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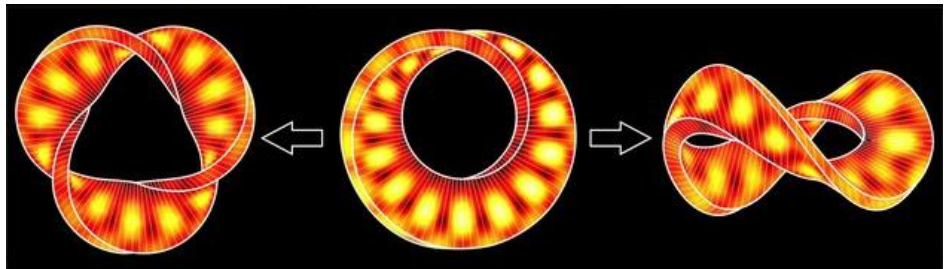
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EXCELLENCE

New Cluster of Excellence ct.qmat: Tailor-Made Materials



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On 27th September, **ct.qmat: Complexity and Topology in Quantum Materials** was approved a Cluster of Excellence. With this, the TU Dresden and the Julius-Maximilians-Universität Würzburg lay the foundation for a globally leading centre for quantum materials research. The cluster spokesperson **Prof. Matthias Voja**, Institute of Theoretical Physics at TU Dresden, beams with pride and joy: „The approval of ct.qmat is an outstanding and extraordinary success for all parties involved. Our work has paid off. The cluster will continue to strengthen solid state physics in Dresden and open up new opportunities for cutting-edge research. Together with our colleagues from Würzburg, we will create the basis for quantum technologies of the future.“ Researchers from the fields of physics, chemistry and materials science will cooperate to understand, control and apply topological states of quantum matter. This class of materials befits an enormous array of potential applications in all advanced technologies — ranging from information processing to energy supply to medical technology. However, before it can be widely utilised, additional fundamental research is necessary.

At the whole, three out of TUD’s six proposed Clusters of Excellence have been approved as part of the Excellence Strategy of the Federal and State Government: PoL under Prof. Stephan Grill (BIOTEC) investigates the physics of life and aims to initiate a paradigm shift: to create understanding of the underlying biological processes of life as complex physical phenomena; at the Center for Tactile Internet „CeTI“ under Prof. Frank Fitzek (Deutsche Telekom Chair of Communication Networks), scientists from the fields of electrical engineering, communication technology, computer science, psychology, neuroscience and medicine aim to expedite the efficient cooperation between man and machine. The press release on the approved Cluster of Excellence ct.qmat can be found [here](#).

RESEARCH

Stormy experiments in TU Dresden’s wind tunnel connect theory and application in maths project

Stefan Siegmund, Professor of Dynamics and Control at the TU Dresden Faculty of Mathematics, has developed a solution to protect against severe storm damage. His invention makes use of the dangerous forces from the air: wind protection tarpaulins that dynamically follow the wind’s movement and distribute it optimally – against the same source that would otherwise simply tear off the roof. The static, constant pressure on the roofs by previous strap and netting systems is too high during windless conditions and too low during strong storms. Prof. Siegmund’s tarpaulins pick up the wind power that threatens to blow off the roof, and direct the forces downwards.

The practical load capacity tests based on theoretical calculations were carried out in the low-speed wind tunnel of TU Dresden. In 2013, a dollhouse covered with tarpaulins was put into the wind tunnel to simulate an artificial mini-storm. In the course of TU Dresden’s annual press conference, the experiment was repeated in August. The detailed article on the maths project and the wind tunnel of TU Dresden can be found [here](#).



Prof. Stefan Siegmund is demonstrating the practical load capacity tests for his tarpaulins at TU Dresden’s wind tunnel. © Claudia Voja

The detailed article on the maths project and the wind tunnel of TU Dresden can be found [here](#).

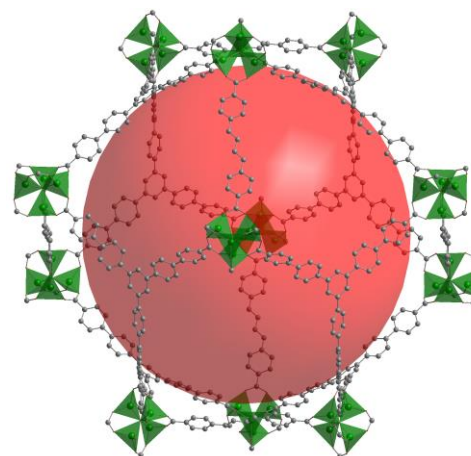
World Record of Cavities.

Chemists of TU Dresden develop highly porous material

Porosity is the key to high-performance materials for energy storage systems, environmental technologies or catalysts. In search of the stability limits of such frameworks, researchers of the TU Dresden around Stefan Kaskel, Professor of Inorganic Chemistry, broke a world record: DUT-60 is a new crystalline framework with the world's highest specific surface and the highest specific pore volume ($5.02 \text{ cm}^3\text{g}^{-1}$) measured so far among all known crystalline framework materials.

90.3% of DUT-60 is free volume. "If you imagine the inner surface of one gram of zeolite as an even, plane area, it would cover about 800 square metres," compares Prof. Kaskel, "graphene would make it up to almost 3,000 square metres. One gram of DUT-60 would attain an area of 7,800 square metres." In that way, the metal-organic framework (MOF) can adsorb huge amounts of gas – e.g. as a gas storage or filter.

The material was developed by computational methods and synthesized subsequently. „Due to its very complicated production, the material is more expensive than gold and diamonds and so far can be only synthesized in small quantities of maximum 50 milligram per batch.“ DUT-60 marks an important step in the investigation of the upper limits of porosity in crystalline porous materials. The complete article can be found [here](#).



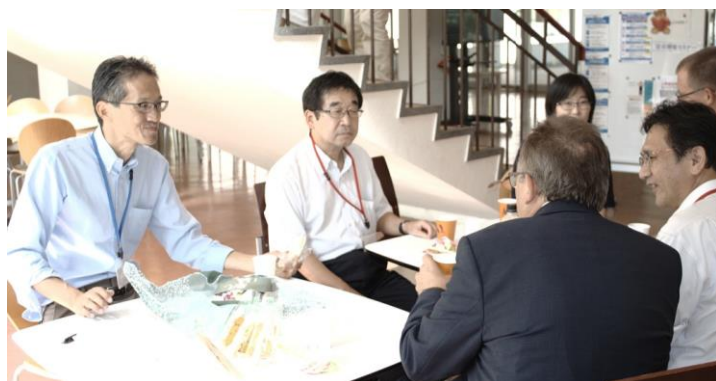
The framework of DUT-60 holds a pore volume of $5.02 \text{ cm}^3\text{g}^{-1}$ – the highest specific pore volume one has ever measured among all crystalline framework materials so far. © Dr. I. Senkovska, TU Dresden

Panic?! What next? TU Dresden offers anxiety prevention programme

At the Institute for Clinical Psychology and Psychotherapy, TU Dresden is starting a DFG-funded study for the prevention of mental disorders. The study aims to investigate if the risk of disease can be decreased for persons with anxiety and panic attacks by prevention programmes. Especially when it comes to anxiety attacks that can lead to high uncertainty and stress in everyday life, it is important to start measurements early. In this prevention programme, participants are to learn a new way of dealing with anxiety and panic for the long-term ability of maturing them within two training sessions. Furthermore, mechanisms underlying the anxiety and panic will be observed: Why are some people's reactions to certain situations more sensitive or expressed stronger in physical manners?

The preventive measure is free; additionally, participants receive a financial expense allowance for the study's diagnostic investigations. The study will run until 2020. Interested people can register and get more information on the website: <http://www.panik-was-nun.de>.

© Luisa Kumpitzsch



NETWORKED

Bridges to the Far East: 2nd Interdisciplinary and Alumni Symposium Japan-Dresden

Around 150 Japanese and Dresden participants from biology, chemistry, mathematics, physics and psychology/educational sciences as well as internationalisation delegates brought developments and ideas from their work together in Japan from 3rd to 7th September: at the interdisciplinary symposium „JaDe2018“. „We took up JaDe 2016 as well as the diverse contacts to Japan in several disciplines that have been established since 2014,“ says project coordinator Maria Richter-Babekoff. „During the past four years, the School of Science generated many joint research projects and pub-

lications, guest lectures, lecturer exchanges and mobility measurements for students and doctoral students together with the Japanese partners. The symposium strengthened existing bonds, intensified Dresden's visibility in Japan and served as a survey over the resilient bonds of cooperations, for a strategic focus of our School's Japan activities.“

Six workshops – five for the scientific disciplines and one for the International Affairs team – were conducted in parallel in the Kansai region's three most important research places: Kobe, Kyoto and Osaka. Young researchers, too, were involved: „The scientific exchange was especially interesting with respect to the research interests of Germany and Japan corresponding widely in our fields, whereas approaches and methods differ,“ says Florian Simon, doctoral student at the Chair of Gesche Pospiech, Didactics of Physics, and at Helmholtz-Zentrum Dresden-Rossendorf: „Thence, the Symposium was of special use to bring up new perspectives for both sides.“ The participation of 20 professors of the School of Science's faculties as well as the material resources were funded by the Alexander von Humboldt Foundation. A ZUK funding from the „Flexible Fund for Internationalisation“ enabled the participation of 20 young researchers from the chairs involved. More information can be found on the symposium's [website](#).

EVENTS

Research and Innovation Programme "Horizon 2020"

In the course of its series of events, „Find your way through the EU jungle: programmes, funding, finances“, the European Project Center is conducting two events:

Wed., 07.11.18, 08:30–12:30 am

Basics Course: Proposal Writing in Horizon 2020 for Newcomers

This workshop addresses professors and scientific staff of all disciplines who want to access new funding possibilities on EU level. It will introduce funding lines and give an introduction into the application process.

Fri., 09.11.18, 08:30–16:00 pm

Advanced Course on Proposal Writing in Horizon 2020

This workshop addresses professors and scientific staff who are planning an application with a consortium and have already had experiences with Horizon 2020. Participants will talk about the Horizon 2020 application for collaborative projects as well as „Dos and Don'ts“. Practical examples will give suggestions and and impulses for the application.

Location:

European Project Center (Nürnberg Str. 31 A), Room 504

Registration is obligatory until **31.10.2018 via E-Mail to epc@tu-dresden.de**.

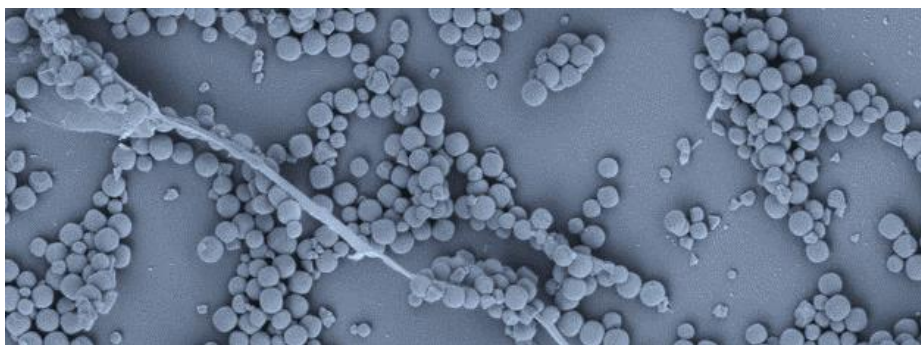
More information on the events can be found [here](#).

International Conference on Particle Physics

Scientists from the Institute of Nuclear and Particle Physics hosted the international conference QCD@LHC from 27th to 31st August. The event brought together experimental and theoretical physicists from all over the world, researching on special aspects of the strong interaction in measurements at the particle accelerator LHC. The range of topics included, amongst others, the latest LHC results on weak and strong quantum chromodynamics, event simulations and Higgs physics.

YOUTH DEVELOPMENT

„Microswimmers“: Lecture series brings together disciplines and international researchers for excellence in teaching



Spermatozoa with iron oxide particles. © Veronika Magdanz and Dagmar Voigt

Connections of research, optimisation of teaching is the ambition of three microswimmers-researchers at the School of Science: **Dr. Juliane Simmchen**, **PD Dr. Benjamin Friedrich** and **Dr. Veronika Magdanz** are highly motivated for the lecture series „Microswimmers“ which they organise jointly. Since 26th September, speakers from all over the world are engaged to create a comprehensive lecture series on microswimmers, ranging from classical model systems to current applications. Microswimmers are objects that actively move on a microscale. In addition to basic research, science aims to make them usable as medical means of transport for drugs or diagnostic tools.

As a stronger interconnectedness is arising at the School of Science, the three researchers themselves are a network-enhancing element of their project: Dr. Simmchen investigates light-propelled movement mechanisms of microswimmers at Physical Chemistry; Dr. Friedrich examines the navigation and synchronisation of biological microswimmers from the physical side; and Dr. Magdanz in Applied Zoology wants to use spermatozoa as a means of transport for the analysis of infertility. Master's degree students can obtain credit points at an accompanying main seminar, doctoral students can take a doctoral viva substitute exam on the subject. The lecture series is open to anyone interested. More information: ["Microswimmers" website](#).

Kickoff: Lecture Series „Bionik“

The lecture „Bionik“ (Bionics) for the FLiK module's upbeat is examining biological structures and biological materials as well as techniques for the analysis of their functional principles. Furthermore, it's investigating the technological imitation of natural models. Various speakers add perspectives from engineering, mathematics, biology and design. An interdisciplinary exchange will make clear possibilities and limits for modelling natural patterns and transferring them into technically usable constructions for machines.

Thursday, 5. DP (14:50-16:20), room HSZ 403, start 11.10.2018



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Publisher: Prof. Clemens Kirschbaum, Chairman for the School of Science. Office hours by prior arrangement: Wednesdays, 9.30 to 10.30 a.m., Tel.: 0351 463 37512.

Editing: Nicole Gierig, Susann Lederer – Public Relations

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