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Prediction and refinement of magnetic equilibrium and Heavy Ion Beam trajectories in MST P.J. FIMOGNARI, A.F. ALMAGRI, J.K. ANDERSON, Univ. of Wisconsin, Madison, D.R. DEMERS, Rensselaer Polytechnic Institute — Operation of a heavy ion beam probe on the Madison Symmetric Torus presents a unique fundamental challenge in accurate prediction of beam trajectory and sample volume. The magnetic field, generated primarily by plasma currents, is central to this issue; it is determined by Grad-Shafranov equilibrium reconstructions produced by MSTFit. The precision of the reconstruction is dependent on both components of the model and diagnostic data used as constraints. Efforts to model magnetic field (error and fluctuation) asymmetries and fine-tune equilibrium plasma profiles have been successful in more precisely computing the heavy ion trajectory. As the beam path is largely determined by the magnetic field, it also contains unique information about the field. Accurate modeling of fluctuation profiles and beam trajectories allows extraction of information which can be used to determine local fluctuation magnitudes. The process of determining the trajectory which not only benefits from, but also improves, the accuracy of equilibrium reconstructions is discussed. This work is supported by the US DOE.

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