

Conference: Planet Formation and Evolution 2012

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Website: <http://www.usm.uni-muenchen.de/~tilman/planets2012/index.html>

My title and abstract for my contributed talk:

Title: "The Temperature and Distribution of Organic Molecules in the Inner Regions of T Tauri Disks"

Abstract: "High-resolution NIR spectroscopic observations of warm molecular gas emission from young circumstellar disks allow us to constrain the temperature and composition of material in the inner planet-forming region. By combining advanced data reduction algorithms with accurate modeling of the terrestrial atmospheric spectrum and a novel double-differencing data analysis technique, we have achieved very high-contrast measurements (S/N ~ 500-1000) of molecular emission at 3 microns. In disks around low-mass stars, we have achieved the first detections of emission from HCN and C₂H₂ at near-infrared wavelengths from several bright T Tauri stars using the CRIFES spectrograph on the Very Large Telescope and NIRSPEC spectrograph on the Keck Telescope. We spectrally resolve the line shape, showing that the emission has both a Keplerian and non-Keplerian component as observed previously for CO emission. We used a simplified single-temperature local thermal equilibrium (LTE) slab model with a Gaussian line profile to make line identifications and determine a best-fit temperature and initial abundance ratios, and we then compared these values with constraints derived from a detailed disk radiative transfer model assuming LTE excitation but utilizing a realistic temperature and density structure. Abundance ratios from both sets of models are consistent with each other and consistent with expected values from theoretical chemical models, and analysis of the line shapes suggests that the molecular emission originates from within a narrow region in the inner disk ($R < 1$ AU)."