Abstract Submitted
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Hybrid FRC equilibria[1] LOREN STEINHAUER, University of Washington — Field-reversed configurations (FRC) have long been known to be highly-kinetic. This has been investigated in the context of stability. However, their kinetic nature affects FRC equilibria, a fact long overlooked. Ion kinetic effects are especially important near the separatrix and in the scrape-off-layer. These equilibria are investigated using a hybrid formulation, i.e. ions governed by the Vlasov equation and electrons as a warm, massless fluid. In axisymmetric equilibria, the ion distribution is expressible as a function of the Hamiltonian and the canonical angular momentum. This approach was originally used in the context of an Astron plasma [1]. The form distribution form has a "thermal" dependence on the Hamiltonian and a two-part dependence on the canonical angular momentum, the latter accounting for the ion confinement boundary in velocity space. Using this formalism the azimuthal current density is an analytic function of the magnetic flux variable. Equilibrium is found by combining this result with Ampere's law, solvable in 1D or 2D by an iterative procedure. Solutions for elongated FRCs (1D) are presented and the implications discussed.

[1] R.V. Lovelace et al., Phys. Fluids (1978).

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