

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

3D Canonical Momentum Measurements During the Merging of Two Counter-Helicity Spheromaks¹

SETTHIVOINE YOU, University of Tokyo, ALEXANDER BALANDIN, Institute of Systems Dynamics and Control Theory, Irkutsk, Russia, HIROSHI TANABE, YASUSHI ONO, University of Tokyo — A pair of counter-helicity spheromaks can merge in two possible ways to form a single final compact toroid depending on their toroidal magnetic field direction. Magnetohydrodynamically, no difference should be expected but experimentally, a positive/negative merging or negative/positive merging will generate final compact toroids with different lifetimes and sizes. A pair of multichannel spectroscopic diagnostics have been installed on the TS-4 experiment with view chords designed for measuring 3D ion velocities and temperature. One set retrieves toroidal velocities and temperature from conventional Abel inversion. The second, novel arrangement retrieves poloidal velocities from 3D vector tomography reconstruction and temperature from scalar tomography. With in situ magnetic probe arrays, the ion canonical momentum is thus determined in the complete volume. The ion temperature at the reconnection plane is also evaluated [1]. Both sets of measurements are followed over several repeatable shots during the spheromak merging to also track the evolution of ion self-helicity.

[1] Tanabe, You, Balandin, Ono, poster this meeting.

¹First author supported by Japanese Society for Promotion of Science

Setthivoine You
University of Tokyo

Date submitted: 21 Jul 2009

Electronic form version 1.4