Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Measurements of reduced parallel electron distributions using whistler wave absorption[1] DEREK THUECKS, Univ of Wisconsin-Madison, FRED SKIFF, CRAIG KLETZING, Univ of Iowa, STEPHEN VINCENA, UCLA — We present the first results of a diagnostic designed to measure the reduced parallel electron distribution using resonant absorption of whistler waves at the electron cyclotron frequency. According to warm-plasma theory, a whistler wave that is swept in frequency is Doppler-shifted into resonance with those parts of the electron phase space density with a velocity component parallel to B_0. In our experiments, whistler waves were launched and received by a pair of dipole antennas immersed in a cylindrical discharge plasma at two positions along the axial background magnetic field. The whistler wave frequency was swept from somewhat below and up to $|\omega_{ce}|$. The measured wave absorption through the plasma was proportional to the reduced parallel electron distribution function. The background theory and initial results from this diagnostic are presented here. These first results show that this diagnostic succeeds in measuring changes to the distribution function due to cooling of the plasma during the transition from the discharge to the afterglow.

[1]Supported by DOE and NSF.

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Date submitted: 13 Jul 2009 Electronic form version 1.4