Abstract Submitted
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Electromagnetic effects on geodesic acoustic modes[1] A. SMOLYAKOV, University of Saskatchewan, Saskatoon, Canada, X. GARBET, C. NGUYEN, G. FALCHETTO, M. OTTAVIANI, CEA Cadarache, DSM/DRFC, Saint Paul lez Durance, France — A new type of electromagnetic modes induced by geodesic compressibility is predicted. The modes are related to Alfven and geodesic acoustic modes. While a standard geodesic acoustic mode involves poloidally and toroidally symmetric perturbations of electrostatic potential ($m = n = 0$) and the first poloidal side-bands of plasma pressure, new modes involve side-bands of the electrostatic and vector potential as well as pressure perturbations at zeroth and second harmonics. Both standard (electrostatic) geodesic acoustic modes and new electromagnetic modes involve finite perturbations of parallel viscosity, which modify an effective adiabatic (compressibility) index for a toroidal plasma. Dispersion relations are derived by using the Grad hydrodynamic equations, which thereby reconcile long known but not previously explained discrepancy between the results of kinetic and fluid calculations. The electromagnetic effects on geodesic acoustic modes due to electron parallel motion are also investigated by employing the kinetic theory and appropriate expansion of the electron distribution function. The dispersive corrections to the mode frequency are calculated in two different regimes.

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