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Energy transport and isochoric heating of ultra-fast heated low-Z targets ROHINI MISHRA, YASUHIKO SENTOKU, PETER HAKEL, ROBERTO MANCINI, University of Nevada, Reno — Ultra-short intense laser pulse generates hot electrons on a target surface. Energy transport and isochoric heating of solid target are important for number of applications, e.g. the generation of secondary sources (ions, X-rays, etc) or the fast ignition of inertial fusion targets. We have performed a particle-in-cell, PICLS, which incorporates the relativistic Coulomb collisions and dynamic ionization in gas and solid targets in order to study the MA current transport and isochoric heating in low Z insulator targets. Our target is a triple layered plastic target ($C_2H_2/C_2H_3Cl/C_2H_2$, 5μm-thick for each layer), inspired by the experiments by Ohshima, Nishimura et al., ILE, Osaka. In the experiment, the 2^{nd} layer is heated up to 50 eV by irradiating a 0.5 PW laser pulse with 250 J in 500fs. We studied the isochoric heating processes in the triple-layered target, and identified three different heating processes, namely, resistive, collisional and diffusive heating, which compete in their different time frames. Re-circulating hot electrons ionize the target, and change the resistivity dynamically. Effects of hot electron recirculation, dynamic ionization, and the resistive magnetic fields are also discussed in this talk.

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