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Modeling of ELM-pacing by Lithium Granule Injection with M3D-C1[1] A. FIL, E. KOLEMEN, Princeton U., N. FERRARO, S. JARDIN, A. BORTOLON, R. LUNSFORD, R. MAINGI, PPPL, P.B. PARKS, GA — We present first modeling results of ELM-pacing by Lithium Granule Injections (LGI) with the 3D full-MHD code M3D-C1. A newly implemented ablation model valid for sub-mm Li granules provides a realistic density source, allowing to model granule injections of realistic size and speed in DIII-D and NSTX-U plasmas. While DIII-D experiments have demonstrated a robust ELM-pacing with ELM triggering efficiency close to 80% for 0.9 mm Li granules, in some cases a strong variability of triggered ELM size was observed. To investigate numerically these phenomena, we first validate the code against experimental data from both DIII-D and NSTX-U discharges, specifically the measured granule ablation time, penetration depth and the increase of line integrated electron density. The maximum pressure gradient induced by LGI scales with the granule size. The injection velocity and angle have to be carefully chosen to reach maximum ablation when the granule is at the top of the pedestal. Then, 3D simulations of granule injections into a pedestal close to marginal stability are used to study ELM pacing efficiency, as a function of injection characteristics, i.e. granule size and speed.

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