Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Evaluation of Kinematic Viscosity of Rotating Cylindrical Plasmas Using Flow Velocity Profile Measurements[1] SHINJI YOSHIMURA, National Institute for Fusion Science, Japan, MASAYOSHI TANAKA, Kyushu Univ., Japan — Viscosity plays a crucial role in determining plasma flow structures. In torus plasmas, for example, the poloidal plasma flow driven by radial electric field produces the toroidal flow through the effect of viscosity. In a laboratory plasma, spontaneous formation of a stable vortex with a density hole around the central axis has been observed. The vorticity distribution around the central axis is well approximated by Burgers vortex in viscous fluids. The kinematic viscosity estimated from the size of the vortex is three to four orders of magnitude larger than the classical value. Although the importance of viscosity on flow structure formation is well recognized, viscosity measurements in laboratory plasmas have been seldom performed. Here we present and discuss an evaluation method of effective plasma viscosity utilizing flow velocity profile measurement. We consider the azimuthal component of ion fluid equation imposing axisymmetric condition. Then the kinematic viscosity is expressed by known quantities related to the flow profile. The result obtained by applying this method to a rotating argon plasma will be shown in the meeting.

[1]This work was partially supported by Grant-in-aid from JSPS No.19740348.

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Date submitted: 20 Jul 2007 Electronic form version 1.4