

High Resolution Observations of Circumstellar Dust Disks using the Submillimeter Array

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Circumstellar disks, we also often call "protoplanetary disks", are the most probable sites for planet formation. In order to understand planet formation, it is important to study circumstellar disks in detail. Observations of circumstellar disks are usually made in thermal dust emission as well as molecular line emission at mm and submillimeter wavelengths. The typical size of the circumstellar disk is about 100 AU, which corresponds to an angular size less than 1" at the nearby star forming region such as Taurus. It is therefore essential to observe them at higher angular resolutions using mm and submillimeter arrays.

We will present recent observations of circumstellar disks using Submillimeter Array (SMA) with an emphasis on results obtained in thermal dust emission. From dust observations, basic parameters of the disks, such as the mass and the surface density, can be derived. More interestingly, these observations have revealed very complicated structures of circumstellar disks, such as holes, spirals, or asymmetric geometries. Such complicated structures might be due to companions or planets formed in the disks. Some disks also show a lower gas-to-dust ratio, which would be important to understand how disks dissipate. We are also going to touch the formation process of circumstellar disks if there is enough time.