



SCUBA-2 Spectrometer Project

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Minutes from Preliminary SCUBA-2 Spectrometer Selection Discussion

Aug. 23rd 2002, Hilton Waikoloa

Attendees: Gary Davis, Brad Gom, Wayne Holland, David Naylor, Ian Robson

There was general discussion of the issues with the various spectrometer options. In summary:

Grating Spectrometer

- not an attractive option due to poor throughput, large grating size, and insufficient science drivers

Internal FP

- the only available space in the SCUBA cryostat is immediately inside the entrance window
- possible issues due to f/6 (?) beam at the proposed location
- necessarily a single FP. Dual band may be impossible
- must be manually removed from SCUBA system when not in use; risky and time consuming
- attractive only from a raw sensitivity standpoint

External FP

- emissivity of extra windows may negate sensitivity advantage, although this needs modeling
- tight space between entrance window and 1st mirror (~0.5m)
- possible issues due to f/6 (?) beam at entrance window
- potential to locate instrument in beam next to main telescope bearing, although space is at a premium in cabin
- there was question as to whether the reflectors could be made large enough to encompass the beam diameter at a convenient mounting location. Is Peter Ade's limit 180mm diameter?
- resolution is high, but may not be useful. high FP resolution not necessarily an advantage over SCUBA-2/HARP combination
- more attractive than internal FP due to self-contained nature

FTS

- beam size currently limited to ~180mm diameter by beam dividers, roughly 1/4 SCUBA-2 beam
- mounting may be an issue as Nasmyth platform not steady enough, and current budget did not include framework modifications
- there may be large complexities depending on what observing modes are used
- may be much easier to interface with SCUBA-2 optics than an FP system
- attractive from scientific, hardware complexity, and optical interface standpoints

A first stab was also made at the science drivers:

Grating

- only useful as a "high-Z engine"

FP

- same science goals as SPIFI; photo-dissociation regions, extended line sources (mostly 450 um), hot dense cores, galactic cores, etc.
- continuum measurements are not feasible

FTS

- spectral index measurements across full/both bands
- spectral index measurements across full molecular clouds for example
- easy continuum measurements
- easily tunable resolution

The general consensus was that an FTS should be the baseline design, unless new science drivers were brought forth from the observing community.

Action Items:

- **WSH** to provide current optics diagrams of potential spectrometer locations
- **DAN** and **BGG** will do noise/sensitivity calculations for FTS-based system, and contact SPIFI group for their input to the FP noise/sensitivity calculations. Once these numbers are filled in, a condensed version of the selection matrix will be distributed to the observing community for input to the science goals.