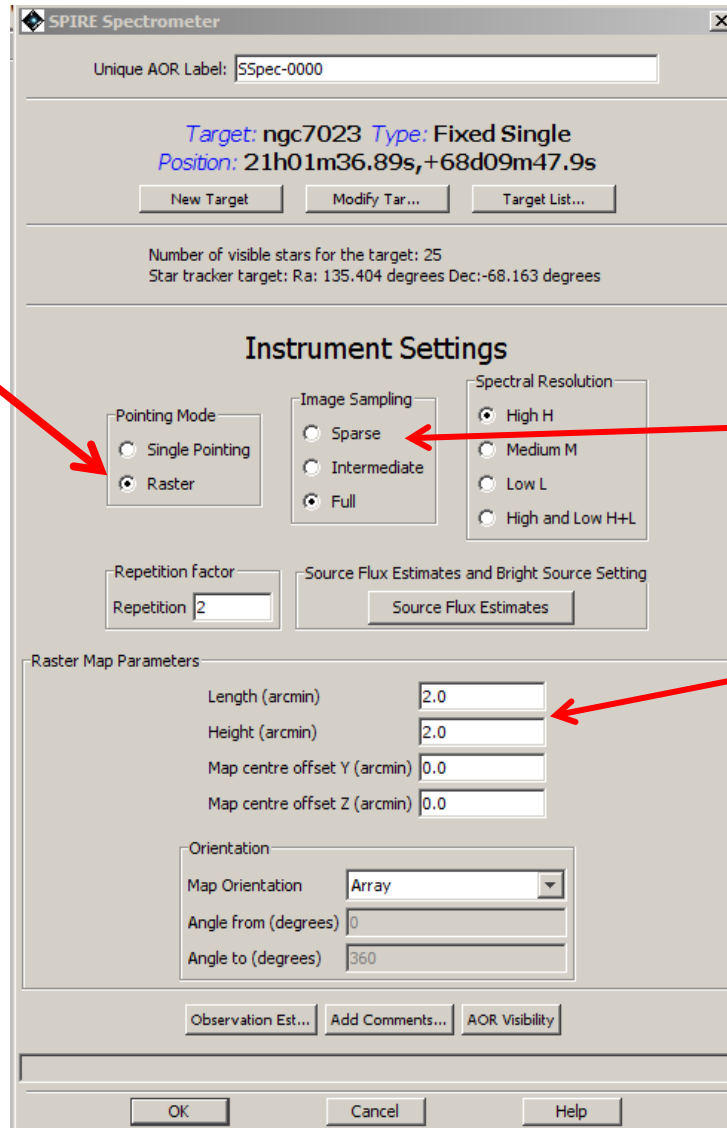


SPIRE Spectrometer Fully Sampled Mapping

Ed Polehampton
RAL/University of Lethbridge

Fully sampled mapping

Large area mapping using Raster



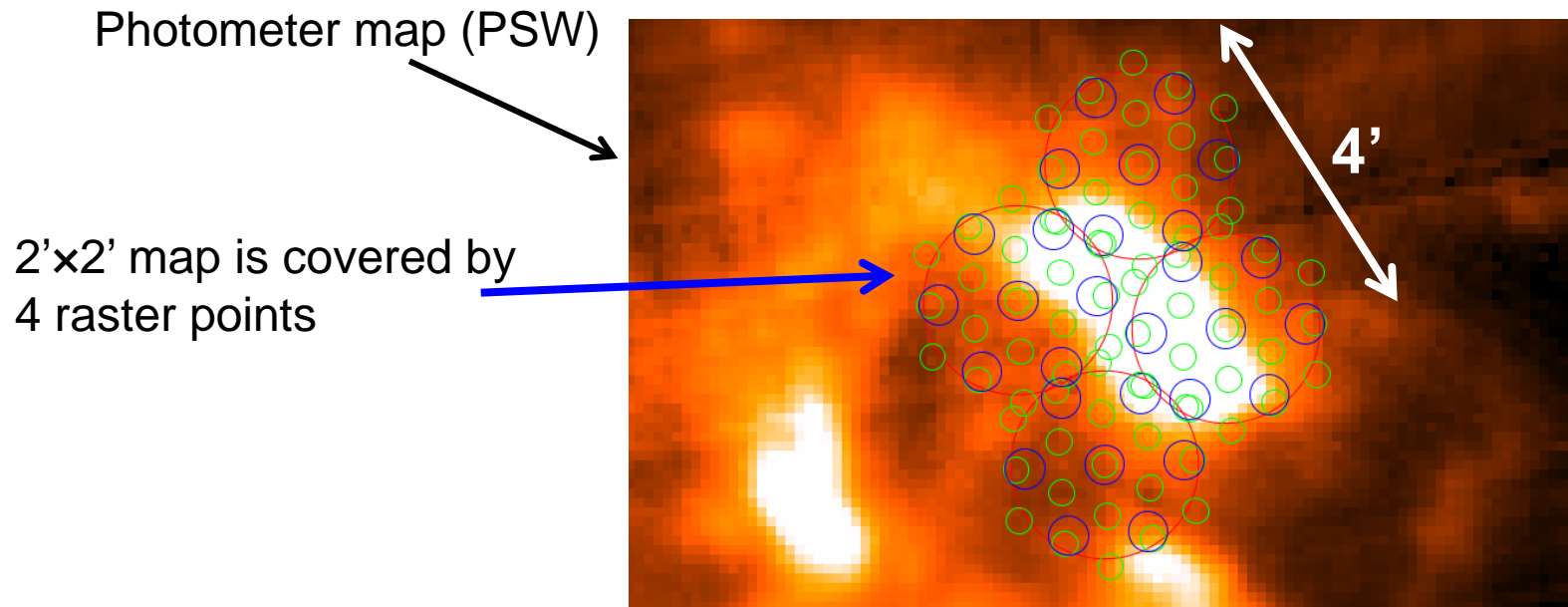
Sparse, intermediate or fully sampled FOV

Map size in arcmin

Raster pattern fixed with respect to telescope Y-Z axes – so if no constraint set, orientation may rotate on sky with time

Planning the observation

Planning in HSpot allows the individual fields in the raster to be visualised
(for sparse sampling, individual detectors are shown)



Example observations:

- NGC7023
- 2 repetitions
- High resolution
- **Sparse sampling**
- Raster (2x2 points)

Time taken = 1609 s = 0.45 hr

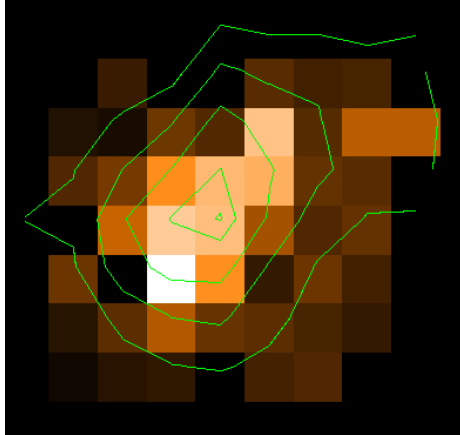
- NGC7023
- 2 repetitions
- High resolution
- **Intermediate sampling**
- Raster (2x2 points)

Time taken = 5114 s = 1.42 hr

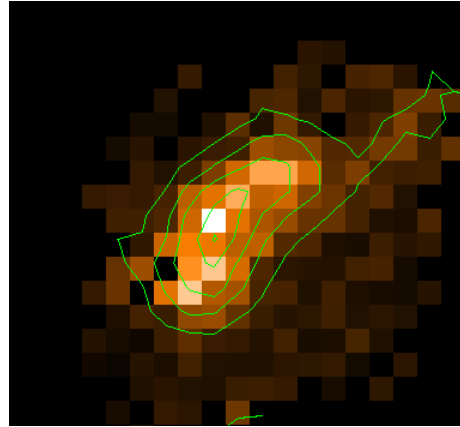
- NGC7023
- 2 repetitions
- High resolution
- **Full sampling**
- Raster (2x2 points)

Time taken = 19130 s = 5.31 hr

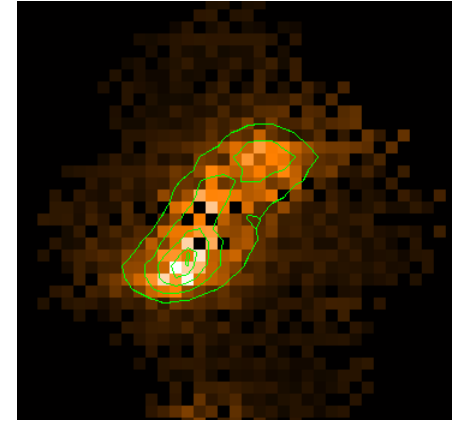
Gridded Sparse, Intermediate and Full Maps



Sparse (38'' pixels)



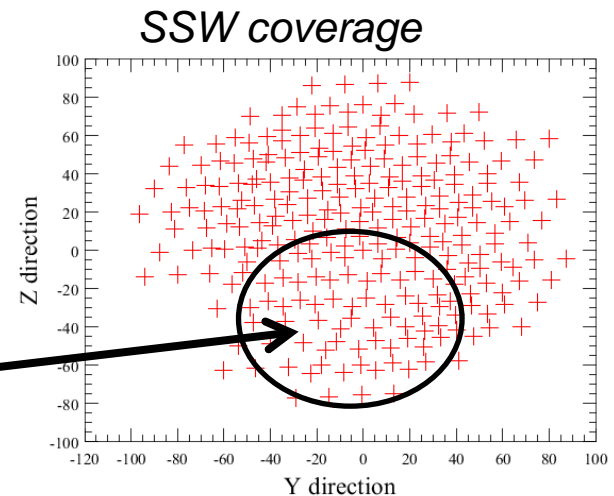
Intermediate (19'' pixels)



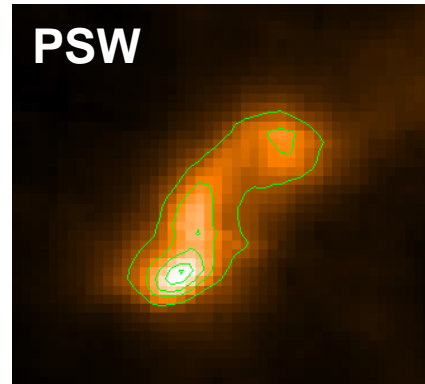
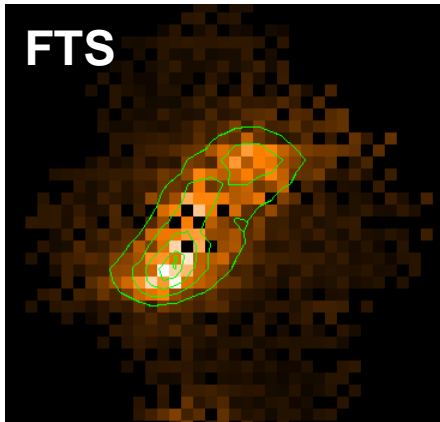
Full (9.5'' pixels)

- This shows the 40 cm^{-1} slice ($250 \mu\text{m}$) (continuum)
- Holes in map due to naive gridding
- Contours of slightly smoothed images

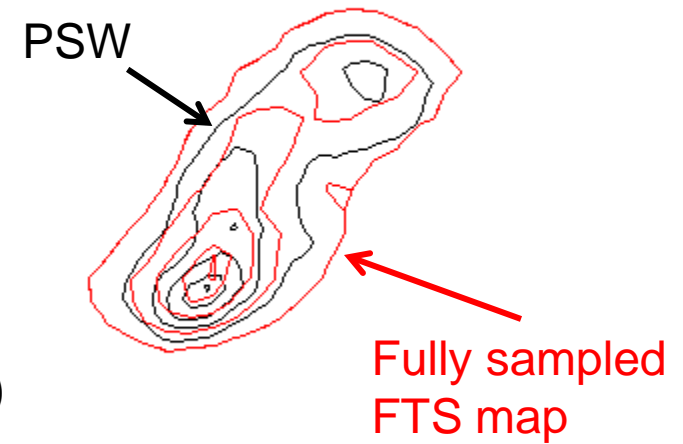
Coverage thinner due to
dead detectors



Comparison with Photometer

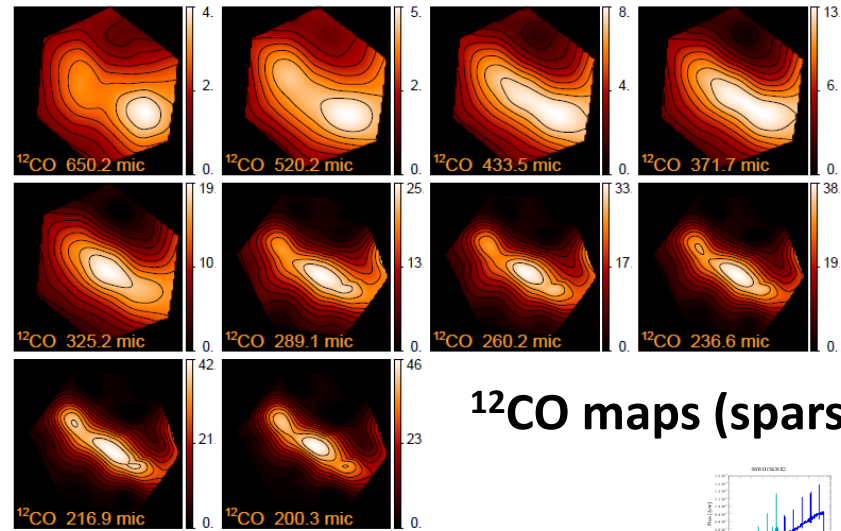
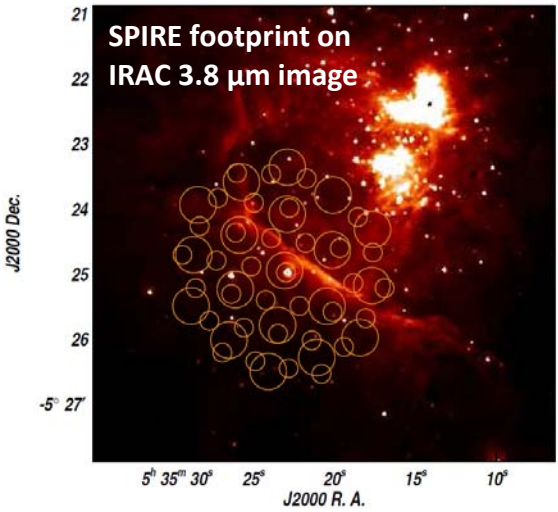


Photometer PSW (6" pixels)

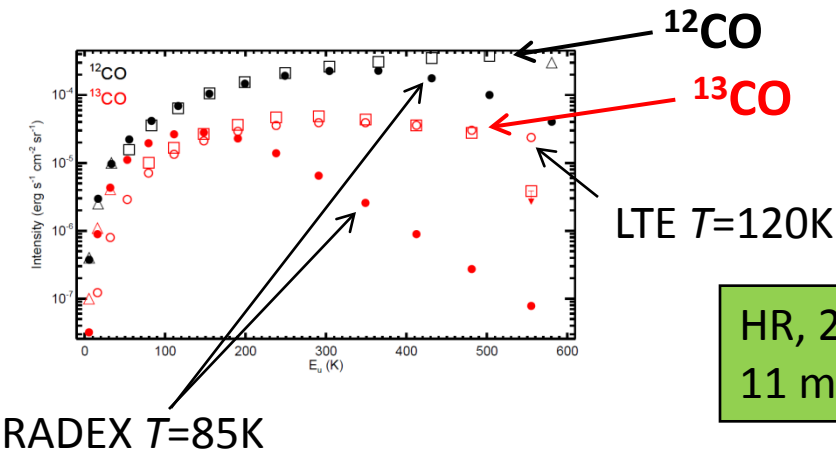
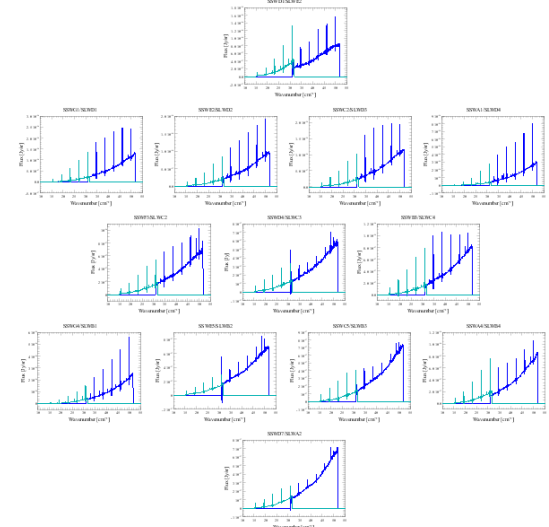


... but the advantage of the spectrometer is to make line maps..

Orion Bar CO line maps



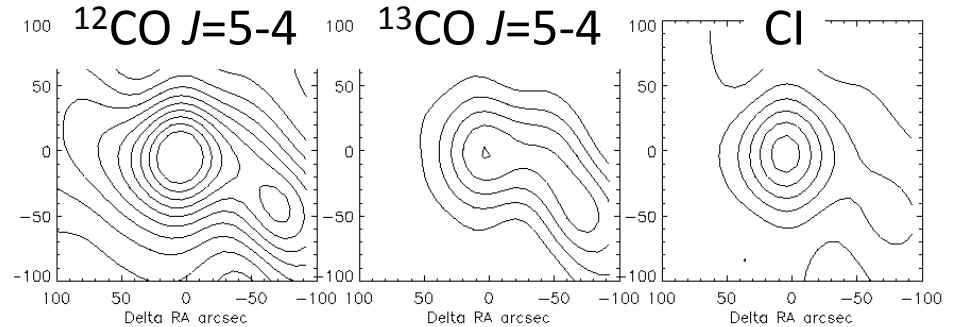
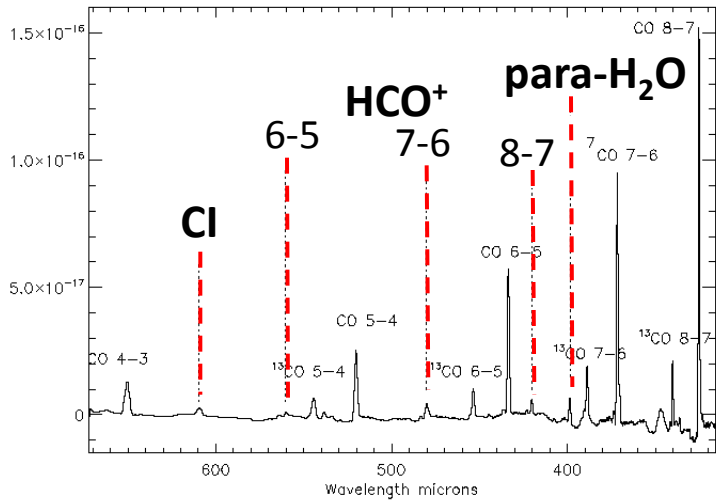
^{12}CO maps (sparse)



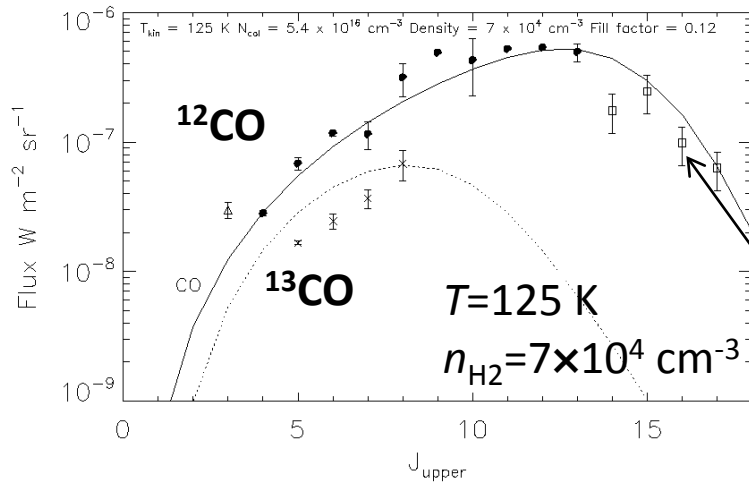
HR, 2 reps, sparse
11 min (4 min on-source)

SPIRE spectroscopy of the prototypical Orion Bar Photodissociation Region, Habart et al. 2010

DR21 line mapping



RADEX LVG model:



ISO lines

Sparse maps

HR, 8 reps, sparse
25 min (18 min on-source)

Herschel-SPIRE spectroscopy of the DR21 Molecular Cloud core, White et al. 2010