

Einladung zum Physikalischen Kolloquium

21.11.2025 Ole Sigmund, Technical University of Denmark
**»Inverse Design by Topology Optimization:
Multiphysics Applications and Practical Realizability«**

Einführung: C. Rockstuhl

Topology Optimization is the pioneering inverse design methodology that enables the discovery of optimal geometries for engineering and physics-based systems. By iteratively solving field equations, applying adjoint sensitivity analysis, and redistributing material, the method identifies high-performance structures across a wide range of physical domains.

The talk provides a brief overview of the background and computational techniques behind topology optimization. Emphasis is placed on how incorporating geometric and manufacturing constraints ensures the realizability of designs—whether at the macro, micro, or nano scale.

The presentation explores recent advances in handling multiphysics problems, including mechanical, thermal, optical, and fluidic domains. It discusses challenges related to fabrication, robustness under uncertainty, and the integration of emerging manufacturing technologies. Applications range from large-scale structural components and compliant mechanisms to architected meta-materials and nano-optical devices.

Der Vortrag findet **am Freitag, den 21. November 2025 um 15:45 Uhr im Otto-Lehmann-Hörsaal**, Physik-Flachbau (Geb. 30.22), KIT-Campus Süd statt.