

PAUL SCHERRER INSTITUT



ETH zürich

**Laboratory for
Mesoscopic
Systems**

Target audience: Master or Bachelor project students

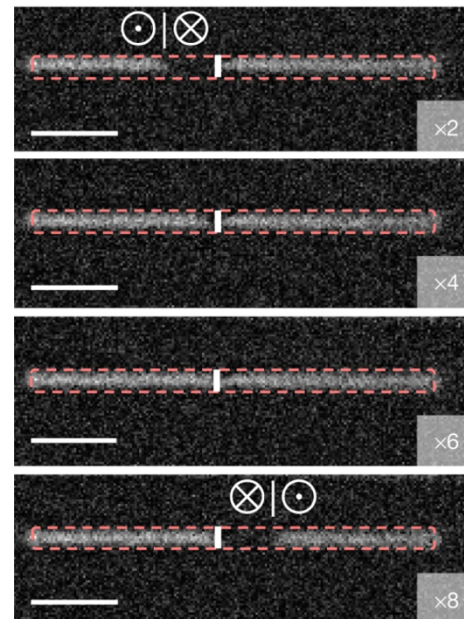
Project Title: Local engineering of magnetic and structural properties for next-generation data storage and processing

Several next-generation memory and computing schemes are contingent on locally modifying the properties of nanomagnetic systems at the mesoscopic scale. As such, there is a need to develop new and straightforward methods to achieve such control material properties.

Goals: This project aims to understand how a newly developed technique for locally modifying magnetic properties is relevant to several application-relevant materials systems, including ferromagnetic, ferrimagnetic, and antiferromagnetic thin films. The utility of these modifications will be demonstrated by their deployment in prototypical memory and computing elements.

Tasks:

- Deposition of magnetic thin films using physical vapor deposition techniques
- Imaging of static and dynamic magnetic properties using magneto-optical microscopy
- Determination of crystalline structure using X-ray diffraction



Magneto-optical micrographs demonstrating how a magnetic domain wall becomes inverted when pushed against a 50 nm-wide region engineered to have in-plane magnetic anisotropy (vertical white lines). The scale bar is 3 μm . Reproduced from Z. Luo et al., Nature 579, 214 (2020).