When: 28 January 2020, 14:50 h
Where: REC / C 213 H
Speaker: Prof. Thorsten Hesjedal
University of Oxford
Title: X-Ray Study of Skyrmion Lattices - Microscopic Properties,
3D Structure, and Dynamics

Abstract:
Magnetic skyrmions in noncentrosymmetric chiral magnets form ordered lattices with a periodicity ranging from 3-100 nm. This lengthscale lends itself to soft x-ray scattering experiments owing to the large resonant scattering cross-section for 3d elements, the excellent reciprocal space resolution, as well as the tunable surface sensitivity. We will present an overview of the capabilities of resonant elastic x-ray scattering (REXS) for the study of magnetic skyrmions [1], highlighting the following effects:

1. Microscopic skyrmion properties [2]: By exploiting the polarization dependence of REXS, the exact surface helicity angles of twisted skyrmions for both left- and right-handed chiral bulk Cu2OSeO3 was determined.
2. Full 3D spin structure of skyrmions [3]: Using polarization-dependent REXS we found a continuous transformation of the skyrmion tubes from pure Néel-twisting at the surface to pure Bloch-twisting in the bulk over a distance of several hundred nanometers.
3. Rotating lattices [4]: In a magnetic field gradient, skyrmions undergo rotation with well-defined dynamics. This provides an effective way of controlling skyrmions in racetrack memory schemes.


Invited by Prof. Jochen Geck