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Principal Attributes of FRCs Sustained by Rotating Magnetic Field Current Drive A.L. HOFFMAN, H.Y. GUO, R.D. MILROY, RPPL, University of Washington — Field Reversed Configurations (FRC) sustained by Rotating Magnetic Fields (RMF) are distinctly different from the decaying FRCs formed in theta-pinches. The RMF drive reverses particle diffusion, producing very long particle lifetimes, low separatrix densities, and complete reversal of the external confinement field. The density is set by torque balance between the RMF drive and resistive drag on the electrons. The FRCs will increase in poloidal flux and expand radially inside a flux conserver until the compressed external field pressure balances the product of density times temperature. Higher temperatures, which are determined by a balance between RMF produced heating and various loss mechanisms, will automatically result in higher diamagnetic currents and poloidal magnetic fields, without requiring any increase in RMF parameters, and with very little increase in absorbed RMF power. Current drive performance thus increases dramatically with increasing plasma temperature. Temperatures in present TCS experiments are limited primarily by radiation ($\sim$80%) and conduction/convection ($\sim$20%). Recent experiments show that conduction/convection losses can be greatly reduced using anti-symmetric RMF drive, and extensive modifications are being made to TCS to reduce impurities and radiation losses, so large increases in overall performance can be expected.

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