Abstract Submitted
for the DPP00 Meeting of
The American Physical Society

Sorting Category: 6.6.8 (Theoretical)

Equilibrium and Stability of Field-Reversed Configurations with Poloidal Flows[1] YU.A. OMELCHENKO, M.J. SCHAFFER, P.A. PARKS, General Atomics — The Field-Reversed Configuration (FRC) is a high-beta compact toroidal plasma in which the external field is reversed on axis by azimuthal plasma current. The FRC is primarily confined by poloidal fields. The possibility of the presence of poloidal plasma flows and self-generated toroidal fields inside the separatrix has been largely ignored in the previous analysis of such configurations. These studies have not identified yet a robust mechanism that would explain the experimentally observed FRC stability to the tilt mode. On the contrary, recent FRC formation and stability simulations[2] performed with a 3-D, hybrid, PIC code FLAME[3] for a limited set of chosen equilibria revealed the important role of poloidal flows in mitigating the tilt mode in the two-component (kinetic ion + fluid electron) FRC model. In the present work we focus on characterizing such equilibria and investigating their stability to a number of toroidal modes, including the most disruptive tilt mode.

[1]Supported by U.S. DOE Grant DE-FG03-95ER54309.
[2]Yu.A. Omelchenko, Phys. Plasmas **7**, 1443 (2000).
[3]Yu.A. Omelchenko and R.N. Sudan, J. Comp. Phys. **133**, 146 (1997).

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Date submitted: July 12, 2000 Electronic form version 1.4