Abstract Submitted
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Neural Network Based Models for Fusion Applications*[1] ORSO MENEGHINI, GA, ARSENE TEMA BIWOLE, TEOBALDO LUDA, PoliTO, BAILEY ZYWICKI, U-Michigan, CRISTINA REA, MIT, STERLING SMITH, PHIL SNYDER, EMILY BELLI, GARY STAEBLER, JEFF CANTY, GA — Whole device modeling, engineering design, experimental planning and control applications demand models that are simultaneously physically accurate and fast. This poster reports on the ongoing effort towards the development and validation of a series of models that leverage neural-network (NN) multidimensional regression techniques to accelerate some of the most mission critical first principle models for the fusion community, such as: the EPED workflow for prediction of the H-Mode and Super H-Mode pedestal structure the TGLF and NEO models for the prediction of the turbulent and neoclassical particle, energy and momentum fluxes; and the NEO model for the drift-kinetic solution of the bootstrap current. We also applied NNs on DIII-D experimental data for disruption prediction and quantifying the effect of RMPs on the pedestal and ELMs. All of these projects were supported by the infrastructure provided by the OMFIT integrated modeling framework.

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