



SFB – Colloquium

Speaker: **Prof. Dr. Matthew J. Gilbert**
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Date: Tuesday, 13 June 2023, 14:15, H34

Topic: Strain Engineering of Novel Materials
Functionality in 2D Systems



Abstract:

Elucidating the unique and remarkable properties of 2D materials has become ubiquitous across seemingly disparate areas of science. At this point in time, the disciplines of condensed matter physics, materials science, and engineering stand together at a crossroads in this unifying pursuit. In one direction, is the aggressive search for new properties in well-characterized materials and in the other is the continuation of the distributed search for the next material or layered set of materials in which new quantum properties may be engendered. The fork in research has been precipitated by questions concerning the ultimate limits and tunability of “well-known” 2D materials. Amidst the many knobs available to tune the properties of 2D materials, strain applied to the lattice has been shown to produce striking quantum phenomena in graphene, the best known of all 2D materials. In this talk, I will introduce the basics of strain engineering in 2D materials and discuss some of the canonical results that have been observed. Subsequently, I will present recent work that demonstrates the appearance of new exotic strongly interacting phases in periodically strained graphene with the goal of demonstrating the breadth of physical effects that are available when periodic strain gradients are applied to graphene. Finally, I will conclude by discussing some of the issues and challenges associated with the use of strain to engineer novel phases in 2D materials; concomitantly pointing to unexplored territories that occupy the space of strain engineered 2D and quasi-2D systems.

Host: Prof. Dr. Jaroslav Fabian