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Irvine FRC Magnetic Field Structure T. ROCHE, E.P. GARATE, W. HARRIS, W. HEIDBRINK, R. MCWILLIAMS, E. TRASK, UC Irvine — Magnetic probe arrays have been used to construct time-evolving images of the magnetic field structure in the Irvine Field Reversed Configuration (IFRC). Two radial arrays, consisting of ten probes each, measure the field in all three directions within the interior of the plasma. Axial field arrays measure field strengths adjacent to inner and outer coils. Magnetic field maps are made by moving the radial probes to different axial and azimuthal positions over a series of shots. The map covers a grid of 30 cm x 50 cm in the r-z plane with grid spacing 2.5 cm x 5 cm. Shot-to-shot variation is small enough (<10%) to use data from successive shots to interpolate magnetic field lines as they evolve in time. Reversed fields of $\sim$ 200 gauss have been measured with lifetimes of $\sim$ 40 μs. These data have been used to estimate essential IFRC equilibrium qualities/quantities such as mid-plane separatrix radii, major radius of the compact toroid, field-null location and azimuthal symmetry. During this process the background fields for shots without plasma also were measured. It has been found that some anisotropy in the background may have been the cause of undesired translational motion of the IFRC. Improvement of the background field symmetry may lead to longer lived equilibria in the desired location.

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