

# Before Visiting CSO Checklist

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- Source Coordinates and Radial Velocities  
Find references for source coordinates (preferably J2000.0 equatorial coordinates) and radial (LSR) velocities. Major sources are in the system default source catalog, but their coordinates may differ in arcsecond level from commonly quoted values.
- Off-source Coordinates (if your target is extended)  
Find an emission-free position, either in absolute coordinates or as an offset from your target, as close to your target as possible. Frequency-switched observations are not possible currently at the CSO, so it may not be easy to find one observationally if your source is extended.
- Pointing Source Coordinates  
If possible, find pointing sources as close to your target as possible. Easiest to point are planets (Mars, Jupiter, and Saturn), but they are not always available or too far away from your target. Major CO point sources are in the system default source catalog, but the same caveat with the target source coordinates applies.
- Mapping Strategy (if you plan to use OTF)  
Find an area to map in equatorial coordinates. Mapping direction can be rotated. If the size of a map is large (larger than several arcminutes squared), divide it down to smaller, more manageably sized areas. Taking a map of  $8 \times 8$  pixels ( $2' \times 2'$  area in  $15''$  grid with  $30''$  beam) takes about 15 minutes and results in on-source integration time of about 7.5 seconds. Limiting time to spend for each OTF map to 15 to 20 minutes, limiting time to spend for each row (scan) to not much longer than 1 minute, taking a temperature calibration scan at the beginning of each OTF map, and mosaic-ing to map a larger area are recommended.
- Spectral Line Frequencies  
Major species are in the system default line catalog, but it is recommended that observers always have their own entries in their private line catalog. The JPL catalog and CDMS catalog are good sources of measured and predicted line frequencies.

- LO Frequencies and IF Offsets

To observe more than one spectral lines simultaneously or to avoid contamination from the image sideband (all the CSO heterodyne receivers are double sideband), consider where in the IF passband to place your target line(s) and how much to offset spectrometers within the IF passband, especially if you will be using one of the wideband receivers ("Frank Rice's" receiver and "Barney"). For example, it is possible to observe  $^{12}\text{CO}(2-1)$ ,  $^{13}\text{CO}(2-1)$ , and  $\text{C}^{18}\text{O}(2-1)$  simultaneously with the 1 GHz FTS (FFTS1) and "Frank Rice's" receiver.