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Numerical modeling for energy transport and isochoric heating in ultra-fast heated high Z target ROHINI MISHRA, YASUHIKO SENTOKU, PETER HAKEL, ROBERTO C. MANCINI, University of Nevada, Reno — Collisional Particle-in-Cell (PIC) code is an effective tool to study extreme energy density conditions achieved in intense laser-solid interactions. In the continuous process of developing PIC code, we have recently implemented models to incorporate dynamic ionizations, namely Saha and Thomas Fermi, and radiation cooling (due to Bremsstrahlung and line emissions). We have also revised the existing collision model to take into account bounded electrons in dynamically ionizing target (partially ionized target). One-dimensional PIC simulation of a gold target with new collision model shows strong local heating in a micron distance due to shorter stopping range of fast electrons, which reflects the increased collision frequency due to bound electrons. The peak temperature in the heated region drops significantly due to the radiation cooling to a level of a few hundred eV from keV. We also discuss the target Z dependence on radiation loss and two-dimensional effects such as the resistive magnetic fields in the hot electron transport in metal targets.

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