

**TT 11: Invited Talk - Martin Fally (organized by DF; with CPP, KR, TT)**

Time: Monday 9:30–10:15

Location: GER 37

**Invited Talk**

TT 11.1 Mon 9:30 GER 37

**Optics with neutrons using holographic gratings** — •MARTIN FALLY<sup>1</sup>, JÜRGEN KLEPP<sup>1</sup>, CHRISTIAN PRUNER<sup>2</sup>, and YASUO TOMITA<sup>3</sup>  
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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