NASA SBIR 2004 Phase I Solicitation

S1.06  UV and EUV Optics

Lead Center: GSFC

Participating Center(s): MSFC

From the Sun's atmosphere to the Earth's aurora, remote imaging, spectroscopy, and polarimetry at ultraviolet (UV) and extreme ultraviolet (EUV) wavelengths are important tools for studying the Sun-Earth connection. A far ultraviolet (FUV) range is sometimes interposed between UV and EUV, but the terminology is arbitrary: the pertinent full range of wavelength is approximately 20–300 nm.

Proposals should explain specifically how they intend to advance the state-of-the-art in one or more of the following areas.

**Imaging Mirrors**

- Large aperture: 1–4 m
- Low mass: 5–20 kg m\(^{-2}\)
- Accurate figure: \(-0.01\) wave rms or better at 632 nm. Figure accuracy must be maintained through launch and on orbit (including, for mirrors subjected to direct or concentrated solar radiation, the effects of differential heating)
- Low microroughness: \(\sim\)1 nm rms or better on scales below 1 mm.

**Optical Coatings and Transmission Filters**

- Coatings (filters) with improved reflectivity (transmission) and selectivity (narrow bands, broad bands, or edges). Technologies include (but are not limited to) multilayer coatings, transmission gratings, and Fabry-Pérot étalons.
Diffraction Gratings

- High groove density (> 4000 mm$^{-1}$) for high spectral resolving power in conjunction with achievable focal lengths and pixel sizes
- High efficiency and low scatter (microroughness)
- Variable line spacing
- Echelle gratings
- Active gratings (replicated onto deformable surfaces)
- Aspherical concave substrates, such as toroids and ellipsoids

Proposals that address detector requirements of Sun-viewing instruments, such as large format, deep wells, fast readout, or “3-D” (spatial-spatial-energy) resolution, should be submitted to Topic S2.05.