

ALMA2019: Science Results and Cross-Facility Synergies



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The puzzle of protoplanetary disk masses

Tuesday, October 15, 2019 11:30 AM (25 minutes)

Invited talk

Abstract:

“Thanks to the advent of the Atacama Large Millimeter/submillimeter Array (ALMA), large surveys of protoplanetary disks in different star forming regions have been carried out to study the gas and dust components simultaneously. Carbon monoxide (CO) and its less abundant isotopologues have been observed to trace the bulk of the gas, while the dust was traced by the (sub-)mm continuum. A result that is common to these surveys is that CO emission from disks is fainter than expected. As a consequence, the overall CO-based gas-masses are very low, often smaller than one Jupiter mass and global gas/dust mass ratios are much lower than the expected interstellar-medium value of 100. This may be interpreted as lack of gas due to fast disk dispersal, or as lack of volatile carbon that leads to faint CO lines. After summarizing the results from different ALMA disk surveys and their implications, I will present alternative observational strategies which may help us to disentangle between the gas dispersal scenario and the chemical evolution hypothesis. More specifically I will show ALMA C₂H observations that allow us to constrain the C/O ratio and to confirm that chemical evolution is at play in disks with faint CO lines.”

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Session Classification: Circumstellar Disks