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Far Infrared Tangential Interferometry and Polarimetry (FIRETIP) System on the National Spherical Torus Experiment

K.C. Lee, C.W. Domier, M. Johnson, and N.C. Luhmann, Jr.

University of California at Davis, Davis, CA 95616

H. Park

Princeton Plasma Physics Laboratory, Princeton, NJ 08543

Far Infrared Tangential Interferometer/Polarimeter (FIRETIP) system based on three CH₃OH lasers ($\lambda = 119\mu\text{m}$) developed for temporally and radially resolved 2-D electron density profile [$n_e(r,t)$] and toroidal field profile [$B_T(r,t)$] data on the National Spherical Tokamak Experiment (NSTX). A successful application of Stark-tuned laser allowed a significantly higher IF frequency (~ 7 MHz) allowed measurement of fast time scale density and density fluctuations. Extensive work has been performed to isolate the entire system from mechanical vibrations originated from various sources and successfully produced vibration free density measurement. In this paper, a brief summary of the present status and future planning of FIRETIP system will be addressed. A comparison study of the measured electron density with Thomson scattering data during L/H transition will be discussed. Density fluctuations measured during L/H transition by interferometer system that has a potential to address in-out symmetry of the fluctuations will be addressed. Para/diamagnetism was studied via polarimetry part of the FIRETIP and the results are compared with the calculated value using the EFIT equilibrium code.