PHYSICS AND ASTRONOMY

COLLOQUIUM

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“The Potential to Form Planets in the Orion Nebula: The ALMA Perspective”

Abstract

The formation of planetary systems is intimately connected to the properties of circumstellar disks in which they are born. Disk studies to date have focused on regions like Taurus and Ophiuchus for their proximity, however, stars rarely form in such isolated environments. Most stars form in massive star-forming regions and there is even clear evidence that our Sun formed near an "OB association" like that found in Orion. Using the Submillimeter Array (SMA) and the Atacama Large Millimeter/Submillimeter Array (ALMA), we surveyed 67 protoplanetary disks ("proplyds") at 850 microns in the Orion Nebula to determine their masses. The SMA, as the world's only sub-millimeter interferometer until ALMA, was uniquely capable of detecting dust emission from the Orion proplyds, making these results the first successful measurements of disk masses in an OB association. These observations have revealed the range of influence of nearby massive stars on disk evolution and allowed us to answer the long-standing question about whether enough material remains in the Orion disks to potentially form Solar System analogs.