Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Magnetic Field Measurements in NSTX-U with the MSE-LIF Diagnostic[1] FRED LEVINTON, Nova Photonics, Inc., JILL FOLEY, Twinleaf LLC, DARRELL DICICCO, DAVID CYLINDER, HANNAH LA FLEUR, HOWARD YUH, Nova Photonics, Inc. — The motional Stark effect with laser-induced fluorescence diagnostic (MSE-LIF) was installed on NSTX during the 2011 run year. The MSE-LIF will enable radially resolved measurements of the magnetic field pitch angle and magnitude, both of which can be used to constrain plasma equilibrium reconstructions. A diagnostic neutral beam with low axial energy spread, low divergence, and high reliability has been developed. It operates routinely at 35 kV and 40 mA. A laser has been developed with high power ($\sim$10 W) and optimal linewidth matched to the energy spread of the neutral beam ($\sim$6 GHz). The laser wavelength is near 651 nm for a match to the Doppler-shifted Balmer-alpha transition in the beam neutrals. The unique high-power, moderate linewidth laser system utilizes a 19 emitter diode laser bar and feedback from a volume Bragg grating for line width narrowing. A magnetic shield protects the ion source from the NSTX stray fields. Initial data in a gas-filled torus and low magnetic fields was taken on NSTX. Several improvements have been made to the system during the NSTX upgrade, including adding more spatial channels and several laser improvements.

[1]Supported by USDOE Grant No. DE-FG02-01ER54616.

Fred Levinton
Nova Photonics, Inc.

Date submitted: 11 Jul 2014 Electronic form version 1.4