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“Shining Light on Bound State Electrons.”

– Energy Transfer in Coupled Quantum Dots and Electron–hole Pair Formation Visualized

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日 時：2023年2月27日（月曜日） 14：30～15：30
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場 所：工学部8号館2階226大会議室 ※現地聴講のみ
Room 226, 2F, Engineering Bldg. #8

【概要】 This presentation reports explicitly time-dependent light-driven electron dynamics simulations. In the first part the atomistic modeling of coupled quantum dots (QDs) is shown.[1] The creation, transfer, and stabilization of localized excitations can be achieved by a UV/IR pump–dump pulse sequence. Our atomistic treatment reveals how size and geometry variations of three Ge/Si nanocrystals influence transfer times and thus the efficiency of laser-driven populations of the electron–hole pair states.
In the second part the important question of the dynamics in the excited states is addressed.[2] The knowledge about the particle and hole location is a long-standing quest as it can help understanding excited state properties. This presentation introduces a tool box to study the dynamics of optical excitations on the attosecond time scale in great detail. The advantages of post-processing the wave packet using an exciton wavefunction analysis are twofold:
i) it enables a detailed view on the process of electron-hole pair formation through animation of various densities, and
ii) it allows a quantification of exciton properties, such as particle/hole positions and exciton sizes, derived from the one-particle transition density matrix.

[1] P. Krause, J.C. Tremblay, A. Bande, Atomistic Simulations of Laser-Controlled Exciton Transfer and Stabilization in Symmetric Double Quantum Dots, J. Phys. Chem. A, 125, 4793 (2021)
[2] F. Langkabel, P. A. Albrecht, A. Bande, and P. Krause, Making optical excitations visible – An exciton wavefunction extension to the time-dependent configuration interaction method, Chem. Phys., 557, 111502 (2022)

使 用 言 語 ： English / 英語
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申 込 方 法 ： 事前の登録はございません。
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