Test of QED in the strongest fields via accurate X-ray spectroscopy with FOCAL

A breakthrough was achieved in the high-resolution measurement of the Lyman-α transitions in high-Z hydrogen-like systems as a precondition for a critical test of QED in the widely unexplored domain of very strong fields. The measurements were carried out on hydrogen-like Au$^{78+}$ at the ESR storage ring by a large international and long-term collaboration comprising more than 40 participants from over 10 institutions also including the Helmholtz-Institute Jena and the Extreme Matter Institute. The present efforts can be considered as an important pilot experiment for FAIR and SPARC emphasizing the physics of extreme electromagnetic fields.

The experiment was made possible by the development of the FOCAL x-ray crystal optics which overcomes both the limiting spectral resolving power of previously used germanium solid-state detectors and the prohibitively low detection efficiency of transmission crystal spectrometers required for the hard x-rays (close to 63 keV).

It also depends on the dedicated 2D position-sensitive germanium strip detectors developed for this experiment and employed in the spectrometers. The figure schematically shows the experimental arrangement at the ESR gas jet together with the x-ray spectra of hydrogen-like Au$^{78+}$.
New webpage of the HI-Jena is now online

We are glad to announce the start of the webpage of the HI-Jena. Currently the German version of the webpage is available and the English version is coming soon.

Please visit our new webpage and feel free to give us your feedback: http://www.hi-jena.de

HI-Jena Seminars are starting again

The HI-Jena invites all its members to participate in the following seminars:

• Helmholtz Institute Jena Seminar – every second Wednesday at 2.30 p.m. (alternating with the APS Seminar)

• Research School ‘Advanced Photon Science’ Seminar – every second Wednesday at 2.30 p.m. (alternating with the Institute Seminar)

• GSI Atomic Physics Online Seminar – transmitted from GSI every Tuesday at 1.15 p.m.

All seminars are held in the seminar room 205 in the HI-Jena building at Fröbelstieg 3. Please visit our website for the announcement of speakers and topics.

New issue of the ‘Hermann’ magazin of the Helmholtz association

Check out the most recent issue: http://www.helmholtz.de/hermann
International Conference on Physics of Highly Charged Ions (HCI 2012) was held in Heidelberg

The 16th international conference 'Physics of Highly Charged Ions' (HCI2012) was held at Heidelberg University between September 2nd and 7th. Being one of the largest international scientific meetings of the atomic physics, close to 300 registered participants had the opportunity to present and to be informed about the latest experimental and theoretical advances in the field.

The whole program can be seen on the conference web page: [http://www.unit.t.de/?context=452&&card=heises.7e77b471fe3d0153ecd20178a6f92e8c](http://www.unit.t.de/?context=452&&card=heises.7e77b471fe3d0153ecd20178a6f92e8c)

HGS-HIRe Lecture Week on Atomic Physics to be held in November at Castle Ebernburg

All students of the HI-Jena are kindly invited to participate in the "HGS-HIRe Lecture Week on Atomic and Plasma Physics" at the castle Ebernburg from November 11-16, 2012. The program is devoted to Plasma and Atomic physics, the final program will be announced soon.

Second annual IZEST conference on ‘International endeavor to establish Laser-Based High Energy Physics and Applications’

This exciting conference, hosted by the University of Strathclyde from 13th to 15th November, will address key topics in laser-based fundamental physics and societal applications of high-power lasers, including:

- Exawatt-Zettawatt lasers
- Laser acceleration to TeV-PeV
- The Standard Model and Beyond
- Probing the quantum vacuum
- Nuclear physics
- Medical applications

The first day will conclude with a keynote talk from Professor Peter Higgs.

As the registration deadline is fast approaching, we would encourage you to register as soon as possible.

More information: IZEST conference webpage

ExtreMe Matter Institute EMMI: EMMI Physics Days 2012

GSI, Darmstadt November 13 to 14 2012
More information: http://www-aix.gsi.de/conferences/emmi/epd2012/

9th International Topical SPARC Workshop to held in Vienna, 26th to 28th of November

The three days of the workshop are dedicated to the latest developments concerning the scientific program of the collaboration, the related technical issues as well as the financial and organizational aspects in the light of the newest on going FAIR activities.

More information: http://www.smi.oeaw.ac.at/conference/sparc/
Recent Publications

Harmonic Generation of Relativistic Plasma Surfaces in Ultrasteep Plasma Density Gradients
doi: 10.1103/PhysRevLett.109.125002

Thomson backscattering from laser-generated, relativistically moving high-density electron layers
New Journal of Physics 14, 093018 (2012)
doi: 10.1088/1367-2630/14/9/093018

Generation of 10 µW relativistic surface high-harmonic radiation at a repetition rate of 10 Hz
J Bierbach, C Rödel, M Yeung, B Dromey, T Hahn, A Galestian Pour, S Fuchs, A E Paz, S Herzer, S Kuschel, O Jäckel, M C Kaluza, G Pretzler, M Zepf and G G Paulus
New Journal of Physics 14, 065005 (2012)
doi: 10.1088/1367-2630/14/6/065005

A Penning trap for advanced studies with particles in extreme laser fields
M. Vogel, W. Quint, G.G. Paulus, and Th. Stöhlker
NIM B 285, 65 (2012)
doi: 10.1016/j.nimb.2012.05.001

Low-Emitance Electron Bunches from a Laser-Plasma Accelerator Measured using Single-Shot X-Ray Spectroscopy
doi: 10.1103/PhysRevLett.109.064802
Information on the insurance of Phd student having stipends

Please note: The acceptance as a Phd student by the HI-Jena and/or the graduate school is not connected to any occupational accident insurance during your work at the HI-Jena or your travels. However, PhD students that are enrolled at the FSU Jena have an accident insurance by the student union (Studentenwerk). So take care that you are enrolled as a Phd student at the FSU as this is also mandatory in order to receive a stipend from the Institute.


Assistance for female PhD students having children

Assistance is offered by the CHRISTIANE NÜSSELEIN-VOLHARD-STIFTUNG to help female Phd students having children.

More information: http://www.cnv-stiftung.de/de/bewerbung.html

Contact at HI-Jena:

Secretary: s.hundack@gsi.de
Tel.: 03641-947600
E-Mail: s.hundack@gsi.de

Admin. Assistent: b.kirchner@gsi.de
Tel.: 03641-947603
E-Mail: b.kirchner@gsi.de

Helmholtz-Institut Jena, Fröbelstieg 3, 07743 Jena