ALMA Status and Future Plan

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Abstract

The Atacama Large Millimeter/submillimeter Array (ALMA) is an international radio observatory under a global partnership among East Asia, Europe, and North America in cooperation with the Republic of Chile. The array is located at an altitude of about 5000 meters in the Chilean Andes with an operating wavelength range of 0.3 to 9 mm. By using an "Aperture Synthesis Technique," ALMA consists of a homogeneous array of 50 12-m diameter antennas and the Atacama Compact Array (ACA) in order to cover all spatial frequency Fourier components of the brightness distribution of observed sources. ACA is an array composed of 4 12-m diameter antennas in a single-dish mode and a homogeneous array of 12 7-m diameter antennas that has a very compact configuration to take short-baseline data corresponding to the high angular resolution and high sensitivity, and newly achieved the high-fidelity imaging by ALMA. The last 66th ALMA antenna arrived at array site on June 16, 2014.

Early science observations (with 15 antennas) started from September 30, 2011 with an initial Call for Proposal (Cycle 0). The early science observations, however, provided an exciting opportunity for science to utilize this unique world-class facility. Second Call for Proposal (Cycle 1), third Call for Proposal (Cycle 2), forth Call for Proposal (Cycle 3), fifth Call for Proposal (Cycle 4), fifth Call for Proposal (Cycle 5) were already done on July 12, 2012, December 5, 2013, April 23, 2015, and April 21, 2016, April 20, 2017 respectively.

In ALMA, some development programs have been started such as remaining frequency bands: e.g. Band 5, 1, and 2. Also, the future upgrade plans have been discussed toward the new scientific requirements based on several science use cases. The required technological breakthroughs and future research topics were identified in order to realize the new scientific requirements that we have discussed.

This presentation provides an overview of the status of ALMA operations, latest results of science observations, and also the future development programs to enhance ALMA.