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Nernst effect as a probe of correlated electrons

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The Nernst effect, the generation of a transverse magnetic field by a longitudinal thermal gradient, has emerged as a powerful probe of electronic interactions. As originally discovered in the context of research on cuprates, it has proved to be a very sensitive probe of superconducting fluctuations. Our recent studies of the Nernst effect in an amorphous thin film of a conventional superconductor, could resolve superconducting fluctuations in a wide temperature window, exceeding well above both T_c and H_{c2}.
However, superconducting fluctuations are not the unique source for a Nernst signal. Recently giant Nernst signals were detected in Heavy-Fermion semi-metals, such as the hidden-order state of URu_2Si_2 or the mysterious ordered state of $PeFe_4P_{12}$. Moreover, studies of the thermoelectric response near the quantum critical point in $CeCoIn_5$ have documented a direct link between a large Nernst signal and a small Fermi energy.
Even elemental bismuth, the system in which Nernst and Ettingshausen discovered their effects, has become a subject of renewed attention thanks to recent studies of the Nernst effect. The origin of the giant quantum oscillations in the Nernst response across the quantum limit, as well as the unexpected anomalies observed beyond this limit, remain open questions.