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Radiation reaction effects in the laser-charged particle interaction[1] STEPAN BULANOV, University of California, Berkeley, ERIC ESAREY, CARL SCHROEDER, WIM LEEMANS, Lawrence Berkeley National Laboratory, ALEXANDER THOMAS, University of Michigan, TIMUR ESIRKEPOV, JAMES KOGA, SERGEI BULANOV, Japan Atomic Energy Agency — During the interaction with ultra-high intensity laser pulses, an electron experiences a strong influence from the self-emitted radiation. This process may strongly affect the experiments being planned with next generation lasers (e.g., mulitple laser pulses with peak powers >100 PW and with a combined focused intensity $> 10^{25}$ W/cm^2), which will also lead to the investigation of new regimes of laser pulse interaction not available before. We study the dependence of the radiation reaction effects on the electromagnetic pulse polarization for different pulse configurations. This dependence will fully manifest itself at extremely high intensities. For circularly polarized colliding pulses, the EM avalanche of photons and electron-positron pairs will immediately follow the production of a single pair at focus, dominating both the charged particle motion and the pulse evolution. We show that, in contrast, for linearly polarized colliding pulses of the same total energy, the effects of radiation reaction are much weaker.

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Stepan Bulanov
University of California, Berkeley

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