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Coupling of zonal flows and geodesic acoustic modes: effects on turbulent transport PAOLO ANGELINO, CRPP, ALBERTO BOTTINO, ROMAN HATZKY, IPP, SEBASTIEN JOLLIET, OLIVIER SAUTER, T.M. TRAN, LAURENT VILLARD, CRPP — The zonal E×B flow (ZF) associated with axisymmetric electrostatic perturbations has a stabilizing effect on turbulence. In toroidal systems, ZFs show an oscillatory behavior due to coupling with poloidally asymmetric perturbations, called geodesic acoustic modes (GAMs). Recent studies show a dependence of GAMs on the safety factor q. ZFs show larger oscillations in high q regions than in low q regions. This affects the turbulent transport because the oscillatory ZFs are less effective in suppressing the turbulence than the steady ones. Simulations with the code ORB5 give new insight into the mutual interactions between ion temperature gradient modes (ITGs), ZFs and GAMs. ORB5 is a global nonlinear electrostatic gyrokinetic PIC code. It has the capability to simulate MHD numerical equilibria, keeping into account the ZFs full geometrical coupling. A q value scan at constant shear has been performed, showing GAM oscillation suppression with increasing plasma current and the anomalous heat flux decrease. Effects of the q profile shear are also investigated.

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