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Lagrangian Particle Simulation of Neon Pellets and SPI for Plasma Disruption Mitigation in Tokamaks[1] ROMAN SAMULYAK, SHAOHUA YUAN, NIZAR NAITLHO, NICOLAS BOSVIEL, Stony Brook University, PAUL PARKS, General Atomics, CENTER FOR TOKAMAK TRANSIENT SIMULATIONS COLLABORATION — Numerical studies of the ablation of neon pellets and shuttered pellet injection (SPI) fragments in tokamaks in the plasma disruption mitigation parameter space have been performed using the time-dependent pellet ablation model based on the Lagrangian Particle (LP) code. The code implements kinetic models for the electronic heat deposition, pellet surface ablation model, equations of state with multiple ionization support, radiation in optically thin limit, and a model for grad B drift of the ablated material across the magnetic field. The Lagrangian particle algorithm is highly adaptive, capable of simulating a large number of fragments in 3D while eliminating numerical difficulties of dealing with the tokamak background plasma. The code achieved good agreement with theory for spherically symmetric ablation flows in terms of ablation rates and their scaling laws as well as the properties of the ablated cloud at the sonic radius. The LP pellet ablation model has been validated using experimental data for deuterium fueling pellets. Simulation prediction of the dependence of single pellet ablation rates on background plasma parameters and the magnetic field will be presented. We will also present simulations of SPI fragments at conditions relevant to DIII-D injection experimen

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