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【631】 Ultrafast light-spin phenomena in topological insulators

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We present time- and angle-resolved photoemission spectroscopy (TR-ARPES) measurements on $\text{Bi}_2\text{Sb}(2-x)\text{Te}_3\text{Se}(3-y)$ topological insulators. Exploiting circularly polarized femtosecond pulses we investigated spin-related ultrafast phenomena as photo-induced spin current and spin-dependent relaxation processes.

In particular, we report the first experimental evidence of a direct coupling between light and empty topological surface states (ESS) that triggers a flow of spin-polarized electrons in k -space i.e. a photon-induced spin-current. In addition, our data suggest an accumulation of spin-polarized electrons in the conduction bands leading to a finite polarization in the surface resonance state (SRS).

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