Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Implementation of a Thomson Scattering Diagnostic on Pegasus[1]
D.J. SCHLOSSBERG, A.S. DOWD, R.J. FONCK, J.I. MORITZ, N.L. SCHOENBECK, G.R. WINZ, University of Wisconsin-Madison — The multipoint Thomson scattering system on Pegasus will diagnose point-source helicity-driven plasmas, including dominant particle transport mechanisms and sources of helicity dissipation. Helicity-driven plasmas are estimated to have $\langle T_e \rangle \sim 50$ eV for stochastic field line confinement and ∼200 eV for standard Ohmic closed flux surface confinement. To accurately characterize these regimes, a novel system is being designed, installed, and calibrated. A Nd:YAG laser is frequency doubled to provide a 9 ns, 2 J pulse radially across the plasma. Remote alignment of steering mirrors can be performed between shots along the 6 m length of the external laser beam-line. The 532 nm laser beam is focused to a ≤ 3 mm diameter beam within the plasma. Plasma background measurements are made simultaneously with data collection. A custom optical system collects signal from >70% of the plasma cross-section with 1.4 cm radial resolution. Optical fibers relay light to a high-efficiency volume phase holographic grating spectrometer coupled to a high quantum efficiency image intensified CCD camera, gated at ≥ 2 ns. Signal levels for plasmas with $n_e > 10^{18}$ m^{-3} and 10 eV $< T_e <$ 1 keV are predicted at 10^3 photons/pulse before background subtraction.

[1]Work supported by US DOE Grant DE-FG02-96ER54375.

M.W. Bongard
University of Wisconsin-Madison

Date submitted: 25 Jul 2011 Electronic form version 1.4