

Status of the IRAM 30m telescope

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Status of the IRAM 30m telescope

+ Frontends & Backends

One science highlight with EMIR

+ MAMBO Bolometer

One science highlight

+ Preparation for Commissioning of EMIR 345GHz Channel




+ KID bolometer camera NIKA: 1st glimpse

Status: Frontends



EMIR

EMIR	Fsky	mixer	polar-	IF width	Trx	Gim	combinations			Trx	 Status	Remark
band	GHz	type	isation	GHz	K	dB	E0/2	E1/3	E0/1	K		
E0	76-119	2SB	H/V	8	50	>10	X		X	65		
E1	127.6-176	SSB	H/V	4	50	>10		X	X	65		
E2	199-269	SSB	H/V	4	50	>10	X			65		
E3	258-362	2SB	H/V	4	70	>10		X		85		(1)

HERA










Rx	#	Pol	tuning range	Trx	IF	IF Bw	Gim	 Status	Rem.
			[GHz]	[K]	[GHz]	[GHz]	[dB]		
HERA1	9	H	215-272	110-380	4	1	~10		
HERA2	9	V	215-241	120-340	4	1	~10		

MAMBO2

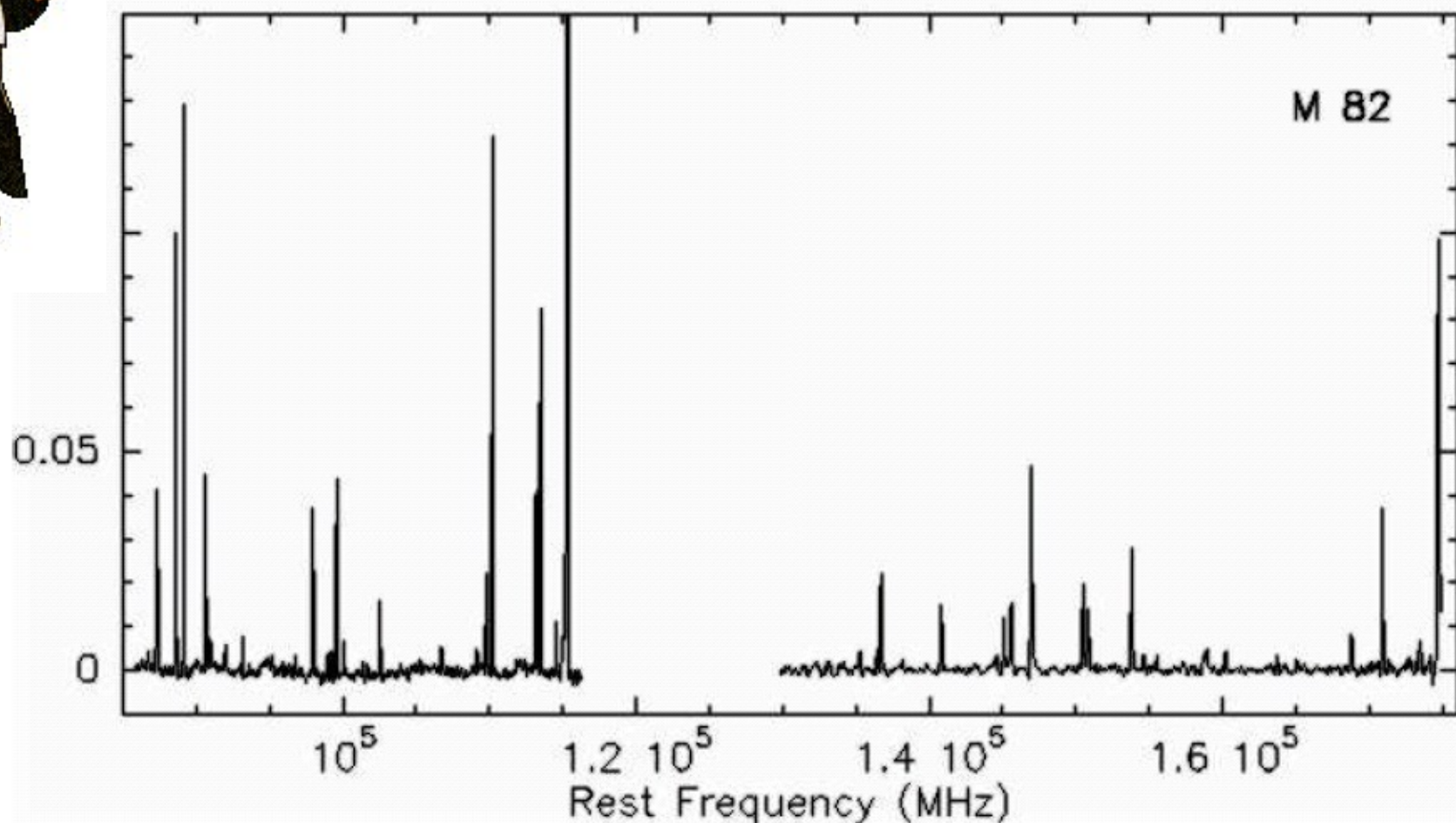
Bolometer	#	Wavelength	HPBW	Pixel Spacing	FOV	NEFD	Status	Remarks
		mmm	arcsec	arcsec	arcmin	mJy s ^{-0.5}		
MAMBO2	117	1.2	11	20	4	40		
MAMBO1	37	1.2	11	20	2	40		

see 30m status wiki pages

Status: Backends

	Type	Channel Width	Bandwidth	Receiver (width mode)	 <u>Status</u>	Remark
1 MHz	Filterbank	1 MHz	4x256 MHz, 2x512 MHz, or, 1x1GHz	EMIR		(1)
4 MHz	Filterbanks	4 MHz	8 or 9 x 1GHz	EMIR, either HERA1 or HERA2 (wide)		(2)
WILMA	Autocorrelator	2 MHz	16 or 18 x 930 MHz	EMIR, HERA (wide)		(3)
VESPA	Autocorrelator	3.3 kHz-1.25 MHz	10-512 MHz	EMIR, HERA (narrow)		(4)
XPOL	VESPA	40kHz-1.25MHz	120-640MHz	EMIR		(5)
ABBA				MAMBO		(6)
Cont.	1 GHz	1 GHz				(7)
Cont.	8 GHz	8 GHz				(8)

Spectral scan of M82



by Rebeca Aladro et al.

EMIR 3mm 30 GHz line survey done in 11 hours

Old CD receivers at 2mm done in 100 hours on+off time

2mK rms at 2MHz resolution

Status: MAMBO2/ABBA2

Intermittent problems: spikes, instabilities, ABBA2 freezing

+ **Telescope oscillations +/-1arcsec** **solved (12/08)**

After March/April 2009 Pool:

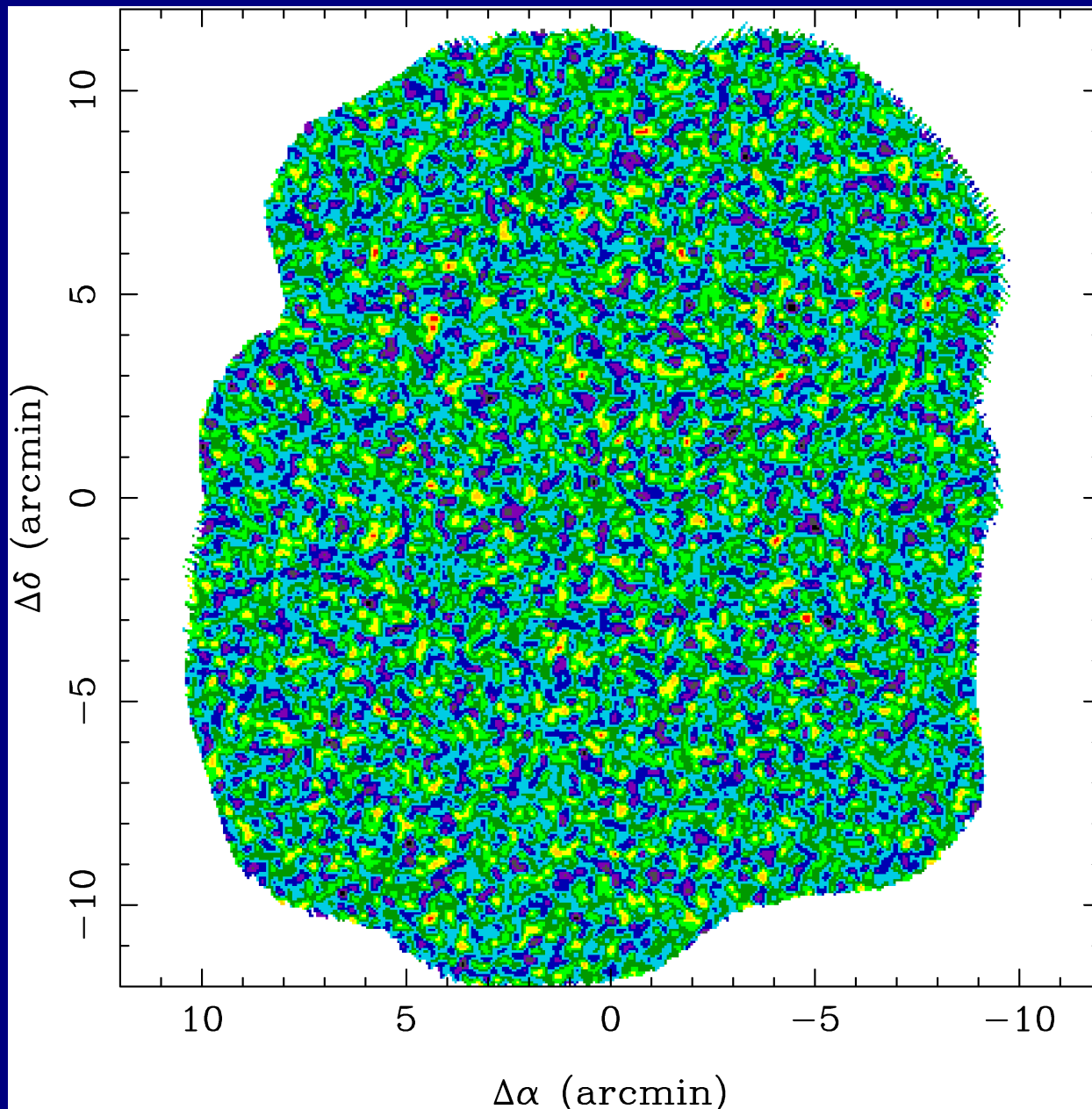
+ **Water leakage** **addressed/repaired/**
(roof/preamps/protection) **on the way**

+ **Cables** to ABBA rack **solved**

+ **Automated recycling box** **repaired**

+ **ABBA software stalling** **not solved**

Science with MAMBO: Deep fields

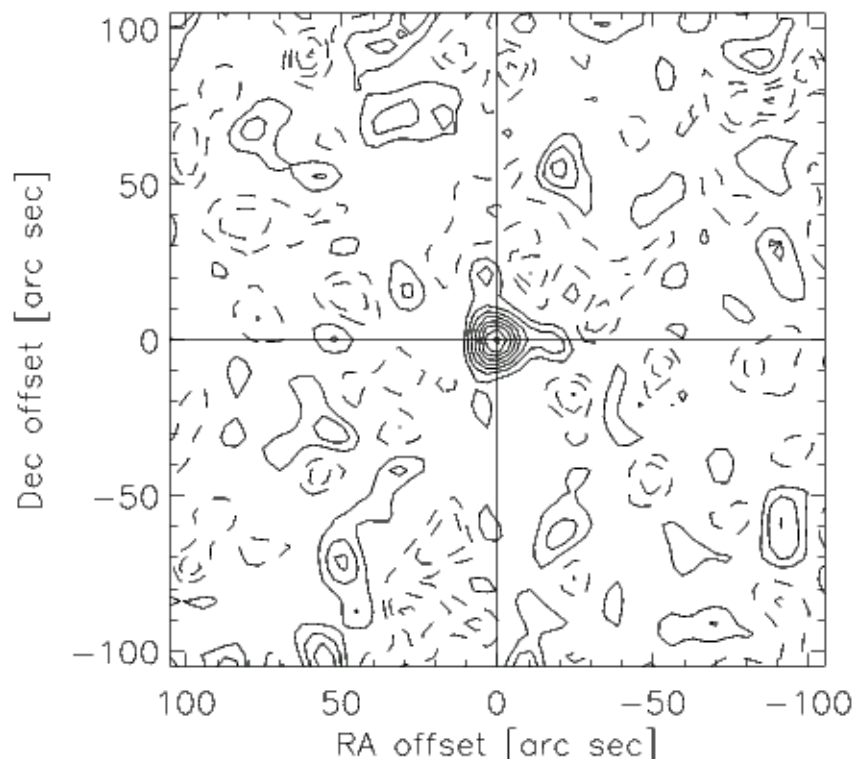


MAMBO2 deep field by
Baker, Omont, Beelen,
Lindner et al.

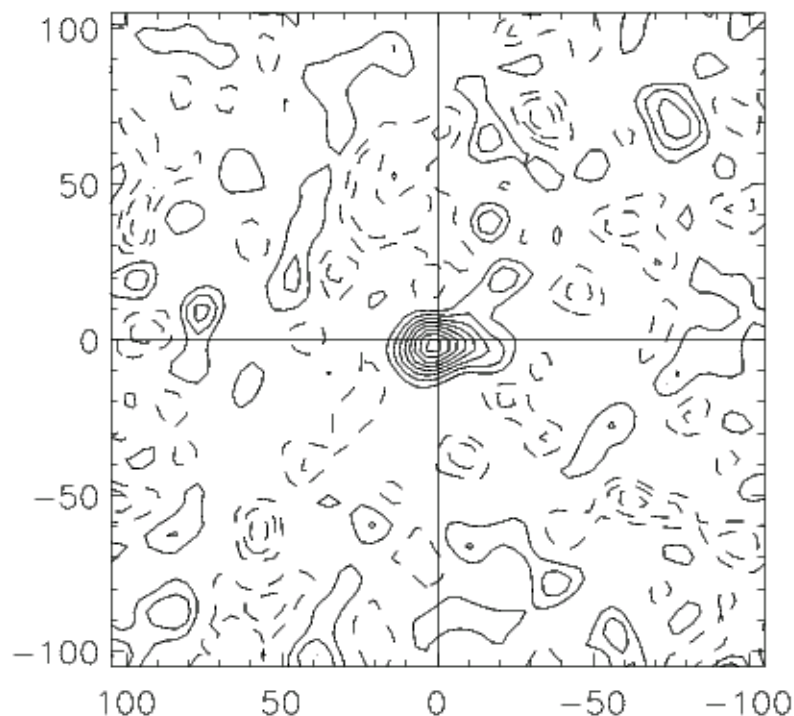
Project 241-08 observed
during pool in March/April
2009

Science with MAMBO: Deep fields

241_08 Outer, rms=0.0294460 N=394

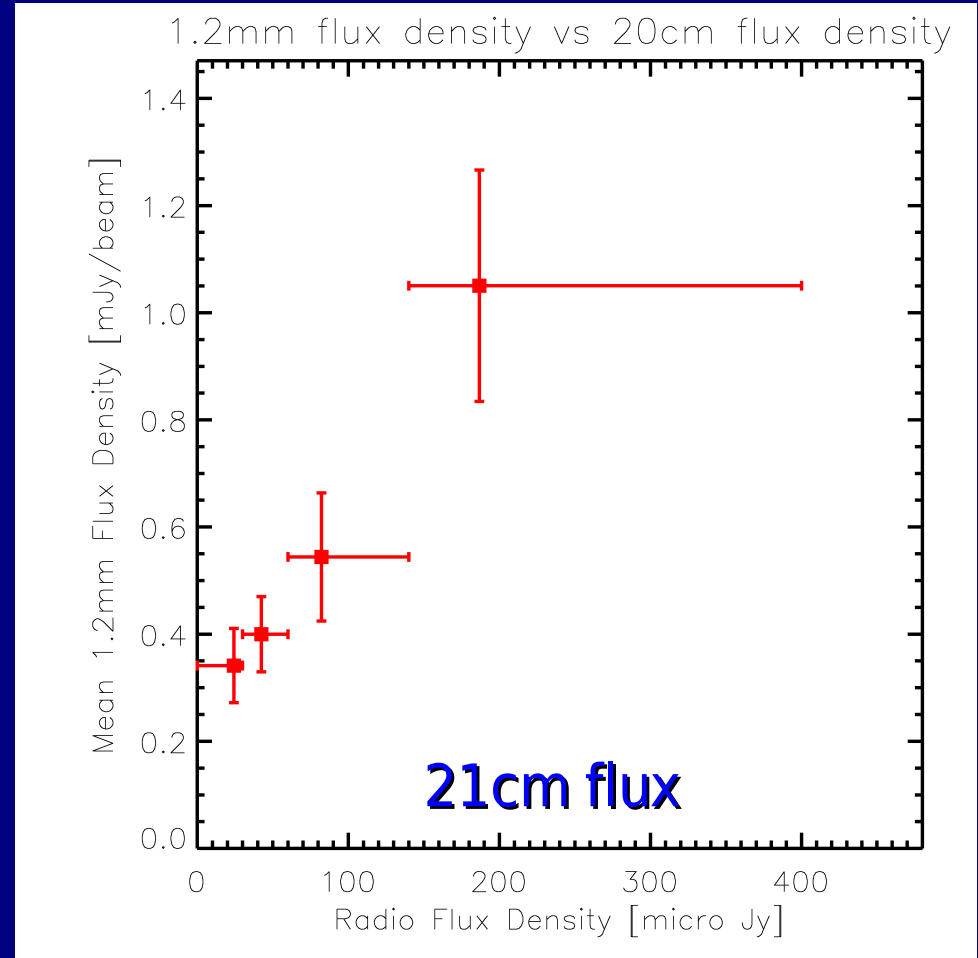
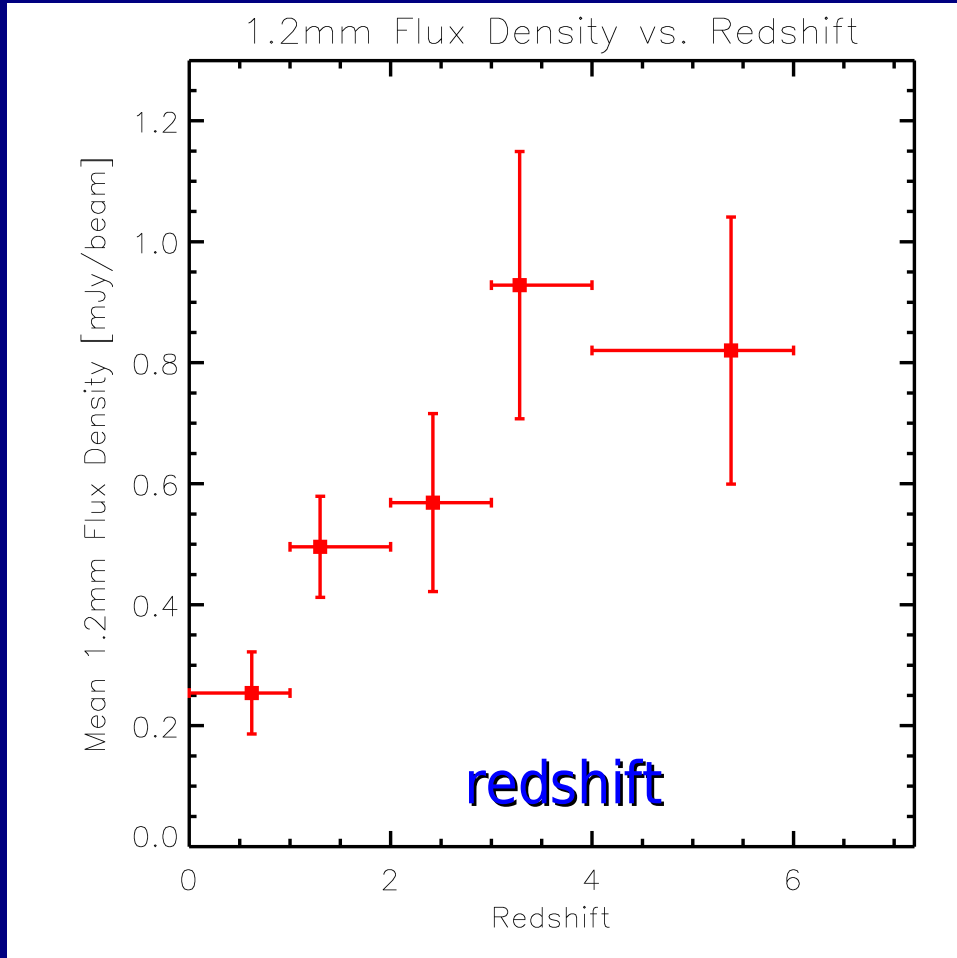


241_08 Inner, rms=0.0270048 N=394



Stacked image of outer/inner MAMBO2 pixels and the same sources.
 $\sigma=29\text{-}27\ \mu\text{Jy}/\text{beam}$, peak flux= $8\ \sigma$ ($15''$ resolution)

Science with MAMBO: Deep fields

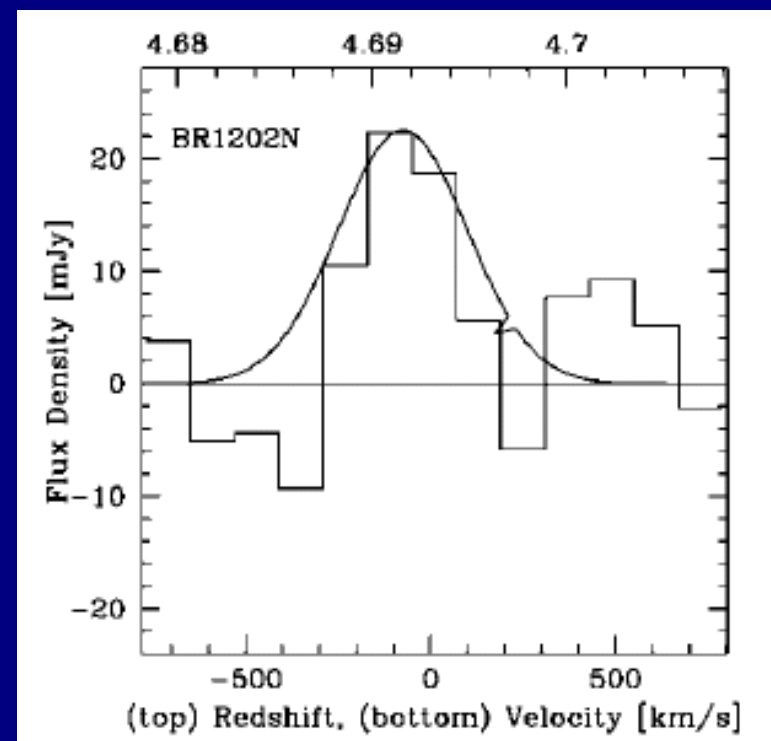


MAMBO2 deep field by Baker, Omont, Beelen, Lindner et al.
Observations in March/April 2009

Preliminary results!

Preparation for 345GHz commissioning

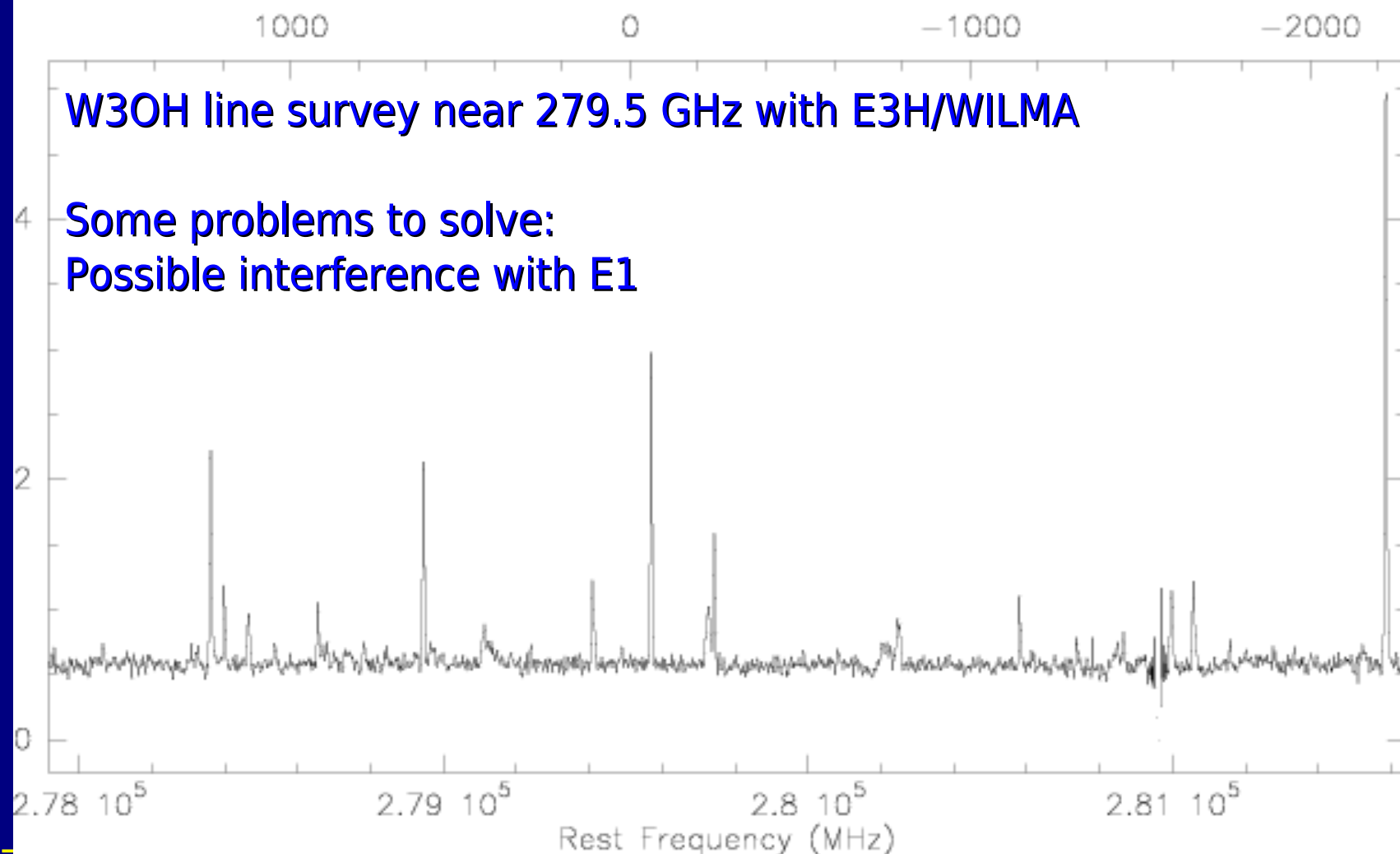
- Weather Statistics
- Telescope Efficiencies
 - Aperture efficiency
 - Gain elevation curve
 - Errorbeam
- Pointing/Alignment
 $E1/E3 = <1.6''$ (Mars)
- Tuning/Leakage/Spurious Signals
Key frequencies: 279, 330, 345
- Stability/Frequency Switching



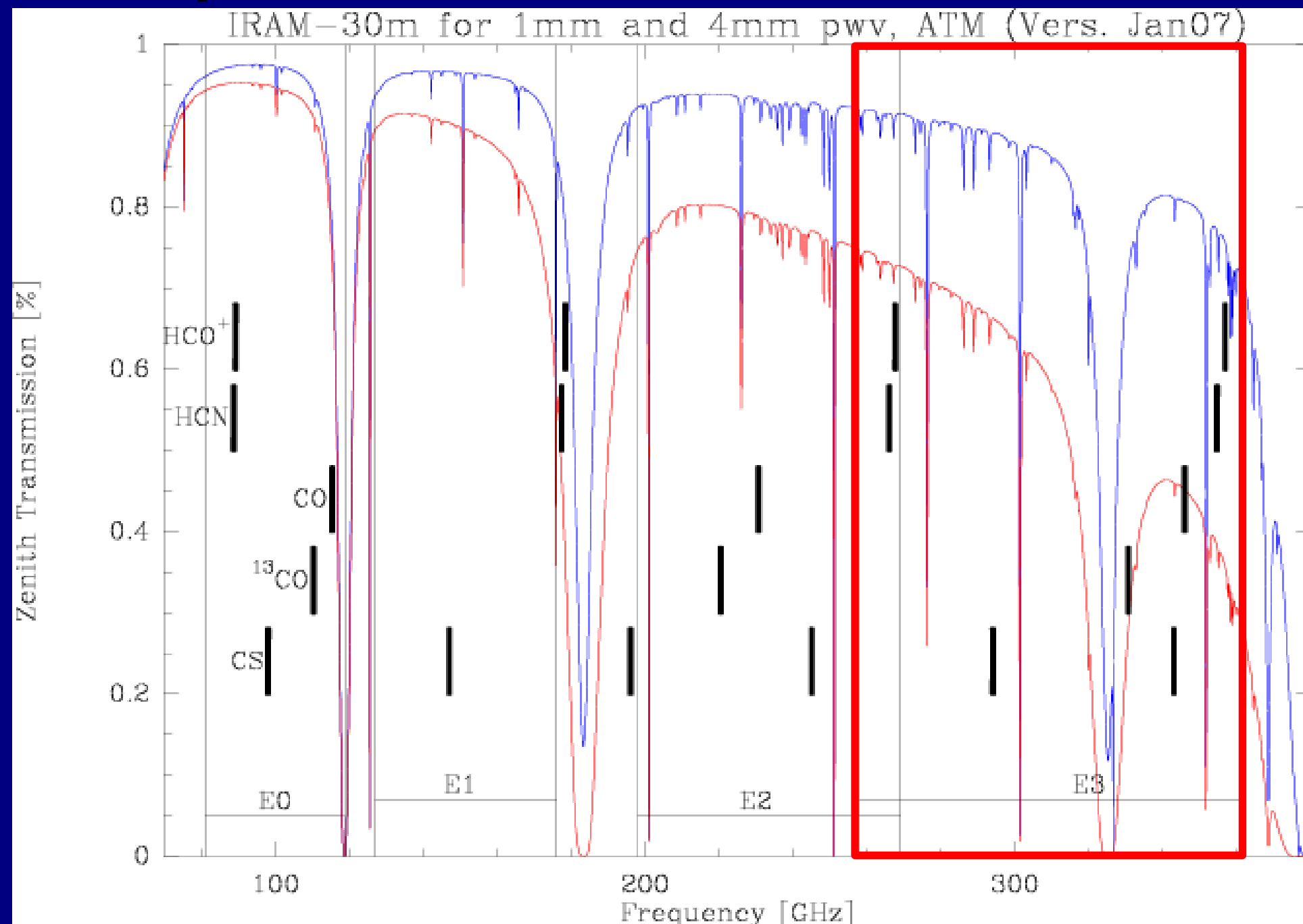
SMA detection of [CII] ?
BR1202 with $z=4.7$ at 334GHz
(Iono et al. 2003)

E3 Observations from last week with old Gunn:

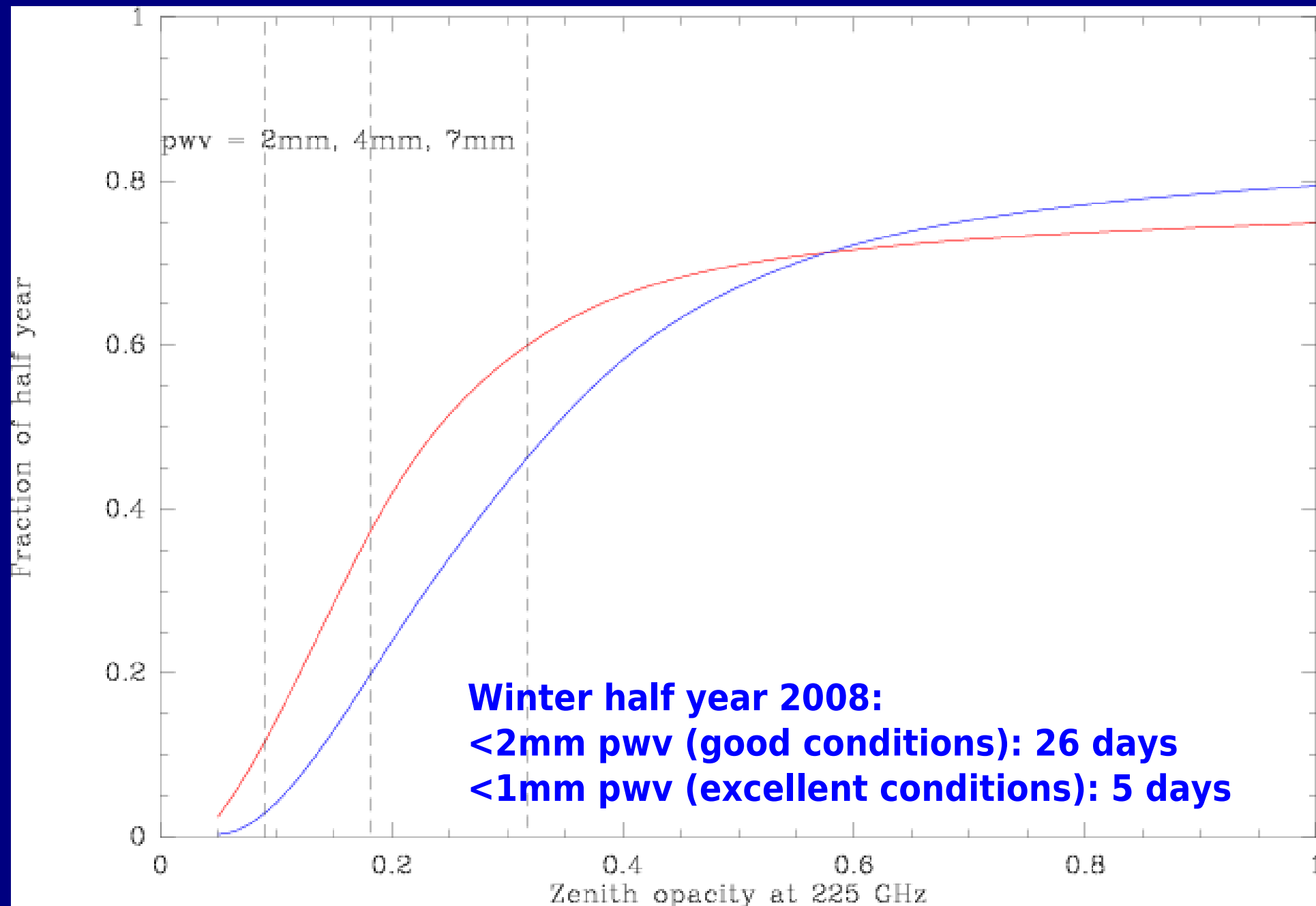
1; 2 W3OH N2H+(3-2) 30ME3HLI-W03 O:22-OCT-2009 R:23-OCT-2009
RA: 02:27:03.88 DEC: 61:52:24.5 Eq 2000.0 Offs: +0.0 +0.0
Unknown tau: 0.196 Tsys: 300. Time: 1.7 min El: 33.6
N: 1860 ID: 798.000 V0: 0.000 Dv: -2.145 Unkn
F0: 279511.832 Df: 2.000 Fi: 292011.832



Atmospheric windows



Weather statistics 2008



Telescope Efficiencies: first result with E3

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

32% beam efficiency at 330GHz. Mars (4.4.09) and skydips.

Gain elevation curve: prediction

At 345GHz, the aperture efficiency is optimum near 43deg elevation.
At 20deg, it expected to be 25% and at 80deg, it will be 20%.

Errorbeam in 1998 (Greve et al.)

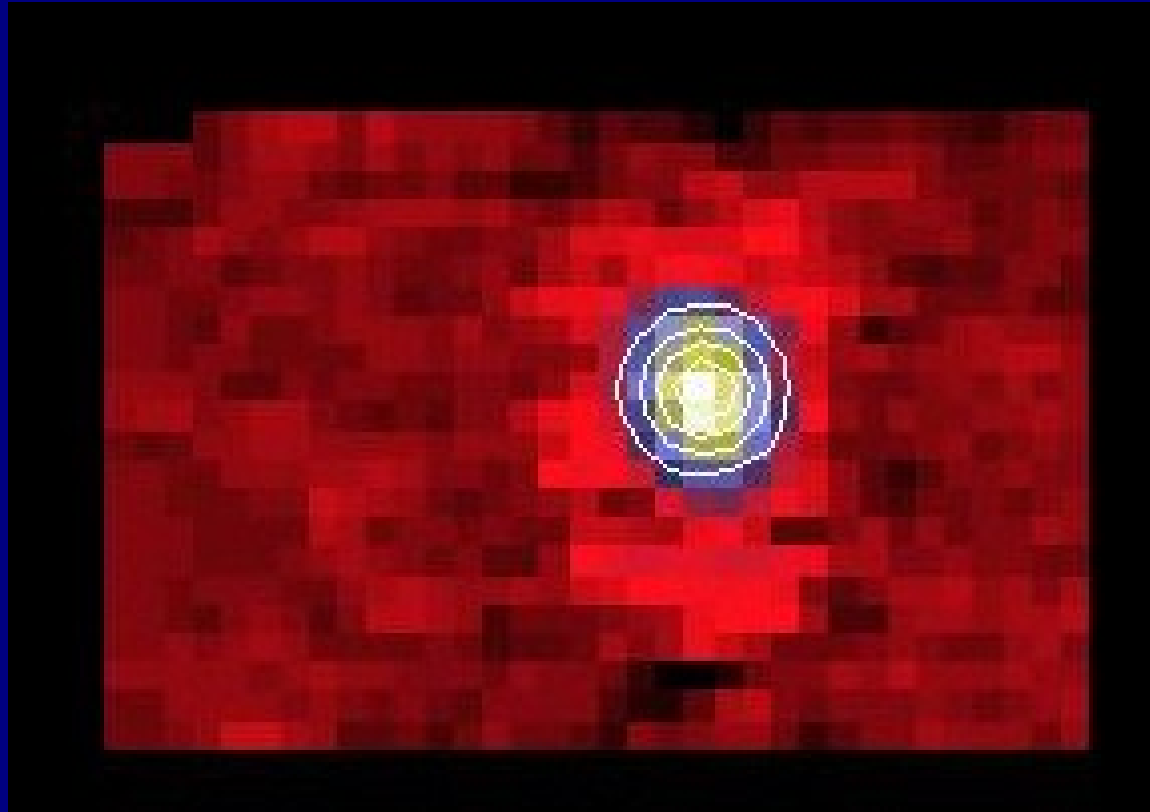
Table 2. Efficiency parameters of the IRAM 30-m telescope (after July 1997)

Wavel./Freq. [mm]/[GHz]	θ_b ["]	θ_{fb} ["]	ϵ_{ap} [%]	B_{eff} [%]	F_{eff} [%]	ϵ_M [%]	S/T_A^* [Jy/K]	$P_1(\theta_{e,1})$ [%] (")	$P_2(\theta_{e,2})$ [%] (")	$P_3(\theta_{e,3})$ [%] (")
3.4 / 88	27.5	~ 64	61 ± 3	73 ± 3	92 ± 2	94 ± 4	5.9 ± 0.3	2–4 (300)	3 (410)	20 (2500)
2.0 / 150	16.0	~ 38	45 ± 3	54 ± 3	90 ± 2	92 ± 4	7.8 ± 0.5	5–10 (175)	8 (280)	25 (1500)
1.3 / 230	10.5	~ 25	35 ± 3	42 ± 3	86 ± 2	85 ± 4	9.7 ± 0.9	10–20 (125)	12 (180)	26 (950)
[0.86 / 350	8.5	~ 20	16 ± 4	19 ± 4	75 ± 3		22 ± 3	15–25 (85)	20 (160)	30 (580)] *)

sun avoidance now 1deg

Neel IRAM KIDs Array (NIKA): 1st glimpse

Test run at the 30m: 16.10. - 28.10.09



Mars at 2mm: 16" FWHM + Errorbeam



Large team from Grenoble, Cardiff, Utrecht, Groningen:
Benoit, Monfardini, Bideau, Camus, Swenson, Desert, Yates, Baselmans,
Baryshev, Doyle + IRAM staff (Key: Samuel Leclercq)