

# HCI 2018

Monday, 3 September 2018 - Friday, 7 September 2018

NOVA School of Science and Technology (FCT NOVA)



## Book of Abstracts



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## FRAGMENTATION AND COOLING OF DOUBLY CHARGED ANTHRACENE STUDIED IN AN ELECTROSTATIC STORAGE RING, THE MINI-RING.

**Authors:** serge Martin<sup>1</sup>; jerome Bernard<sup>2</sup>; Li Chen<sup>3</sup>; ABDULAZIZ El-Mogeeth<sup>4</sup>

<sup>1</sup> CNRS ILM

<sup>2</sup> UCB Lyon1 ILM

<sup>3</sup> UCB lyon1

<sup>4</sup> ucb lyon1

**Corresponding Authors:** smartin@univ-lyon1.fr, jerome.bernard@univ-lyon1.fr, abdulaziz.al-mogeeth@univ-lyon1.fr, chen@univ-lyon1.fr

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## Open Shell Ions Mobility in Cooled Helium Gas

**Author:** Lamia Aissaoui<sup>1</sup>

**Co-author:** Moncef Bouledroua<sup>2</sup>

<sup>1</sup> Physics Department, Batna 1 University, Algeria

<sup>2</sup> Physics Department, Badji Mokhtar University, Annaba, Algeria

**Corresponding Author:** aissaouilamia@yahoo.fr

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## Measurements of the L-shell X-ray Emission of Neonlike Europium on an Electron Beam Ion Trap

**Authors:** Peter Beiersdorfer<sup>1</sup>; G. Brown<sup>1</sup>; N. Hell<sup>2</sup>; R. L. Kelley<sup>3</sup>; C. A. Kilbourne<sup>3</sup>; F. S. Porter<sup>3</sup>; Elmar Träbert<sup>1</sup>

<sup>1</sup> *Lawrence Livermore National Laboratory*

<sup>2</sup> *Lawrence Livermore National Laboratory,*

<sup>3</sup> *NASA-Goddard*

**Corresponding Authors:** beiersdorfer1@llnl.gov, hell1@llnl.gov, brown86@llnl.gov

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Fundamental Aspects, Structure and Spectroscopy

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## **A fresh computational approach to atomic structures, processes and cascades for multiply and highly-charge ions**

**Author:** Stephan Fritzsche<sup>1</sup>

<sup>1</sup> *Helmholtz-Institut Jena*

**Corresponding Author:** s.fritzsche@gsi.de

**Keywords:**

relativistic atomic structure theory

atomic properties and processes

advanced computations

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## **Extreme Ultraviolet Spectra of Europium –Chasing for Spectral Lines of P- to Ar-like Ions**

**Authors:** Elmar Träbert<sup>1</sup>; Peter Beiersdorfer<sup>2</sup>; Gregory V. Brown<sup>3</sup>; Natalie Hell<sup>4</sup>; Joel H. T. Clementson<sup>5</sup>

<sup>1</sup> *Ruhr-Universität Bochum*

<sup>2</sup> *Lawrence Livermore National Laboratory*

<sup>3</sup> *LLNL*

<sup>4</sup> *Sternwarte Erlangen-Bamberg*

<sup>5</sup> *E.ON Energiedistribution AB*

**Corresponding Authors:** beiersdorfer1@llnl.gov, joel.clementson@gmail.com, natalie.hell@sternwarte.uni-erlangen.de, traebert@astro.rub.de, brown86@llnl.gov

**Keywords:**

Extreme-ultraviolet spectroscopy

Electron beam ion trap

Highly charged ions

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

15

## Shakeoff Ionization near the Coulomb Barrier Energy

**Authors:** PRASHANT SHARMA<sup>1</sup>; TAPAN Nandi<sup>2</sup>

<sup>1</sup> INTER-UNIVERSITY ACCELERATOR CENTRE, DELHI

<sup>2</sup> IUAC, JNU CAMPUS, NEW DELHI

**Corresponding Authors:** nanditapan@gmail.com, phyprashant@gmail.com

**Keywords:**

X-RAY SPECTROSCOPY,  
SUDDEN PERTURBATION,  
SHAKEOFF PROCESS,  
COULOMB BARRIER

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

16

## First application of combined isochronous and Schottky mass spectrometry: Half-lives of fully ionized $^{49}\text{Cr}^{24+}$ and $^{53}\text{Fe}^{26+}$ atoms

**Authors:** Xiaolin Tu<sup>None</sup>; Chen Ruijiu<sup>None</sup>; Yuri Litvinov<sup>None</sup>

**Corresponding Authors:** tuxiaolin@impcas.ac.cn, y.litvinov@gsi.de

**Keywords:**

isochronous and Schottky mass spectrometry,  $\beta$ -decaying, highly charged ions

**Topics:**

Production, Experimental Developments and Applications

17

## Imaging Properties Of A Broad-Band Toroidal Electron-Positron Pair Spectrometer

**Authors:** Siegbert Hagmann<sup>1</sup>; Pierre-Michel Hillenbrand<sup>2</sup>; Yuri Litvinov<sup>3</sup>; Uwe Spillmann<sup>3</sup>; Thomas Stoehlker<sup>4</sup>

<sup>1</sup> GSI

<sup>2</sup> GSI- Darmstadt, Univ. Giessen, Columbia U. N.Y.

<sup>3</sup> GSI

<sup>4</sup> GSI, Helmholtz-Inst Jena, IOQ, Fak. f. Physik Uni Jena

**Corresponding Authors:** s.hagmann@gsi.de, hillenbrand@astro.columbia.edu, u.spillmann@gsi.de

**Keywords:**

ion atom collisions, free-free opair production

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Multiple ionization induced by proton

**Author:** Xianming Zhou<sup>None</sup>

**Corresponding Author:** zhouxianming@impcas.ac.cn

**Keywords:**

Multiple ionization, Proton, lower collision energy

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Interaction Strength Dependence Orientation Effect In Ionization Of CO

**Authors:** Deepak Sharma<sup>1</sup>; Pragya Bhatt<sup>2</sup>; C P Safvan<sup>2</sup>

**Co-author:** Bhas Bapat <sup>1</sup>

<sup>1</sup> Indian Institute of Science Education and Research, Pune

<sup>2</sup> Inter University Accelerator Center, New Delhi 110067, India

**Corresponding Authors:** bhas.bapat@iiserpune.ac.in, deepak.sharma@students.iiserpune.ac.in

**Keywords:**

Multiple Ionization, Collisions, Orientation

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## **Ionization and electron capture in C6+ + H collisions**

**Author:** Alisher Kadyrov<sup>1</sup>

<sup>1</sup> *Curtin University*

**Corresponding Author:** a.kadyrov@curtin.edu.au

**Keywords:**

ionization  
electron capture  
scattering theory  
carbon

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

22

## **observation of electron correlation in transfer target excitation process**

**Authors:** Daniel Fischer<sup>None</sup>; Xincheng Wang<sup>None</sup>; Zhangyong Song<sup>None</sup>

**Keywords:**

reaction microscope, transfer target excitation, electron correlation

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

23

## **Radiative and Auger rates for highly-ionized iron K-lines under dense astrophysical plasma conditions**

**Author:** Jérôme Deprince<sup>1</sup>

**Co-authors:** Manuel Bautista <sup>2</sup>; Stephan Fritzsche <sup>3</sup>; Javier Garcia <sup>4</sup>; Tim Kallman <sup>5</sup>; Patrick Palmeri <sup>1</sup>; Pascal Quinet <sup>6</sup>

<sup>1</sup> *Université de Mons (Belgium)*

<sup>2</sup> *Western Michigan University (Kalamazoo, USA)*

<sup>3</sup> *Helmholtz-Institut Jena (Germany)*

<sup>4</sup> *California Institute of Technology (Pasadena, USA)*

<sup>5</sup> *NASA Goddard Space Flight Center (Greenbelt, USA)*

<sup>6</sup> *Université de Mons & Université de Liège (Belgium)*

**Corresponding Authors:** jerome.deprince@umons.ac.be, s.fritzsche@gsi.de

**Keywords:**

Plasma effects  
Iron K-lines

Radiative and Auger rates

**Topics:**

Interactions with Photons and Plasmas

25

## **DIMERIC CATIONS OF SMALL PAHs PRODUCED IN AN ELECTRON CYCLOTRON RESONANCE ION SOURCE**

**Authors:** Abdulaziz Al Mogeeth<sup>1</sup>; Li CHEN<sup>1</sup>; Serge MARTIN<sup>2</sup>; Jérôme BERNARD<sup>3</sup>

<sup>1</sup> *Institut Lumière Matière, Université Lyon 1*

<sup>2</sup> *Institut Lumière Matière, Université Lyon 1-CNRS*

<sup>3</sup> *Institut Lumière Matière, Université Lyon 1*

**Corresponding Authors:** [abdulaziz.al-mogeeth@univ-lyon1.fr](mailto:abdulaziz.al-mogeeth@univ-lyon1.fr), [smartin@univ-lyon1.fr](mailto:smartin@univ-lyon1.fr), [chen@univ-lyon1.fr](mailto:chen@univ-lyon1.fr), [jerome.bernard@univ-lyon1.fr](mailto:jerome.bernard@univ-lyon1.fr)

**Keywords:**

ECR ion Source, dimer cations, Polycyclic Aromatic Hydrocarbons (PAHs)

**Topics:**

Production, Experimental Developments and Applications

26

## **The experimental investigation of sequential dissociation of OCS induced by Ne<sup>4+</sup> ion impact**

**Authors:** Shuncheng Yan<sup>1</sup>; Lili Shen<sup>1</sup>; Xinwen Ma<sup>1</sup>; Xiaolong Zhu<sup>1</sup>; Wentian Feng<sup>1</sup>; Dongmei Zhao<sup>1</sup>

<sup>1</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

**Corresponding Authors:** [x.ma@impcas.ac.cn](mailto:x.ma@impcas.ac.cn), [yanshuncheng@impcas.ac.cn](mailto:yanshuncheng@impcas.ac.cn), [zhuxiaolong@impcas.ac.cn](mailto:zhuxiaolong@impcas.ac.cn), [fengwentian@impcas.ac.cn](mailto:fengwentian@impcas.ac.cn), [dmzhao@impcas.ac.cn](mailto:dmzhao@impcas.ac.cn)

**Keywords:**

Sequential Dissociation, Ion impact, KER, OCS

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

27

## **Half-life Measurement of <sup>94m</sup>Ru<sup>44+</sup> at Storage Ring in Lanzhou**

**Authors:** Qi Zeng<sup>None</sup>; Meng Wang<sup>None</sup>; Yuhu Zhang<sup>None</sup>; Yuri Litvinov<sup>None</sup>; Yuanming Xing<sup>None</sup>

**Corresponding Authors:** y.litvinov@gsi.de, qzeng@impcas.ac.cn, xym@impcas.ac.cn, yhzhang@impcas.ac.cn, wangm@impcas.ac.cn

**Keywords:**

Half-life Measurement  
highly charged radioactive ions  
Storage Ring

**Topics:**

Production, Experimental Developments and Applications

29

## Potential Sputtering of CaSiO<sub>3</sub> by Solar Wind Ions

**Author:** Paul Stefan Szabo<sup>1</sup>

**Co-authors:** Herbert Biber<sup>2</sup>; Rimpei Chiba<sup>1</sup>; Reinhard Stadlmayr<sup>1</sup>; Daniel Mayer<sup>1</sup>; Bernhard Maximilian Berger<sup>1</sup>; Andreas Mutzke<sup>3</sup>; Michael Doppler<sup>4</sup>; Markus Sauer<sup>5</sup>; Julia Appenroth<sup>4</sup>; Jürgen Fleig<sup>4</sup>; Annette Foelske-Schmitz<sup>5</sup>; Herbert Hutter<sup>4</sup>; Klaus Mezger<sup>6</sup>; Helmut Lammer<sup>7</sup>; André Galli<sup>8</sup>; Peter Wurz<sup>8</sup>; Friedrich Aumayr<sup>1</sup>

<sup>1</sup> *Institute of Applied Physics, TU Wien*

<sup>2</sup> *Institute of Applied Physics*

<sup>3</sup> *Max-Planck-Institut für Plasmaphysik*

<sup>4</sup> *Institute of Chemical Technologies and Analytics, TU Wien*

<sup>5</sup> *Analytical Instrumentation Center, TU Wien*

<sup>6</sup> *Institute of Geological Sciences, University of Bern*

<sup>7</sup> *Space Research Institute, Austrian Academy of Sciences*

<sup>8</sup> *Physics Institute, University of Bern*

**Corresponding Author:** szabo@iap.tuwien.ac.at

**Keywords:**

Potential Sputtering  
Quartz Crystal Microbalance  
Solar Wind  
Space Weathering

**Topics:**

Interaction with Clusters, Surfaces and Solids

31

## Lifetime Study of Fully Ionized 205 Tl 81+

**Authors:** Ragandeep Singh Sidhu<sup>1</sup>; Ruijiu Chen<sup>2</sup>; J. Glorius<sup>2</sup>; Yuri Litvinov<sup>None</sup>; M.K. Pavićević<sup>None</sup>; M.S. Sanjari<sup>None</sup>; Thomas Stoeckler<sup>3</sup>

<sup>1</sup> *GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany and Physikalisches Institut, Ruprecht-Karls-Universität, Heidelberg, Germany*

<sup>2</sup> *GSI*

<sup>3</sup> *GSI, Helmholtz-Inst Jena, IOQ, Fak. f. Physik Uni Jena*

**Corresponding Authors:** r.s.sidhu@gsi.de, r.chen@gsi.de, y.litvinov@gsi.de, j.glorius@gsi.de

**Keywords:**

Bound-state beta-decay

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

32

## Coherence and Spotting Effects of Fast Atoms Colliding With Surfaces: From Quantum to Classic.

**Authors:** Leandro Frisco<sup>1</sup>; Maria Silvia Gravielle<sup>2</sup>; Jorge Miraglia<sup>3</sup>

<sup>1</sup> *Instituto de Astronomía y Física del Espacio (IAFE, CONICET- Universidad de Buenos Aires).*

<sup>2</sup> *CONICET argentina*

<sup>3</sup> *University of Buenos Aires and CONICET of Argentina*

**Corresponding Authors:** msilvia@iafe.uba.ar, miraglia@iafe.uba.ar

**Keywords:**

Coherence.  
Interference.  
Wave Matter.  
Surface

**Topics:**

Interaction with Clusters, Surfaces and Solids

33

## The Spin Doublets, FWHM, and Shake Probabilities in 3d K $\beta$ 1,3 Spectra

**Author:** Yoshiaki Ito<sup>1</sup>

**Co-authors:** Tatsunori Tochio<sup>2</sup>; Michiru Yamashita<sup>3</sup>; Sei Fukushima<sup>4</sup>; Aurel Vlaicu<sup>5</sup>; Lukasz Syrocki<sup>6</sup>; Katarzyna Slabkowska<sup>7</sup>; Ewa Weder<sup>8</sup>; Marek Polasik<sup>9</sup>; Paul Indelicato<sup>10</sup>; José Manuel Marques<sup>11</sup>; Jorge Miguel Sampaio<sup>12</sup>; Mauro Guerra<sup>12</sup>; Jose Paulo Santos<sup>12</sup>; Fernando Parente<sup>12</sup>

<sup>1</sup> *Kyoto University*

<sup>2</sup> *Kobe University*

<sup>3</sup> *HIT*

<sup>4</sup> *Kobe Material Testing Laboratory Co., Ltd.*

<sup>5</sup> *National Institute of Materials Physics*

<sup>6</sup> *Nicolaus Copernicus University*

<sup>7</sup> *Nicolaus Copernicus University*

<sup>8</sup> *Nicolaus Copernicus University*

<sup>9</sup> *Nicolaus Copernicus University*

<sup>10</sup> *CNRS, Sorbonne Universities, UPMC Universities*

<sup>11</sup> *University of Lisbon*

<sup>12</sup> *Da Universidade Nova de Lisboa*

**Corresponding Authors:** amvlaicu@infim.ro, facp@fct.unl.pt, mguerra@fct.unl.pt, jmsampaio@fc.ul.pt, paul.indelicato@lkb.upmc.fr, ewaweder@umk.pl, mpolasik@umk.pl, lukaszsyrocki@umk.pl, katarzyna.slabkowska@umk.pl, sei.f@lasti.u-hyogo.ac.jp, myn@hyogo-kj.jp, tochio@people.kobe-u.ac.jp, yoshito@scl.kyoto-u.ac.jp, jps@fct.unl.pt, jmarmques@fc.ul.pt

**Keywords:**

3d K $\beta$ 1,3 spectra, high-resolution X-ray crystal spectrometer, spin doublets, FWHM, diagram lines

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## On The Characteristics of Various X-ray Crystal Spectrometers

**Authors:** Yoshiaki Ito<sup>1</sup>; Jose Paulo Santos<sup>2</sup>

**Co-authors:** Tatsunori Tochio<sup>3</sup>; Yamasita Michiru<sup>4</sup>; Fukusima Sei<sup>5</sup>; Aurel Vlaicu<sup>6</sup>

<sup>1</sup> *Kyoto University*

<sup>2</sup> *Da Universidade Nova de Lisboa*

<sup>3</sup> *Kobe University*

<sup>4</sup> *HIT*

<sup>5</sup> *Kobe Material Testing Laboratory Co., Ltd.*

<sup>6</sup> *National Institute of Materials Physics*

**Corresponding Authors:** amvlaicu@infim.ro, sei.f@lasti.u-hyogo.ac.jp, myn@hyogo-kj.jp, tochio@people.kobe-u.ac.jp, yoshito@scl.kyoto-u.ac.jp, jps@fct.unl.pt

**Keywords:**

Anti-parallel x-ray crystal spectrometer, diagram lines, high-resolution, instrumental function

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Near L-edge photoionization of singly charged iron ions

**Authors:** Stefan Schippers<sup>1</sup>; Randolf Beerwerth<sup>2</sup>; Sadia Bari<sup>3</sup>; Kristof Holste<sup>4</sup>; Kaja Schubert<sup>3</sup>; Jens Viehhaus<sup>5</sup>; Daniel Wolf Savin<sup>6</sup>; Stephan Fritzsche<sup>7</sup>; Alfred Müller<sup>8</sup>; Michael Martins<sup>9</sup>

<sup>1</sup> *Justus-Liebig-University Giessen, Germany*

<sup>2</sup> *University of Jena & Helmholtz Center Jena*

<sup>3</sup> *DESY*

<sup>4</sup> *Justus-Liebig-university Giessen*

<sup>5</sup> *HZB*

<sup>6</sup> *Columbia Astrophysics Laboratory*

<sup>7</sup> *Helmholtz-Institut Jena*

<sup>8</sup> *Justus-Liebig-University Giessen*

<sup>9</sup> *University of Hamburg*

**Corresponding Authors:** stefan.schippers@physik.uni-giessen.de, s.fritzsche@gsi.de

**Keywords:**

inner-shell photoionization  
multiple ionization  
interstellar medium  
soft x-rays  
synchrotron radiation

**Topics:**

Interactions with Photons and Plasmas

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## SOFT X-RAY SPECTRA FROM LASER PRODUCED SAMARIUM PLASMAS

**Authors:** John Sheil<sup>1</sup>; Ragava Lokasani<sup>2</sup>; Hiroyuli Hara<sup>3</sup>; Toshiki Tomura<sup>3</sup>; Takuya Gisuji<sup>3</sup>; Takeshi Higashiguchi<sup>3</sup>; Chihiro Suzuki<sup>4</sup>; Jiri Lampouch<sup>2</sup>; Gerry O'Sullivan<sup>1</sup>

<sup>1</sup> *University College Dublin*

<sup>2</sup> *CTU*

<sup>3</sup> *Utsunomiya University*

<sup>4</sup> *NIFS*

**Corresponding Authors:** gerry.osullivan@ucd.ie, john.sheil@ucdconnect.ie

**Keywords:**

soft x-ray spectra, laser produced plasmas, spectroscopy, samarium ion spectra

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Dissociative Ionization of the H<sub>2</sub>O Molecule Induced by MeV-energy Bare and Partially Screened Projectiles

**Author:** Sándor Kovács<sup>1</sup>

**Co-authors:** Péter Herczku ; Zoltán Juhász ; László Sarkadi ; László Gulyás ; Béla Sulik

<sup>1</sup> *Institute for Nuclear Research, Hungarian Academy of Science (MTA Atomki)*

**Corresponding Author:** kovacs.sandor@atomki.mta.hu

**Keywords:**

molecule  
ionization  
fragmentation  
dissociation  
ion impact

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

39

## Main Magnetic Focus Ion Sources: past, present and future

**Author:** Vladimir Ovsyannikov<sup>1</sup>

**Co-authors:** Andrei Nefiodov<sup>2</sup>; Alexander Levin<sup>3</sup>

<sup>1</sup> *MaMFIS Group*

<sup>2</sup> *Petersburg Nuclear Physics Institute*

<sup>3</sup> *MaMFIS Lab*

**Corresponding Authors:** aalevin63@gmail.com, a.v.nefiodov@gmail.com, anef@thd.pnpi.spb.ru

**Keywords:**

novel ion sources

**Topics:**

Production, Experimental Developments and Applications

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## First runs of MaMFIS-35 at JINR in Dubna

**Author:** Vladimir Ovsyannikov<sup>1</sup>

**Co-authors:** A. Boytsov<sup>2</sup>; D. Donets<sup>2</sup>; A. Ramsdorf<sup>2</sup>; Andrei Nefiodov<sup>3</sup>

<sup>1</sup> *MaMFIS Group*

<sup>2</sup> *Joint Institute for Nuclear Research*

<sup>3</sup> *Petersburg Nuclear Physics Institute*

**Corresponding Authors:** anef@thd.pnpi.spb.ru, a.v.nefiodov@gmail.com

**Keywords:**

novel ion source, deep ionization of heavy elements

**Topics:**

Production, Experimental Developments and Applications

41

## Relativistic configuration-interaction calculation of the ground and singly excited energy levels in berylliumlike ions

**Author:** Mikhail Kaygorodov<sup>1</sup>

**Co-authors:** Vladimir Shabaev<sup>2</sup>; Yury Kozhedub<sup>2</sup>; Ilya Tupitsyn<sup>2</sup>

<sup>1</sup> Saint Petersburg State University

<sup>2</sup> SPbU

**Corresponding Authors:** mkay0404@gmail.com, i.tupitsyn@spbu.ru, y.kozhedub@spbu.ru, v.shabaev@spbu.ru

**Keywords:**

Relativistic calculation, configuration-interaction, heavy charged ions, berillium-like, energy levels

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

42

## Laser Cooling and Precision Laser Spectroscopy of Relativistic Highly Charged Ions: From the CSRe to HIAF

**Authors:** Weiqiang Wen<sup>1</sup>; Hanbing Wang<sup>2</sup>; Zhongkui Huang<sup>None</sup>; Danyal Winters<sup>3</sup>; Michael Bussmann<sup>4</sup>; Xinwen Ma<sup>1</sup>

<sup>1</sup> Institute of Modern Physics, Chinese Academy of Sciences

<sup>2</sup> IMP

<sup>3</sup> GSI

<sup>4</sup> HZDR

**Corresponding Authors:** x.ma@impcas.ac.cn, wenweiqiang@impcas.ac.cn, wanghanbing@impcas.ac.cn

**Keywords:**

Laser cooling, Precision laser spectroscopy, Phase transition, QED

**Topics:**

Interactions with Photons and Plasmas

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## Fragmentation of hydrocarbon molecule produced by slow highly charged ion impact

**Authors:** Yu Wandong<sup>1</sup>; WEI Baoren<sup>None</sup>

<sup>1</sup> Fudan University



**Keywords:**

Highly charged ion, hydrocarbon molecule, fragmentation

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

44

## Angular Distribution of Radiation Emitted after Electron Capture into 197 MeV/u Xe54+ Collision with Kr and Xe Gaseous Targets

**Authors:** Bian Yang<sup>1</sup>; Deyang Yu<sup>1</sup>

**Co-authors:** Xiaohong Cai<sup>1</sup>; Caojie Shao<sup>1</sup>; Yingli Xue<sup>1</sup>; Wei Wang<sup>1</sup>; Mingwu Zhang<sup>1</sup>; Junliang Liu<sup>1</sup>; Zhangyong Song<sup>1</sup>; Yehong Wu; Rongchun Lu<sup>1</sup>; Fangfang Ruan

<sup>1</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

**Corresponding Author:** yangbian@impcas.ac.cn

**Keywords:**

Ion-Atom Collisions, Heavy Ion Storage Ring, X-ray Spectroscopy, Electron Capture

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

45

## State Selective X-ray of Electron Capture into Bare Xenon Ions in Fast Collision with Krypton and Xenon Gaseous Targets

**Authors:** Bian Yang<sup>1</sup>; Deyang Yu<sup>1</sup>

**Co-authors:** Xiaohong Cai<sup>1</sup>; Caojie Shao<sup>1</sup>; Yingli Xue<sup>1</sup>; Wei Wang<sup>1</sup>; Mingwu Zhang<sup>1</sup>; Junliang Liu<sup>1</sup>; Zhangyong Song<sup>1</sup>; Yehong Wu; Rongchun Lu<sup>1</sup>; Fangfang Ruan

<sup>1</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

**Corresponding Author:** yangbian@impcas.ac.cn

**Keywords:**

Ion-Atom Collisions, Heavy Ion Storage Ring, Non-Radiative Electron Capture, Radiative Electron Capture

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Dissociative Ionization of the C<sub>2</sub>H<sub>6</sub> Molecule Induced by 1 and 2 MeV H<sup>+</sup> Impact

**Author:** Sándor Kovács<sup>1</sup>

**Co-authors:** Sándor Demes ; Péter Herczku ; Zoltán Juhász ; Béla Sulik

<sup>1</sup> *Institute for Nuclear Research, Hungarian Academy of Sciences (Atomki)*

**Corresponding Author:** kovacs.sandor@atomki.mta.hu

**Keywords:**

molecule  
ionization  
fragmentation  
dissociation  
ion impact

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

47

## Energy Dependence of Blocking Effects on the Transmission of Ne<sup>7+</sup> Ions through Nanocapillaries

**Author:** Péter Herczku<sup>1</sup>

**Co-authors:** Zoltán Juhász<sup>2</sup>; Sándor T. S. Kovács ; Richard Rác ; Sándor Biri ; Béla Sulik

<sup>1</sup> *Institute for Nuclear Research Hungarian Academy of Sciences*

<sup>2</sup> *Institute for Nuclear Research, Hungarian Academy of Sciences*

**Corresponding Authors:** juhasz.zoltan@atomki.mta.hu, herczku.peter@atomki.mta.hu

**Keywords:**

Nanocapillaries  
Ion guiding

**Topics:**

Interaction with Clusters, Surfaces and Solids

48

## Monochromatic and mean radiative properties of astrophysical plasma mixtures in non-local thermodynamic equilibrium regime

**Authors:** Rafael Rodríguez Pérez<sup>1</sup>; Guadalupe Espinosa<sup>None</sup>; Juan Miguel Gil<sup>None</sup>; Pablo R. Beltrán<sup>None</sup>

<sup>1</sup> *Universidad de Las Palmas de Gran Canaria*

**Corresponding Author:** rafael.rodriguezperez@ulpgc.es

**Keywords:**

Astrophysical plasma mixtures radiative properties

Highly charged ions

Non-local thermodynamic equilibrium regime

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Calculations of stopping power of partially stripped ions in partially ionized plasmas

**Authors:** Juan Miguel Gil<sup>1</sup>; Rafael Rodríguez Pérez<sup>2</sup>

<sup>1</sup> *Departamento de Física de la Universidad de las Palmas de Gran Canaria*

<sup>2</sup> *Universidad de Las Palmas de Gran Canaria*

**Corresponding Authors:** rafael.rodriguezperez@ulpgc.es, juanmiguel.gil@ulpgc.es

**Keywords:**

Plasma atomic properties

Ion beam-plasma interaction

Non-local thermodynamic equilibrium plasmas

**Topics:**

Interactions with Photons and Plasmas

50

## Nuclear recoil effect on the g factor of Li-like ions

**Author:** Vladimir Shabaev<sup>1</sup>

<sup>1</sup> *SPbU*

**Corresponding Author:** v.shabaev@spbu.ru

**Keywords:**

g factor

quantum electrodynamics

nuclear recoil effect

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

51

## Approximate Scaling of the Time-Dependent Dirac Equation for Multiphoton Ionization of Hydrogen-like Ions

**Author:** Irina Ivanova<sup>1</sup>

**Co-authors:** Vladimir Shabaev<sup>1</sup>; Dmitry Telnov<sup>1</sup>; Alejandro Saenz<sup>2</sup>

<sup>1</sup> *SPbU*

<sup>2</sup> *Humboldt-Universität zu Berlin*

**Corresponding Authors:** v.shabaev@spbu.ru, ira.ivanova.v@gmail.com

**Keywords:**

scaling laws,  
hydrogen-like ions,  
intense laser pulses

**Topics:**

Strong Field and Ultrafast Processes

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## Total Cross Sections of Ionization and Electron Capture for Biological Molecules Impacted by Ions

**Authors:** Michele Quinto<sup>1</sup>; Juan Monti<sup>1</sup>; Philippe Weck<sup>2</sup>; Omar Fojón<sup>1</sup>; Christophe Champion<sup>3</sup>; Roberto Rivarola<sup>1</sup>

<sup>1</sup> *Instituto de Física Rosario (IFIR/CONICET), Rosario, Argentina*

<sup>2</sup> *Sandia National Laboratories, Albuquerque, USA*

<sup>3</sup> *Centre Lasers Intenses et Applications, Université de Bordeaux, France*

**Corresponding Authors:** rivarola@ifir-conicet.gov.ar, quinto@ifir-conicet.gov.ar

**Keywords:**

Ionization  
Capture  
Ions collision  
Biological molecules

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

54

## Role of Ion Impact Ionization Cross Sections in Radiation Biology Using Swift Highly Charged Ion Beams

**Author:** Moribayashi Kengo<sup>1</sup>

<sup>1</sup> *National Institutes for Quantum and Radiological Science and Technology*

**Corresponding Author:** moribayashi.kengo@qst.go.jp

**Keywords:**

Ion impact ionization cross sections, Radiation biology, Cancer therapy, electric field

**Topics:**

Production, Experimental Developments and Applications

55

## Multiconfiguration Dirac-Hartree-Fock Energy Levels and Transition Data for As XIX, Kr XXII, and Mo XXVIII Ions

**Authors:** Laima Radžiūtė<sup>1</sup>; Gediminas Gaigalas<sup>1</sup>; Pavel Rynkun<sup>1</sup>; Per Jönsson<sup>2</sup>

<sup>1</sup> *Institute of Theoretical Physics and Astronomy, Vilnius University*

<sup>2</sup> *Group for Materials Science and Applied Mathematics, Malmö University*

**Corresponding Authors:** laima.radziute@tfai.vu.lt, gediminas.gaigalas@tfai.vu.lt, pavel.rynkun@tfai.vu.lt

**Keywords:**

Energy levels,  
transitions data,  
P-like isoelectronic sequence

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

56

## Interaction of Highly Charged Ions with Surfaces and Nano-Materials using Kobe EBIS

**Authors:** Makoto Sakaurai<sup>1</sup>; Naofumi Nishida<sup>1</sup>; Akane Yamauchi<sup>1</sup>; Yuuki Hori<sup>1</sup>; Hazuki Fujiwara<sup>1</sup>; Shinichi Honda<sup>2</sup>; Hiroyuki Sakaue<sup>3</sup>; Daiji Kato<sup>3</sup>; Tomohiro Yamaguchi<sup>4</sup>; Kouji Ishibashi<sup>4</sup>; Yuya Fujiwara<sup>2</sup>; K.-Y. Lee<sup>5</sup>; Toshifumi Terui<sup>6</sup>

<sup>1</sup> *Kobe University*

<sup>2</sup> *University of Hyogo*

<sup>3</sup> *National Institute for Fusion Science*

<sup>4</sup> *Riken*

<sup>5</sup> *National Taiwan University of Science and Technology*

<sup>6</sup> *National Institute of Information and Communications Technology*

**Corresponding Authors:** tyamag@riken.jp, kishiba@riken.jp, sakaue.hiroyuki@lhd.nifs.ac.jp, 157s119s@stu.kobe-u.ac.jp, msakurai@kobe-u.ac.jp, dkato@nifs.ac.jp

**Keywords:**

Carbon nano tube  
Transmission electron microscope  
Electron spin resonance

**Topics:**

Interaction with Clusters, Surfaces and Solids

57

## **Non-Perturbative Vacuum Polarization Effects in One- and Two-Dimensional Supercritical Dirac-Coulomb Systems**

**Author:** Andrei Davydov<sup>1</sup>

**Co-authors:** Konstantin Sveshnikov<sup>1</sup>; Yuliya Voronina<sup>1</sup>

<sup>1</sup> *Department of Physics and Institute of Theoretical Problems of MicroWorld, Lomonosov Moscow State University*

**Corresponding Authors:** voroninayu@physics.msu.ru, costa@bog.msu.ru, davydov.andrey@physics.msu.ru

**Keywords:**

non-perturbative QED-effects, one- and two-dimensional Dirac-Coulomb systems, supercritical fields, vacuum polarization.

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

58

## **Characteristics of HCIs Produced at Kobe EBIS under Modulated Operation**

**Authors:** Makoto Sakurai<sup>1</sup>; Naofumi Nishida<sup>1</sup>; Yuuki Hori<sup>1</sup>; Akane Yamauchi<sup>1</sup>; Hazuki Fujiwara<sup>1</sup>; Daiji Kato<sup>2</sup>; Hiroyuki Sakaue<sup>2</sup>

<sup>1</sup> *Kobe University*

<sup>2</sup> *National Institute for Fusion Science*

**Corresponding Authors:** sakaue.hiroyuki@lhd.nifs.ac.jp, 157s119s@stu.kobe-u.ac.jp, msakurai@kobe-u.ac.jp, dkato@nifs.ac.jp

**Keywords:**

Electron beam ion source  
Modulation of electron beam  
Time evolution

**Topics:**

Production, Experimental Developments and Applications

60

## Theoretical Description Of The K-shell Ionization In Heavy Ion Collisions

**Authors:** Oleksandr Novak<sup>1</sup>; Roman Kholodov<sup>1</sup>; Andrey Surzhykov<sup>2</sup>; Anton Artemyev<sup>3</sup>; Thomas Stoehlker<sup>4</sup>

<sup>1</sup> *Institute of Applied Physics, NAS of Ukraine, Petropavlivska Street 58, 40000 Sumy, Ukraine*

<sup>2</sup> *Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany*

<sup>3</sup> *Institut für Physik und CINSaT, Universität Kassel, Heinrich-Plett-Straße 40, 34132 Kassel, Germany*

<sup>4</sup> *GSI, Helmholtz-Inst Jena, IOQ, Fak. f. Physik Uni Jena*

**Corresponding Authors:** andrey.surzhykov@ptb.de, kholodovroman@yahoo.com, novak-o-p@ukr.net

### Keywords:

K-shell ionization, hydrogen-like ion, two-center hamiltonian, asymmetric collisions

### Topics:

Collisions with Electrons, Ions, Atoms and Molecules

61

## A FPGA/Labview-based Data Acquisition System for Voltage-Biased Silicon Microcalorimeters for X-ray Detection

**Author:** Saskia Kraft-Bermuth<sup>1</sup>

**Co-authors:** Holger Brand<sup>2</sup>; Artur Echler<sup>2</sup>; Damian Muell<sup>1</sup>; Pascal Scholz<sup>1</sup>

<sup>1</sup> *I. Physics Institute, Justus-Liebig-University, Giessen, Germany*

<sup>2</sup> *GSI Helmholtz Centre for Heavy Ion Research, Darmstadt, Germany*

**Corresponding Authors:** saskia.kraft-bermuth@iamp.physik.uni-giessen.de, pascal.a.scholz@physik.uni-giessen.de, damian.muell@physik.uni-giessen.de, a.echler@gsi.de, h.brand@gsi.de

### Keywords:

silicon microcalorimeters  
data acquisition system  
X-ray detection

### Topics:

Production, Experimental Developments and Applications

62

## Simulation of ion beam-plasma interaction processes for point-like ions in partially ionized plasmas.

**Author:** Pablo Rodríguez Beltrán<sup>1</sup>

<sup>1</sup> *Departamento de Física de la Universidad de las Palmas de Gran Canaria*

**Corresponding Author:** pablorb95@gmail.com

**Keywords:**

Ion beam plasma interaction  
Stopping power  
Heating plasma

**Topics:**

Interactions with Photons and Plasmas

63

## Proton Collision With Nitrogen Gas By Using Time-dependent Density Functional Theory

**Authors:** Wandong Yu<sup>1</sup>; Congzhang Gao<sup>2</sup>; Tiantian Jiang<sup>1</sup>; Roger Hutton<sup>1</sup>; Yaming Zou<sup>1</sup>; Baoren Wei<sup>1</sup>

<sup>1</sup> *Fudan university*

<sup>2</sup> *Institute of Applied Physics and Computational Mathematics*

**Corresponding Authors:** rhutton@fudan.edu.cn, 16210200005@fudan.edu.cn, zouym@fudan.edu.cn, czgao88@hotmail.com, yuwandong1989@126.com, brwei@fudan.edu.cn

**Keywords:**

Cross sections, time-dependent density functional theory, Nitrogen gas, KeV

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

64

## Differential Cross Sections for Single Ionization of Li by p, Li<sup>2+</sup>, and O<sup>8+</sup>

**Authors:** Andrey Bondarev<sup>None</sup>; Ilya Tupitsyn<sup>1</sup>; Vladimir Shabaev<sup>1</sup>

<sup>1</sup> *SPbU*

**Corresponding Authors:** i.tupitsyn@spbu.ru, v.shabaev@spbu.ru, a.bondarev@spbu.ru

**Keywords:**

ion-atom collisions  
ionization  
differential cross sections

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules



65

## Electron Induced K-Shell X-ray Emission from Solid Metal Targets : A Monte Carlo Simulation

**Authors:** Xiaoxiao Yuan<sup>1</sup>; Wei Wang<sup>2</sup>; Denghong Zhang<sup>3</sup>; Deyang Yu<sup>4</sup>; Xiaohong Cai<sup>4</sup>

<sup>1</sup> *College of Physics and Electronic Engineering, Northwest Normal University, China*

<sup>2</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

<sup>3</sup> *College of Physics and Electronic Engineering, Northwest Normal University, China*

<sup>4</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

### Keywords:

inner-shell ionization, electron beams, Monte Carlo (MC) simulation

### Topics:

Collisions with Electrons, Ions, Atoms and Molecules

66

## Electron Capture in O<sub>2</sub><sup>+</sup> + H<sub>2</sub> Collisions at a few keV Impact Energies

**Authors:** Sándor Demes<sup>1</sup>; Zoltán Juhász<sup>2</sup>; Jean-Yves Chesnel<sup>3</sup>; Sándor Kovács<sup>1</sup>; Peter Herczku<sup>1</sup>; Erika Bene<sup>1</sup>; Violaine Vizcaino<sup>3</sup>; Alain Méry<sup>3</sup>; Jimmy Rangama<sup>3</sup>; Jean-Christophe Pouilly<sup>3</sup>; Nicolas Sens<sup>3</sup>; Béla Sulik<sup>1</sup>

<sup>1</sup> *Institute for Nuclear Research, Hungarian Academy of Sciences (ATOMKI)*

<sup>2</sup> *Institute for Nuclear Research, Hungarian Academy of Sciences*

<sup>3</sup> *Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), Unité mixte CEA-CNRS-Ensicaen-Université de Caen Normandie*

**Corresponding Authors:** juhasz.zoltan@atomki.mta.hu, demes.sandor@atomki.mta.hu, herczku.peter@atomki.mta.hu, kovacs.sandor@atomki.mta.hu

### Keywords:

ion-molecule collision, electron capture, coupled channel theory, fragmentation

### Topics:

Collisions with Electrons, Ions, Atoms and Molecules

67

## Microscopic characterization of noble gas plasmas of interest in Laboratory Astrophysics

**Authors:** Guadalupe Espinosa Vivas<sup>1</sup>; Rafael Rodríguez Pérez<sup>1</sup>; Juan Miguel Gil<sup>2</sup>; Pablo Rodríguez Beltrán<sup>2</sup>

<sup>1</sup> *Universidad de Las Palmas de Gran Canaria*

<sup>2</sup> *Departamento de Física de la Universidad de las Palmas de Gran Canaria*

**Corresponding Authors:** pablorb95@gmail.com, rafael.rodriguezperez@ulpgc.es, juanmiguel.gil@ulpgc.es, guadalupe.espinosa@ulpgc.es

**Keywords:**

Laboratory Astrophysics  
NLTE Radiative Properties  
Lowly and highly charged ions of noble gases

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

68

## **SIM-X: Silicon Microcalorimeters For X-ray Spectroscopy At Storage Rings –Status And Perspectives**

**Author:** Pascal Scholz<sup>1</sup>

**Co-authors:** Victor Andrianov<sup>2</sup>; Alexander Bleile<sup>3</sup>; Artur Echler<sup>4</sup>; Peter Egelhof<sup>4</sup>; Damian Müll<sup>1</sup>; Saskia Kraft-Bermuth<sup>1</sup>

<sup>1</sup> *Justus-Liebig-University Giessen*

<sup>2</sup> *Lomonosov Moscow State University*

<sup>3</sup> *GSI Helmholtz Center*

<sup>4</sup> *Johannes-Gutenberg University Mainz*

**Corresponding Authors:** pascal.a.scholz@physik.uni-giessen.de, damian.muell@physik.uni-giessen.de, saskia.kraft-bermuth@iamp.physik.uni-giessen.de, a.echler@gsi.de, p.egelhof@gsi.de, andrva22@mail.ru, a.bleile@gsi.de

**Keywords:**

X-ray spectroscopy, Silicon microcalorimeters

**Topics:**

Production, Experimental Developments and Applications

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## **TOTAL BINDING ENERGIES OF XENON AND LEAD IONS**

**Authors:** GUOJIE BIAN<sup>None</sup>; Paul Indelicato<sup>1</sup>

<sup>1</sup> *CNRS, Sorbonne Universites, UPMC Universites*

**Corresponding Authors:** paul.indelicato@lkb.upmc.fr, bianguojie@gmail.com

**Keywords:**

Binding energy, Highly charged ions, Multi-Conguration Dirac-Fock calculation

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

70

## Fine And Hyperfine Structure Of Heavy Muonic Atoms

**Authors:** Niklas Michel<sup>1</sup>; Natalia S. Oreshkina<sup>1</sup>; Christoph H. Keitel<sup>1</sup>

<sup>1</sup> *Max Planck Institute for Nuclear Physics*

**Corresponding Authors:** oresh@mpi-hd.mpg.de, keitel@mpi-hd.mpg.de, n.michel@mpi-hd.mpg.de

**Keywords:**

Muonic atoms  
Fine structure  
Hyperfine structure

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

71

## Direct two-electron ejection from F<sup>-</sup> by a single photon

**Authors:** Alfred Müller<sup>1</sup>; Alexander Borovik<sup>2</sup>; Sadia Bari<sup>3</sup>; Ticia Buhr<sup>2</sup>; Kristof Holste<sup>4</sup>; Michael Martins<sup>5</sup>; Alexander Perry-Saßmannshausen<sup>2</sup>; Ronald Phaneuf<sup>6</sup>; Simon Reinwardt<sup>7</sup>; Stefan Schippers<sup>2</sup>

<sup>1</sup> *Justus-Liebig-University Giessen*

<sup>2</sup> *Justus-Liebig-University Giessen, Germany*

<sup>3</sup> *DESY*

<sup>4</sup> *Justus-Liebig-university Giessen*

<sup>5</sup> *University of Hamburg*

<sup>6</sup> *University of Nevada, Reno, USA*

<sup>7</sup> *University of Hamburg, Germany*

**Corresponding Author:** stefan.schippers@physik.uni-giessen.de

**Keywords:**

negative ions  
inner-shell photoionization  
direct double ionization  
synchrotron radiation  
photon-ion merged-beams method

**Topics:**

Interaction with Clusters, Surfaces and Solids

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## Resonant propagation of polarized photon in a strong magnetic field

**Authors:** Mykhailo Diachenko<sup>1</sup>; Roman Kholodov<sup>1</sup>

<sup>1</sup> *Institute of Applied Physics, NAS of Ukraine, Petropavlivska Street 58, 40000 Sumy, Ukraine*

**Corresponding Authors:** kholodovroman@yahoo.com, mykhailo.m.diachenko@gmail.com

**Keywords:**

Quantum electrodynamic processes,  
strong magnetic field,  
resonance.

**Topics:**

Strong Field and Ultrafast Prozesse

73

## **Towards an Optical Clock based on Quantum Logic Spectroscopy of Highly Charged Ions**

**Author:** Peter Micke<sup>1</sup>

**Co-authors:** Steven King<sup>1</sup>; Tobias Leopold<sup>1</sup>; Steffen Kühn<sup>2</sup>; Janko Nauta<sup>2</sup>; Lisa Schmöger<sup>2</sup>; Maria Schwarz<sup>2</sup>; Julian Stark<sup>2</sup>; José Crespo López-Urrutia<sup>3</sup>; Piet Schmidt<sup>1</sup>

<sup>1</sup> *Physikalisch-Technische Bundesanstalt, Germany*

<sup>2</sup> *Max-Planck-Institut für Kernphysik, Heidelberg*

<sup>3</sup> *Max-Planck-Institut für Kernphysik, Heidelberg*

**Corresponding Author:** peter.micke@mpi-hd.mpg.de

**Keywords:**

Highly charged ions  
Quantum logic spectroscopy  
Optical clock  
Frequency metrology  
Electron beam ion trap  
Paul trap

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## **Towards Laser Cooling of Relativistic 16O5+ Ion Beams at the CSRe**

**Authors:** Hanbing Wang<sup>1</sup>; Weiqiang Wen<sup>1</sup>; Zhongkui Huang<sup>1</sup>; Dacheng Zhang<sup>None</sup>; Bang Hai<sup>1</sup>; Dongmei Zhao<sup>1</sup>; Xiaolong Zhu<sup>1</sup>; Xiaoni Li<sup>1</sup>; Lijun Mao<sup>1</sup>; Ruishi Mao<sup>1</sup>; Junxia Wu<sup>1</sup>; Jiancheng Yang<sup>1</sup>; Youjin Yuan<sup>1</sup>; Danyal Winters<sup>2</sup>; Michael Bussmann<sup>3</sup>; Xinwen Ma<sup>1</sup>

<sup>1</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

<sup>2</sup> *GSI Helmholtzzentrum für Schwerionenforschung GmbH*

<sup>3</sup> *Helmholtz-Zentrum Dresden-Rossendorf*

**Corresponding Authors:** huangzhongkui@impcas.ac.cn, yuanyj@impcas.ac.cn, yangjch@impcas.ac.cn, maolijun@impcas.ac.cn, d.winters@gsi.de, haibang@impcas.ac.cn, maorsh@impcas.ac.cn, dch-zhang@impcas.ac.cn, lixn@impcas.ac.cn, wujx@impcas.ac.cn, m.bussmann@hzdr.de, x.ma@impcas.ac.cn, wenweiqiang@impcas.ac.cn, wanghanbing@impcas.ac.cn, zhuxiaolong@impcas.ac.cn, dmzhao@impcas.ac.cn

**Keywords:**

heavy- ion storage ring, laser cooling, highly charged ions, ultra-cold ion beams, precision laser spectroscopy

**Topics:**

Production, Experimental Developments and Applications

75

## Resolved contributions of resonant inelastic electron scattering to the soft x-ray photon emission of Fe XVII

**Authors:** Pedro Amaro<sup>1</sup>; Chintan Shah<sup>2</sup>; Sven Bernitt<sup>2</sup>; Stepan Dobrodey<sup>2</sup>; José Marques<sup>None</sup>; José Paulo Santos<sup>3</sup>; Thomas Pfeifer<sup>2</sup>; José R. Crespo López-Urrutia<sup>2</sup>

<sup>1</sup> LIBPhys-UNL

<sup>2</sup> Max-Planck-Institut für Kernphysik, Heidelberg

<sup>3</sup> DF @ FCT NOVA

**Corresponding Authors:** pdamaro@fct.unl.pt, jps@fct.unl.pt, jmmarques@fc.ul.pt

**Keywords:**

Electron recombination;  
EBIT  
Resonant electron scattering

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Dielectronic Recombination of B-Like Ar13+ at the CSRm

**Authors:** Zhongkui Huang<sup>1</sup>; Weiqiang Wen<sup>1</sup>; Shuxing Wang<sup>2</sup>; Hanbing Wang<sup>3</sup>; Xin Xu<sup>4</sup>; nadir khan<sup>1</sup>; lijun dou<sup>1</sup>; xiaoya Chuai<sup>1</sup>; Dongmei Zhao<sup>1</sup>; Xiaolong Zhu<sup>1</sup>; Lijun Mao<sup>1</sup>; Xiaoming Ma<sup>1</sup>; Jie Li<sup>1</sup>; Ruishi Mao<sup>1</sup>; Jiancheng Yang<sup>1</sup>; Dayu Yin<sup>1</sup>; Youjin Yuan<sup>1</sup>; Linfan Zhu<sup>5</sup>; Xinwen Ma<sup>1</sup>

<sup>1</sup> Institute of Modern Physics, Chinese Academy of Sciences

<sup>2</sup> Department of Modern Physics, USTC

<sup>3</sup> Institute of Modern Physics, Chinese Academy of Sciences

<sup>4</sup> University of Science and Technology of China

<sup>5</sup> Department of Modern Physics, University of Science and Technology of China

**Corresponding Authors:** maxiaoming@impcas.ac.cn, huangzhongkui@impcas.ac.cn, yuanyj@impcas.ac.cn, yangjch@impcas.ac.cn, maolijun@impcas.ac.cn, xuxin09@mail.ustc.edu.cn, lfzhu@ustc.edu.cn, lijie@impcas.ac.cn, doulijun@impcas.ac.cn, chuaixiaoya@impcas.ac.cn, nadirkhan@impcas.ac.cn, yindy@impcas.ac.cn, wsx0417@mail.ustc.edu.cn, maorsh@impcas.ac.cn, x.ma@impcas.ac.cn, wenweiqiang@impcas.ac.cn, wanghanbing@impcas.ac.cn, zhuxiaolong@impcas.ac.cn, dmzhao@impcas.ac.cn

**Keywords:**

highly charged ions, dielectronic recombination, storage ring

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## The ALPHATRAP g-factor Experiment

**Authors:** Tim Sailer<sup>1</sup>; Ioanna Arapoglou<sup>1</sup>; Alexander Egl<sup>1</sup>; Sandro Kraemer<sup>1</sup>; Timo Steinsberger<sup>1</sup>; Andreas Weigel<sup>1</sup>; José R. Crespo López-Urrutia<sup>2</sup>; Martin Höcker<sup>3</sup>; Bingsheng Tu<sup>3</sup>; Robert Wolf<sup>4</sup>; Sven Sturm<sup>2</sup>; Klaus Blaum<sup>2</sup>

<sup>1</sup> *Max-Planck-Institut für Kernphysik, Fakultät für Physik und Astronomie, Universität Heidelberg*

<sup>2</sup> *Max-Planck-Institut für Kernphysik, Heidelberg*

<sup>3</sup> *Max-Planck-Institut für Kernphysik*

<sup>4</sup> *Max-Planck-Institut für Kernphysik, ARC Centre of Excellence for Engineered Quantum Systems, School of Physics, The University of Sydney, NSW Australia*

**Corresponding Author:** tim.sailer@mpi-hd.mpg.de

**Keywords:**

Penning trap  
Highly charged ions  
Precision Measurement  
BS-QED

**Topics:**

Production, Experimental Developments and Applications

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## 1s-1s Electron Capture from Adenine Molecule by Swift Projectile Ions Using KLL-Auger Electron Technique

**Authors:** Chandan Bagdia<sup>1</sup>; Lokesh C. Tribedi<sup>1</sup>

**Co-authors:** Anuvab Mandal<sup>1</sup>; Madhusree Roychowdhury<sup>1</sup>; Shamik Bhattacharjee<sup>1</sup>

<sup>1</sup> *Department of Atomic and Nuclear Physics, Tata Institute of Fundamental Research, Dr. Homi Bhabha Road, Colaba, Mumbai –400005, India*

**Corresponding Authors:** lokesh@tifr.res.in, chandan.bagdia@tifr.res.in

**Keywords:**

1s-1s electron transfer, adenine, Auger Electron, 1s-ionization, radiation damage, electron spectroscopy

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Double Differential Cross Section Measurement of Electron Emission from Fluorene Molecule Upon Ion Impact

**Authors:** Chandan Bagdia<sup>1</sup>; Lokesh C. Tribedi<sup>1</sup>

**Co-authors:** Anuvab Mandal<sup>1</sup>; Shamik Bhattacharjee<sup>1</sup>; Madhusree Roychowdhury<sup>1</sup>; Madugula Nrisimhamurty<sup>1</sup>; Deepankar Misra<sup>1</sup>

<sup>1</sup> *Department of Atomic and Nuclear Physics, Tata Institute of Fundamental Research, Dr. Homi Bhabha Road, Colaba, Mumbai – 400005, India*

**Corresponding Authors:** lokesh@tifr.res.in, chandan.bagdia@tifr.res.in

**Keywords:**

PAH, Fluorene, Collective excitation, DDCS

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Prospects of atomic physics with highly charged heavy ions at HIAF

**Authors:** Xinwen Ma<sup>1</sup>; Weiqiang Wen<sup>1</sup>; Shaofeng Zhang<sup>1</sup>; Zhongkui Huang<sup>1</sup>; Hanbing Wang<sup>2</sup>; Jie Yang<sup>1</sup>; Xiaolong Zhu<sup>1</sup>; Deyang Yu<sup>1</sup>; Rui Cheng<sup>1</sup>; Lijun Mao<sup>1</sup>; Jiancheng Yang<sup>1</sup>; Lina Sheng<sup>1</sup>; Bo Wu<sup>1</sup>; Xiaohong Zhou<sup>1</sup>; Hushan Xu<sup>1</sup>; Youjin Yuan<sup>1</sup>; Jiawen Xia<sup>1</sup>; Hongwei Zhao<sup>1</sup>; Guoqing Xiao<sup>1</sup>; Wenlong Zhan<sup>1</sup>

<sup>1</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

<sup>2</sup> *IMP*

**Corresponding Authors:** jie.yang@impcas.ac.cn, xiajw@impcas.ac.cn, zxh@impcas.ac.cn, huangzhongkui@impcas.ac.cn, yuanyj@impcas.ac.cn, shenlina@impcas.ac.cn, xiaogq@impcas.ac.cn, zhan@impcas.ac.cn, yangjch@impcas.ac.cn, maolijun@impcas.ac.cn, wubo@impcas.ac.cn, chengrui@impcas.ac.cn, zhangshf@impcas.ac.cn, zhaohw@impcas.ac.cn, hushan@impcas.ac.cn, x.ma@impcas.ac.cn, wenweiqiang@impcas.ac.cn, wanghanbing@impcas.ac.cn, zhuxiaolong@impcas.ac.cn

**Keywords:**

Highly Charged ions,  
Relativistic collision dynamics,  
Precision spectroscopy,  
HIAF

**Topics:**

Production, Experimental Developments and Applications

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## Performance And Testing Of Ultra High Vacuum Compatible Silicon Strip Detectors At GSI Storage Rings

**Author:** Laszlo Varga<sup>1</sup>

**Co-authors:** C. G. Bruno <sup>2</sup>; T. Davinson <sup>2</sup>; J. Glorius <sup>3</sup>; B. Jurado <sup>4</sup>; C. Langer <sup>5</sup>; C. Lederer-Woods <sup>2</sup>; M. Lestinsky <sup>6</sup>; Yuri Litvinov ; R. Reifarh <sup>5</sup>; Z. Slavkovská <sup>6</sup>; M. Steck <sup>6</sup>; T. Stöhlker <sup>6</sup>; P. J. Woods <sup>2</sup>; Yuanming Xing

<sup>1</sup> *GSI, Germany*

<sup>2</sup> *University of Edinburgh, UK*

<sup>3</sup> *GSI*

<sup>4</sup> *CENBG, Bordeaux, France*

<sup>5</sup> *Goethe Universität, Frankfurt am Main, Germany*

<sup>6</sup> *GSI, Darmstadt, Germany*

**Corresponding Authors:** m.lestinsky@gsi.de, y.litvinov@gsi.de, l.varga@gsi.de, j.glorius@gsi.de, xym@impcas.ac.cn

**Keywords:**

DSSSD  
 $^{124}\text{Xe}(p,\gamma)$   
 proton-capture

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

82

## Upgrade of the Main Magnetic Focus Ion Trap in Giessen

**Authors:** Marc Keil<sup>1</sup>; Stefan Schippers<sup>1</sup>; Alfred Müller<sup>1</sup>; Alexander Borovik<sup>1</sup>

<sup>1</sup> *Justus-Liebig-Universität Gießen*

**Keywords:**

Argon Ions  
 Highly-charged ions production  
 Main Magnetic Focus Ion Trap  
 X-ray spectra

**Topics:**

Production, Experimental Developments and Applications

83

## Two-center Dirac equation beyond the monopole approximation: critical distances for lower electronic levels

**Authors:** Artem Roenko<sup>1</sup>; Konstantin Sveshnikov<sup>1</sup>

<sup>1</sup> *Lomonosov Moscow State University, Faculty of Physics*

**Corresponding Authors:** costa@bog.msu.ru, roenko@physics.msu.ru

**Keywords:**

two-center Dirac equation,  
 heavy ions collisions,



critical distances,  
superheavy nuclear quasi-molecules

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

84

## Shift of electronic levels due to dynamically screened electron magnetic anomaly for systems with supercritical charge

**Authors:** Artem Roenko<sup>1</sup>; Konstantin Sveshnikov<sup>1</sup>

<sup>1</sup> *Lomonosov Moscow State University, Faculty of Physics*

**Corresponding Authors:** costa@bog.msu.ru, roenko@physics.msu.ru

**Keywords:**

dynamically screened AMM,  
non-perturbative QED effects,  
H-like atoms,  
nuclear quasi-molecule,  
large Z

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

85

## Electron-Ion Recombination Rate Coefficients of Be-like Ca

**Authors:** Shuxing Wang<sup>1</sup>; Xin Xu<sup>None</sup>; Zhongkui Huang<sup>2</sup>; Weiqiang Wen<sup>2</sup>; Nadir Khan<sup>2</sup>; Hanbing Wang<sup>3</sup>; Simon Preval<sup>None</sup>; Nigel Badnell<sup>None</sup>; Stefan Schippers<sup>4</sup>; Sultan Mahmood<sup>None</sup>; Lijun Dou<sup>2</sup>; Xiaoya Chuai<sup>2</sup>; Dongmei Zhao<sup>2</sup>; Xiaolong Zhu<sup>2</sup>; Xiaoming Ma<sup>2</sup>; Jie Li<sup>2</sup>; Lijun Mao<sup>2</sup>; Ruishi Mao<sup>2</sup>; Dayu Yin<sup>2</sup>; Youjin Yuan<sup>2</sup>; Jiancheng Yang<sup>2</sup>; Bo Wu<sup>2</sup>; Xinwen Ma<sup>2</sup>; Linfan Zhu<sup>5</sup>

<sup>1</sup> *Department of Modern Physics, USTC*

<sup>2</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

<sup>3</sup> *IMP*

<sup>4</sup> *Justus-Liebig-University Giessen, Germany*

<sup>5</sup> *Department of Modern Physics, University of Science and Technology of China*

**Corresponding Authors:** maxiaoming@impcas.ac.cn, huangzhongkui@impcas.ac.cn, yuanyj@impcas.ac.cn, yangjch@impcas.ac.cn, maolijun@impcas.ac.cn, lfzhu@ustc.edu.cn, lijie@impcas.ac.cn, douljun@impcas.ac.cn, chuaixiaoya@impcas.ac.cn, nadirkhan@impcas.ac.cn, yindy@impcas.ac.cn, wsx0417@mail.ustc.edu.cn, maorsh@impcas.ac.cn, wubo@impcas.ac.cn, x.ma@impcas.ac.cn, wenweiqiang@impcas.ac.cn, wanghanbing@impcas.ac.cn, stefan.schippers@physik.uni-giessen.de, zhuxiaolong@impcas.ac.cn, dmzhao@impcas.ac.cn

**Keywords:**

storage ring, electron-ion recombination, rate coefficient

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

86

## Electron Impact Double K-shell Ionization and Hypersatellite Radiative Transitions of Solid Sc, Cr and Cu

**Authors:** Faisal Zeeshan<sup>1</sup>; Jean-Claude Dousse<sup>1</sup>; Joanna Hoszowska<sup>1</sup>

<sup>1</sup> *University of Fribourg, Department of Physics, CH-1700 Fribourg, Switzerland*

**Corresponding Authors:** jean-claude.dousse@unifr.ch, joanna.hoszowska@unifr.ch, faisal.zeeshan@unifr.ch

**Keywords:**

Electron impact  
Double K-shell ionization  
X-ray hypersatellite transitions  
High resolution X-ray emission spectroscopy

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

87

## MULTIPOLE CROSS SECTIONS FOR COLLISIONAL EXCITATIONS OF HIGHLY CHARGED IONS BY ISOTROPIC ELECTRONS

**Authors:** Mohamed Sadek Bentotoche<sup>1</sup>; Mokhtar Kemal Inal<sup>1</sup>; Mustapha Benmouna<sup>1</sup>

<sup>1</sup> *University of Tlemcen, 13000 Tlemcen, Algeria*

**Corresponding Author:** m\_inal@mail.univ-tlemcen.dz

**Keywords:**

electron-ion collision,  
isotropic electrons,  
multipole cross sections.

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

88

## The Hyperfine-Puzzle of Strong-Field Bound-State QED

**Author:** Wilfried Nörtershäuser<sup>None</sup>

**Co-authors:** R. Sánchez ; Z. Andelkovic ; C. Brandau ; A. Dax ; W. Geithner ; Ch. Geppert ; C. Gorges ; M. Hammen ; V. Hannen ; S. Kaufmann ; K. König ; A. Yu ; M. Litvinov ; M. Lochmann ; M. Maaß ; J. Meisner ; T. Murböck ; M. Schmidt ; S. Schmidt ; M. Steck ; T. Stöhlker ; R.C. Thompson ; C. Trageser ; J. Vollbrecht ; C. Weinheimer ;

V.M. Shabaev ; L.V. Skripnikov ; A.V. Volotka ; J. Ullmann ; F. Kraus ; B. Kresse ; A.F. Privalov ; B. Scheibe ; M. Vogel

**Corresponding Authors:** m.vogel@gsi.de, c.brandau@gsi.de, t.stoehlker@gsi.de, wnoertershaeuser@ikp.tu-darmstadt.de

**Keywords:**

strong field QED  
laser spectroscopy

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

89

## Calculations Of The Electron-Positron Pair Creation In Low-Energy Collisions Of Heavy Bare Nuclei

**Authors:** Roman Popov<sup>1</sup>; Andrey Bondarev<sup>None</sup>; Iliya Maltsev<sup>2</sup>; Yury Kozhedub<sup>2</sup>; Vladimir Shabaev<sup>2</sup>; Ilya Tupitsyn<sup>2</sup>; Xinwen Ma<sup>3</sup>; Günter Plunien<sup>4</sup>; T. Stöhlker<sup>None</sup>

<sup>1</sup> Saint Petersburg State University

<sup>2</sup> SPbU

<sup>3</sup> Institute of Modern Physics, Chinese Academy of Sciences

<sup>4</sup> Institut für Theoretische Physik, Technische Universität Dresden

**Corresponding Authors:** i.tupitsyn@spbu.ru, t.stoehlker@gsi.de, i.maltsev@spbu.ru, st016948@student.spbu.ru, a.bondarev@spbu.ru, x.ma@impcas.ac.cn, v.shabaev@spbu.ru, y.kozhedub@spbu.ru

**Keywords:**

collisions, low-energy, heavy nuclei, pair creation

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

90

## High-Precision Mass Measurements of Highly-Charged Xenon Isotopes with PENTATRAP

**Authors:** Christoph Schweiger<sup>1</sup>; José R. Crespo López-Urrutia<sup>1</sup>; Menno Door<sup>1</sup>; Sergey Eliseev<sup>1</sup>; Pavel Filianin<sup>1</sup>; Kathrin Kromer<sup>1</sup>; Yuri N. Novikov<sup>2</sup>; Alexander Rischka<sup>1</sup>; Rima X. Schüssler<sup>1</sup>; Stefan Ulmer<sup>3</sup>; Sven Sturm<sup>1</sup>; Klaus Blaum<sup>1</sup>

<sup>1</sup> Max-Planck-Institut für Kernphysik

<sup>2</sup> Petersburg Nuclear Physics Institute

<sup>3</sup> RIKEN, Ulmer Initiative Research Unit

**Corresponding Author:** christoph.schweiger@mpi-hd.mpg.de

**Keywords:**

Penning trap, mass spectrometry, xenon, mass, neutrino physics, special relativity theory, QED, highly-charged ions

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

91

**Electron Emission In Collisions Between Dressed Ions And Multielectronic Targets: The Role Of The Projectile Distortion****Author:** Juan Manuel Monti<sup>1</sup>**Co-authors:** Michele Quinto<sup>2</sup>; Roberto Rivarola<sup>3</sup><sup>1</sup> *Instituto de Física Rosario - CONICET-UNR*<sup>2</sup> *Instituto de Física Rosario (IFIR/CONICET)*<sup>3</sup> *Instituto de Física Rosario (IFIR/CONICET), Rosario, Argentina***Corresponding Authors:** rivarola@ifir-conicet.gov.ar, quinto@ifir-conicet.gov.ar, monti@ifir-conicet.gov.ar**Keywords:**

ionization  
dressed-projectiles  
multielectronic-targets  
distorted-wave

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

92

**Ionization Of Water Molecules By Fast Dressed H, He+ And He Ion Beam Impact****Author:** Juan Manuel Monti<sup>1</sup>**Co-authors:** Michele Quinto<sup>2</sup>; Christophe Champion<sup>3</sup>; Roberto Rivarola<sup>4</sup><sup>1</sup> *Instituto de Física Rosario - CONICET-UNR*<sup>2</sup> *Instituto de Física Rosario (IFIR/CONICET)*<sup>3</sup> *Centre Lasers Intenses et Applications, Université de Bordeaux, France*<sup>4</sup> *Instituto de Física Rosario (IFIR/CONICET), Rosario, Argentina***Corresponding Authors:** rivarola@ifir-conicet.gov.ar, quinto@ifir-conicet.gov.ar, monti@ifir-conicet.gov.ar**Keywords:**

ionization  
biological-molecules  
dressed-projectiles  
distorted-wave-models

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

93

## Towards Experiments with Highly Charged Ions at HESR

**Authors:** Angela Braeuning-Demian<sup>1</sup>; Anton Kalinin<sup>2</sup>; Jan Glorius<sup>3</sup>; Nikolaos Petridis<sup>2</sup>; Pierre-Michel Hillenbrand<sup>4</sup>; Rodolfo Sánchez<sup>3</sup>; Shahab Sanjari<sup>2</sup>; Siegbert Hagmann<sup>2</sup>; Thomas Köhler<sup>5</sup>; Thomas Stöhlker<sup>2</sup>; Uwe Spillmann<sup>2</sup>; Yuri Litvinov<sup>2</sup>

<sup>1</sup> FAIR and GSI

<sup>2</sup> GSI

<sup>3</sup> GSI Darmstadt

<sup>4</sup> Columbia U. N.Y.

<sup>5</sup> Universität Jena

**Corresponding Authors:** r.sanchez@gsi.de, n.petridis@gsi.de, t.stoehlker@gsi.de, a.braeuning-demian@gsi.de, s.sanjari@gsi.de, thomas.koehler@uni-jena.de, a.kalinin@gsi.de, y.litvinov@gsi.de, j.glorius@gsi.de, s.hagmann@gsi.de, hillenbrand@astro.columbia.edu, u.spillmann@gsi.de

### Keywords:

Ion storage rings  
Atomic physics  
Instrumentation

### Topics:

Production, Experimental Developments and Applications

94

## Lattice Calculation of Electron-Capture and Electron-Loss Cross Sections in Ion-H<sub>2</sub>O Collisions

**Authors:** Marco Alfonso Lombana<sup>1</sup>; Clara Illescas<sup>1</sup>; Luis Méndez<sup>1</sup>; Ismanuel Rabadán<sup>1</sup>; Jaime Suárez<sup>2</sup>

<sup>1</sup> Universidad Autónoma de Madrid

<sup>2</sup> Università degli Studi di Milano

**Corresponding Authors:** jsuarez.tcam@gmail.com, ismanuel.rabadan@uam.es, l.mendez@uam.es, marco.lombana@uam.es, clara.illescas@uam.es

### Keywords:

Lattice methods. Ion-Molecule collisions. Electron capture. Electron loss

### Topics:

Collisions with Electrons, Ions, Atoms and Molecules

95

## CRYRING@ESR - Towards First Experiments with Beam from ESR

**Authors:** Frank Herfurth<sup>None</sup>; M. Lestinsky<sup>1</sup>; Z. Andelkovic<sup>None</sup>; Angela Braeuning-Demian<sup>2</sup>; Svetlana Fedotova<sup>3</sup>; W. Geithner<sup>None</sup>; Anders Kaellberg<sup>4</sup>; Gleb Vorobjev<sup>3</sup>

<sup>1</sup> *GSI, Darmstadt, Germany*

<sup>2</sup> *FAIR and GSI*

<sup>3</sup> *GSI Helmholtzzentrum für Schwerionenforschung GmbH*

<sup>4</sup> *Department of Physics, Stockholm University*

**Corresponding Authors:** m.lestinsky@gsi.de, f.herfurth@gsi.de, g.vorobjev@gsi.de, a.braeuning-demian@gsi.de, s.fedotova@gsi.de, anders.kallberg@fysik.su.se

**Keywords:**

Storage Ring Facility  
heavy, highly charged ions  
precision experiments

**Topics:**

Production, Experimental Developments and Applications

96

## Observation of Radiative Double Electron Capture (RDEC) for F9+ + N2

**Authors:** Nuwan Kumara<sup>1</sup>; David La Mantia<sup>2</sup>; Asghar Kayani<sup>1</sup>; John Tanis<sup>2</sup>

<sup>1</sup> *Western Michigan University*

<sup>2</sup> *Western Michigan University*

**Corresponding Authors:** pathirannehelag.kumara@wmich.edu, asghar.kayani@wmich.edu, david.s.lamantia@wmich.edu, john.tanis@wmich.edu

**Keywords:**

Electron Capture  
Atomic collisions  
RDEC

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

97

## Target K-Shell Ionization with Single and Double Electron Capture for F7+, 8+, 9+ + Ar Collisions

**Authors:** David La Mantia<sup>1</sup>; Nuwan Kumara<sup>1</sup>; Asghar Kayani<sup>2</sup>; Anna Simon<sup>3</sup>; John Tanis<sup>1</sup>

<sup>1</sup> *Western Michigan University*

<sup>2</sup> *Western Michigan University*

<sup>3</sup> *Notre Dame University*

**Corresponding Authors:** john.tanis@wmich.edu, david.s.lamantia@wmich.edu, anna.simon@nd.edu, asghar.kayani@wmich.edu, pathirannehelag.kumara@wmich.edu

**Keywords:**

K-shell, ionization, capture

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

98

## **Radiation Hydrodynamic Characteristics of Highly Charged Ions in Laser-Produced Plasmas**

**Author:** Maogen Su<sup>1</sup>

**Co-authors:** Qi Min<sup>1</sup>; Shiquan Cao<sup>1</sup>; Duixiong Sun<sup>2</sup>; Gerry O'Sullivan<sup>3</sup>; Chenzhong Dong<sup>2</sup>

<sup>1</sup> Northwest Normal University

<sup>2</sup> Northwest Normal University

<sup>3</sup> University College Dublin

**Corresponding Author:** sumg@nwnu.edu.cn

**Keywords:**

Laser produced plasma, Highly Charged Ions, Radiation Hydrodynamic

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

99

## **Radiative Double Electron Capture for 40 MeV F8+ and F9+ + Ne**

**Authors:** David La Mantia<sup>1</sup>; Nuwan Kumara<sup>1</sup>; Asghar Kayani<sup>2</sup>; Anna Simon<sup>3</sup>; John Tanis<sup>1</sup>

<sup>1</sup> Western Michigan University

<sup>2</sup> Western Michigan University

<sup>3</sup> Notre Dame University

**Corresponding Authors:** pathirannehelag.kumara@wmich.edu, asghar.kayani@wmich.edu, david.s.lamantia@wmich.edu, john.tanis@wmich.edu, anna.simon@nd.edu

**Keywords:**

electron capture, radiative

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

100

## Lifetime measurements of ultra-short-lived excited states in Be-like ions

**Authors:** Jan Rothhardt<sup>1</sup>; Moazzam Bilal<sup>1</sup>; Randolph Beerwerth<sup>1</sup>; A.V. Volotka<sup>None</sup>; Vinzenz Hilbert<sup>2</sup>; T. Stöhlker<sup>3</sup>; Stephan Fritzsche<sup>4</sup>; Jens Limpert<sup>5</sup>

<sup>1</sup> *Helmholtz Institute Jena*

<sup>2</sup> *Friedrich-Schiller-Universität*

<sup>3</sup> *GSI, Darmstadt, Germany*

<sup>4</sup> *Helmholtz-Institut Jena*

<sup>5</sup> *Friedrich-Schiller-University Jena*

**Corresponding Authors:** randolf.beerwerth@uni-jena.de, moazzam.bilal@uni-jena.de, vinzenz.hilbert@uni-jena.de, jens.limpert@uni-jena.de, j.rothhardt@gsi.de, s.fritzsche@gsi.de

**Keywords:**

Lifetimes, excited states, Be-like ions, QED, XUV, laser

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

103

## Stereo-dynamical ion-pair formation in collisions of highly-charged ions with argon dimers

**Authors:** Tomoko Ohyama-Yamaguchi<sup>1</sup>; Atsushi Ichimura<sup>2</sup>

<sup>1</sup> *Tokyo Metropolitan College of Industrial Technology*

<sup>2</sup> *Tokyo University of Science*

**Corresponding Authors:** ichimura\_atsushi@nifty.com, rsp19371@nifty.com

**Keywords:**

highly-charged ions, argon dimers, stereo-dynamics

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

104

## Coincidence Measurements of Scattered and Desorbed Ions from Solid Ne Surfaces by Slow Arq+ Ion Impact

**Author:** Hiroyoshi Sawa<sup>1</sup>

**Co-authors:** Shuntarou Uchida<sup>1</sup>; Hirokazu Ueta<sup>2</sup>; Takato Hirayama<sup>1</sup>

<sup>1</sup> *Department of Physics, Rikkyo University*

<sup>2</sup> *Department of Physics, Rikkyo University.*



**Corresponding Authors:** hirayama@rikkyo.ac.jp, hirokazu.ueta@rikkyo.ac.jp, 16la008a@rikkyo.ac.jp, hiro.sawa@rikkyo.ac.jp

**Keywords:**

Rare gas solids, Potential sputtering, Coincidence measurement, Gas flow model

**Topics:**

Interaction with Clusters, Surfaces and Solids

105

## **X-Ray Atomic Data Of W LXXIII And W LXXII For ITER Hot Core Temperature Measurement Studies**

**Author:** Gajendra Singh<sup>1</sup>

**Co-author:** Ajay Kumar Singh<sup>2</sup>

<sup>1</sup> *Department of Applied Sciences, MSIT, Janak Puri, USICT, GGSIPU, Dwarka, New Delhi, India*

<sup>2</sup> *MSIT, Janak Puri, USICT, GGSIPU, Dwarka, New Delhi, India*

**Corresponding Authors:** gpskmc@gmail.com, drajayphd@gmail.com

**Keywords:**

Atomic Structure Calculations,  
Plasma Diagnostic Studies,  
Highly Charged Ions

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

106

## **Toward Experiments on Highly-charged Muonic Atom/ion Formation and Muon Transfer Process at J-PARC**

**Authors:** Toshiyuki Azuma<sup>1</sup>; Shinji Okada<sup>1</sup>

<sup>1</sup> *RIKEN*

**Corresponding Authors:** sokada@riken.jp, toshi-yuki-azuma@riken.jp

**Keywords:**

muonic atom, muonic x-ray

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

107

## VISIBLE SPECTROSCOPY OF HIGHLY CHARGED BARIUM IONS IN A COMPACT ELECTRON BEAM ION TRAP WITH A BUFFER GAS CALIBRATION METHOD

**Author:** Naoki Kimura<sup>1</sup>

**Co-authors:** Ryuunosuke Kodama<sup>2</sup>; Suzuki Kento<sup>2</sup>; Shimpei Ohishi<sup>2</sup>; Michiharu Wada<sup>3</sup>; Kunihiro Okada<sup>1</sup>; Noriaki Ohmae<sup>4</sup>; Hidetoshi Katori<sup>5</sup>; Nobuyuki NAKAMURA<sup>2</sup>

<sup>1</sup> *Sophia University*

<sup>2</sup> *The University of Electro-Communications*

<sup>3</sup> *High Energy Accelerator Research Organization (KEK)*

<sup>4</sup> *RIKEN*

<sup>5</sup> *The University of Tokyo*

**Corresponding Authors:** naoki.kimura@riken.jp, n\_nakamu@ils.uec.ac.jp

**Keywords:**

Compact EBIT  
Visible spectroscopy  
Calibration method  
Precision and Accuracy  
Highly charged Barium ion  
Toward HCI Clock

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

108

## The Relative Correlation Probability For The Formation Of Various Charge States Of Argon Recoil Ions Under Electron Impact

**Author:** SUNIL KUMAR<sup>1</sup>

<sup>1</sup> *Banaras Hindu University*

**Corresponding Author:** sunilphy88@gmail.com

**Keywords:**

Recoil ions, Auger process, electron-ion coincidence.

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

109

## Development of a High Photon Flux XUV Laser Source for Spectroscopy of Highly-Charged Ions at FAIR

**Authors:** Alexander Kirsche<sup>1</sup>; Jan Rothhardt<sup>2</sup>; Jens Limpert<sup>3</sup>; Maxim Tschernajew<sup>4</sup>; Robert Klas<sup>4</sup>; Stefan Schippers<sup>5</sup>; T. Stöhlker<sup>6</sup>; vinzenz hilbert<sup>7</sup>

<sup>1</sup> *Institute of Applied Physics*

<sup>2</sup> *Helmholtz Institute Jena*

<sup>3</sup> *Friedrich-Schiller-University Jena*

<sup>4</sup> *Helmholtz Institute Jena & Institute of Applied Physics*

<sup>5</sup> *Justus-Liebig-University Giessen, Germany*

<sup>6</sup> *GSI, Darmstadt, Germany*

<sup>7</sup> *Institute of Applied Physics, Albert-Einstein-Straße 15, 07745 Jena, Germany*

**Corresponding Authors:** maxim.tschernajew@uni-jena.de, alexander.kirsche@uni-jena.de, robert.klas@uni-jena.de, vinzenz.hilbert@uni-jena.de, jens.limpert@uni-jena.de, j.rothhardt@gsi.de, stefan.schippers@physik.uni-giessen.de

**Keywords:**

XUV

Laser

Spectroscopy

Fair

HHG

Highly Charged Ions

**Topics:**

Production, Experimental Developments and Applications

110

## Light-by-light Scattering Corrections to the Bound-Electron $g$ Factor at the Two-Loop Level

**Authors:** Vincent Debierre<sup>1</sup>; Bastian Sikora<sup>1</sup>; Halil Cakir<sup>1</sup>; Natalia Oreshkina<sup>2</sup>; Zoltán Harman<sup>1</sup>; Christoph H. Keitel<sup>2</sup>

<sup>1</sup> *Max Planck Institut für Kernphysik Heidelberg*

<sup>2</sup> *Max Planck Institute for Nuclear Physics*

**Corresponding Authors:** vincent.debierre@mpi-hd.mpg.de, oresh@mpi-hd.mpg.de, keitel@mpi-hd.mpg.de

**Keywords:**

$g$  Factor

Light-by-light scattering

QED corrections

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

111

## ELECTRON AND X-RAY EMISSION BY IONS IMPACTING ON SURFACE

**Author:** Wang Yuyu<sup>1</sup>

**Co-author:** Zhou Xianming<sup>2</sup>

<sup>1</sup> *IMP,CAS*

<sup>2</sup> *IMP, CAS*

**Corresponding Author:** wangyuyu@impcas.ac.cn

**Keywords:**

electron emission, X-ray emission, highly charged ions

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Effects Of Radiative Cascades From Higher Levels On The Properties Of The Lyman-line Emission Following Radiative Recombination Of Highly Charged Ions

**Author:** Latifa Bettadj<sup>1</sup>

**Co-author:** Mohammed Réda Boufatah <sup>2</sup>

<sup>1</sup> *dpt of Physics, Faculty of Sciences, University of Tlemcen*

<sup>2</sup> *Dpt of Physics, Faculty of Sciences, University of Tlemcen*

**Corresponding Authors:** boufatah@gmail.com, bettadj@gmail.com

**Keywords:**

radiative recombination  
electron beam  
Lyman emission  
line polarization  
H-like ions  
magnetic sublevels cross-sections

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## The Polarization Of The Lyman- $\alpha$ 1, $\beta$ 1 Lines Emission Following Radiative Recombination Of Highly Charged Ions : E1-M2 Mixing Effect

**Author:** Mohammed Réda Boufatah<sup>1</sup>

**Co-author:** Latifa BETTADJ <sup>1</sup>

<sup>1</sup> *Dpt of Physics, Faculty of Sciences, University of Tlemcen*

**Corresponding Authors:** bettadj@gmail.com, boufatah@gmail.com

**Keywords:**

radiative recombination  
electron beam  
Lyman emission  
line polarization  
H-like ions  
magnetic sublevels cross-sections

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

114

## The Effect of Gas Mixing on Output Currents of Xe from ECR Plasma

**Authors:** Anuvab Mandal<sup>1</sup>; Lokesh C. Tribedi<sup>1</sup>

<sup>1</sup> *Department of Atomic and Nuclear Physics, Tata Institute of Fundamental Research, Dr. Homi Bhabha Road, Colaba, Mumbai –400005, India*

**Corresponding Author:** lokesh@tifr.res.in

**Keywords:**

Electron cyclotron resonance (ECR) ion source  
Gas mixing technique  
Xenon

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Electron Emissions from 5-Iodouracil Induced by 5.5 MeV/u Bare C Ions

**Authors:** Anuvab Mandal<sup>1</sup>; CHANDAN BAGDIA<sup>2</sup>; Madhusree Roy Chowdhury<sup>3</sup>; Deepankar Misra<sup>1</sup>; Lokesh C. Tribedi<sup>1</sup>

<sup>1</sup> *Department of Atomic and Nuclear Physics, Tata Institute of Fundamental Research, Dr. Homi Bhabha Road, Colaba, Mumbai –400005, India*

<sup>2</sup> *Research Scholar*

<sup>3</sup> *TIFR*

**Corresponding Authors:** lokesh@tifr.res.in, chandan.bagdia@tifr.res.in, rcmadhusree@gmail.com

**Keywords:**

Bio-molecule  
5-Iodouracil  
Double differential cross-section (DDCS)  
Electron emissions  
Electron spectroscopy

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

116

## Separating Sequential and Concerted Dissociation Pathways of $\text{OCS}^+_{3+}$

**Author:** Herendra Kumar<sup>1</sup>

**Co-authors:** C P Safvan<sup>2</sup>; Jyoti Rajput<sup>1</sup>; Pragya Bhatt<sup>2</sup>

<sup>1</sup> *University of Delhi*

<sup>2</sup> *Inter University Accelerator Centre*

**Corresponding Authors:** harendraamu@gmail.com, pbpragya@gmail.com, safvan@iuac.res.in, jrajput.du@gmail.com

**Keywords:**

Fragmentation, Kinetic Energy Release, Intermediate Ion

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Status of the Transverse Free-Electron Target for the Heavy-Ion Storage Ring CRYRING@ESR

**Author:** Carsten Brandau<sup>1</sup>

**Co-authors:** Alexander Borovik<sup>1</sup>; B. Michel Döhning<sup>2</sup>; Benjamin Ebinger<sup>1</sup>; Michael Lestinsky<sup>3</sup>; Tobias Molkenin<sup>1</sup>; Alfred Müller<sup>1</sup>; Stefan Schippers<sup>1</sup>

<sup>1</sup> *Justus-Liebig-University Giessen, Germany*

<sup>2</sup> *Justus-Liebig-Universität Giessen*

<sup>3</sup> *GSI, Darmstadt, Germany*

**Corresponding Authors:** m.lestinsky@gsi.de, michel.doehring@physik.uni-giessen.de, benjamin.ebinger@physik.uni-giessen.de, tobias.molkenin@physik.uni-giessen.de, c.brandau@gsi.de, alexander.borovik@physik.uni-giessen.de, stefan.schippers@physik.uni-giessen.de

**Keywords:**

Storage Ring  
Electron-Ion Collisions  
Free-Electron Target

**Topics:**

Production, Experimental Developments and Applications

118

## Development of an Experimental Database of EUV Spectra from Highly Charged Ions of Medium to High Z Elements in the Large Helical Device Plasmas

**Author:** Chihiro Suzuki<sup>None</sup>

**Co-authors:** Izumi Murakami ; Fumihiro Koike ; Takeshi Higashiguchi ; Hiroyuki Sakaue<sup>1</sup> ; Naoki Tamura ; Shigeru Sudo ; Gerard O'Sullivan<sup>2</sup>

<sup>1</sup> *National Institute for Fusion Science (NIFS)*

<sup>2</sup> *University College Dublin*

**Corresponding Authors:** gerry.osullivan@ucd.ie, murakami.izumi@nifs.ac.jp, csuzuki@nifs.ac.jp, sakaue@nifs.ac.jp

### Keywords:

EUV spectra  
LHD  
UTA

### Topics:

Fundamental Aspects, Structure and Spectroscopy

119

## Evolution of Dense nP Rydberg Rb Atoms into Ultracold Plasma

**Authors:** Yufan Li<sup>1</sup>; Syed Zaheer Ud Din<sup>1</sup>; Dongmei Zhao<sup>2</sup>; Xinwen Ma<sup>2</sup>; Jie Yang<sup>2</sup>

<sup>1</sup> *Institute of Modern Physics, Chinese Academy of Sciences, 730000 Lanzhou, China ; University of Chinese Academy of Sciences, 100049 Beijing, China*

<sup>2</sup> *Institute of Modern Physics, Chinese Academy of Sciences, 730000 Lanzhou, China*

**Corresponding Authors:** jie.yang@impcas.ac.cn, x.ma@impcas.ac.cn, zaheer@impcas.ac.cn, dmzhao@impcas.ac.cn, liyufan@impcas.ac.cn

### Keywords:

Dense Rydberg Atoms  
Ultracold Plasma  
Spontaneous Evolution  
Collision Dynamics

### Topics:

Interactions with Photons and Plasmas

120

## HILITE - An Ion Trap for High-Intensity-Laser Experiments

**Authors:** Stefan Ringleb<sup>1</sup>; Nils Stallkamp<sup>2</sup>

**Co-authors:** Sugam Kumar<sup>3</sup>; Tino Morgenroth<sup>2</sup>; Markus Kiffer<sup>1</sup>; Manuel Vogel<sup>2</sup>; Wolfgang Quint<sup>4</sup>; T. Stöhlker<sup>5</sup>; Gerhard G. Paulus<sup>1</sup>

<sup>1</sup> *Friedrich-Schiller-Universität Jena*

<sup>2</sup> *GSI Helmholtzzentrum für Schwerionenforschung Darmstadt*

<sup>3</sup> *Inter-University Accelerator Centre, New Delhi*

<sup>4</sup> *Physikalisches Institut, Ruprecht Karls-Universität Heidelberg*

<sup>5</sup> *GSI, Darmstadt, Germany*

**Corresponding Authors:** m.vogel@gsi.de, stefan.ringleb@uni-jena.de

**Keywords:**

Penning trap, laser ionization, strong field, high photon-energy

**Topics:**

Strong Field and Ultrafast Prozesse

121

## **Electron-Positron Pair Production as an Ionization Process**

**Author:** Christian Kohlfürst<sup>1</sup>

<sup>1</sup> *Helmholtz-Institute Jena*

**Corresponding Author:** christian.kohlfuerst@uni-jena.de

**Keywords:**

Electron-positron pair production, QED in strong fields, Kinetic theory, Wigner formalism

**Topics:**

Strong Field and Ultrafast Prozesse

122

## **Atmospheric-pressure argon plasma by two-parallel-wire transmission line resonator**

**Author:** JUN CHOI<sup>1</sup>

<sup>1</sup> *KITECH*

**Corresponding Author:** junchoi@kitech.re.kr

**Keywords:**

Atmospheric

Plasma

Two-parallel-wire transmission line resonator

**Topics:**

Production, Experimental Developments and Applications



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## Results Of The Gamma Factory Test Runs With Highly Charged Xe And Pb Ions In The SPS And LHC Accelerator Rings At CERN

**Authors:** Simon Hirlander<sup>1</sup>; Reyes Alemany-Fernandez<sup>1</sup>; Hannes Bartosik<sup>1</sup>; Verena Kain<sup>1</sup>; Nicolo Biancacci<sup>1</sup>; Thomas Bohl<sup>1</sup>; Stephane Cettour Cave<sup>1</sup>; Karel Cornelis<sup>1</sup>; John Jowett<sup>1</sup>; Mieczyslaw Krasny<sup>2</sup>; Mike Lamont<sup>1</sup>; Django Manglunki<sup>1</sup>; Giulia Papotti<sup>1</sup>; Felix Kroeger<sup>3</sup>; Thomas Stoehlker<sup>3</sup>; Guenther Weber<sup>3</sup>; Viacheslaw Petrovich Shevelko<sup>4</sup>

<sup>1</sup> CERN

<sup>2</sup> CERN, LPNHE, University Paris VI et VII, CNRS-IN2P3, Paris

<sup>3</sup> HI Jena, IOQ FSU Jena, and GSI, Darmstadt, Germany

<sup>4</sup> LPI RAS, Moscow

**Corresponding Authors:** simon.hirlander@cern.ch, g.weber@gsi.de

### Keywords:

CERN, partially stripped ions, gamma factory, light source, accelerator physics, lead, xenon

### Topics:

Collisions with Electrons, Ions, Atoms and Molecules

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## Photon-ion coincidence system for HIRFL-CSRe Internal target

**Authors:** Wei Wang<sup>1</sup>; Caojie Shao<sup>1</sup>; Deyang Yu<sup>None</sup>; Junliang Liu<sup>None</sup>; Bian Yang<sup>None</sup>; Xiaoxiao Yuan<sup>None</sup>; Jianguo Wang<sup>None</sup>; Peng Ma<sup>None</sup>; Herun Yang<sup>None</sup>; Xiaohong Cai<sup>None</sup>

<sup>1</sup> Institute of Modern Physics, Chinese Academy of Sciences

**Corresponding Authors:** wang\_jianguo@iapcm.ac.cn, wangwei@impcas.ac.cn

### Keywords:

Photon, ion, coincidence, HIRFL-CSRe Internal target

### Topics:

Production, Experimental Developments and Applications

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## Influence of Noble Gas and Mirror Magnetic Field on Electron Cyclotron Heated Hydrogen Plasma

**Authors:** Wenbin Wu<sup>1</sup>; Shixiang Peng<sup>1</sup>; Haitao Ren<sup>1</sup>; Jingfeng Zhang<sup>1</sup>; Tao Zhang<sup>1</sup>; Tenghao Ma<sup>1</sup>; Yaoxiang Jiang<sup>1</sup>; Jiang Sun<sup>1</sup>; Jiamei Wen<sup>1</sup>; Zhiyu Guo<sup>1</sup>; Jiaer Chen<sup>1</sup>

<sup>1</sup> Institute of Heavy Ion Physics, School of Physics, Peking University

**Corresponding Authors:** maizi@pku.edu.cn, zhyguo@pku.edu.cn, wbwu@pku.edu.cn, sxpeng@pku.edu.cn, 1701210161@pku.edu.cn, jiangyaoxiang@pku.edu.cn, wenjiamei1011@163.com, htren@pku.edu.cn, 18700911130@163.com, zhangjingfeng@pku.edu.cn

**Keywords:**

ECR ion source  
plasma  
noble gas  
magnetic-mirror

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Total electron scattering cross sections from low to high energies in S3 and O3 molecules

**Author:** Parthasarthy Pal<sup>1</sup>

**Co-authors:** Bharadvaja<sup>1</sup>; Savinder Kaur<sup>2</sup>; K L Baluja<sup>3</sup>

<sup>1</sup> Bhaskaracharya College of Applied Sciences, (University of Delhi), Delhi 110075, India

<sup>2</sup> SGTB Khalsa College, (University of Delhi), Delhi 110006, India

<sup>3</sup> Retired Professor

**Corresponding Authors:** sk\_savinder2005@yahoo.co.in, kl\_baluja@yahoo.com, anand\_bharadvaja@yahoo.com, parths.pal@bcas.du.ac.in

**Keywords:**

R- matrix, Single Centre Method, Scattering, Polarization, Exchange

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

127

## The FISIC-Project –First tests and status report

**Author:** Daniel Schury<sup>1</sup>

**Co-authors:** Ajit Kumar ; Alain Méry<sup>2</sup>; J.M. Ramillon ; L. Adoui ; Jean-Yves Chesnel<sup>2</sup>; Anna Lévy ; Stéphane Macé ; Christophe Prigent ; Jimmy Rangama<sup>2</sup>; P. Rousseau ; J.-P. Rozet ; Sebastien Steydli ; Martino Trassinelli ; Dominique Vernhet ; Alexander Gumberidze ; T. Stöhlker<sup>3</sup>; Angela Bräuning-Demian ; C. Hahn ; Uwe Spillmann ; Emily Lamour

<sup>1</sup> INSP-UPMC

<sup>2</sup> Centre de Recherche sur les Ions, les Matériaux et la Photonique (CIMAP), Unité mixte CEA-CNRS-Ensicaen-Université de Caen Normandie

<sup>3</sup> GSI, Darmstadt, Germany

**Corresponding Author:** daniel.schury@insp.upmc.fr

**Keywords:**

FISIC  
 Ion-Ion  
 Collision  
 Stopping Power  
 Beamline  
 Charge State Purification

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

128

## High-resolution Wavelength-dispersive Spectroscopy of K-shell Transitions in Hydrogen-like Gold

**Authors:** Alexandre Gumberidze<sup>None</sup>; Tobias Gassner<sup>None</sup>; Martino Trassinelli<sup>None</sup>; Regina Hess<sup>1</sup>; Uwe Spillmann<sup>1</sup>; Dariusz Banas<sup>2</sup>; Karl-Heinz Blumenhagen<sup>None</sup>; Fritz Bosch<sup>1</sup>; C. Brandau<sup>None</sup>; Weidong Chen<sup>None</sup>; Dimopoulou Christina<sup>1</sup>; Eckhart Förster<sup>None</sup>; Robert Grisenti<sup>1</sup>; Siegbert Hagmann<sup>3</sup>; Pierre-Michel Hillenbrand<sup>4</sup>; Paul Indelicato<sup>5</sup>; Pawel Jagodzinski<sup>6</sup>; Tino Kämpfer<sup>7</sup>; Kozhuharov Christophor<sup>1</sup>; M. Lestinsky<sup>8</sup>; Dieter Liesen<sup>1</sup>; Yuri Litvinov<sup>None</sup>; Robert Löttsch<sup>7</sup>; Bruno Manil<sup>9</sup>; Fritz Nolden<sup>1</sup>; Nikolaos Petridis<sup>1</sup>; Shahab Sanjari<sup>1</sup>; Kai-Sven Schulze<sup>None</sup>; Max Schwemlein<sup>1</sup>; Alexandre Simionovici<sup>10</sup>; M. Steck<sup>None</sup>; T. Stöhlker<sup>8</sup>; Csilla Szabo-Foster<sup>11</sup>; Sergiy Trotsenko<sup>1</sup>; Ingo Uschmann<sup>7</sup>; Guenther Weber<sup>12</sup>; Ortrud Wehrhan<sup>13</sup>; Nicolas Winckler<sup>1</sup>; Danyal Winters<sup>14</sup>; Natalya Winters<sup>1</sup>; Eric Ziegler<sup>15</sup>; Heinrich Beyer<sup>1</sup>

<sup>1</sup> GSI

<sup>2</sup> UJK Kielce

<sup>3</sup> GSI Darmstadt

<sup>4</sup> GSI- Darmstadt, Univ. Giessen, Columbia U. N.Y.

<sup>5</sup> CNRS, Sorbonne Universites, UPMC Universites

<sup>6</sup> University of Technology, Kielce, Poland

<sup>7</sup> HIJ

<sup>8</sup> GSI, Darmstadt, Germany

<sup>9</sup> LPL, Universite' Paris 13, Villetaneuse, France

<sup>10</sup> ISTerre, Observatoire des Sciences de l'Univers, Grenoble, France

<sup>11</sup> NIST

<sup>12</sup> HI Jena, IOQ FSU Jena, and GSI, Darmstadt, Germany

<sup>13</sup> IQO, FSU Jena

<sup>14</sup> GSI Helmholtzzentrum für Schwerionenforschung GmbH

<sup>15</sup> ESRF

**Corresponding Authors:** g.weber@gsi.de, m.lestinsky@gsi.de, n.petridis@gsi.de, jagodzini@tu.kielce.pl, s.trotsenko@gsi.de, n.winckler@gsi.de, r.hess@gsi.de, h.beyer@gsi.de, c.dimopoulou@gsi.de, d.banas@ujk.edu.pl, c.kozhuharov@gsi.de, a.gumberidze@gsi.de, f.bosch@gsi.de, f.nolden@gsi.de, ingo.uschmann@uni-jena.de, n.winters@gsi.de, foerster@ioq.uni-jena.de, ziegler@esrf.fr, k.-h.blumenhagen@gsi.de, m.schwemlein@gsi.de, wehrhan@ioq.uni-jena.de, csilla.szabo-foster@nist.gov, tino.kaempfer2@uni-jena.de, w.chen@gsi.de, r.grisenti@gsi.de, robert.loetsch@uni-jena.de, bruno.manil@univ-paris13.fr, tobias.gassner@web.de, kai.sven.schulze@uni-jena.de, alexandre.simionovici@ujf-grenoble.fr, d.liesen@gsi.de, c.brandau@gsi.de, s.sanjari@gsi.de, y.litvinov@gsi.de, d.winters@gsi.de, paul.indelicato@lkb.upmc.fr, s.hagmann@gsi.de, hillenbrand@astro.columbia.edu, u.spillmann@gsi.de

**Keywords:**

X-ray spectroscopy, Crystal spectrometer, Storage ring, QED

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Exciting Highly Charged Ions at PETRA III Beamline P01

**Author:** René Steinbrügge<sup>1</sup>

**Co-authors:** Sven Bernitt<sup>2</sup>; Jan Rudolph<sup>3</sup>; José R. Crespo López-Urrutia<sup>4</sup>

<sup>1</sup> DESY

<sup>2</sup> Max-Planck-Institut für Kernphysik, Heidelberg

<sup>3</sup> Justus-Liebig-Universität Gießen

<sup>4</sup> Max-Planck-Institut für Kernphysik

**Corresponding Author:** rene.steinbruegge@desy.de

**Keywords:**

Eletron beam ion trap  
X-ray spectroscopy  
synchrotron radiation  
K-shell transitions

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Development of a Frequency Comb for XUV Metrology of Highly Charged Ions

**Authors:** Janko Nauta<sup>1</sup>; Jan-Hendrik Oelmann<sup>2</sup>; Alexander Ackermann<sup>3</sup>; Julian Stark<sup>1</sup>; Steffen Kühn<sup>1</sup>; Peter Micke<sup>4</sup>; José R. Crespo López-Urrutia<sup>2</sup>; Thomas Pfeifer<sup>5</sup>

<sup>1</sup> Max-Planck-Institut für Kernphysik, Heidelberg

<sup>2</sup> Max-Planck-Institut für Kernphysik

<sup>3</sup> Max-Planck-Institut für Kernphysik,

<sup>4</sup> Physikalisch-Technische Bundesanstalt, Germany

<sup>5</sup> Max-Planck-Institut für Kernphysik, Heidelberg

**Corresponding Authors:** alexander.ackermann@mpi-hd.mpg.de, jan-hendrik.oelmann@mpi-hd.mpg.de, peter.micke@mpi-hd.mpg.de

**Keywords:**

frequency comb  
laser spectroscopy  
metrology  
highly charged ions  
high harmonic generation  
enhancement cavity

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

131

## Progress Report On A New Experimental Set-up To Measure Emitted Electrons From Metallic Nanoparticles Upon Ion Collision

**Authors:** Violaine Vizcaino<sup>None</sup>; Nicolas Sens<sup>1</sup>; Michal Ryszka<sup>1</sup>; Alain Méry<sup>1</sup>; Jean-Christophe Pouilly<sup>2</sup>

<sup>1</sup> CIMAP

<sup>2</sup> pouilly@ganil.fr

**Corresponding Authors:** mery@ganil.fr, sens@ganil.fr, ryszka@ganil.fr

**Keywords:**

Ion collision, Nanoparticles, electron emission

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## A Dual-Anode Miniature Electron Beam Ion Trap to Produce and Extract Highly-Charged Ions with Low Ionization Threshold

**Authors:** Aung Sis Naing<sup>1</sup>; Joseph Tan<sup>2</sup>

<sup>1</sup> University of Delaware / NIST

<sup>2</sup> National Institute of Standards and Technology

**Corresponding Authors:** joseph.tan@nist.gov, aungsn@gmail.com

**Keywords:**

mini-EBIT  
HCI  
permanent magnet ion trap  
ion trap  
spectroscopy  
EBIT

**Topics:**

Production, Experimental Developments and Applications

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## Experiments with Multiply-Charged Lanthanide Ions in the NIST EBIT

**Authors:** Joseph Tan<sup>1</sup>; Aung Sis Naing<sup>2</sup>; Eric Norrgard<sup>3</sup>; Angela Small<sup>4</sup>; Samuel Sanders<sup>5</sup>; Roshani Silwal<sup>5</sup>; Endre Takacs<sup>6</sup>; Yuri Ralchenko<sup>3</sup>

<sup>1</sup> *National Institute of Standards and Technology*

<sup>2</sup> *University of Delaware / NIST*

<sup>3</sup> *National Institute of Standards & Technology*

<sup>4</sup> *University of Maryland at College Park*

<sup>5</sup> *Clemson University*

<sup>6</sup> *Clemson University / NIST*

**Corresponding Authors:** scsande@g.clemson.edu, joseph.tan@nist.gov, rsilwal@g.clemson.edu, endre.takacs@nist.gov, eric.norrgard@nist.gov, yuri.ralchenko@nist.gov, asmall12@umd.edu, aungsn@gmail.com

**Keywords:**

Spectroscopy

EBIT

EUV

HCI

lanthanide

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Calculations of the Autoionization States of He- and Li-like Ions by the Complex Scaling method

**Author:** Ilya Tupitsyn<sup>1</sup>

**Co-authors:** Victor Ivanov ; Vladimir Shabaev <sup>2</sup>

<sup>1</sup> *St. Petersburg State University, Physics faculty*

<sup>2</sup> *SPbU*

**Corresponding Authors:** i.tupitsyn@spbu.ru, v.shabaev@spbu.ru

**Keywords:**

He-like and Li-like Ions, Auger Resonances, Complex Scaling method

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Multi-Electron Processes In MeV/u Mixed-State C4+ (1s2, 1s2s 3S) + He Collisions: Comparison Of AOCC Calculations And Experiments

**Authors:** Emmanouil Benis<sup>1</sup>; Alain Dubois<sup>2</sup>; Jun Wen Gao<sup>3</sup>; Angelos Laoutaris<sup>4</sup>; Ioannis Madesis<sup>4</sup>; Theo Zouros<sup>4</sup>

<sup>1</sup> *Department of Physics, University of Ioannina, GR 45110 Ioannina, Greece*

<sup>2</sup> *Sorbonne Université, CNRS, Laboratoire de Chimie Physique–Matière et Rayonnement, Paris, France*

<sup>3</sup> *Institute of Applied Physics and Computational Mathematics, 100088 Beijing, China & Sorbonne Université, CNRS, Laboratoire de Chimie Physique–Matière et Rayonnement, Paris, France*

<sup>4</sup> *Department of Physics, University of Crete, P.O. Box 2208, GR 71003 Heraklion, Greece & Tandem Accelerator Laboratory, INPP, NCSR Demokritos, GR 15310 Ag. Paraskevi, Greece*

**Corresponding Authors:** junwen.gao@etu.upmc.fr, alain.dubois@upmc.fr, imadesis@physics.uoc.gr, mbenis@uoi.gr, tzouros@physics.uoc.gr, laoutaris@physics.uoc.gr

**Keywords:**

high resolution electron spectroscopy  
metastable states  
Atomic Orbital Coupled Channel (AOCC) calculations  
transfer-excitation  
double excitation

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Systematic Study of Kinetic Energy Distributions of Fragment Ions from Multiply Ionized C<sub>2</sub>H<sub>2</sub><sup>n</sup> (n=1-3) as Functions of the Charge States

**Authors:** Shintaro Yoshida<sup>1</sup>; Takuya Majima<sup>1</sup>

**Co-authors:** Tatsuya Asai<sup>1</sup>; Hidetsugu Tsuchida<sup>1</sup>; Manabu Saito<sup>1</sup>

<sup>1</sup> *Kyoto University*

**Corresponding Authors:** saito@nucleng.kyoto-u.ac.jp, tsuchida@nucleng.kyoto-u.ac.jp, shin1270@gmail.com, majima@nucleng.kyoto-u.ac.jp

**Keywords:**

Fast ion collision  
Coulomb explosion  
Molecular fragmentation  
Multiple ionization

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## Isotope shifts of the 1s<sup>n</sup>2s2p(J)-1s<sup>n</sup>2s<sup>n-2</sup> transition energies in Be-like ions

**Authors:** Natalia Zubova<sup>1</sup>; Mikhail Kaygorodov<sup>2</sup>; Yury Kozhedub<sup>3</sup>; Aleksei Malyshev<sup>4</sup>; Vladimir Shabaev<sup>3</sup>; Ilya Tupitsyn<sup>3</sup>

<sup>1</sup> *St. Petersburg State University, SSC RF ITEP of NRC “Kurchatov Institute”*

<sup>2</sup> Saint Petersburg State University

<sup>3</sup> SPbU

<sup>4</sup> St. Petersburg State University

**Corresponding Authors:** i.tupitsyn@spbu.ru, n.zubova@spbu.ru, a.v.malyshev@spbu.ru, mkay0404@gmail.com, v.shabaev@spbu.ru, y.kozhedub@spbu.ru

**Keywords:**

isotope shifts; nuclear charge radius differences; atomic structure

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Optimization of giant magnetocaloric materials with ion irradiation

**Authors:** Martino Trassinelli<sup>None</sup>; Dominique Vernhet<sup>1</sup>

**Co-authors:** Sophie Cervera<sup>2</sup>; A Bartok<sup>3</sup>; C Carrétéro<sup>4</sup>; Mahmoud Eddrief<sup>1</sup>; Victor Etgens<sup>3</sup>; Vincent Garcia<sup>4</sup>; E Jacquet<sup>4</sup>; Emily Lamour; Martino LoBue<sup>3</sup>; Anna Lévy; F Mazaleyrat<sup>3</sup>; Stéphane Macé; A Pasko<sup>3</sup>; Christophe Prigent; Sebastien Steydli; Massimiliano Marangolo<sup>2</sup>

<sup>1</sup> Institut des NanoSciences de Paris

<sup>2</sup> Institut des NanoSciences de Paris, INSP, CNRS, Sorbonne Université

<sup>3</sup> SATIE, ENS Cachan, CNRS, Université Paris-Saclay

<sup>4</sup> Unité Mixte de Physique, CNRS, Thales, Univ. Paris-Sud, Univ. Paris-Saclay

**Corresponding Authors:** dominique.vernhet@insp.jussieu.fr, cervera.sophie@live.fr, martino.lo-bue@satie.ens-cachan.fr, mahmoud.eddrief@insp.jussieu.fr

**Keywords:**

slow ion collisions  
magnetocaloric effect  
magnetic refrigeration

**Topics:**

Interaction with Clusters, Surfaces and Solids

139

## Electron Emission from Uracil in Collisions with Fast Bare Carbon Ions

**Authors:** Madhusree Roy Chowdhury<sup>1</sup>; Lokesh Tribedi<sup>1</sup>

<sup>1</sup> Tata Institute of Fundamental Research

**Corresponding Authors:** ltribedi@gmail.com, rcmadhusree@gmail.com

**Keywords:**



Ion-molecule collisions,  
DDCS,  
Biomolecules,  
electron spectroscopy

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

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## **Ionization, Capture and Transfer-Ionization Processes of Ar Targets by Proton and Antiproton Impact**

**Authors:** Pavel Terekhin<sup>1</sup>; Michele Quinto<sup>2</sup>; Juan Manuel Monti<sup>3</sup>; Omar Fojón<sup>4</sup>; Roberto Rivarola<sup>4</sup>

<sup>1</sup> *Department of Physics and Research Center Optimas, Technical University of Kaiserslautern; National Research Centre "Kurchatov Institute", Kurchatov Sq. 1, 123182 Moscow, Russia*

<sup>2</sup> *Instituto de Física Rosario (IFIR/CONICET)*

<sup>3</sup> *Instituto de Física Rosario - CONICET-UNR*

<sup>4</sup> *Instituto de Física Rosario (IFIR/CONICET), Rosario, Argentina*

**Corresponding Authors:** p.n.terekhin@yandex.ru, rivarola@ifir-conicet.gov.ar, juan.monti@gmail.com, quinto@ifir-conicet.gov.ar

**Keywords:**

Multiple ionization  
Electron capture  
Transfer-ionization

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

141

## **Single and Multiple Ionization of Methane Molecules by Antiproton, Proton and Hydrogen-Atom Impact**

**Authors:** Pavel Terekhin<sup>1</sup>; Michele Quinto<sup>2</sup>; Juan Manuel Monti<sup>3</sup>; Omar Fojón<sup>4</sup>; Roberto Rivarola<sup>4</sup>

<sup>1</sup> *Department of Physics and Research Center Optimas, Technical University of Kaiserslautern; National Research Centre "Kurchatov Institute", Kurchatov Sq. 1, 123182 Moscow, Russia*

<sup>2</sup> *Instituto de Física Rosario (IFIR/CONICET)*

<sup>3</sup> *Instituto de Física Rosario - CONICET-UNR*

<sup>4</sup> *Instituto de Física Rosario (IFIR/CONICET), Rosario, Argentina*

**Corresponding Authors:** p.n.terekhin@yandex.ru, juan.monti@gmail.com, rivarola@ifir-conicet.gov.ar, quinto@ifir-conicet.gov.ar

**Keywords:**

Multiple-electron reactions  
Molecules

Structured projectiles

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

142

## Proton-Induced Multiple-Electron Processes of Pyrimidine

**Authors:** Pavel Terekhin<sup>1</sup>; Michele Quinto<sup>2</sup>; Juan Manuel Monti<sup>3</sup>; Omar Fojón<sup>4</sup>; Roberto Rivarola<sup>4</sup>

<sup>1</sup> *Department of Physics and Research Center Optimas, Technical University of Kaiserslautern; National Research Centre "Kurchatov Institute", Kurchatov Sq. 1, 123182 Moscow, Russia*

<sup>2</sup> *Instituto de Física Rosario (IFIR/CONICET)*

<sup>3</sup> *Instituto de Física Rosario - CONICET-UNR*

<sup>4</sup> *Instituto de Física Rosario (IFIR/CONICET), Rosario, Argentina*

**Corresponding Authors:** p.n.terekhin@yandex.ru, juan.monti@gmail.com, quinto@ifir-conicet.gov.ar, rivarola@ifir-conicet.gov.ar

**Keywords:**

Multiple-electron processes

Molecular targets

Pyrimidine

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

143

## Plasmon Excitation and Subsequent Isomerisation Dynamics In Naphthalene and Azulene Under Fast Proton Interaction

**Author:** VINITHA M V MELOOTTAYIL<sup>1</sup>

<sup>1</sup> *IIST, THIRUVANANTHAPURAM, INDIA*

**Corresponding Author:** vinithamvv@gmail.com

**Keywords:**

Plasmon excitation, Azulene, Naphthalene, Isomerization, PAH

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

144

## The new HITRAP cooling trap and production of highly charged metallic ions from an EBIT

**Authors:** Zoran Andelkovic<sup>1</sup>; Frank Herfurth<sup>None</sup>; K. König<sup>None</sup>; F. Lenz<sup>2</sup>; B. Maaß<sup>2</sup>; Wilfried Nörtershäuser<sup>2</sup>; J. Viering<sup>2</sup>; Gleb Vorobjev<sup>3</sup>

<sup>1</sup> *GSI Darmstadt*

<sup>2</sup> *TU Darmstadt*

<sup>3</sup> *GSI Helmholtzzentrum für Schwerionenforschung GmbH*

**Corresponding Authors:** z.andelkovic@gsi.de, f.herfurth@gsi.de, g.vorobjev@gsi.de, wnoertershaeuser@ikp.tu-darmstadt.de

### Keywords:

HITRAP  
ion trap  
EBIT

### Topics:

Production, Experimental Developments and Applications

145

## Measuring The Electron Magnetic Moment In Highly Charged Ions Via Laser-Microwave Double-Resonance Spectroscopy And Studying The Behaviour Of Ion Ensembles In A Penning Trap

**Authors:** Zhexi Guo<sup>1</sup>; Patrick Baus<sup>2</sup>; Gerhard Birkl<sup>2</sup>; Mohammad Sadegh Ebrahimi<sup>1</sup>; Wolfgang Quint<sup>3</sup>; Manuel Vogel<sup>1</sup>

<sup>1</sup> *GSI Helmholtzzentrum für Schwerionenforschung GmbH*

<sup>2</sup> *Institute for Applied Physics, TU Darmstadt*

<sup>3</sup> *Physikalisches Institut, Ruprecht Karls-Universität Heidelberg*

**Corresponding Authors:** m.vogel@gsi.de, gerhard.birkl@physik.tu-darmstadt.de, z.guo@gsi.de

### Keywords:

electron g factor  
magnetic moment  
Penning trap  
double-resonance spectroscopy  
highly charged ions  
ion ensembles  
laser microwave

### Topics:

Fundamental Aspects, Structure and Spectroscopy

146

## Enhanced Ar-K X-ray Emission Observed in EBIT at Electron Energies around 6500 eV

**Authors:** Weronika Biela<sup>1</sup>; Andrzej Warczak<sup>1</sup>

**Co-authors:** Adam Mucha<sup>1</sup>; Adam Malarz<sup>1</sup>

<sup>1</sup> Jagiellonian University

**Corresponding Authors:** weronika.biela@student.uj.edu.pl, andrzej.warczak@uj.edu.pl

**Keywords:**

Electron Beam Ion Trap,  
EBIT,  
dielectronic recombination,  
trielelectronic radiative recombination

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

149

## Single-electron Capture in slow Collisions of Ne<sup>9+</sup> with He and H<sub>2</sub>

**Author:** Xiaolong Zhu<sup>1</sup>

**Co-authors:** Jiawei Xu<sup>1</sup>; Wentian Feng<sup>1</sup>; Ling Liu<sup>2</sup>; Dalong Guo<sup>1</sup>; Yong Gao; Shaofeng Zhang<sup>1</sup>; Shuncheng Yan<sup>3</sup>; Dongbin Qian<sup>1</sup>; Yong Wu<sup>4</sup>; Dongmei Zhao<sup>1</sup>; Jianguo Wang<sup>4</sup>; Xinwen Ma<sup>1</sup>

<sup>1</sup> Institute of Modern Physics, Chinese Academy of Sciences

<sup>2</sup> Institute of Applied Physics and Computational Mathematics, China

<sup>3</sup> Institute of Modern Physics, Chinese Academy of Sciences

<sup>4</sup> Institute of Applied Physics and Computational Mathematics, China

**Corresponding Authors:** wang\_jianguo@iapcm.ac.cn, liu\_ling@iapcm.ac.cn, wu\_yong@iapcm.ac.cn, guodalong@impcas.ac.cn, gaoyong@impcas.ac.cn, qiandb@impcas.ac.cn, xujiawei@impcas.ac.cn, zhangshf@impcas.ac.cn, x.ma@impcas.ac.cn, yanshuncheng@impcas.ac.cn, zhuxiaolong@impcas.ac.cn, fengwentian@impcas.ac.cn, dmzhao@impcas.ac.cn

**Keywords:**

charge transfer, differential cross sections, TC-AOCC, COLTRIMS

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

151

## X-RAY SPECTROSCOPY OF n=3 TO n=2 TRANSITIONS IN HIGHLY CHARGED XENON IONS

**Authors:** Gang Xiong<sup>None</sup>; Yangluojia Su<sup>None</sup>; Yintao Wang<sup>None</sup>; Roger Hutton<sup>None</sup>; Yunqing Fu<sup>None</sup>; Yang Shen<sup>None</sup>; Yang Yang<sup>None</sup>; Jun Xiao<sup>None</sup>; Yaming Zou<sup>None</sup>; Ke Yao<sup>1</sup>

<sup>1</sup> Fudan University, China

**Corresponding Author:** keyao@fudan.edu.cn

**Keywords:**

X-rays, xenon, EBIT

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

152

## Long-Range Dispersion Interactions Between Alkali-Metal And Rare-Gas Atoms

**Authors:** Deng Hong Zhang<sup>1</sup>; Ya Bin Xu<sup>1</sup>; Jun Jiang<sup>1</sup>; Li Jiang<sup>1</sup>; Lu You Xie<sup>1</sup>; Chen Zhong Dong<sup>1</sup>

<sup>1</sup> Key Laboratory of Atomic and Molecular Physics and Functional Materials of Gansu Province, College of Physics and Electronic Engineering, Northwest Normal University, Lanzhou 730070, P. R. China.

**Keywords:**

long-range interaction; dispersion coefficients; the relativistic configuration interaction plus core polarization method(RCICP)

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

153

## Angle-dependent Magic Wavelengths For The $4s_{1/2}$ - $3d_{5/2}$ Transition Of The $\text{Ca}^+$ Ions

**Authors:** Li Jiang<sup>1</sup>; Jun Jiang<sup>1</sup>; Zhong Wen Wu<sup>1</sup>; Deng Hong Zhang<sup>1</sup>; Lu You Xie<sup>1</sup>; Chen Zhong Dong<sup>1</sup>

<sup>1</sup> Key laboratory of Atomic and Molecular Physics & Functional Materials of Gansu Province, College of Physics and Electronic Engineering, Northwest Normal University, Lanzhou, 730070, China

**Keywords:**

dynamic polarizability, magic wavelength, linear polarized light

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

154

## Single-Particle Detectors For CRYRING@ESR

**Authors:** Christoph Hahn<sup>1</sup>; Anton Kalinin<sup>2</sup>

**Co-authors:** M. Lestinsky<sup>3</sup>; Esther Menz<sup>4</sup>; Philip Pfäfflein<sup>5</sup>; Stefan Schippers<sup>6</sup>; Guenther Weber<sup>7</sup>; T. Stöhlker<sup>3</sup>

<sup>1</sup> *Helmholtz Institute Jena*

<sup>2</sup> *GSI*

<sup>3</sup> *GSI, Darmstadt, Germany*

<sup>4</sup> *Friedrich Schiller University Jena*

<sup>5</sup> *DESY*

<sup>6</sup> *Justus-Liebig-University Giessen, Germany*

<sup>7</sup> *HI Jena, IOQ FSU Jena, and GSI, Darmstadt, Germany*

**Corresponding Authors:** g.weber@gsi.de, m.lestinsky@gsi.de, christoph.hahn@uni-jena.de, a.kalinin@gsi.de, stefan.schippers@physik.uni-giessen.de

**Keywords:**

CRYRING

FAIR

Particle Detection

Ion Detection

Storage Rings

Instrumentation

**Topics:**

Production, Experimental Developments and Applications

155

## PROPOSAL OF HIGHLY ACCURATE TESTS OF BREIT AND QED EFFECTS IN THE GROUND STATE $2p_5$ OF THE F-LIKE ISOELECTRONIC SEQUENCE

**Authors:** Meichun Li<sup>1</sup>; Ran Si<sup>2</sup>; Yaming Zou<sup>3</sup>

**Co-authors:** Roger Hutton<sup>3</sup>; Tomas Brage<sup>4</sup>

<sup>1</sup> *Shanghai EBIT Laboratory, Institute of Modern Physics, Fudan University, Shanghai, China 200433,*

<sup>2</sup> *Department of Computer Science, University of British Columbia, Vancouver V6T 1Z4, Canada*

<sup>3</sup> *Shanghai EBIT Laboratory, Institute of Modern Physics, Fudan University, Shanghai, China 200433*

<sup>4</sup> *Division of Mathematical Physics, Department of Physics, Lund University, 221 00 Lund, Sweden*

**Corresponding Authors:** 14110200003@fudan.edu.cn, rhutton@fudan.edu.cn

**Keywords:**

layzer complex, QED, F-like isoelectronic sequence

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

156

## Design of Penning Trap for High Intensity Laser Ions Experiment

**Authors:** Sugam Kumar<sup>1</sup>; Stefan Ringleb<sup>2</sup>; Nils Stallkamp<sup>3</sup>; M. Vogel<sup>None</sup>; Wolfgang Quint<sup>4</sup>; T. Stöhlker<sup>5</sup>; C P Saffan<sup>6</sup>

<sup>1</sup> *Inter University Accelerator Centre*

<sup>2</sup> *Friedrich-Schiller-Universität Jena*

<sup>3</sup> *GSI Helmholtzzentrum für Schwerionenforschung Darmstadt*

<sup>4</sup> *Physikalisches Institut, Ruprecht Karls-Universität Heidelberg*

<sup>5</sup> *GSI, Darmstadt, Germany*

<sup>6</sup> *Inter University Accelerator Center, New Delhi 110067, India*

**Corresponding Authors:** m.vogel@gsi.de, sugamkumar@gmail.com, stefan.ringleb@uni-jena.de

**Keywords:**

Penning Trap, Cylindrical Penning Trap, Multiphoton ionization, Axial resonator

**Topics:**

Production, Experimental Developments and Applications

158

## Probing Scattering Phases in Ion-molecule Collisions

**Authors:** Shaofeng ZHANG<sup>None</sup>; Y Gao<sup>1</sup>; X. L. ZHU<sup>1</sup>; D. L. Guo<sup>1</sup>; M. Schulz<sup>2</sup>; A. B. Voitkiv<sup>None</sup>

<sup>1</sup> *Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou 730000, China*

<sup>2</sup> *Department of Physics and LAMOR, Missouri University of Science & Technology*

**Corresponding Author:** zhangshf@impcas.ac.cn

**Keywords:**

ion-atom collisions, scattering phase,

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

159

## Status of the cryogenic ion storage ring RICE

**Author:** Yuji Nakano<sup>1</sup>

**Co-authors:** Ryo Igosawa ; Shimpei Iida ; Shinji Okada <sup>2</sup>; Mathew Lindly ; Menk Sebastian ; Hashimoto Tadashi ; Nagaoka Ryosuke ; Yamada Shinya ; Takayuki Yamaguchi ; Susumu Kuma ; Toshiyuki Azuma <sup>2</sup>

<sup>1</sup> *Rikkyo University*

<sup>2</sup> *RIKEN*

**Corresponding Authors:** nakano@rikkyo.ac.jp, sokada@riken.jp, toshiyuki-azuma@riken.jp

**Keywords:**

electrostatic storage ring

**Topics:**

Production, Experimental Developments and Applications

160

## Radiative Lifetime Measurement of Metastable Levels in Kr<sup>3+</sup> Using Electrostatic Ion Beam Trap

**Author:** Hirotugu Kubota<sup>1</sup>

**Co-authors:** Manabu Saito<sup>2</sup>; Takuya Majima<sup>1</sup>; Makoto Imai<sup>1</sup>; Hidetsugu Tsuchida<sup>1</sup>; Yoichi Haruyama<sup>3</sup>

<sup>1</sup> *Kyoto University*

<sup>2</sup> *Kyoto University*

<sup>3</sup> *Kyoto Prefectural University*

**Corresponding Authors:** haruyama@kpu.ac.jp, imai@nucleng.kyoto-u.ac.jp, kubota.hirotugu.34x@st.kyoto-u.ac.jp, tsuchida@nucleng.kyoto-u.ac.jp, saito@nucleng.kyoto-u.ac.jp, majima@nucleng.kyoto-u.ac.jp

**Keywords:**

Radiative lifetime

Electrostatic ion beam trap

Metastable levels in triply charged Kr

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

161

## High-Precision Mass Measurements of Highly Charged Xenon Isotopes with PENTATRAP

**Authors:** Menno Door<sup>None</sup>; Sergey Eliseev<sup>1</sup>; José R. Crespo López-Urrutia<sup>1</sup>; Pavel Filianin<sup>1</sup>; Kathrin Kromer<sup>1</sup>; Yuri N. Novikov<sup>2</sup>; Alexander Rischka<sup>1</sup>; Rima X. Schüssler<sup>1</sup>; Christoph Schweiger<sup>1</sup>; Sven Sturm<sup>1</sup>; Stefan Ulmer<sup>3</sup>; Klaus Blaum<sup>1</sup>

<sup>1</sup> *Max-Planck-Institut für Kernphysik*

<sup>2</sup> *Petersburg Nuclear Physics Institute*

<sup>3</sup> *RIKEN, Ulmer Initiative Research Unit*

**Corresponding Authors:** menno.door@mpi-hd.mpg.de, christoph.schweiger@mpi-hd.mpg.de

**Keywords:**

high-precision mass spectrometry

Penning trap mass spectrometry

precision tests of fundamental physicist

test of bound-state QED



test of special relativity  
neutrino physics

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

162

## Extreme Ultraviolet Emission Spectra of Highly Charged Sb Ions

**Authors:** Shiquan Cao<sup>1</sup>; Qi Min<sup>1</sup>; Duixiong Sun<sup>None</sup>; Bo Wang<sup>None</sup>; Lei Wu<sup>None</sup>; Siqu He<sup>None</sup>; Pengpeng Ma<sup>None</sup>; Kaiping Wang<sup>None</sup>; Haidong Lu<sup>None</sup>

**Co-authors:** Maogen Su<sup>1</sup>; Chenzhong Dong<sup>1</sup>

<sup>1</sup> *Northwest Normal University*

**Corresponding Authors:** dongcz@nwnu.edu.cn, nwnu\_sumg@163.com, cao\_sq@163.com

**Keywords:**

Highly Charged Ions, Laser Produced Plasmas, Extreme Ultraviolet Emission

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

163

## Revised and Extended Analysis of fifth Spectrum of Cerium: Ce V

**Author:** ABDUL WAJID<sup>1</sup>

**Co-author:** SAYED JABEEN SHAH MOHAMMAD<sup>2</sup>

<sup>1</sup> *DEPARTMENT OF PHYSICS, ALIGARH MUSLIM UNIVERSITY, ALIGARH*

<sup>2</sup> *DEPARTMENT OF PHYSICS, ALIGARH MUSLIM UNIVERSITY, ALIGARH*

**Corresponding Authors:** sjabeenshah@gmail.com, abdulwajidamu@gmail.com

**Keywords:**

ENERGY LEVELS, WAVELENGTH, COWAN CODE, SPECTROGRAPH

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

164

## Development of a high temperature superconducting magnet for use in a cryogen-free electron beam ion trap

**Authors:** Toshihiro Tamai<sup>1</sup>; Hiroyuki Sakaue<sup>2</sup>; Yoshiro Terazaki<sup>3</sup>; Nagato Yanagi<sup>3</sup>; Nobuyuki Nakamura<sup>1</sup>

<sup>1</sup> *The University of Electro-Communications*

<sup>2</sup> *National Institute for Fusion Science (NIFS)*

<sup>3</sup> *National Institute for Fusion Science*

**Corresponding Authors:** yanagi@lhd.nifs.ac.jp, n\_nakamu@ils.uec.ac.jp, terazaki@nifs.ac.jp, sakaue@nifs.ac.jp

### Keywords:

electron beam ion trap  
high temperature superconducting magnet  
cryogen-free

### Topics:

Production, Experimental Developments and Applications

165

## Visible spectra of heavy ions with an open 4f shell

**Authors:** Shunichi Murata<sup>1</sup>; Takayuki Nakajima<sup>1</sup>; Marianna S. Safronova<sup>2</sup>; Ulyana I. Safronova<sup>3</sup>; Nobuyuki Nakamura<sup>1</sup>

<sup>1</sup> *The University of Electro-Communications*

<sup>2</sup> *The University of Delaware*

<sup>3</sup> *The University of Nevada*

**Corresponding Authors:** n\_nakamu@ils.uec.ac.jp, msafro@udel.edu, ulyana.i.safronova.2@nd.edu

### Keywords:

visible spectra  
4f open shell  
metrology

### Topics:

Fundamental Aspects, Structure and Spectroscopy

166

## Resonant electron impact excitation of highly charged Fe ions studied with a compact electron beam ion trap

**Authors:** Masashi Monobe<sup>1</sup>; Takashi Tsuda<sup>1</sup>; Hiroyuki Sakaue<sup>2</sup>; Daiji Kato<sup>3</sup>; Izumi Murakami<sup>3</sup>; Hirohisa Hara<sup>4</sup>; Tetsuya Watanabe<sup>4</sup>; Nobuyuki Nakamura<sup>1</sup>

<sup>1</sup> *The University of Electro-Communications*

<sup>2</sup> *National Institute for Fusion Science (NIFS)*

<sup>3</sup> *National Institute for Fusion Science*

<sup>4</sup> *National Astronomical Observatory of Japan*

**Corresponding Authors:** hirohisa.hara@nao.ac.jp, m\_monobe@ils.uec.ac.jp, watanabe@uvlab.mtk.nao.ac.jp, murakami.izumi@nifs.ac.jp, sakaue@nifs.ac.jp, n\_nakamu@ils.uec.ac.jp, dkato@nifs.ac.jp

**Keywords:**

resonant excitation  
iron ions  
electron beam ion trap

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

167

## X-ray Emission Via K $\alpha$ Resonance Complexes In Gold Ions

**Authors:** Viorica Stancalie<sup>1</sup>; Cristian Iorga<sup>1</sup>

<sup>1</sup> *National Institute for Laser, Plasma & Radiation Physics*

**Corresponding Authors:** viorica.stancalie@gmail.com, criiorga@gmail.com

**Keywords:**

atomic data, electron-collision, photoionization, R-matrix

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

168

## Measurement Of The Linear Polarization Of Radiative Electron Capture

**Author:** Marco Vockert<sup>1</sup>

**Co-authors:** Günter Weber <sup>2</sup>; Uwe Spillmann <sup>3</sup>; T. Stöhlker

<sup>1</sup> *IOQ, FSU Jena and Helmholtz Institute Jena*

<sup>2</sup> *HI Jena, IOQ FSU Jena, and GSI, Darmstadt, Germany*

<sup>3</sup> *GSI*

**Corresponding Authors:** marco.vockert@uni-jena.de, u.spillmann@gsi.de, t.stoehlker@gsi.de, g.weber@gsi.de

**Keywords:**

Compton Polarimetry  
X-Ray Spectroscopy  
REC Radiation  
Storage Rings  
Semiconductor Detectors

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

169

## High-resolution tungsten spectroscopy relevant to the diagnostic of high-temperature tokamak plasmas

**Authors:** Jacek Rzadkiewicz<sup>1</sup>; Yang Yang<sup>2</sup>

<sup>1</sup> *Narodowe Centrum Badań Jądrowych*

<sup>2</sup> *Fudan University*

**Keywords:**

Tungsten spectroscopy in X-ray  
EBIT  
Tokamak

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

170

## A Fluorescence Detection System for Laser Spectroscopy at CRYRING@ESR

**Author:** Axel Buß<sup>1</sup>

**Co-authors:** Christian Huhmann<sup>2</sup>; Christian Weinheimer ; Konstantin Mohr ; Volker Hannen ; Wilfried Nörtershäuser<sup>3</sup>; Zoran Andelkovic<sup>4</sup>

<sup>1</sup> *Institut für Kernphysik, Universität Münster*

<sup>2</sup> *Institut für Kernphysik, Universität Münster*

<sup>3</sup> *TU Darmstadt*

<sup>4</sup> *GSI Darmstadt*

**Corresponding Authors:** k.mohr@gsi.de, axel.buss@wwu.de, z.andjelkovic@gsi.de, wnoertershaeuser@ikp.tu-darmstadt.de

**Keywords:**

CRYRING  
Laser Spectroscopy  
Detector Development  
Instrumentation  
Atomic Physics

**Topics:**

Production, Experimental Developments and Applications

171

## Novel Approach to Heavy Ion X-Ray Spectroscopy using a Microcalorimeter Detector at an Electron Beam Ion Trap

**Authors:** Marc Oliver Herdrich<sup>1</sup>; Andreas Fleischmann<sup>2</sup>; Daniel Hengstler<sup>2</sup>; Steffen Allgeier<sup>2</sup>; Sergiy Trotsenko<sup>3</sup>; Tino Morgenroth<sup>4</sup>; Christian Enss<sup>2</sup>; Thomas Stöhlker<sup>5</sup>

<sup>1</sup> *Helmholtz-Institute Jena*

<sup>2</sup> *Kirchhoff-Institute for Physics, Heidelberg, Germany*

<sup>3</sup> *GSI*

<sup>4</sup> *GSI Helmholtzzentrum für Schwerionenforschung Darmstadt*

<sup>5</sup> *GSI, Darmstadt, Germany*

**Corresponding Authors:** m.o.herdrich@gsi.de, s.trotsenko@gsi.de

### Keywords:

x-ray  
spectroscopy  
calorimeter  
ebit

### Topics:

Fundamental Aspects, Structure and Spectroscopy

172

## Formation of Quasi-Molecules in Adiabatic Heavy Ion Atom Collisions

**Author:** Ruchika Gupta<sup>1</sup>

**Co-authors:** Punita Verma<sup>2</sup>; Kajol Chakraborty<sup>1</sup>; Ch. Vikar Ahmad<sup>1</sup>; Anjali Rani<sup>3</sup>; Samit Kumar Mandal<sup>3</sup>; Deepak Swami<sup>4</sup>; Akhil Jhingan<sup>4</sup>

<sup>1</sup> *Department of Physics, Kalindi College and Department of Physics and Astrophysics, University of Delhi, Delhi, India*

<sup>2</sup> *Department of Physics, Kalindi College, University of Delhi, Delhi, India*

<sup>3</sup> *Department of Physics and Astrophysics, University of Delhi, Delhi, India*

<sup>4</sup> *Inter University Accelerator Centre, New Delhi, India*

**Corresponding Authors:** kajolchakraborty.du@gmail.com, choudaryvikarahmad@gmail.com, ruchikagupta.du@gmail.com, drpunitaverma.nature@gmail.com

### Keywords:

quasi-molecules, adiabatic, correlation diagrams

### Topics:

Collisions with Electrons, Ions, Atoms and Molecules

173

## Delayed ionic dissociation of doubly ionized ethylene produced by highly-charged ion collision

**Authors:** Jun Matsumoto<sup>1</sup>; Kouta Takahashi<sup>1</sup>; Anna Mizumura<sup>1</sup>; Kiichi Yokokawa<sup>1</sup>; HERENDRA KUMAR<sup>2</sup>; Pragya Bhatt<sup>3</sup>; C P Safvan<sup>3</sup>; Haruo Shiromaru<sup>1</sup>

<sup>1</sup> *Tokyo Metropolitan University*

<sup>2</sup> *University of Delhi, Delhi, India*

<sup>3</sup> *Inter University Accelerator Centre*

**Corresponding Authors:** junmatsu@tmu.ac.jp, shiromaru-haruo@tmu.ac.jp, harendraamu@gmail.com, safvan@iuac.res.in, pbpragya@gmail.com

**Keywords:**

HCI-molecule collision  
fragmentation  
delayed process  
organic molecule

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

174

## High-Precision Theory Of The Bound-Fermion g-Factor

**Authors:** Bastian Sikora<sup>None</sup>; Vladimir A. Yerokhin<sup>None</sup>; Natalia S. Oreshkina<sup>None</sup>; Halil Cakir<sup>None</sup>; Niklas Michel<sup>None</sup>; Vincent Debierre<sup>None</sup>; Nikolay A. Belov<sup>None</sup>; Christoph H. Keitel<sup>None</sup>; Zoltan Harman<sup>None</sup>

**Corresponding Author:** bastian.sikora@mpi-hd.mpg.de

**Keywords:**

Hydrogenlike Ions  
High-Precision Theory  
QED Corrections  
g-Factor  
Muonic Ions

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

175

## A Compact Electron Beam Ion Trap for X-ray Light Sources

**Authors:** Sven Bernitt<sup>1</sup>; Steffen Kühn<sup>2</sup>; René Steinbrügge<sup>3</sup>; José R. Crespo López-Urrutia<sup>4</sup>

<sup>1</sup> *University Jena*

<sup>2</sup> *Max-Planck-Insitut für Kernphysik, Heidelberg*

<sup>3</sup> *DESY*

<sup>4</sup> *Max-Planck-Institut für Kernphysik*

**Corresponding Authors:** rene.steinbruegge@desy.de, sven.bernitt@mpi-hd.mpg.de

**Keywords:**

electron beam ion trap  
synchrotron  
X-ray light sources  
few-electron ions  
calibration  
compact ion trap

**Topics:**

Production, Experimental Developments and Applications

176

## Interactions Of Highly Energetic Tin Ions With Plasma-Facing Materials In EUV Light Source

**Authors:** S Rai<sup>1</sup>; M J Deuzeman<sup>1</sup>; O O Versolato<sup>2</sup>; R Hoekstra<sup>1</sup>

<sup>1</sup> *University of Groningen*

<sup>2</sup> *ARCNL*

**Corresponding Authors:** r.a.hoekstra@rug.nl, m.j.deuzeman@rug.nl, s.raai@rug.nl, o.versolato@arcnl.nl

**Keywords:**

tin ions  
EUV light source  
plasma facing material

**Topics:**

Interaction with Clusters, Surfaces and Solids

177

## Proton and electron impact excitation cross sections for hydrogenlike uranium

**Authors:** Günter Weber<sup>1</sup>; Alexandre Gumberidze<sup>None</sup>; Andrey Surzhykov<sup>2</sup>; Christopher John cjf@lanl.gov Fontes<sup>3</sup>; T. Stöhlker<sup>None</sup>

<sup>1</sup> *HI Jena and GSI, Darmstadt, Germany*

<sup>2</sup> *Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany*

<sup>3</sup> *Los Alamos National Laboratory*

**Corresponding Authors:** g.weber@gsi.de, a.gumberidze@gsi.de, cjf@lanl.gov, andrey.surzhykov@ptb.de, t.stoehlker@gsi.de

**Keywords:**

Electron Impact Excitation, Proton Impact Excitation, Heavy Ion

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

178

## Charge Exchange Spectroscopy for Multiply Charged Ions of Heavy Elements in the Extreme Ultra-Violet Region

**Author:** Takumi Ohna<sup>None</sup>

**Corresponding Author:** takumi03291996@gmail.com

**Keywords:**

Charge exchange spectroscopy  
EUV photo-emission spectra of heavy elements  
r-process in neutron star mergers

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

179

## Results From The Commissioning Of A Detection System For Forward Emitted XUV Photons At The ESR

**Author:** Daniel Winzen<sup>1</sup>

**Co-authors:** Michael Bussmann<sup>2</sup>; Axel Buß<sup>3</sup>; Christian Egelkamp<sup>1</sup>; Lewin Eidam<sup>4</sup>; V. Hannen; Zhongkui Huang<sup>5</sup>; Daniel Kiefer<sup>4</sup>; Sebastian Klammes<sup>4</sup>; Thomas Kühl<sup>6</sup>; Markus Loeser<sup>7</sup>; Xinwen Ma<sup>5</sup>; Wilfried Nörtershäuser<sup>4</sup>; Hans-Werner Ortjohann<sup>1</sup>; Rodolfo Sánchez<sup>6</sup>; Mathias Siebold<sup>2</sup>; T. Stöhlker<sup>8</sup>; J. Ullmann; J. Vollbrecht; Thomas Walther<sup>4</sup>; Hanbing Wang<sup>9</sup>; C. Weinheimer; Danyal Winters<sup>10</sup>

<sup>1</sup> *Westfälische Wilhelms-Universität Münster*

<sup>2</sup> *Helmholtz-Zentrum Dresden-Rossendorf*

<sup>3</sup> *Institut für Kernphysik, Uni Münster*

<sup>4</sup> *TU Darmstadt*

<sup>5</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

<sup>6</sup> *GSI, Darmstadt*

<sup>7</sup> *Helholtz-Zentrum Dresden-Rossendorf*

<sup>8</sup> *GSI, Darmstadt, Germany*

<sup>9</sup> *IMP*

<sup>10</sup> *GSI Helmholtzzentrum für Schwerionenforschung GmbH*

**Corresponding Authors:** r.sanchez@gsi.de, huangzhongkui@impcas.ac.cn, d.winzen@uni-muenster.de, axel.buss@wwu.de, wnoertershaeuser@ikp.tu-darmstadt.de, d.winters@gsi.de, m.bussmann@hzdr.de, x.ma@impcas.ac.cn, wanghanbing@impcas.ac.cn

**Keywords:**

laser spectroscopy  
detector development  
ESR  
XUV

**Topics:**

Production, Experimental Developments and Applications



180

## Ground-State Energy of Heavy Diatomic Homonuclear Quasimolecules

**Authors:** Artem Kotov<sup>1</sup>; Dmitry Glazov<sup>2</sup>; Aleksei Malyshev<sup>2</sup>; Anastasia Vladimirova<sup>3</sup>; Vladimir Shabaev<sup>3</sup>; Günter Plunien<sup>4</sup>

<sup>1</sup> Saint-Petersburg State University

<sup>2</sup> St. Petersburg State University

<sup>3</sup> SPbU

<sup>4</sup> Institut für Theoretische Physik, Technische Universität Dresden

**Corresponding Authors:** breengles@gmail.com, kaktys171819@yandex.ru, d.glazov@spbu.ru, a.v.malyshev@spbu.ru, v.shabaev@spbu.ru

**Keywords:**

Quasimolecules  
Quantum electrodynamics  
Two-center Dirac equation  
Electron-electron interaction

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

181

## Strong Higher-order Resonant Contributions to X-ray Polarization of the Ground and Metastable States of B-like Silicon Ions

**Authors:** Simei Lu<sup>1</sup>; Luyou Xie<sup>1</sup>

<sup>1</sup> Northwest Normal University, Lanzhou 730070, China

**Corresponding Author:** xiely@nwnu.edu.cn

**Keywords:**

Dielectronic recombination; Resonance strength; polarization

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

182

## Charge Exchange Spectroscopy in Collisions between Metastable He-like Ions (1s2s 3S) and Neutrals

**Author:** Naoki Numadate<sup>1</sup>

**Co-author:** Hajime Tanuma<sup>1</sup>

<sup>1</sup> *Tokyo Metropolitan University*

**Corresponding Author:** a0876315@gmail.com

**Keywords:**

charge exchange collisions  
soft X-ray spectroscopy  
inner-shell-excited states

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

183

## **Influence of Electron Correlations on the Electron Impact Excitation of the 4 1P1 State of Zinc Atom**

**Authors:** Xiaoshu Cheng<sup>1</sup>; Luyou Xie<sup>1</sup>

<sup>1</sup> *Northwest Normal University, Lanzhou 730070, China*

**Corresponding Author:** xiely@nwnu.edu.cn

**Keywords:**

Electron impact excitation; Cross sections; Stokes parameter

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

184

## **Development of Laser Ion Source at IMP**

**Author:** Huanyu Zhao<sup>None</sup>

**Corresponding Author:** zhaohy@impcas.ac.cn

**Keywords:**

Laser  
Ion Source  
high charged state

**Topics:**

Production, Experimental Developments and Applications

185

## **Applications of the Internal Multiphase Target**

**Authors:** Nikolaos Petridis<sup>1</sup>; Anton Kalinin<sup>1</sup>; Ulrich Popp<sup>1</sup>; Uwe Spillmann<sup>1</sup>; Robert Grisenti<sup>1</sup>; Yuri Litvinov<sup>1</sup>; Thomas Stöhlker<sup>1</sup>

<sup>1</sup> GSI

**Corresponding Authors:** u.popp@gsi.de, n.petridis@gsi.de, r.grisenti@gsi.de, t.stoehlker@gsi.de, a.kalinin@gsi.de, y.litvinov@gsi.de, u.spillmann@gsi.de

**Keywords:**

internal target  
fluid expansion  
storage rings

**Topics:**

Production, Experimental Developments and Applications

186

## Ab Initio Lifetimes for QED Sensitive Transitions in Highly Charged Ions

**Authors:** Moazzam Bilal<sup>1</sup>; Andrey Volotka<sup>1</sup>; Randolph Beerwerth<sup>1</sup>; Stephan Fritzsche<sup>1</sup>

<sup>1</sup> Helmholtz Institute Jena

**Corresponding Authors:** a.volotka@gsi.de, s.fritzsche@gsi.de, moazzam.bilal@uni-jena.de, randolf.beerwerth@uni-jena.de

**Keywords:**

Relativistic & quantum electrodynamic effects in atoms  
Electron correlation calculations for atoms & ions  
M1 transition rates

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

187

## Opportunities For Measurements Of Astrophysical Relevant Alpha Capture Reaction Rates At CRYRING

**Author:** O. Forstner<sup>1</sup>

**Co-authors:** D. Bemmerer ; T.E. Cowan ; R. Dressler ; A.R. Junghans ; D. Schumann ; T. Stöhlker <sup>2</sup>; T. Szücs ; A. Wagner ; K. Zuber

<sup>1</sup> Friedrich Schiller University Jena

<sup>2</sup> GSI, Darmstadt, Germany

**Corresponding Author:** oliver.forstner@uni-jena.de

**Keywords:**

Nuclear Astrophysics  
Storage Rings  
EBIS Ion Source

**Topics:**

Production, Experimental Developments and Applications

188

## Dynamically assisted Schwinger effect beyond the spatially-homogeneous-field approximation

**Authors:** Ivan Aleksandrov<sup>1</sup>; Günter Plunien<sup>2</sup>; Vladimir Shabaev<sup>3</sup>

<sup>1</sup> *Saint Petersburg State University*

<sup>2</sup> *Institut für Theoretische Physik, Technische Universität Dresden*

<sup>3</sup> *SPbU*

**Corresponding Authors:** v.shabaev@spbu.ru, i.aleksandrov@spbu.ru

**Keywords:**

Schwinger effect  
Pair production  
Laser fields  
Non-perturbative methods

**Topics:**

Strong Field and Ultrafast Prozesse

189

## Scattering Of Twisted Electrons By Bare Nuclei

**Author:** Valeriia Kosheleva<sup>1</sup>

**Co-authors:** Andrey Surzhykov<sup>2</sup>; Thomas Stöhlker<sup>3</sup>; Vladimir Shabaev<sup>4</sup>; Vladimir Zaytsev<sup>5</sup>

<sup>1</sup> *Department of Physics, St. Petersburg State University, 7/9 Universitetskaya naberezhnaya, St. Petersburg 199034, Russia*

<sup>2</sup> *Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany*

<sup>3</sup> *GSI Helmholtzzentrum für Schwerionenforschung GmbH; Institut für Optik und Quantenelektronik, Friedrich-Schiller-Universität; Helmholtz-Institut Jena*

<sup>4</sup> *SPbU*

<sup>5</sup> *Department of Physics, St. Petersburg State University; ITMO University*

**Corresponding Authors:** shvartzz@yandex.ru, t.stoehlker@gsi.de, andrey.surzhykov@ptb.de, v.shabaev@spbu.ru, v.a.zaytsev@spbu.ru

**Keywords:**

twisted electrons, elastic scattering

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

190

## Investigation of Triply Excited States in Dielectronic Recombination with Excited Two-Electron Uranium

**Authors:** Konstantin Lyashchenko<sup>None</sup>; Oleg Andreev<sup>1</sup>

<sup>1</sup> *Petersburg State University, St. Petersburg, Russia*

**Corresponding Authors:** olyuan@gmail.com, laywer92@mail.ru

### Keywords:

dielectronic recombination  
electron-ion collisions  
QED

### Topics:

Collisions with Electrons, Ions, Atoms and Molecules

191

## THE ENERGY LEVEL STRUCTURE OF TRIPLY CHARGED TIN IONS

**Author:** Joris Scheers<sup>1</sup>

**Co-authors:** J C Berengut<sup>2</sup>; A Borschevsky<sup>3</sup>; D Kurilovich<sup>1</sup>; R Schupp<sup>1</sup>; A Ryabtsev<sup>4</sup>; F Torretti<sup>1</sup>; A Bayerle<sup>1</sup>; E Eliav<sup>5</sup>; W Ubachs<sup>6</sup>; O O Versolato<sup>7</sup>; R Hoekstra<sup>3</sup>

<sup>1</sup> *Advanced Research Center for Nanolithography*

<sup>2</sup> *University of New South Wales*

<sup>3</sup> *University of Groningen*

<sup>4</sup> *Institute of Spectroscopy, Russian Academy of Sciences*

<sup>5</sup> *Tel Aviv University*

<sup>6</sup> *Vrije Universiteit Amsterdam*

<sup>7</sup> *ARCNL*

**Corresponding Authors:** ephraim@tau.ac.il, ryabtsev@isan.troitsk.ru, a.borschevsky@rug.nl, w.m.g.ubachs@vu.nl, r.schupp@arcnl.nl, f.torretti@arcnl.nl, d.kurilovich@arcnl.nl, julian.berengut@unsw.edu.au, a.bayerle@arcnl.nl, o.versolato@arcnl.nl, r.a.hoekstra@rug.nl, j.scheers@arcnl.nl

### Keywords:

SnIV  
Sn3+  
optical spectroscopy  
electronic structure

### Topics:

Fundamental Aspects, Structure and Spectroscopy

193

## EUV EMISSION FROM HIGHLY CHARGED TIN IONS IN AN EBIT

**Author:** Joris Scheers<sup>1</sup>

**Co-authors:** Chintan Shah<sup>2</sup>; H Bekker<sup>3</sup>; A Windberger<sup>1</sup>; F Torretti<sup>1</sup>; W Ubachs<sup>4</sup>; R Hoekstra<sup>5</sup>; José R. Crespo López-Urrutia<sup>6</sup>; O O Versolato<sup>7</sup>

<sup>1</sup> *Advanced Research Center for Nanolithography*

<sup>2</sup> *Max-Planck-Institut für Kernphysik, Heidelberg*

<sup>3</sup> *Max Planck Institute for Nuclear Physics*

<sup>4</sup> *Vrije Universiteit Amsterdam*

<sup>5</sup> *University of Groningen*

<sup>6</sup> *Max-Planck-Institut für Kernphysik*

<sup>7</sup> *ARCNL*

**Corresponding Authors:** bekker@mpi-hd.mpg.de, a.windberger@gmail.com, w.m.g.ubachs@vu.nl, f.torretti@arcnl.nl, o.versolato@arcnl.nl, r.a.hoekstra@rug.nl, j.scheers@arcnl.nl

**Keywords:**

EUV  
EBIT  
Sn plasma

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

194

## X-ray crystal optics at the S-EBIT Facility

**Authors:** Sergiy Trotsenko<sup>1</sup>; Severin Wipf<sup>2</sup>; Robert Löttsch<sup>3</sup>; Tino Morgenroth<sup>4</sup>; Gleb Vorobjev<sup>5</sup>; Alexandre Gumberidze<sup>None</sup>; Christophor Kozhuharov<sup>5</sup>; Frank Herfurth<sup>None</sup>; Reinhold Schuch<sup>6</sup>; Thomas Stoehlker<sup>7</sup>

<sup>1</sup> *GSI*

<sup>2</sup> *Friedrich Schiller University Jena*

<sup>3</sup> *HIJ*

<sup>4</sup> *GSI Helmholtzzentrum für Schwerionenforschung Darmstadt*

<sup>5</sup> *GSI Helmholtzzentrum für Schwerionenforschung GmbH*

<sup>6</sup> *University of Stockholm*

<sup>7</sup> *HI Jena, IOQ FSU Jena, and GSI, Darmstadt, Germany*

**Corresponding Authors:** schuch@fysik.su.se, s.wipf@gsi.de, s.trotsenko@gsi.de, c.kozhuharov@gsi.de, a.gumberidze@gsi.de, robert.loettsch@uni-jena.de, f.herfurth@gsi.de, g.vorobjev@gsi.de

**Keywords:**

EBIT, x-ray, spectroscopy

**Topics:**

Production, Experimental Developments and Applications

195

## Isotope Shifts for the $2P_{3/2-1/2}$ Transition in $AK_{2+}$

**Authors:** Yury Kozhedub<sup>None</sup>; Ilya Tupitsyn<sup>1</sup>; Vladimir Shabaev<sup>1</sup>

<sup>1</sup> *SPbU*

**Corresponding Authors:** v.shabaev@spbu.ru, y.kozhedub@spbu.ru, i.tupitsyn@spbu.ru

**Keywords:**

isotope shift, relativistic quantum theory

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

196

## Pair production in supercritical collisions of heavy ions

**Authors:** Ilia Maltsev<sup>1</sup>; Vladimir Shabaev<sup>2</sup>; Roman Popov<sup>3</sup>; Yury Kozhedub<sup>2</sup>; Günter Plunien<sup>4</sup>; T. Stöhlker<sup>5</sup>

<sup>1</sup> *St. Petersburg State University*

<sup>2</sup> *SPbU*

<sup>3</sup> *Saint Petersburg State University*

<sup>4</sup> *Institut für Theoretische Physik, Technische Universität Dresden*

<sup>5</sup> *GSI, Darmstadt, Germany*

**Corresponding Authors:** i.maltsev@spbu.ru, st016948@student.spbu.ru, v.shabaev@spbu.ru, y.kozhedub@spbu.ru

**Keywords:**

heavy-ion collisions, supercritical field

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

197

## Towards Laser Spectroscopy at CRYRING@ESR

**Author:** Konstantin Mohr<sup>None</sup>

**Co-authors:** V. Hannen ; Tim Ratajczyk <sup>1</sup>; Zoran Andelkovic <sup>2</sup>; Axel Buß <sup>3</sup>; Rodolfo Sánchez <sup>4</sup>; Wilfried Nörter-shäuser <sup>1</sup>; Aineah Wekesa Barasa <sup>1</sup>

<sup>1</sup> *TU Darmstadt*

<sup>2</sup> *GSI Darmstadt*

<sup>3</sup> *Institut für Kernphysik, Uni Münster*

<sup>4</sup> *GSI, Darmstadt*

**Corresponding Authors:** r.sanchez@gsi.de, a.w.barasa@gsi.de, tratajczyk@ikp.tu-darmstadt.de, k.mohr@gsi.de, axel.buss@wwu.de, z.andjerkovic@gsi.de, wnoertershaeuser@ikp.tu-darmstadt.de

**Keywords:**

laser spectroscopy  
optical pumping  
polarized ion beams

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

198

## Two-Quantum Annihilation of Positrons with Bound Electrons

**Author:** Vladimir Zaytsev<sup>1</sup>

**Co-authors:** Andrey Volotka<sup>2</sup>; Stephan Fritzsche<sup>3</sup>; deyang Yu<sup>4</sup>; Xinwen Ma<sup>4</sup>; Vladimir Shabaev<sup>5</sup>

<sup>1</sup> *Department of Physics, St. Petersburg State University; ITMO University*

<sup>2</sup> *Helmholtz Institute Jena*

<sup>3</sup> *Helmholtz-Institut Jena*

<sup>4</sup> *Institute of Modern Physics, Chinese Academy of Sciences*

<sup>5</sup> *SPbU*

**Corresponding Authors:** v.a.zaytsev@spbu.ru, a.volotka@gsi.de, x.ma@impcas.ac.cn, d.yu@impcas.ac.cn, v.shabaev@spbu.ru, s.fritzsche@gsi.de

**Keywords:**

annihilation, positrons, bound electrons

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

199

## g factor of Boronlike Ions: Relativistic and QED Effects

**Authors:** Valentin Agababaev<sup>1</sup>; Dmitry Glazov<sup>2</sup>; Andrey Volotka<sup>3</sup>; Dmitrii Zinenko<sup>1</sup>; Vladimir Shabaev<sup>4</sup>; Günter Plunien<sup>5</sup>

<sup>1</sup> *Saint-Petersburg State University*

<sup>2</sup> *St. Petersburg State University*

<sup>3</sup> *Helmholtz Institute Jena*

<sup>4</sup> *SPbU*

<sup>5</sup> *Institut für Theoretische Physik, Technische Universität Dresden*



**Corresponding Authors:** z-witcher@mail.ru, v.agababaev@gmail.com, a.volotka@gsi.de, d.glazov@spbu.ru, v.shabaev@spbu.ru

**Keywords:**

g factor, bound-state QED, boronlike ions

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

200

## Theoretical study of TEOP transitions in He-like highly charged ions

**Authors:** Oleg Andreev<sup>1</sup>; Konstantin Lyashchenko<sup>1</sup>; Deyang Yu<sup>None</sup>

<sup>1</sup> *St. Petersburg State University*

**Corresponding Authors:** laywer92@mail.ru, olyuan@gmail.com

**Keywords:**

TEOP, transition probabilities, dielectronic recombination, He-like ions, QED

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

201

## Technological Progress in Compton Polarimetry

**Authors:** Uwe Spillmann<sup>1</sup>; Thomas Krings<sup>2</sup>; Marco Vockert<sup>None</sup>; Günter Weber<sup>3</sup>; Thomas Stoehlker<sup>4</sup>

<sup>1</sup> *GSI*

<sup>2</sup> *FZ-Jülich*

<sup>3</sup> *Helmholtz-Institut Jena*

<sup>4</sup> *HI Jena, IOQ FSU Jena, and GSI, Darmstadt, Germany*

**Corresponding Authors:** t.krings@fz-juelich.de, u.spillmann@gsi.de, marco.vockert@uni-jena.de, g.weber@gsi.de

**Keywords:**

Compton Polarimetry

X-ray

**Topics:**

Production, Experimental Developments and Applications

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## Coherent and incoherent calculation of fully differential cross sections for the ionization of He by fast ions

**Author:** Tokesi Karoly<sup>1</sup>

<sup>1</sup> *Institute for Nuclear Research, Hungarian Academy of Sciences, H-4001 Debrecen, Hungary*

**Corresponding Author:** tokesi@atomki.mta.hu

**Keywords:**

ionization, fast collision, fully differential cross section

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

204

## Measurements of Electron Impact Excitation Cross Sections of X-ray transitions in Highly Charged Potassium

**Author:** Greg Brown<sup>1</sup>

**Co-authors:** Gabriele Betancourt-Martinez<sup>2</sup>; Esra Bulbul<sup>3</sup>; Adam Foster<sup>3</sup>; Natalie Hell<sup>4</sup>; Richard Kelley<sup>5</sup>; Caroline Kilbourne<sup>5</sup>; Maurice Leutenegger<sup>5</sup>; Tom Lockard<sup>4</sup>; F. Scott Porter<sup>5</sup>; Randall Smith<sup>3</sup>; Beiersdorfer Peter<sup>4</sup>

<sup>1</sup> *Lawrence Livermore National Laboratory*

<sup>2</sup> *IRAP CNRS, 9 Av. Toulouse Cedex 4, France*

<sup>3</sup> *Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA, 02138, USA*

<sup>4</sup> *Lawrence Livermore National Laboratory, Livermore, CA 94550, USA*

<sup>5</sup> *NASA/GSFC*

**Corresponding Authors:** hell1@llnl.gov, brown86@llnl.gov

**Keywords:**

atomic physics  
x-ray spectroscopy  
laboratory astrophysics

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

205

## A Sneak Peek At The Future Highly Charged Ions Research Program With CRYRING@ESR

**Author:** M. Lestinsky<sup>1</sup>

<sup>1</sup> *GSI, Darmstadt, Germany*

**Corresponding Author:** m.lestinsky@gsi.de

**Keywords:**

Storage ring facility  
Research program  
Highly charged ions

**Topics:**

Production, Experimental Developments and Applications

208

## **Zeeman Effect in Few-Electron Ions: g Factor, Nonlinear Terms and Nuclear Magnetic Shielding**

**Authors:** Dmitry Glazov<sup>1</sup>; Valentin Agababaev<sup>2</sup>; Anastasiya Varentsova<sup>3</sup>; Anna Volchkova<sup>1</sup>; Andrey Volotka<sup>4</sup>; Dmitrii Zinenko<sup>1</sup>; Vladimir Shabaev<sup>5</sup>; Günter Plunien<sup>6</sup>

<sup>1</sup> *St. Petersburg State University*

<sup>2</sup> *Saint-Petersburg State University*

<sup>3</sup> *ITMO University*

<sup>4</sup> *Helmholtz Institute Jena*

<sup>5</sup> *SPbU*

<sup>6</sup> *Institut für Theoretische Physik, Technische Universität Dresden*

**Corresponding Authors:** glazov.d.a@gmail.com, volchania@gmail.com, varentsova.a@mail.ru, z-witcher@mail.ru, v.agababaev@gmail.com, a.volotka@gsi.de, v.shabaev@spbu.ru

**Keywords:**

Zeeman effect  
g factor  
nuclear magnetic shielding  
bound-state QED

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

209

## **Na-like Ion Spectroscopy for Determining Nuclear Charge Radius Change Between Isotopes**

**Authors:** Endre Takacs<sup>1</sup>; Roshani Silwal<sup>1</sup>; Alain Lapiere<sup>2</sup>; John Gillaspay<sup>3</sup>; Joan Dreiling<sup>4</sup>; Steven Blundell<sup>5</sup>; Dipti<sup>6</sup>; Alexander Borovik, Jr<sup>7</sup>; Gerald Gwinner<sup>8</sup>; Antonio Villari<sup>2</sup>; Yuri Ralchenko<sup>6</sup>

<sup>1</sup> *Clemson University*

<sup>2</sup> *National Superconducting Cyclotron Laboratory*

<sup>3</sup> *National Science Foundation*

<sup>4</sup> *National Institute of Standards and Technology*

<sup>5</sup> *Univ. Grenoble Alpes*

<sup>6</sup> *National Institute of Standards and Technology*

<sup>7</sup> *Justus-Liebig Universitat Giessen*

<sup>8</sup> *University of Manitoba*

**Corresponding Authors:** etakacs@clemson.edu, fnu.dipti@nist.gov, jgillasp@nsf.gov, rsilwal@g.clemson.edu, yuri.ralchenko@nist.gov, alexander.borovik@physik.uni-giessen.de

**Keywords:**

Na-like ions  
spectroscopy  
extreme ultraviolet  
EUV  
nuclear radius  
electron beam ion trap  
EBIT

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

210

## Experimental Determination of Electron Capture Cross Sections into Excited States of Decelerated Xenon Projectiles

**Author:** Felix Kröger<sup>None</sup>

**Co-authors:** Guenther Weber <sup>1</sup>; J. Glorius <sup>2</sup>; Yuri Litvinov ; Marc Oliver Herdrich <sup>3</sup>; Uwe Spillmann <sup>2</sup>; Marco Vockert ; Thomas Stoehlker <sup>1</sup>

<sup>1</sup> *HI Jena, IOQ FSU Jena, and GSI, Darmstadt, Germany*

<sup>2</sup> *GSI*

<sup>3</sup> *Helmholtz-Institute Jena*

**Corresponding Authors:** m.o.herdrich@gsi.de, g.weber@gsi.de, felix.kroeger@uni-jena.de, marco.vockert@uni-jena.de, y.litvinov@gsi.de, j.glorius@gsi.de, u.spillmann@gsi.de

**Keywords:**

Photon spectrum,  
Electron capture,  
NRC cross sections,  
CRYRING@ESR

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

211

## New Calibration References for X-ray Light Sources Based on Highly Charged Ions

**Author:** Steffen Kühn<sup>1</sup>

**Co-authors:** Sven Bernitt <sup>2</sup>; Maurice Leutenegger <sup>3</sup>; Peter Micke <sup>4</sup>; René Steinbrügge <sup>5</sup>; José R. Crespo López-Urrutia <sup>1</sup>

<sup>1</sup> *Max-Planck-Institut für Kernphysik*

<sup>2</sup> *Max-Planck-Institut für Kernphysik, Heidelberg*

<sup>3</sup> *NASA/GSFC*

<sup>4</sup> *Physikalisch-Technische Bundesanstalt, Germany*

<sup>5</sup> *DESY*

**Corresponding Authors:** steffen.kuehn@mpi-hd.mpg.de, rene.steinbruegge@desy.de, peter.micke@mpi-hd.mpg.de

**Keywords:**

X-Ray Laser Spectroscopy  
Highly Charged Ions  
Electron Beam Ion Trap  
Off-Axis Electron Gun

**Topics:**

Production, Experimental Developments and Applications

212

## Charge State Tailoring of Relativistic Heavy Ion Beams for FAIR and CERN

**Author:** Felix Kröger<sup>None</sup>

**Co-authors:** Guenther Weber <sup>1</sup>; Viacheslaw Petrovich Shevelko <sup>2</sup>; Thomas Stoehlker <sup>1</sup>

<sup>1</sup> *HI Jena, IOQ FSU Jena, and GSI, Darmstadt, Germany*

<sup>2</sup> *LPI RAS, Moscow*

**Corresponding Authors:** felix.kroeger@uni-jena.de, g.weber@gsi.de

**Keywords:**

Charge state evolution,  
Stripping,  
FAIR,  
CERN,  
Gamma Factory

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

213

## PIXE Induced by Medium Energy Heavy Ions in Application to Analysis of Thin Films and Subsurface Regions

**Authors:** Marek Moneta<sup>1</sup>; Pawłowski Bogdan<sup>1</sup>

<sup>1</sup> *Uniwersytet Łódzki*

**Corresponding Authors:** marek\_moneta@uni.lodz.pl, pawlow@uni.lodz.pl

**Keywords:**

PIXE - particle induced X-ray emission, thin film, elemental composition

**Topics:**

Interaction with Clusters, Surfaces and Solids

214

## A high resolution von Hamos X-ray spectrometer based on a segmented crystal for low energy spectroscopy at the CRYRING@FAIR

**Author:** Pawel Jagodzinski<sup>1</sup>

**Co-authors:** Marek Pajek<sup>2</sup>; Dariusz Banas<sup>3</sup>; Andrzej Warczak<sup>4</sup>; Aldona Kubala-Kukuś<sup>2</sup>; Ilona Stabrawa<sup>2</sup>; Łukasz Jabłoński<sup>5</sup>; Daniel Sobota<sup>2</sup>; Karol Szary<sup>2</sup>

<sup>1</sup> *University of Technology, Kielce, Poland*

<sup>2</sup> *Jan Kochanowski University*

<sup>3</sup> *UJK Kielce*

<sup>4</sup> *Jagiellonian University*

<sup>5</sup> *Jan Kochanowski University in Kielce*

**Corresponding Authors:** k.szary@ujk.edu.pl, a.kubala-kukus@ujk.edu.pl, i.stabrawa@interia.pl, d.sobota@ujk.edu.pl, m.pajek@ujk.edu.pl, lukasz@ujk.edu.pl, jagodzin@tu.kielce.pl, andrzej.warczak@uj.edu.pl, d.banas@ujk.edu.pl

**Keywords:**

von Hamos X-ray spectrometer, CRYRING@FAIR, Radiative Recombination

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

215

## Nuclear Excitation In The Two-Photon Decay Of Highly Charged Ions

**Authors:** Andrey Volotka<sup>1</sup>; Andrey Surzhykov<sup>2</sup>; Sergiy Trotsenko<sup>3</sup>; Günter Plunien<sup>4</sup>; T. Stöhlker<sup>None</sup>; Stephan Fritzsche<sup>5</sup>

<sup>1</sup> *Helmholtz Institute Jena*

<sup>2</sup> *Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig, Germany*

<sup>3</sup> *GSI*

<sup>4</sup> *Institut für Theoretische Physik, Technische Universität Dresden*

<sup>5</sup> *Helmholtz-Institut Jena*

**Corresponding Authors:** a.volotka@gsi.de, s.trotsenko@gsi.de, t.stoehlker@gsi.de, andrey.surzhykov@ptb.de, s.fritzsche@gsi.de

**Keywords:**

nuclear excitation, two-photon decay

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

216

## Microscopic Liquid Jets: from supercooled liquid water to superfluid helium

**Author:** Anton Kalinin<sup>1</sup>

**Co-authors:** Alexander Schottelius<sup>2</sup>; Claudia Goy<sup>3</sup>; Robert Grisenti<sup>3</sup>; Thomas Stöhlker<sup>1</sup>

<sup>1</sup> *GSI Helmholtzzentrum für Schwerionenforschung GmbH*

<sup>2</sup> *IKF Uni-Grankfurt*

<sup>3</sup> *IKF Uni-Frankfurt*

**Corresponding Authors:** grisenti@atom.uni-frankfurt.de, kalinin@atom.uni-frankfurt.de, schottelius@atom.uni-frankfurt.de, goy@atom.uni-frankfurt.de, t.stoehlker@gsi.de

**Keywords:**

cryogenic beams, droplet jets

**Topics:**

Interaction with Clusters, Surfaces and Solids

217

## Interpretation of X-ray Emission in Interaction of Slow Highly Charged Xe Ions with Be Surface

**Author:** Łukasz Jabłoński<sup>1</sup>

**Co-authors:** Dariusz Banas<sup>2</sup>; Pawel Jagodzinski<sup>3</sup>; Aldona Kubala-Kukuś<sup>1</sup>; Daniel Sobota<sup>1</sup>; Ilona Stabrawa<sup>1</sup>; Karol Szary<sup>1</sup>; Marek Pajek<sup>1</sup>

<sup>1</sup> *Jan Kochanowski University*

<sup>2</sup> *UJK Kielce*

<sup>3</sup> *University of Technology, Kielce, Poland*

**Corresponding Authors:** k.szary@ujk.edu.pl, a.kubala-kukus@ujk.edu.pl, i.stabrawa@interia.pl, d.sobota@ujk.edu.pl, m.pajek@ujk.edu.pl, lukasz@ujk.edu.pl, jagodzin@tu.kielce.pl, d.banas@ujk.edu.pl

**Keywords:**

highly charged ions,  
ion-surface interactions,  
internal dielectronic excitation

**Topics:**

Interaction with Clusters, Surfaces and Solids

218

## Investigation of metastable levels in highly charged Tungsten ions at Shanghai EBITs

**Author:** Jun Xiao<sup>1</sup>

**Co-authors:** Bingsheng Tu<sup>1</sup>; Ke Yao<sup>1</sup>; Yang Yang<sup>1</sup>; Meichun Li<sup>1</sup>; Yang Shen<sup>1</sup>; Yunqing Fu<sup>1</sup>; Baoren Wei<sup>1</sup>; Chongyang Chen<sup>1</sup>; Roger Hutton<sup>1</sup>; Yaming Zou<sup>1</sup>

<sup>1</sup> *Shanghai EBIT Lab, Institute of Modern Physics, and Key Laboratory of Nuclear Physics and Ion-beam Application(MOE), Fudan University, Shanghai 200433, China*

**Corresponding Author:** xiao\_jun@fudan.edu.cn

**Keywords:**

EBIT, Metastable levels, Tungsten

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

219

## Fission of multiply charged divalent-metal clusters

**Author:** Masato Nakamura<sup>1</sup>

<sup>1</sup> *Nihon University*

**Corresponding Author:** mooming@phys.ge.cst.nihon-u.ac.jp

**Keywords:**

cluster fission

**Topics:**

Interaction with Clusters, Surfaces and Solids

220

## Overview of the HCI Spectroscopy Program at the NIST Electron Beam Ion Trap

**Authors:** Yuri Ralchenko<sup>1</sup>; Dipti<sup>2</sup>; Alexander Borovik<sup>3</sup>; Joan Dreiling<sup>4</sup>; Amy Gall<sup>5</sup>; John Gillaspay<sup>6</sup>; Deirdre Kilbane<sup>7</sup>; Aung Sis Naing<sup>8</sup>; Eric Norrgard<sup>9</sup>; Dmitry Osin<sup>10</sup>; Yuri Podpaly<sup>11</sup>; Joseph Reader<sup>1</sup>; Samuel Sanders<sup>5</sup>; Angela Small<sup>12</sup>; Endre Takacs<sup>13</sup>; Joseph Tan<sup>4</sup>

<sup>1</sup> *NIST*

<sup>2</sup> *National Institute of Standards and Technology*



<sup>3</sup> *Justus-Liebig-Universität Gießen*

<sup>4</sup> *National Institute of Standards and Technology*

<sup>5</sup> *Clemson University*

<sup>6</sup> *National Science Foundation*

<sup>7</sup> *Univ College Dublin*

<sup>8</sup> *University of Delaware / NIST*

<sup>9</sup> *National Institute of Standards & Technology*

<sup>10</sup> *TAE Technologies*

<sup>11</sup> *LLNL*

<sup>12</sup> *University of Maryland at College Park*

<sup>13</sup> *Clemson University / NIST*

**Corresponding Authors:** scsande@g.clemson.edu, joseph.tan@nist.gov, fnu.dipti@nist.gov, jgillasp@nsf.gov, endre.takacs@nist.gov, eric.norrgard@nist.gov, yuri.ralchenko@nist.gov, asmall12@umd.edu, aungsn@gmail.com, alexander.borovik@physik.uni-giessen.de

**Keywords:**

EBIT

Mid- and high-Z elements

EUV and x-ray spectra

Collisional-radiative modeling

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

222

## Hyperfine Structure of Some Multicharged Ions within Relativistic Many-Body Perturbation Theory

**Author:** Olga Khetselius<sup>1</sup>

<sup>1</sup> *Odessa State Environmental University*

**Corresponding Author:** okhetsel@gmail.com

**Keywords:**

Hyperfine Structure

Multicharged Ions

Relativistic Theory

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

223

## NEET and “Shake up” Effects in Laser Electron-Gamma-Nuclear Spectroscopy of Multicharged Ions

**Authors:** Olga Khetselius<sup>1</sup>; Yuliya Dubrovskaya<sup>1</sup>; Larisa Vitavetskaya<sup>1</sup>; Alexander Glushkov<sup>1</sup>

<sup>1</sup> *Odessa State Environmental University*

**Corresponding Authors:** dubrovskayayv@gmail.com, okhetsel@gmail.com, vitavetskayala@gmail.com, glushkovav@gmail.com

**Keywords:**

“Shake up” Effects  
Multicharged Ions  
Gamma-Nuclear Spectroscopy

**Topics:**

Interactions with Photons and Plasmas

224

## **Electron-Collisional Spectroscopy of Multicharged Ions in Plasmas: Relativistic Energy Approach**

**Author:** Vasily Buyadzhi<sup>1</sup>

<sup>1</sup> *Odessa State Environmental University*

**Corresponding Author:** buyadzhivv@gmail.com

**Keywords:**

Electron-Collisional Spectroscopy  
Multicharged Ions  
Plasmas

**Topics:**

Interactions with Photons and Plasmas

225

## **Multi-photon Spectroscopy of the Debye Plasmas Multicharged Ions in One- and Two-Colour Laser Fields**

**Authors:** Vasily Buyadzhi<sup>1</sup>; Anna Kuznetsova<sup>1</sup>; Alexander Glushkov<sup>1</sup>; Andrey Svinarenko<sup>1</sup>

<sup>1</sup> *Odessa State Environmental University*

**Corresponding Authors:** buyadzhivv@gmail.com, glushkovav@gmail.com, svinarenkoaa@gmail.com, kuznetsova232@gmail.com

**Keywords:**

Multi-photon Spectroscopy  
Plasmas  
Multicharged Ions

**Topics:**

Interactions with Photons and Plasmas

226

## Resonance Phenomena in Heavy Multicharged Ions Collisions: Operator Perturbation Theory and Relativistic Energy Approach

**Authors:** Alexander Glushkov<sup>1</sup>; Vasily Buyadzhi<sup>1</sup>; Anna Ignatenko<sup>1</sup>

<sup>1</sup> *Odessa State Environmental University*

**Corresponding Authors:** ignatenkoav13@gmail.com, buyadzhivv@gmail.com, glushkovav@gmail.com

**Keywords:**

Heavy Ions Collisions  
Resonance Phenomena  
Relativistic Energy Approach

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

227

## Stark Effect, Multiphoton and Autoionization Resonances in Spectra of Multicharged Ions in a Strong Electromagnetic Field

**Authors:** Alexander Glushkov<sup>1</sup>; Anna Kuznetsova<sup>1</sup>; Anna Ignatenko<sup>1</sup>; Valentin Ternovsky<sup>1</sup>

<sup>1</sup> *Odessa State Environmental University*

**Corresponding Authors:** ternovskiyvb@gmail.com, kuznetsovaa232@gmail.com, ignatenkoav13@gmail.com, glushkovav@gmail.com

**Keywords:**

Multicharged Ions  
Stark Effect  
Multiphoton Resonances

**Topics:**

Strong Field and Ultrafast Processes

228

## Computing Radiative Spectroscopic Parameters for Li-like Multicharged Ions within Model Potential Method and Energy Approach

**Authors:** Eugeny Ternovsky<sup>1</sup>; Valentin Ternovsky<sup>1</sup>; Vasily Buyadzhi<sup>1</sup>; Olga Khetselius<sup>1</sup>

<sup>1</sup> *Odessa State Environmental University*

**Corresponding Authors:** ternovskyvb@gmail.com, okhetsel@gmail.com, ternovskyev@gmail.com, buyadzhivv@gmail.com

**Keywords:**

Radiative Parameters  
Li-like Multicharged Ions  
Energy Approach

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

229

## **Relativistic Computing Excited and Autoionizing States Spectroscopic Parameters for He-like Multicharged Ions**

**Authors:** Eugeny Ternovsky<sup>1</sup>; Valentin Ternovsky<sup>1</sup>; Andrey Svinarenko<sup>1</sup>; Tatyana Tkach<sup>1</sup>

<sup>1</sup> *Odessa State Environmental University*

**Corresponding Authors:** ternovskyvb@gmail.com, svinarenkoa@gmail.com, tkachtb@gmail.com, ternovskyev@gmail.com

**Keywords:**

Relativistic Computing  
Autoionizing States  
He-like Multicharged Ions

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

230

## **Two-electron one-photon transitions in He-like Ar**

**Authors:** Ming-Xin Cao<sup>1</sup>; Xiao-bin Ding<sup>1</sup>; Maogen Su<sup>1</sup>; Chenzhong Dong<sup>1</sup>

<sup>1</sup> *Northwest Normal University*

**Corresponding Authors:** 763481251@qq.com, sumg@nwnu.edu.cn, dongcz@nwnu.edu.cn, dingxb@nwnu.edu.cn

**Keywords:**

Radiative transition  
electron correlation  
MCDF

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

231

## On the Line intensities of Pm-like Bi

**Authors:** José Marques<sup>1</sup>; José Santos<sup>2</sup>; Paul Indelicato<sup>3</sup>; Jorge Sampaio<sup>4</sup>; Maria Martins<sup>1</sup>; Fernando Parente<sup>2</sup>

<sup>1</sup> *Universidade de Lisboa*

<sup>2</sup> *Universidade Nova de Lisboa*

<sup>3</sup> *Laboratoire Kastler Brossel, Sorbonne Université, CNRS*

<sup>4</sup> *LIP Laboratório de Instrumentação e Física Experimental de Partículas*

**Corresponding Authors:** mdmartins@fc.ul.pt, fACP@fct.unl.pt, jmsampaio@fc.ul.pt, paul.indelicato@lkb.upmc.fr, jps@fct.unl.pt, jmmarques@fc.ul.pt

**Keywords:**

spectroscopy  
relativity  
x-radiation

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

232

## Measurement of Surface Wakefield Intensity for 1s3s 3S1 state in He-like Ti

**Authors:** gaurav sharma<sup>1</sup>; TAPAN Nandi<sup>2</sup>; nitin K puri<sup>3</sup>; Sarvesh Kumar<sup>4</sup>

<sup>1</sup> *Delhi Technological University, New Delhi, India*

<sup>2</sup> *IUAC, JNU CAMPUS, NEW DELHI*

<sup>3</sup> *delhi technological University*

<sup>4</sup> *3Cefitec, Department of Physics, Faculdade de Ciencias e Tecnologia, Universidade NOVA de Lisboa, Portugal*

**Corresponding Authors:** nanditapan@gmail.com, gaurav.kmc891101@gmail.com

**Keywords:**

Beam-foil spectroscopy, stark mixing, time-of-flight measurement,

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

233

## Detection of cascading states and time-of-flight method

**Authors:** gaurav sharma<sup>1</sup>; Sarvesh Kumar<sup>2</sup>; nitin K puri<sup>3</sup>; TAPAN Nandi<sup>4</sup>

<sup>1</sup> *Delhi Technological University, New Delhi, India*

<sup>2</sup> *3Cefitec, Department of Physics, Faculdade de Ciencias e Tecnologia, Universidade NOVA de Lisboa, Portugal*

<sup>3</sup> *delhi technological University*

<sup>4</sup> *IUAC, JNU CAMPUS, NEW DELHI*

**Corresponding Authors:** nanditapan@gmail.com, gaurav.kmc891101@gmail.com

**Keywords:**

x-ray spectroscopy, time-of-flight measurement, circular rydberg states

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

236

## **Ion Emission from CO<sub>2</sub> Laser Produced Tin Plasmas**

**Author:** Padraig Dunne<sup>1</sup>

**Co-authors:** Frank McQuillan<sup>1</sup>; Emma Sokell<sup>1</sup>; Howard Scott<sup>2</sup>

<sup>1</sup> *University College Dublin*

<sup>2</sup> *Lawrence Livermore National Laboratory*

**Corresponding Authors:** padraig.dunne@ucd.ie, frankmcquillan@gmail.com, emma.sokell@ucd.ie, scott6@llnl.gov

**Keywords:**

CO<sub>2</sub> Laser Produced Plasma

Ion Probe Experiment

Plasma Simulations

**Topics:**

Interactions with Photons and Plasmas

237

## **Study of Soft X-ray Light Sources with High Radiance**

**Author:** Joseph Gladson<sup>1</sup>

**Co-authors:** O'Reilly Fergal<sup>1</sup>; Tom McCormack<sup>1</sup>

<sup>1</sup> *University College Dublin*

**Corresponding Authors:** gg.glad@gmail.com, tom.mccormack@ucd.ie, f.oreilly@ucd.ie

**Keywords:**

Plasma Emission

Light Source

Soft x-ray

**Topics:**

Interactions with Photons and Plasmas

238

## **EUV Spectroscopy of Optically Thin Ge VI-XI Plasmas in the 9-18 nm Region.**

**Author:** Oisin Maguire<sup>1</sup>

**Co-authors:** Domagoj Kos<sup>1</sup>; Gerry O'Sullivan<sup>1</sup>; Sokell Emma<sup>1</sup>

<sup>1</sup> *University College Dublin*

**Corresponding Authors:** oisin.maguire@ucdconnect.ie, emma.sokell@ucd.ie, gerry.osullivan@ucd.ie, domagoj.kos@gmail.com

**Keywords:**

Spectroscopy  
Laser Produced Plasmas  
Germanium

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

239

## **Spectroscopy of Strontium Ions in the Soft X-ray Region**

**Author:** Takanori Miyazaki<sup>1</sup>

**Co-authors:** Gerard O'Sullivan<sup>2</sup>; Padraig Dunne<sup>1</sup>

<sup>1</sup> *University College Dublin*

<sup>2</sup> *University College Dublin*

**Corresponding Authors:** padraig.dunne@ucd.ie, takanori.miyazaki.cst@gmail.com, gerry.osullivan@ucd.ie

**Keywords:**

Spectroscopy  
Laser Produced Plasmas  
Soft x-ray  
Strontium

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

240

## **Study of Light Sources in the Soft X-ray Region**

**Author:** Mateusz Olszewski<sup>1</sup>

**Co-authors:** Padraig Dunne<sup>1</sup>; O'Reilly Fergal<sup>1</sup>; Joseph Gladson<sup>1</sup>; Tony Donnelly<sup>1</sup>

<sup>1</sup> *University College Dublin*

**Corresponding Authors:** gg.glad@gmail.com, tony.donnelly@ucd.ie, mateusz.olszewski@ucdconnect.ie, padraig.dunne@ucd.ie, f.oreilly@ucd.ie

**Keywords:**

Laser Produced Plasma  
Soft x-ray  
Light Source

**Topics:**

Production, Experimental Developments and Applications

241

## **Emission From Highly-Charged Ions as a Diagnostic of Laser Produced Plasma Conditions**

**Author:** Elgiva White<sup>1</sup>

**Co-authors:** Padraig Dunne<sup>1</sup>; Sokell Emma<sup>1</sup>

<sup>1</sup> *University College Dublin*

**Corresponding Authors:** elgiva.white@ucdconnect.ie, emma.sokell@ucd.ie, padraig.dunne@ucd.ie

**Keywords:**

Laser Produced Plasma  
Plasma Models  
Inner-shell Spectra

**Topics:**

Interactions with Photons and Plasmas

242

## **Laboratory Measurements Compellingly Support a Charge-Exchange Mechanism for the Dark Matter ~3.5 keV X-ray Line**

**Authors:** Chintan Shah<sup>1</sup>; Stepan Dobrodey<sup>1</sup>

<sup>1</sup> *Max-Planck-Institut für Kernphysik, D-69117 Heidelberg, Germany*

**Keywords:**

K-shell emission; dark matter; charge exchange

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

243



## Polarization of K-shell Dielectronic Recombination Satellite Lines of Fe XIX- XXV

**Authors:** Chintan Shah<sup>1</sup>; Pedro Amaro<sup>2</sup>

<sup>1</sup> *Max-Planck-Institut für Kernphysik, D-69117 Heidelberg, Germany*

<sup>2</sup> *LIBPhys-UNL*

**Corresponding Author:** pdamaro@fct.unl.pt

**Keywords:**

K-shell emission; polarization; dielectronic recombination

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

244

## Search for Technetium in Extremely Hot Evolved Stars

**Author:** Chintan Shah<sup>1</sup>

<sup>1</sup> *Max-Planck-Institut für Kernphysik, D-69117 Heidelberg, Germany*

**Keywords:**

nucleosynthesis; atomic structure; plasma modelling

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

246

## Dynamics of $C_2H_2^3+ \rightarrow H^{++}H^{++}C_2^+$ investigated by 50-keV/u Ne<sup>8+</sup> impact

**Authors:** Xu S.Y.<sup>1</sup>; Zhu X.L.<sup>2</sup>; Feng W. T. <sup>2</sup>; Guo D. L. <sup>2</sup>; Zhao Q. <sup>3</sup>; Yan S.<sup>2</sup>; Zhang P.<sup>2</sup>; Zhao D.M.<sup>3</sup>; Gao Y.<sup>3</sup>; Zhang S.F.<sup>2</sup>; Yang J.<sup>3</sup>; Ren Xueguang<sup>4</sup>; Ma X.<sup>2</sup>

<sup>1</sup> *Xi'an Jiaotong University*

<sup>2</sup> *Chinese Academy of Sciences*

<sup>3</sup> *Chinese Academy of Sciences*

<sup>4</sup> *Xi'an Jiaotong University*

**Keywords:**

ion-collision

C<sub>2</sub>H<sub>2</sub>

Three-body fragmentation

**Topics:**

Collisions with Electrons, Ions, Atoms and Molecules

252

## Spectroscopic Analysis of an Indium -Tin Plasma Produced By A Pulsed Laser System

**Author:** Muhammad Hanif<sup>1</sup>

<sup>1</sup> *National University of Sciences & Technology, Islamabad, Pakistan*

**Corresponding Author:** hanif\_muhammad@yahoo.com

**Keywords:**

Indium - Tin plasma, laser ablation, optical emission spectroscopy, electron temperature, and number density (Ne).

**Topics:**

Interactions with Photons and Plasmas

264

## Theoretical Line Energies and Fluorescence Yields of Ne-like and Ar-like Ions

**Authors:** José Marques<sup>None</sup>; Jorge Miguel Sampaio<sup>1</sup>; José Paulo Santos<sup>2</sup>; Mauro Guerra<sup>1</sup>; Paul Indelicato<sup>3</sup>; Fernando Parente<sup>1</sup>

<sup>1</sup> *Da Universidade Nova de Lisboa*

<sup>2</sup> *DF @ FCT NOVA*

<sup>3</sup> *CNRS, Sorbonne Universites, UPMC Universites*

**Corresponding Authors:** facp@fct.unl.pt, mguerra@fct.unl.pt, jmsampaio@fc.ul.pt, paul.indelicato@lkb.upmc.fr, jps@fct.unl.pt, jmmarques@fc.ul.pt

**Keywords:**

Fluorescence Yields

**Topics:**

Fundamental Aspects, Structure and Spectroscopy

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## Activities at the IAEA on Data for Plasma-Material Interaction in Fusion Devices

**Authors:** Kalle Heinola<sup>1</sup>; Christian Hill<sup>1</sup>

<sup>1</sup> *International Atomic Energy Agency*

**Corresponding Authors:** [ch.hill@iaea.org](mailto:ch.hill@iaea.org), [k.heinola@iaea.org](mailto:k.heinola@iaea.org)

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**Topics:**

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