

Kinetic-MHD simulation of compressional Alfvén eigenmodes excited by runaway electrons in current quench

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Kinetic instabilities in the MHz range have been observed during current quench in DIII-D disruption experiments (A. Lvovskiy et al., PPCF 60, 124003 (2018)). In this talk we show the new updates on kinetic-MHD simulation of current quench modes using M3D-C1. It is found that this mode is mainly compressional Alfvén eigenmode (CAE) and has large parallel perturbed magnetic field component. The wave can have resonance with high energy trapped runaway electrons, which have precession frequency close to the mode frequency. Nonlinear simulation shows that multiple eigenmodes can be excited with the same toroidal mode number but different frequencies. The characteristics of the simulated modes, including frequencies and polarization, are consistent with experimental observations.

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