Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Uncertainty quantification workflows in fusion plasma surface interaction modeling TIERNAN CASEY, KHACHIK SARGSYAN, HABIB NAJM, Sandia National Laboratories California — Numerical simulations of plasma surface interactions at the device level involve multi-scale processes represented through complex coupled models. These models are defined by parameters that are estimated from typically noisy experimental measurement data, or from higher fidelity simulations that themselves contain multiple parameters that may be physical or related to numerical convergence or tuning. As such the uncertain nature of these parameters and their consequence on the uncertainty of predictions is of interest in order to glean meaningful conclusions with respect to design and operational optimization. We present a variety of uncertain quantification methodologies to enable quantification of parameter uncertainty, model selection, and efficient uncertainty propagation and describe their deployment in the context of a fusion reactor plasma surface interaction modeling hierarchy.

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Date submitted: 03 Jul 2019 Electronic form version 1.4