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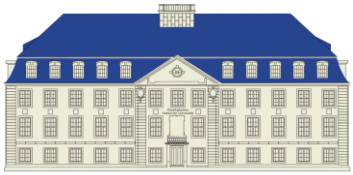

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COLLOQUIUM „OPTICS AND CONDENSED MATTER“

Thomas Pohl

Aarhus University, Aarhus, Denmark

Long-range interactions of light and matter: from dipolar photons to temperature-driven supersolids

The coupled dynamics of dipoles and electromagnetic waves is fundamental to our understanding of light-matter interactions. Hereby, incident photons polarize atoms in a material and may induce interactions between particles. Conversely, the radiation from induced dipoles can affect the propagating light and thereby cause a nonlinear interplay with a rich and fascinating phenomenology.

This talk will explore such nonlinear behavior of light- and matter-wave fields under conditions where quantum effects play an essential role. A striking consequence of strong nonlinearities is the emergence of synthetic photon-photon interactions, which can manifest in an effective attraction and repulsion, or even dipolar exchange reactions between individual light quanta. Such interactions are at the heart of quantum technology developments, enable the generation and processing of optical quantum states, and offer exciting opportunities to study self-organization phenomena. I will discuss such perspectives and describe examples from optics and cold-atom physics where dipolar interactions can lead to interesting and sometimes counterintuitive collective effects.

October 25th, starting with discussion at 16:45 h, talk at 17:15 h, live IAP lecture hall or via Zoom
https://uni-bonn.zoom.us/j/98441612025?pwd=a01SSjlkY1Q3SDFhL09JQk1qc1V6dz09
Meeting-ID: 984 4161 2025
Kenncode: 294164