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**Antenna arrays for producing plane whistler waves**[1] REINER STENZEL, J. MANUEL URRUTIA, Dept of Physics and Astronomy, UCLA — Linear whistler modes with $\omega \simeq 0.3\omega_{ce} \ll \omega_{pe}$ are excited in a large laboratory plasma with magnetic loop antennas. A single antenna always produces a spatially bounded wave packet whose propagation cannot be directly compared to plane wave theories. By superimposing the fields from spatially separated antennas, the wavenumber along the antenna array can be nearly eliminated. 2D arrays nearly produce plane waves. The angle $\theta$ of wave propagation has been varied by a phase shift along the array. The refractive index surface $n(\theta)$ has been measured. The parallel phase and group velocities for Gendrin modes has been demonstrated. The interference between two oblique plane whistlers creates a whistler "waveguide" mode, i.e. standing waves for $\mathbf{k} \perp \mathbf{B_0}$ and propagation for $\mathbf{k} \parallel \mathbf{B_0}$. It also describes the reflection of oblique whistlers from a sharp discontinuity in the refractive index or conductivity. Radial reflections are also a dominant factor in small plasma columns of helicon devices. These results are of interest to space and laboratory plasmas.

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