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Absorption of Intense Short Laser Pulses in Nanowire Arrays[1]
ANDREAS KEMP, SCOTT WILKS, GARY GRIM, RICCARDO TOMMASINI, GINEVRA COCHRAN, JAEBUM PARK, Lawrence Livermore Natl Lab — We study the absorption of intense short laser pulses in arrays of carbon nanowires attached to solid substrates; in particular, we are interested in sub-100fs pulses with several Joules of energy, as well as multi-picosecond, multi-kiloJoule pulses. In both cases, we find that laser absorption of nanowire targets exceeds that of flat targets even if preceded by density gradients. Performing two- and three-dimensional particle-in-cell simulations, we focus on laser absorption physics, particle acceleration during the formation of nanoscale z-pinches, and on applications like the optimization of this target platform for nuclear physics experiments [Kemp et al, Nat.Comm. 10:4156 (2019)] and compact, fast neutron sources.

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