Abstract Submitted
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Simulation of Equilibrium, Stability, and Transport in Advanced FRCs S. A. DETTRICK, D. C. BARNES, TAE Technologies, Inc, E. V. BELOVA, Princeton Plasma Physics Laboratory, F. CECCHERINI, L. GALEOTTI, S. A. GALKIN, S. GUPTA, K. HUBBARD, O. KOSHKAROV, C. K. LAU, TAE Technologies, Inc, Z. LIN, University of California, Irvine, Y. MOK, A. NECAS, B. S. NICKS, M. ONOFRI, J. PARK, S. V. PUTVINSKI, L. S. STEINHAUER, T. TAJIMA, TAE Technologies, Inc, W. WANG, X. WEI, University of California, Irvine, K. YAKYMENKO, P. N. YUSHMANOV, TAE Technologies, Inc, TAE TEAM — The Advanced FRC is a Field Reversed Configuration maintained by neutral beam injection and electrode biasing, with scrape-off-layer (SOL) pumping and electron heat confinement provided by expander divertors. This alternate magnetic confinement system has been developed at TAE Technologies, Inc in the C-2, C-2U and C-2W (aka NORMAN) devices. To study this configuration, hybrid fluid/kinetic equilibrium models have been developed which include the effects of fast ion pressure anisotropy. The 3D hybrid PIC codes FPIC and HYM are being used to understand the interplay of beams and biasing in global stability. The 2D hybrid kinetic/MHD/neutral code, Q2D, is being used to study global transport including coupled perpendicular/parallel FRC/SOL transport, neutral gas effects, and field line expansion and electrostatic potential formation in the expander. The 3D electrostatic PIC codes ANC and GTC-X add wave-particle kinetic ion and electron effects to the global transport studies, including shear flows and sheath effects related to biasing. Parallel electron heat transport in the SOL is studied using the KSOL 1d2v continuum code.

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