

The ALMA Band 1 Receiver Development project: building the lower frequency end of ALMA

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The ALMA Band 1 receiver development project is the East Asia contribution to ALMA development. The project is led by ASIAA (Academia Sinica Institute of Astronomy & Astrophysics) in Taiwan, in collaboration with NAOJ (Japan) and the University of Chile, and with contribution from HIA (Canada) and NRAO (USA). The original design of ALMA Band 1 receiver was to provide access to the frequencies around 40 GHz at high resolution and sensitivity. The development of the ALMA Band 1 receiver will allow ALMA to use the 35--50 GHz range, and will open up access to a wide range of compelling scientific cases. The two main scientific goals of ALMA Band 1 are also two Level One ALMA goals: the study of dust around protoplanetary disks, and the follow-up of dust grain growth to cm-sizes; and the observation of molecular gas in galaxies at high redshift, up to the era of re-ionization, through the observation of several transitions of CO. The Band 1 Science Case contains many more additional scientific cases from observations of molecules in dense cold cores of molecular clouds to the observation of the Sunyaev-Zel'dovich effect in clusters of galaxies. The ALMA Band 1 receiver is expected to provide similar or improved sensitivity and substantially better imaging and mosaicking capabilities compared to the JVLA. Currently, we are starting the production phase of the Band 1 receiver: three pre-production cartridges are already assembled and being tested. We are expecting to start deploying the cartridges in Chile during 2017.