

Abstract Submitted
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Antisymmetric RMF Current Drive in FRCs R.D. MILROY, H.Y. GUO, A.L. HOFFMAN, L.C. STEINHAEUER, RPPL, University of Washington — Rotating Magnetic Fields (RMF) can be used to both form and sustain Field Reversed Configurations (FRC). The addition of even a small simple transverse magnetic field to an FRC tends open the field lines, leading to a concern that confinement could also be compromised. Calculations show that both electron and ion orbits are confined due to the cyclic nature of the field line opening, but rapid electron thermal conduction to the outside world remains a concern unless the outside density can be maintained extremely low. It was shown¹ that if an antisymmetric RMF is applied, the field lines remain closed for small ratios of vacuum RMF B_ω to external axial magnetic field B_e . Recent experiments show improved confinement when antisymmetric RMF is applied, and an analysis of these results² shows that field lines remain closed for much larger ratios of B_ω/B_e due to fact that the RMF only partially penetrates the FRC. With these encouraging results, antisymmetric RMF will soon be tested further on the new TCS upgrade experiment. We will extend the analysis to include a representation of the antisymmetric RMF that more accurately accounts for the antenna geometry, study the sensitivity of the results to precise symmetry, and determine the threshold for the opening of field lines. ¹S. A. Cohen and R. D. Milroy, Phys. Plasmas, **7**, 2539, (2000) ²H. Y. Guo, A. L. Hoffman, and L. C. Steinhauer, Phys. Plasmas **12**, 062507 (2005)

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