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".

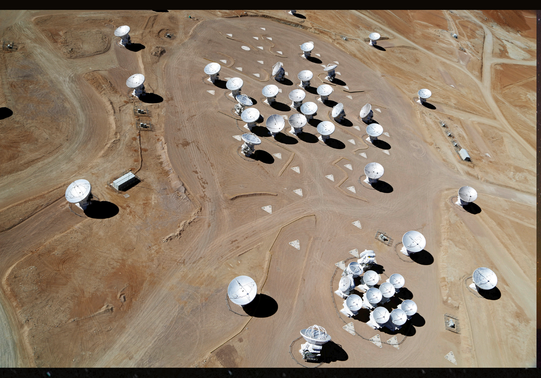
ALMA is the most powerful telescope for observing the cool Universe — molecular gas and dust as well as the relic radiation of the Big Bang. ALMA studies the building blocks of stars, planetary systems, galaxies, and life itself.

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

ALMA is a partnership of ESO, the U.S. National Science Foundation (NSF) and the National Institutes of Natural Sciences (NINS) of Japan in cooperation with the Republic of Chile. ALMA is funded by ESO on behalf of its Member States, by NSF in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC) and by NINS in cooperation with the Academia Sinica (AS) in Taiwan and the Korea Astronomy and Space Science Institute (KASI).

ALMA construction and operations are led by ESO on behalf of its Member States; by the National Radio Astronomy Observatory (NRAO), managed by Associated Universities, Inc. (AUI), on behalf of North America; and by the National Astronomical Observatory of Japan (NAOJ) on behalf of East Asia. 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, 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)

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ALMA and Hubble observations of the Antennae Galaxies.
Credit: ALMA (ESO/NAOJ/NRAO). Visible-light image: The NASA/ESA Hubble Space Telescope.

A European ALMA antenna takes a ride on one of the two enormous transporters.
Credit: ALMA (ESO/NAOJ/NRAO)

The APEX telescope is located at Chajnantor, on the same 5000-metre-high plateau as ALMA.
Credit: ESO/H. H. Heyer

www.eso.org/alma

Background image: ALMA and the southern Milky Way.
Credit: ESO/B. Tafreshi (twanight.org)