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Role of poloidal flows on the particle confinement time in a simple toroidal device : an experimental study UMESH KUMAR, R GANESH, Y. C. SAXENA, Inst for Plasm Res, SHEKAR G. THATIPAMULA, Pohang University of science and Technology, K. SATHYANARAYANA, DANIEL RAJU, Inst for Plasm Res — In magnetized toroidal devices without rotational transform also known as Simple Magnetized Torus (SMT). The device BETA at the IPR is one such SMT with a major radius of 45 cm, minor radius of 15 cm and a maximum toroidal field of 0.1 Tesla. Understanding confinement in such helical configurations is an important problem both for fundamental plasma physics and for Tokamak edge physics. In a recent series of experiments it was demonstrated experimentally that the mean plasma profiles, fluctuation, flow and turbulence depend crucially on the parallel connection length, which was controlled by external vertical field. In the present work, we report our experimental findings, wherein we measure the particle confinement time for hot cathode discharge and ECRH discharge, with variation in parallel connection length. As ECRH plasma don't have mean electric field and hence the poloidal rotation of plasma is absent. However, in hot cathode discharge, there exist strong poloidal flows due to mean electric field. An experimental comparison of these along with theoretical model with variation in connection length will be presented. We also present experimental measurements of variation of plasma confinement time with mass as well as the ratio of vertical field to toroidal magnetic field.

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