DPP15-2015-000931

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Sorting Category: 6.23 (E)

**Progress Toward a New Technique for Measuring Local Electric Field Fluctuations in High Temperature Plasmas**[1] M.R. BAKKEN, M.G. BURKE, R.J. FONCK, B.T. LEWICKI, M.M. LIBEN, D.S. THOMPSON, G.R. WINZ, University of Wisconsin - Madison, Madison, WI — A new diagnostic measuring local $E_z(r,t)$ fluctuations is being developed at the Pegasus Toroidal Experiment. A novel multiple volume phase holographic grating spectrometer, designed to have high resolution (0.25Å) and high étendue (U = 0.01cm$^2$-ster), measures the line separation of the $\pi$ components of the $H_\alpha$ motional Stark spectrum of emitted beam light. The spectra are recorded at high frequency ($f_{Ny} \approx$ 500kHz) by a high speed CMOS imaging detector. The groove density of the objective grating is varied linearly along its surface to counter geometric Doppler broadening. A low divergence ($\Omega \approx 0.5^o$), 80kV, 2.5A $H^0$ diagnostic neutral beam is being deployed on Pegasus. The beam uses a washer-stack arc ion source to maximize full energy species fraction in the injected neutral beam. Laboratory tests of the ion source demonstrate stable, repeatable plasmas with $T_e \leq$ 20eV and $n_e \approx 5x10^{17}m^{-3}$, sufficient to sustain a 6mA/cm$^2$ current density at the focal plane for up to 20ms. A three phase resonant converter power supply, with low amplitude ($\delta$V/80kV $\approx$ 0.05%), high frequency ($f_{rip} \approx$ 280kHz) ripple, is in development to provide the 80kV accelerator power.

[1]This research supported by US D.O.E. Grant DE-FG02-89ER53296

Mindy Bakken
mrbakken@wisc.edu
University of Wisconsin - Madison, Madison, WI

☐ Prefer Oral Session
☒ Prefer Poster Session

Special instructions: Please place as poster 9 within the Pegasus presentations.

Date submitted: 23 Jul 2015 Electronic form version 1.4