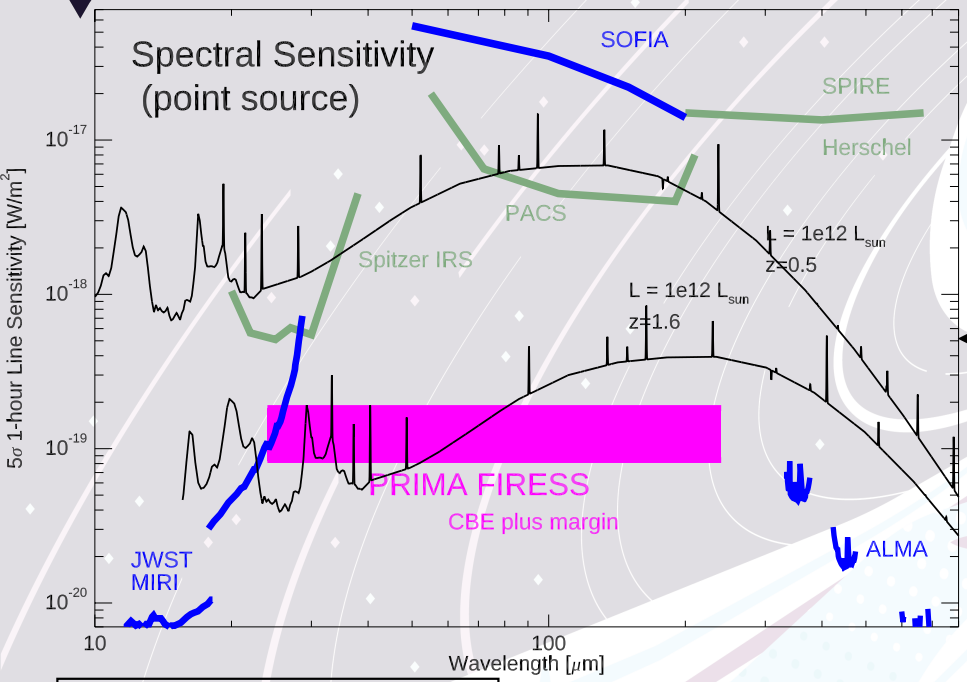
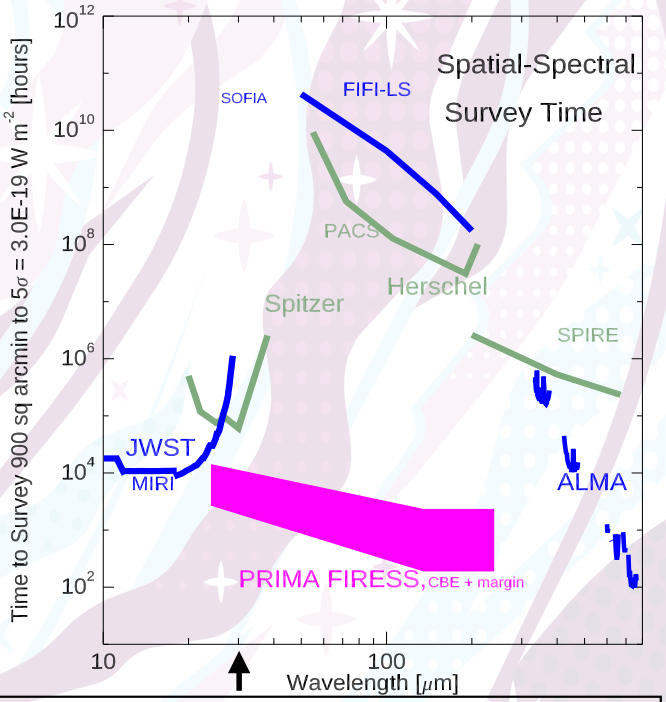
PRIMA Far-Infrared Enhanced Survey Spectrometer (FIRESS)



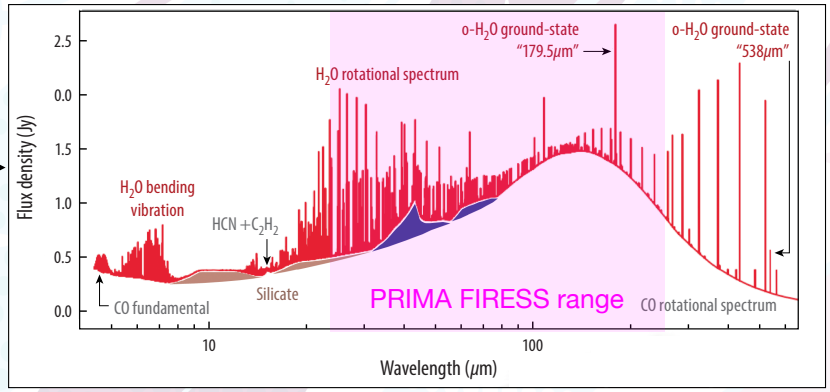
Low-Resolution Mode

- Provides R~130 and covers with **complete full-band** shown in two pointings.
- Sensitivities shown are for unresolved spectral lines in point sources, assume north ecliptic pole backgrounds. Higher background regions will have increased limits.
- Bar envelopes wavelength dependence under optimization. 2×10^{-19} W/m² is a safe assumption for estimation purposes.



High-Resolution Mode

- Also covers the **full complete band** in 2 pointings.
- Provides tunable resolving power up to R=4,400 at 112 microns, R=17,000 at 28 microns.
- Use 4.7×10^{-19} W/m² for unresolved lines in faint sources. See FIRESS presentation from March 2023 workshop, slide 7 for more info.



Mapping Modes

- Long slits -> maps a square degree to 3×10^{-19} W/m² line flux in 1000 hours at 100 microns. Full band covered in two pointings.
- Small and large map modes available with observatory scan and steering mirror. Map depth scaled by area / time^2
- **Excellent surface brightness sensitivity** for low-surface-brightness line emission: 5 sigma below 10^{-10} W/m²/sr, **per beam** in 5 minutes at [CII], [NII] wavelengths.