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Simulation of Fast Ion Effects on Global Stability of C-2W Equilibria FRANCESCO CECCHERINI, LAURA GALEOTTI, SEAN DETTRICK, DAN BARNES, KEVIN HUBBARD, AND THE TAE TEAM, TAE Technologies, Inc. — The stability of field-reversed configuration (FRC) plasmas has been investigated both experimentally and theoretically by other authors mainly in terms of the thermal plasma components. The kinetic effects due to a fast particle population are a topic of active debate and the corresponding changes in the plasma dynamics still need to be clarified. TAE Technologies most advanced and recent FRC machine, C-2W, can take advantage of up to eight particle beams to build high pressure of energetic ions and produce fast ion-dominated FRCs. In order to investigate the fast ion effects on FRCs, both TAEs equilibrium and hybrid codes, LReqMI and FPIC respectively, have been modified to include fast ion components. We present FPIC results of the evolution of this new kind of equilibria and address the stabilizing and destabilizing effects for both the rotational and longitudinal modes, which have been studied and presented in the past. The results of a parametric study of fast ion effects will be presented.

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