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Effects of strong radiation reaction and quantum-electrodynamics on relativistic transparency PENG ZHANG, A.G.R. THOMAS, University of Michigan, Ann Arbor, MI, USA, C.P. RIDGERS, Physics Department, University of York, UK — Relativistic transparency is the process that optically switches the overdense plasma from opaque to transparent and enables light propagation through the otherwise opaque plasma, when light of sufficient intensity drives the electrons in the plasma to near light speeds. We study the relativistic transparency in radiation dominant and strong quantum electrodynamic (QED) regime, for the interaction of high-intensity laser pulses with a thin foil solid target. We analytically study the simplified motion of an electron in a circularly polarized plane wave to understand the physics of the transmissivity and absorption in the presence of classical and quantum-corrected, semiclassical radiation-reaction forces and the trapping of particles in nodes of laser standing wave through radiative cooling. These arguments are supported by both one dimensional and two dimensional particle-in-cell calculations including strong field QED effects. Measurement of the transmission of these pulses would be experimentally feasible and a robust test of the strong field QED particle-in-cell framework.

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