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MEASURING QUANTUM PHASES IN GRAPHENE BY PHOTOEMISSION SPECTROSCOPY

Graphene exhibits novel electronic properties based on its two-components spinor eigenstate, imposing pseudospin nature to quasiparticles. By using angle-resolved photoemission spectroscopy, we study the origin of the momentum distribution of photoemission intensity upon changing light polarization. We thus provide a new powerful way to directly measure fundamental quantum phases, central properties to understand the electronic properties of a material. More specifically, we directly measure the Berry's phase for a specific electron band structure and the sign of the inter-orbital hopping integral within a tight-binding formalism. The former is advantageous compared to a conventional magneto-transport method and the latter has never been measured for any material by any experimental method before.

In collaboration with:

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