**First-principles study of Berry-phase-mediated thermoelectric effects**

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We are interested in how to achieve much higher thermoelectric conversion efficiency by effectively manipulating electron-spin degree of freedom. As one possibility, we have been studying *Berry-phase-mediated thermoelectric effects*, namely the contribution of the anomalous Hall conductivity (AHC) to thermoelectric power. What we target here is the anomalous Nernst effect (ANE), which is a heat-to-electricity conversion observed in magnetic materials and directly related to AHC. We discussed AHC mainly driven by an effective magnetic field, *Berry curvature,* induced by spin-orbit coupling and/or spin chirality.

In this presentation, we will present our recent first-principles computations [1] on topological magnet (skyrmion crystals) [2,3] and half-Heusler compounds [4]. We found that the effective magnetic field indeed generates large ANE. This behavior was clearly understood by the chemical potential dependence of AHC. Based on the gained knowledge, we will discuss how to enhance such Berry-phase-mediated thermoelectric effects.

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