

凝縮系物理学ゼミナール

Condensed Matter Seminar

Location: Room 413, School of Science Bldg. 5 (理学 5 号館 413 号室)

Date: 13:30-14:15, Wednesday, 13 November 2013

Giant Nernst Effect due to Berry Phase Fluctuation in Chiral Superconductors

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Abstract:

Chiral superconductors, in which Cooper pairs have angular momentum and time-reversal symmetry is broken, inherit the Berry phase, which causes exotic quantum transport phenomena such as the anomalous (spontaneous) thermal Hall effect [1].

The purpose of this study is to clarify how the chirality or the Berry phase which thermally excited Cooper pairs inherit contributes to transport phenomena in superconducting fluctuation regime. In this study we introduced a model of chiral $d_{zx} \pm i d_{zy}$ superconductors and studied the Nernst effect caused by chiral superconducting fluctuations, i.e. Berry-phase fluctuations, by using a diagrammatic approach. This study showed that the new contribution is significant in clean and strongly correlated systems and this feature is qualitatively different from the conventional case of superconducting fluctuations. We discuss the implications for the recent experimental results of URu₂Si₂ [2].

Reference:

[1] H. Sumiyoshi and S. Fujimoto, J. Phys. Soc. Jpn. **82**, 023602 (2013)

[2] T. Yamashita et al., the 68th JPS Annual Meeting, 27aEB-1, Tokushima (2013)