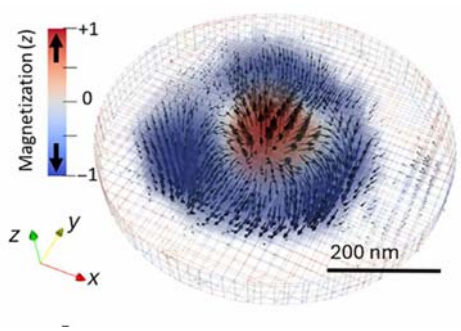
## SLS – Skyrmion topology quantified in 3D

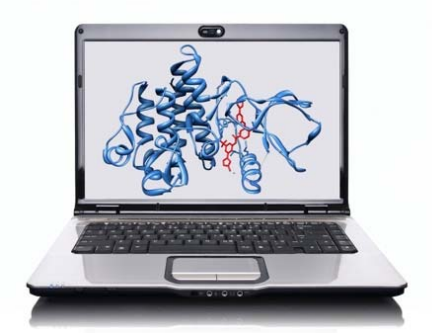



Magnetic skyrmions are traditionally assumed to be intrinsically 2D objects. However, real systems that would be used in 3D spintronics exhibit non-negligible thicknesses; moreover, it cannot be assumed that the 2D magnetic configurations simply extend rigidly to the third dimension. It is thus crucial to access, explore, and tailor 3D topological devices with functionalities not accessible in 2D. In an international collaboration of researchers from the US and Switzerland, 3D skyrmions were imaged in 3D using soft X-ray magnetic laminography at the PolLux beamline of the Swiss Light Source, with a voxel size of 20 nm achieved in the reconstructed 3D images. The data provided the 3D distribution of the topological charge density of the magnetic skyrmion, allowing the research team to directly correlate charge-density variations to parameters such as the magnitude of the magnetic anisotropy. The experimental images were then directly compared with micromagnetic simulations using a similar voxel size. The results provide the foundations for nanoscale magnetic metrology, essential for tailoring future spintronic devices at the nanoscale. The discovery is published in the journal Science Advances.

***Read more*** *https://www.psi.ch/en/microspec/scientific-highlights/skyrmion-topology-quantified-in-3d*

---

## SLS – Unlocking the secrets of proteins

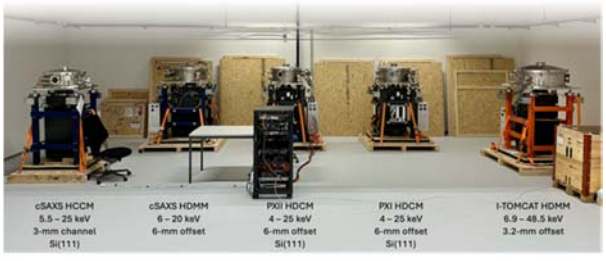


The 2024 Nobel Prize in Chemistry went to three scientists who led the development of the AI tool, Alphafold. The success of Alphafold, an Open Science project, would not have been possible without comprehensive, high-quality, open databases provided by the global scientific community, most notably the Protein Data Bank (PDB). The Paul Scherrer Institute has been an important contributor to the PDB: at the time that AlphaFold was developed, the structures of some 140,000 proteins had been determined experimentally and deposited in the PDB. More than five percent of this data originates from the Swiss Light Source SLS. The SLS is presently undergoing an upgrade ("SLS 2.0"). Once the upgrade is completed and operation restarts in mid 2025, the new facility will be able to determine experimental structures in a matter of seconds, some two orders of magnitude faster than previously possible.

***Read more:*** *https://www.psi.ch/en/news/psi-stories/unlocking-the-secrets-of-proteins*

---

## SLS - New Monochromators for SLS 2.0




Six new hard X-ray monochromators have been installed at four beamlines at SLS 2.0 – I-TOMCAT, PXI, PXII, and cSAXS. The horizontal-offset monochromators were built by XDS Oxford (formerly FMB). Depending on the application, the diffracting elements chosen were double crystals, double multilayers, or channel-cut crystals. The primary focus of the design strategy of these optical components has been beam stability, an essential feature for the much smaller beams that SLS 2.0 will deliver compared to the original SLS. Details of the design of these monochromators and other hard X-ray optical components for SLS 2.0 were published in the Journal of Synchrotron Radiation.

***Read more:*** *https://www.psi.ch/en/bloptics/news/new-monochromators-for-sls*