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Interaction of intense multi-picosecond laser pulses with matter for HEDP[1] ANDREAS KEMP, LAURENT DIVOL, FREDERIC PEREZ, BRUCE COHEN, LLNL — We present new results on kinetic modeling of Petawatt laser pulses relevant to fast-ignition inertial confinement fusion and related experiments. First, fully resolved simulations of relativistic electron beams at reduced scale provide guidance on numerical requirements and mitigation strategies with respect to instabilities that occur near the laser-plasma interaction region. In a second step, full-scale 2D and 3D simulations are used to characterize the multi-picosecond evolution of the laser energy conversion into hot electrons, i.e., conversion efficiency as well as angular- and energy distribution; the impact of return currents on the laser-plasma interaction; and the effect of self-generated electric and magnetic fields on the onset of electron transport near the laser interaction region. We will report applications to current experiments at LLNL's Titan laser and to a Fast-Ignition point design.

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