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Utilizing M3D-C1 to understand triggering of ELMs in pellet pacing experiments in DIII-D ITER-like plasmas[1] S.J. DIEM, L.R. BAYLOR, ORNL, N.M. FERRARO, PPPL, B.C. LYONS, GA, D. SHIRAKI, R.W. WILCOX, ORNL — M3D-C1, a code for solving the linear and non-linear extended-MHD equations in toroidal geometry, is currently being used to model pellet ELM triggering in DIII-D ITER-like plasmas. ELM pacing via injection of hydrogenic pellets can trigger small ELMs at a rate exceeding the natural ELM frequency and has been shown to be a successful method to mitigate effects of large ELMs. Understanding of the physical mechanisms of ELM triggering and improved modeling are required for confident extrapolation to ITER and beyond. A feature of M3D-C1 is that an unstructured triangular mesh provides sufficient resolution to capture the sharp gradients present in the pellet deposition layer. Additionally, the code provides high toroidal resolution that is important for investigating the ballooning mode physics of ELM triggering by pellets. Recent M3D-C1 modeling efforts have focused on 3D nonlinear- time-dependent simulations incorporating a pellet ablation model. Simulated pellets are injected at a speed of 150 m/s with varying pellet size and ablation location to examine the affect of ELM triggering in DIII-D ITER-like plasmas. Initial 3D results show toroidally localized perturbations in the pressure and current profiles due to the presence of the pellet.

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Stephanie Diem
Oak Ridge National Laboratory

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