



# HIFI Point Mode Observations

- Point mode is the simplest of HIFI observing modes:
  - *single object*
  - *single LO tuning*
- All reference schemes are possible

## Demos included:

- CS 10-9 emission in a Carbon star (point source) using Dual-Beam Switch
- CS 10-9 and CI 1-0 simultaneous observations
- Spur warning in HSPOT
- C+ emission in Orion using Position Switch



## Key settings and steps

- Define target position
- Rename the AOR label to something meaningful
- Pick your band and source velocity
  - $f_{\text{sky}} = f_0(1+v_{\text{opt}}/c)^{-1}$  -OR-  $f_{\text{sky}} = f_0(1-v_{\text{radio}}/c)$  -OR- redshift
- Choose your spectrometer settings
  - HRS has resolutions from 0.125 MHz to 1.0 MHz. WBS resolution is fixed.
  - Not common to have a separate setup per polarization
  - Not common to select HRS or WBS only
  - Not common to select fast HRS
- Set the LO tuning with the frequency editor
- Select the reference scheme
- Select your time goals
  - 1 GHz reference if line is contained with a single WBS subband
  - MIN width is what you smooth your spectrum to in order to improve SNR.
  - MAX width should represent the size of your widest line.
  - Can choose noise or time based estimates (though noise is more common)



# HIFI Spectral Scan Observations

- SScan mode is used when a broader bandwidth is required:
  - *single object*
  - *multiple LO tunings*
- All reference schemes are possible EXCEPT position switch

Demos included:

- Line survey in Orion using Load-Chop (high density of lines)
- mini-line survey in Orion using Frequency-Switch (low density of lines)



## Notes for Spectral Scans

- Setup is similar to that for Point Mode
- No ability to select HRS (though you may still get HRS data)
- No frequency editor is available. Entire range is surveyed
  - This means spurs or instabilities cannot be avoided
  - Possibly means extra processing of the data
- New parameter: redundancy. Must balance observing time against the ability to deconvolve the data.
- Noise estimate given is for the most sensitive frequency in the range requested.
  - By definition then the noise is higher elsewhere in the survey
  - If more uniform noise is required, break up a wide scan into several smaller ones.
  - Deconvolution software can handle multiple observations