# MM 43 Symposium Tomographic Methods in Materials Research Hauptvortrag Wolfgang Treimer

Zeit: Dienstag 14:45–15:15 Raum: TU H1058

## Hauptvortrag

MM 43.1 Di 14:45 TU H1058

**Absorption- and phase-based imaging signals for neutron tomography** — •Wolfgang Treimer — Unversity of Applied Sciences (TFH) Berlin, FB II, D - 13353 Berlin

Thermal and cold Neutrons are a perfect tool to investigate massive and large (several cm3) samples by means of computerized tomography (CT). The main interaction to visualize structures in samples is absorption, similar to x-rays in medicine or material research. Based on absorption new techniques such as energy dependent CT or real time CT have gained importance within the last years and were used to show e.g. the movement of pistons in engines. Absorption, however, is not the only interaction that can be used for computerized tomography. Other interactions such as interference effects, so-called phase based interactions, were exploited for CT to visualize details in samples that could not be detected by absorption. Phase contrast imaging was first applied to x-ray CT, but soon it was also applied to neutron CT. Based on the same interaction, refraction and ultra small angle scattering of neutrons were studied and successfully applied to neutron tomographic investigations of samples. These new imaging signals (refraction and ultra small angle scattering) require entirely different techniques, different experimental set ups (high resolution double crystal diffractometer)and data evaluation, to detect these signals and separate them from absorption and noise. Using absorption and phase-based signals the length scale of tomography with neutrons is more than five orders of magnitude, which covers a large field of non-destructive testing in material research and fundamental physics.