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【715】 Ultrafast electron vortex beam and temporal holography in ultrafast electron microscope

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Ultrafast electron microscopy provides the possibility to conduct time-resolved experiment in three independent dimensions: real space, reciprocal space and energy domain. Being promising for condensed matter and material research it also serves as a platform for electron-light interaction. There are two mechanisms which facilitate the strong interaction regime: interaction with near-fields and interaction via inverse transition radiation. We utilise these effects to demonstrate:

- 1) Momentum exchange between electron and photon;
- 2) Generation of electron vortex facilitated by orbital angular momentum conservation upon absorption of circularly polarized photons
- 3) Coherence interaction involving multiple optical fields, used for time-holography of optical fields.

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