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High Intensity Particle Physics at PW-class laser facilities STEPAN BULANOV, CARL SCHROEDER, ERIC ESAREY, Lawrence Berkeley National Laboratory, TIMUR ESIRKEPOV, MASAKI KANDO, Kansai Photon Science Institute, JAEA, NIKOLAY ROSANOV, Vavilov State Optical Institute, GEORG KORN, ELI Beamline Facility, Institute of Physics, Czech Academy of Sciences, SERGEY V. BULANOV, Kansai Photon Science Institute, JAEA, WIM P. LEEMANS, Lawrence Berkeley National Laboratory — The processes typical for high intensity particle physics, i.e., the interactions of charged particles with strong electromagnetic fields, have attracted considerable interest recently. Some of these processes, previously believed to be of theoretical interest only, are now becoming experimentally accessible. High intensity electromagnetic (EM) fields significantly modify the interactions of particles and EM fields, giving rise to the phenomena that are not encountered either in classical or perturbative quantum theory of these interactions. One of such phenomena is the radiation reaction, which radically influences the electron motion in an electromagnetic standing wave formed by two super-intense counter-propagating laser pulses. Depending on the laser intensity and wavelength, either classical or quantum mode of radiation reaction prevail, or both are strong. When radiation reaction dominates, electron motion evolves to limit cycles and strange attractors. This creates a new framework for high energy physics experiments on an interaction of energetic charged particle beams and colliding super-intense laser pulses. Work supported by U.S. DOE under Contract No. DE-AC02-05CH11231.

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