VolkswagenStiftung

Electrondynamics of Ultrafast Energy Transfer Processes in Clusters of Real and Artificial Atoms Induced by Long-Range Electron Correlation

Initiative: Freigeist-Fellowships

Bewilligung: 30.03.2014

Laufzeit: 5 Jahre

Projekt-Website: http://www.helmholtz-berlin.de/forschung/oe/em/materialentwicklung/research/

research-groups/theory-group/index_en.html

Electrons located in different atoms are correlated over astonishingly long distances: assuming them to be as tall as humans this distance compares to that from earth to moon. Their long-range correlation results in ultrafast energy transfer processes in which, for example, the electron in an excited atom relaxes while a neighboring atom emits an electron. Accurate electrondynamics calculations supplemented with creative approaches for the intriguing treatment of many-electron atoms will open up new horizons for the physical insight into this family of state-of-the-art processes. By considering nano-structured semiconductor quantum dots, the so-called artificial atoms, as sites for the electrons, a pioneering research field at the coalescence point of solid state physics, nano-material science, and theoretical chemistry has been established. Its major aspect is the theoretical exploration of the full portfolio of conceivable energy transfer processes in various technologically relevant quantum dot architectures. Any experimental proof would be groundbreaking and leading to cutting-edge quantum dot applications as photodetectors or solar cells.

Projektbeteiligte

Dr. Annika Bande
Helmholtz-Zentrum Berlin
für Materialien und Energie GmbH
Institut für Methoden der Materialentwicklung
Joint Ultrafast Dynamics Lab in Solutions and at
Interfaces (JULiq) mit dem FB Physik der FUB
Berlin

Dr. Annika Bande
Helmholtz-Zentrum Berlin
für Materialien und Energie GmbH
Institut für Methoden der Materialentwicklung
Joint Ultrafast Dynamics Lab in Solutions and at
Interfaces (JULiq) mit dem FB Physik der FUB
Berlin

Dr. Annika Bande
Helmholtz-Zentrum Berlin
für Materialien und Energie GmbH
Institut für Methoden der Materialentwicklung
Joint Ultrafast Dynamics Lab in Solutions and at
Interfaces (JULiq) mit dem FB Physik der FUB
Berlin

Dr. Annika Bande
Helmholtz-Zentrum Berlin
für Materialien und Energie GmbH
Institut für Methoden der Materialentwicklung
Joint Ultrafast Dynamics Lab in Solutions and at
Interfaces (JULiq) mit dem FB Physik der FUB
Berlin

Open Access-Publikationen

Electron-Correlation Driven Capture and Release in Double Quantum Dots
Geometrical Control of the Interatomic Coulombic Decay Process in Quantum Dots
Strong Field Control of the Interatomic Coulombic Decay Process in Quantum Dots
Interdependence of ICD Rates in Paired QDs

Es werden die Institutionen genannt, an denen das Vorhaben durchgeführt wurde, und nicht die aktuelle Adresse.