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Impact of Resonant Magnetic Perturbation Fields on NSTX-U Advanced Divertor Topologies IAN WATERS, HEINKE FRERICHS, OLIVER SCHMITZ, University of Wisconsin-Madison, JOON-WOOK AHN, Princeton Plasma Physics Laboratory, GUSTAVO CANAL, TODD EVANS, General Atomics, VLAD SOUKHANOVSKII, Lawrence Livermore National Laboratory — Explorations are under way to optimize the magnetic topology in the plasma edge of NSTX-U with the goal of improving neutral and impurity fueling and exhaust. The use of magnetic perturbation fields is being considered to spread heat and particle fluxes in the divertor, adjust plasma refueling, control impurity transport, and improve coupling to the exhaust systems. Also, advanced divertor configurations are being considered to improve peak heat loads on divertors. An assessment is made of the topologies of a number of representative NSTX-U advanced divertor configurations: lower single null, exact snowflake, and snowflake minus. Wall to wall magnetic connection lengths for each configuration are assessed in both their perturbed and axisymmetric configurations with perturbation coil currents of 1kA and 3kA. The magnetic perturbations yield complex strike patterns on divertor elements that are expected to be resolvable experimentally. The EMC3-EIRENE fluid plasma and kinetic neutral transport code will be used to study neutral and impurity transport and exhaust in these topologies. This work was funded in part by the Department of Energy under grant DE-SC0012315 and by startup funds of the Department of Engineering Physics at the University of Wisconsin-Madison.

Ian Waters
University of Wisconsin-Madison

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