Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Experiments on the ducting of Whistler waves at the LAPTAG high school plasma laboratory[1] AMY LEE, New Roads School, WALTER GEKELMAN, PATRICK PRIBYL, UCLA Dept of Physics, CHLOE EGHTEBAS, University High, ROLAND HWANG, Princeton University, JOE WISE, New Roads School, BOB BAKER, University High, ANATOLY STRELSOV, Darthmouth — A low density duct$\left(5\% \leq \frac{\delta n}{n} \leq 50\%\right)$ in the quiescent afterglow of an RF plasma (L= 1.5 m, dia = 0.3 m ($30G \leq B_{0z} \leq 100G$), $n \simeq 10^{11}$cm^{-3}) is formed by biasing a 3 cm diameter grid. Whistler waves are launched with a single loop antenna (1 cm diameter), placed within the duct using a phase-locked tone burst ($40 \leq f_{wave} \leq 110$ MHz). The vector magnetic field of the whistler waves is measured in a plane with dx=dz =1cm, dt = 0.4 ns along with the local plasma density. The whistlers are observed to propagate within the duct, however waves with a different wavelength and angle of propagation radiate from the duct edge. The ducting is studied as a function of the depth of density minima, width of the density channel, and wave frequency, $\frac{f}{f_{ce}}$. The results will be compared to computer simulations of a two-dimensional electron MHD model.

[1]Work funded by NSF and DOE.

Walter Gekelman
UCLA

Date submitted: 16 Jul 2010 Electronic form version 1.4