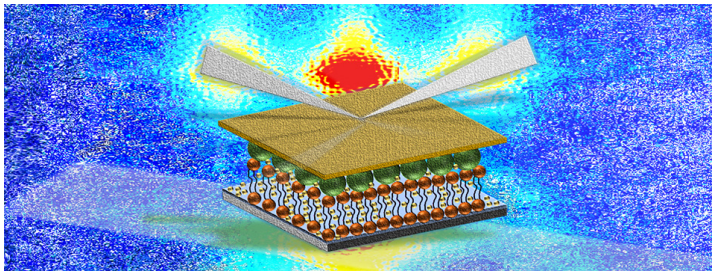

Beitrag ID: **13** Typ: **Invited talk**

An overview of the latest developments in the field of neutron supermirrors

Dienstag, 8. Oktober 2024 16:15 (30 Minuten)

Efficient neutron transport through neutron guides is the basis for the high performance of modern neutron scattering instruments. The combination of special guide profiles and high reflectivity supermirror coatings allows the properties of the neutron beam to be tailored to the needs of the experiment. In addition, a variety of substrate materials (different glasses, different metals, silicon) offer extended possibilities in terms of precision, shielding and lifetime.
Recently, new concepts for focusing (nested mirror optics) and wide-angle polarisation analysis (tWAPA) have been developed, using advanced supermirror technology in new sophisticated geometric arrangements. In our presentation we will report on the state of the art and the latest developments in these areas at SwissNeutronics. In particular, we will demonstrate the capabilities and performance of neutron guides made from metallic substrates with highly reflective supermirror coatings. Similar coatings are used on very thin silicon substrates. Such substrates are used to build compact Nested Mirror Optics (NMO) [1], which make it possible to transfer the high brilliance of modern neutron sources to experiments or to focus large beams with defined phase space (beam size and divergence) on very small samples. In addition to neutron beam transport and focusing, polarising supermirror coatings are often used in special configurations such as
V-cavities to polarise the incident neutron beam and polarising benders in the transmission geometry. These devices are simple to use, easy to align and maintenance free. These advantages are highly appreciated for polarisation analysis of scattered neutrons, where devices capable of covering a large solid angle are required. This is realised by the tWAPA (Transmission Wide Angle Polarisation Analyzer) [2] concept.

[1] Ch. Herb, Nuclear Instruments and Methods in Physics Research Section A, 1040, 167154 (2022).
[2] P. Böni, Nuclear Instruments and Methods in Physics Research Section A, 966, 163858 (2020).

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