The SPICA MCS

(Mid-infrared Camera and Spectrometer)

Instrument

MCS : Instrument Overview

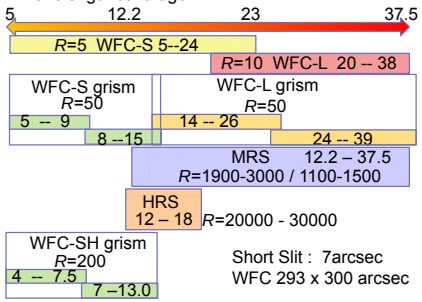
5 -- 38μm Camera and Spectrometer

- WFC (Wide Field Camera)
  Imaging + Low resolution Spectroscopy
- MRS (Mid Resolution Spectrograph)
- HRS (High Resolution Spectrograph)

	Imaging + Low resolution Spectroscopy	
Instrument	WFC	
Channel	S	L
Array format	Si:As (2k x 2k)	Si:Sb (1k x 1k)
Wavelength coverage (μm)	5-24	20-38
Filter bands	5-24 μm R=5	20-38 μm R=10
Spectral resolution (λ/Δλ)	5-9,8-15 μm R=50 additional R=200	14-26,24-39 μm R=50
FOV size	293" x 300"	293" x 300"
Slit length x width	Slit less full FOV 7" length slit at FOV edge	Slit less full FOV 7" length slit at FOV edge
Pixel scale ("/pix)	0".146/pix	0".413/pix Update May 2013
Main disperser	grism	grism

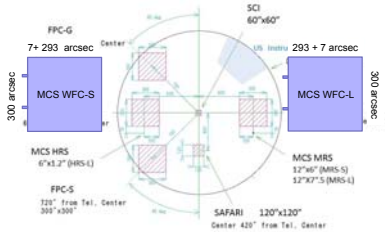
	Spectroscopy		
Instrument	MRS		HRS
Channel	S	L	L
Array format	Si:As (2k x 2k)	Si:Sb (1k x 1k)	Si:As (2k x 2k)
Wavelength coverage (μm)	12.2-23.0	23.0-37.5	12-18
Spectral resolution (λ/Δλ)	2000--3000	1100--1400	20,000-30,000
FOV size	12" x 8"	12" x 8"	
Slit length x width	12" x 1".6 (x 5 slices)	12" x 2".65 (x 3 slices)	6".0 x 1".2
Pixel scale ("/pix)	0".32/pix	0".44/pix	0".48/pix
Main disperser	Grating	Grating	immersion grating

Wavelength coverage

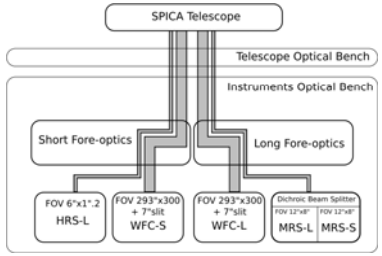


Short Slit : 7arcsec
WFC 293 x 300 arcsec

Focal Plane map



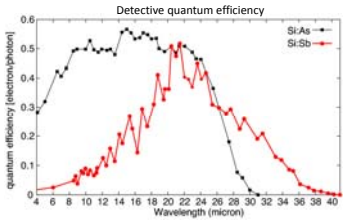
Design: Optical architecture



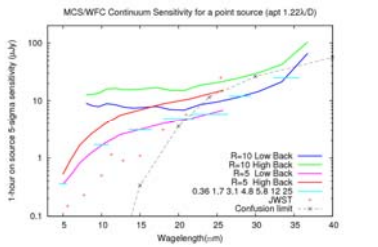
Detectors

- Si:As (Raytheon)
  - BIB crystal : matured
  - Read Out IC : make new 2k x 2k design from 1k x 1k design.
  - Chip Carrier : new design for SPICA
- Si:Sb (DRS)
  - BIB crystal : Optimized - fabricated 6 different dope levels / structures
  - Read Out IC : matured
  - Chip Carrier : new design for SPICA

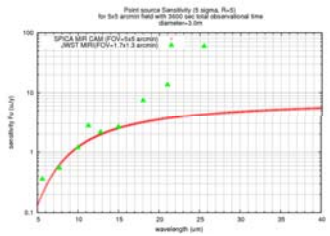
	Si:As	Si:Sb
Format	2048 x 2048	1024 x 1024
Pixel size	25 μm	18 μm
Dark current	0.2 e^-/sec/pix	2 e^-/sec/pix
Readout noise/sample*	40 e^-	100 e^-
Readout noise (Fowler-16)	10 e^-	25 e^-
Well depth	2.5 x 10^5 e^-	1 x 10^5 e^-



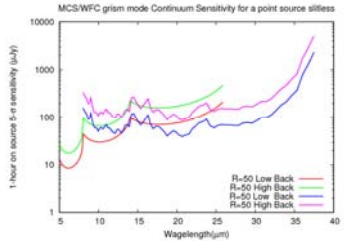
WFC point source sensitivity of imaging 5σ, 1hr



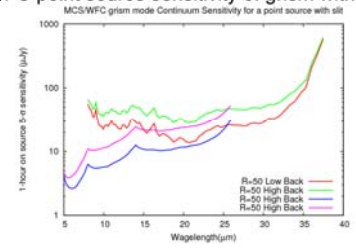
WFC mapping speed



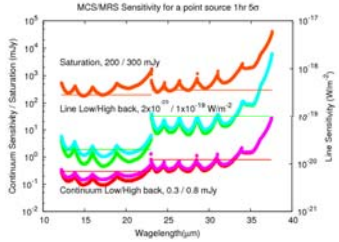
WFC point source sensitivity of grism / slitless



WFC point source sensitivity of grism with slit



MRS point source sensitivity of imaging 5σ, 1hr



WFC point source sensitivity of imaging 5σ, 1hr