

Newsletter Physics 03/23

Department News Research Highlights Events New colleagues



News from the Department

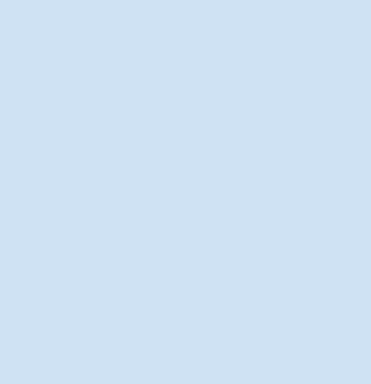


Interview with Georg Otto

In our series of interviews with key people in our department, Josefine Neuhaus met with Georg Otto, who is responsible for the preparation of experimental lectures. Read about how he came to this job, about his famous physics shows and why he thinks that rock-paper-scissors describes well our department.

In unserer Reihe von Interviews mit Schlüsselpersonen unseres Fachbereichs hat Josefine Neuhaus Georg Otto getroffen, der für die Vorbereitung von Experimentalvorlesungen zuständig ist. Lesen Sie, wie er zu diesem Job gekommen ist, über seine berühmte Physik-Show und warum er findet, dass Stein-Papier-Schere unseren Fachbereich gut beschreibt.

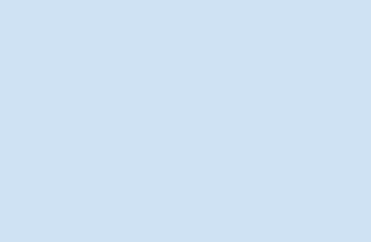
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Tag der Physik, 6 May, 11am - 6pm, Renthof

The PR team organizes a Day of Physics on May 6 in Renthof. The goal is to offer an exciting day for all physics interested people in Marburg and the surroundings. The day is meant to be an advertisement for our department, but it is also an event for all employees and students within the department. We will offer an exciting program for the whole family - from a physics show full of fascinating effects to an interactive experiment street and a science slam in the afternoon. There will also be food from the grill and drinks, so you can spend the whole afternoon with your family at the department.

Die Werbegruppe organisiert einen Tag der Physik, der am 6. Mai im Renthof stattfinden wird. Das Ziel ist es einen spannenden Erlebnisstag für alle Physik-Interessierten in Marburg und der Umgebung anzubieten. Der Tag soll Werbung für unseren Fachbereich sein, aber er richtet sich auch intern an alle Mitarbeiter/innen und Student/innen innerhalb des Fachbereichs. Wir werden ein spannendes Programm für die ganze Familie anbieten - von einer Physikshow voller faszinierender Effekte über eine interaktive Experimentierstrasse hin zu einem Science Slam am Nachmittag. Es wird auch Essen vom Grill und Getränke angeboten, so dass man den ganzen Nachmittag mit der Familie am Fachbereich verbringen kann.



Science Slam workshop, 3 April, Renthof

Take your thoughts in new directions and bring your science to a wider audience. In science slams, the aim is to present research to a non-expert audience in an entertaining way. On April 3, there will be a workshop on the topic "Science slam". Janina Otto will give inputs to the format and the rules of science slams, and we will practice tools like storytelling and visual design (janinaexplainsitall.de).

You will have the opportunity to try out the skills you learned on May 6, as there will be a science slam at Tag der Physik at our department. Please note that the workshop will be in German. You can register to this free workshop below. If you would like to participate in the science slam (even possible without the workshop) write a mail to josefine.neuhaus@physik.uni-marburg.de.

Bring Deine Gedanken in neue Richtungen und mach Deine Wissenschaft einem breiteren Publikum zugänglich. Bei Science Slams geht es darum, einem nicht fachkundigen Publikum auf unterhaltsame Art und Weise Forschungsergebnisse zu präsentieren. Am 3. April findet ein Workshop zum Thema "Science Slam" statt. Janina Otto wird Inputs zum Format und den Regeln von Science Slams geben, und wir werden Tools wie Storytelling und visuelle Gestaltung üben (janinaexplainsitall.de).

Am 6. Mai habt ihr die Möglichkeit, das Gelernte auszuprobieren, denn dann findet am Tag der Physik ein Science Slam an unserer Fakultät statt. Der Workshop findet in deutscher Sprache statt. Du kannst dich unter "register" zu diesem kostenlosen Workshop anmelden. Wenn Du am Science Slam teilnehmen möchtest (auch ohne Workshop möglich), schreib eine Mail an josefine.neuhaus@physik.uni-marburg.de.

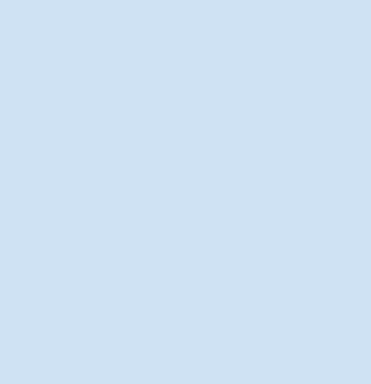
[Register](#)



Andreas Schrimpf as new dean of studies

Starting from April 2023, Andreas Schrimpf will be our new Dean of Studies. "Having more than 20 years of experience in counseling of students and in exam regulations' conform planning of the lecture schedule, I am sure I can achieve a quick familiarization with the new function", Andreas Schrimpf noted. Many thanks to Heinz Jänsch for his invaluable commitment to this task in the last years!

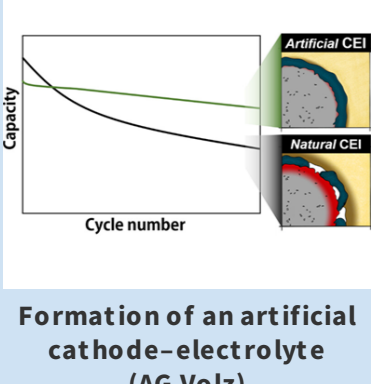
Ab April 2023 wird Andreas Schrimpf das Amt des Studiendekans übernehmen. "Mit mehr als 20 Jahren Erfahrung in der Beratung von Studierenden und in der prüfungsordnungs-konformen Planung des Vorlesungsverlaufs bin ich sicher, dass ich mich schnell in die neue Aufgabe einarbeiten kann", so Andreas Schrimpf. Vielen Dank an Heinz Jänsch für sein unschätzbare Engagement in den letzten Jahren!



Prof. Markus Raschke visiting Marburg

Prof. Markus Raschke from the University of Colorado at Boulder is visiting Marburg in March and April 2023. He will collaborate with the group of Prof. Ulrich Höfer and other researchers of SFB 1083 on spatio-temporal investigations of 2D materials. He has pioneered the development of nano-scale nonlinear and ultrafast techniques for the spectroscopy of surfaces and nanostructures and is among the world wide leading researchers successfully combining nanometer spatial and femtosecond temporal resolution. He received his PhD in 2000 from the TU Munich for work conducted at the Max-Planck Institute of Quantum Optics in Garching. Since 2010 he is working at the University of Colorado at Boulder where he holds professorships at the Department of Physics, Chemistry, and at JILA.

Prof. Markus Raschke von der University of Colorado at Boulder ist im März und April 2023 zu Gast in Marburg. Er wird mit der Gruppe von Prof. Ulrich Höfer und anderen Forschern des SFB 1083 an raum-zeitlichen Untersuchungen von 2D-Materialien zusammenarbeiten. Er hat Pionierarbeit bei der Entwicklung von nichtlinearen und ultraschnellen Techniken für die Spektroskopie von Oberflächen und Nanostrukturen im Nanobereich geleistet und gehört zu den weltweit führenden Forschern, die erfolgreich räumliche Auflösung im Nanometerbereich mit zeitlicher Auflösung im Femtosekundenbereich kombinieren. Er promovierte im Jahr 2000 an der TU München mit einer Arbeit am Max-Planck-Institut für Quantenoptik in Garching. Seit 2010 ist er an der University of Colorado in Boulder tätig, wo eine Professuren am Fachbereich Physik, Chemie und am JILA innehat.

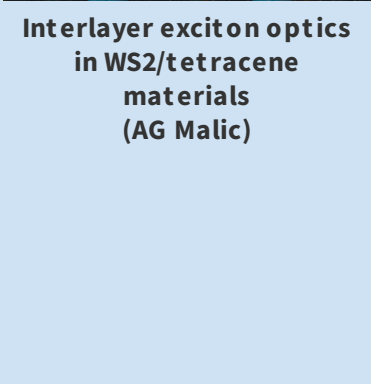


Lukas Wagner as the new sustainability manager

Lukas Wagner is the new "sustainability appointee" at the physics department. You are cordially invited to get in touch with him for matters concerning sustainability at the department. In the summer semester (tuesdays 4-6pm), there will be an exciting lecture series on sustainability.

Lukas Wagner ist der neue "Nachhaltigkeitsbeauftragte" am Fachbereich Physik. Sie sind herzlich eingeladen, sich mit ihm in Verbindung zu setzen, wenn es um Nachhaltigkeit am Fachbereich geht. Im Sommersemester wird es dienstags von 16:00-18:00 Uhr eine spannende Vortragsreihe zum Thema Nachhaltigkeit geben.

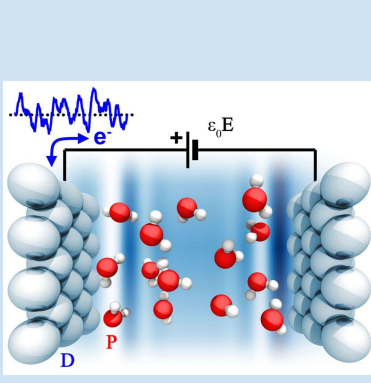
Research Highlights



Formation of an artificial cathode-electrolyte (AG Volz)

All solid-state batteries are promising candidates to circumvent some of the problems, we currently face with batteries having a liquid electrolyte, e.g. the flammation hazard. In this class of material systems, sulfide-based electrolytes and Ni-rich cathode materials are considered as promising materials for high-performance. However, their poor chemical compatibility causes stability issues and fast capacity fading, particularly at high potentials. Here, AG Volz in collaboration with Jürgen Janek (University Giessen) propose a coating concept inspired by the natural cathode-electrolyte interphase (CEI) formation to overcome the degradation at the solid electrolyte-cathode active material interface. We show the great potential of this coating concept to suppress interfacial degradation in sulfide-based composite cathodes. The work is published in ACS Energy Letters.

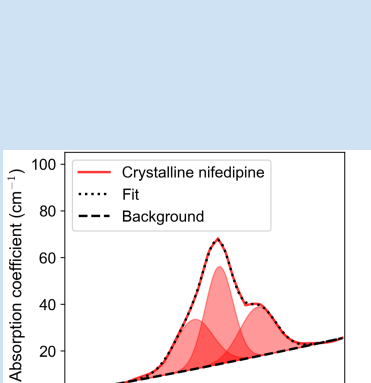
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Interlayer exciton optics in WS2/tetracene materials (AG Matic)

The vertical stacking of two-dimensional materials into heterostructures gives rise to a plethora of intriguing optoelectronic properties and presents an unprecedented potential for technological concepts. While much progress has been made combining different monolayers of transition metal dichalogenides (TMDs), little is known about TMD-based heterostructures including organic layers of molecules. In this joint theory-experiment study, AG Matic together with the group of Libai Huang (Purdue University, USA) demonstrates clear signatures of spatially separated interlayer excitons in low temperature photoluminescence spectra of TMD/tetracene materials. Here, the Coulomb-bound electrons and holes are localized either in the TMD or in the molecule layer, respectively. In particular, we reveal both in theory and experiment that at cryogenic temperatures, signatures of momentum-dark interlayer excitons emerge. Our findings shed light on the microscopic nature of interlayer excitons in TMD/molecule heterostructures and could have important implications for technological applications of these materials. The work is published in Nanoscale.

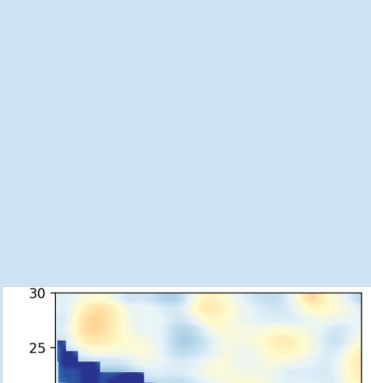
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Dielectric properties of nanoconfined water (AG Wippermann)

Chemical reactions occurring at solid/liquid interfaces are at the heart of sustainable energy conversion and storage technologies. Ab initio techniques have revolutionized the way how theory can help practitioners to explore critical mechanisms and devise new strategies in discovering and designing materials. While this is in many fields already common practice, applying these techniques to electrochemical systems is by far not so progressed. In their study, Florian Deisenbeck and Stefan Wippermann introduce a novel technique to perform ab initio molecular dynamics simulations for electrified interfaces under potential control. The work is published in Journal of Chemical Theory and Computation.

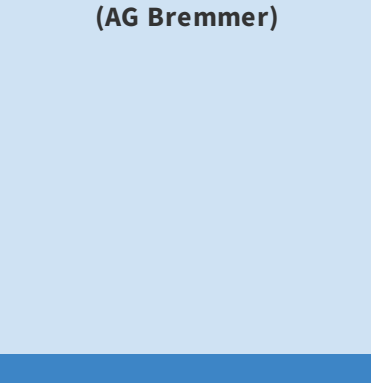
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Crystallization inhibition of pharmaceuticals using terahertz spectroscopy (AG Koch / AG Camus)

Maintaining active pharmaceutical ingredients in an amorphous form is an extensively studied approach in pharmaceutical research to overcome the poor dissolution properties of many drugs. However, the performance of such formulations is often limited by the low physical stability of amorphous drugs which can lead to crystallization and subsequently poor solubility and bioavailability. In this work, AG Koch/Camus investigated nifedipine as a model drug, which serves as a calcium channel blocker and is poorly soluble in water. Nifedipine was loaded into a cellulose-based paper matrix, so called smartFilms, and its crystallinity was investigated using terahertz time-domain spectroscopy. By adding polyvinylpyrrolidone (PVP) as an extra carrier, the capacity of smartFilms to transfer nifedipine into its amorphous state improved. Additionally, the performance of the formulation to inhibit the crystallization of amorphous nifedipine over a period of six months increased. This work was published in the International Journal of Pharmaceutics.

[read more](#)

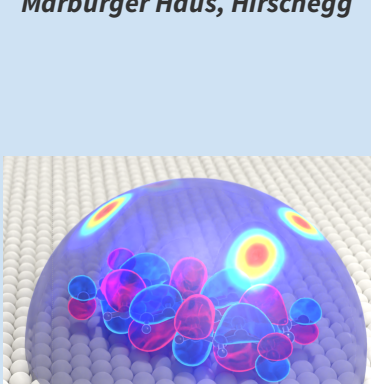


Deep Brain Stimulation in Parkinson's Disease (AG Bremner)

Parkinson's disease (PD) is a neurodegenerative disease characterized predominantly by motor symptoms. While deep brain stimulation (DBS) in the subthalamic nucleus (STN) improves motor functions in PD, it may also increase impulsivity by interfering with the inhibition of reflexive responses. The aim of our study of AG Bremner and collaborators was to investigate if varying the pulse frequency of STN-DBS has a modulating effect on response inhibition and its neural correlates. 14 PD patients repeated an anti-saccade task in three stimulation settings in a randomized order, while eye movements and brain activity via high-density EEG were recorded. Our preliminary findings suggest that mid-frequency STN-DBS may provide beneficial effects on response inhibition (i.e., reduced impulsivity), while both 130 Hz- and 60 Hz STN-DBS may promote voluntary actions at the expense of slower reflexive responses. The work has been published in Neuroimage: Clinical.

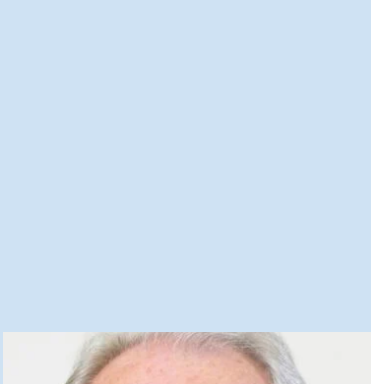
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Events



SFB Winter School 28 February - 3 March Marburger Haus, Hirschegg

SFB1083's Winter School 2023 will be held from 28 February to 3 March at Marburger Haus in Hirschegg, Kleinwalsertal, Austria. The 40 participants come from the five different collaborating institutions, i.e., Philipps-Universität Marburg, Justus-Liebig-Universität Gießen, Forschungszentrum Jülich, Westfälische Wilhelms-Universität Münster and Universität Leipzig. The event is organized by the student speaker for his fellow PhD students, but included also some Master students and young postdoctoral researchers, who followed the invitation. The idea behind the meeting is to pick up everybody, where they are in knowledge and experience and to brighten everyone's horizon.



SFB Workshop "Organic Interfaces and Orbital Tomography" 6. & 7. March Renthof 5

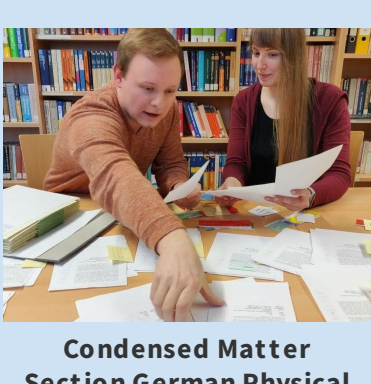
The structure and dynamics of well-defined organic donor/acceptor interfaces, as well as of interfaces between ordered organic layers and single crystal inorganic substrates, play a central role in SFB 1083. Photoemission orbital tomography has unique capabilities to determine the electronic properties of such interfaces at the molecular orbital level. Moreover, its extension to the time-domain allows investigations of transiently excited molecules. The latter development and the demonstration of subcycle time-resolution in angle resolved photoemission form the basis of "Orbital Cinema", a new synergy project funded by the European Research Council (ERC) that aims at coherent driving, actively shaping, and functionalizing orbitals with light waves. SFB 1083 and Orbital Cinema have different scientific scopes, yet they work with similar method systems and rely on related experimental and theoretical methods. The aim of this workshop is to bring scientists of SFB 1083 and Orbital Cinema together in order to discuss common interests and to explore the potential for future collaboration.



Prof. Josef Michl at the SFB 1083 Joint Seminar with Theoretical Chemistry, 17 March, HS C Chemie

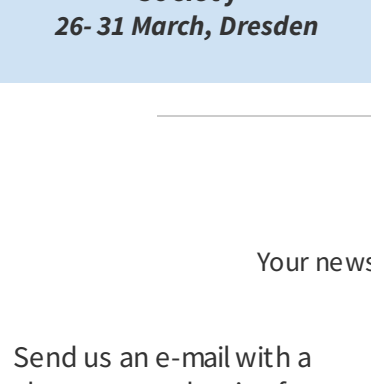
On 17 March, we will welcome Prof. Dr. Josef Michl from the University of Colorado Boulder, USA. In a joined colloquium of the Theoretical Chemistry Department and the CRC 1083, he will talk on porphene, an antiaromatic analog of graphene. Prof. Michl's group works in physical organic chemistry, a combination of synthesis of organic and organometallic compounds with an investigation of their properties by physical, mechanistic, and computational methods. This ranges from photochemical reactions to nanoscience.

[read more](#)



Physik am Samstag 18 March, lecture hall 201, Biegenstr. 12

The lecture series "Physik am Samstagmorgen" has now finished. The lectures were given by several members of our department and have attracted a lot of interested people. We are happy about this success and are looking forward to another round of lectures, starting in fall 2023. Moreover, there will be a "special session" on March 18th. The director of the Mineralogical Museum Marburg, Dr. Sebastian Müller, will give a presentation about "Von edlen Steinen und ihren Farben" starting at 11 am in the lecture hall 201 in Biegenstr. 12.



Condensed Matter Section German Physical Society 26- 31 March, Dresden

The Spring Meeting of Condensed Matter Section of the German Physical Society will take place on 16-31 March in Dresden. With an anticipated number of participants exceeding 4000, it will most likely be the largest physics conference in Europe in 2023. As chair of the DPG Surface Science Division, Ulrich Höfer has been responsible for putting together a large part of the scientific programme for the Dresden conference. The picture shows Alexa Adamkiewicz and Tim Bergmeier from his group sorting 772 oral and poster contributions into 98 scientific sessions.

Share your good news

Your newsletter team: Carina Hlawaty and Ermin Malic

Send us an e-mail with a short text and a nice foto to newsfb13@physik.uni-marburg.de

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