Abstract Submitted for the DPP05 Meeting of The American Physical Society

Geodesic Acoustic Modes Tokamak  $\mathbf{Plasmas}^1$ Α.  $\mathbf{in}$  $\mathbf{a}$ SMOLYAKOV, University of Saskatchewan, Canada, X. GARBET, M. OTTA-VIANI, G. FALCHETTO, CEA Cadarache, France — Recently geodesic acoustic modes (GAM) have been identified in a number of experiments and numerical simulations. GAM are rotational modes that occur as a result of the compression of poloidal rotation in a toroidal geometry. In ideal MHD, they correspond to two neutral ( $\omega = 0$ ) modes that are degenerate in a cylindrical plasma immersed in the axial magnetic field. These modes, uniform poloidal rotation and uniform (m = 0, m) $k_z = 0$ ) slow compression, become GAM in the toroidal case. We study GAM both with kinetic and fluid theory, such as that used to study the ion temperature gradient driven turbulence. We also investigate the transition of GAM into the slow modes in the classical theory of the neoclassical rotation. Effects of Landau damping, higher order toroidal coupling, and excitation of GAM by fast particles are studied. Results of fluid numerical simulations of ion temperature gradient driven turbulence exhibiting zonal flow and GAM generation will be presented.

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