Beitrag ID: **10** Typ: **Talk**

Relativistic Electron beams driven by ultra intense Laser-Plasma Electron Accelerator

Montag, 15. September 2025 15:05 (25 Minuten)

It has been more than two decades since the first experimental demonstrations of the generation of relativistic electron beams produced by the interaction of ultra intense laser pulses with plasma [1]. Ever since, several research groups worldwide invested considerable effort towards detailing the Physics behind the mechanism of Laser Wakefield Acceleration (LWFA), that drives the formation and dynamics of the relativistic electron beams [2]. Additional efforts were directed towards improving the electron beam quality characteristics (brightness, maximum energy, quasi-monochromaticity, divergence and stability) to harness it as a reliable secondary high energy electron source. Here, we will review our recent work on the generation of relativistic electron beams using multi-10-TW laser pulses [3]. The experiments were performed at the Institute of Plasma Physics and Lasers (IPPL) of the Hellenic Mediterranean University using the 45 TW fs laser system "Zeus"[4]. The optimization of the electron beam characteristics as well as its current application in radiation dosimetry will be detailed. Aspects of its potential applications in electron-atom collisions, electron diffraction, generation of anti-matter will also be discussed.

References

[1] S. P. Mangles et al. Nature 431, 535–538 (2004); C. Geddes et al. Nature 431, 538–541 (2004); J. Faure et al. Nature 431, 541–544, (2004).
[2] W. P. Leemans et al. Nat. Phys. 2, 696–699 (2006).
[3] A. Grigoriadis et al. Sci. Rep. 13, 2918 (2023).
[4] E. L. Clark et al. High Power Laser Sci. Eng. 9, e53 (2021).

Autoren: PAPADOGIANNIS, Nektarios (Institute of Plasma Physics and Lasers, Hellenic Mediterranean University, 74100 Rethymno, Greece); Dr. GRIGORIADIS, Anastasios (Institute of Plasma Physics and Lasers, Hellenic Mediterranean University, 74100 Rethymno, Greece); Dr. ANDRIANAKI, Georgia (Institute of Plasma Physics and Lasers, Hellenic Mediterranean University, 74100 Rethymno, Greece & School of Production Engineering and Management, Technical University of Crete, Chania, Greece); Prof. BENIS, Emmanouil (Department of Physics, University of Ioannina, GR-45110 Ioannina, Greece); Prof. TATARAKIS, Michael (Institute of Plasma Physics and Lasers, Hellenic Mediterranean University, 74100 Rethymno, Greece & Department of Electronic Engineering, Hellenic Mediterranean University, 73133 Chania, Greece)

Vortragende(r): PAPADOGIANNIS, Nektarios (Institute of Plasma Physics and Lasers, Hellenic Mediterranean University, 74100 Rethymno, Greece)

Sitzung Einordnung: Session 2