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Global Alfven eigenmode (GAE) simulations for NSTX(-U) and DIII-D ELENA BELOVA, Princeton Plasma Physics Laboratory, NEAL CROCKER, SHAWN TANG, UCLA, JEFF LESTZ, UCI, ERIC FREDRICKSON, Princeton Plasma Physics Laboratory — Numerical study of global Alfvén eigenmodes (GAEs) in the sub-cyclotron frequency range explains observed GAE frequency scaling with beam parameters in experiments across different devices. GAEs are frequently excited during neutral beam injection (NBI) in the National Spherical Torus Experiment (NSTX/NSTX-U), as well as other beam-heated devices such as MAST and DIII-D. These modes are driven unstable through the Doppler shifted cyclotron resonance with the NBI ions, and can be excited in ITER due to super-Alfvénic velocities and strong anisotropy of the beam ions. Numerical simulations using the HYM code have been performed to study the excitation of GAEs in the NSTX, NSTX-U and most recently for DIII-D. Simulation results match the experimentally observed unstable GAEs in the NSTX-U and NSTX. New simulations for typical DIII-D plasma and beam parameters demonstrate that high-frequency modes with ω/ω_{ci}~0.6, previously identified as compressional Alfvén eigenmodes (CAEs), have in fact shear Alfven polarization and are identified as GAEs. Simulation results match the observed frequencies and estimated toroidal mode numbers. Nonlinear simulations show broadening of the GAE mode structure at saturation, and the scaling of saturation amplitude with the beam parameters.

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