Abstract Submitted
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3D Simulations of Edge Transport for RMP Experiments at DIII-D[1] H. FRERICHS, German Research School for Simulation Sciences GmbH, O. SCHMITZ, D. REITER, FZJ, T.E. EVANS, GA, Y. FENG, MPI, M.E. FENSTERMACHER, LLNL — Resonant magnetic perturbations (RMPs) are a candidate for ELM control in ITER. Modeling of the perturbed magnetic field structure during RMPs in the vacuum approach suggests the formation of an open chaotic edge layer, leading to a complex 3D magnetic field. To investigate the resulting impact on plasma and neutral gas transport, the 3D edge transport code EMC3-EIRENE has been extended to poloidal divertor geometry. For this, a new grid topology, i.e., grid cells with non-trivial neighbor relations, has been introduced to the code. This facilitates simulations of regions with poloidally asymmetric radial extensions (such as the edge layer in poloidal diverted tokamaks) and allows, for the first time, 3D simulations of ELM control experiments at DIII-D using a self-consistent treatment of the particle and energy transport. These simulations predict a significant 3D modulation of electron density and temperature by the perturbed magnetic topology. Experimental observations show clear splitting of target particle flux. Modeling results predict this splitting only for small anomalous perpendicular transport coefficients.

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