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Straggling in laser-electron beam collisions

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Current high intensity laser facilities can be used to reach the regime in which electron trajectories are strongly modified by the quantum equivalent of the radiation reaction force. We describe a Monte-Carlo simulation of a set-up in this regime and present results in which GeV electrons counter-propagate into a 10^{22} W/sq cm laser pulse. These show that the stochastic nature of quantum synchrotron emission results in many more high energy photons than expected from a purely classical calculation, and that electron-positron pair production by an analog of the nonlinear Breit-Wheeler process should be observable.

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