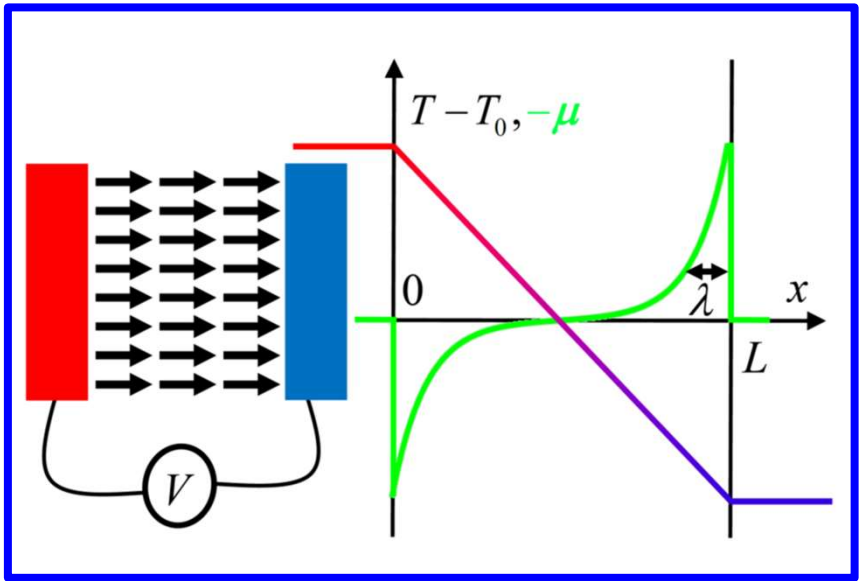
作成者： Bauer Gerrit（東北大 AIMR & 金研）

研究プロジェクト名：Magnonics vs. Ferronics

概要: The spontaneous order of electric and magnetic dipoles in ferroelectrics and ferromagnets even at high temperatures is both fascinating and useful. Spintronics studies the transport of magnetic order in the form of magnonic spin currents, but the polarization current of the ferroelectric order (ferronics) has escaped attention. We study theoretically the analogies and differences between the magnon transport in ferromagnets and ferron transport in ferroelectrics. We will focus on two limiting regimes in which analytic results appear to be feasible, viz. the diffuse/ballistic regime in which the scattering mean-free path is smaller/larger than the samples size.

コアメンバー: Ping Tang, Ryo Iguchi (NIMS), Ken-ichi Uchida (NIMS/IMR) and Gerrit Bauer

期待される研究成果: We derive the polarization vs. spin Peltier and Seebeck effects and discuss observability of the field or temperature gradient-driven polarization current. The results will kick start a new research direction and help to develop new strategies for thermal management using ferroelectric materials.



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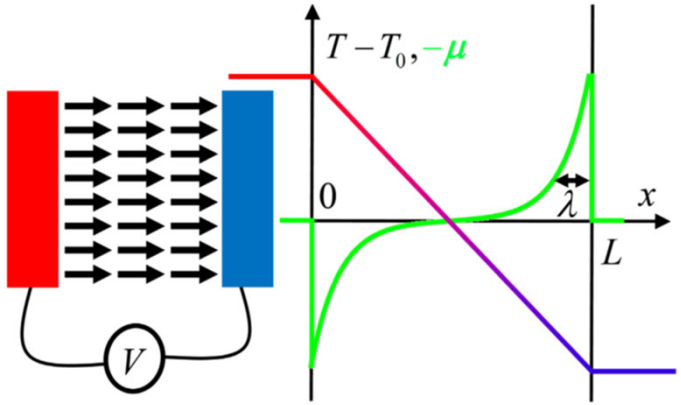
研究成果（実施状況）： We derive the polarization vs. spin Peltier and Seebeck effects and discuss observability of the field or temperature gradient-driven polarization current in terms of thermovoltages, transient Peltier effects and stray magnetic fields. The results will kick start a new research direction and help to develop new strategies for thermal management using ferroelectric materials.



主要発表論文等： [1] G.E.W. Bauer, R. Iguchi, and K. Uchida, *Theory of Transport in Ferroelectric Capacitors*, Phys. Rev. Lett. **126**, 187603 (2021); [2] P. Tang, R. Iguchi, K. Uchida and G.E.W. Bauer, *Thermoelectric Polarization Transport in Ferroelectric Ballistic Point Contacts*, Phys. Rev. Lett., **128**, 047601 (1-6) (2022)