Abstract Submitted
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Calculation of Neoclassical Ripple Transport in ITER using SFINCS[1] ELIZABETH PAUL, MATT LANDREMAN, University of Maryland, College Park, DONALD SPONG, Oak Ridge National Laboratory, FRANCESCA POLI, Princeton Plasma Physics Laboratory — Neoclassical interactions with non-axisymmetric magnetic fields cause a damping force known as neoclassical toroidal viscosity (NTV). The toroidal symmetry of ITER will be broken by the finite number of toroidal field coils and the presence of perturbing ferromagnetic structures such as test blanket modules (TBM) and ferritic inserts (FI). We compute 3D equilibrium magnetic fields for an ITER steady-state scenario using VMEC and calculate neoclassical transport quantities in the presence of these error fields using the Stellarator Fokker-Planck Iterative Neoclassical Conservative Solver (SFINCS) code. In the presence of both the FI and TBM, the net effect is a decrease in toroidal damping. The magnitude of NTV torque density at large radii ($r/a \geq 0.7$) is comparable to the NBI torque density at small radii ($r/a \leq 0.4$), but is opposite in direction. This could indicate the possibility of generating sheared flows. The magnetic field ripple does not significantly affect the neoclassical tokamak relationship between radial electric field and parallel flow velocity, and at $r/a \geq 0.7$ the ripple drives additional collisional heat flux comparable to the axisymmetric neoclassical flux.

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