



Date & Time: **WEDNESDAY, June 10, at 10:00**

Location: **MPSD, 900 EG 136**

Speaker: **YIQI FANG**

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qcmd - Seminar



Shaping electron dynamics with structured light

Laser-excited electron motions allow the investigation of fundamental physical phenomena with unprecedented resolution in time, space and energy. Structured light offers new opportunities to tailor and control the optical response of materials, far beyond the ability of conventional linearly or circularly polarized light [1]. In this talk, I will show the physics and application of structured light when it interacts with bound electrons in atoms as well as when it interacts with electron pulses in free space. In atomic systems, I will show that the momentum spectra of photoelectrons released by strong-field ionization can serve as an in-situ probe for intense optical fields [2] and high-harmonic generation is an efficient process to generate extreme ultraviolet radiations with on-demand topological structures in time and space [3]. In free space, we use free-standing, electron-transparent silicon nitride membranes to create and characterise two types of chiral electrons in an ultrafast transmission electron microscope: electrons with chiral mass and charge [4] and electrons with internal torque [5].

Reference

- [1] Y. Fang, Z. Lyu, Y. Liu, *Nature Reviews Physics* 7, 713–727 (2025).
- [2] Y. Fang, M. Han, P. Ge, Z. Guo, X. Yu, Y. Deng, C. Wu, Q. Gong, Y. Liu, *Nature Photonics* 15, 115–120 (2021).
- [3] Y. Fang, S. Lu, Y. Liu, *Physical Review Letters* 127, 273901 (2021).
- [4] Y. Fang, J. Kuttruff, D. Nabben, P. Baum, *Science* 385, 183–187 (2024).
- [5] Y. Fang, J. Kuttruff, P. Baum, *Nature Physics* pp. 1–6 (2026).