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Kinetic Studies of the Formation and Stability of Field-Reversed Configurations[1] Y.A. OMELCHENKO, General Atomics, R.N. SUDAN, Cornell University — Field-Reversed Configurations (FRCs) are compact toroidal plasmas confined by poloidal fields. The external field is reversed on axis by diamagnetic current carried by either thermal particles or energetic ions. The latter configuration is known as the Ion Ring Configuration (IRC). Hybrid systems have also been proposed. One of the distinct FRC features is the existence of a magnetic null point in the vicinity of which ion Larmor radii are finite. Thus, kinetic effects play an essential role in the formation and equilibrium of such configurations. Since the typical Alfvén and ion cyclotron frequencies in the FRC are comparable, ions can be modeled as full-orbit macroparticles. Using a 3-D, hybrid, Particle-in-Cell code, FLAME[2] we have studied the formation and compression of an IRC under experimental conditions.[3] We also report results obtained by simulating the field-reversed theta-pinch formation and kinetic tilting of FRCs.

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[2]Y.A. Omelchenko and R.N. Sudan, J. Comp. Phys. **133**, 146 (1997).
[3]Y.A. Omelchenko and R.N. Sudan, Phys. Plasmas **2**, 2773 (1995).

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[X] Prefer Oral Session
[ ] Prefer Poster Session

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