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Gyrokinetic simulations predict anomalous poloidal rotation in tokamak plasmas GUILHEM DIF-PRADALIER, VIRGINIE GRANDGIRARD, YANICK SARAZIN, XAVIER GARBET, PHILLIPPE GHENDRIH, PAOLO ANGELINO, ASSOCIATION EURATOM-CEA, CEA/IRFM, CADARACHE, FRANCE TEAM — First-principle based collisionless gyrokinetic theory consensually provides today's deepest insight on turbulence-related problems in plasma physics. Conversely, neoclassical theory describes the effects of binary Coulomb collisions in a toroidal and inhomogeneous magnetic geometry and its consequences on particle trapping. The interplay between turbulence and collisions is a subject of great current focus for first-principle modeling since recent evidences have started to emphasise its relevance for the onset and the control of enhanced confinement regimes in the next-generation devices like Iter. A finite differences Fokker-Planck ion-ion collision operator is implemented in the *full-f* and *global* GYSELA code and has been thoroughly benchmarked in neoclassical regimes. Two types of simulations are compared, either purely neoclassical or turbulent including neoclassical effects. In each case, three different values of collisionality in the banana regime are investigated. Preliminary results show an enhancement of about 30% of the poloidal rotation of the main ions (Z=1) in the turbulent regime as compared to its neoclassical value. In all cases the radial force balance equation is satisfied within a few percent. Most of this increase comes from the radial electric field.

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