Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Propagation of helicon waves with magnetic boundaries V.P. ANITHA, DEVENDRA SHARMA, SHYAMA PRASAD BANERJEE, S.K. MATTOO, PREDHIMAN KAW, Institute for Plasma Research — Propagation of bounded whistlers is analyzed in presence of a radially sheared magnetic field (Bo) where the boundary effects are assumed to be provided purely by sharp magnetic field gradients. The propagation of a plane polarized wave requires the constituent left and right circularly polarized waves with single k value to have different radial extents, a condition which is inaccessible in cases of conventional, conducting or dielectric, physical boundaries. The possibility of achieving such a plane polarized bounded mode is explored in an alternate set up with magnetic field boundaries. The results are correlated with experimental observations in the Large Volume Plasma Device (LVPD) where a transition from a right handed to a left handed polarized helicons wave was detected in addition to the presence of a plane polarized wave. When contribution of a nonuniform B_o was taken in to account in finding numerical solutions for the wave magnetic field component B_z(r)a good agreement was recovered with the measured B_z(r). The numerically obtained k values were used to find a dispersion relation that provided an improved agreement with the measure dispersion data as compared to the conventional Helicon dispersion relation applicable to physical boundaries.

Predhiman Kaw
Institute for Plasma Research

Date submitted: 15 Jul 2011 Electronic form version 1.4