Abstract Submitted
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Neoclassical level poloidal rotation measurements based on the inboard-outboard asymmetry of toroidal rotation in the TCV tokamak YANN CAMENEN, CNRS / Aix-Marseille Univ., ALESSANDRO BORTOLON, University of California, Irvine, ALEXANDER N. KARPUSHOV, YANIS ANDREBE, BASIL DUVAL, LUCIA FEDERSPIEL, OLIVIER SAUTER, CRPP / EPFL — Direct and indirect poloidal rotation measurements with improved accuracy were performed and compared in the TCV tokamak. The indirect measurement argues that, provided the plasma flow is divergence free on a flux surface, poloidal rotation can be inferred from the toroidal rotation at the high and low field sides of a flux surface. The key advantage of the method is an intrinsic amplification factor: instead of measuring poloidal rotation directly (typically few km/s i.e. of the order of the measurement accuracy), a difference in toroidal rotation is measured that is 4 to 10 times larger. Here, the main uncertainties arise from the flux surface mapping that are, however, largely compensated by this amplification factor. In TCV, the C^{6+} toroidal rotation was measured across the whole plasma diameter by charge exchange (CX) spectroscopy for a series of low collisionality ($0.1 < \nu^* < 1.5$) OH and ECH L-mode plasmas, including positive and negative plasma current and toroidal magnetic field. Interestingly, the inferred poloidal rotation and the neoclassical theory predictions from the NEOART code, a variant of NCLASS, agree within ± 1 km/s. In particular, a reversal of poloidal rotation is observed with the toroidal magnetic field direction, as predicted by theory.

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