Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Effect of Neutral Beam Injection on QSH onset in the RFP J.K. ANDERSON, G. FIKSEL, D. LIU, M.D. NORNBERG, J. WAKSMAN, University of Wisconsin, P. DEICHULI, A.A. IVANOV, N. STUPISHIN, V.I. DAVYDENKO, Budker Institute of Nuclear Physics — The recent installation of a 1MW neutral beam injector (NBI) on the Madison Symmetric Torus has enabled studies of several different phenomena of the RFP plasma. Non-reversed discharges are prone to conversion to a quasi-single helicity (QSH) state mode where the core-most resonant tearing mode (m=1,n=5) becomes significantly larger than all other modes within the plasma. The island experiences a significant drag torque and quickly decelerates and locks in the lab frame. It is observed that launching 1MW of 25kV neutral H atoms into these discharges can suppress the transition to QSH, resulting in significantly lower magnetic fluctuation amplitude. With this and the considerable momentum injected via NBI, the magnetic island can rotate much faster than in non-NBI discharges. Wall interactions are reduced and a substantially longer pulse length is observed. One possible explanation of QSH suppression is a small core-localized NBI current drive, which reduces the on-axis safety factor to slightly below 0.2 and removes the resonance condition. Equilibrium reconstructions can illustrate this subtle change in current density profile; no change to the total toroidal plasma current is measured. Work supported by USDOE.

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Date submitted: 15 Jul 2010 Electronic form version 1.4