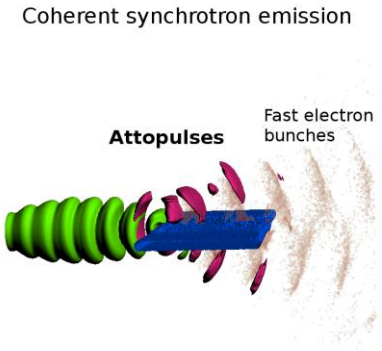
Short wavelength radiation from intense laser-plasma interactions

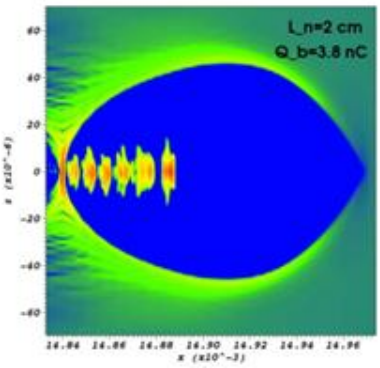
JAI – Oxford, Accelerator Science Seminars 2018

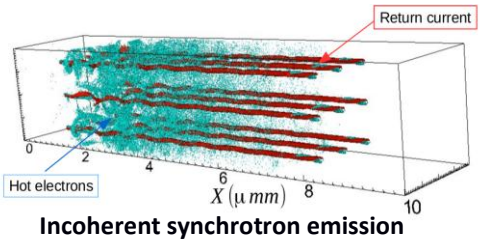
Dr. Lecz Zsolt (ELI-ALPS, Hungary)

19th of April at 4.15pm in the Dennis Sciama lecture theatre.



The main mission of ELI-ALPS, Hungary, is to convert the optical laser's wavelength down to nanometers or sub-nanometers with high efficiency and controllable directionality through the: atomic electron shell excitations, laser-assisted ionization-recombination processes or relativistic laser-plasma interactions. In the latter the high energy photons are generated via the coherent and incoherent synchrotron emission on metallic surfaces or inside low density gases. Depending on their number and energies these photons can be used in numerous applications ranging from a sample imaging through high density plasma diagnostics to electron-positron pair creation. In the seminar I will present the most recent results obtained with the help of Particle-in-Cell simulations focusing on under-dense gas plasmas, where electrons can be easily accelerated to 100s of MeV energies and oscillate transversally inside the plasma wake-field, or bubble. These oscillations are called betatron oscillation and by increasing their amplitude the generated radiation can be enhanced.





Incoherent synchrotron emission

Research Fellow at ELI-ALPS, Szeged, in the Plasma Physics Theory group. Main research topic, which I am working on, is related to intense laser plasma interactions and to the consequent particle acceleration and radiation emission. I received my PhD at the Technical University of Darmstadt, Germany, in 2013 working on laser-driven ion acceleration. In 2014 I joined the ELI-ALPS as a researcher. Since then I have been working on different aspects of laser-matter interactions including laser wakefield acceleration in gases and high harmonic generation on dense plasma surfaces. From 2015 I am collaborating with the John Adams Institute aiming to further develop the already existing wakefield acceleration concepts and to study the properties of generated radiation by using sophisticated numerical simulations.

The Seminar will be broadcasted on the Webex, and the connection information will be posted on the web site http://www.adams-institute.ac.uk/lectures