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Density and magnetic flux measurements on the PFRC-2¹ EUGENE S. EVANS, Princeton Plasma Physics Laboratory, CHARLES SWANSON, Princeton Satellite Systems, SAMUEL A. COHEN, Princeton Plasma Physics Laboratory — Understanding the core plasma of the PFRC-2 is essential to achieving ion heating. Line-integrated density from a 170 GHz microwave interferometer and excluded magnetic flux from an axial array of diamagnetic loops allow a detailed look at the time evolution of the core plasma and magnetic field strength during a rotating magnetic field (RMF) pulse. We have measured the variations in time of density and excluded flux with the axial magnetic field, the RMF power, and the neutral fill pressure. At the midplane, excluded flux values to 2 μ Wb have been observed, consistent with an FRC with separatrix radius ranging from 2 to 5 cm in an axial magnetic field of 75 G. The plasma current is then estimated as 500 A. The hot electron densities and energies obtained via x-ray diagnostics broadly agree with the flux measurements. The evolution of discharges shows periodic and well as chaotic density behavior, correlated with the flux measurements.

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