
Frequency Chirping of Energetic-Particle-Driven Geodesic Acoustic Modes in Tokamaks

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Résumé

Energetic-particle-driven geodesic acoustic modes (EGAMs) are expected to play an important role in the nonlinear dynamics of tokamak plasmas. In this work, we perform a systematic gyrokinetic investigation of EGAMs using the global gyrokinetic particle-in-cell code ORB5 in a simplified tokamak geometry.

By varying the energetic particle (EP) concentration, we study the linear and nonlinear dynamics. We focus on the wave-particle nonlinearity of the EP species. The nonlinear saturation level scalings are shown and the corresponding frequency chirping is described. These results help understanding the nature of EGAMs as modes with a strong EP dependence, and a dynamics which is determined mainly by the phase space structures.

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