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Evolution of Young Stars and Their Disks in Serpens

Isa Oliveira[1], Bruno Merín[2], Klaus Pontoppidan[3] and Ewine van Dishoeck[1,4]

[1]Sterrewacht Leiden, Leiden University, P.O. Box 9513, 2300 RA Leiden, The Netherlands
email: oliveira@strw.leidenuniv.nl
[2]Herschel Science Center, European Space Agency (ESA),
P.O. Box 78, 28691 Villanueva de la Cañada (Madrid), Spain
[3]California Institute of Technology, Division for Geological and Planetary Sciences,
MS 150-21, Pasadena, CA 91125, USA
[4]Max-Planck Institut für Extraterrestrische Physik,
Giessenbachstrasse 1, 85748 Garching, Germany

Abstract. Unbiased, flux-limited surveys of protoplanetary disks and their parent stars currently exist for only a few clouds, primarily Taurus and IC 348, selected primarily by optical and near-IR data. Such surveys are essential to address questions of disk evolution as a function of stellar parameters such as spectral type, age, accretion activity and environment. Using the 'Cores to Disks' (c2d) Spitzer Legacy Program, we discovered a new population of young stellar objects (YSOs) in a region of only 0.8 deg^2 in the Serpens Molecular Cloud. This sample contains 150 mid-IR bright ($\geqslant$ 3 mJy at 8 μm) YSOs with infrared excess, having a broad range of SED types and luminosities. Serpens is therefore a unique target region for obtaining a complete, well-defined sample of multi-wavelength observations of young stars in a possible evolutionary sequence. Compared with other clouds such as Taurus and Chamaeleon, Serpens has an exceptionally high star-formation rate (5.7×10^{-5} M$_\odot$ yr^{-1}). Follow-up complimentary observations in the optical, near- and mid-infrared (Spitzer/IRS GO3) have allowed us to characterize both the central stars and the surrounding disks. The shape and slope of the mid-infrared excess provide information on the flaring geometry of the disks. The spectral features give constraints on grain growth and mineralogy, which in turn probes heating and radial mixing. The presence of PAH features traces UV radiation, whereas Hα and Brγ are used as diagnostics of accretion. Assuming that all stars within a sufficiently small region are nearly coeval, this provides direct constraints on the importance of environment and initial conditions on disk evolution. In this meeting, we have presented our latest results on this rich populations of YSOs, as detailed in Oliveira *et al.* (2009, 2010). We have discussed connections between the evolution of the disks and that of their harboring stars, and the processes that determine the evolutionary sequence of protoplanetary disks.

Keywords. stars: pre–main sequence – stars: planetary systems: protoplanetary disks

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