PAUL SCHERRER INSTITUT

PSI facilities newsletter

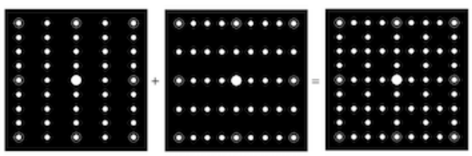
https://www.psi.ch/science/facility-newsletter
https://synchrotron-analysis.ch/

FUNDED ACCESS TO EUROPEAN LIGHT SOURCES FOR SMEs

Your company may gather invaluable information about your product at the micro-scale by using advanced experiments at European infrastructures. Talk to us about your challenge and benefit from the current LEAPS-INNOV project support. LEAPS-INNOV is funding an access programme that is tailor-made for SMEs through a programme called "TamaTA-INNOV", for which SMEs can apply using a very simple form.

Read more: *https://wayforlight.eu/en/industries/*

EXPLORING THE ELECTRONIC STRUCTURE OF INAS AND INSB SURFACES

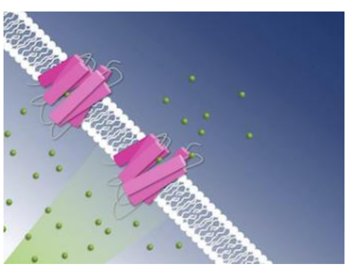


With a view to putting quantum materials to work in quantum devices, the electronic structure of their surfaces is of central importance. However, engineering and simulating surfaces is highly challenging. Hence the interest in comprehensive theory–experiment works, such as a recent study combining density functional theory (DFT) and soft X-ray angle-resolved photoemission spectroscopy (ARPES) performed at SLS. A scheme to project the calculated band structure of a surface slab supercell onto the bulk primitive cell facilitated direct comparison of simulated and experimental results. With this approach, the collaborating teams studied the electronic structure of InAs(001), InAs(111), and InSb(110) surfaces. The detailed insight they obtained is particularly important for applications of these materials in hybrid semiconductor–superconductor devices, not least for topological qubits utilizing the Majorana zero modes.

Read the full story: *https://www.psi.ch/en/media/our-research/towards-compact-quantum-computers-thanks-to-topology*

S. Yang et al., Advanced Quantum Technologies 5, 210003 (2022)
DOI: 10.1002/qute.202100033

DYNAMICS AND MECHANISM OF A LIGHT-DRIVEN CHLORIDE PUMP



Utilizing the unique synergy at PSI of the SwissFEL free-electron laser and the SLS synchrotron light source, researchers captured for the first time a molecular movie that shows in detail the process of an anion transported across the cell membrane by a light-fueled protein pump. They combined time-resolved serial crystallography with time-resolved spectroscopy and multiscale simulations to study the working principles of a chloride-pumping rhodopsin protein. Dynamics in the millisecond-range were investigated at SLS, whereas faster processes, down to the picosecond time scale, were captured at SwissFEL. Based on the combined insights obtained in these experiments, the researchers propose a ion-transfer pathway in bacterial halorhodopsin — bringing us a step closer to unravel the mystery of how light energy initiates the pumping process, and how nature made sure there is no anion leakage back outside.

Read the full story: *https://www.psi.ch/en/science/scientific-highlights/how-to-get-chloride-ions-into-the-cell*

S. Mous et al., Science 375, 845 (2022)
DOI: 10.1126/science.abj6663