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Impurity Killer Pellet Plasma Termination and Disruption Mitigation Physics in the DIII–D Tokamak[1] T.E. EVANS, A.G. KELLMAN, P.L. TAYLOR, P.B. PARKS, D.A. HUMPHREYS, M.J. SCHAFFER, A.W. HYATT, R.L. LEE, S.C. CHIU, General Atomics, D.G. WHYTE, S. LUCKHARDT, UC, San Diego, T.C. JERNIGAN, L.R. BAYLOR, ORNL, S. JARDIN, G.L. SCHMIDT, PPPL, R.W. HARVEY, CompX — Impurity killer pellet (KP) injection with Ne and Ar have shown that the ablation and mass distribution profiles are different than those of D_2 pellets. This may be related to large instabilities observed during ablation. Modeling indicates these may be ∇P instabilities driven by rapid, non-isobaric cooling of flux surfaces during the pellet flight. In addition, KP injection can produce prompt runaway electron bursts. Two burst mechanisms are being considered: plasma mixing by ∇P modes may supply the cold region behind the pellet with thermal $T_e > E_{Dreicer}$ electrons or weakly coupled Maxwellian tail electrons with energies >12 T_e may slide away from the rapidly cooled thermal distribution. Modeling indicates that methane pellets may be able to provide successful mitigation and avoid these problems. Initial methane results are in good agreement with the model.

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