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**NIMROD simulations of the stabilization of the FRC tilt instability with energetic ion beams** RICHARD MILROY, CHARLSON KIM, University of Washington, ALES NECAS, Tri Alpha Energy — The hybrid kinetic-MHD option [Charlson C. Kim, Phys. Plasmas, **15**, 072507 (2008)] in the NIMROD code [C.R. Sovinec, et al., J. Comp. Phys. **195**, 355 (2004)] has been extended to optionally employ a full-orbit, full-f PIC advance. In addition, a current coupling option has been added where the particles are coupled to the fluid through the  $\mathbf{J} \times \mathbf{B}$  term in the momentum equation, rather than through the pressure tensor. As an initial test, simulations were performed to compare with previous calculations that investigated the stabilization of the field-reversed configuration (FRC) tilt instability with energetic ion beams [D.C. Barnes and R.D. Milroy, Phys. Fluids B **3**, 2609 (1991)]. FRC parameters were adjusted to duplicate those of the previous study, and the energetic particles were found to stabilize the  $n=1$  mode at an almost identical beam threshold as was found earlier. While the previous study did not include higher order modes, initial results with NIMROD suggest that an  $n=3$  mode may be driven by the energetic particles for these parameters. Further studies investigate scaling to different machine sizes and study FRC profile modifications due to the beams presence.

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