

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Improvements in FRC Stability and Confinement by Neutral Beam Injection in the TS-4 Device¹ TORU II, MICHIAKI INOMOTO, KEIJI GI, TOSHIYUKI UMEZAWA, TAICHI ITO, YASUHIRO KAMINOU, YASUSHI ONO, The University of Tokyo — The first experimental investigation of tangential neutral beam injection (NBI) application on oblate field-reversed configurations (FRCs) has been conducted in the TS-4 device. The low- n modes, which cause destructive instabilities in FRCs produced from light gases, are stabilized by the NB fast ions to prolong the FRC lifetime significantly. FRCs produced from heavier gases such as argon show better stability against the low- n modes due to kinetic or two-fluid effects. The reduced total loss power of less than 5 MW indicates that 0.6 MW NBI not only heats FRC plasma but also changes the equilibrium and transport properties. The NBI also provides modifications not only on pressure profiles but also on current density ones, suggesting that the diamagnetic plasma current is spontaneously driven by the modified pressure profile in the NB-injected FRC. These results indicate that the utilization of NBI brings about improvement of FRC confinement by active control of pressure and current density profiles as well as electron heating.

¹Work supported by Grant-in-Aids for JSPS Fellows 23-2462, Scientific Research 22246119 and 22686085, and the Core-to-Core Program No. 22001

Toru Ii
The University of Tokyo

Date submitted: 13 Jul 2012

Electronic form version 1.4