Astronomy/Astrophysics Colloquium

Zooming in on planet-forming disks with ALMA

Thanks to ALMA, the study of protoplanetary disks is undergoing a revolution, with a wide variety of results being reported on statistics of disks and fascinating substructures in dust and gas. This talk will present a few recent results from our group and collaborators on ALMA observations and associated models of disks. First, the latest statistics on disk masses in nearby star-forming regions will be presented, including low vs high-mass

regions and young vs more evolved disks. An important conclusion from comparison of disk dust masses with the solid mass in exoplanets is that planet formation must start early.

Second, the differences in sizes of gas vs dust disks will be discussed. Do the much smaller dust disks indeed provide evidence for radial drift of mm-sized dust grains as often claimed? How do the large disks imaged by the DSHARP team fit into the overall disk population? Third, possible explanations for the surprisingly weak CO

emission will be discussed, including models in which CO is chemically transferred into other species. Consequences for the C/O ratios in gas and ice will be presented. Special attention will be given to transitional disks, which are a subset of disks with evidence for sharp-rimmed cavities (gaps or holes). They are the best candidate sources for harboring just-formed giant planets.

Presented by

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Location: Broadcast via Zoom

Date: Wednesday, June 11, 2020

Time: 12:00pm