The Atacama Large Millimeter/submillimeter Array — In Search of our Cosmic Origins

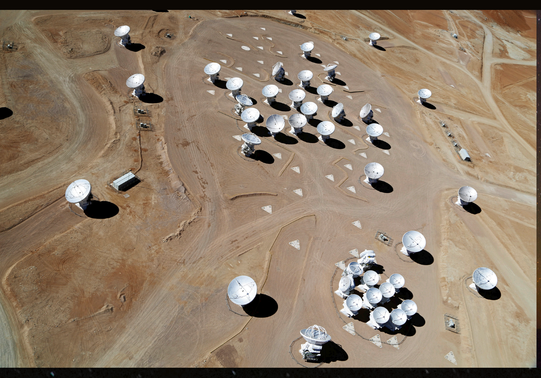
At an altitude of 5000 metres on the Chajnantor Plateau in the Chilean Andes, the European Southern Observatory (ESO), together with its international partners, is operating the most complex ground-based astronomical project in existence. ALMA is composed of 66 high precision antennas, operating at wavelengths of 0.32 to 3.6 millimetres. The antennas can be arranged in different configurations, where the maximum distance between antennas can vary from 150 metres to 16 kilometres, which will give ALMA a powerful variable "zoom".

ALMA is the most powerful telescope for observing the cool Universe — molecular gas and dust as well as the relic radiation of the Big Bang. ALMA studies the building blocks of stars, planetary systems, galaxies, and life itself.

ALMA was inaugurated in 2013, but early scientific observations with a partial array began in 2011.

The ALMA Project is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction, commissioning and operation of ALMA.

Astronomers also do millimetre- and submillimetre-wavelength astronomy at Chajnantor using the Atacama Pathfinder Experiment (APEX) telescope, a collaboration between the Max-Planck-Institut für Radioastronomie (in collaboration with the Astronomisches Institut Ruhr Universität Bochum), Onsala Space Observatory and ESO. APEX is operated by ESO. The two telescopes are complementary: for example, APEX can find many targets across wide areas of sky, which ALMA will be able to study in great detail.



Aerial view of the ALMA array.
Credit: Clem & Adri Bacri-Normier (wingsforscience.com)/ESO

ALMA antennas at night on Chajnantor.
Credit: ESO/B. Tafreshi (twanight.org)