



Contribution ID: 27

Type: Oral

Unified Beam Dynamics and Radiation in Potential Channels Formed by Lasers of Arbitrary Polarisation.

Thursday, October 9, 2014 10:00 AM (15 minutes)

The questions of electron beam-laser interaction form a vast research area involving a great number of scientists all over the world. Thomson scattering, charged particles laser acceleration, laser wakefield acceleration and beam longitudinal phase space manipulation are probably the most popular aspects of laser-beam interaction research.

Nevertheless more and more work these days is devoted to describing charged particles dynamics in the field of crossed lasers [1, 2]. It was shown that such a field could cause charged particles channeling in its periodic potential [3, 4]. Namely, in the region of crossed laser fields interference potential channels parallel to lasers summarized wave vector are formed. Putting aside particles reflection from such a laminate potential, charged particles moving in this region could be either trapped in channeling regime [4, 5, 6], or become quasichanneled if their transverse energy exceeds channel barrier.

Unifying the results provided for different laser polarisations before, the arbitrary polarisation case description will be presented together with the latest results of electron beam radiation modelling in such a system. Also, questions of possible channeled particles acceleration will be discussed.

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Session Classification: S2: Channeling & Radiation in Various Fields