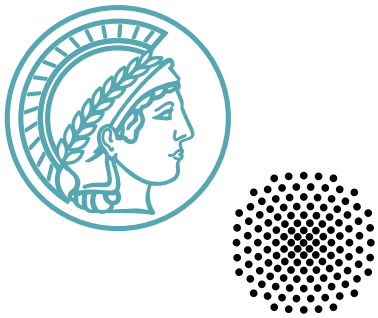
www.physik.uni-stuttgart.de/aktuelles/kolloquium

Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme
Fachbereich Physik, Universität Stuttgart

Ansprechpartner: Eberhard Göring
E-Mail: e.goering@is.mpg.de
Telefon: 0711 689-1815



Dienstag, 14. Juni 2022 | **16.15 Uhr** | **Hörsaal 2D5**

Stuttgarter Max-Planck-Institute, Heisenbergstraße 1, 70569 Stuttgart-Büsnau

Gastgeber: Prof. Gisela Schütz, Max-Planck-Institut für Intelligente Systeme, Telefon: 0711 689-1950

X-ray science with atomic nuclei: When materials science meets quantum optics

Ralf Röhlsberger
Universität Jena

Abstract

The remarkable development of accelerator-driven light sources such as synchrotrons and X-ray lasers with their highly brilliant X-rays has brought quantum and nonlinear phenomena at X-ray energies within reach.

X-ray photonic structures like cavities and superlattices are employed as new laboratory to realize quantum optical concepts at X-ray energies. The prime candidates to be chosen as atomic emitters in this field are Mössbauer isotopes. Their extremely small resonance bandwidth facilitates to probe fundamental phenomena of the light-matter interaction like the observation of single-photon superradiance and the collective Lamb shift as well as electromagnetically induced transparency with nuclei.

Employing higher-order coherences of X-ray fields in the spirit of Glauber could even lead to novel concepts for quantum imaging at X-ray energies.