

Ultrafast dynamics explored by laser-assisted electron scattering

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Abstract

When an electron collides with an atom in the presence of a laser field, laser-assisted electron scattering (LAES) processes occur, in which the energy of the scattered electrons is modulated through the collision process. We have investigated LAES processes induced by ultrashort intense laser fields for exploring time-dependent collision physics [1]. The present talk overviews various applications of ultrafast LAES, such as improving time resolution in gas-phase electron diffraction [2,3], probing the spatiotemporal evolution of light-dressed electronic states of atoms in intense laser fields [4,5], clocking the time of electron collisions in many-cycle [6] and single-cycle [7,8] laser fields, high-energy photoelectron emission from superfluid helium droplets [9,10], as well as future prospects towards zeptosecond science.

References

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| [1] Atoms 7 (2019) 85. | [2] Phys. Rev. Lett. 105 (2010) 123202. |
| [3] J. Chem. Phys. 140 (2014) 064201. | [4] Phys. Rev. Lett. 115 (2015) 123201. |
| [5] Phys. Rev. A 104 (2021) 062812. | [6] Phys. Rev. A 95 (2017) 023414. |
| [7] Phys. Rev. A 95 (2017) 033416. | [8] Chem. Phys. Lett. 795 (2022) 139512. |
| [9] Nat. Commun. 12 (2021) 4204. | [10] J. Phys. Chem. A 126 (2022) 8380. |