Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Fast Ion Transport in the MST Reversed Field Pinch P. J. BONOFIGLO, J. K. ANDERSON, W. CAPECCHI, J. KIM, S. H. SEARS, J. EGEDAL, University of Wisconsin - Madison — The reversed field pinch (RFP) provides a unique environment to study fast ion confinement and transport. The magnetic topology of the RFP establishes guiding center drifts along flux surfaces, resulting in naturally well-confined fast ions. Past experiments reveal reduced confinement and a redistribution of fast ions with beam-driven instabilities or transition to a 3D equilibrium state. A fast ion transport model characterized by a temporally and spatially dependent diffusion profile describes the fast ion evolution. The diffusion coefficient varies as the square of the measured mode amplitude, and the width is inferred from comparison with correlated density fluctuations. In studying multiple interacting modes, the model reproduces the dynamic NPA-measured $\sim 20\%$ drop in core fast ion concentration. In the case of long-lived frequency chirping modes, there is a consistent time evolution of the fast ion distribution and measured mode frequency on a spatially varying Alfven continuum. Additional studies probe the dynamics of energetic particle modes (EPMs) during the growth of the core-localized kink mode and the rapid loss of fast ion confinement as a transition to a 3D equilibrium occurs. This research is supported by US DOE.

Phillip Bonofiglo
University of Wisconsin - Madison

Date submitted: 14 Jul 2016 Electronic form version 1.4