STIS Spectroscopic Modes

Grating/ Prism	Detector	Wavelength Range (Å)		Resolving Power ($\lambda/\Delta\lambda$)
		Full	per tilt	
First Order Gratings				
G140L	FUV-MAMA	1150-1730	580	934-1440
G140M		1150-1740	55	11,500-17,400
G230L	NUV-MAMA	1570-3180	1610	500-1005
G230M		1640-3175	90	9100-17,500
G230LB	CCD	1685-3175	1380	615-1135
G230MB		1640-3190	155	5550-10,335
G430L		2900-5700	2800	530-1040
G430M		3025-5615	286	5330-10,270
G750L		5240-10270	5030	535-1170
G750M		5450-10200	570	4870-9950
Echelle Gratings				
E140M	FUV-MAMA	1150-1700	550	45,800
E140H		1150-1700	210	114,000
E230M	NUV-MAMA	1575-3100	800	30,000
E230H		1650-3000	267	114,000
PRISM				
PRISM	NUV-MAMA	1150-3000	1950	2500 - 10

Fixing STIS Slit Angle on the Sky

The STIS long slit is approximately aligned with the detector's AXIS2, i.e., it is perpendicular to the dispersion axis (AXIS1). If you want the long slit to be oriented at a position angle θ on the sky, where θ is measured in degrees east of north, then the ORIENT special requirement parameter in your Phase 2 APT file should be set to θ+45 or θ+225 degrees.

STIS CCD Imaging Filters

Filter Name	Filter Description	Central Wavelength (Å)	FWHM (Å)	FOV (arcsec)^2
50CCD	unfiltered CCD	5754	4333	52 x 52
F28X50LP	longpass > 5500 Å	7222	2692	28 x 52
F28X50OII	[O II]	3738	57	28 x 52
F28X50OIII	[O III]	5006*	6.2*	28 x 52
F25ND3	ND = 2 x 10^{-3}	6331	4675	25 x 25
F25ND5	ND = 10^{-5}	7022	4704	25 x 25

*Value excludes contribution of red leak

Supported STIS Apertures

Aperture	Peakup	Throughput	Comment
Supported Long Slits for First Order Gratings			
52X0.05	yes	31-51%	2 pixel resolution with MAMA
52X0.1	yes	50-75%	2 pixel resolution with the CCD
52X0.2	no	65-87%	Good throughput and spectral purity
52X0.5	no	83-93%	Good point source spectrophotometry
52X2	no	97-99%	Best point source spectrophotometry
52X0.2F1	no	65-87%	Places source behind occulting bar

Note: Appending E1 to the 52X* aperture names above positions the target closer to the readout of the CCD, allowing for reduced CTI losses.

Supported Apertures for Echelle Gratings			
0.2X0.06	yes	35-59%	2 pixel resolution for E140M, E230M
0.2X0.09	yes	42-69%	2 pixel resolution for E140M, E230M
0.2X0.2	no	54-78%	Good throughput and spectral purity.
6X0.2	no	66-84%	For emission lines; order overlap.
0.1X0.03	2-stage	20-37%	Best spectral resolution
0.2X0.06FP	yes	38-64%	Mitigate fixed pattern noise
0.2X0.2FP	no	55-78%	Mitigate fixed pattern noise
0.2X0.05ND	yes	0.18-0.67%	For bright sources
0.3X0.05ND	yes	0.03-0.07%	For bright sources

STIS FUV Imaging Filters

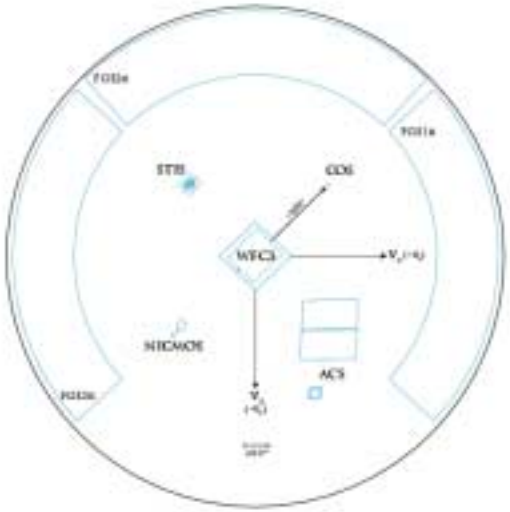
Filter Name	Filter Description	Central Wavelength (Å)	FWHM (Å)	FOV (arcsec)^2
25MAMA	clear	1369	318	25 x 25
F25LYA	Lyman α	1242	142	25 x 25
F25SRF2	longpass > 1275 Å	1453	282	25 x 25
F25QTZ	longpass > 1475 Å	1595	229	25 x 25
F25ND3	ND = 10^{-3}	1371	311	25 x 25
F25ND5	ND = 7 x 10^{-7}	1380	328	25 x 25
F25NDQ	Quad ND filter 10^{-1},10^{-2},10^{-3},10^{-4}	varies	varies	~12 x 12 each

STIS NUV Imaging Filters

Filter Name	Filter Description	Central Wavelength (Å)	FWHM (Å)	FOV (arcsec)^2
F25SRF2	longpass > 1275 Å	2306	1134	25 x 25
F25QTZ	longpass > 1475 Å	2361	995	25 x 25
F25CN182	1800 Å continuum	2007	677	25 x 25
F25CIII	C III narrow band	1991*	166*	25 x 25
F25CN270	2700 Å continuum	2723	288	25 x 25
F25MGII	MG II narrow band	2807*	50*	25 x 25
F25ND3	ND = 10^{-3}	2361	1310	25 x 25
F25ND5	ND = 2 x 10^{-6}	2634	1471	25 x 25
F25NDQ	Quad ND filter 10^{-1},10^{-2},10^{-3},10^{-4}	varies	varies	~12 x 12 each

*Values exclude contributions from red leak.

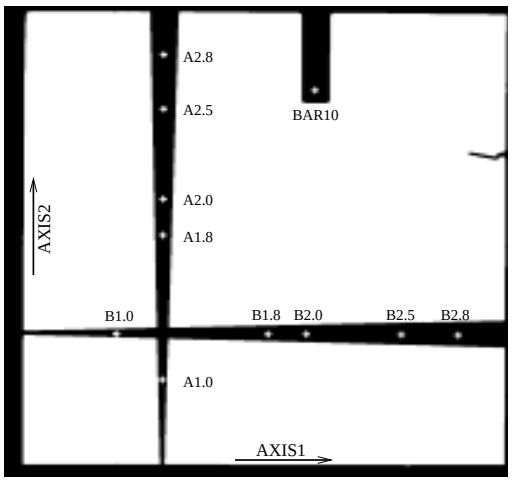
HST Field of View



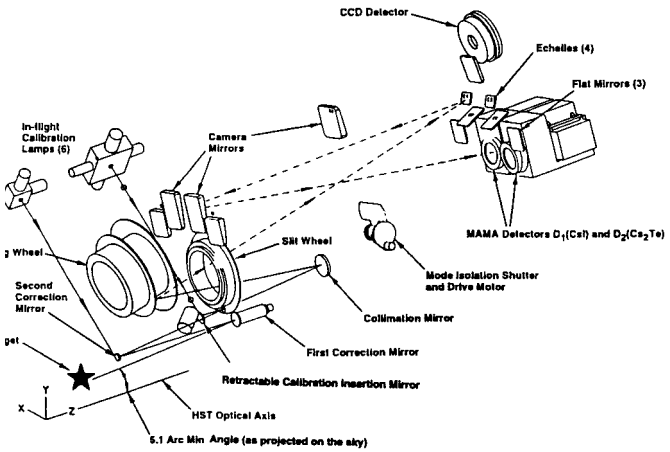
STIS Coronography

Each of the 52" STIS apertures has two occulting bars. Appending F1 or F2 to the aperture name will position the target at the 0.5" or 0.86" wide bars. Only the 52X0.2F1 position is fully supported.

STIS has a single coronagraphic mask aperture for direct unfiltered CCD imaging. This aperture contains one occulting bar and two wedges that vary in width from 0.5 to 3.0 arcsec over their 50 arcsec length.



STIS Optical Components



STIS History

STIS was installed in HST on February 14, 1997. The Side-1 electronics failed on May 16, 2001, but STIS continued operations using the redundant Side-2 electronics until August 3, 2004, when a power supply on Side-2 failed and rendered STIS unusable for scientific operations.

Since the Side-2 failure, STIS has been in safe mode; the instrument is switched off, but the heaters are on to ensure a healthy and stable thermal environment.

During its period of operations, STIS provided scientists with spectra and images at ultraviolet and visible wavelengths, probing the Universe from our solar system out to cosmological distances. The UV echelles allowed observations with very high spectral resolution, while the first order spectral modes combined with long slits allowed very high spatial resolution observations of extended objects at wavelengths ranging from the far-UV to the near-IR.

The current plan for the next servicing mission to HST includes an attempt to repair STIS. We expect the unique capabilities of a repaired STIS will ensure that, after SM4, it will once again be used to carry out a very substantial part of the HST observing program.

STIS

Space Telescope Imaging Spectrograph

FUV MAMA

- 1024 × 1024 cesium iodide detector
- Sensitive from 1150 to 1700 Å
- 25″ × 25″ field of view with 0.025″ pixels
- first order and echelle gratings plus imaging filters

NUV MAMA

- 1024 × 1024 cesium telluride detector
- Sensitive from 1650 to 3100 Å
- 25″ × 25″ field of view with 0.025″ pixels
- first order and echelle gratings and imaging filters

CCD

- 1024 × 1024 SITE CCD detector
- Sensitive from 1640 to 10,740 Å
- 52″× 52″ field of view with 0.051″ pixels
- Can be used with coronographic mask and aperture bars

Coronagraphy

- Coronagraphic imaging from 2000–10,300 Å
- Bar-occulted spectroscopy from 1150-10,300 Å

The Space Telescope Imaging Spectrograph was built through a collaborative effort between Ball Aerospace & Goddard Space Flight Center. STIS was installed on the Hubble Space Telescope (HST) during servicing mission SM2 in 1997 and operated until 2004. An attempt to repair STIS and restore it to scientific operations is being planned for the next HST servicing mission SM4 in late 2008.

The STIS principal investigator is Bruce Woodgate (GSFC).

SPACE TELESCOPE SCIENCE INSTITUTE
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