Abstract Submitted
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Gyrokinetic particle simulations of reversed shear Alfvén eigenmode in DIII-D tokamak[1] WENJUN DENG, University of California, Irvine — Simulations of reversed shear Alfvén eigenmode (RSAE) in DIII-D discharge 142111 near 750ms have been successfully performed using the global gyrokinetic toroidal code (GTC). The background plasma pressure raises the mode frequency due to the elevation of the Alfvén continuum by the geodesic compressibility. The non-perturbative contributions from the fast ions and kinetic thermal ions modify the mode structure relative to the ideal magnetohydrodynamic (MHD) theory due to the breaking of radial symmetry, in qualitative agreement with XHMGC and TAEFL simulations and recent 2D imaging of RSAE mode structure in DIII- D tokamak. Various RSAE damping mechanisms are identified and measured in the simulations. The mode structure, frequency, and growth rate obtained from GTC simulations are close to those given by GYRO and TAEFL simulations. The frequency up-chirping of the RSAE and the mode transition from RSAE to toroidal Alfvén eigenmode (TAE) are revealed to be close to the experimental results when scanning $q_{\min}$ values in our simulations. Study of nonlinear effects of the RSAE is in progress.

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