Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Calculated Refraction and Cotton-Mouton Effect for a Millimeter-wave Interferometer/Polarimeter on the Compact Toroidal Hybrid (CTH) Experiment[1] J. SHIELDS, S. KNOWLTON, B.A. STEVENSON, J. HANSON, G. HARTWELL, Auburn University — A combined mm-wave interferometer/polarimeter based on the method of Dodel and Kunz[1] is being developed to measure the density and current profiles of current-driven discharges in the CTH torsatron ($R = 0.75$ m, $a \sim 0.2$ m, $B \leq 0.7$ T, $n_e \leq 10^{19}$ m^{-3}). Measurement of the internal magnetic field by Faraday rotation wavelengths is less costly than FIR approaches, but is more susceptible to refraction effects and the Cotton-Mouton (C-M) broadening of the polarization. Computational modeling of Faraday rotation, beam refraction, and C-M effects for wavelengths between 1.0 and 4.0 mm have been performed in 3-D geometry using plasma parameter values relevant to CTH plasmas in order to minimize the undesired refraction and C-M broadening while maintaining an adequate magnitude of Faraday rotation. Study results indicate that a 1 mm system is optimal for the CTH. 1. G. Dodel and W. Kunz, Infrared Phys. **18**, 773 (1978)

[1]Supported by US DOE Grant DE-FG02-00ER54610 and the DOE FES Fellowship Program

John Shields
Auburn University

Date submitted: 05 Sep 2007 Electronic form version 1.4