TRR 142
Tailored Nonlinear Photonics

TRR Guest Scientist Lecture / Seminar

Date/Time: 11.06.2018 / 13:00 Uhr
Location: Paderborn, A1.322

Dr. Roberto Rosati
Institut für Festkörpertheorie
Westfälische Wilhelms-Universität (WWU) Münster,
Münster

Spatiotemporal evolution of inhomogeneous electronic wave packets

Abstract:

Inhomogeneous electronic wave packets describe a nanometric localization of electrons (obtainable, e.g., by near field spectroscopy) and may be important in several fields, e.g., in quantum information protocols. Their evolution undergoes an interplay between coherent and dissipative dynamics: Here we consider different nanomaterials and, by means of alternative off-diagonal Markov approaches, we show different scattering-induced phenomena associated with an initial confinement. After discussing the so-called scattering nonlocality and scattering-induced diffusion in one-dimensional materials, showing huge differences between conventional quantum wires and metallic nanotubes, we move to two-dimensional materials embedding a null-dimensional (0D) confinement potential in order to study the phonon-induced carrier capture into the latter. Adopting a MoSe2 monolayer as hosting material, we show a spatial control, by which the captured charge in the 0D potential is affected not only in terms of populations, but also of quantum interstate coherences and nontrivial spatiotemporal dynamics [1] (see Fig. 1).

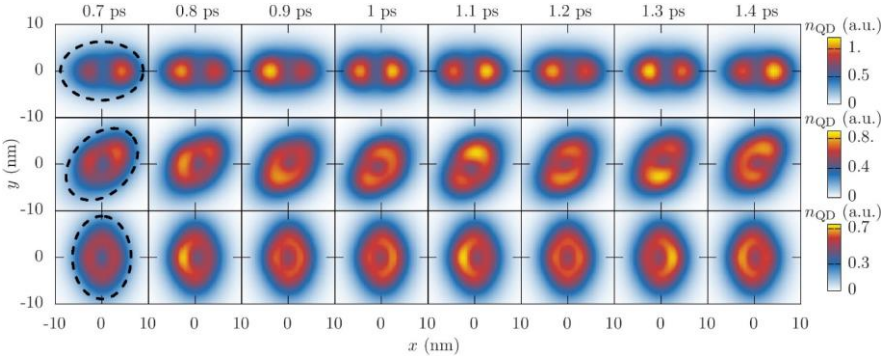

Fig. 1: *Spatiotemporal dynamics of the charge which is captured by emission of optical phonons from a travelling wave packet into a differently oriented 0D potential (sketched as dashed line).*

[1] R. Rosati, F. Lengers, D. E. Reiter, and T. Kuhn, arXiv:1802.01409 [cond-mat.mes-hall] (2018).

Contact: **Prof. Dr. Torsten Meier**
torsten.meier@upb.de

UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

technische universität dortmund