

Exploring Relativistic Laser Plasmas with Free-Electron-Lasers

Initiative: Forschung mit Freie-Elektronen-Lasern: Peter Paul Ewald-Fellowships am LCLS in Stanford

Bewilligung: 16.06.2014

Laufzeit: 3 Jahre

Femtosecond x-ray pulses from free-electron lasers (FEL) are ideally suited for diagnostics of dense relativistic plasmas since dense plasmas are transparent to X-rays. With the advent of X-ray FELs new opportunities for accurate time-resolved measurements of plasma properties are opened. However, extremely high spatial resolution is required due to the small extent of relativistic laser plasmas. To this end, bendable X-ray mirrors will be developed which are capable of resolving the plasma parameters on a micrometer scale. High precision pump-probe experiments are proposed that will provide critical experimental tests of simulations and theory of high-power laser-plasma interactions. The expected results are of importance for the understanding of dense relativistic laser plasmas. Furthermore, the results of the proposed experiments will set the direction for the development of future laser-based particle and photon sources using such plasmas. This fellowship comprises an 18 months research stay in the group of Professor Dr. Siegfried Glenzer, Linac Coherent Light Source (LCLS) at SLAC National Accelerator Laboratory, USA.

Projektbeteiligte

Dr. Christian Rödel

Universität Jena
Physikalisch-Astronomische Fakultät
Institut für Optik und Quantenelektronik
Jena

Prof. Dr. Siegfried Glenzer

SLAC National Accelerator Laboratory
Department for High Energy Density Science
Menlo Park, CA
USA