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Nimrod Simulations of FRC Formation with Rotating Magnetic Field Current Drive R.D. MILROY, C.C. KIM, PSI-Center, University of Washington, C.R. SOVINEC, PSI-Center, University of Wisconsin, Madison — Three dimensional simulations of Field Reversed Configuration (FRC) formation and sustainment with Rotating Magnetic Field (RMF) current drive have been performed with the NIMROD code. The Hall term is a zeroth order effect with strong coupling between Fourier components, and recent enhancements to the NIMROD preconditioner allow much larger timesteps than was previously possible. A two-fluid option with a finite electron mass set equal to 1/100 of the ion mass is used. Boundary conditions to capture the effects of a finite length RMF antenna have been added, and simulations of FRC formation from a uniform background gas have been performed with parameters relevant to the TCSU experiment at the University of Washington. Results will be compared with experimental observations. The calculations indicate that the current drive extends considerably beyond the ends of the antenna, that the RMF appears to have a strong stabilizing effect on the configuration, and that an electron poloidal flow (poloidal current) provides the current drive on the inner field lines.

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