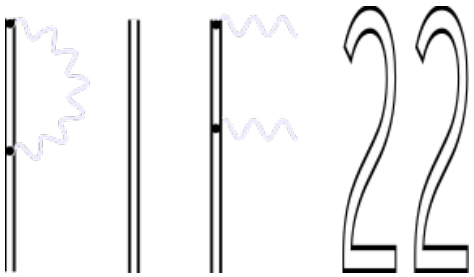

Contribution ID: **11** Type: **not specified**

Nonlinear Compton scattering in time-dependent electric fields: LCFA and beyond

Thursday 1 September 2022 10:35 (20 minutes)

The locally constant crossed field approximation (LCFA) is a powerful tool for studies of various strong field QED phenomena. It is common that numerical codes for simulating strong laser-matter interaction rely on LCFA for taking into account QED effects, and therefore it is crucial to establish the limits of applicability of the approximation and develop possible extensions.

We explore LCFA in detail for photon emission by a spinless particle in a strong time-dependent electric field. This kind of electromagnetic field is of particular interest, because it models the electric antinode of a standing electromagnetic wave, which is the beneficial configuration for QED cascade generation. It is worth emphasizing that a time-dependent electric field is not crossed in contrast to the comprehensively studied case of a plane wave.

We develop an approach for calculating the photon emission probability rate in a generic time-dependent electric field. It allows one to establish the LCFA applicability range, and calculate the first and higher-order corrections to it. We test LCFA and such corrections against the numerically calculated probability rates.

Primary author: GELFER, Evgeny

Co-authors: Dr FEDOTOV, Alexander (National Research Nuclear University MEPhI); Dr MIRONOV, Arseny (LULI, Sorbonne Universite, CNRS, CEA, Ecole Polytechnique, Institut Polytechnique de Paris); Dr WEBER, Stefan (ELI Beamlines)

Presenter: GELFER, Evgeny

Session Classification: Strong Field QED

Track Classification: Strong-field QED: Laser particle physics