Abstract Submitted
for the APR09 Meeting of
The American Physical Society

**Relativistic two-fluid waves in pulsar plasmas** A.R. SOTO-CHAVEZ, S.M. MAHAJAN, R.D. HAZELTINE, Institute for Fusion Studies, The University of Texas at Austin, Austin, Texas 78712 — A relativistic two-fluid approach for a streaming magnetized pair plasma is considered. Such a scenario corresponds to secondary plasmas created at the polar caps of pulsar magnetospheres. The model, in which instead of the magnetic field the generalized vorticity is frozen in the fluid, is investigated for propagating waves. For parallel propagation four transverse modes are found. Two of them are analogous to the R and L modes of the non-relativistic pair plasma limit. The other two are Alfvénic modes split into a fast and slow mode. The slow mode is cyclotron two-stream unstable at large wavelengths and always subluminous. The fast Alfvén mode is superluminous for large wavelengths only becoming subluminous at $k > 2\sqrt{\gamma_o^2 - 1}$. In this incompressible approximation only the ordinary mode is present for perpendicular propagation. For oblique propagation the dispersion relation is numerically studied for finite and infinitely magnetic field and the results are qualitatively described.

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Date submitted: 29 Dec 2008 Electronic form version 1.4