

Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Neutral Beam Heating Of Reversed Field Pinch Plasmas in MST

J. WAKSMAN, J.K. ANDERSON, D. LIU, M.D. NORBERG, University of Wisconsin-Madison, G. FIKSEL, University of Rochester, V.I. DAVYDENKO, P. DEICULI, A.A. IVANOV, N. STUPISHIN, Institute of Nuclear Physics, Novosibirsk, Russia — Neutral beams are a powerful source of particle heating in tokamak plasmas, but only recently have studies of NBI heating begun in RFP devices. Previous work has shown that while thermal energy and particle transport are strong due to radial magnetic fluctuations, NBI-born fast ions are well confined ($\tau_{fi} \gg \tau_e$). This motivated the installation of a 1 MW, 20 ms tangential neutral beam injection system on MST. The NBI has no measurable effect on the central electron temperature in standard MST plasmas. In improved confinement plasmas, the magnetic fluctuations are transiently reduced, leading to a five-fold increase in thermal confinement. These periods are characterized (without NBI) by an increase in T_e from 400 to 800 eV in ~ 5 ms. In this case, significant NBI heating of nearly 150 eV was measured in the plasma core. To model these data, a 1-D temperature profile evolution model was developed. This model uses ensembled data from non-NBI enhanced confinement discharges to solve for a consistent set of P_{ohmic} and X_e profiles versus time. Assuming no additional change in thermal conductivity due to NBI, the measured increase in T_e is consistent with classical slowing and heating of the MST plasma. Work supported by the USDOE.

J. Waksman
University of Wisconsin-Madison

Date submitted: 22 Jul 2011

Electronic form version 1.4