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First PIC simulations modeling the interaction of ultra-intense lasers with sub-micron, liquid crystal targets MATTHEW MCMAHON, PATRICK POOLE, CHRISTOPHER WILLIS, DAVID ANDERECK, DOUGLASS SCHUMACHER, The Ohio State University — We recently introduced liquid crystal films as on-demand, variable thickness (50 – 5000 nanometers), low cost targets for intense laser experiments [POP 21, 063109 (2014)]. Here we present the first particle-in-cell (PIC) simulations of short pulse laser excitation of liquid crystal targets treating Scarlet (OSU) class lasers using the PIC code LSP. In order to accurately model the target evolution, a low starting temperature and field ionization model are employed. This is essential as large starting temperatures, often used to achieve large Debye lengths, lead to expansion of the target causing significant reduction of the target density before the laser pulse can interact. We also present an investigation of the modification of laser pulses by very thin targets. This work was supported by the DARPA PULSE program through a grant from ARMDEC, by the US Department of Energy under Contract No. DE-NA0001976, and allocations of computing time from the Ohio Supercomputing Center.

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