

Status of the IRAM 30m telescope

October, 1st, 2009

Carsten Kramer
IRAM, Granada



Status of the IRAM 30m telescope

Frontends

HERA 1mm dual-polarization 3x3 pixel array	ok!
EMIR 4 band single pixel receiver	E0-E3 ok
MAMBO 117channel bolometer	ongoing effort

Backends

VESPA autocorrelator	ok
1MHz filterbank	in preparation
2MHz WILMA autocorrelator	ok
4MHz filterbank	ok
ABBA bolometer backend	ongoing effort

Observing Modes

psw, wsw, fsw, otf/psw, otf/fsw	ok
Polarimetry with E0	ok!
VLBI with E0	ok!

Status of the IRAM 30m telescope

Current Work:

- + MAMBO2/ABBA2
- + Telescope Control Loop
- + Header Data Base
- + Commissioning of EMIR 345GHz Channel
- + EMIR Continuum backends
- + Preparation for new high resolution spectrometers (FFTS)

Status of the IRAM 30m telescope

+ MAMBO2/ABBA2: MPIfR PI instrument

+ intermittent problems: spikes, instabilities, ABBA2 freezing

Telescope oscillations +/-1arcsec **solved**

Receiver cabin:

water leakage from roof **solved**

cables **solved**

MAMBO2:

check preamplifiers **on the way**

repair temperature sensors **on the way**

ABBA2: G.Siringo now at ESO/APEX **unclear**

Remaining problems? Severity?

Excellent scientific output: Hacar, Baker, Boone, ...

Status of the IRAM 30m telescope

+ Telescope Control Loop (lead: Hans Ungerechts)

- + clean-up: one stable version, revision control
- + Oscillations:
 - + rare but bad events ± 2 arcmin **unclear**
 - + small oscillations: ± 1 arcsec **solved**
- + High elevations 85-88deg **in progress**
- + Sunavoidance 5deg to 1deg **planned**
- + Faster control loop: 1Hz to 8Hz **in progress**
smooth curves, observing efficiency (subscans)
- + Lissajous curves (needed for GISMO) **in progress**

Timeline: end of 2009

Status of the IRAM 30m telescope

+ Header Data Base TAPAS (lead: Walter Brunswig)

Telescope Archive for Pool and Astronomers - TAPAS

(<http://mrt-lx3.iram.es/tapas/>, IRAM/IAA effort 2005-2008):

Contents:

Heterodyne and bolometer scan headers:

- observing setup (source, frequency, observing mode, etc.)
- project (PI, title, etc.)
- status (receiver, backend, weather, etc.)
- calibration/pointing/focus results
- 225GHz taumeter data
- Open access to all after 1 year proprietry period (same rule as for PdB)
- Adaptation to EMIR done
- Start systematic filling (all frontends) in progress
- Check robustness to be done

Timeline: end of 2009

Status of the IRAM 30m telescope

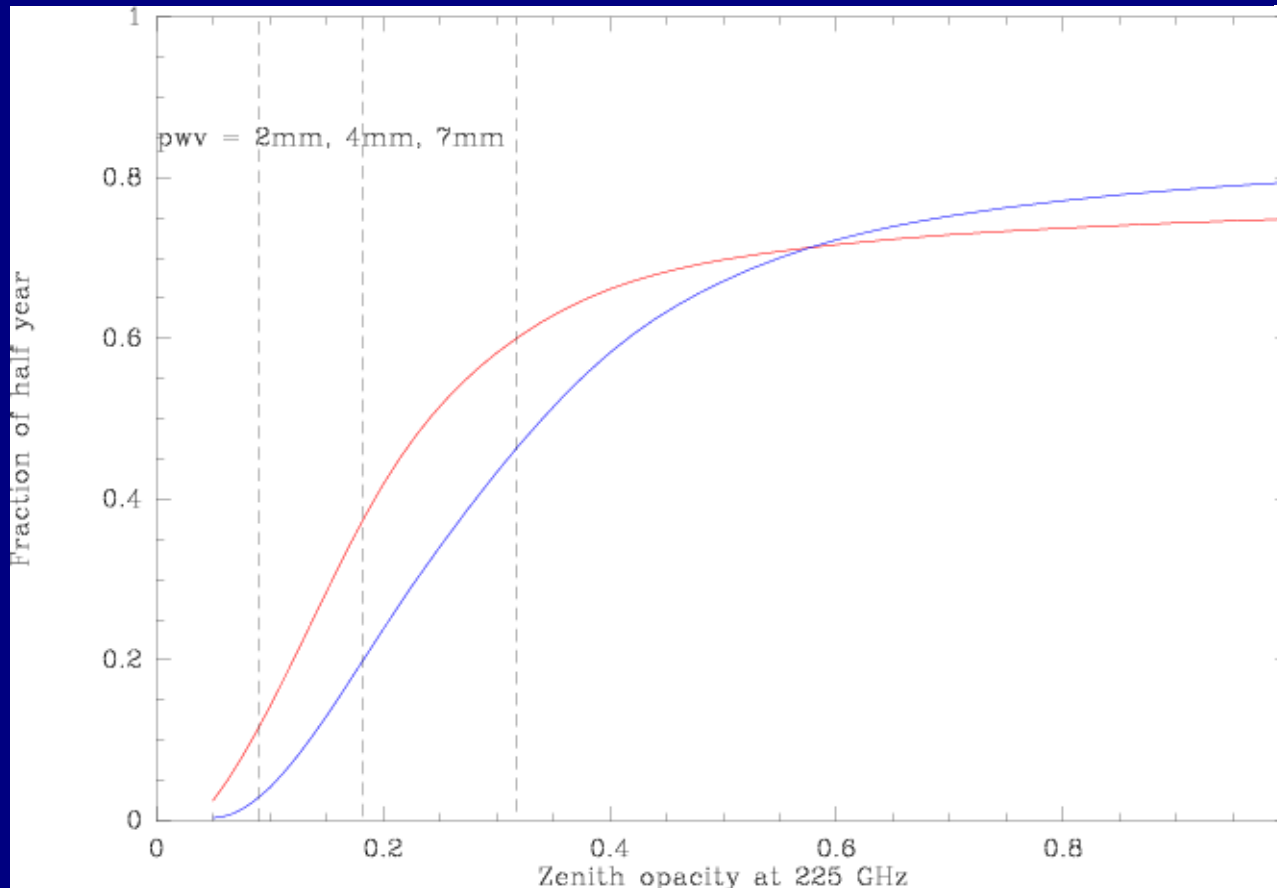
+ Commissioning of EMIR 345GHz Channel E3

- + LO in repair at Carlstrom, LO power
- + Tests planned during pool weeks in Oct./Nov.09:
 - + Tuning range 260-360GHz
 - + telescope efficiencies
 - first result: 30% at 330GHz
 - + gain elevation curve
 - + pointing with 7" beam: E1/E3 alignment
- + new atmospheric model including Ozone etc.
(ATM J.Pardo, GILDAS group)

Timeline: Oct./Nov.09 -- Very high interest for the winter semester

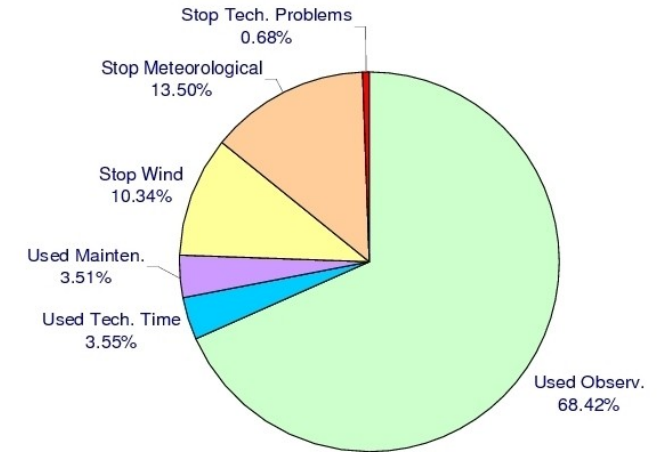
+ Commissioning of EMIR 345GHz Channel E3

Weather statistics 2008



Three weeks better than 2mm of water vapor in the 6 winter months of 2008

30m Time Distribution. Year 2008



to be done:

- extend statistics
- typical durations of good weather
- new taumeter **delayed**

+ Commissioning of EMIR 345GHz Channel E3

Telescope Efficiencies

Frequency [Ghz]	HPBW [arcsec]	Feff [%]	Beff [%]	Aeff [%]
86	29	95	81	63
142	16	93	62	57
330	7	89	32	29

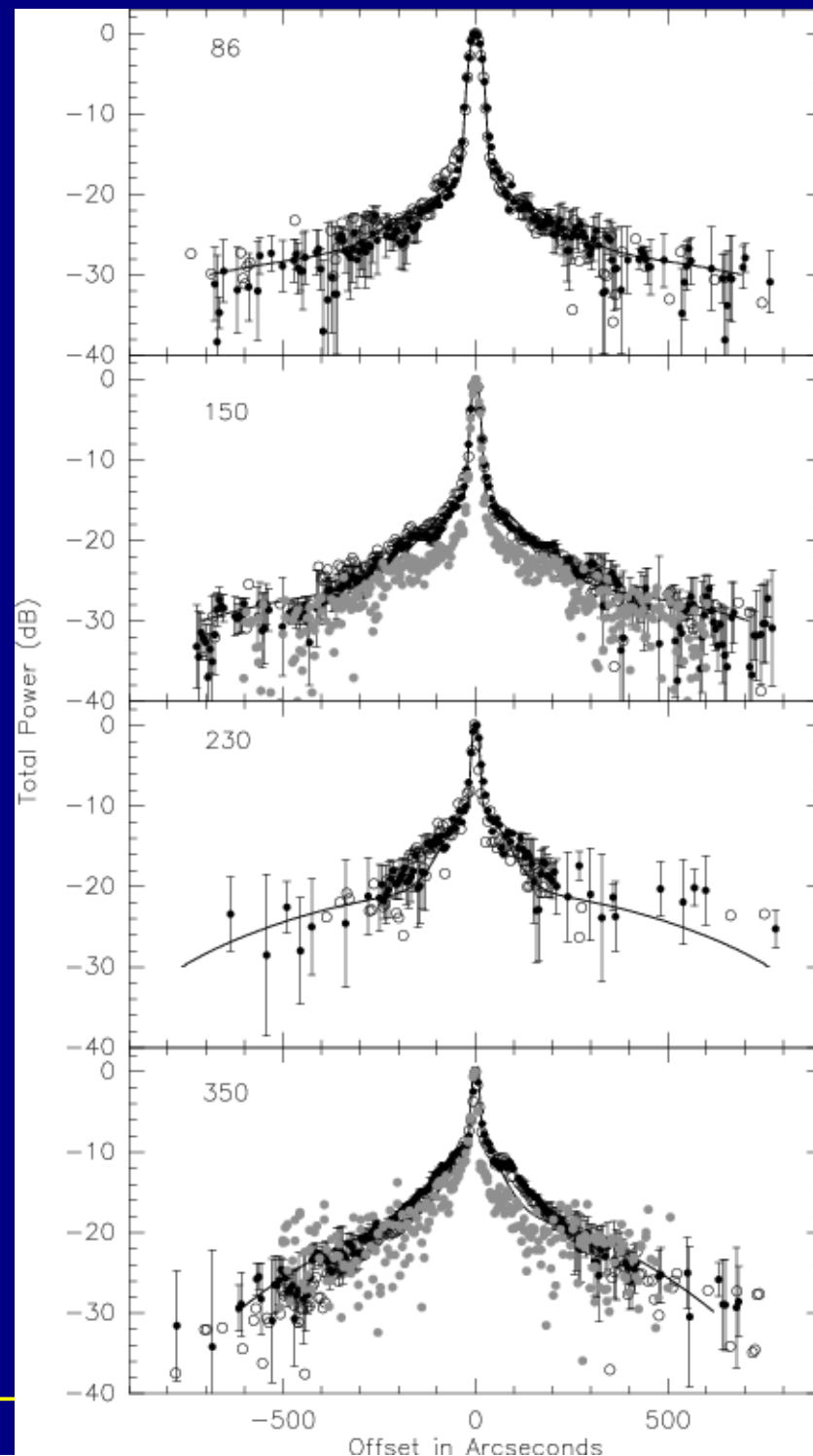
from Mars (4.4.09) and from skydips

Beam shapes (differentiated moon edge)

1998 (Greve et al., A&A)

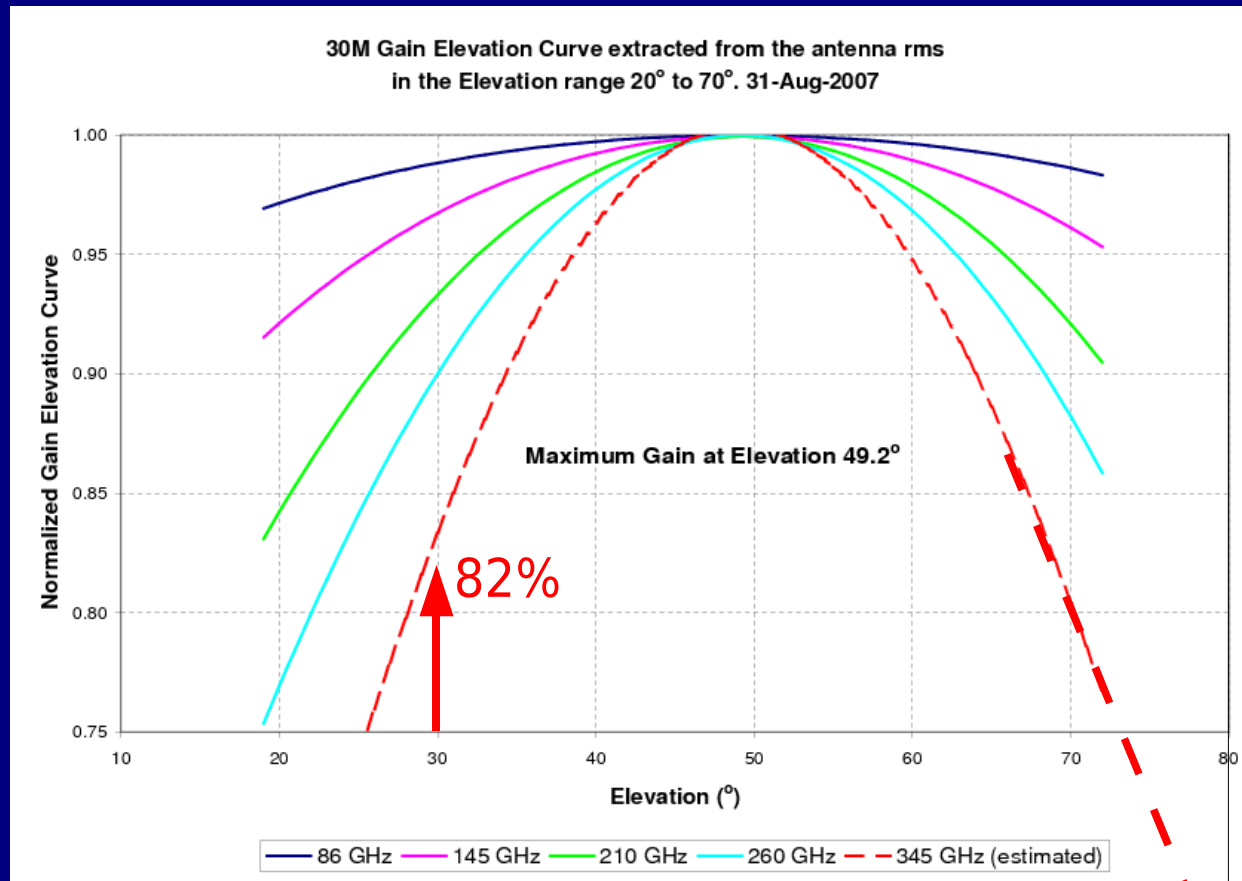
next steps:

- confirm Aeff at 345 GHz
- full moon scans under stable conditions



+ Commissioning of EMIR 345GHz Channel E3

Gain elevation curve



The aperture efficiency is ~30% at 43deg Elevation, but is predicted to drop by 65% to ~20% at 80deg Elevation. Check with Mars in 9/09.

Status of the IRAM 30m telescope

+ Preparation for new high resolution spectrometers

20 Fast Fourier Transform Spectrometers (FFTS):
8192 channels @ 200kHz resolution and 1.5 GHz bandwidth

+ New IF processor under construction

+ improve data processing in preparation

+ about **300k Channels** (more than a factor of 10 increase)

+ Assuming a dump time of 1sec, 4 byte/channel, the data rate is 1.4MB/sec or **5GB/hour**. Network between mrt-fft and mrt-lx1 runs at 1 GB/sec. A backup robot to handle 16 800GB LT04 tapes automatically has already been installed.

Software needs to be adapted: NCS, mira

Timeline: >1 year