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Numerical simulations of GAE stabilization in NSTX-U[1] ELENA BELOVA, ERIC FREDRICKSON, Princeton Plasma Physics Laboratory, NEAL CROCKER, UCLA, NSTX-U TEAM — Beam-driven Global Alfven Eigenmodes (GAEs) were frequently observed on NSTX and NSTX-U and have been linked with a flattening of the electron temperature profile in the plasma core. New experimental results from NSTX-U have demonstrated that neutral beam injection from the new beam sources with large tangency radii deposit beam ions with large pitch, which can very effectively stabilize all unstable GAEs. Numerical simulations using the HYM code have been performed to study the excitation and stabilization of GAEs in the NSTX-U right before and shortly after the additional off-axis beam injection. HYM simulations reproduce experimental finding, namely it is shown that off-axis neutral beam injection reliably and strongly suppresses all unstable GAEs. Before additional beam injection, the simulations show unstable counter-rotating GAEs with toroidal mode numbers n=7-12, and frequencies that match the experimentally observed unstable GAEs. Additional of-axis beam injection has been modeled by adding beam ions with large pitch, and about 1/3 of the total beam ion inventory. The simulations in this case show a complete stabilization of all unstable GAEs (n=7-12), even for the cases when the HYM calculated GAE growth rates were relatively large.

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