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Heavy Ion Beam Probe sample volume characteristics in the MST RFP and effects on single and multipoint measurements[1] P.J. FIMOGNARI, D.R. DEMERS, Xantho Technologies, LLC, Madison, WI, P.W. TERRY, University of Wisconsin - Madison, Madison, WI — Heavy ion beam probe operation in the MST reversed field pinch entails a highly three dimensional beam trajectory. Modeling suggests that the sample volumes are complex functions of the strong magnetic shear in the RFP (which rotates the fan angle of the detected ions), and interaction of the beam with physical structures in the diagnostic beamlines. The orientation, shape, and size of the sample volumes vary across the plasma radius. An electrostatic analyzer with three apertures acquires data from two sample locations simultaneously. Sample volume features affecting single point data influence measurements of fluctuations in density and potential, and those affecting multiple point data influence the inference of electric field and wavenumber. Traditional methods of HIBP data analysis are at times insufficient for this system and, therefore, alternatives are being developed. Additionally, methods to mitigate the effects through changes in diagnostic operating conditions are considered.

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P.J. Fimognari
Xantho Technologies

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