

Abstract Submitted
for the DPP98 Meeting of
The American Physical Society

Sorting Category: 5.1.5 (theoretical)

Kinetic Studies of Field-Reversed Configuration¹ Y.A. OMELCHENKO, General Atomics — A Particle-in-Cell (PIC) model in cylindrical coordinates is applied to study the tilt instability of the Field-Reversed Configuration (FRC). Kinetic FRC equilibria are generated by running a 3-D, parallel code, FLAME (fluid electrons/particle ions) in axisymmetric mode. These are characterized by a range of values of parameter s (the approximate ratio of the FRC separatrix radius to the average Larmor radius) and exhibit different toroidal behaviors. This PIC model is applicable to both low- s and high- s plasmas and can predict the nonlinear FRC evolution in current and future experiments. The tilt mode (an axial displacement of the plasma with an azimuthal mode number $m = 1$) is studied by running FLAME in three dimensions (axisymmetric configurations being used as input). Tilting is clearly observed at large s . Hybrid FRC/Ion Ring configurations are also investigated in 2-D and 3-D. Their stability properties are shown to improve due to the presence of a fraction of axis-encircling (ring) ions

¹Work supported by U.S. DOE under Contracts DE-AC03-89ER51114 and DE-AC02-76CH03073.

Prefer Oral Session
 Prefer Poster Session

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Date submitted: July 21, 1998

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