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Impurity Monitoring on NSTX-U with Three New Extreme Ultraviolet Spectrometers[1] M.E. WELLER, P. BEIERSDORFER, V.A. SOUKHANOVSKII, E.W. MAGEE, T.D. ROGNLIEN, LLNL, B.C. STRATTON, PPPL — The National Spherical Torus Experiment – Upgrade (NSTX-U) is a significant advancement from NSTX offering increased toroidal field, plasma current, and neutral beam injector input power. Due to these improvements generating more intense plasma conditions, impurities penetrating into the core could also be enhanced, despite efforts to improve wall conditioning (bake out, boronization, and lithium evaporation). To monitor and study these impurities, three extreme ultraviolet (EUV) spectrometers have been implemented on NSTX-U. All three are flat field grazing incident spectrometers capable of capturing time-resolved data to about 5.0 ms. Two of the spectrometers, the X-ray and Extreme Ultraviolet Spectrometer (XEUS, 5 – 65 Å) the Long-Wavelength and Extreme Ultraviolet Spectrometer (LoWEUS, 190 – 440 Å) were previously implemented on NSTX. The third has been dubbed the Metal Monitor and Lithium Spectrometer Assembly (MonaLisa, 50 – 220 Å). A new laser blow-off (LBO) system has also been developed in conjuncture with the spectrometers to introduce low and high-Z elements to study core impurity transport. The three spectrometers, along with the new LBO system, provide a unique opportunity to attain highly resolved spectra of impurities from 5 – 440 Å with time-resolution.

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Michael Weller
LLNL

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