

PHYSICAL COLLOQUIUM
INVITATION

Monday, 19.06.2023, 4.15 p.m., Room No. W02 1-148

speaks

Prof. Dr. Michael Sentef

**University of Bremen and
Max Planck Institute for the Structure and Dynamics of Matter, Hamburg, Germany**

about

“Light-Matter Control of Quantum Materials”

Advances in time-resolved pump-probe spectroscopies have enabled us to follow the microscopic dynamics of quantum materials on femtosecond time scales. This gives us a glimpse into the inner workings of how complex, emergent functionalities of quantum many-body systems develop on ultrafast time scales or react to external forces. The ultimate dream of the community is to use light as a tuning parameter to create new states of matter on demand with designed properties and new functionalities, perhaps not achievable by other means. In this talk I will discuss recent progress in controlling and engineering properties of quantum materials through light-matter interaction [0]. I will highlight work on Floquet engineering — the creation of effective Hamiltonians by time-periodic drives — on sub-cycle time scales [1,2] combining theory and pump-probe experiments at the limits of energy and time resolution. I will then showcase recent theories on inducing superconductivity with light by employing enhanced light-matter interaction in the near-field involving polaritonic excitations [3,4].

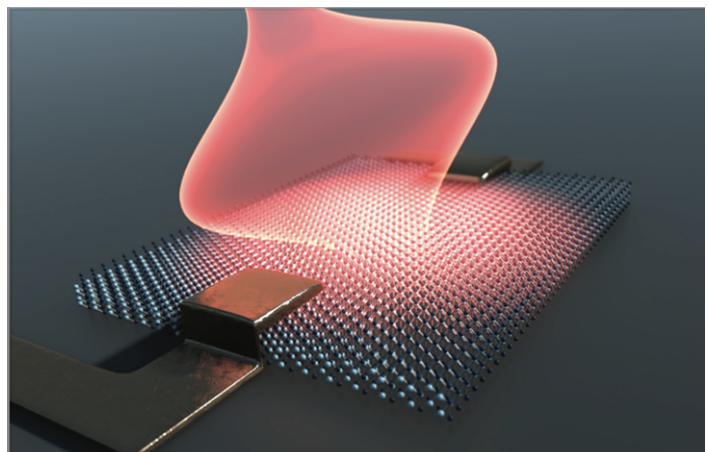
[0] M. A. Sentef, „Licht treibt Materie an“, Physik-Journal, März 2023

[1] M. Schüler and M. A. Sentef, <https://doi.org/10.1016/j.elspec.2021.147121>

[2] S. Ito et al., Nature 616, 696-701 (2023), <https://www.nature.com/articles/s41586-023-05850-x>

[3] C. J. Eckhardt et al., arXiv:2303.02176

[4] S. Chattopadhyay et al., arXiv:2303.15355



All interested persons are cordially invited.

Prof. Dr. Caterina Cocchi