A Spatially Resolved AU-scale Inner Disk around DM Tau with ALMA

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We present Atacama Large Millimeter/submillimeter Array (ALMA) observations of the dust continuum at 1.3 mm and 12CO (2-1) line of the transitional disk around DM Tau. DM Tau exhibits no near-infrared (NIR) excess in its spectral energy distribution (SED), which means the inner cavity is well depleted. However we found a spatially resolved inner disk at about r =3 AU in the dust continuum image. Assuming the inner disk's temperature of 200 K, a dust mass of the inner disk is about 0.2 Mjup. The brightness structures in both the dust continuum and the 12CO (2-1) are marginally asymmetric: 1.15 +- 0.08 and 1.47 +- 0.16 times brighter in the northwest part in the inner disk, respectively. We also performed a simple analytic modeling of the disk's brightness profile, and derived physical disk parameters by fitting the observed visibilities. Our modeling efforts found DM Tau's dust disk consists of three components: an inner disk, an outer disk, and an extended structure. In the presentation, we will discuss possible origins of the multi-ring structure around DM Tau.

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