1E13

Hybrid Simulations of Alfvenic Instabilities Excited by Bounce-Precession Resonances in Tokamaks

S. Hu and Liu Chen
Department of Physics and Astronomy, University of California, Irvine

Resonant excitations of Alfvenic instabilities excited by energetic ions in toroidal plasmas have been investigated using a linear gyrokinetic-magnetohydrodynamic hybrid code which solves the coupled vorticity and energetic-ion gyrokinetic equations by the numerical scheme developed in Zheng et al. [2000]. Motivated by recent NSTX observations, instability excitation associated with the bounce resonance is delineated by purposely suppressing the usual precession resonance through reversing its direction with respect to the diamagnetic drift. In the low-β tokamak plasmas, this drift reversal is achieved by making the turning points of trapped ions fall in the strong-B (good curvature) side so that the usual energetic-particle mode (EPM) due to the precession resonance becomes a new type due to the bounce-precession resonance. In the high-β case, such as in NSTX, the drift reversal can also be achieved due to pressure gradients. Investigations on the new EPM in the high-β regime as well as details of the simulation scheme and results will be presented.

Work supported by DOE and NSF Grants.