

For the last year, the SAFIRE team has been developing a prototype instrument called FIBRE (Fabry-Perot Interferometer Bolometer Research Experiment). FIBRE is a ground-based spectrometer designed to demonstrate the key technologies for SAFIRE: superconducting transition edge sensor (TES) bolometers, SQUID multiplexed amplifiers, high speed data acquisition hardware, and a cryogenic Fabry-Perot. FIBRE achieved first light at the Caltech Submillimeter Observatory on June 2, 2001. Although the weather was extremely poor for observing at the  $365\mu\text{m}$  observing wavelength, the limb of the Moon was detected with an atmospheric transmission of about 1%. The spectrometer was operating with a spectral resolving power of  $\sim 1100$ , and the signal amplitude and noise were consistent with expectations. The TES bolometer and SQUID multiplexer technology has been thus validated in an astronomical application. We anticipate future observations to study galaxies in the fine structure line of CI and the CO rotational lines, and to continue to refine the multiplexed TES detectors in astronomical applications.

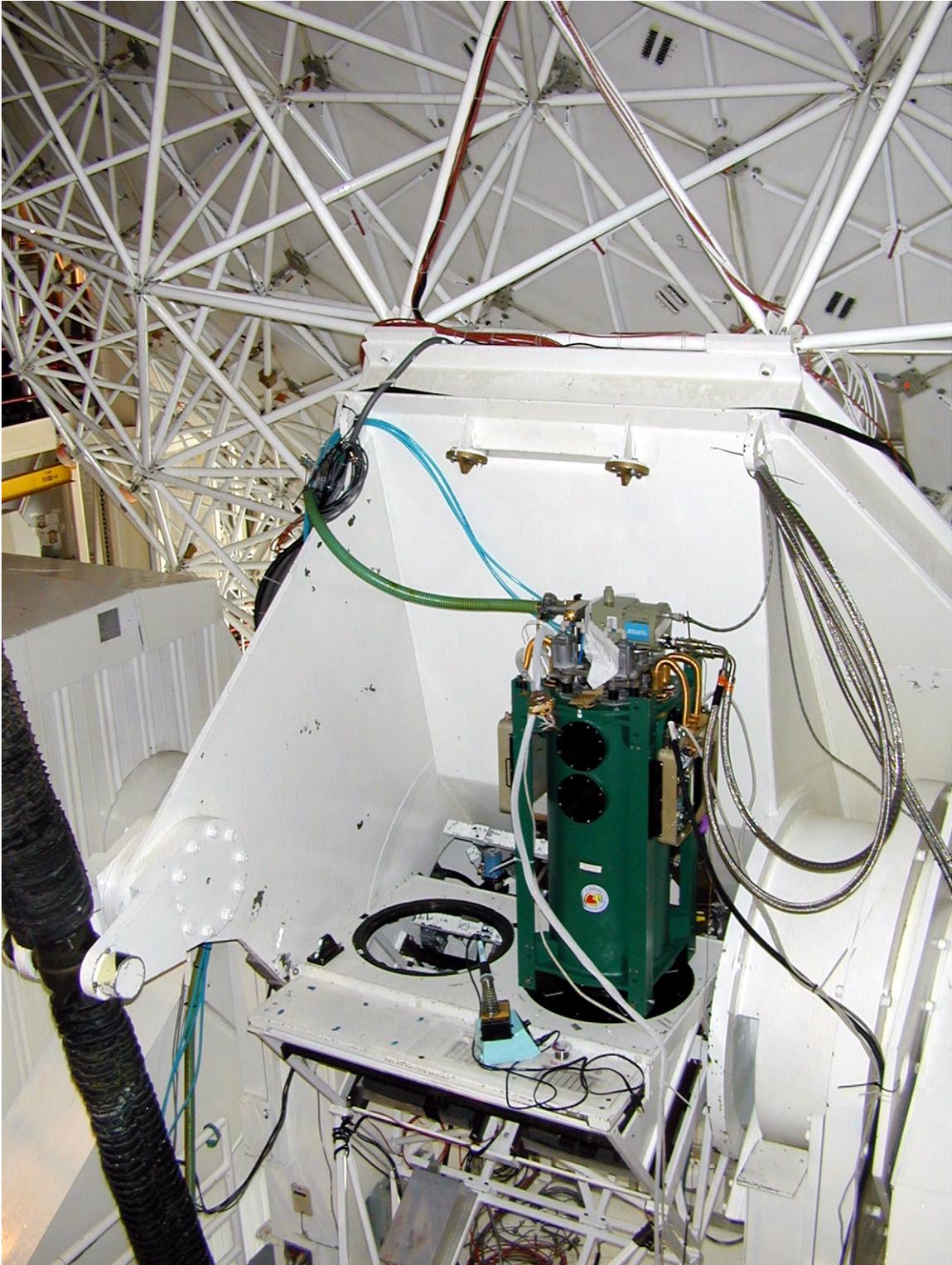


Figure 1. FIBRE in place on the Cassegrain relay focus of the Caltech Submillimeter Observatory on Mauna Kea, Hawai'i.

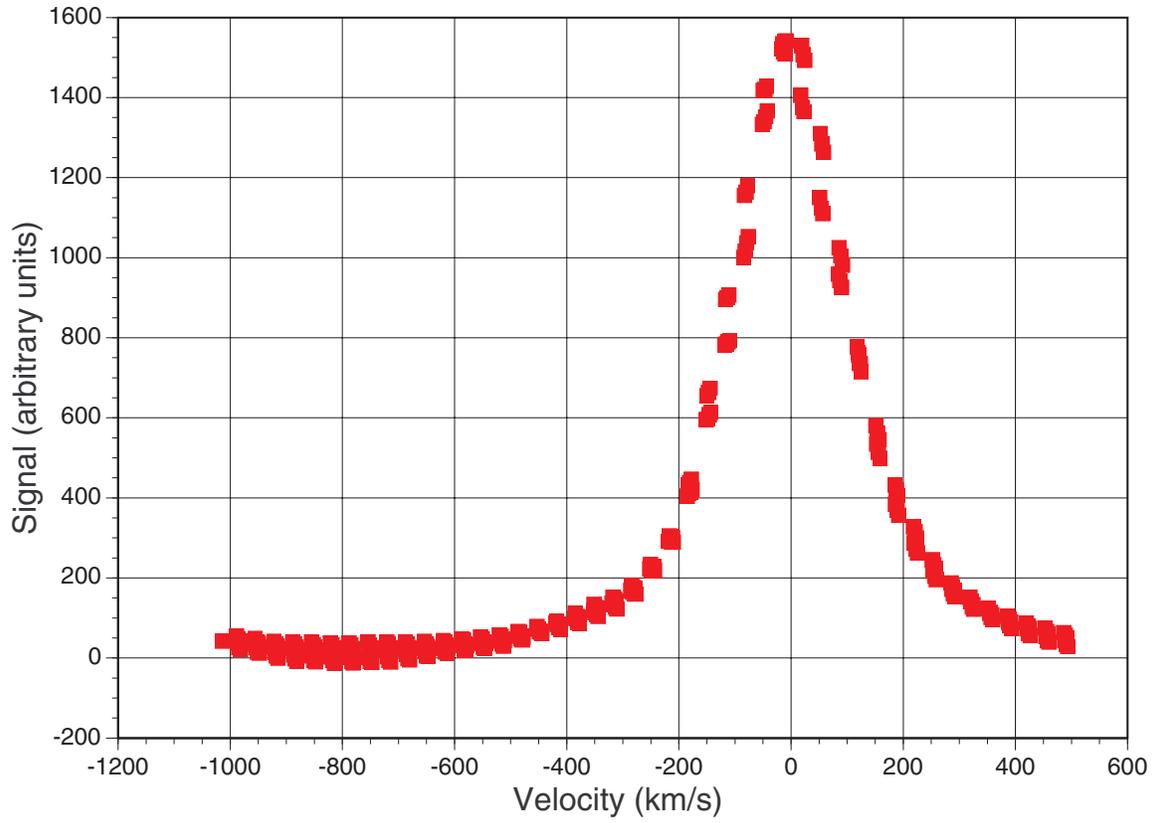


Figure 2. Spectrum of a local oscillator source operating at 807GHz (372 $\mu$ m) as seen by FIBRE, calibrated in velocity units.

## FIBRE Observation of the Moon Limb at $365\mu\text{m}$

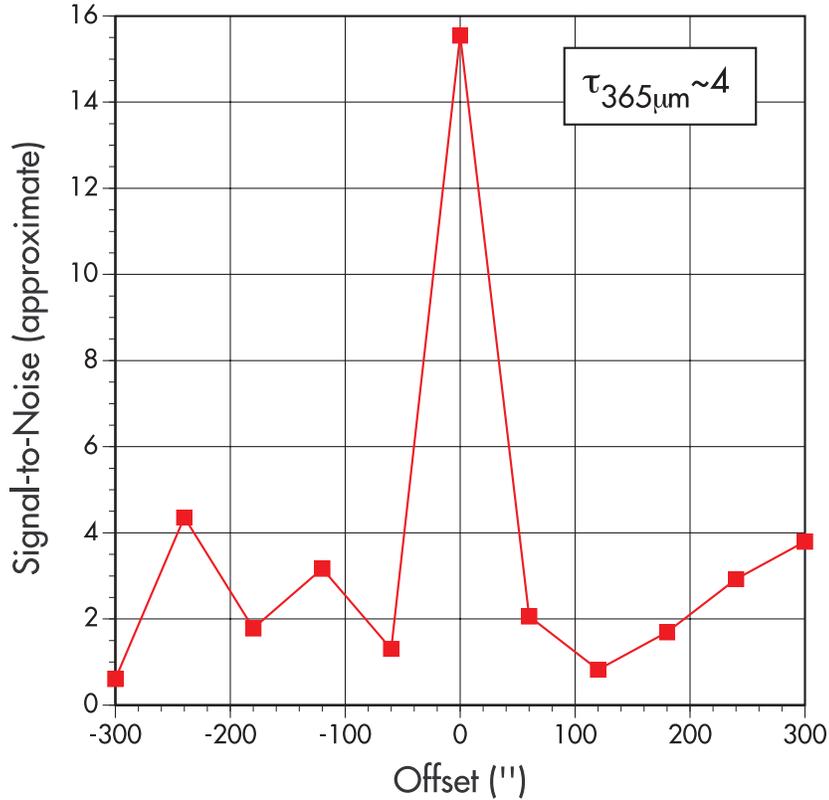


Figure 3. First light observation of the limb of the Moon, detected when the atmospheric transmission was about 1%. The signal measured is chopped in the offset direction to yield a signal only when crossing the Moon limb. Each point contains 3.5s of data on source.