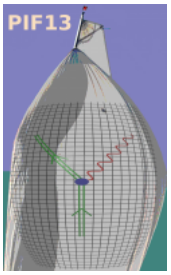

Contribution ID: **14** Type: **oral presentation**

Nonlinear double Compton scattering in the ultrarelativistic quantum regime

Tuesday, 9 July 2013 14:00 (25 minutes)

A detailed analysis of the process of two-photon emission by an electron scattered from a high-intensity laser pulse is presented. The calculations are performed in the framework of strong-field QED and include exactly the presence of the laser field described as a plane wave [1]. We investigate the full nonlinear quantum regime of interaction with a few-cycle pulse, where nonlinear effects in the laser field amplitude, photon recoil, and the short pulse duration substantially alter the emitted photon spectra as compared to those in previously studied regimes. We provide a semiclassical explanation for such differences, based on the possibility of assigning a trajectory to the electron in the laser field before and after each quantum photon emission [2]. Our numerical results indicate the feasibility of investigating experimentally the full ultrarelativistic quantum regime of nonlinear double Compton
scattering with available electron accelerator and laser technology.

References

[1] A. Di Piazza et al., Rev. Mod. Phys. 84, 1177 (2012).
[2] F. Mackenroth and A. Di Piazza, Phys. Rev. Lett. 110, 070402 (2013).

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Session Classification: Processes and Solutions