

The Band 7 Cartridge (275-373GHz) for ALMA

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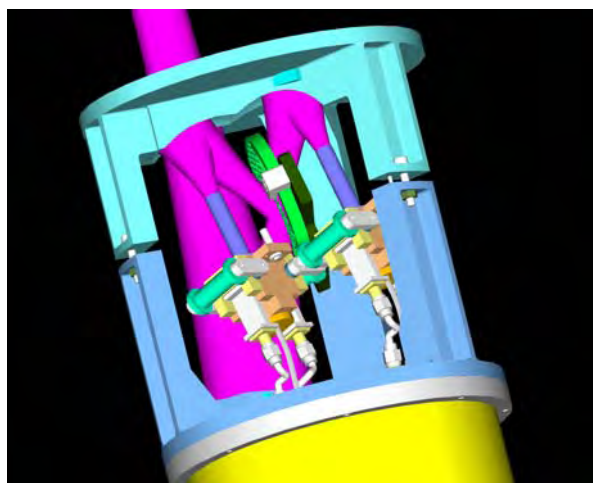
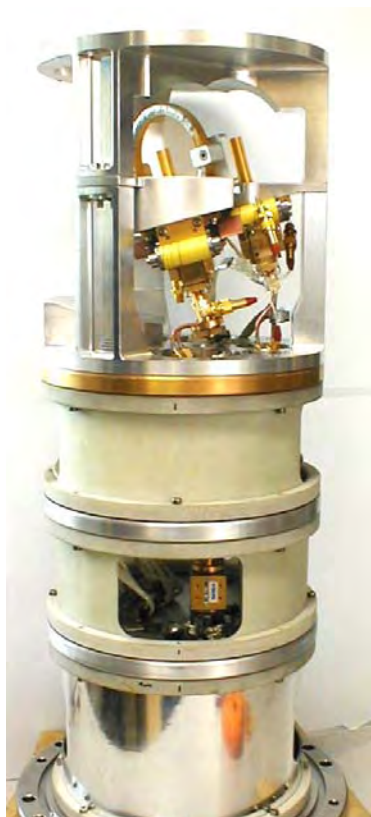
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The ALMA frontends are designed for ten frequency bands, of which four are currently budgeted. Each frequency band is implemented as a dual-polarization modular cartridge. IRAM is responsible for designing the Band 7 cartridge covering the signal frequency range 275–373 GHz, and for building 8 pre-series units. The cartridge must meet a number of specifications, including SSB noise temperature less than 133K, but also total power stability, optical beam coupling, etc...

The Band 7 cartridge comprises, within a cylindrical support structure, several elements:

- Cold refocusing optics, including polarization diplexing;
- Two sideband separating mixer units, reported separately in this Conference;
- Four intermediate frequency amplifiers (4–8 GHz), designed by Centro Astronómico de Yebes;
- Two cryogenic frequency triplers (VDI);
- Bias circuits.

We will present some key design issues, notably the optics, and experimental results.



Left: The complete cartridge. Right: A CAD rendering showing the 4K part of the cartridge: optics, mixers, signal beams; one part has been removed for clarity.