



TECHNISCHE UNIVERSITÄT
CHEMNITZ

Institut für Physik Physikalisches Kolloquium



Mittwoch, 24.05.2023, um 11:15 Uhr

Ort: Reichenhainer Str. 90;
Zentrales Hörsaal- und Seminargebäude,
Raum C10.013

Prof. Dr. Richard A. Wilhelm

TU Wien, Institut für Angewandte Physik



GAEDE-PREISTRÄGER 2021

Charge Exchange of Slow Heavy Ions at Surfaces

Ion beams are a well-known tool in surface science and plenty of industrial applications. In almost all applications of ion beams it is the momentum of the heavy particles which is harnessed to change surface shapes and properties or to perform surface composition analysis.

However, ions carry also a charge which can, in contrast to electrons or photons, change when the ion is brought into contact with a surface [1]. A changing charge state affects the total amount of energy the ion deposits and the range it travels inside a material. Since the charge exchange dynamics at surfaces and inside solids is not well known, a changing charge is commonly considered an obstacle in experiments and applications.

In this contribution I will present recent experimental results on the charge exchange dynamics of slow heavy ions in elevated charge states at surfaces [2,3]. We use freestanding 2D materials as ideal model systems for surfaces, because they allow (i) the transmission of ions on the relevant time scale of electron transfer and excitation and (ii) the application of atomically resolved (scanning) transmission electron microscopy to identify surface modifications driven by electronic excitations [4]. With this toolset we can now quantitatively determine the timescale of charge state decay inside of a solid.

- [1] Wilhelm, R. A. *Surface Science Reports* 77, 100577 (2022)
- [2] Niggas, A. et al. *Physical Review Letters* 129, 086802 (2022)
- [3] Niggas, A. et al. *Communications Physics* 4, 180 (2021)
- [4] Schwestka, J. et al. *ACS Nano* 14, 10536–10543 (2020)

Alle Zuhörer sind ab 11:00 Uhr zum Kaffee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt:
Prof. Dr. Dr. h.c. Dietrich R. T. Zahn, Tel. 0371 531 33036



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