

Abstract Submitted  
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**Progress on the FIRE TIP Diagnostic on NSTX-U**<sup>1</sup> EVAN SCOTT, ROBERT BARCHFELD, PAUL RIEMENSCHNEIDER, Univ of California - Davis, CHRIS MUSCATELLO, General Atomics, MOHAMMAD SOHRABI, CALVIN DOMIER, Univ of California - Davis, YANG REN, ROBERT KAITA, Princeton Plasma Physics Laboratory, NEVILLE LUHMANN, JR., Univ of California - Davis, NSTX-U TEAM — The Far-infrared Tangential Interferometer/Polarimeter (FIRE TIP) system on NSTX-U at the PPPL aims to provide robust, line-averaged electron density measurements. The system consists of three optically-pumped 119 m methanol lasers, one of which can be tuned via Stark broadening, allowing for uniquely high intermediate frequencies and time resolutions. One of the major goals of FIRE TIP is to incorporate it into the NSTX-U plasma control system (PCS) for real-time plasma density feedback control. The front-end optics mounted to Bay G, which shape and position the beam going into the plasma, and internal retroreflector located near Bay B, which facilitates double-pass measurements, are hard-mounted to the NSTX-U vacuum vessel. Because interferometric density measurements are sensitive to vibrational effects, FIRE TIP has been upgraded to a two-color interferometer system with the inclusion of a 633 nm laser interferometer for the direct measurement of vibrations and a field programmable gate array (FPGA) for the subsequent subtraction of vibrational effects from the density measurement in real-time.

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