Building SOFIA's Instrument Roadmap: Day 2

SOFIA
Stratospheric Observatory for Infrared Astronomy

NASA DLR USRA DSI

(from J. Jackson's talk) Identified Gaps

- Mid to High-resolution 30 to 60 μm spectroscopy/imaging
- Mapping speed for existing instruments
- Wavelength coverage for existing instruments
- Sensitivity at some key wavelengths
- Line Polarimetry

What we heard from the science community

BASIC STATISTICS	MINIMUM	MAXIMUM	MEDIAN	MEAN	STANDARD DEVIATION
Medium spectral resolution (R>1000) at 50-120 microns	1.00	4.00	2.00	2.22	0.92
Extending GREAT's wavelength coverage	1.00	8.00	3.00	3.75	2.35
Medium spectral resolution (R>1000) at 5-40 microns	3.00	5.00	4.00	4.00	0.53
Improved sensitivity at 50-350 microns	1.00	11.00	3.00	4.09	3.06
High spectral resolution (R>10^5) at 50-120 microns	1.00	7.00	5.00	4.13	2.26
Improved sensitivity at 5-40 microns	1.00	9.00	3.50	4.38	2.83
Faster mapping capabilities at 50-250 microns	2.00	10.00	4.00	4.44	2.27
5-40 microns polarimetry	1.00	8.00	5.00	4.86	3.00
Improved jitter	3.00	12.00	4.00	5.75	3.70
Covering the 40-50 microns region	1.00	11.00	6.00	5.80	3.19
Faster mapping capabilities at >250 microns	3.00	10.00	6.00	6.33	2.56
Other (please specify in question 6)	10.00	10.00	10.00	10.00	0.00

What we heard from the science community

- “It is a "must" that SOFIA instruments get upgraded. Otherwise, what are these arguments about SOFIA's upgrade advantage over satellites worth? “, “With aging instruments, new detector development is essential. “
- “Worry about trying to do too much with one instrument and increasing the complexity. We do not need a Swiss Army Knife instrument but an instrument that can get flying faster. “
- “My concern is that with limited observing time, SOFIA will spread itself to thinly across many science areas, along potentially new ones to draw a bigger audience, without being able to complete projects or go for depth of study.”

Strong emphasis on spectral resolution: how does that compete with development/improvement of faster imaging of low res instruments (FIFI-LS++/ larger HAWC) ?

Considerations on timelines and operations

- Strategies for the (tight) roadmap timeline: common dewar, onsite development (FIFI+LS), other?
- How to minimize impact of development / commission on operations and science productivity
- New instrument scheme can imply development and integration optics / spectrometers (gratings / filters) - where could this effort come from?

Workshop 1 Themes

Science Case	Capability
Disk Masses	HD line at 112 μm
ISM/disk diagnostics	High-res MIR/FIR spectroscopy (hydrides, Si II, H_2O)
Disk/Solar System Ices + solids	Med-res MIR spectroscopy (ice features)
Star Formation/ISM	High-res FIR spectral imaging (C II, O I, O III…)
Galaxies/Star Formation B-field	MIR and FIR polarimetry
Stars/Novae/Supernovae	Monitoring/Photometry/Imaging
Galaxies ISM	Med-res spectroscopy (C II, O I, O III…)
Galactic Center	Imaging, spectroscopy, polarimetry
Solar System/Comets gas	Med-res and High-res spectroscopy, imaging