

Review of observations of protoplanetary disks with ALMA

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The Atacama Large Millimeter/Submillimeter Array (ALMA) started its science operation in 2011. Thanks to its high sensitivity and mapping capability, ALMA has revealed detailed structure of nearby protoplanetary disks, providing us with new informations about the formation of a planetary system in general. In particular, long-baseline campaign observations of HL Tau with ~ 3 au resolution revealed ring-gap structure in the protoplanetary disk, demonstrating that ALMA will be a powerful tool for exploring disks around young stars. Possible origins of the ring-gap structure revealed in the disk associated with HL Tau will be presented in this talk. Observations of disks with deficient emission at near-infrared wavelengths (so called "transitional disks") will also be reviewed. It has been proven that these disks commonly show intriguing features, such as asymmetric distribution of emission and significant spatial variation of gas-to-dust mass ratio. I will discuss the importance of these features when one examines the generalized scenario for planet formation.

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