Abstract Submitted
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Modeling of Pellet Ablation and Deposition on Plasma Facing Surfaces[1] A.M. LIETZ, U. Illinois, G.L. JACKSON, W. WU, General Atomics, L.R. BAYLOR, N. COMMAUX, ORNL — The injection of pellets into tokamaks has a variety of uses, such as ELM mitigation, refueling, and the reduction of hydrogenic recycling. We have modeled the ablation rate of pellets as a function of the plasma density and temperature. A computational model is then used to compare pellet ablation, penetration into the plasma and, for non-hydrogenic pellets, the deposition of ablation material on plasma facing surfaces. In the pedestal region, density and temperature profiles are approximated by a tanh fit using DIII-D experimental data. Penetration and ablation profiles of lithium pellets are compared to Be, B, C, and cryogenic deuterium pellets using these profiles. The behaviors at different injection locations, initial velocities, and pellet sizes are also explored, especially to determine the minimum size and velocity necessary to reach just inside of the last closed flux surface. The results of the model can be used to optimize a lithium dropper experiment for DIII-D by determining the placement of the dropper and size of the lithium pellets for maximum penetration.

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