

Observation of Planetary Atmospheres: Possible Breakthroughs brought by ALMA

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Atacama Large Millimeter/Submillimeter Array (ALMA) is an international collaboration among Europe, North America, Japan and Chile to construct a synthesis radio telescope on a high-altitude (~5000m) and extremely dry site in northern Chile. ALMA will be comprised of (1) the array of 64 12-meter antennas with baselines extending up to 10km and (2) another compact array system (socalled ACA) that consists of 16 antennas with a packed configuration to accurately map spatially extended emissions. Thanks to the large collecting area and large number of antennas, ALMA will provide unprecedented sensitivity and spatial resolution (up to 0.01 arcsecond, which corresponds to \sim 40km at the distance to Jupiter) over the wide frequency range from 80 to 950 GHz. Its imaging capability will enable us to map an astronomical object on very short timescale (< 1 hour). In the case of line emissions, one can obtain high velocity resolution (< 1km/s) with a high dispersion mode of the digital spectral correlator. Although the ALMA will be a premier tool to study various targets in the field of astronomy, we will focus in this talk on the study of planetary atmosphere and discuss possible breakthroughs brought by the ALMA observations.

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