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Whistler instabilities in EMHD spheromaks and FRCs[1] J. MANUEL URRUTIA, KYLE STROHMAIER, REINER STENZEL, UCLA — In a large laboratory plasma anisotropic electron distributions are produced by accelerating electrons in magnetic null regions. These null regions are predominantly the toroidal null lines of field-reversed configuration (FRC) and spheromaks in the parameter regime of electron MHD (EMHD). The electrons gain energy from an inductive electric field along the separator thereby converting magnetic energy into electron kinetic energy. The non-adiabatic electron motion near null points produces non-equilibrium distributions which give rise to kinetic instabilities. The emission of whistlers from toroidal electron current rings is observed. Frequency spectra, amplitudes and wave magnetic field distributions are measured. Of particular interest is the source region which is not a toroidal rf current but two opposing poloidal current layers. Since the source region is of order of the whistler wavelength the instability appears to be absolute rather than convective. Possible instability mechanisms will be discussed.

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