Contribution ID: **29** Type: **Oral presentation**

Towards the detection of strong field, Volkov resonances in electron-laser interactions

Tuesday, 27 September 2016 10:00 (15 minutes)

A theoretical and phenomenological consideration is given to higher order, strong field effects in electron/laser interactions. A consistent strong field theory is the Furry interaction picture of quantum field theory [1,2]. In this theory, fermions are embedded in the strong laser field and the Volkov wavefunction solutions that result, are exact with respect to the strong field [3,4]. When these Volkov fermions interact with individual photons from other sources, the transition probability is enhanced in a series of resonances when the kinematics allow the virtual fermion to go on-shell [5,6]. In order to move towards an experiment that detects these resonances, a simple analytical description of these Volkov resonances is required.

Recent work allows a simple form for Volkov traces, using Fierz relations and strong field Ward identities. Volkov resonances are understood in terms of bound or excited strong field states that decay according to the strong field self-interaction of virtual fermions. When these insights are applied to the Furry picture, 2 vertex Compton scattering, a clear description of Volkov resonances results. All of this is reported on, including the experimental set-up required to detect these new, theoretically predicted, phenomena.

References
[1] S. Schweber. An introduction to Relativistic Quantum Field Theory, section 15g.
[2] A. Hartin, EPJ C 71:1729, appendix A (2011)
[3] D.M. Volkov, Z. Phys 94:250 (1935)
[4] A. Hartin, Phys. Lett. B., 743:166 (2015)
[5] V.P. Oleinik, Sov. Phys. JETP, 25(4):697 (1967)
[6] V.P. Oleinik, Sov. Phys. JETP, 26(6):1132 (1968)

Primary author: HARTIN, Anthony (University of Hamburg)

Presenter: HARTIN, Anthony (University of Hamburg)

Session Classification: S2.3: Channeling & Radiations in Various Fields