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Current Diagnostics in an FRC with a Toroidal Electric Field

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UC Irvine — A time-of-flight neutral particle detector¹ will be used to diagnose the ion contribution to the current in the FRC experiment at UCI. The ions are accelerated due to the EMF induced by a flux coil with a peak field of 1 kG. In addition to ion acceleration measurements, the ion distribution function can also be determined. The diagnostic involves a slotted disk that spins at 20,000 rpm, which allows a snapshot of the toroidal velocity distribution to be measured after the neutrals free stream to an electron multiplier. A Mach probe has also been implemented to measure the plasma flow. In conjunction with these, a Rogowski coil is used to measure the total toroidal current. From these measurements, we can deduce the ion contribution to the current.

¹D. E. Voss and S. A. Cohen, Rev. Sci. Instrum. **53**, 1696 (1982).

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