Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Radiation efficiency of nonlinear whistler wave antennas[1] J.M. URRUTIA, R.L. STENZEL, K.D. STROHMAIER, Physics & Astronomy, UCLA — Time varying magnetic fields are applied with various antenna configurations in a laboratory plasma in the regime of low frequency whistler modes. In contrast to earlier work on antenna properties for linear whistler waves [R. L. Stenzel, Antenna radiation patterns in the whistler wave regime measured in a large laboratory plasma, Radio Science **11**, 1045 (1976)], the present work deals with exciting whistlers whose wave magnetic field exceeds the ambient magnetic field. In this case, the propagation depends on the amplitude and direction of the wave magnetic field. When the two fields oppose each other, a field-reversed configuration arises which essentially prevents the excitation of propagating whistler waves. The field stagnates and dissipates. However, when the wave field adds to the ambient field a propagating whistler wave packet is excited. Thus, for a sinusoidal antenna current, only one half cycle produces radiation, the other leads to local dissipation. Rectified or pulsed currents produce optimum excitation of whistler waves.

[1]Work supported by NFS

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Date submitted: 22 Jul 2005 Electronic form version 1.4