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Using existing laser facilities to probe quantum radiation reaction –optimal parameters and expected results

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High power laser facilities currently under construction will open up new accelerator applications, which will encounter quantum processes. Experiments such as Compton backscatter sources will require a thorough experimental understanding of non-classical behaviour. Recently, experiments have started to measure these effects in isolation by studying radiation reaction, using the collision between a PW-scale laser pulse and GeV electron beams from a laser wakefield accelerator. However, for these experiments to conclusively identify and understand these quantum effects, high quality electron beams and laser pulses are required.

We describe simulations of radiation reaction experiments using realistic parameters, already demonstrated

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