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Flying relativistic mirrors for nonlinear QED studies.[1] STEPAN BULANOV, CARL SCHROEDER, ERIC ESAREY, WIM LEEMANS, Lawrence Berkeley National Laboratory — Recent progress in laser technology has led to a dramatic increase of laser power and intensity. As a result, the laser–matter interaction will happen in the radiation dominated regimes. In a strong electromagnetic field, electrons can be accelerated to such high velocities that the radiation reaction starts to play an important role. The radiation effects change drastically the laser–plasma interaction leading to fast energy losses. Moreover, previously unexplored regimes of the interaction will be entered into, in which quantum electrodynamics (QED) can occur. Depending on the laser intensity and wavelength, either classical or quantum mode of radiation reaction prevail. In order to study different regimes of interaction as well as the transition from one into another the utilization of flying relativistic mirrors, which can generate electromagnetic pulses with varying frequency and intensity, is proposed. The scheme is demonstrated for multiphoton Compton scattering.

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