



TECHNISCHE UNIVERSITÄT
CHEMNITZ

Institut für Physik Physikalisches Kolloquium



Mittwoch, 13.04.2016, um 16:00 Uhr

Ort: Reichenhainer Str. 90;

Zentrales Hörsaal- und Seminargebäude, Raum 2/N013

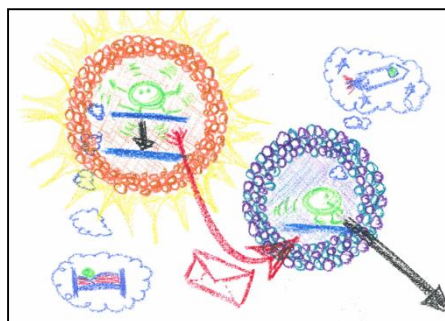
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Institut für Methoden der Materialentwicklung

Electrons moving on new paths ... : Electron dynamics of ultrafast energy transfer processes in quantum dots

The elementary physical process of interatomic Coulombic decay (ICD)¹ and the interatomic Coulombic electron capture (ICEC)² are recognized as an ultrafast energy transfer process between atoms and molecules induced by long-range electron correlation. Recently we have shown that they are possible when electrons are confined in an array of two general, non-infinite binding potentials commonly used to model quantum dots (QDs).³ In ICD one electron bound to the left QD is radiatively excited to a higher-energy resonance state, after which it deexcites by transferring its energy to the neighboring QD, from which a second electron is emitted. In ICEC electron release from one QD happens upon electron capture by the other QD.

Both processes were studied by means of highly accurate electron dynamics calculations with an antisymmetrized version of the multiconfiguration time-dependent Hartree method.⁴ Here we present the effect of the control factors geometry, laser, and phonons on the processes with view on experimental realizations.



¹ L.S. Cederbaum *et al.*, *Phys. Rev. Lett.* **79**, 4778 (1997).

² A. Bande *et al.*, *J. Chem. Phys.* **135**, 144112 (2011); A. Bande *et al.*, *EPJ Web Conf.* **41**, 04031 (2013); A. Bande, *J. Chem. Phys.* **138**, 214104 (2013).

³ F. M. Pont, A. Bande, L.S. Cederbaum, *Phys. Rev. B* **88**, 241304(R) (2013); A. Bande *et al.*, *EPJ Web Conf.* **84**, 07002 (2015); F. M. Pont, A. Bande, L.S. Cederbaum, *J. Phys.: Cond. Matt.* **28**, 075301 (2016).

⁴ *Multidimensional Quantum Dynamics*, ed.: H.-D. Meyer *et al.*, 2009 (WILEY- VCH, Weinheim) and references therein.

Alle Zuhörer sind ab 15:45 zum Kaffee vor dem Hörsaal eingeladen.

Informationen zum Vortrag erteilt:

Prof. Dr. Michael Schreiber, Tel. 0371 531-21910



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