**CONTROL ID:** 2258124

**TITLE:** Tracing the origin of warm water emission through the stages of low-mass star formation

**ABSTRACT BODY:**

**Abstract Body:** Water is a crucial molecule in the physics and chemistry of star- and planet formation, but its evolution from cold cores to disks is still poorly constrained. The gas-phase abundance of water varies between cold and warm regions up to a factor of 105 and this abundance variation makes water an excellent diagnostic of the physical structure in these sources.

The origin of the warm water emission in deeply-embedded low-mass protostars is still debated, however. Current options include the innermost envelope ('hot corino'), heated by the luminosity from the central protostar; a young disk heated by shocks related to ongoing accretion or the warm disk surface layers heated radiatively by the young star. Determining the location and kinematics of the warm water is important because it provides insights into whether water, and the locked up complex organics, actually moves from the outer envelope into the disk, and if so, whether it enters the disk mostly as gas or ice. Evolutionary models suggest that water and complex species enter the disk mostly as ice but this is so far unconfirmed observationally.

Thus, in our collaboration we are undertaking a study of warm water in low-mass protostars. So far we have obtained interferometric maps of several isotopologues of water toward four deeply-embedded (i.e. Class 0) low-mass protostars with PdBI and ALMA. The detected water emission is compact toward the Class 0 sources, and a significant source of uncertainty in determining the abundances is the poorly constrained physical structure in the inner regions. Thus we try to constrain this physical structure by fitting simple disk models to the dust continuum visibilities that are left after subtracting a model of the spherical envelope. Furthermore we estimate upper limits to the warm water content toward the Class I protostars TMC-1A and L1527 from observations with PdBI.

In this talk I will summarize our ongoing work in tracing the warm water emission through the various stages of low-mass star formation.

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