



Observing the cold Universe: IRAM Observing School 2007

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Welcome to the IRAM Observing school 2007

- **Goals: Find new “customers” for radio and mm telescopes from outside the traditional radioastronomy centers**
- **Provide you with tools and techniques to successfully write proposals, perform observations and interpreting them**
- **Methods: Lectures/ Tutorials / Observations**
- **Social events: Excursion to Granada and its Alhambra, ... hiking, using the hotel pool/ gym...**



Alternative mm-Telescopes for Europeans

Telescope	Altit. (m)	Diam. (m)	Freq. Range (GHz)	Partners
IRAM-30m	2900	30	80-280	D, F, ES
Onsala	25	20	<115	Sweden
JCMT	4100	15	211-880	UK, NL
Apex	5000	10	215-1000	ESO, D, Sweden
KOSMA	3100	3	230-660	U. Cologne

The IRAM 30m Telescope



Diameter: 30m
Altitude: 2900m
Surface accuracy: 0.05 mm

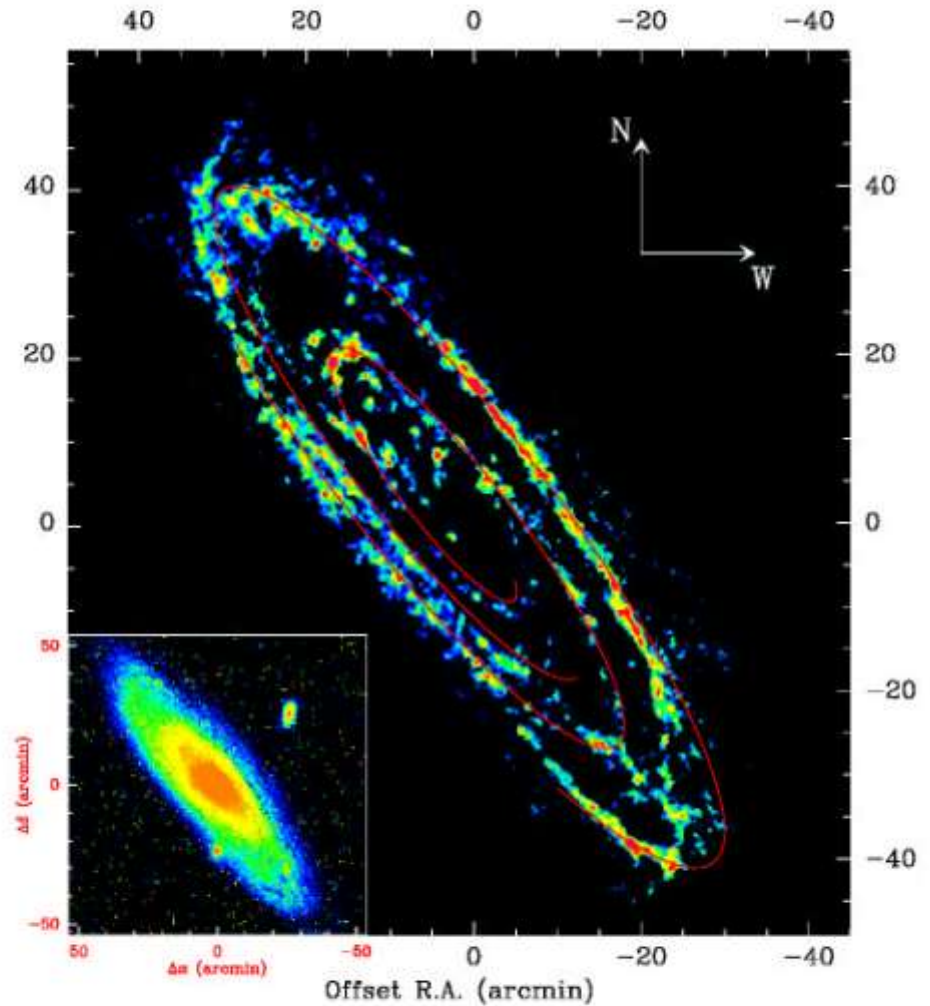


For which projects do you *need* the 30-m telescope?

- Resolution of 12": point sources, compact sources
- Mapping of extended sources at 1mm (very clean beam)
- Zero spacing for the Plateau de Bure Interferometer
- High resolution bolometer maps and detection of weak point sources
- Spectral Line identification in crowded regions



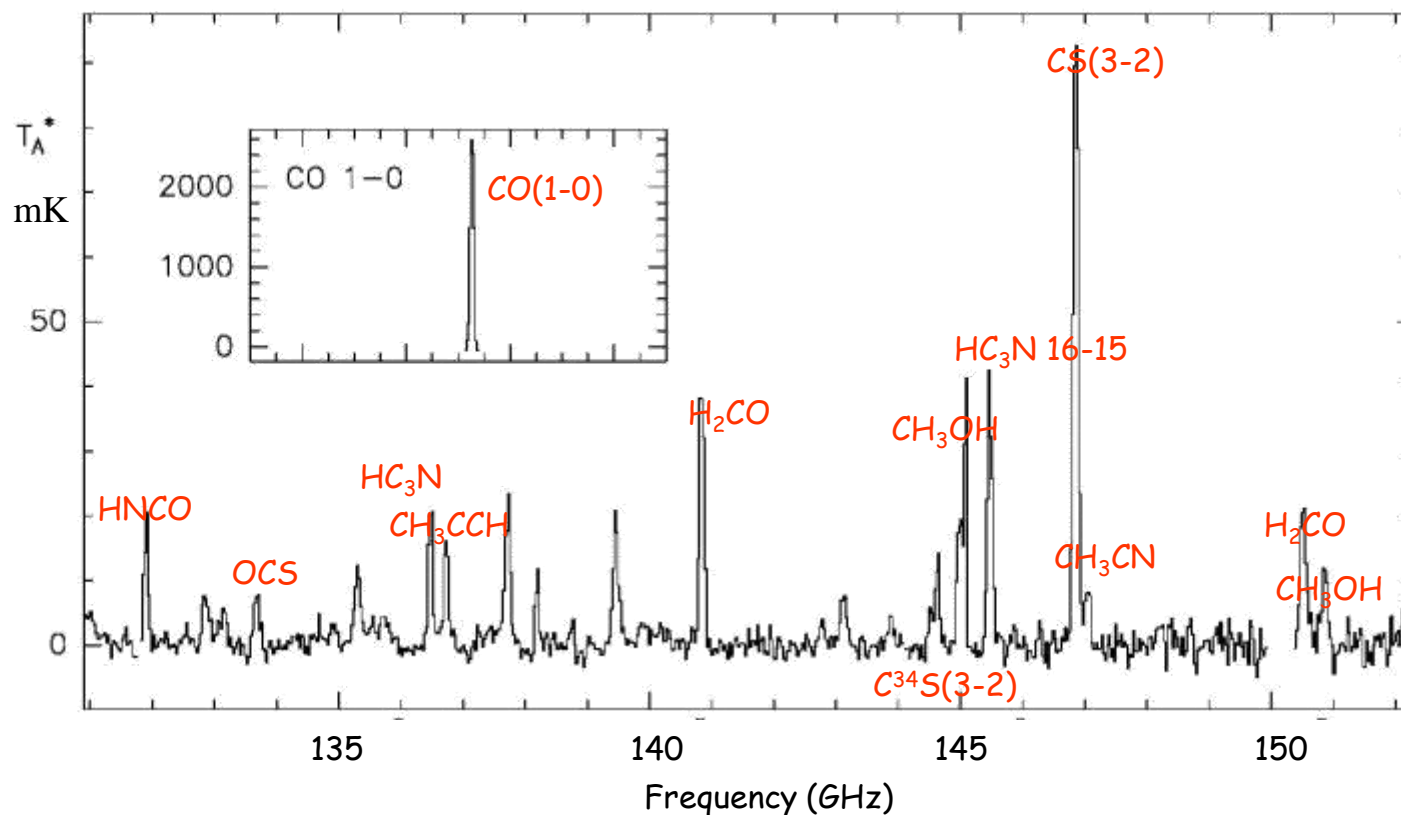
Andromeda Galaxy optically and in CO emission





NGC 253 2 mm sweep: Results

11; 4 NGC253 L1518 IRAM-30M-B72 O: 01-APR-2002 R: 11-APR-2002
RA: 00:45:06.000 DEC: -25:33:45.00 (1950.0) Offs: 0.0 0.0 Eq
Unknown Tau: 0.2093 Tsys: 2.6662E+05 Time: 2816. El: 20.38
N: 765 IO: 747.4 VO: 250.0 Dv: -55.30 Unkn
FO: 151800.000 Df: 28.00 Fi: 159810.743
B ef: 0.9300 F ef: 0.9300 G im: 5.0000E-02





Present Instrumentation at the 30-m telescope

- **Single pixle receivers in the atmospheric windows 80-115 GHz, 130-180 GHz, 190-290 GHz**
- **Two 9 pixel arrays for 220-280 GHz**
- **Spectrometers with resolutions ranging from 10 kHz to 4 MHz and up to 1 GHz bandwidth**
- **117 GHz bolometer arrays for 230 GHz**
- **Polarimetry**
- **VLBI**



How to get involved in mm astronomy

- **IRAM Newsletter**
- **Try to write a proposal, the lecturers offer ongoing help**
- **Also propose to other mm telescopes with less pressure factor**
- **Offer flexibility of your project (e.g. as bad weather backups)**



Tools

- **The IRAM Newsletter and web pages (time estimator, ASTRO ...)**
- **K. Rohlfs and Tom Wilson: Tools in Radio Astronomy (Springer)**
- **Tom Wilson and S. Huettemeister: Problem Book (Springer)**



Announcements and warnings

- **Weather conditions may be unpredictable: stay on the roads if you walk into Sierra Nevada**
- **Use sun lotion and sun glasses**
- **Alcohol as much as you want**
- **... but only outside this Galaxy**
- **Two excursions to Granada: Tuesday & Wednesday: walk through Granada or the gardens of the Alhambra/ night visit to the Alhambra**
- **You can connect your laptops to WIFI or cable of IRAM (free), the hotel also has internet connection**



Today's schedule

- **10:00 Clemens Thum**
- **11:00 Coffee break**
- **11:30 P. Hily Blant**
- **13:30 Lunch**
- **Afternoon: group work and observing**
- **18:00 P. Cox**
- **20:30 Dinner**
- **Cox's group meets at 14:30 in the lobby for transport to the telescope**