IRD
Advancing the UV/EUV Measurement Science

Home

Photodiode Selection

2011 Downloadable Brochure (3.6 MB)

AXUV Series

100% Internal Quantum Efficiency in the UV/EUV

AXUV Information

Standard Products
Operating Principles
Applications
Electron Detectors
Ion Detectors
Quantum Efficiency
Stability
Absolute X-Ray Detectors

AXUV Products

Single Element (Absolute Devices Transfer Standards)
Quadrant/Position Sensing
Arrays (Linear)
Arrays (Concentric)
Arrays (2 Dimensional)
Split Geometries
High Speed
Directly Deposited Filters
Electron Detectors
Transmission Detectors

UVG Series

100% Internal Quantum Efficiency and Improved Stability in the UV

UVG Information

Standard Products
Operating Principles
Radiation Hardness

Quantum Yield
Responsivity
Linearity
Uniformity
Responsivity
Stability
Performance Characteristics

UVG Products

Single Element
Quadrant/ Position Sensing
High Speed

SXUV Series

Hundred of gigarads of radiation hardness; no degradation on exposure to 100 eV photons

SXUV Information

International Radiation Detectors, Inc.

Radiometric Characterization

The UV to IR Spectral Comparator Facility (SCF) is a monochromater based system that can measure the absolute spectral responsivity and spectral reflectance of photodiodes in the 200 nm 3000 nm spectral region. The SCF operates from 200 to 1100 nm using silicon photodiodes as working standards and from 1000 to 3000 nm using a lead sulfide photodiode as a working standard. The silicon working standards are IRD photodiodes which have been calibrated at NIST. The PbS photodiode was obtained from Optronic Labs and has NIST traceable calibration.

Owing to their nitrided oxides and lack of surface defects, IRD silicon working standards have superior lifetime stability over their operational lifetimes, with less than 0.8% variation observed in responsivity and quantum efficiency over 24 months of usage. Semi-annual calibrations of the working standard against a correlating primary standard establish confidence in measurement accuracy.

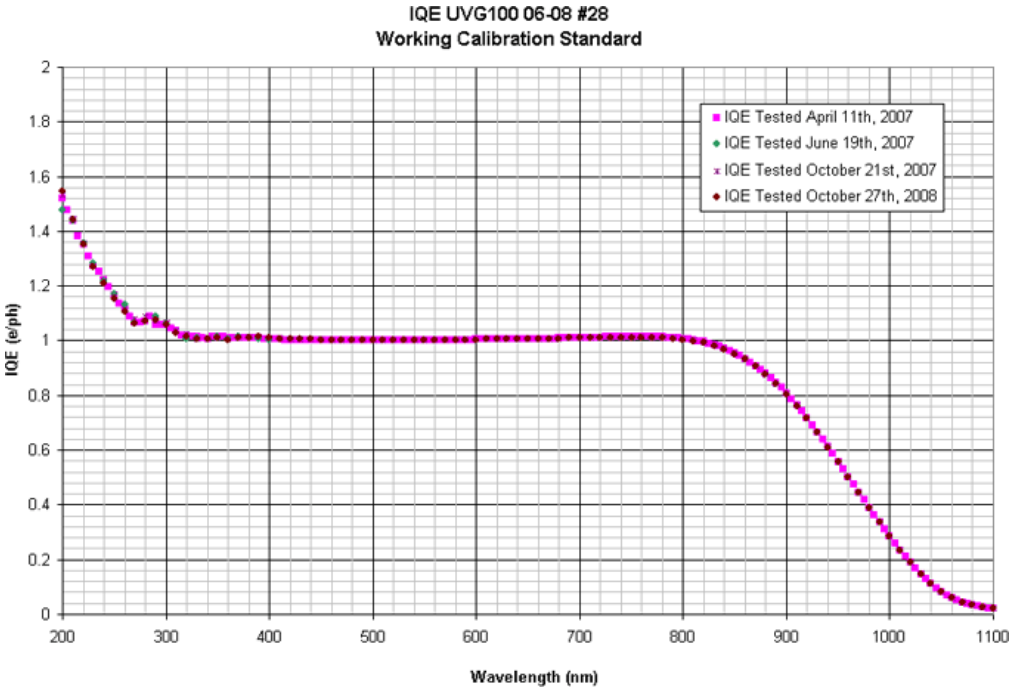
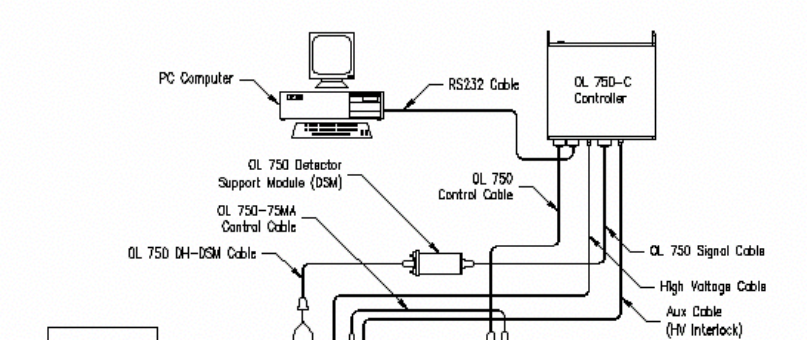


Figure 1: Internal quantum efficiency of UVG100 working standard at various times

The SCF uses an Optronic Labs Series 750-M-D double monochromater with automated computer-controlled tri-grating mounts. It has an effective aperture of f/4 and a focal length of 254 mm. The optical design is shown in Figure 1. The source consists of both a Deuterium arc lamp and a quarts-halogen lamp. The deuterium lamp has an effective wavelength range of 200 nm to 400 nm and the quartz-halogen has a wavelength range of 330 nm to 3000 nm. An 11 position filter wheel is located at the exit port of the monochromater to effectively block second order harmonics of the selected wavelength. An AC lock in signal detection system with automated variable frequency optical chopper is built into the monochromater at the entrance port. User interchangeable fixed slits are used for selection of bandwidth and signal level. The use of fixed slits ensures the highest degree of accuracy and repeatability. The wavelength drive is a precision worm gear coupled directly to a stepper motor via a pre load coupling eliminating gear backlash. This provides for a wavelength accuracy of +/- .05% and precision of +/- .01%.



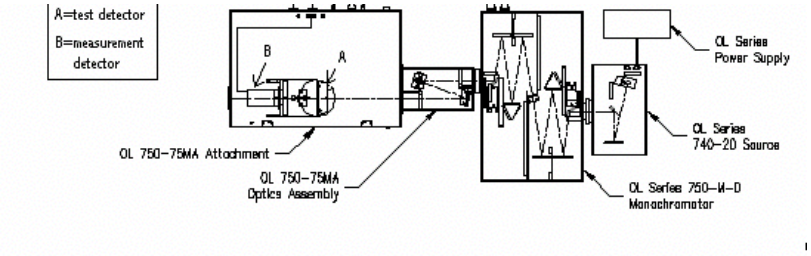


Figure 2: IRD Spectral Comparator Facility

The OL 750-M-D is coupled to the OL 750-75MA through a focusing optic assembly. The OL 750-75MA consists of a rotating stage where the detector under test is mounted and a rotating arm in which the reflectometer photodiode is mounted and can rotate independently around the stage. Reflectance measurements can be made from 0 deg. to 60 deg.

The following characterizations can also be performed at IRD facilities:

- Photodiode linearity using the ac-dc method
- Photodiode responsivity uniformity
- Photodiode temperature dependence of responsivity
- Photodiode temperature dependence of shunt resistance
- Photodiode temperature dependence of capacitance

Return to Main Page

IRD *Delivering Unparalleled Performance*