Large transverse thermoelectric effect induced by topological flat bands

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Magnetic topological materials, such as magnetic Weyl and nodal-line semimetals, host topologically non-trivial band structures near the Fermi energy in their magnetically ordered phases. The associated enhancement of momentum-space Berry curvature leads to large transverse responses, such as anomalous Hall and anomalous Nernst effects, that cannot be fully accounted for by conventional magnetization scaling. In particular, the anomalous Nernst effect generates a voltage transverse to a thermal gradient, allowing versatile thin-film device geometries. These characteristics make topological magnets attractive candidates for next-generation transverse thermoelectric devices, with potential applications in energy harvesting and sensing technologies for IoT and wearable systems.

In this presentation, we will review recent experimental progress on large transverse thermoelectric effects in topological magnets such as Co_2MnGa, Fe_3Ga, Fe_3Sn and $GdCo_5$ [1-5].

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