

Anisotropic spin-to-charge conversion in bismuth

Bismuth (Bi) is an important and intriguing element for many quantum materials. In this work, we show that the hexagonal crystal structure of Bi profoundly modifies the spin-to-charge conversion. We reveal the highly anisotropic spin-to-charge conversion between Bi(003) and Bi(012). Our results address the experimental criteria for the spin conversion in Bi, which is essential for Bi-based topological quantum materials and spintronics.

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Observation of Vector Spin Seebeck Effect in a Noncollinear Antiferromagnet

Previously, we show spin Seebeck effect (SSE) has been firmly established only in a ferromagnet with the collinear moment and spin injection in the out-of-plane direction but not with spin injection in the in-plane direction. [Phys. Rev. Lett. 117, 247201 (2016)]. In this work, in collaboration with Prof. Chien (JHU and NTU Distinguished Professor), we report the observation of a vector SSE in a noncollinear antiferromagnet (AF) LuFeO₃, where temperature gradient along the out-of-plane and also the in-plane directions can both inject a pure spin current. The noncollinear AFs expand new realms for exploring spin phenomena and provide a new route to low-field antiferromagnetic spin caloritronics and magnonics.

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