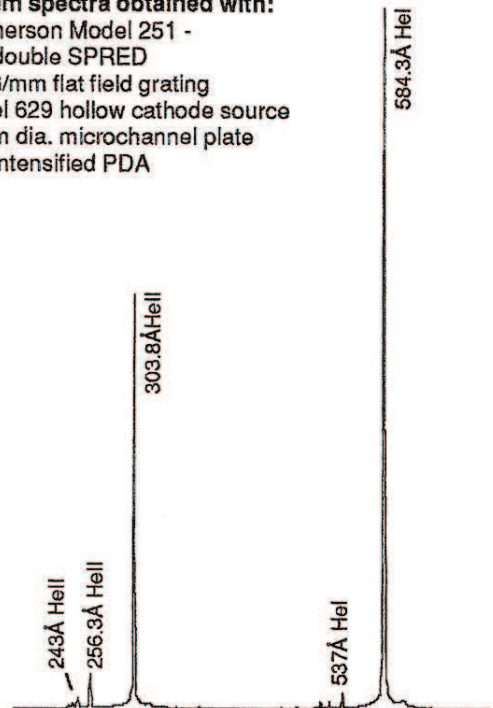
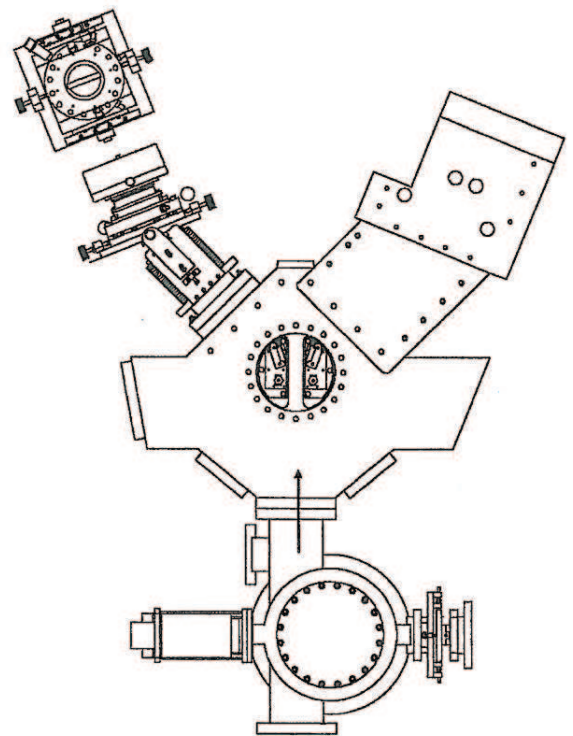


Helium spectra obtained with:
McPherson Model 251 -
double SPRED
450G/mm flat field grating
Model 629 hollow cathode source
52mm dia. microchannel plate
intensified PDA

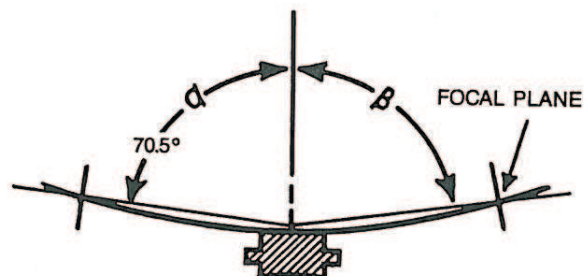
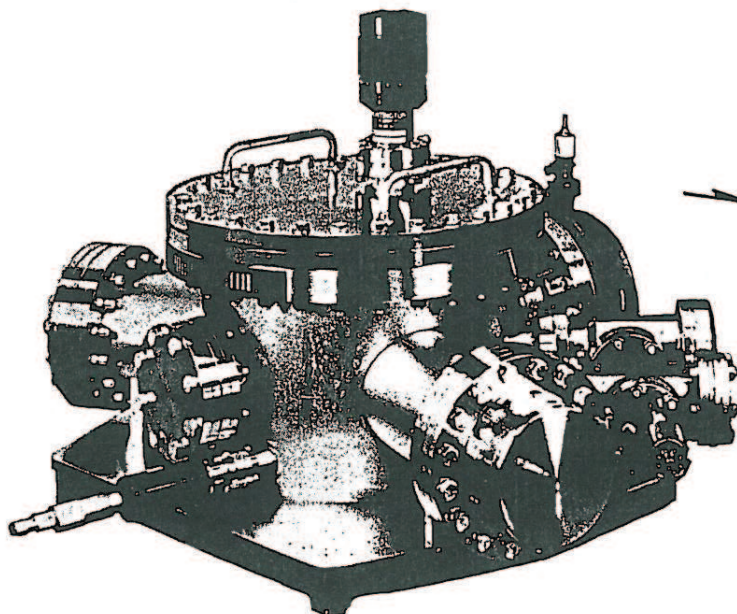


**Features of the model 251M2 double SPRED
dual spectrograph:**

1. Triple input entrance assembly:
 - a. fixed slits are provided for the two installed gratings of the double SPRED
 - b. a clear line of sight aperture to provide energy to the optionally mountable grazing incidence spectrometer
2. Equipped with calibration/alignment chamber, permitting:
 - a. laser alignment of either installed grating or of third instrument port (straight through) used for a grazing incidence spectrometer
 - b. calibration lamp mounted for calibration of both gratings and grazing incidence unit
3. Two flat field ion etched toroidal gratings:
 - a. 2105G/mm for coverage of the 120Å to 410Å range
 - b. 450G/mm for coverage of the 300Å to 1615Å range
4. Two 52mm diameter microchannel plates with 50mm output for two 2048 pixel diode array camera detection systems - simultaneous rapid detection of events
5. All metal sealed UHV construction with complete thermal and neutron shielding



Model 251M2 shown with calibration/alignment chamber and with one half of the detector neutron shielding removed to expose a single MCP/PDA assembly



Grazing Incidence: A Rowland Circle Mount with a wavelength range of 100 to 1700 Å.

*SPRED: A MULTICHANNEL GRAZING INCIDENCE SPECTROMETER FOR PLASMA IMPURITY DIAGNOSIS

- Designed for easy coupling to flat detector arrays
- Unique multi-grating mounts for remote interchange
- Aberration-corrected toroidal gratings, ion etched
- Available as complete spectrometer system, with MCP-fiber transfer-diode detectors
- UHV capability, 2×10^{-9} torr
- Antimagnetic construction
- Operates in any orientation
- Flat field permits rapid VUV spectral region surveys
- Accepted worldwide

Entrance Focal Length	292 mm		
Exit Focal Length	326 mm (nominal)		
Angle between entrance and exit beams	137° (nominal)		
Grating, G/mm	2105	450	290
Wavelength range at focal plane, Å*	102-311 Å*	104-1066 Å*	162-1655 Å*
Dispersion, Å/pixel based on a 1,024-element, 25mm wide, diode array (as influenced by focusing conditions)	0.275 @ 102 Å 0.299 @ 203 Å 0.316 @ 311 Å	1.00 @ 104 Å 1.10 @ 568 Å 1.17 @ 1066 Å	1.44 @ 162 Å 1.58 @ 880 Å 1.16 @ 1655 Å
Resolution, FWHM, Å**	0.5	1	1.6
Grating area used, H x W, mm	3 x 13	3 x 21	3 x 21
Focal plane width, mm	40	40	40

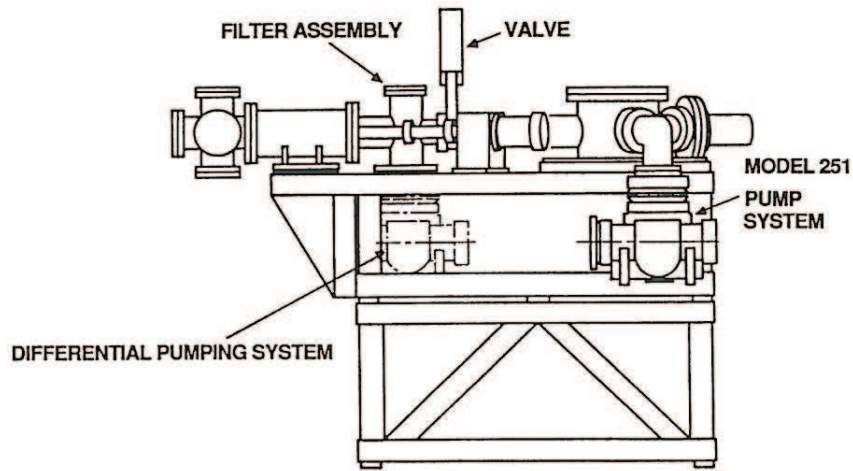
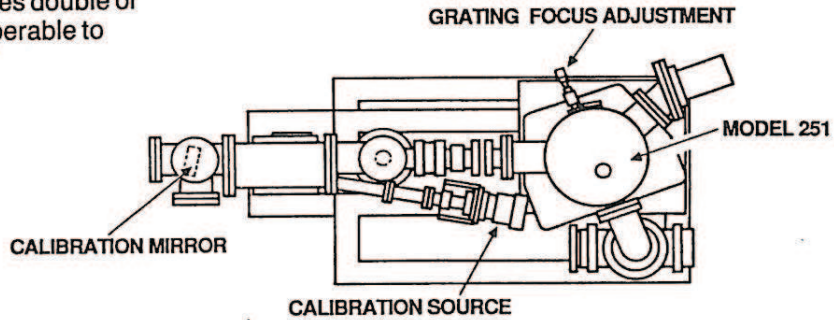
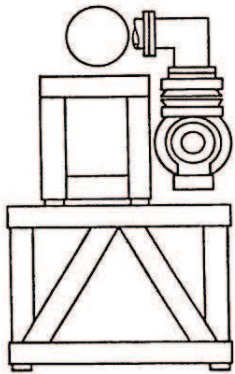
* Average interception range after MCP/FO reducer/FDP interface.

** With entrance slit 2 mm H x 25 μm W.

** At front face of MCP (pixels on PDA determine subsequent resolution)

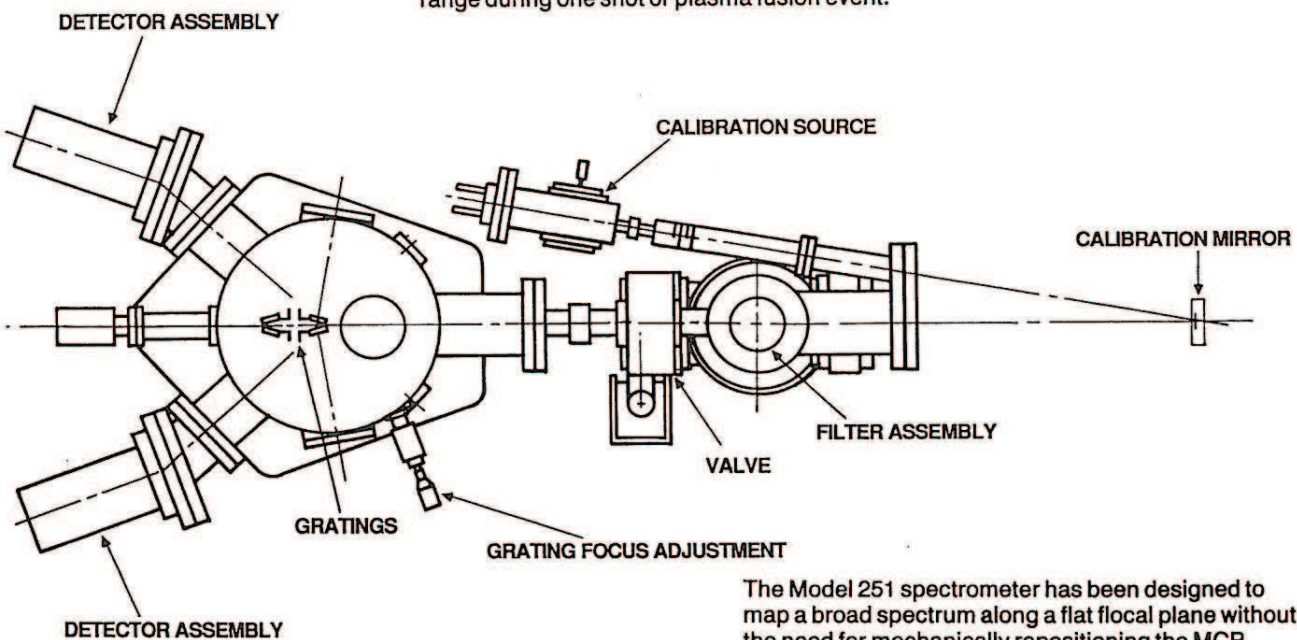
UHV Diagnostic Spectrometer features double or quadruple grating turrets remotely operable to cover a wide VUV/XUV range.

Model 251
with 'Y' Branch Focusing



Model 251M Double Beam
Simultaneously Cover Two
Spectral Ranges

The Model 251M features two gratings that are permanently in position. Two high speed MCP/PDA detectors cover a broader spectral range during one shot or plasma fusion event.



The Model 251 spectrometer has been designed to map a broad spectrum along a flat focal plane without the need for mechanically repositioning the MCP.