Scaling of confinement time and SOL-like boundary conditions in GYSELA global and flux-driven simulations

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Abstract

Plasma turbulence determines the performance, measured by the energy confinement time, of fusion machines. Of particular interest is the confinement time scaling with operational parameters. We investigate the confinement time resulting from 5D global and flux-driven gyrokinetic simulations of ITG turbulence with the GYSELA code. Scaling laws with respect to dimensionless parameters accounting for plasma size, aspect ratio and collisionality are determined from a set of near steady state simulations. Boundary conditions of the code have been improved to Scrape-Off Layer like for the ion heat flux and adiabatic electron response. The penalisation technique used to simulate the wall and limiter region is observed to be numerically stable.