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Compressional Alfven Eigenmodes Driven by Runaway Electrons in a Tokamak[1] CHANG LIU, Princeton Plasma Physics Laboratory, ANDREY LVOVSKIY, CARLOS PAZ-SOLDAN, General Atomics, ERIC FREDRICKSON, Princeton Plasma Physics Laboratory, DYLAN BRENNAN, Princeton University, AMITAVA BHATTACHARJEE, Princeton Plasma Physics Laboratory — This work provides the first study of resonant interactions between runaway electrons (REs) and compressional Alfven eigenmodes (CAEs) in a tokamak. Kinetic instabilities driven by MeV REs during tokamak disruptions have been recently observed on DIII-D [A. Lvovskiy et al., Plasma Phys. Control. Fusion 60, 124003 (2018)]. These instabilities correlate with intermittent RE loss from the plasma and they are hypothesized to be responsible for a non-sustained post-disruption RE current. In the present work, CAEs driven by REs are proposed as a possible candidate for the instability. Their mode structure is modeled using the modified code modelling excitation of CAEs by fast ions [E. D. Fredrikson et al., Phys. Plasmas 20, 042112 (2013)]. The growth rate is calculated from a simulation of runaway electron distribution function based on bounce-averaging, which includes the enhanced RE pitch-angle scattering due to ion partial screening. Radial diffusion of REs to the edge is explained via interactions with CAEs. The results match the experiment qualitatively, and provide a way to predict the dynamics of REs and study means of their control for disruption mitigation in ITER.

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