Graduate School Seminar

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High-contrast laser-proton acceleration from a condensed hydrogen jet

Demanding applications like radiation therapy of cancer have pushed the development of laser plasma proton accelerators and defined levels of control and necessary proton beam stability in laser plasma experiments. The presentation will give an overview of the recent experiments for laser driven proton acceleration with high contrast at the high power laser Draco at HZDR, delivering pulses with a puls duration of 30 fs and a puls energy of 5 J. We present results of an experimental campaign employing a pure condensed hydrogen jet as a renewable target. The jet's nominal electron density is approximately 30 times the critical density and it's diameter can be varied to be 2 um, 5 um or 10 um. Different ion diagnostics reveal mono-species proton acceleration in the laser incidence plane around the wire-like target. Radiochromic film stacks in forward direction display signatures of filament-like structures. In addition the expanding jet could be monitored on-shot with a temporally synchronized probe beam perpendicular to the pump laser axis. Recorded probe images taken on a 10 ps timescale indicating instabilities from pinching effects in the plasma density along the jet axis.

Talk: English
Slides: English

Location: Institute of Physics, Albert-Einstein-Str. 24, HS1

Talks in WS 2016/2017

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