

Abstract Submitted
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High-k poloidal scattering and FIR tangential interferometer/polarimeter diagnostics on NSTX-U¹ R. BARCHFELD, C.W. DOMIER, C.M. MUSCATELLO, C. ROBERTSON, N.C. LUHMANN, University of California, Davis, R. KAITA, Y. REN, B.C. STRATTON, Princeton Plasma Physics Laboratory — The addition of a 2nd neutral beam injector on NSTX during the current shut-down period necessitates reconfiguration of the toroidal scattering and far-infrared tangential interferometer/polarimeter (FIReTIP) systems. During this shut-down period, the laser systems are undergoing laboratory characterization, maintenance, and upgrade at UC Davis. The 280GHz tangential scattering diagnostic will be reconfigured into a steerable 600GHz poloidal high-k scattering system, providing enhanced fluctuation measurements of radial and poloidal k spectra. The workhorse of the scattering diagnostic consists of a CO₂-pumped FIR laser, whose output provides the probing beam. This laser system is extensively characterized, and a concept for a scattering test target is demonstrated. FIReTIP will be reconfigured as a 3-channel system, employed for core density monitoring/feedback control as well as core/edge fluctuation measurements. Besides the spatial rearrangement of the laser system, optics, and electronics, a significant upgrade to FIReTIP involves modification of its constituent Stark laser, in particular, the shape of its waveguide and electrodes. With the new design, simulations indicate improved mode quality and power output which directly translates to improved FIReTIP signal quality.

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