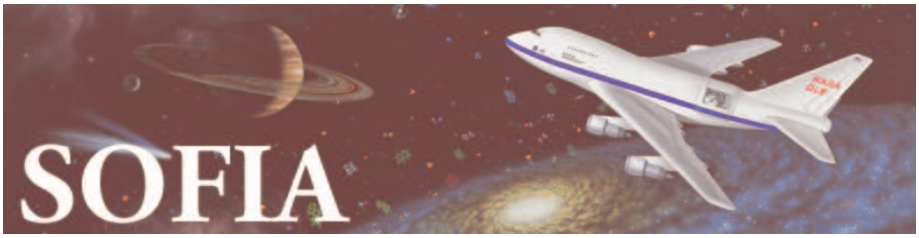
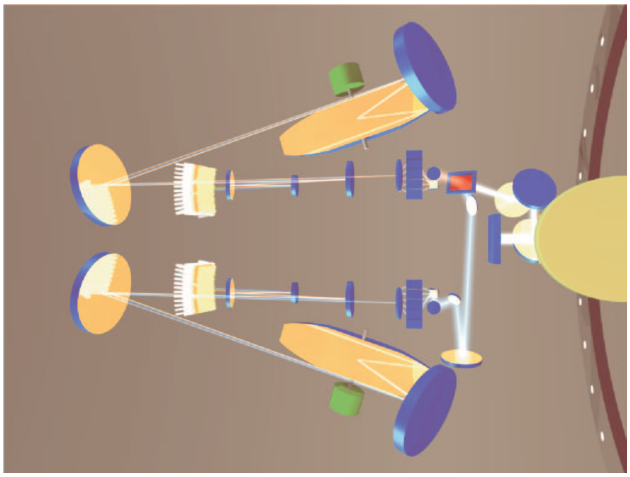
Far-Infrared Field-Imaging Line Spectrometer (FIFI LS) for SOFIA

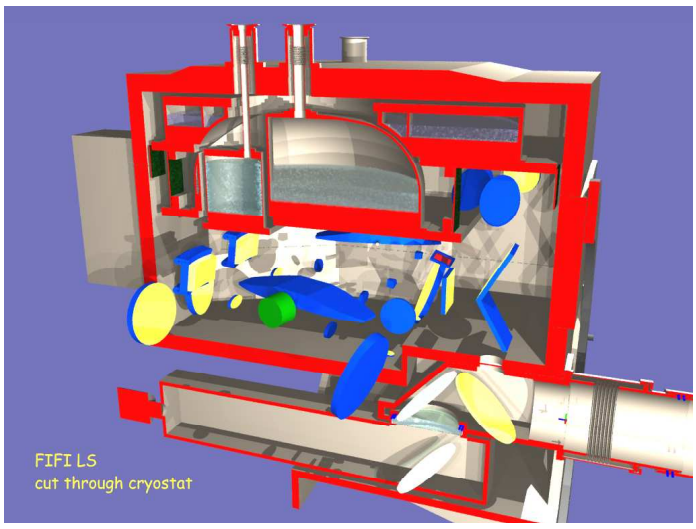
FIFI LS (the Field-Imaging Far-Infrared Line Spectrometer) will utilize the unprecedented high angular resolution and sensitivity of the joint DLR/NASA airborne observatory SOFIA (the Stratospheric Observatory for Infrared Astronomy) to address many key questions in modern astronomy. As a state-of-the-art astronomical instrument, FIFI LS will enable simultaneous observations in two separate bands **Blue (42-110 μm)** and **Red (110-210 μm)** and instantaneous 3D imaging--- 2D spatially and 1D spectrally. With first flights scheduled for 2004, FIFI LS will also allow for pre-observations of some of the targets for our similar instrument for Herschel – PACS, which is scheduled for launch in 2007 (see PACS abstract).





FIFI LS employs a novel, reflective image slicer optical design that optically rearranges the 5×5 pixel field of view into a pseudo-slit of 25×1 pixels which is then dispersed via a Littrow mounted spectrometer. As shown on left, the two spectrometer channels (red on top, blue on bottom) are virtually autonomous, allowing contemporaneous observing in the two wavelength channels.

As shown on right, the vacuum vessel of FIFI LS uses three cryogen vessels for cooling of the optics and detectors (see the Ge:Ga abstract). As can be seen in both Figures, FIFI LS utilizes two reflective gratings in the spectrometers that will provide moderate resolution (R~2000) integral field imaging of the scientific targets.



		Blue	Red
Wavelength		42-110 μm	110-210 μm
Detector Type (photoconductor)		Ge:Ga	Stressed Ge:Ga
Spatial Pixels		5×5	5×5
Spectral Pixels		16	16
Pixel Size		6″	12″
Field of View		30″×30″	60″×60″
Velocity Resolution		150-300 km/s	150-300 km/s
Line Sensitivity (5s in 1hr)	50 μm	5.5×10^{-17} W/m^2	----
	100 μm	3.5×10^{-17} W/m^2	----
	150 μm	----	2.2×10^{-17} W/m^2
	200 μm	----	1.4×10^{-17} W/m^2

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