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The LLAMA radiotelescope: Present status, available instrumentation, and scientific perspectives

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The LLAMA Observatory, in the Argentinian Andes at 4800m altitude, in the Salta province, is a project of Argentina and Brazil, which started in 2014 with an agreement between FAPESP (research foundation of Sao Paulo State), University of São Paulo, and MinCyt (Ministry of Science and technology of Argentina). The expenses will be equally shared. The 12m diameter antenna was constructed by VERTEX Antennentechnik GmbH (Duisburg, Germany). The surface precision of the dish will reach 15 microns r.m.s. deviations from an ideal parabola, after a period of fine adjustments. The antenna will perform observations at mm and sub-mm radio waves, like the international ALMA interferometer. The LLAMA antenna will be equipped with two lateral Nasmith cabins, similarly to the APEX antenna. Initially, we will work with receivers for band 5, band 6 and band 9 (band names of the ALMA observatory), constructed at NOVA Labs (University of Groningen, Holland). Brazil contributed to the acquisition of part of the receivers and construction of sub-systems, like the optomechanical system to be installed inside the Nasmith and Cassegrain cabins, the cryogenics, and cryostat,where the receivers will be installed, and a system for holography.

Figure 1. The dish of the LLAMA Radio Telescope being mounted.

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The mounting of the antenna, which was slow in last years is going quite rapidly now, after Mincyt attributed to INVAP, a strong engineering and technological company, the task of mounting. It is predicted that the mounting will be concluded in March 2024, and the first light will happen 2 years later.

The main scientific uses will be in the following areas: Galaxy Formation in the Early Universe, Astrochemistry, molecular evolution of interstellar clouds and identification of unknown lines, extra-solar planets and proto-planetary disks, polarimetry of radio sources and of the Interstellar Medium, Solar Physics (few antennas at this frequency can be pointed towards the Sun, like LLAMA).

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