Max-Planck-Institut für biophysikalische Chemie

MPIbpc NEWS

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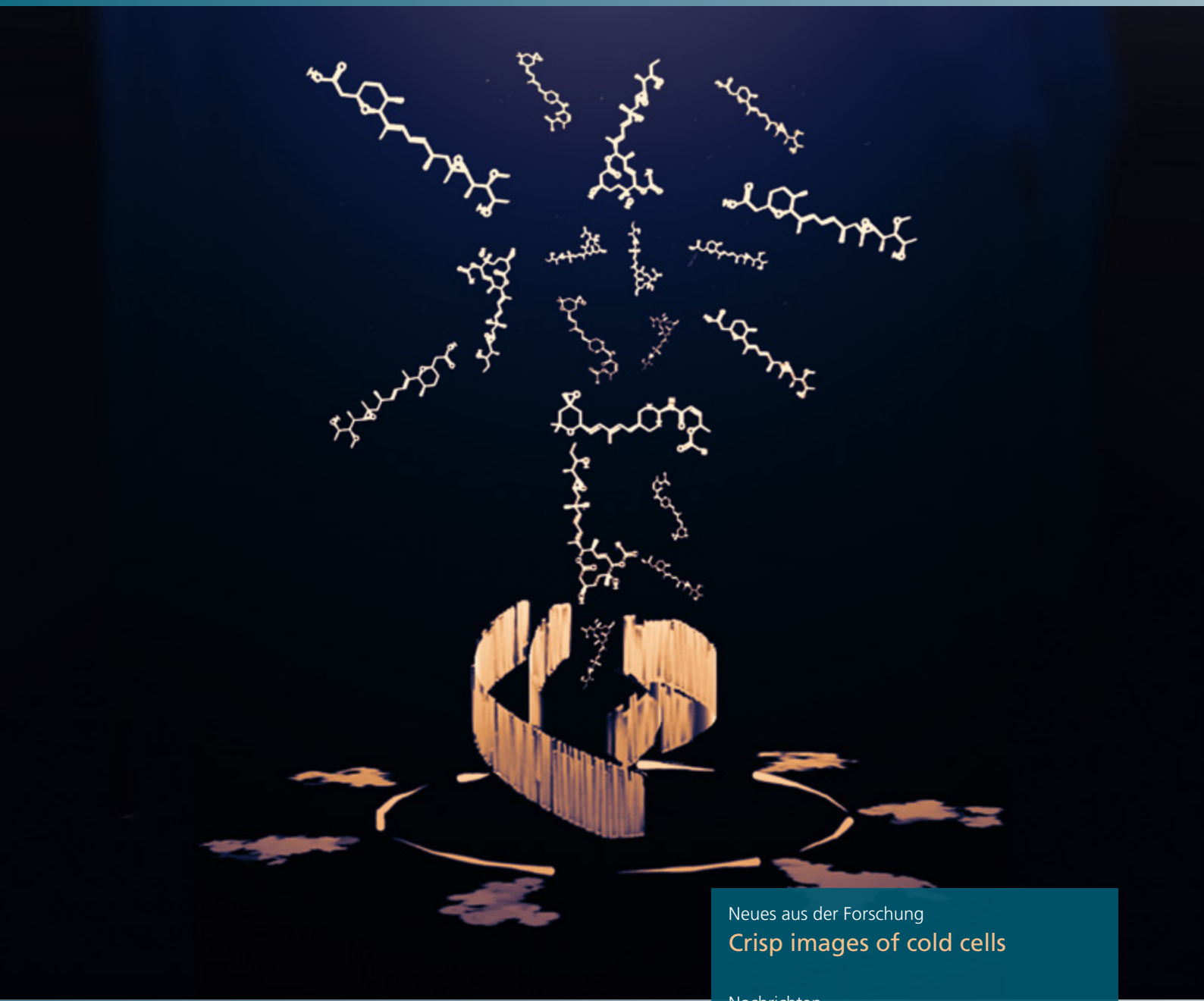

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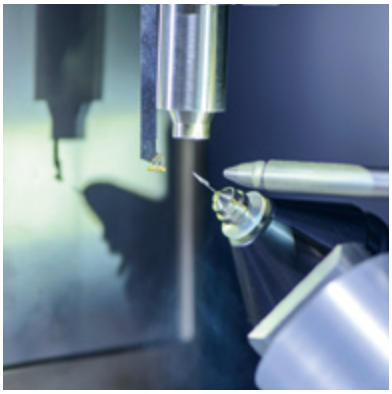
INHALT

18 ***Zelluläre Müllverwertung für die Gesundheit***



25 ***New X-ray home source***

NEUES AUS DEM INSTITUT

MAX-PLANCK-CAMPUS AKTUELL

Hinweis: Obwohl aus Gründen der Lesbarkeit im Text die männliche Form gewählt wurde, beziehen sich die Angaben stets auf Angehörige beider Geschlechter.

«The best X-ray home source available to date»

Solving the structure of proteins remains a challenging task. Starting in December 2017, a state-of-the-art X-ray source was set up at the institute, making it possible to investigate crystals of proteins and protein complexes "at home".

Ashwin Chari, Trevor Huyton, and Ulrich Steuerwald established the new device from Bruker and share the responsibilities as well as the training of users. They talked to us about the X-ray home source and the advantages for researchers at the institute.

What is so special about the new instrument?

Trevor Huyton: The Bruker Metaljet X-ray source generates X-rays with a liquid metal-jet source, which overcomes the brightness limitations of conventional rotating anodes of older devices. It uses liquid gallium as the target of a bright electron gun, which generates X-rays with a wavelength of 1.3 angstrom. Synchrotron-grade optics turn these X-rays into a highly brilliant, semi-parallel X-ray beam of 70 micrometers in diameter. This is basically comparable to second generation synchrotron sources! The crystal is mounted on a Kappa-Goniometer movable in all directions, and the detector used to acquire the diffraction data has almost zero background and is the largest single X-ray detector on the market. In a nutshell, it is the best X-ray home source available to date.

What is its main application?

Ulrich Steuerwald: So far, our institute's Crystallization Facility has been able to offer an X-ray in-situ diffraction analysis for our users to differentiate between protein and salt crystals – the PX Scanner. With the new X-ray home source, one can now collect datasets in-house to either efficiently optimize crystals and/or potentially even solve structures of some targets 'at home'. For difficult targets and to squeeze out the best resolution of a given crystal, one might still want to measure at the synchrotron. To facilitate synchrotron access, the facility organizes regular remote shifts at the PXII beamline at SLS – which are currently shared by several people from three groups. Common synchrotron remote shifts are scheduled roughly once per month – the home source is available every single day to screen crystals, optimize cryo-protectants and crystallization samples, and get hands-on X-ray data collection.

What are the main benefits to MPI-BPC researchers?

Ashwin Chari: The pressure to solve structures quickly is rapidly increasing – here, the new X-ray home source is a huge step forward to speed up this process because we can characterize crystals before synchrotron data collection. Thus, our measuring time there can be used much more efficiently or may, if one is really lucky, make the visit to the synchrotron beamlines even dispensable.

Will the home source be available to all researchers at the MPI-BPC?

Ashwin Chari: The new device can in principle be used by all scientists at the institute. But they need to be trained first by one of us. We already had a short demonstration in mid-January and many people were interested and joined the session.

Interview: cr/fk

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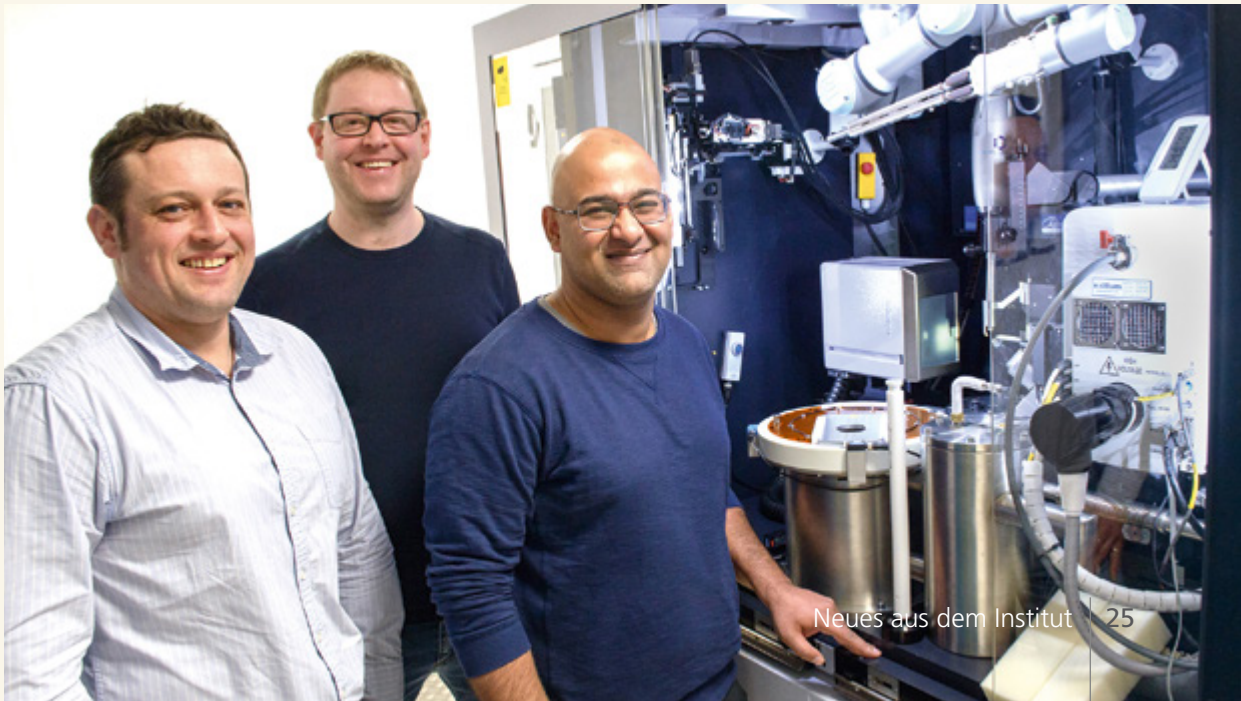

Trevor Huyton, Ulrich Steuerwald, and Ashwin Chari (from left). *(Photo: ibg)*

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