Laser driven plasma accelerators offer the prospect of a new source of relativistic electron beams. One of the key parameters to be determined is the temporal profile of the electron bunch. Available experimental data show bunch lengths <30fs, however, best estimates still rely on particle-in-cell simulations predicting durations of ∼10fs.

We report on progress towards measuring the temporal profile of electron bunches from a laser-wakefield accelerator, based on the detection of coherent THZ radiation emitted at a metal-vacuum boundary. The construction of a broadband (2–40μm) spectrometer based on pyroelectric detectors as well as a numerical assessment of its capabilities will be presented.

HK 34.6 Di 18:05 HG ÜR 9

Terahertz Radiation Production and Terahertz Imaging at Chiang Mai University — •Jatuporn Saisut[1,2], Vitoon Jinamool[1], Noppadon Kangrang[1], Keerati Kusoljariyakul[1], Prissana Tamboon[3], Pathom Wichaisirimongkol[3], Michael W. Rhodes[3], and Chitrlada Thongbai[1] — [1]Department of Physics and Materials Science, Chiang Mai University, Chiang Mai 50200, Thailand — [2]DESY,15738 Zeuthen, Germany — [3]STIR, Chiang Mai University, Chiang Mai 50200, Thailand

Femtosecond electron bunches can be generated from a system consisting of an RF gun with a thermionic cathode, an alpha magnet as a magnetic bunch compressor, and a linear accelerator as a post acceleration section. These short electron pulses can be used to produce high intensity terahertz (THz) radiation. The THz radiation is generated in the form of transition radiation by placing an aluminum foil (Al-foil) in the electron path, representing a transition between vacuum and Al-foil.

In THz imaging system (transmission measurement), THz radiation is focused on a sample which will be scanned using an xy- translation stage controlled by computer. The transmission intensity (IT) will be detected by a room-temperature pyroelectric detector. Computer program is employed to calculate and analyze the intensity at difference points on the sample for terahertz image construction.

The generation of femtosecond electron bunches, the generation of THz radiation, THz imaging system and the recent experimental results will be presented and discussed

HK 34.7 Di 18:20 HG ÜR 9

Untersuchung kohärenter Synchrotronstrahlung mit Hot Electron Bolometer — •Vitali Judin[1], Miriam Fitterer[1], Steffen Hillenbrand[1], Nicole Hiller[1], André Hofmann[1], Marit Klein[1], Sebastian Marsching[1], Anka-Susanne Müller[1], Nigel Smale[1], Kiran Sonnad[1] und Pedro Tavares[1,2] — [1]KIT - Karlsruher Institut für Technologie, Karlsruhe, Deutschland — [2]ABTLuS - The Brazilian Association for Synchrotron Light Technology, Campinas, Barzil (on leave)

Die kohärente Synchrotronstrahlung an der Synchrotronstrahlungsquelle ANKA lässt sich mit dem Hot Electron Bolometer (HEB, schneller Detektor für THz-Strahlung) detektieren und untersuchen. Durch die sehr hohe zeitliche Auflösung des Detektors kann man die Signale der einzelnen THz-Pulse, die von den Elektronenpaketen ausgesandt werden, aufnehmen. Dies kann man für die Strahldiagnose ausnutzen. Beispielsweise kann man mit diesem System mit einer einzigen Aufnahme das THz-Signal von Elektronenpaketen mit unterschiedlichen Strömen aufzeichnen und auswerten. Dieser Vortrag gibt einen Überblick über verschiedene mit System durchgeführte Studien.

HK 34.8 Di 18:35 HG ÜR 9

Ein Bunch Kompressor für TBONE — •Steffen Hillenbrand, Miriam Fitterer, Nicole Hiller, Marit Klein, Kiran Sonnad, Vitali Judin, Sebastian Marsching, Andre Hofmann, Müller Anke-Susanne und Huttel Erhard — Karlsruhe Institut für Technologie (KIT)

Am Karlsruher Institut für Technologie (KIT) wird eine neue Synchrotronstahlungsquelle für den Bereich von THz bis zum mittleren Infrarot konzipiert. Der TBONE genannte Beschleuniger beruht auf einem Linearbeschleuniger mit anschließendem Bunch-Kompressor. Im folgenden Strahltransportsystem wird die Synchrotronstahlung als Kantenstrahlung erzeugt. Dieser Vortrag stellt das vorläufige Design der Anlage vor und gibt einen kurzen Überblick über die zum Bunch-Kompressor durchgeführten Simulationen.

HK 34.9 Di 18:50 HG ÜR 9

Recent progress at the Petawatt Field Synthesizer — •Christoph Skrobol[1,2], Sandro Klingebiel[1], Christoph Wandt[1], Izhar Ahmad[1], Mathias Siebold[1], Sergei A. Trushin[1], Zsuzsanna Major[1,2], Ferenc Krausz[1,2], and Stefan Karsch[1,2] — [1]Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Str. 1, D-85748 Garching, Germany — [2]Department für Physik, Ludwig-Maximilians-Universität München, Am Coulombwall 1, D-85748 Garching, Germany

The Petawatt Field Synthesizer (PFS) aims at delivering wave-form controlled, few-cycle laser pulses with petawatt-scale peak power. The PFS design is based on a modified scheme of optical parametric chirped pulse amplification (OPCPA), where short pulses (of the order of 1 ps) are used for both pumping and seeding. The broadband seed pulses (700-1400 nm) are amplified in a series of DKDP crystals, pumped by 515 nm pulses with a total energy of 15-20 J at a repetition rate of 10 Hz. The chirped pulse amplifier chain of the pump laser uses diode pumping and Yb:YAG as the gain material in order to support the 1 ps pulse duration. To ensure a high level of synchronization between pump and seed pulses (< 100 fs), both are derived from a common frontend and are thereby inherently optically synchronized. However, along the large optical path difference between the seed and the pump chain additional temporal jitter can be accumulated, which is detrimental to the short-pulse OPCPA scheme. After an introduction to the PFS system, we report on our recent progress in identifying and eliminating the sources of timing jitter in preparation for the OPCPA stages.

HK 35: Hauptvorträge III

Zeit: Mittwoch 8:30–10:00 Raum: HG X

Hauptvortrag HK 35.1 Mi 8:30 HG X

ALICE "First Day" Physics — •Yvonne Pachmayer for the ALICE Collaboration — Physikalisches Institut, Universitaet Heidelberg

The world's highest energy particle accelerator, the Large Hadron Collider (LHC) at CERN, produced its first collisions in November 2009. ALICE (A Large Ion Collider Experiment) [1] is the dedicated heavy-ion experiment at LHC. It is designed to exploit the full potential of the LHC experimental program including both nucleus-nucleus and proton-proton collisions. Besides an overview of the current status of the ALICE experiment we will point out its physics capabilities by discussing some selected examples. In particular, first results obtained in the first weeks of p-p collisions will be presented. These are a glimpse of the wealth of physics to be extracted from the ALICE program over the next several years.

[1] ALICE Collaboration, J. Phys. G 30 (2004) 1517 and J. Phys. G 32 (2006) 1295

Hauptvortrag HK 35.2 Mi 9:00 HG X

Recent results from COMPASS and HERMES — •Gunar Schnell — DESY Zeuthen

Deep-inelastic lepton scattering has for a long time been a valuable tool to examine the structure of nucleons. Both the COMPASS and the HERMES collaborations have followed up on this long tradition by scattering charged leptons from polarized and unpolarized targets. The recent results from both experiments will be reviewed and, when applicable, compared; with emphasis given to polarized quark distributions and 3D nucleon tomography.

Hauptvortrag HK 35.3 Mi 9:30 HG X

Multi-reference energy density functional theory: The description and role of fluctuations in collective degrees of freedom models of nuclear structure based on self-consistent mean fields — •Michael Bender — Centre d'Etudes Nucleaires de Bordeaux Gradignan, France

At present, methods based on self-consistent mean-field approaches are the only microscopic nuclear structure models that can be ap-