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GAM damping and neoclassical rotation in a tokamak A.G. ELFIMOV, R.J.F. SGALLA, R.M.O. GALVAO, Institute of Physics, University of San Paulo, San Paulo, Brazil, A. SMOLYAKOV, University of Saskatchewan — Geodesic Acoustic Modes (GAM) are linear eigen-modes of poloidal plasma rotation supported by plasma compressibility in toroidal geometry and linearly coupled to drift-waves via toroidal side-bands of plasma pressure. These modes are expected to play an important role in dynamics of drift-wave turbulence. In this talk we describe the mechanisms of GAM damping via Landau collisionless wave-particle interaction and ion-ion collisions. GAM intrinsically involve anisotropic perturbations of plasma pressure (corresponding to parallel viscosity). This underlies the intrinsic relation of GAM modes with neoclassical rotation in a tokamak. It is shown that GAMs and standard equilibrium (neoclassical) plasma rotation represent two limit cases of poloidal plasma rotation: high frequency rotational mode (GAM) and the low frequency over damped (damping is larger than the real part of the frequency) mode of the neoclassical equilibrium rotation. New regimes of global GAM modes will be reported. These regimes occurs as a result of the parallel kinetic response of electrons which has not been included previously. It is shown that in certain regimes (corresponding to global modes), the electron response becomes strongly electromagnetic and GAM have significant electromagnetic components that affect mode damping. Resulting modifications in the mode dispersion and mode damping will be presented.

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