P 20: Laser Plasmas

Zeit: Mittwoch 16:30–18:30 Raum: HS Foyer

P 20.1 Mi 16:30 HS Foyer

Laser-plasma interactions in ultra-intense fields of colliding laser pulses — •Christoph Baumann and Alexander Pukhov — Institut für Theoretische Physik I, Heinrich-Heine-Universität, 40225 Düsseldorf, Deutschland

The continuous development of laser technology will open the door of studying laser-plasma interactions in fields with intensities above 10^{23} Wcm^{-2}. In the so-called quantum-dominated regime, the plasma dynamics can change significantly due to the increasing influence of nonlinear Compton scattering and Breit-Wheeler pair production on the interaction process.

In the present work, we use PIC simulations to report about the interaction of a one micron thick plasma foil with two counter-propagating circularly-polarized laser pulses that have intensities up to the order of 10^{24} Wcm^{-2}. We analyze the influence of pair production on the interaction process. In a second simulation setup, we report about the generation of a train of attosecond electron bunches within the interaction of the plasma target with two Laguerre-Gaussian laser pulses of ultra-high intensity.

P 20.2 Mi 16:30 HS Foyer

Collisionless shocks in laboratory plasmas — •shikha bhadoria, naveen kumar, and christoph h. keitel — Max Planck Institute for Nuclear Physics, Heidelberg, Germany

Collisionless shocks are formed when two counter-propagating streams of plasmas are collided. This situation occurs quite often in astrophysical environments e.g when the supernova remnant blast shell hits the interstellar medium etc. This can be envisaged in a laboratory easily by irradiating two energetic laser pulses on thin-foil targets placed opposite to each other. These collisionless shocks are responsible for extreme acceleration of charged particles (e.g. cosmic rays) by Fermi acceleration mechanism, however little is known about their formation process. We present results of collisionless shock formation in such a situation and discuss their implications for ion acceleration in the laboratory.