Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Active Stabilization of FRCs by Intermittent Merging of Counter-Helicity Spheromaks in TS-3 and TS-4 Merging Experiments
SHIZUO INOUE, YASUSHI ONO, SHINGO ITO, MICHIAKI INOMOTO, University of Tokyo, RITOKU HORIUCHI, National Institute for Fusion Science — Since 1990, an efficient formation method of a field-reversed configuration (FRC) has been developed in the TS-3. The slingshot and spontaneous formation of toroidal flow was measured during the FRC merging formation in TS-3 and TS-4 experiments. We found this shear-flow produced by the sling-shot motion suppresses the n=1 tilt instability of FRCs by transforming the n = 1 mode into the n = 2 and higher mode. A new method for continuous sheared-flow generation is proposed for stabilization and heating of the FRCs using intermittent merging of a pair of spheromaks with opposing toroidal field. We studied about this concept by comparing our simulations with our TS-4 experiments. We simulated for the first time the FRC plasma with the intermittent merging of a pair of counterhelicity spheromaks using the MHD code. We will present how the intermittent merging maintains the flow shear as well as the stability of FRCs and then will show initial results in TS-4 intermittent merging experiment in comparison with the simulation results.

Shizuo Inoue
University of Tokyo

Date submitted: 15 Jul 2011 Electronic form version 1.4