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Development of a magnetic vector potential profile measurement using a Heavy Ion Beam Probe[1] P.J. FIMOGNARI, D.R. DEMERS, T.P. CROWLEY, Xantho Technologies, LLC — Measurement of the plasma current density profile remains a fundamental need in toroidal confinement. Establishing this unique capability within the fusion program is invaluable to stability and transport studies. Inference of localized values of the magnetic vector potential, which will enable current density profile studies, can be accomplished through measurement of the toroidal velocity of secondary ions produced through electron-impact ionization of a heavy ion beam in an axisymmetric plasma. We are developing a specialized detector to measure particle velocity and the techniques necessary to unfold the magnetic vector potential profile, and hence the poloidal flux and current density profiles. Initial modeling of the velocity detector has been performed. Simulations are enabling estimation of anticipated sensitivity to, and resolution of, equilibrium and fluctuating quantities. Results of this work and forward looking plans will be presented.

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