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Experimental Measurement and comparison to theory of Whistler Waves at the LAPTAG high school plasma laboratory[1] ROLAND HWANG, Princeton University, CHLOE EGHTEBAS, University High School, AMY LEE, New Roads School, WALTER GEKELMAN, PATRICK PRIBYL, UCLA Dept of Physics, JANE SHIN, Walnut Grove Secondary School, Vancouver, JOE WISE, New Roads School, BOB BAKER, University High School, ALEX MARTINEZ, New Roads School — The vector magnetic field of whistler waves above and below half the electron cyclotron frequency is measured in 2 dimensions in a 51×31 plane with $dx = dz = 1cm, \delta t = 0.4ns, 30G \leq B_{0z} \leq 100G$. The experiments are performed in a high school plasma physics lab featuring a 1.5 meter long, 30 cm diameter pulsed, inductively coupled RF Argon plasma ($\tau_{on} = 10ms, \tau_{off} = 50ms, 10^8 \leq n \leq 10^{11} cm^{-3}$). A three magnetic probe, single loop launch antenna and signal detection amplifiers were constructed by the high school students. A phase-locked tone burst is generated at a fixed frequency and launches a whistler wave. Data is acquired with a computer controlled 2D drive and a networked 2.5 Gs digital oscilloscope. We present maps of the phase fronts of the wave, and group velocity as a function of frequency. Index of refraction curves are generated from the measured plasma parameters. Appleton's equation with a point source antenna is used to simulate the wave propagation in a plane and the results compared to the acquired data.

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