Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Development of a Multichannel Spectrometer for the Thomson Scattering Diagnostic on Pegasus[1] N.L. SCHOENBECK, A.S. DOWD, R.J. FONCK, D.J. SCHLOSSBERG, G.R. WINZ, University of Wisconsin-Madison — To explore electron transport in helicity-driven discharges and investigate edge stability, a multi-point Thomson scattering diagnostic is being developed. Red-shifted scattered light from the Nd:YAG laser, 532-632 nm, is imaged using a custom lens coupled to fiber optic cables capable of imaging 1.4 cm along the length of the laser beam. Initially 1 spectrometer, containing up to 8 radial spatial points will be available for detection, with an upgrade to 3 spectrometers planned in the near future. New high efficiency volume phase holographic gratings, with $> 75\%$ transmission, allow for a simplified spectrometer design. This provides high optical throughput and readily couples to new high quantum efficiency ($\sim$45%) image intensified CCD cameras for multichannel design. These cameras can be gated to as low as 2 ns. The two gratings fabricated for this system (2971 lines/mm and 2072 lines/mm) cover the design temperature range of 10 eV to 1 keV. Completing the spectrometer are high quality lenses with focal lengths of 130 cm on the collimating lens and 85 cm on the exit lens. This design has a spectral range compatible with the blue shift from a conventional ruby laser and allows for a compact, simplified system.

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

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Date submitted: 15 Jul 2011 Electronic form version 1.4