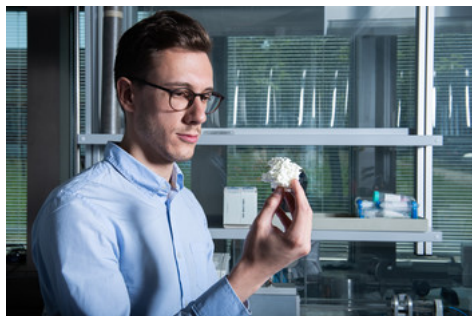


New material with magnetic shape memory

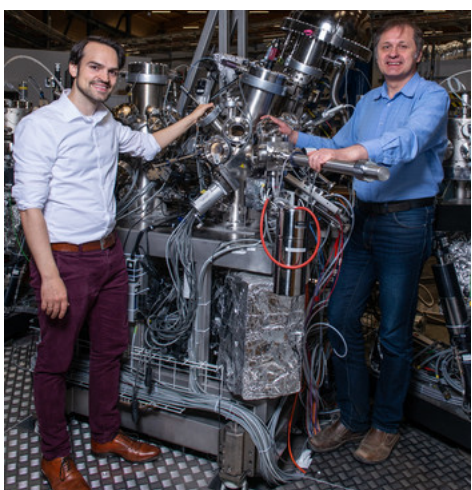


Researchers at the Paul Scherrer Institute PSI and ETH Zurich have developed a new material whose shape memory is activated by magnetism. It retains a given shape when it is put into a magnetic field. It is a composite material consisting of two components. What is special about the new material is that, unlike previous shape-memory materials, it consists of a polymer and droplets of a so-called magnetorheological fluid embedded in it. Areas of application for this new type of composite material include medicine, aerospace, electronics and robotics. The researchers are now publishing their results

in the scientific journal *Advanced Materials*.

Read more: <https://www.psi.ch/en/media/our-research/new-material-with-magnetic-shape-memory>

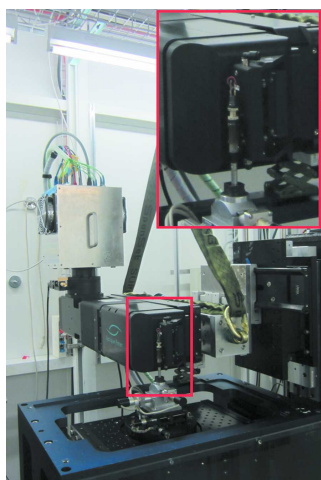
New material also reveals new quasiparticles



Researchers at PSI have investigated a novel crystalline material that exhibits electronic properties that have never been seen before. It is a crystal of aluminum and platinum atoms arranged in a special way. In the symmetrically repeating unit cells of this crystal, individual atoms were offset from each other in such a way that they – as connected in the mind's eye – followed the shape of a spiral staircase. This resulted in novel properties of electronic behaviour for the crystal as a whole, including so-called Rarita-Schwinger fermions in its interior and very long and quadruple topological Fermi arcs on its surface. The researchers have now published their results in the journal *Nature Physics*.

Read more: <https://www.psi.ch/en/media/our-research/new-material-also-shows-new-quasiparticles>

High-numerical-aperture optics for ultra-fast tomographic microscopy



A novel high-performance custom-made macroscope, dedicated to high-resolution time-resolved X-ray tomographic microscopy, is now available for the user community at the TOMCAT beamline. The macroscope offers a 4x magnification and has a very high numerical aperture of 0.35. Coupled to the in-house developed GigaFRoST camera (DOI: 10.1107/S1600577517013522), this new, highly efficient imaging setup enables tomographic investigations with high-temporal and high-spatial resolution: tomographic microscopy studies with a time resolution of 20 Hz and beyond have become possible, unlocking unprecedented possibilities for the tomographic investigation of dynamic processes and radiation-sensitive samples. A detailed characterization of the macroscope performance is provided here:

<https://doi.org/10.1107/S1600577519004119>