Comparison of Calibrations performed at MLS/PTB and SURF III/NIST based on the XRS Rocket Instrument

Concept

Since the thorough characterization of this instrument will take a significant amount of time, should we explore the possibility of seeking external funding. Should we write a proposal?

In discussions between LASP, NIST, and PTB scientists it was determined that the most useful approach to a cross calibration would be using a flight instrument as the transfer standard. LASP offered that we could modify the XRS rocket instrument slightly for this purpose. The X-Ray Sensor (XRS) was developed as part of the GOES-R Series Extreme Ultraviolet and X-ray Irradiance Sensors (EXIS) instrument.

The instrument used in this calibration will have

- At least four channels based on "classic" AXUV photodiodes (manufactured before Raj Korde sold the company)
- Quad diode for alignment
- Lyman alpha filter (121.1 nm) - the source of this filter will have to be determined
- 130 nm filter
- 476 nm Interference filter to match previous calibrations
- Double Metal filters – Al, Be, Zr (holes). Al filters should have a protective layer of carbon on both sides
- Apertures
- On-board preamplifiers

Need to work out the interface between the instrument and the MLS data computer

- Serial link like XRS has now
- Current output
- counts output

The characterization of the instrument will be based on measurements with both monochromatic and undispersed synchrotron radiation.

Qualification of components

Uwe Arp at NIST has the ability perform spatial scanning of photodiodes in the air-uv (200 nm - 400 nm), which is generally sufficient to qualify AXUV diodes. Scanning spatial uniformity of photodiodes at wavelengths shorter than 300 nm is generally not advisable, as they deteriorate quickly.

Metal filters and interference filters should becharacterized prior to instrument assembly. Beamline 3, the former X24C or NRL beamline, covers this wavelength range. We will have to discuss this with Rob Vest and Charlie Tarrio.

ANDREW: Please provide some information on the XRS Rocket Instrument