



# APEX

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APEX team

- APEX is a submillimeter telescope that presently is being commissioned at the best accessible site on Earth - Ilano de Chajnantor in Chile (5100m altitude)
- Partners:
  - MPIfR (50%)
  - ESO (27%)
  - Sweden (23%)
- Antenna from VERTEX, 12m diameter (a modified copy of one of the ALMA prototype antennas)







# APEX INSTRUMENTS

## Bolometers:

- LABOCA, 300 pixels at 850  $\mu\text{m}$  (MPIfR)
- 37 elements at 350  $\mu\text{m}$  (MPIfR)
- 300 pixels at 2 mm for SZ (Berkeley, PI)

## Heterodyne:

- Facility instr. - 3 receivers from 210 to 500 GHz and a THz channel (1.24–1.40) - Sweden.
- PI instr. (7 pixel arrays) at 650 and 850 GHz (CHAMP) - MPIfR
- 183 GHz water vapour radiometer for calibration purposes.

## Spectrometer:

- 2 independent channels, bandwidth 64, 128, 256, 516, 1024 Ghz, 2048 channels



Photogrammetry in December 2003  
Surface accuracy about 50 microns (rms)





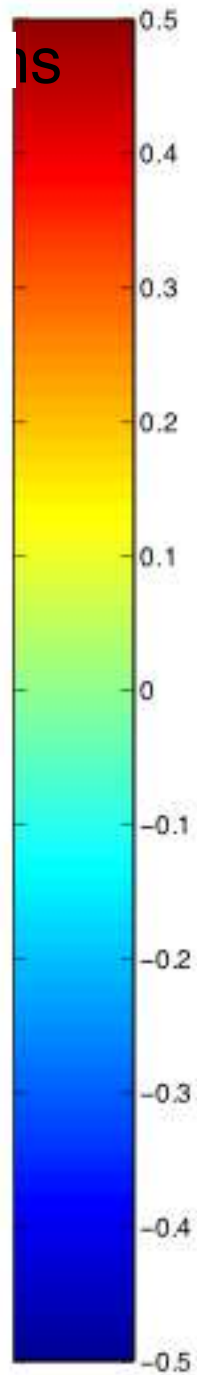
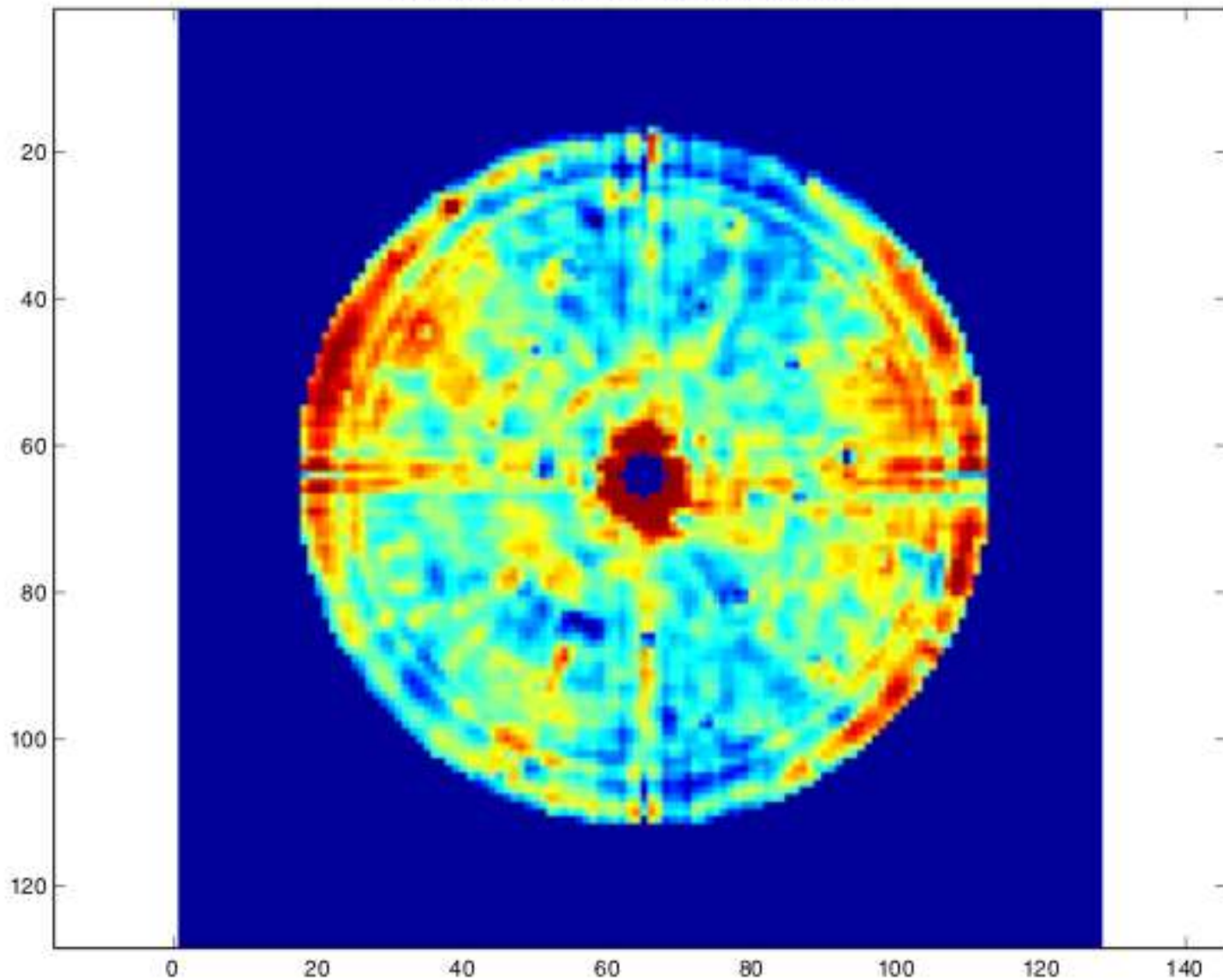


Holography transmitter on Cerro Chajnantor (5500m)





Average Phase Map 16 May 2004

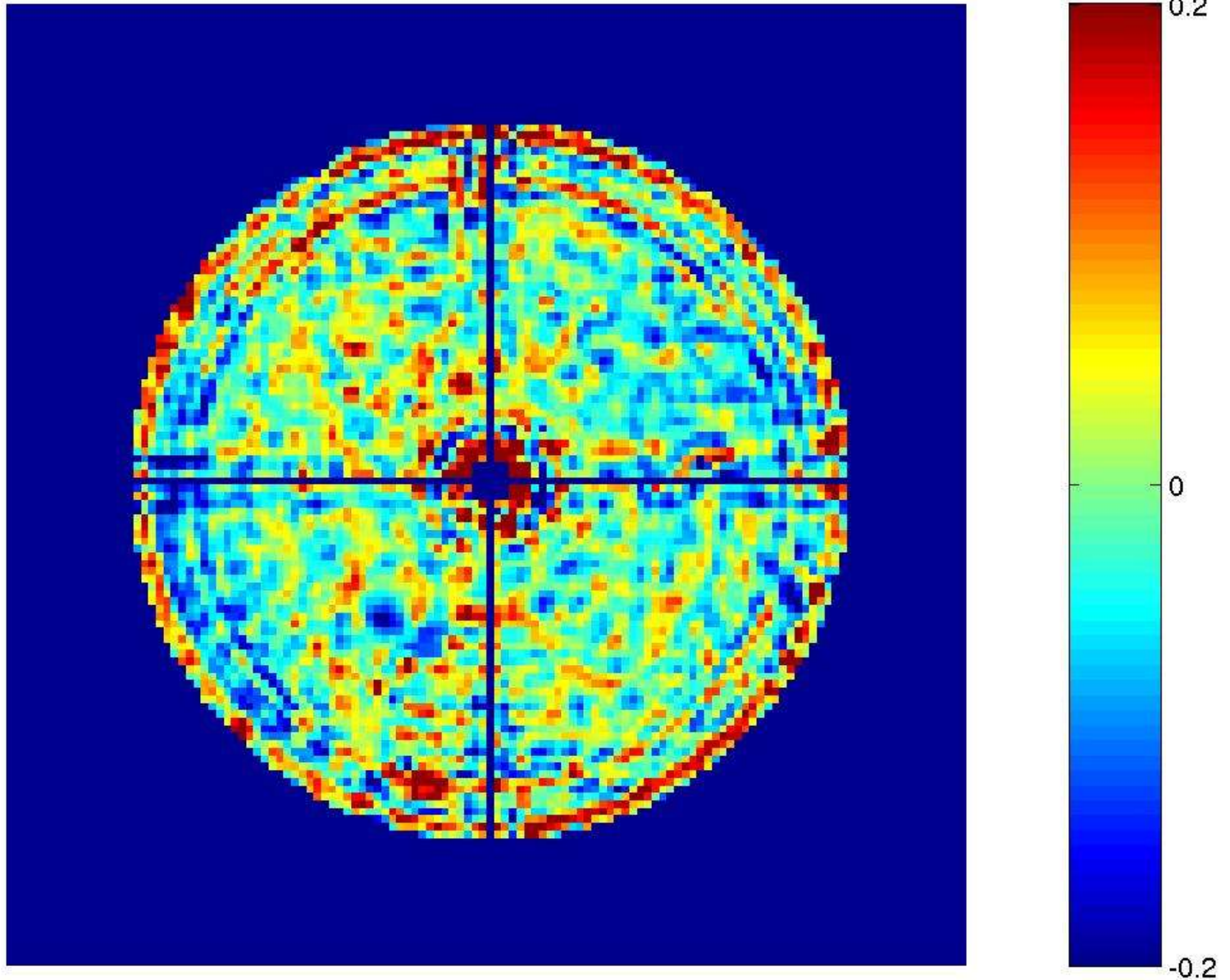








13jun04-avg4.Epr

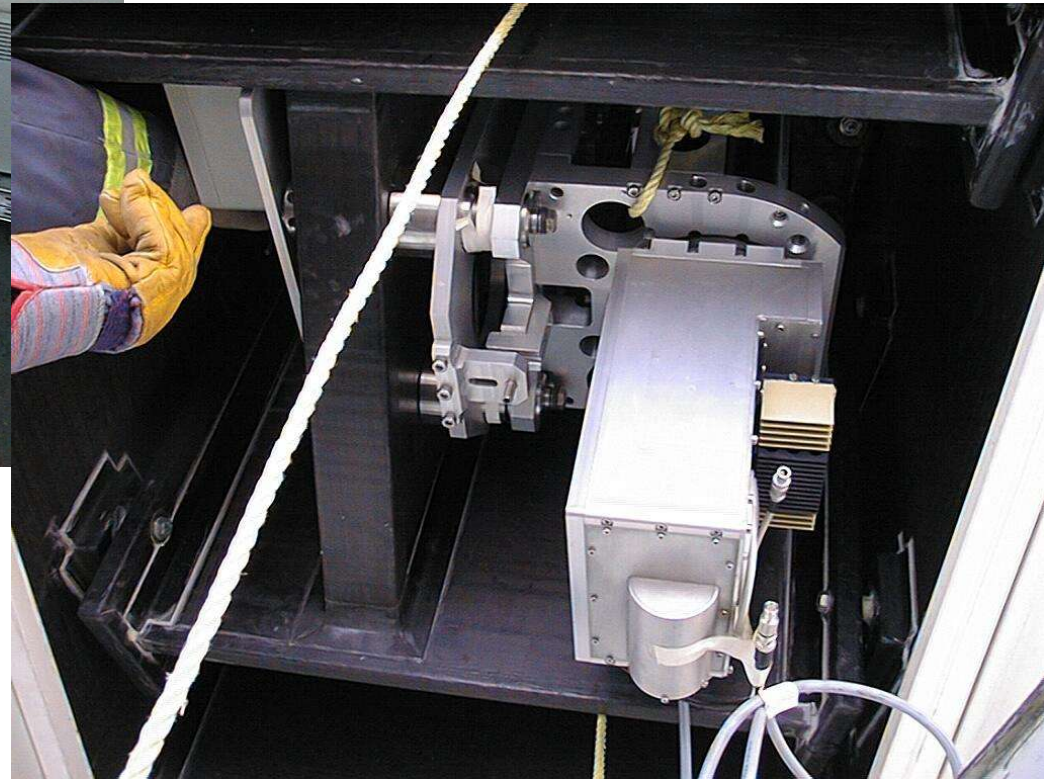
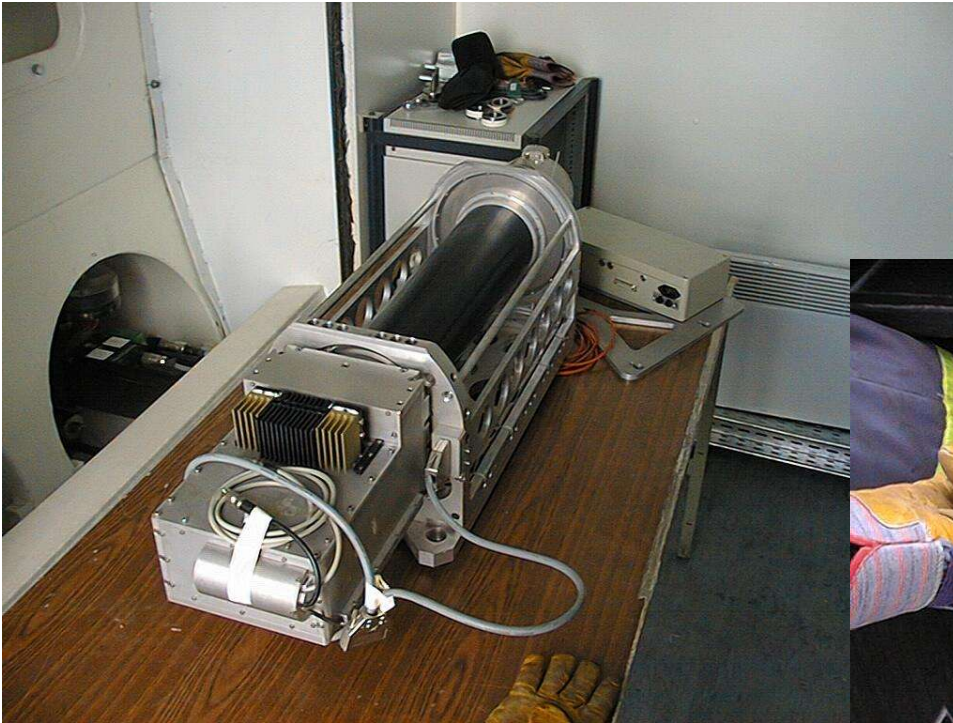


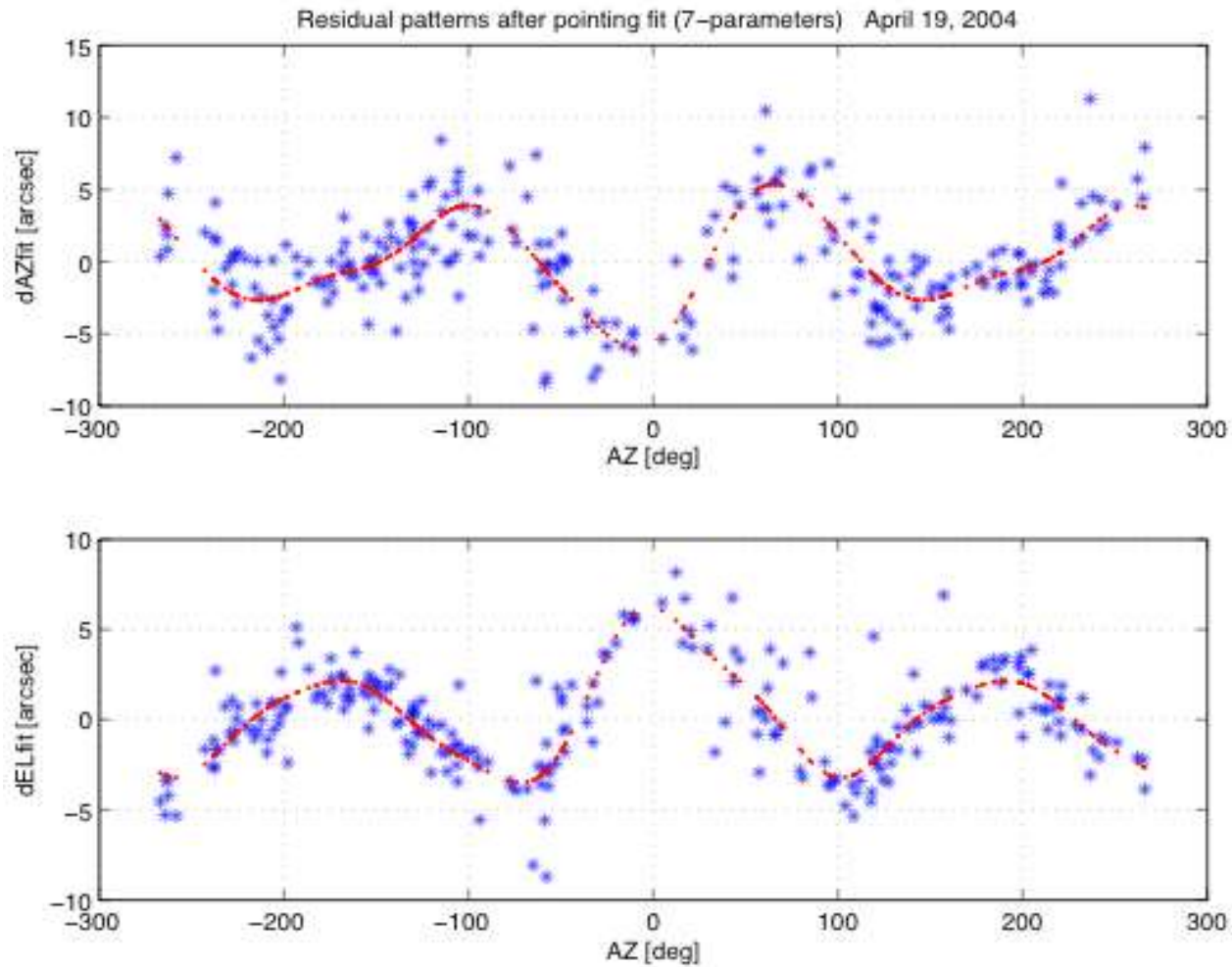
Surface rms < 20  $\mu\text{m}$



# OPTICAL POINTING TELESCOPE

used from January 2004 to verify the pointing characteristics



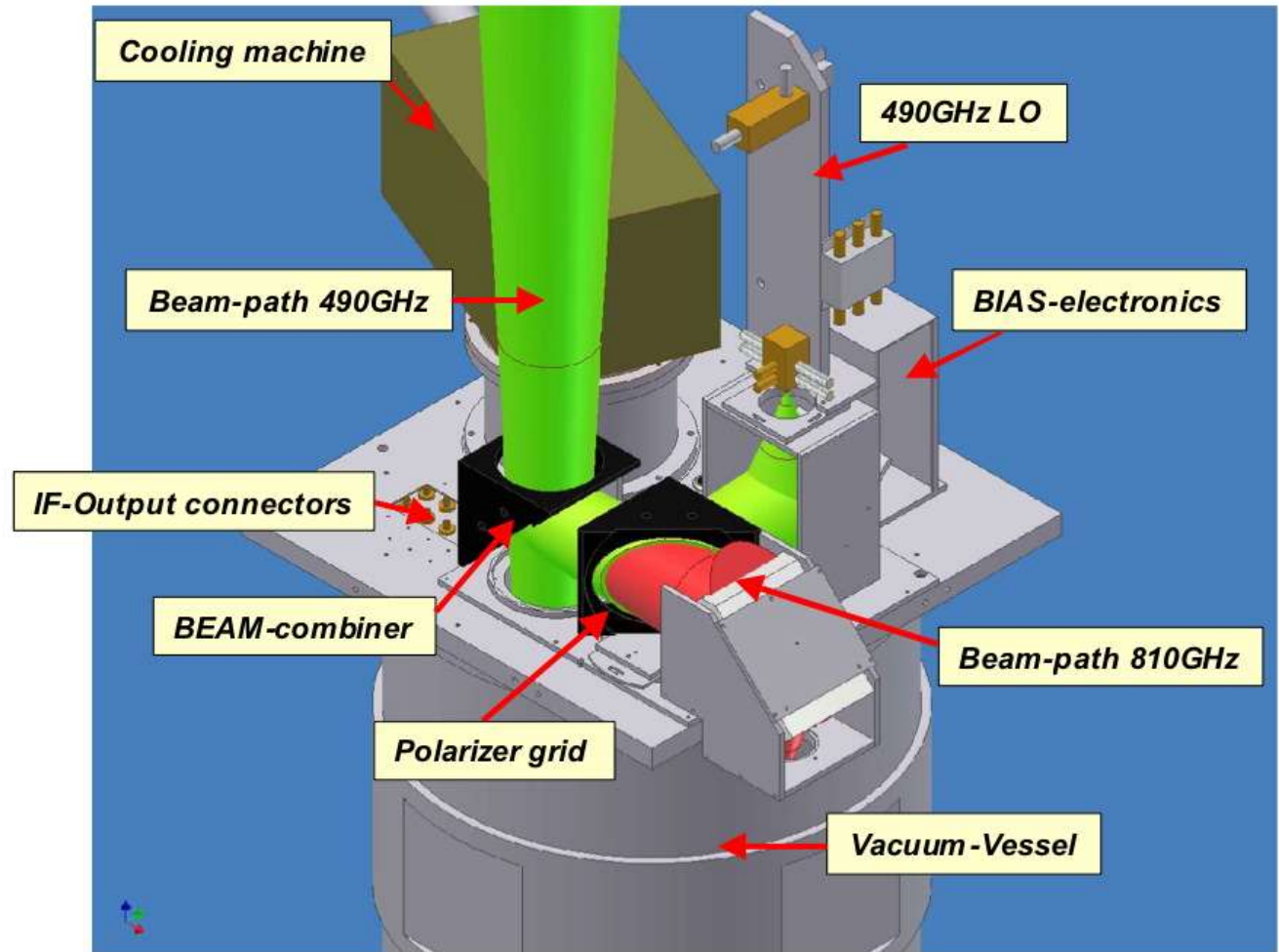
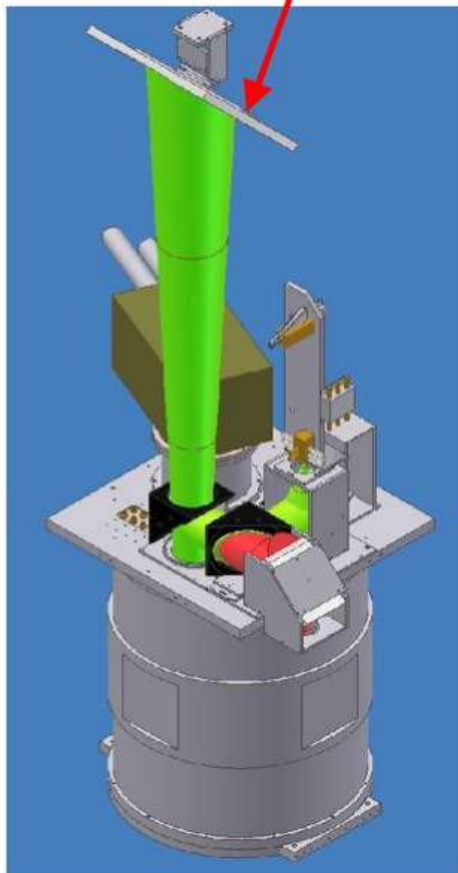


SIMBA, 37 pixel bolometer at 1.3mm, from SEST, was used to verify the radio pointing (pointing rms about 3")

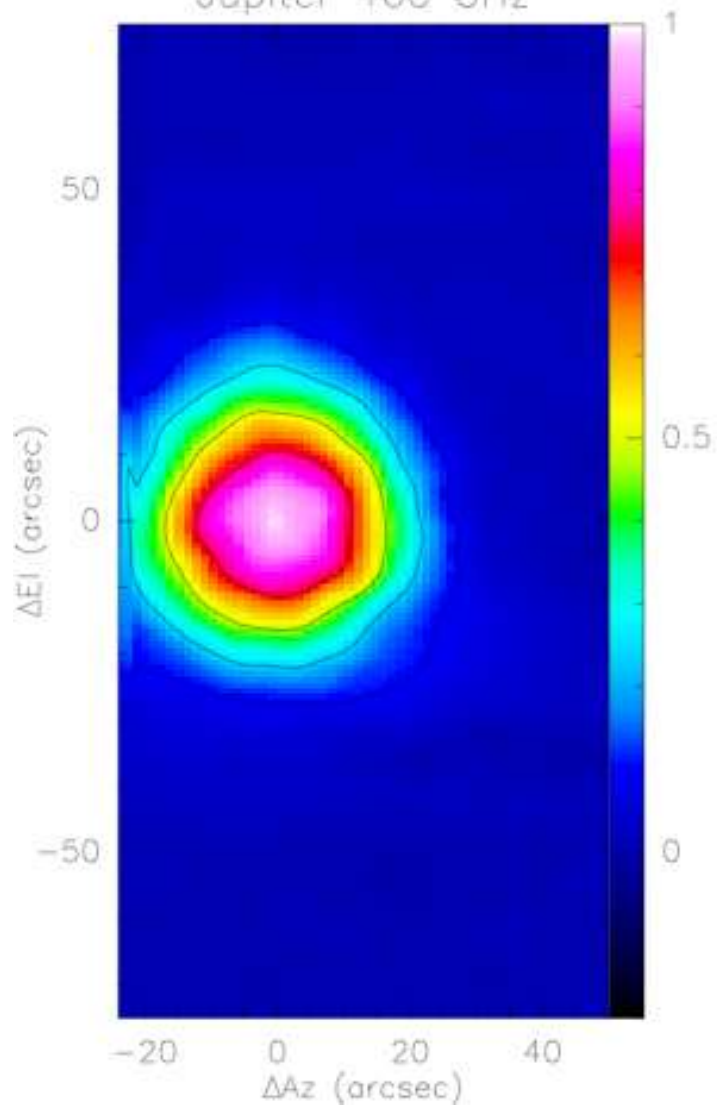


# FLASH

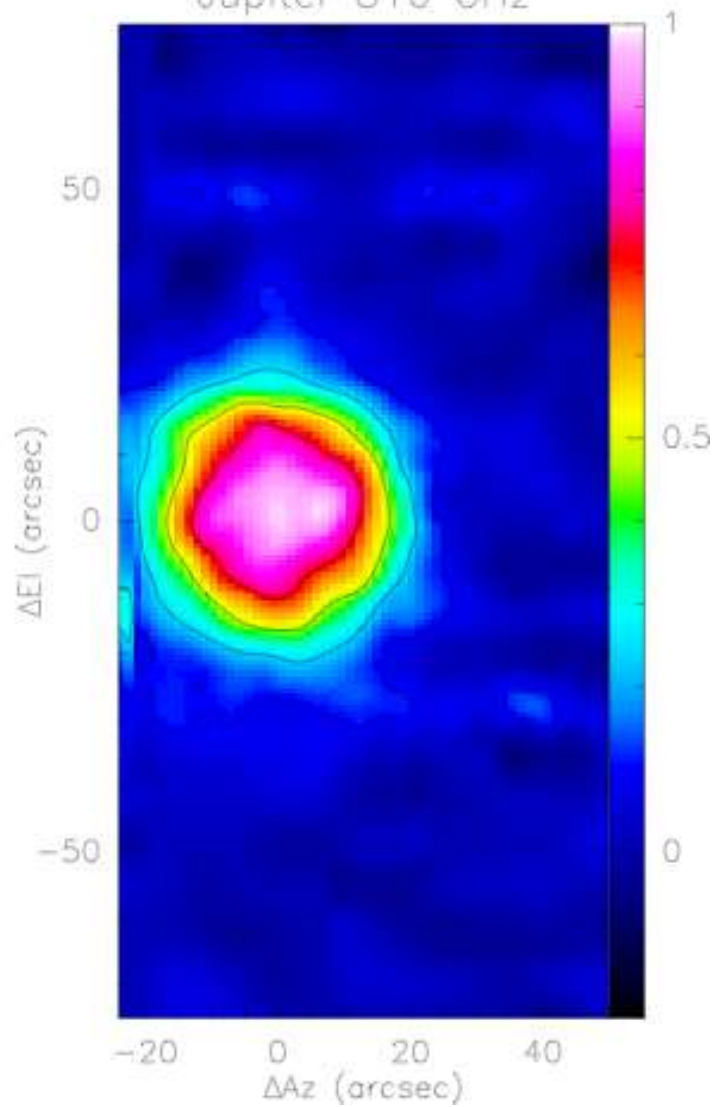
PI instrument for telescope commissioning and first submm light. Two pixels, one at 460 GHz the other at 810 GHz. Installed in June 2004.



Jupiter 460 GHz



Jupiter 810 GHz



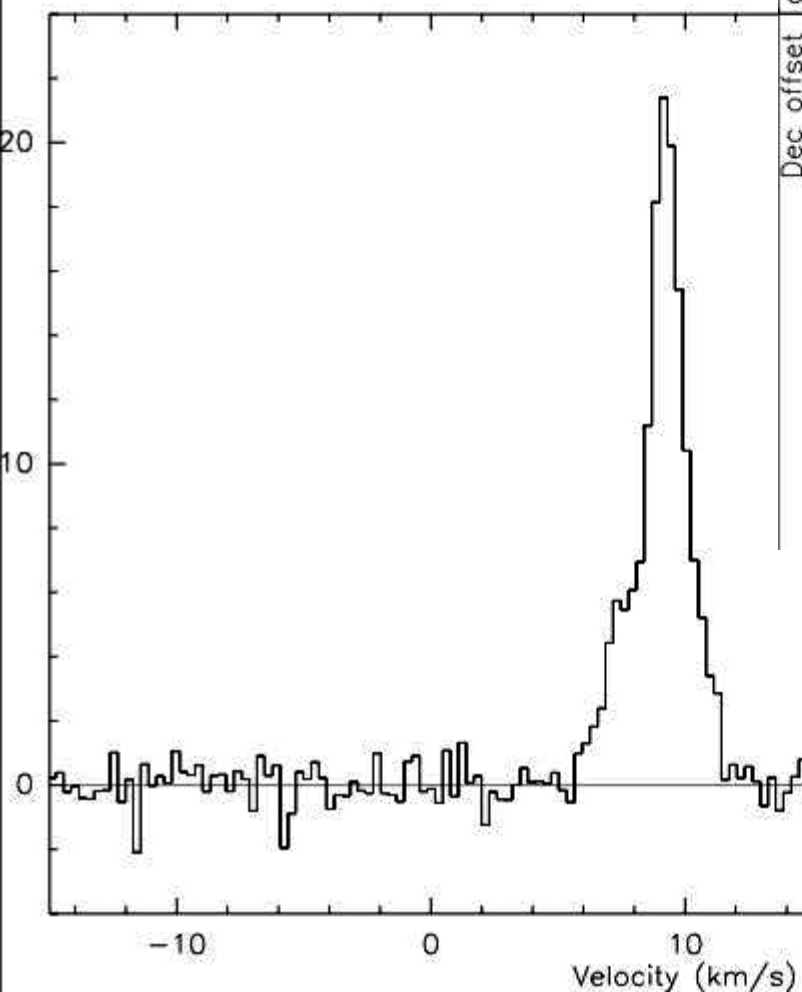


# N159HW(LMC) $^{12}\text{CO}(4-3)$

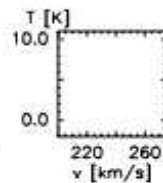
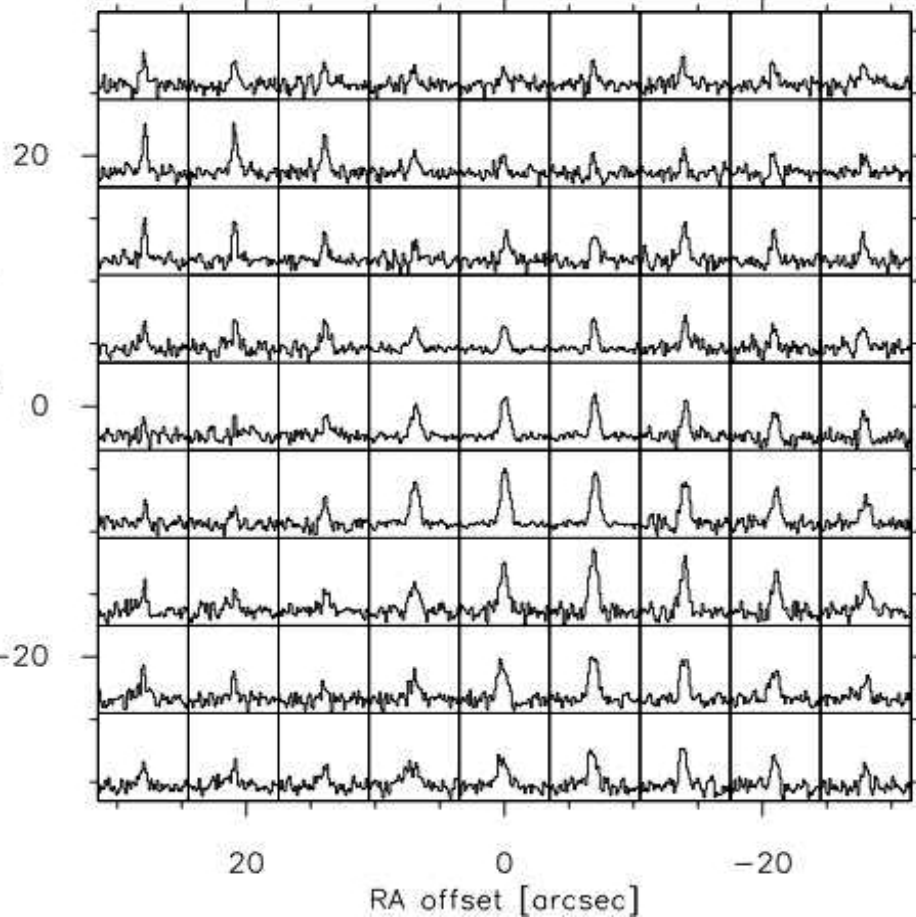
Orion Bar [CI]



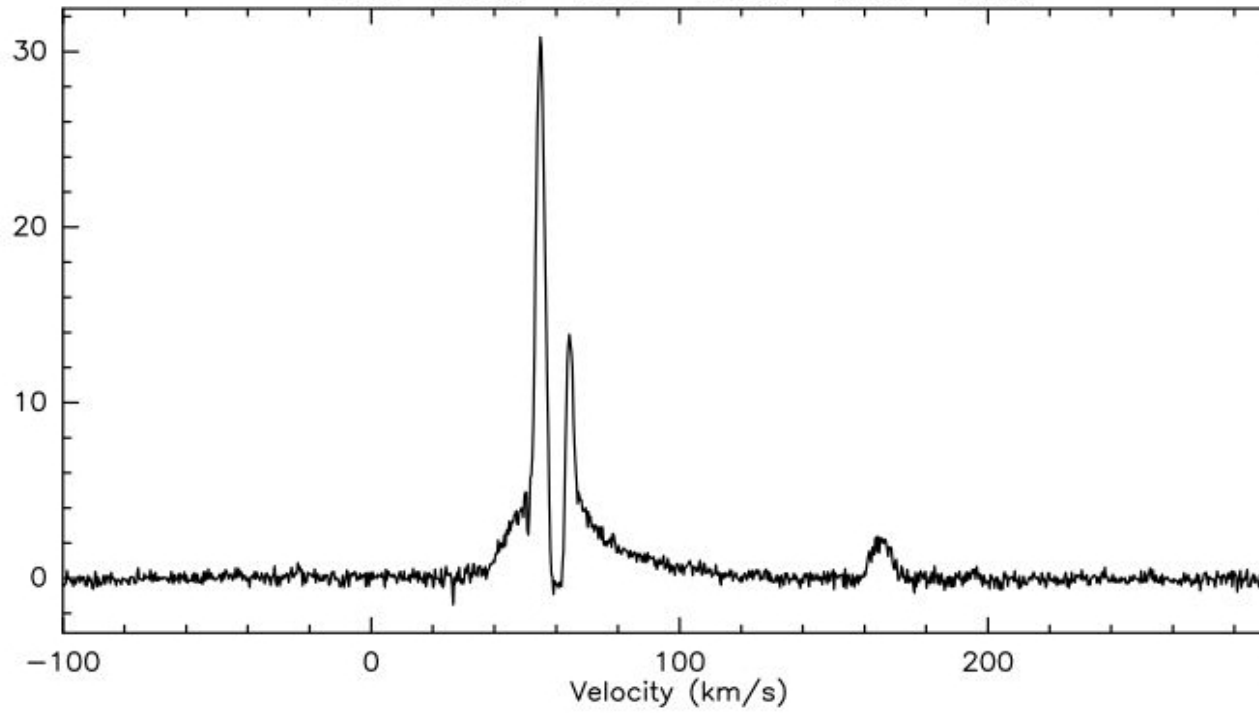
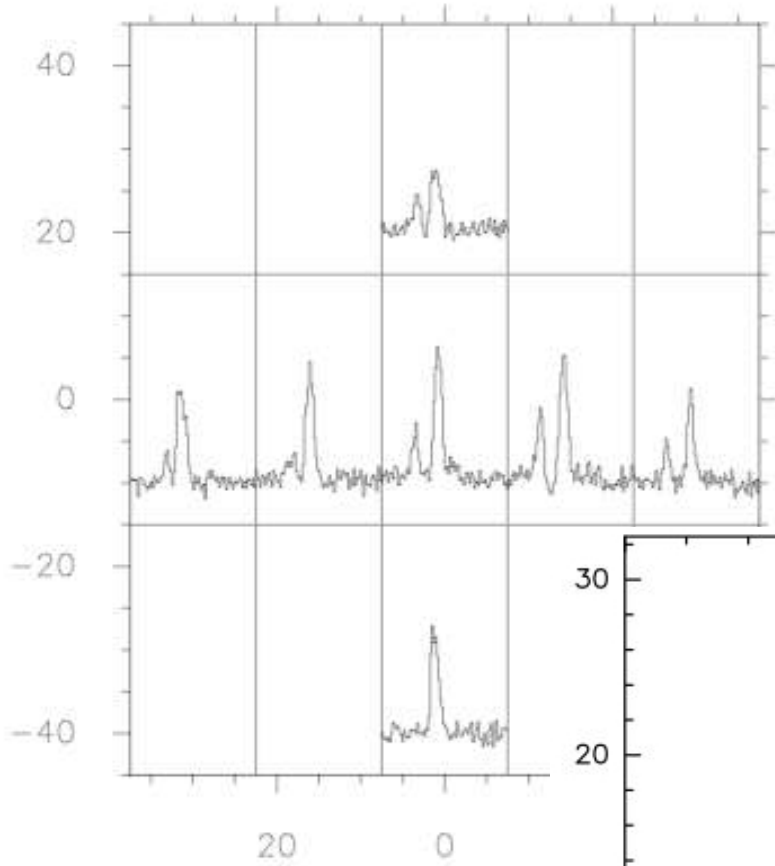
1520; 3 Orion-Bar CI FLASH460-1



Dec offset [arcsec]



G 34.26 CO(4-3)





- San Pedro base: Control Room, 2 Labs., Offices, 12 + 4 dormitories. Meeting room.
- Staff: All staff (except one astronomer) now hired
  - 6 astronomers,
  - 4 TIOs,
  - 8 engineers,
  - 6 contractors (including adm, cooking, cleaning).

## FUTURE:

- Chopping secondary (carbon fibre).  
Delivered by VERTEX in Nov 2004.
- Holography. Dec 2004.
- 350 GHz SIS. Dec 2004.
- Tertiary optics and LABOCA. Jan-Apr '05.
- Operations. April 2005 (?)

















