The HIFI ‘mapping observations’ AOT

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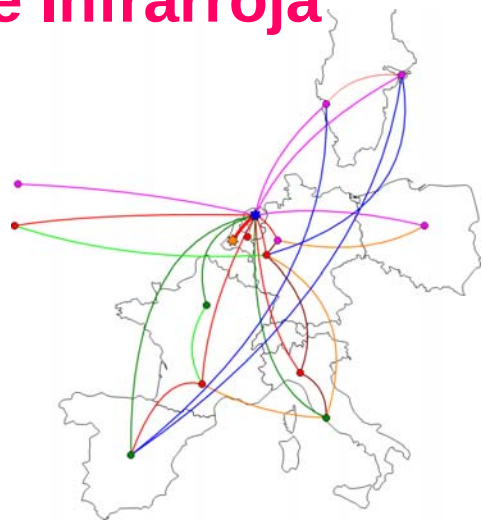


The HIFI AOT team

- **Volker Ossenkopf:** AOT scripts/testing
- **Pat Morris:** AOT testing/scripts
- **David Teyssier:** Instrument configuration ..
- **Andrew Bonfield:** HSPOT implementation
- **Tony Marston**: HSPOT design

Spitzer +HST

Spitzer +HST

CN IRAM 30-m

5-6 km/s

Rodriguez-Franco et al (1998)

Spitzer +HST

CN IRAM 30-m
6-7 km/s

Rodriguez-Franco et al (1998)

Spitzer +HST

CN IRAM 30-m
7-8 km/s

Rodriguez-Franco et al (1998)

Spitzer +HST

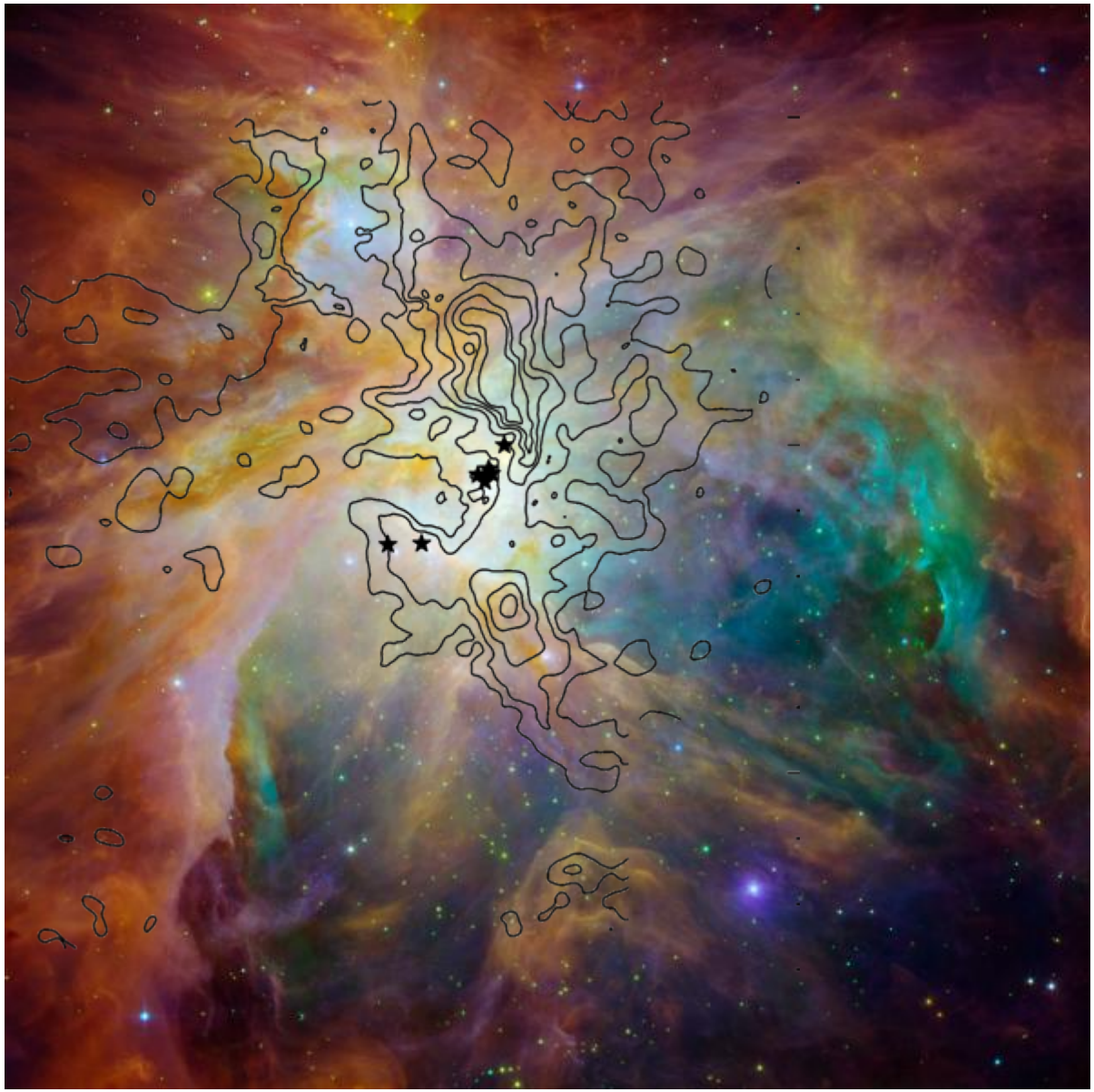
CN IRAM 30-m
8-9 km/s

Rodriguez-Franco et al (1998)

Spitzer +HST

CN IRAM 30-m
9-10 km/s

Rodriguez-Franco et al (1998)



Mapping with HIFI

Scientific potential of mapping with HIFI

Reveals the spatial distribution of different kinematics components

- **Evolved stars (AGBs, protoplanetary nebulae..)**
- **Star formation (outflows, ..)**
- **Interaction of stars with the ISM (PDRs, XDRs, Shocks..)**
- **Heating of the ISM in the center of galaxies**

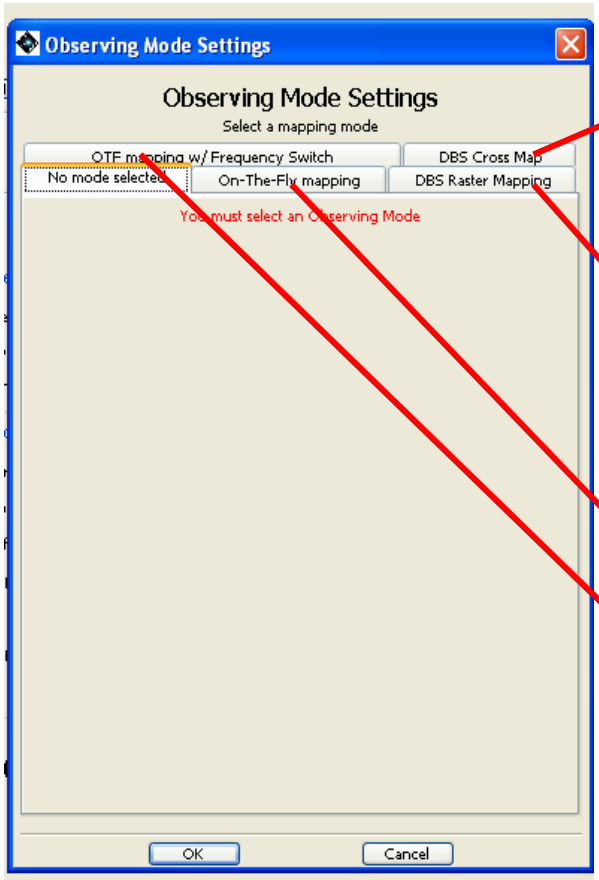
Multiline studies (H_2O, CI, ..) to derive the physical properties

- **Combine lines measured with different beams**
  The beam for band 1 is 4 times larger than for band 6

Need to synthesized the larger beam by mapping

Mapping modes

HIFI provides the following mapping AOTs in HSPOT



Cross Map with Dual Beam Switch

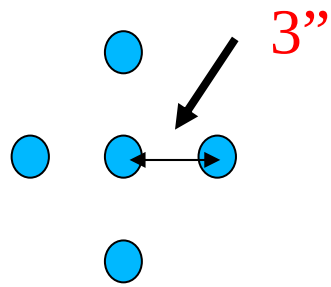
Raster Maps with Dual Beam Switch

On-the-fly (OTF) Maps:

- **Position-Switch Reference**
- **Frequency Switch**

Cross Map DBS

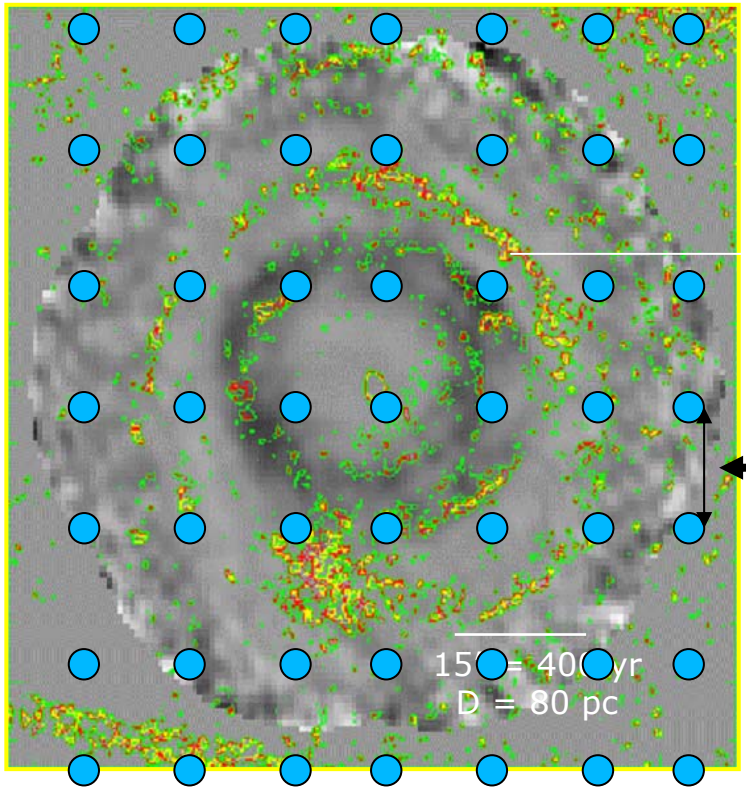
High accurate flux measurement of lines or continuum in a point source correcting for pointing or position inaccuracies



Raster Maps DBS

Small extended sources in spectral lines and continuum

IRC+10216 PDBI CN(2-1)

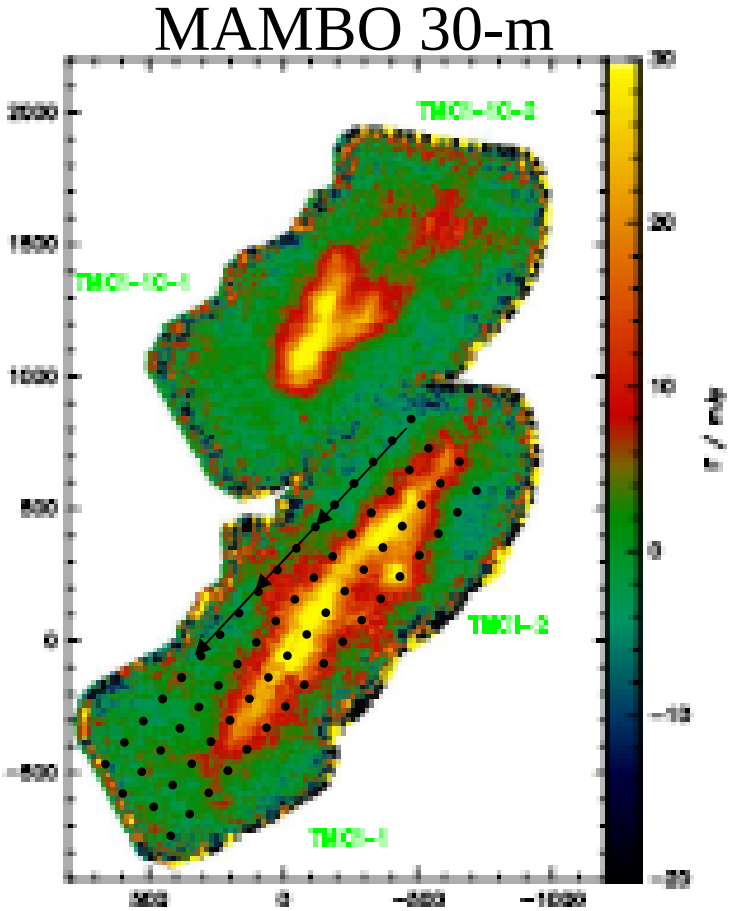


No extended emission >3’
Limited to 32x32
Good baselines and continuum

Nyquist 10”, 20”, 40”

OTF Maps FS

Large scale maps within very extended emission and narrow lines



Mapping water, CI,CII, ..

- molecular clouds
- outflows with moderate velocities
- PDRs, and low velocity shocks

Any sampling (Nyquist)

Frequency throw: 120 240 MHz

Linewidths: <5 km/s (ripples)

No continuum emission

Measuring a reference position

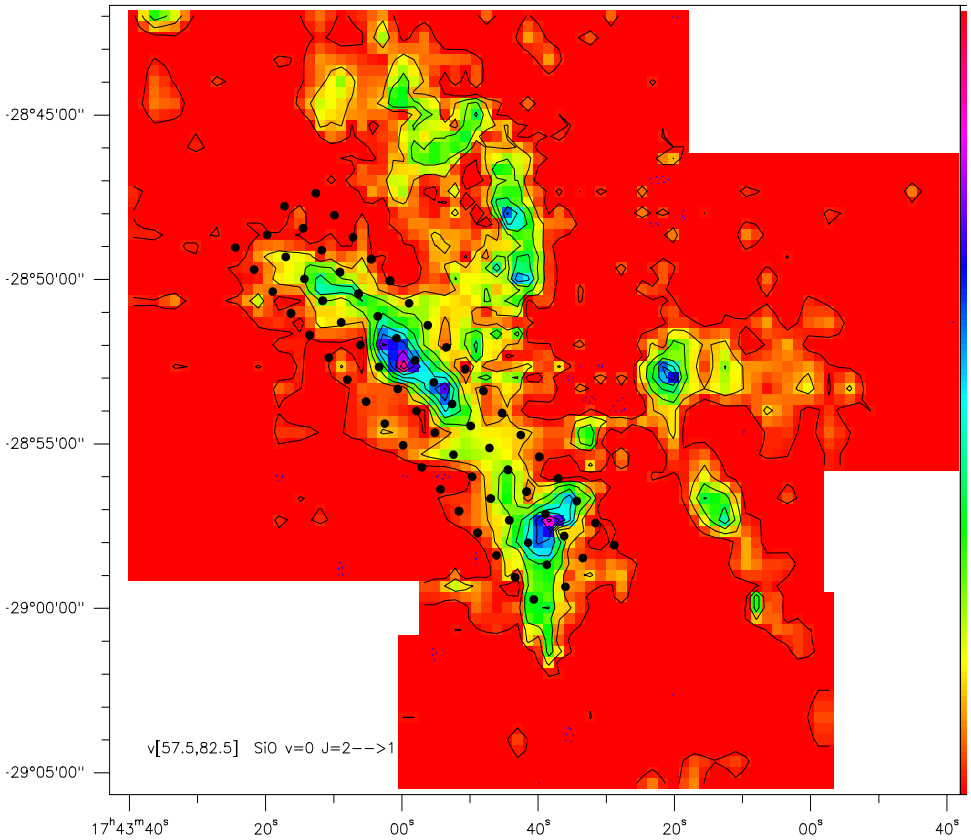
Baselines (ripple suppression)

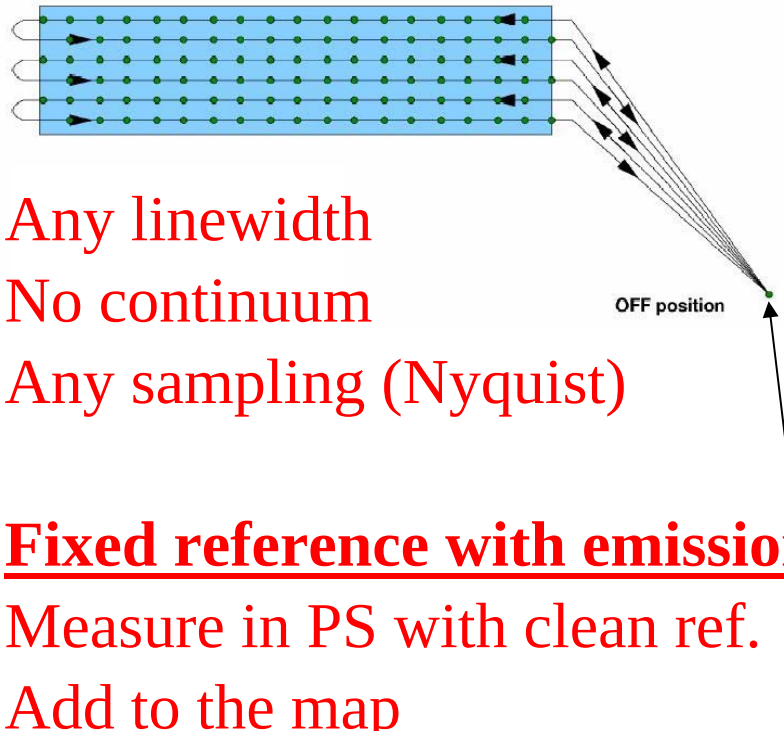
Linewidths: < 15 km/s

OTF Maps PR

Large scale maps with a nearby reference position free from emission

Galactic Center SiO 2-1 30-m





Any linewidth

No continuum

Any sampling (Nyquist)

Fixed reference with emission

Measure in PS with clean ref.

Add to the map

Summary

	Source size	Linewidths	Baselines Continuum	Efficiency
Raster DBS	Compact <3’	Any	Very good YES	↓
OTF FS	Any	<5 km/s	Ripples NO	↑
OTF FS +Reference	Any	<20 km/s	Good NO	—
OTF PR Clean Ref	Any	Any	OK NO	↑
OTF PR Add Ref.	Any	Any	OK NO	↑