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Spectroscopic diagnostics and experimental planning for plasma-surface interaction studies in NSTX-U F. SCOTTI, V.A. SOUKHANOVSKII, LLNL, J.P. ALLAIN, F. BEDOYA, UIUC, R. KAITA, A.L. ROQUEMORE, C.H. SKINNER, PPPL — In the mixed-material environment of the NSTX-U first wall, visible imaging diagnostics will be used to study the evolution of the plasma facing component (PFC) surface conditions and the distribution of impurity influxes. Characterizing the dynamic material environment originating from wall conditioning techniques (boronization, lithium evaporation) on graphite PFCs requires simultaneous monitoring of emission from different atomic species. Full poloidal/toroidal coverage of impurity emission is achieved via a combination of bandpass-filtered fast cameras viewing upper and lower PFCs and line-scan cameras. Two image-intensified radiation-hardened cameras expand these capabilities with the ability to image weaker visible lines and a custom-built two-color system for the simultaneous imaging of different wavelengths. Intensified camera views include the lower divertor and a close-up of the surface analysis sample system Material Analysis and Particle Probe (MAPP). Redundant views via multiple cameras and two-color setups will enable a more accurate determination of impurity influxes (via line ratio techniques) and the simultaneous characterization of carbon (chemical/physical), lithium and oxygen influx evolution following lithium and boron wall conditioning. The imaging of MAPP samples will allow comparing the evolution of surface composition determined via surface analysis techniques to visible spectroscopy. Supported by U.S. DOE Contracts: DE-AC02-09CH11466, DE-AC52-07NA27344, DE-SC0010717

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