

Abstract Submitted
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Excitation of Kinetic Geodesic Acoustic Modes by Drift Waves in Nonuniform Plasmas¹ ZHIYONG QIU, LIU CHEN, Zhejiang University, FULVIO ZONCA, ENEA, Frascati — Spontaneous excitation of geodesic acoustic mode (GAM) by drift wave turbulence (DW), which is expected to play an important role in the DW saturation process, is investigated including effects of system nonuniformities and kinetic plasma response. The coupled equations describing the fully nonlinear interaction between GAM and DW are derived based on the nonlinear gyrokinetic theory, and then we solved both analytically and numerically to investigate the spatial-temporal evolution of the coupled DW-GAM system. Kinetic effects as well as nonuniformities due to diamagnetic frequency profile, finite radial envelope width of DW pump and GAM continuum are systematically included in the analysis. It is found that the parametric decay process is a convective instability for typical tokamak parameters, when finite group velocities of DW and GAM associated with kinetic effects and finite radial envelope width are taken into account. The nonlinearly driven GAM propagates at a group velocity, that, due to coupling with DW, is typically much larger than that predicted by the linear theory of GAM. When, however, nonuniformity of diamagnetic frequency is taken into account, the parametric decay process becomes, time asymptotically, a quasi-exponentially growing absolute instab

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