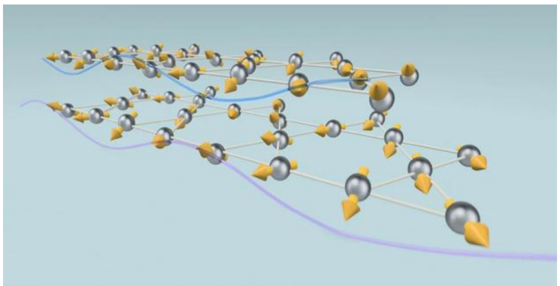
PSI Facility Newsletter

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

SLS 2.0: How to start up a particle accelerator

The upgrade of the Swiss Light Source at the PSI is forging ahead: the electrons are back and circulating the completely new electron storage ring.
The upgraded synchrotron, SLS 2.0, reached its target current of 400 mA (6-hour lifetime) in early April 2025, a little over two months after starting commissioning, and has already begun to deliver high-intensity X-ray light to the first couple of around 20 experimental stations at the facility; commissioning of these beamlines has started. Thanks to the upgrade and the associated significantly tighter electron beam, this light is many times brighter and thus enables better research than ever before.
Progress towards regular machine and experimental operation is well advanced – the first phase of beamlines is being rolled out in 2025 and first pilot users are expected in the summer. The second phase of beamlines comes back online after a three-month intermediate shutdown in the first quarter of 2026. First regular user operation at some beamlines is planned for after the 2026 shutdown and subsequent machine commissioning. The future for Swiss photon science indeed looks bright!
Read more *https://www.psi.ch/en/news/psi-stories/sls-2-0-how-to-start-up-a-particle-accelerator*

SLS – A new dimension of complexity for layered magnetic materials



For solid materials, their properties depend not only on their chemical composition, but intimately on how their atoms or molecules are organised. This can give rise to exotic properties in quantum materials, an exciting and highly promising avenue of research for future technologies.

Research in this field over the last decade has investigated whether two-dimensional arrays of atoms, either alone, or stacked into a three-dimensional layered material, can reveal novel behaviours, particularly in the field of electronics and so-called spintronics.

The kagome lattice, which takes its name from a type of Japanese basket woven in corner-sharing triangles, is a two-dimensional atomic arrangement that potentially hosts exotic quantum states, ranging from superconductivity to unconventional magnetism. Fe_3Sn_2 is a kagome lattice that exhibits intriguing magnetic phenomena. At the heart of these are spin waves: collective precessions of electron spins that differ slightly in phase, adding up or cancelling out to form magnetic ripples that move through the material like waves on a pond. Although the material has been the subject of research interest for many decades, the nature of these spin waves and their potential impact on magnetic and electronic behaviour remained opaque. Until now. Using X-rays at the SLS, the magnetic excitations in the material were probed; it was demonstrated that the spin waves have very low-energy excitations, which in turn means they interact strongly with each other, opening the door to a range of exotic quantum effects.

Read more: *https://www.psi.ch/en/news/science-features/a-new-dimension-of-complexity-for-layered-magnetic-materials. Original article: W. Zhang et al., Nature Communications*
