Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Evaluating NSTX-U Operational Space Relative to PFC Engineering Limits[1] TOM LOOBY, University of Tennessee - Knoxville, MATTHEW REINKE, ANDREAS WINGEN, Oak Ridge National Laboratory, DAVID DONOVAN, University of Tennessee - Knoxville, MIKE MESSINEO, JONATHAN KLABACHA, Princeton Plasma Physics Laboratory — Sustaining high beam power on NSTX-U, $P_{NBI} \sim 10$ MW for $\Delta t \sim 5$s , may be limited by overheating of the divertor plasma facing components (PFCs). New castellated and fish-scaled graphite PFCs are inherently 3-dimensional, creating non-axisymmetric features that vary with plasma shape. A new Heat flux Engineering Analysis Toolkit (HEAT) has been developed to simulate 3D plasma effects coupled to 3D CAD geometry. Features of HEAT are described and predictions compared with 2D models originally used to scope design requirements. Results show how HEAT can be used to map an operational space for NSTX-U to reduce the risk of PFC failure. A side by side comparison of the 2D design analysis with 3D HEAT results is provided for a variety of discharge configurations and features that are missed with a 2D toroidally symmetric model are highlighted.

[1]This work is supported in part by U.S. Department of Energy Awards: DE-AC05-00OR22725 DE-AC02- 09CH11466

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Date submitted: 25 Jun 2020 Electronic form version 1.4