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Effect of up-down asymmetry on the plasma current[1] JAVIER MAURINO, FELIX PARRA, MICHAEL BARNES, University of Oxford, SARAH NEWTON, CCFE — Up-down asymmetric geometries enable turbulence to redistribute toroidal momentum in the radial direction [Camenen, et al. 2010]. The bulk toroidal rotation generated by this phenomenon can improve MHD stability, motivating recent work to optimise the magnetic geometry in order to maximise the plasma rotation [Ball, et al. 2014]. However, the impact that this asymmetric turbulence has on the plasma current had not yet been studied. To this end, we have coupled a δf local gyrokinetic code (STELLA) and a neoclassical code (SFINCS). We show that the elongated asymmetric geometries found to maximize intrinsic rotation yield higher plasma currents than symmetric configurations. Nevertheless, the asymmetric turbulence produces a negligible effect on the current when compared to the total increment observed. The up-down asymmetric configuration also affects the balance of trapped and passing particles. Scans in elongation and elongation tilt suggest that the trapped particle population can be increased, yielding potential enhancements to the current of the order of 10% in originally symmetric geometries.

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