Nonlinear dynamics of Beta-induced Alfvén Eigenmode excited by Energetic Particles in Tokamak plasmas

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Nonlinear simulations of Beta-induced Alfvén eigenmode (BAE) excited by purely circulating energetic particles in Tokamak plasmas have been studied by an extended version of the Hybrid Magnetohydrodynamic Gyrokinetic Code (XHMGC). Dynamics of circulating enegetic particles have been demonstrated with both phase space structures and test particle behaviors. Nonlinear dynamics is found to depend crucially on the non-uniformities and geometry. Transports of the resonant particles, furthermore, reflect the non-local nature of the nonlinear dynamics.