

Abstract Submitted
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**Novel heavy ion beam computer-control to enable measurements
in plasmas with significant temporal variations of equilibrium quantities¹**

D.R. DEMERS, K.A. CONNOR, P.M. SCHOCH, Rensselaer Polytechnic Institute, S.Y. ZHANG, University of Wisconsin - Madison — A novel heavy ion beam computer-control system applying pre-programmed time varying voltages to the electrostatic sweep-plates and the analyzer anode is under development. It is necessitated by plasmas in which equilibrium quantities vary significantly as a function of time and the heavy ion beam experiences substantial path changes. This is exhibited in discharges with time varying current drive or large magnetic reconnection events (sawteeth) when the magnetic field profiles undergo modification. Alteration of the beam path may prevent secondary ions from entering the analyzer (thus limiting the duration of signal detection) or it may alter the sample location. Similar limitations in signal acquisition also occur with large temporal variations in the electric field or plasma potential. Control of the sweep and analyzer voltages (and hence the beam trajectory) will permit measurements as a function of time at spatially stationary sample volumes. This technique will be used to probe the MST plasma core throughout enhanced confinement discharges where electrostatic transport may be the dominant loss mechanism. Status of the development and utilization of the computer-control system will be presented.

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