

Abstract Submitted  
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**Measuring 3D Plasma Velocity in the TS-4 Compact Toroid<sup>1</sup>**

SETTHIVOINE YOU, University of Tokyo, ALEXANDER BALANDIN, YASUSHI ONO — Experiments at the University of Tokyo shoot two compact toroids at each other to form a single compact toroid with strong plasma flows. The plasma flows have been observed with conventional ion Doppler spectroscopy, and up to now, have been constrained to the toroidal component of the velocity. We present the progress in implementing an additional Doppler spectroscopy diagnostic, set up to determine the 3D plasma fluid velocity profile by vector tomographic reconstruction. The line-integrated measurements are collected from 70 locations around the plasma into a 35 channel fiber-bundle array and recorded on a CCD array after passing through the 1m monochromator. The reconstruction of the solenoidal component of the velocity vectors uses the spherical harmonics expansion method [1]. Realistic simulations of the experimental setup determines the required location and minimum number of line-of-sights (projections) for an acceptable reconstruction. Experimental results will be discussed. The diagnostic will help determine the ion self-helicity of a compact toroid in the context of two-fluid MHD relaxation theory [2]. [1] AL Balandin, Y Ono, J. Comp. Phys., 202 (2005) 52-64 [2] L Steinhauer, A Ishida, Phys. Rev. Lett., 79, 18 (1997)

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