Abstract Submitted
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Coupled core-pedestal simulations with self-consistent transport of impurities[1] G. SNOEP, Eindhoven University of Technology, O. MENEGHINI, General Atomics, B. GRIERSON, A. ASHOURVAN, PPPL, E. BELLI, J. CANDY, P.B. SNYDER, G.M. STAEBLER, General Atomics, J. CITRIN, DIFFER, R.J.E. JASPERS, Eindhoven University of Technology — This poster reports on the ongoing development of a production tool that robustly predicts density, temperature and rotation profiles from on-axis to the separatrix. The number of free parameters and assumptions in the simulations are reduced by using physics based models that are self-consistently coupled to one another. Previous coupled core-pedestal simulations were shown to be able to reproduce experimental profiles [Meneghini PoP 2016, NF 2017], but relied on prior knowledge of the plasma Z_{eff} and pedestal rotation boundary condition. Z_{eff} is an important parameter since it influences both core performance, through transport and line radiation, and pedestal stability via its effect on the bootstrap current. To self-consistently account for the effects of impurities the previously mentioned core-pedestal workflow is iteratively coupled to the 1D impurity transport code STRAHL [Dux 2006] within the OMFIT framework. In this scheme NEO and TGLF will provide the transport fluxes used to calculate the diffusion and pinch profiles used in STRAHL. The new workflow also implements a boundary condition for the plasma rotation based on first principles [Stoltzfus-Dueck PRL 2015].

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Orso Meneghini
General Atomics

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