Abstract Submitted
for the DPP08 Meeting of
The American Physical Society

Finite ion gyroradius effects in exciting low frequency electrostatic waves in a Q-machine[1] P.M. MILLER, M.E. KOEPKE, E.W. REYNOLDS, H. GUNELL, Department of Physics, West Virginia University, Morgantown, WV 26506 — Low-frequency ($\sim$ 3 f_{ci}) electrostatic waves appear in a magnetized, cylindrical barium plasma in a double-ended Q-machine. Coaxial plasmas with different potential were formed, yielding a strong (up to 25 V/cm), narrow ($HWHM \sim \rho_i/2$) radial electric field at the cylindrical interface. We evaluate the plausibility of three free energy sources. (1) Cross-field electron current (2) $E \times B$-drift shear, and (3) ion-temperature anisotropy. We characterize the dependence of the wave frequency and wave-vector on the magnetic field strength and neutral pressure. We eliminate drift, cyclotron, and ion-acoustic mechanisms and are left with shear-modified ion acoustic, velocity space, and Farley-Buneman instability mechanisms.

[1]This work supported by grant PHY-0613238.

P.M. Miller
Department of Physics, West Virginia University, Morgantown, WV 26506

Date submitted: 17 Jul 2008 Electronic form version 1.4