

Abstract Submitted  
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**Oblate Field-Reversed Configuration Experiments with Neutral Beam Injection**<sup>1</sup> T. II, K. GI, T. UMEZAWA, M. INOMOTO, Y. ONO, The University of Tokyo — The effect of energetic beam ions on oblate Field-Reversed Configurations (FRCs) has been studied experimentally in the TS-4 plasma merging device. In order to examine its kinetic effects, we developed an economical pulsed Neutral Beam Injection (NBI) system by using a washer gun plasma source and finally attained the beam power of 0.6 MW (15 kV, 40 A) for its pulse length of 0.5 ms, longer than the FRC lifetime in TS-4. The Monte Carlo simulation indicates that the tangential NB ions of 15 keV are trapped between the magnetic axis and the separatrix. We found that two merging high- $s$  ( $s$  is plasma size normalized by ion gyroradius) hydrogen spheromaks with opposite helicities relaxed into the large scale FRC with poloidal flux as high as 15 mWb under the assistance of the NBI. Without the assistance of NBI, however, they did not relax to an FRC but to another spheromak. These facts suggest some ion kinetic effects such as toroidal ion flow are essential to FRC stability. Recently, two new NB sources with acceleration voltage and current of 15 kV and 20 A were installed on the TS-4 device on the midplane for tangential injection, increasing the beam power over 1 MW. We will start the upgraded FRC experiments using the 1 MW NBI for ion flow control.

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