TECHNISCHE UNIVERSITÄT DARMSTADT

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# Physikalisches Kolloquium

**Title:** **The Alchemy of Vacuum**

**Speaker:** **Prof. PhD Thomas W. Ebbesen,**
**USIAS & ISIS, University of Strasbourg, France**

**Date & time:** **Friday 06.06.2025, 2 pm**

**Location:** **ZKS-Uhrturmhörsaal, S2|08, R. 171, Hochschulstraße 4**

**Host:** **Prof. Dr. Claudiu Genes**

**Abstract:**

Over the past decade, the possibility of manipulating material and chemical properties by using hybrid light-matter states has stimulated considerable interest [1,2].

Such hybrid light-matter states can be generated by strongly coupling the electronic or the vibrational transitions of a material, to the spatially confined electromagnetic field of an optical resonator.

Most importantly, this occurs even in the dark because the coupling involves the zero-point electromagnetic fluctuations of the resonator, the vacuum field.

After introducing the fundamental concepts, examples of modified properties of strongly coupled systems, such as chemical reactivity, charge and energy transport, and magnetism will be given to illustrate the broad potential of light-matter states.

[1] F.J. Garcia Vidal, C. Ciuti, T.W. Ebbesen, Science 2021, 373, eabd336
[2] K. Nagarajan, A. Thomas, T.W. Ebbesen, J. Am. Chem. Soc. 2021, 141, 16877.