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Banhidi, Z.; Pontoppidan, K.M.; Blake, G.A.; Dishoeck, E.F. van; Hogerheijde, M.R.; Evans, N.J. II

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SPECTRAL MAPPING OF ROTATIONAL LINES OF H_2 IN THE SERPENS STAR-FORMING CORE WITH SPITZER-IRS.

Z. Banhidi, *Stockholm Observatory, AlbaNova, SE - 106 91 Stockholm, Sweden, (zita@astro.su.se)*, K. M. Pontoppidan, G. A. Blake, *California Institute of Technology, Division of Geological and Planetary Sciences, MS 150-21, Pasadena, CA 91125, USA*, E. F. van Dishoeck, M. R. Hogerheijde, *Leiden Observatory, P.O. Box 9513, NL-2300 RA Leiden, Netherlands*, N. J. Evans II, *The University of Texas at Austin, 1 University Station, C1400, Austin, TX 78712-0259, USA*, The c2d Team, *Multiple Institutions*.

We present a mid-infrared spectral map (5.2 - 38 μm) of the south-eastern core of the Serpens star forming region obtained with the Infrared Spectrograph (IRS) on board of the Spitzer Space Telescope. The data were taken within the framework of the Cores to Disks (c2d) Legacy program (Evans et al., 2003, *PASP*, 115, 965). The spectral map was observed using the short-low as well as the long-low modules of the IRS and covers an area of around $150'' \times 260''$ and $150'' \times 160''$. The rotational transitions of H_2 from S(0) to S(7) are detected and reveal the traces of the warm cloud condensation SMM2 as well as various outflows including the known outflows of the deeply embedded young stars SMM3 and SMM4. Additionally we find a new extended region of H_2 emission possibly associated with the class I object CK1 as well as various smaller concentrations of H_2 . There is a strong correspondence between the H_2 lines and the emission in the HCO^+ (1-0) rotational transition (Hogerheijde et al., 1999, *ApJ*, 513, 350). We present maps of the individual transitions of H_2 and discuss their relation with rotational transitions of other molecules as well as differences in H_2 excitation temperatures in the various outflows. Our results show that spectral mapping in the mid-infrared with Spitzer-IRS using the low resolution mode is a highly effective method of mapping deeply embedded protostellar outflows in particular in crowded regions.

As a bonus we also detect ice absorption features toward a

large number of point sources in the field of the observations. This presents the possibility to map abundance variations between different ice species across the region. We will present preliminary results of this ice map.

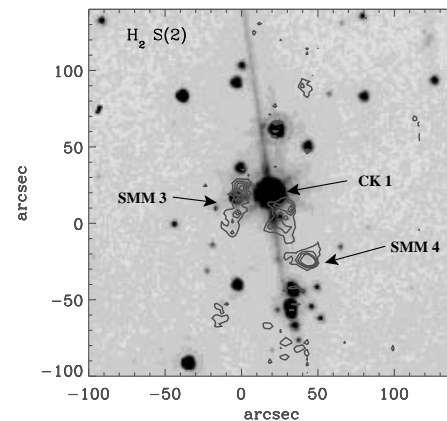


Figure 1: IRAC 4 image of the Serpens star-forming core with contours of the S(2) rotational transition of H_2