CONTROL ID: 2253471

TITLE: CO abundances in TW Hya and a direction detection of the the CO snow line

ABSTRACT BODY:

Abstract Body: Snow lines represent volatile sublimation fronts in protoplanetary disks, which are believed to aid in the growth of small planetesimals. Additionally, when volatile species such as CO are present in the gas they can potentially be chemically reprocessed into more complex forms. This has been shown theoretically to lower the gas phase abundance of CO, providing a time dependent carbon sink in the gas phase chemistry. Furthermore, a growing number of observations support the idea that volatile carbon is depleted in disks. We present the first direct detection of the CO snow line in TW Hya using resolved ALMA observations of ^{13}CO and C^{18}O J=6-5. These specially resolved observations are used to map the radial temperature structure of the ^{13}CO emitting layer as well as determine the radial distribution of the CO in the disk. Our observations will provide the first complete picture of the CO abundance in an evolved T Tauri disk and enable a direct exploration as to whether the carbon is missing closer to the star or at greater distances.

CONTACT (NAME ONLY): Kamber Schwarz

CONTACT (E-MAIL ONLY): kamberrs@umich.edu

AUTHORS/INSTITUTIONS: K. Schwarz, E. Bergin, Astronomy, University of Michigan, Ann Arbor, Michigan, UNITED STATES|

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