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## View Abstract

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**CONTROL ID:** 3317200

**TITLE:** Real space and real time electron dynamics simulations for attosecond physics in solids

**Abstract Body:** Real-space and real-time electron dynamics simulation based on the time-dependent density functional theory is a powerful tool to analyze complex and highly-nonlinear interactions of light with solids. To investigate laser-induced ultrafast electron dynamics in solids, we developed a numerical technique to simulate pump-probe experiments [1]. Recently, we applied the numerical pump-probe simulations for the attosecond transient absorption spectroscopy and studied the light-induced ultrafast electron dynamics in solids [2,3]: First, we investigated laser-induced electron dynamics in GaAs with the first-principles simulations. As a result, we found an important role of the light-induced intraband transition in transient optical properties of optically-driven semiconductors [2]. Then, we investigated ultrafast electron dynamics in Titanium, and the first-principles simulations provided microscopic insight into laser-induced electron-localization dynamics in transition metals [3].

[1] S. A. Sato, K. Yabana, Y. Shinohara, T. Otobe, G. F. Bertsch, Phys. Rev. B 89, 064304 (2014).

[2] F. Schlaepfer, M. Lucchini, S. A. Sato, M. Volkov, L. Kasmi, N. Hartmann, A. Rubio, L. Gallmann, U. Keller, Nature Physics 14, 560 (2018).

[3] M. Volkov, S. A. Sato, F. Schlaepfer, L. Kasmi, N. Hartmann, M. Lucchini, L. Gallmann, A. Rubio, U. Keller, Nature Physics (2019): <https://doi.org/10.1038/s41567-019-0602-9>

**PRESENTATION TYPE:** Invited: Focus Session

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