Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

The interchange and geodesic acoustic type modes in two-fluid theory A. SMOLYAKOV[1], S. BENKADDA, X. GARBET[2], O. AGULLO, International Institute for Fusion Science, CNRS/Universite de Provence, Centre Universitaire St Jérôme, Case 321, 13397 Marseille, France — Interchange and geodesic acoustic type modes are considered within the unified approach of two-fluid theory. It is assumed that electrons are in the adiabatic, $\omega << k_{\|} v_{Te}$, while the ions are in the fluid regime, $\omega >> k_{\|} v_{Ti}$. Appropriate moment equations are used for both components taking into account the the magnetic field curvature, which is modeled by the addition of the constant gravity forces, as well as electromagnetic effects. Both electron and ion drift effects are taken into account including the finite Larmor radius (FLR) effects for ions due to gyroviscosity. Within this approach , ion temperature gradient, interchange, and geodesic acoustic modes are recovered. It is shown that geodesic acoustic modes are intrinsically related to interchange modes. Both types of modes occur as a result of the essential balance between the radial diamagnetic and inertial (polarization) currents. It is shown that coupling of drift and geodesic curvature effects leads to the destabilization of geodesic acoustic modes.

[1]University of Saskatchewan, Saskatoon, Canada
[2]IRFM/SCCP, CEA Cadarache 13108 St Paul Lez Durance, France

A. Smolyakov
University of Saskatchewan

Date submitted: 22 Jul 2010 Electronic form version 1.4