

## Applied Physics

*Tuesday, 19.08.2025, Room Elise Richter Saal*

| Time  | ID  | <b>APPLIED PHYSICS I</b><br><i>Chair: Fabio Avino, EPF Lausanne</i>   |
|-------|-----|---|
| 14:00 | 551 | <p style="text-align: center;"><b><sup>44</sup>Ti – A new Trace Isotope for Astrophysics</b></p> <p style="text-align: center;"><i>David Krebs<sup>1</sup>, Martin Martschini<sup>1</sup>, Silke Merchel<sup>1</sup>, Karin Hain<sup>1</sup>, Zeynep Talip<sup>2</sup></i><br/> <sup>1</sup> University of Vienna, Faculty of Physics, Isotope Physics, Vienna, Austria,<br/> <sup>2</sup> Paul Scherrer Institute PSI, Laboratory of Radiochemistry, Villigen, Switzerland</p> <p>The radioisotope <sup>44</sup>Ti can be detected in some rare core-collapse supernovae remnants, produced primarily via <sup>40</sup>Ca(<math>\alpha,\gamma</math>)<sup>44</sup>Ti. Its measurement by Accelerator Mass Spectrometry (AMS) has been hindered by intense isobaric interference from stable <sup>44</sup>Ca, necessitating large tandem accelerators (&gt;10 MV). <sup>44</sup>Ti detection is investigated at the 3 MV Vienna Environmental Research Accelerator (VERA) using Ion-Laser InterAction Mass Spectrometry (ILIAMS). The AMS technique employs negative ion acceleration, molecular dissociation in a terminal stripper, and high-resolution magnetic/electric separation. Critical <sup>44</sup>Ca suppression was achieved through ion-gas reactions in the ion cooler (ILIAMS) and reduced <sup>44</sup>Ca backgrounds by &gt; 10<sup>6</sup>, allowing for measurements of <sup>44</sup>Ti/<sup>48</sup>Ti around 5 × 10<sup>-14</sup>. This enables <sup>44</sup>Ti measurements at VERA for cross section measurements of the reaction <sup>40</sup>Ca(<math>\alpha,\gamma</math>)<sup>44</sup>Ti.</p> |
| 14:15 | 552 | <p style="text-align: center;"><b>M<sup>2</sup> as a Quantitative Measure of Beam Quality</b></p> <p style="text-align: center;"><i>Filipp Lausch<sup>1,2</sup>, Vito F. Pecile<sup>1</sup>, Oliver H. Heckl<sup>1</sup></i><br/> <sup>1</sup> University of Vienna - Optical Metrology Group, Vienna, Austria,<br/> <sup>2</sup> University of Vienna - Vienna Doctoral School in Physics, Vienna, Austria</p> <p>Beam quality is a fundamental aspect for evaluating the performance of laser sources. M<sup>2</sup>-measurements serve as the gold standard for beam quality assessment since the 1990s. The measured M<sup>2</sup>-parameter indicates similarity to the fundamental Gaussian mode by describing a beams' divergence. However, in terms of the higher-order mode contribution, it acts as a qualitative measure that does not permit a quantitative statement. We introduce a framework to assess the fundamental mode content of a beam using M<sup>2</sup>-measurements and establish a link between beam divergence and its mode composition. Our results enhance the utility of M<sup>2</sup>-measurements in evaluating laser sources, coupling efficiencies, focusing performance, and long-distance propagation. This repositions M<sup>2</sup> from a qualitative figure to a quantitative tool in modern photonics.</p>  |
| 14:30 | 553 | <p style="text-align: center;"><b>Production and characterization of an isotopic Np spike for mass spectrometry</b></p> <p style="text-align: center;"><i>Karin Hain<sup>1</sup>, Andreas Wiederin<sup>1</sup>, Martin Martschini<sup>1</sup>, Aya Sakaguchi<sup>2</sup>, Peter Steier<sup>1</sup>, Akihiko Yokoyama<sup>3</sup></i><br/> <sup>1</sup> University of Vienna, Faculty of Physics, Vienna, Austria,<br/> <sup>2</sup> University of Tsukuba, Institute of Pure and Applied Sciences, Tsukuba, Japan,<br/> <sup>3</sup> Kanazawa University, Institute of Science and Engineering, Kanazawa, Japan</p> <p>The second most abundant anthropogenic actinide in the environment <sup>237</sup>Np has great potential as an oceanographic tracer. An isotopic Np spike would provide a reliable normalization method for mass spectrometric <sup>237</sup>Np measurements. Such material has been produced via the <sup>232</sup>Th(<sup>t</sup>Li,3n)<sup>236</sup>Np reaction at the RIKEN Nishina center. The mass spectrometric separation of the co-produced isobars <sup>236</sup>U, <sup>236</sup>Pu presented a challenge for the spike characterization. An approach that combines Accelerator Mass Spectrometry, Anion Formation Isobar Analysis and the first non-chemical isobar separation in the actinide range using Ion Laser InterAction Mass Spectrometry has been developed to characterize a pilot Np spike.</p> <p>This work was funded by the Austrian Science Fund (FWF): [I4803-N] and a Dimitrov Fellowship of the Austrian Academy of Sciences.</p>                                    |

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| 14:45 | 554 | <p style="text-align: center;"><b>Dark Field MOKE as a laboratory-based characterization tool for complex 3D magnetic nanostructures</b></p> <p style="text-align: center;"><i>Jakub Jurczyk <sup>1</sup>, Naëmi Leo <sup>2</sup>, Miguel Angel Cascales Sandoval <sup>1</sup>, Amalio Fernández-Pacheco <sup>1</sup></i><br/> <sup>1</sup> <i>Institute of Applied Physics, TU Wien, Austria,</i><br/> <sup>2</sup> <i>Department of Physics, School of Science, University of Loughborough, United Kingdom</i></p> <p>The dark field magneto-optical Kerr effect (DF-MOKE) utilizes a laser beam to characterize magnetic properties of 3D nanostructures and so far has been used to investigate nanostructures with one reflection plane only. However, the development of 3D nano-printing methods, like focused electron beam induced deposition (FEBID) and two-photon lithography (TPL), introduce a need for a reliable method of magnetic characterization of structures with multiple reflection planes. Here we discuss possibilities and limitations of DF-MOKE for this purpose, by presenting the measurements of a simplified system containing single nanostructures as well as arrays of them to provide multiple reflection planes.</p> <p>EC Horizon 2020 Program, Contract No. 101001290 (3DNANOMAG).</p>   |
| 15:00 | 555 | <p style="text-align: center;"><b>Ultrashort Picosecond Ion Pulse Generation by Laser-Stimulated Desorption</b></p> <p style="text-align: center;"><i>Alexander Redl, Markus Goldberger, Richard A. Wilhelm</i><br/> <i>TU Wien, Institute of Applied Physics, Vienna, Austria</i></p> <p>Our novel laser-stimulated desorption technique enables generation of tunable picosecond ion pulses using an electrochemically etched tungsten nanotip (~150 nm tip radius), irradiated by a pulsed femtosecond 259 nm ultraviolet laser. Ion pulses are produced as the laser ionizes adsorbates on the tip, yielding time-of-flight pulse widths (FWHM) below 100 ps at ion kinetic energies of 8.5 keV. Operating in an ultrahigh vacuum chamber with minimal laser energy (~15 nJ/pulse), our setup enables generation of various elemental ions. The built-in synchronization between ion and optical pulses allows precise pump-probe experiments to investigate ion-solid interactions, including the study of surface dynamics or defect formation. This flexible, compact approach significantly advances capabilities in ultrafast materials science, surface analysis, and simulation validation.</p>   |
| 15:15 | 556 | <p style="text-align: center;"><b>Femtosecond two-photon-absorption laser-induced-fluorescence in fusion-relevant hydrogen plasmas</b></p> <p style="text-align: center;"><i>Michael Goddijn <sup>1</sup>, Marcelo Baquero-Ruiz <sup>1</sup>, Michele Puppin <sup>2</sup>, Simon Vincent <sup>1</sup>, Yanis Andrebe <sup>1</sup>, Arnaud Clément <sup>1</sup>, Fabrizio Carbone <sup>2</sup>, Ivo Furno <sup>1</sup></i><br/> <sup>1</sup> <i>EPFL, Swiss Plasma Center (SPC), Lausanne, Switzerland,</i><br/> <sup>2</sup> <i>EPFL, Lausanne Centre for Ultrafast Science (LACUS), Lausanne, Switzerland</i></p> <p>Two-photon-Absorption Laser-Induced Fluorescence (TALIF) is an established diagnostic for measuring neutral densities in low-temperature plasmas. We study the feasibility of femtosecond-pulsed TALIF in fusion-relevant plasmas, which could enable fast density measurements of atomic hydrogen (H) and its isotopes.</p> <p>For this purpose, we develop a laser system that consists of a fs-pulsed laser and a fourth-harmonic generator. The system generates stable high-energy deep-UV pulses. The large bandwidth of the fs pulses allows us to excite the complete H population without scanning of the laser wavelength.</p> <p>We perform fs-TALIF measurements in a krypton gas, which characterises the fluorescence and which will be used for calibration purposes. We perform initial fluorescence observations in steady-state H plasmas in the RAID linear device.</p> |
| 15:30 |     | <b>Coffee Break</b>  |

| Time  | ID  | <p style="text-align: center;"><b>APPLIED PHYSICS II</b><br/><i>Chair: Fabio Avino, EPF Lausanne</i></p>   |
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| 16:00 | 561 | <p style="text-align: center;"><b>Nanoscaled Spin-Wave Frequency Selective Limiter (FSL) and Delay Line for 5G Technology</b></p> <p style="text-align: center;"><i>Kristýna Davidková<sup>1</sup>, Khrystyna Levchenko<sup>1</sup>, Florian Bruckner<sup>1</sup>, Roman Verba<sup>2</sup>, Rostyslav Serha<sup>1</sup>, Fabian Majcen<sup>1</sup>, Qi Wang<sup>3</sup>, Morris Lindner<sup>4</sup>, Carsten Dubs<sup>4</sup>, Vincent Vlaminc<sup>5</sup>, Jan Klíma<sup>6</sup>, Michal Urbánek<sup>6</sup>, Dieter Suess<sup>1</sup>, Andrii Chumak<sup>1</sup></i></p> <p style="text-align: center;"><sup>1</sup> University of Vienna, Faculty of Physics, Boltzmannngasse 5, Vienna, Austria,<br/> <sup>2</sup> V. G. Baryakhtar Institute of Magnetism of the NAS of Ukraine, Kyiv, Ukraine,<br/> <sup>3</sup> School of Physics, Huazhong University of Science and Technology, Luoyu Road 1037, Wuhan, China,<br/> <sup>4</sup> INNOVENT e. V. Technologieentwicklung, Prussingstrase 27 B, Jena, Germany,<br/> <sup>5</sup> IMT Atlantique, Lab-STICC—UMR 6285 CNRS, Technopole Brest-Iroise CS83818, Brest, France,<br/> <sup>6</sup> CEITEC BUT, Brno University of Technology, Purkyňova 123, Brno, Czech Republic</p> <p>The ongoing demand for faster 5G communication systems requires RF devices to operate at higher frequencies, specifically 24.25 – 27.5 GHz. However, conventional RF components, such as power limiters, filters, and delay lines, face challenges due to increased noise, switching delays, and enhanced damping. Spin-wave-based devices offer a promising alternative, maintaining high efficiency at GHz frequencies, although they have predominantly been studied at the macroscale. We demonstrate a proof of concept for a nanoscale frequency-selective limiter and delay line based on spin-wave transmission in a 97-nm-thin YIG film. Spin waves are excited and detected using 250 nm-wide transducers. Devices are tested up to 25 GHz for two spin-wave modes, with key parameters such as power threshold, delay time, and insertion losses extracted.</p> |
| 16:15 | 562 | <p style="text-align: center;"><b>Novel InAs/AlSb interband detectors</b></p> <p style="text-align: center;"><i>Stefania Isceri, Andreas Windischhofer, Miriam Giparakis, Rolf Szedlak, Werner Schrenk, Gottfried Strasser, Benedikt Schwarz, Aaron Maxwell Andrews</i><br/>TU Wien, Vienna, Austria</p> <p>Quantum cascade detectors are room-temperature photovoltaic infrared devices based on inter-subband transitions. We designed and grew four different InAs/AlSb QCDs on GaSb substrates and utilized the interband transitions to realize a short-wavelength infrared detector. Operating between 1.7 and 2.7 <math>\mu\text{m}</math>. We calculated the QCD absorption with applied electric fields between -16 – 16 kV/cm, including both the out-of-plane and in-plane contributions. By applying an electric field, the absorption peaks shift to different energies and the intensity increases. The room-temperature peak responsivities of the IB transitions was measured as a function of a bias voltage. At zero bias they are 2.8 – 24.8 mA/W for different designs and increase up to two orders of magnitude in the considered bias voltage range.</p>  |
| 16:30 | 563 | <p style="text-align: center;"><b>Wavefront correction over large fields of view via cone tomography</b></p> <p style="text-align: center;"><i>Juan David Munoz Bolanos, Johannes Locher, Maria Borozdova, Kibum Nam, Simon Moser, Monika Ritsch-Marte, Alexander Jesacher</i><br/>Medical University of Innsbruck, Innsbruck, Austria</p> <p>Imaging objects in scattering media requires the correction of complex wave distortions. Adaptive optics and wavefront shaping can correct these distortions, but aberrations are rarely isoplanatic and vary spatially over the field of view. We propose a tomographic approach to reconstruct a scatterer's local refractive index distribution, allowing the calculation of aberration maps for larger fields of view. Wavefront measurements guide the approach at test points around the target area. We demonstrate the ability of our tomographic approach to provide spatial aberration maps through numerical simulations and proof-of-concept experiments.</p>  |

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| 16:45 | 564 | <p style="text-align: center;"><b>Towards Monte Carlo based Full Spectrum Modeling of Airborne Gamma-Ray Spectrometry Systems</b></p> <p style="text-align: center;"><i>David Breitenmoser, PSI Villigen</i></p> <p>Airborne gamma-ray spectrometry (AGRS) enables rapid identification and quantification of anthropogenic radionuclides over large areas, serving as an essential tool in emergency response to nuclear accidents and nuclear weapon detonations. This work presents a full spectrum modeling approach that overcomes critical limitations in AGRS calibration and data evaluation for emergency scenarios. The methodology integrates high-fidelity Monte Carlo simulations within a Bayesian inversion framework and has been extensively validated under laboratory and field conditions. It enables accurate quantification of any gamma-ray-emitting radionuclide, significantly expanding the detection capabilities and operational scope of AGRS systems worldwide.</p>  |
| 17:15 | 565 | <p style="text-align: center;"><b>ILIAMS-assisted accelerator mass spectrometry measurements of long-lived radionuclides produced in nuclear fusion environment</b></p> <p style="text-align: center;"><i>Carlos Vivo-Vilches<sup>1</sup>, Esad Hrnjic<sup>1</sup>, Martin Martschini<sup>1</sup>, Lee W. Packer<sup>2</sup>, Silke Merchel<sup>1</sup>, Johannes H. Sterba<sup>3</sup>, Karin Hain<sup>1</sup>, Robin Golser<sup>1</sup></i></p> <p style="text-align: center;"><sup>1</sup> University of Vienna, Faculty of Physics, Isotope Physics, Vienna, Austria,<br/><sup>2</sup> UKAEA, Culham Campus, Abingdon, United Kingdom,<br/><sup>3</sup> Center for Labelling and Isotope Production, TRIGA Center Atominstitut, TU Wien, Austria</p> <p>To reliably assess the radionuclide inventories of future nuclear fusion reactors, different materials were irradiated in the Joint European Torus. The activities of long-lived radionuclides are too low for radiometric techniques.</p> <p>At the Vienna Environmental Research Accelerator (VERA), the potential of accelerator mass spectrometry for the detection of <sup>91</sup>Nb, <sup>94</sup>Nb and <sup>93</sup>Mo is investigated. Their measurement requires the use of VERA's Ion-Laser InterAction Mass Spectrometry (ILIAMS) setup for laser photodetachment to suppress their stable isobars.</p> <p>For <sup>91</sup>Nb and <sup>94</sup>Nb, <sup>91</sup>Zr and <sup>94</sup>Zr are suppressed just by collisions with the He buffer gas. This suppression is enhanced by photons from a 355 nm laser, which also suppress <sup>94</sup>Mo. For <sup>93</sup>Mo, isobaric <sup>92</sup>Nb is suppressed by photons from a 637 nm laser.</p> |
| 17:30 | 566 | <p style="text-align: center;"><b>Impact of divertor leg length on plasma-wall interaction in the TCV boundary plasma using self-consistent, global turbulence simulations</b></p> <p style="text-align: center;"><i>Sergio Garcia Herreros, Christian Theiler, Paolo Ricci, EPFL - SPC, Lausanne, Switzerland</i></p> <p>Different experimental campaigns at the TCV tokamak have focused on studying the impact of magnetic geometry on the power exhaust at the divertor region, showing a weak dependence on the poloidal leg length of the geometry. In order to achieve a deeper understanding of the role of turbulence when changing magnetic geometry, we perform different simulations of the TCV plasma changing the leg length of the magnetic configuration. This is done by means of GBS, a self-consistent 3D plasma turbulence code developed at the Swiss Plasma Center (SPC).</p>  |
| 17:45 | 567 | <p style="text-align: center;"><b>Design of a Fast Reciprocating Diagnostic to Characterize the Boundary Plasma in the Tokamak à Configuration Variable</b></p> <p style="text-align: center;"><i>Alysée Khan, Olivier Février, Christian Theiler, Hammam Elaijan, TCV Team</i><br/><sup>1</sup> Ecole Polytechnique Fédérale de Lausanne, Switzerland</p> <p>Tokamaks are promising devices for achieving fusion energy, yet they involve complex plasma physics in the boundary of the confined plasma, where strong turbulent transport and plasma flows set heat and particle loads on the first wall. To establish, benchmark, and refine models describing these mechanisms, in-situ measurements of plasma parameters are essential. At the Swiss Plasma Center, the Fast Reciprocating Diagnostic (FReDi) is being developed for the Tokamak à Configuration Variable to measure boundary profiles of ion and electron temperatures, density, electric fields, and plasma flows using a flexible Langmuir probe array, Mach probes and Retarding Field Analyzers. In this talk, we detail the design of the diagnostic head to investigate the aforementioned processes under stringent environmental conditions.</p>  |

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| <b>18:00</b> | <b>568</b> | <p align="center"><b>Trajectoids: Rolling stones downhill.</b></p> <p align="center"><i>Jean-Pierre Eckmann, University of Geneva, Switzerland</i></p> <p>A cylinder will always roll downhill along a straight line. The question we ask: Given any curve, can one construct an object which will roll along that given curve? The answer is "for almost all curves it is possible". I will explain how one constructs (and 3d-prints) such objects, and, if time permits, what are the theoretical challenges.<br/>This talk is based on work, published in Nature, Notices AMS, and PRL.</p> |
| <b>18:15</b> |            | <b>END</b>  |
|              |            | <p><b>Transfer to ÖAW</b><br/><i>Doktor-Ignaz-Seipel-Platz 2, 1010 Wien</i></p>   |
| <b>19:00</b> |            | <b>Public Lecture</b>   |

| <b>ID</b>  |   | <b>APPLIED PHYSICS POSTER</b> |
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| <b>581</b> | <p align="center"><b>Influence of impurity injection location on a tokamak plasma performance</b></p> <p align="center"><i>Riccardo Morgan, Christian Theiler, Olivier Février</i><br/><i>École Polytechnique Fédérale de Lausanne, Swiss Plasma Center (SPC), Switzerland</i></p> <p>In tokamaks, intense heat fluxes strike localized areas of the reactor walls, risking damage and plasma contamination through erosion. Future reactors must therefore operate in a detached regime, where heat loads and plasma temperatures near the walls are greatly reduced. This can be achieved by seeding impurity gases, which promote radiative cooling in the boundary plasma. However, minimizing impurity penetration into the core plasma is critical. Nitrogen seeding experiments on TCV reveal that the choice of injection location strongly influences core contamination: seeding in the private flux region best preserves core purity, while still yielding optimal detachment access, which appears independent of the injection site. These results highlight the potential to optimize seeding strategies for future devices.</p>   |                               |
| <b>582</b> | <p align="center"><b>Interpretation of Neutral Pressure Measurements and Design of a Novel Pressure Diagnostic Array for the TCV Tokamak through Monte Carlo Modelling with MolFlow</b></p> <p align="center"><i>Benjamin Brown, Olivier Février, Holger Reimerdes, Christian Theiler, Hammam Elaïan, Marcello Baquero, Elena Tonello</i><br/><i>Swiss Plasma Center, EPFL, Lausanne, Switzerland</i></p> <p>Neutral particles interacting with the plasma in the scrape-off-layer of tokamaks play an important role for plasma fueling and heat load mitigation. On the Tokamak à Configuration Variable (TCV), neutral pressure is inferred using Baratron Pressure Gauges (BPGs) and ASDEX type Pressure Gauges (APGs). These gauges are cross calibrated, in vacuum, with ambient temperature gas injection; however, significant discrepancies emerge during plasma discharges. Monte Carlo based free molecular flow simulations of the tokamak using the software MolFlow identified sources of transient and steady-state disagreement between the APGs and BPGs, in line with observed trends. The findings were further used to inform the design of novel APG array to be installed in 2026 with the Tightly-Baffled Long-Legged Divertor Upgrade on TCV.</p> |                               |
| <b>583</b> | <p align="center"><b>Design of 3D Printed Tips for Advanced Magnetic Force Microscopy</b></p> <p align="center"><i>Dominik Schramm <sup>1</sup>, Jakub Jurczyk <sup>1</sup>, Sabri Koraltan <sup>1</sup>, Claas Abert <sup>2</sup>, Amalio Fernández-Pacheco <sup>1</sup></i><br/><i><sup>1</sup> TU Wien, Austria, <sup>2</sup> University of Vienna, Austria</i></p> <p>With the advancement in 3D nanofabrication techniques such as Focused Electron Beam Induced Deposition (FEBID), manufacturing of complex magnetic nanostructures emanating more complex stray fields becomes feasible. To quantify these fields, the development of a modified Vector- Magnetic Force Microscope (MFM), resolving all three spatial components of the stray field while still maintaining industrial feasibility, is targeted.<br/>To design an optimized MFM tip, highly sophisticated micromagnetic simulation frameworks (NeuralMag, magnum.pl) are leveraged to simulate an MFM signal. The simulator allows us to study for the first time the impact of tip geometry, inclination angle, magnetic state as well as additional oscillatory modes on the output.</p>  |                               |

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| 584 | <p style="text-align: center;"><b>Action Spectroscopy of He-Tagged, Anionic Coinage Metal Clusters</b></p> <p style="text-align: center;"><i>Martin Schmidt<sup>1</sup>, Johannes Reichegger<sup>1</sup>, Anna Maria Reider<sup>1</sup>, Paul Scheier<sup>1</sup>, Olga Lushchikova<sup>2</sup></i><br/> <sup>1</sup> University of Innsbruck, Austria, <sup>2</sup> Kyushu University, Fukuoka, Japan</p> <p>The production and spectroscopic investigation of anionic clusters is challenging due to their instability. By utilizing superfluid helium nanodroplets (HNDs), we successfully produced and stabilized small anionic silver and gold clusters (<math>\text{Ag}_{1-9}^-</math>, <math>\text{Au}_{1-9}^-</math>) in sufficient quantity for He-tagged VIS spectroscopy. HNDs are formed via supersonic expansion of precooled helium (~10 K) and cool further to 0.37 K by evaporative cooling. Subsequent electron impact creates multiply charged HNDs capable of picking up volatile dopants. Cluster formation and Penning ionization occur at the charge centers within the HNDs, while excess energy is dissipated through helium evaporation. Upon collision with a stainless-steel surface, the doped HNDs splash, releasing singly negatively charged, helium-tagged, low-temperature dopant clusters for spectroscopic analysis.</p> |
| 585 | <p style="text-align: center;"><b>Development of a quasi-optical high-magnetic-field millimeter-wave spectrometer</b></p> <p style="text-align: center;"><i>Levente Hegyessy, Bence Szász, Dávid Szaller</i><br/> Budapest University of Technology and Economics, Budapest, Hungary</p> <p>Electron spin resonance (ESR) in magnetically ordered systems typically occurs in the millimeter-wave range under standard laboratory magnetic fields. Here, we present a newly developed quasi-optical millimeter-wave spectrometer at the Budapest University of Technology. The instrument offers continuous frequency coverage from 50 to 250 GHz and supports both transmission and reflection experimental geometries. It operates without cryogenics over a broad temperature range of 10 – 300 K and in magnetic fields up to 9 T. This versatile setup provides a powerful tool for investigating previously inaccessible optical phenomena related to low-frequency magnetic and magnetoelectric resonances.</p>  |
| 586 | <p style="text-align: center;"><b>Updates on CREScent:<br/>High-Precision Electron Spectroscopy using Cyclotron Radiation Emissions</b></p> <p style="text-align: center;"><i>Alberto Jose Saavedra Garcia, Hartmut Abele, Irina Pradler, Johannes Schilberg</i><br/> Atominstytut - TU Wien, Vienna, Austria</p> <p>High-precision measurements of angular correlations in neutron beta decay address a number of questions which are at the forefront of particle physics. For a new generation of beta decay experiments, like the PERC (Proton Electron Decay Channel) experiment currently under construction in Munich, frequency-based beta spectroscopy methods using the cyclotron radiation emitted by electrons in a homogeneous magnetic field have been emerging as new approaches for high-precision beta spectroscopy. The CREScent experiment is a proof-of-principle experiment aiming to combine the CRES (Cyclotron Radiation Emission Spectroscopy)-technique with the signal amplification qualities of a RF cavity, naturally compensating for the extremely weak signal power of the expected cyclotron radiation pulses.</p>  |
| 587 | <p style="text-align: center;"><b>Upgrade of the proton induced x-ray emission setup<br/>at the Vienna Environmental Research Accelerator (VERA)</b></p> <p style="text-align: center;"><i>Leopold Unterweger, Michael Pavlenko, Karin Hain, Martin Martschini, Robin Golser</i><br/> University of Vienna, Faculty of Physics – Isotope Physics, VERA Laboratory, Wien, Austria</p> <p>Proton Induced X-ray Emission (PIXE) is a non-destructive, multi-elemental analysis technique especially for light elements. This project extends the PIXE setup at VERA for thick sample analysis, such as air filters, by installing two new silicon drift detectors (SDDs). The new instrumentation has been characterized in terms of efficiency, resolution, solid angle, sensitivity and geometry dependent x-ray transmission. In addition, two beam normalization methods are being developed for quantitative analysis: using either Si x-rays from a <math>\text{Si}_3\text{N}_4</math> window or Ar x-rays excited in ambient air. Since Ar can interfere with key elemental peaks (S, K, Cl), a He atmosphere is introduced to suppress Ar emission and whereby, simultaneously x-ray transmission is enhanced by factor <math>(16.7 \pm 0.2)</math> for Si K<math>\alpha</math>.</p>   |