

CIRCUMSTELLAR DISKS, OUTFLOWS AND STAR FORMATION

IA-UNAM Meeting, Cozumel, México, 28 November—2 December 1994

Abstract for Poster or Invited Talk

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Type of presentation: Poster

Title of presentation: Small Scale Fragmentation and Protostar Formation in TMC1

ABSTRACT:

We present new evidence of small scale fragmentary structure in core D in TMC1 using high spectral and spatial resolution observations of CCS at 22 GHz. These data were taken with NASA's DSN 70m antenna at Goldstone (beamwidth 45") and Wide Band Spectrum Analyzer (velocity resolution 0.008 km s⁻¹) and with the VLA (spatial resolution of 15"). The DSN spectra are fully resolved into multiple velocity components, each with intrinsic linewidth ≤ 0.15 km s⁻¹. The line profiles and maps show that core D is highly fragmented, containing several low mass (0.1 solar mass objects.) of angular size distributions in the range 20" to 90". In addition, CCS at 93 GHz and CS at 98 GHz were observed with the OVRO interferometer with 8" spatial resolution. We use these observations with the cm line to estimate the density of the smallest scale structures to be about 10⁶ cm⁻³. They appear to be gravitationally inbound and so coalescence may be necessary for star formation to occur in core D of TMC1.

This research has been supported by a research grant from the National Aeronautics and Space Administration. T.V. is supported under an NRC-NAS Senior Research Associate.

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