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Energetic-particle-modified global Alfvén Eigenmodes JEFF LESTZ, Princeton University, ELENA BELOVA, NIKOLAI GORELENKOV, Princeton Plasma Physics Lab — Fully self-consistent hybrid MHD/particle simulations reveal strong energetic particle modifications to sub-cyclotron global Alfvén eigenmodes (GAE) in low-aspect ratio, NSTX-like conditions. Key parameters defining the fast ion distribution function – the normalized injection velocity V_B/V_A and central pitch – are varied in order to study their influence on the characteristics of the excited modes. It is found that the frequency of the most unstable mode changes significantly and continuously with beam parameters, depending most substantially on V_B/V_A. This unexpected result is present for both co- and counter-propagating GAEs, which are driven by Doppler-shifted cyclotron resonances. Large changes in frequency without clear corresponding changes in mode structure could indicate the existence of a new energetic particle mode, referred to here as an energetic-particle-modified GAE (EP-GAE). Additional simulations conducted for a fixed MHD equilibrium demonstrate that the GAE frequency shift cannot be explained by the equilibrium changes due to energetic particle effects.

Jeff Lestz
Princeton University

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