

The Atacama Submillimeter Telescope Experiment (ASTE) Project

Seiichi Sakamoto[1]

[1] NAOJ, ALMA Project Office

The Atacama Submillimeter Telescope Experiment (ASTE) is the first large submillimeter telescope operating in the southern hemisphere. It was installed in 2002 March at a high altitude (4800 m) site of the Atacama desert in the northern Chile, and has been operated as a collaborative project among National Astronomical Observatory of Japan, Japanese radio astronomers' consortium, and University of Chile.

The antenna has a primary reflector of 10 m diameter and was designed to have a high surface accuracy (better than 25 micrometers in rms; the goal is 17 micrometers) so that it can collect submillimeter wave up to 950 GHz with reasonable efficiency. At its Cassegrain focus, sensitive receivers that cover most of the atmospheric windows in a frequency range from 90 to 950 GHz are installed. In addition, sub-millimeter camera using an SIS photon detector array is also planned for sensitive continuum observations. Spectroscopic observations are made with a digital auto-correlator system with a bandwidth up to 2 GHz and 4096 spectral channels. The telescope can be, so far, remotely operated from the nearby base camp at 2450 m altitude and will be operated from Mitaka and/or Santiago via satellite communication link and the optical fiber network.

Science targets of this telescope include protoplanetary disks and solar system objects such as comets, as well as star forming regions and galaxies. Because it is a ground-based observatory operating at millimeter and submillimeter wavelengths, it offers a unique opportunities in the following aspects: (1) Observations of molecules and molecular ions such as CO, HCN, HCO⁺, and HDO. (2) Observations of thermal emission from dust and cold astronomical objects like planets and satellites. (3) Measurements of gas motion and line shape with very high velocity resolution. (4) Daytime measurements. (5) Long term monitoring.

Current status of the telescope, preliminary results, and planned observational programs related to planetary sciences will be presented.