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Poster
Understanding the initiation of solar flares and coronal mass ejections (CMEs) is essential for improving forecasts of extreme space weather. Soft X-ray (SXR) and Extreme Ultraviolet (EUV) observations provide critical diagnostics of the highly dynamic solar corona; however, significant measurement gaps persist despite decades of observations. The Solar Extreme Ultraviolet Spectrograph and High-energy Imager (SEUSHI) is being developed to address these gaps by combining multi-pinhole SXR imaging with grazing-incidence EUV spectroscopy on a shared CMOS sensor. SEUSHI delivers spatially resolved temperature and emission measure maps at 1 arcminute resolution and 5 second cadence to identify Hot Onset Precursor Events (HOPEs), which provide early alerts of flares. Additionally, high-cadence (100 Hz) readouts of selected image rows enable photon-counting spectroscopy over 1–4 keV with ~0.1 keV energy resolution, to investigate elemental abundance evolution in active regions, a key diagnostic of coronal heating. SEUSHI also provides high-resolution EUV spectra measurements across the 17–34 nm range with ~0.2 nm spectral resolution for studies of coronal dimming and generation of early alerts for Earth-directed CMEs. SEUSHI is designed with low power, mass, and volume requirements, making it suitable for small satellite platforms. A technology demonstration version of SEUSHI is currently under development for flight aboard the Solar Dynamics Observatory Extreme Ultraviolet Variability Experiment calibration sounding rocket. This poster presents the instrument design, development, and calibration. Successful demonstration on the sounding rocket platform is an important step towards the opportunity to fly SEUSHI on future satellite missions and thus to improve space weather operations.


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