Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Relativistic Thomson scattering including depolarization[1] E.B. PARKE, V.V. MIRNOV, D.J. DEN HARTOG, University of Wisconsin - Madison — Several analytic relativistic approximations that include the depolarization term have been derived for the Thomson scattered spectrum [K. V. Beausang and S. L. Prunty, Plasma Phys. Control. Fusion **50**, 095001 (2008)]. In general, the simplifying assumption is made that the detector of the scattered radiation collects only the component of the electric field along the direction of the incident wave electric field. This assumption is not valid for the Thomson scattering diagnostic system on the Madison Symmetric Torus (MST) reversed-field pinch, which collects all polarizations and is able to measure radiation scattered from highly-relativistic electrons (Te $\geq$ 10 keV). We present relativistic analytic extrapolations derived for this case and analyze their accuracy. The results are of particular importance for analysis of data from the MST Thomson scattering diagnostic, as it is being extended to high repetition rate and will produce a large amount of Thomson scattered spectra for every MST shot. This data must be analyzed both quickly (with minimal computational resources) and accurately (correct measurement of the actual electron temperature).

[1]The work supported by the U.S. D.O.E.

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Date submitted: 13 Jan 2009 Electronic form version 1.4