P 5: Sonstiges

Zeit: Montag 17:30–18:15 Raum: INP-Staffelgeschoß

P 5.1 Mo 17:30 INP-Staffelgeschoß

Relativistic laser-plasma intensity measurement by nuclear-activation based diagnostics — •Marc Günther[1], Karsten Vogt[2], Kerstin Sonnabend[1], Erik Brambrink[3], Knut Harres[1], Ina Alber[1], Anke Otten[1], Jörg Schütrumpf[1], Klaus Witte[2], and Markus Roth[1] — [1]TU Darmstadt - Institut für Kernphysik, Darmstadt, Germany — [2]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany — [3]Ecole Polytechnique - LULI, Palaiseau, France

The recent progress in ultra-intense lasers induces focused intensities (I > 10ˆ19 W/cmˆ2) in the highly relativistic regime. During the laser-solid interaction for such high intensities, an intense relativistic electron current is injected from the plasma created on the laser focal spot inside the target. The laser absorption and the laser peak intensity during the laser-solid interaction are still unknown. The measurement of the laser peak intensity within the relativistic range with conventional techniques is not directly possible, mainly because the laser intensity is determined by the laser-plasma interaction itself.

In order to determine the "temperature" of the hot electron distribution by nuclear pyrometry we use novel activation targets as a kind of calorimeter consisting of a composition of several isotopes with different photon-neutron disintegration cross sections in the preferred (g,n) reaction type. The consequence is a relatively high reaction yield for a wide range of photon energies. The determination of the relativistic electron distribution in a wide range of laser intensities will be possible.

P 5.2 Mo 17:45 INP-Staffelgeschoß

Modulated ECRH scans in ASDEX Upgrade for electron heat transport studies — •Philip Schneider, Francois Ryter, Hans-Ulrich Fahrbach, Anja Gude, Fritz Leuterer, Marc Maraschek, Grigori Pereverzev, Dietmar Wagner, and the ASDEX Upgrade Team — Max Plank Institut für Plasmaphysik, EURATOM Association, D-85748 Garching, Germany

The new electron cyclotron heating system of ASDEX Upgrade is equipped with steerable mirrors, which allow us to vary the localized energy deposition position during a single plasma discharge. Combining modulation of the ECH power with the deposition scan, we investigated the profile of the electron heat conductivity (χ_e) and the possible existence of radially localized variations of this quantity. Usually, in power modulation experiments, the radial propagation of the heat pulses are analysed. In the present work we used a new approach better suited to search for local changes of χ_e: amplitude and phase of the induced T_e modulation at the position of the ECH deposition are analysed. These two quantities react sensitively to the local value of χ_e and the results yield the profile of the heat diffusivity, which indeed exhibits local radial variations.

Besides local radial variations, which are clearly not due to MHD activity, we also investigated locked MHD modes, which show reduced transport inside an island and increased transport around it. Furthermore, the mode could be excited to rotate again due to ECH deposition at the island's location.

P 5.3 Mo 18:00 INP-Staffelgeschoß

Generation of proton bunches by ultra-short laser pulses with high contrast — •Sven Steinke[1], Matthias Schnuerer[1], Thomas Sokollik[1], Peter Nickles[1], Wolfgang Sandner[1], Andreas Henig[2], Daniel Jung[2], Daniel Kiefer[2], Dietrich Habs[2], and Alexander Andreev[3] — [1]Max-Born-Institut, Max Born Str. 2a, D-12489 Berlin, Germany — [2]Max-Planck-Institut, Hofgartenstrasse 8, D-80539 Muenchen, Germany — [3]Research Institute for Laser Physics, St. Petersburg, Russia

Laser accelerated ion or proton bunches offer advantages compared to those generated by conventional accelerators, like better emittance and shorter pulse duration.

We present our results on the acceleration of proton/ ion bunches created by ultra-short laser pulses of ultra-thin (d < λ) foils. To approach this regime, where the target becomes more and more transparent for the laser, we developed a so called double-plasma mirror to increase the intensity contrast of the laser pulse by several orders of magnitude up to 10^{12}. It will be shown how the features of the proton/ ion bunches depend on the laser pulse parameters, like intensity and contrast of the laser pulse. The results will be discussed on the base of analytical calculation and PIC simulations.

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