
KR 1: Invited Talk - Martin Fally (DF jointly with CPP, TT, KR)

Time: Monday 9:30–10:15

Location: GER 37

Invited Talk

KR 1.1 Mon 9:30 GER 37

Optics with neutrons using holographic gratings — •MARTIN FALLY¹, JÜRGEN KLEPP¹, CHRISTIAN PRUNER², and YASUO TOMITA³
— ¹Faculty of Physics, Uni Wien, Austria — ²Department of Materials Science and Physics, Uni Salzburg, Austria — ³University of Electro-Communications, Tokyo, Japan

All neutron-optical phenomena are governed by the neutron-optical potential or, equivalently, the neutron refractive-index. Thus, an important task in the design of neutron-optical elements is to efficiently pattern the neutron refractive-index of materials. For this purpose we use light-sensitive materials and employ holographic techniques to produce diffraction gratings for neutrons.

After an introduction to the basics of neutron optics and the chal-

lenges as compared to light optics I will discuss our recent experiments, where we successfully demonstrated the power of this approach. Two- and three-port beam-splitters as well as free-standing film mirrors for cold and very-cold neutrons were set up by exploiting the Pendellösung interference effect. Another intriguing possibility is offered by holographic gratings containing superparamagnetic nanoparticles to produce business card-size neutron polarizers working in comparably low external magnetic induction. Such devices are being developed at present. Finally, I will give an outlook on novel neutron-scattering instrumentation and techniques which are expected from those advancements.

In collaboration with: I. Drevensek-Olenik, S. Gyergyek, J. Kohlbrecher, P. Geltenbort, R. A. Rupp