Abstract Submitted
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**Self-consistent modeling investigation of density fueling needs on ITER and future devices**[1] JOSEPH MCCLENAGHAN, General Atomics, JIE ZHANG, ASIPP, LANG LAO, ORSO MENEGHINI, PAUL PARKS, STERLING SMITH, WEN WU, General Atomics — Self-consistent modeling using the STEP workflow in OMFIT (predicting pedestal with EPED, core profiles with TGYRO, current profile with ONETWO, and EFIT for equilibrium) suggests ITER and future devices such as CFETR will benefit from high-density operation (Greenwald limit fraction $f_{gw} \sim 0.7 - 1.3$). Regimes with operational $n_e$ near the Greenwald limit will likely need peaked $n_e$ profiles so that the $n_e$ pedestal remains below the Greenwald limit. Peaked $n_e$ profiles can be achieved with the help of pellet injection. Furthermore, the primary source of tritium in ITER will be provided via pellet injection. The Pellet Ablation Module (PAM), which predicts the density source of an ablated pellet based on the PELLET module, has been developed for predicting pellet fueling for transport studies, and has been incorporated into the STEP workflow for predictive modeling. On ITER the effect of pellet fueling is examined on two high-density scenarios: the super-H mode inductive scenario and the steady-state high $\beta_p$ scenario. On CFETR, with a mid-radius density source, an average of $10^{22}$ particles/sec are required to predict $n_e$ and $T_i$ necessary for the 1000 MW advanced scenario.

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Joseph McClenaghan
General Atomics

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