



EINLADUNG zum IFP-SEMINAR

Electron-beam manipulation of single impurity atoms

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Host: Silke Bühler-Paschen
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Important recent advances in transmission electron microscopy instrumentation and capabilities have made it indispensable for atomic-scale materials characterization down to their chemical structure. At the same time, the availability of two-dimensional materials has provided ideal samples where each individual atom or vacancy can be resolved and chemically identified [1,2]. Recent studies have further revealed the possibility of using the focused electron beam of the scanning transmission electron microscope for the controlled manipulation of structures down to individual atoms [3,4].

Evaluating the full range of future possibilities for this method requires a precise physical understanding of the interactions of relativistic electrons with matter, becoming feasible due to advances both in experimental techniques and in theoretical models [5]. Precision measurements of irradiation damage in materials with varying dielectric properties are starting to emerge, and will provide much needed experimental guidance for theory. Two-dimensional materials offer an ideal model system to develop a general and quantitative understanding of structural changes caused by electron irradiation [6].

- [1] T. Susi et al., 2D Materials 4, 021013 (2017)
- [2] T. Susi et al., ACS Nano 12, 4641-4647 (2018)
- [3] M. Tripathi et al., Nano Lett. 18, 5319–5323 (2018)
- [4] T. Susi et al., 2D Materials 4, 042004 (2017)
- [5] T. Susi et al., Nat. Commun. 7, 13040 (2016)
- [6] T. Susi, J. Meyer, J. Kotakoski, submitted