Tau or L1551 with a noise level $\sigma \simeq 1$ mJy. With this non-detection we estimate upper limits to the column density ($N(H_2) \simeq 10^{24} - 10^{25}$ cm^{-2}) and mass ($M(H_2) \simeq 0.03 - 0.1\ M_\odot$ for HL Tau, and $0.07 - 0.3\ M_\odot$ for L1551) of the high-density molecular gas in possible protoplanetary (~ 100 AU) molecular disks around these sources.

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NUMERICAL MODELS FOR SHOCKS AND WAVE PROPAGATION IN DENSE CLOUD CORES

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We present a model for the interaction of a high-velocity cloud falling onto the gas of the galactic disk. A hydrodynamic simulation is used to describe the velocity field of the gas as a function of time. We assume that stars are continuously being formed during the crossing time as a result of the compression of the gas, and that the initial velocity of the young stellar objects perpendicular to the galactic plane equal is equal to the velocity of the gas in which they formed. While the young stellar objects continue their motion under the action of gravity only, the gas suffers braking. A gradient of age of young stellar objects results in the Z-direction. The results are compared with observations of star-formation regions.

ALFVÉN WAVES AND TURBULENCE IN MOLECULAR CLOUDS

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There is strong evidence for magnetic fields in molecular clouds to be oriented parallel to the direction of bipolar outflows. We study the Alfvén wave protostellar model of Jatenco-Pereira and Opher (1989, MNRAS, 236, 1) to explain the observed bipolar outflows and turbulence in molecular clouds. We assume that the Alfvén waves are primarily dissipated by non-linear damping and turbulent damping and examine the physical parameters necessary to produce the observed massive low-velocity outflows and turbulence in molecular clouds.

EL POLVO INTERESTELAR EN LA REGION DE ETA CARINAE

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Se hace una separación cuidadosa de las contribuciones del polvo dentro y frente al complejo Eta Carinae. Se encuentra que el polvo intracúmulo manifiesta una polarización normal con longitudes de onda de máxima polarización similares a la del medio interestelar general y también un poco por encima. No se obedece la relación ($R_V - \lambda_{max}$) aceptada en general para las zonas donde el polvo es anómalo. La extinción en el ultravioleta, obtenida mediante espectros *IUE* tampoco es distinta entre el material intracúmulo y el ubicado por delante.

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