Organic solar cells and OLEDs united: Shining novelty

A fundamental loss mechanism in semiconductors is the emission of light to maintain the thermodynamic balance of the material with its environment, ensuring that “an ideal solar cell is also an ideal light-emitting diode,” says Johannes Benduhn from the Organic Solar Cells (OSOL) group at the Institute of Applied Physics. However, further, non-radiative loss mechanisms are one of the main reasons why organic solar cells are not as efficient as established technologies. The OSOL Group has succeeded in developing combinations of organic semiconductors based on electron acceptor and electron donor heterojunctions that function as both solar cells and LEDs. The results of this research combine for the first time the physical description of organic solar cells and OLEDs.

Ionic Liquids 4.0

Chemists from TU Dresden under Prof. Thomas Straßner, Professor of Physical Organic Chemistry, presented a new class of tunable aryl alkyl ionic liquids (TAAILs). They are the fourth generation of ionic liquids – salts which are liquid at temperatures below 100°C – in which the physical properties can to a large extent be adapted to the technical requirements needed. Ionic liquids consist of organic cations and inorganic or organic anions and are used in a variety of ways, including as solvents or electrolytes. Prof. Straßner and his team have been working on the composition of TAAILs for over 10 years. Now the breakthrough: “For the first time, we were able to synthesize a series of TAAILs with palladium-containing anions”. Many of these metal-containing salts are liquid at room temperature. “The combination of the physical properties of the ionic liquids and the catalytic activity of the palladium components is very promising.”

TUD mathematicians close a gap in crystallography

Dr. Marco Salvalaglio and Prof. Axel Voigt from the Institute of Scientific Computing at TU Dresden have succeeded for the first time in combining the microscopic and macroscopic description of crystal lattice deformations. The study enables the detailed analysis of elasticity effects for macro- and mesoscale systems taking microscopic details into account.

I know how you feel.

Neuroscientists under the direction of Prof. Philipp Kanske demonstrated the importance of distinguishing between empathy and perspective-taking – for research, but also for practical application. This fundamental understanding could become important in developing interventions that counteract mental disorders with altered emotionality, says Prof. Kanske.
EXCELLENT

New priority programme on 2D materials under Prof. Thomas Heine

In a new priority programme of the DFG, Prof. Thomas Heine, Professor of Theoretical Chemistry, will research on „2D Materials - Physics of van der Waals [Hetero]Structures (2DMP)“, starting in 2020. 2D materials are a young class of materials with great potential. 2D crystals (the “miracle material” graphene probably being the best known) are atomically thin compounds, structurally flexible and often have unusual properties. If different 2D crystals are stacked on top of each other, the interactions between the crystal layers - the van der Waals forces - can have a decisive influence on the material, e.g. turning semiconducting individual layers into a metal. The aim of the priority programme is to understand the effects of van der Waals forces on material properties and to discover new physical phenomena. Potential fields of application are, for example, sensors and quantum optics.

Quasi decisive: Emmy Noether junior research group on quasiparticles approved for Dr. Lukas Janssen

At which critical points quantum materials change basic properties, why and how they do so, and how they can be controlled: These are questions that Dr. Lukas Janssen from the Chair of Theoretical Solid State Physics at TU Dresden will be investigating in a recently approved Emmy Noether independent junior research group. By this, Lukas Janssen continues his previous teaching and research activities on phase transitions and magnetic frustration in this prestigious programme of a six-year DFG funding of a group of young researchers. Dr. Janssen's quantum material research focuses on the formation and disappearance of quasiparticles: Microparticle assemblies that behave like single particles in terms of interactions. Janssen wants to investigate their behavior at critical points that cause state changes in a material - and thus find out which quantum mechanical interactions determine the physics of strongly correlated materials such as superconductors or magnetic insulators. The group will start their work on 1.9.2019.

Chemistry off the beaten track: Prof. Michael Ruck awarded the Will-Kleber-Gedenkmünze for efforts in crystallography

The commemorative coin „Will-Kleber-Gedenkmünze“ acknowledges outstanding efforts in crystallography. In 2019, Prof. Michael Ruck was awarded the prize by the German Society for Crystallography (DGK). The association chose the Professor of Inorganic Chemistry due to the many brilliant scientific contributions as well as his “excellent, broad and far-sighted research on synthesis, crystal growth and structure elucidation”. "I was delighted to receive the award. To be honoured as a chemist by the DGK is remarkable,” said Prof. Ruck. "I take this as confirmation of our course to conduct research off the beaten track."

NETWORKED

International exchange in mathematical spaces

The workshop "Ordered Banach spaces, positive operators and applications", sponsored by a German-Russian DFG-RSF project, took place from 27th to 29th March at the Willers-Bau in Dresden. Positive operators on ordered Banach spaces or general ordered vector spaces occur in many applications, for example in transport equations, diffusion equations, in mathematical physics or in dynamic systems. The 20 workshop participants, specialists in the structural theory of ordered vector spaces and positive operators, came from Russia, Poland, the Netherlands, Turkey, Tunisia, India and Germany. Intensive discussions took place between the presentations.
**Seminar**

**Sovereign appearance in male-dominated professional contexts**

Even if you are more competent, career doors would open more difficult for you as a woman? In this seminar you will strengthen your communication skills in order to increase your chances of success in a male-dominated university environment.

**For whom?**

Female postdoctoral researchers at the School of Science

**When?**

Tuesday and Wednesday, 20/21.08.2019, each 9 a.m. to 4.30 p.m.

**Where?**

Seminar room 206A, Andreas-Schubert-Bau, Zellescher Weg 19

If you are interested in participating, please contact Dr. Magdalena Wekenborg by 17.05.2019 - even if you would like to participate but the date does not suit you!

**Mail:** magdalena.wekenborg@tu-dresden.de

**Phone:** +49 351 463-33708

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**Murder investigations on Girls’ Day**

Eleven committed and interested girls of the 8th to 10th grade went on a search for clues at the TU Dresden on 28th March. For the fifth time, employees in the SPP1708 priority programme and in Prof. Ruck’s working group fueled curiosity about chemistry in a varied, informative Girls’ Day entitled “Crime-Lab - Tracing Chemistry”. After an insight into the broad field of chemistry, a tour and safety instruction, the schoolgirls were ready for protective goggles and smocks: With the help of chemistry, they had to solve a murder and identify the perpetrator. Under the guidance of Mai Lê Anh, Hagen Poddig, Matthias Grasser, Maximilian Knies and Tobias Pietsch, the schoolgirls completed three stations where they evaluated “secured” traces - armed with knowledge of chromatography, heavy metal ion analysis, luminescence and alloys. They learned that chemistry, unlike in well-known crime series, not only requires a lot of patience and perseverance, but can also provide fascinating insights into nature and everyday processes.

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**Networked: Workshop on configuration management system Ansible**

Ansible is a tool for configuring, administering and combining computers and services. In a workshop on 21 March, the configuration management system was presented at the School of Science - as was the SDM (Simple Deploy and Management) framework, which was developed by Martin Pietsch, IT administrator of the Faculty of Mathematics, as part of his diploma thesis and is to be used in the future for the administration of IT infrastructures at the School. The workshop was organized on the initiative of the School's CIO Prof. Oliver Sander and Martin Pietsch through the Dresden Ansible Community, which consists of members of local IT companies and the TU Dresden. 50 participants followed the invitation addressed to community members, but also to all members of the IT administrations and software development from the Dresden Concept partners and the City of Dresden.

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**7th Data Salon: Safe ways for the care of tomorrow in Saxony**

The Center for Demography and Diversity (CDD) together with the Statistisches Landesamt Sachsen (Statistical state office of Saxony) invited to the data salon on 21.01.2019 under the motto “Safe ways for the care of tomorrow in Saxony”. Between lectures on care statistics, mobility promotion and activation of older hospital patients through architecture and networked care, the care robots Anna Constantia (HTW Dresden), Loomo (TU Dresden) and Pepper (University Hospital Halle) as well as a poster session on care-related projects and studies were available for information and discussions during interactive breaks.