

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Thermal Hall conductivity of a nodal chiral superconductor.¹

SUNGKIT YIP, Institute of Physics, Academia Sinica — Motivated by the suggestion that Sr2RuO4 is a chiral superconductor and the experimental observation of universal thermal conductivity at low temperature (indicating line nodes or nearly line nodes in the gap) for this system, we evaluate the zero field thermal Hall conductivity of a chiral nodal superconductor. We show that this thermal Hall conductivity (in contrast to the diagonal component) is not universal in the low temperature limit but depends on impurity concentration and phase shift characterizing the impurities. This zero-field Hall thermal conductivity vanishes when the phase shifts are multiple of $\pi/2$. However, under general circumstances, it is smaller than the universal diagonal thermal conductivity only by the factor $\ln(2\Delta/\gamma)$, where Δ is the maximum superconducting gap and γ is the impurity band width. Numerically this is roughly 0.1-0.2 for available samples. Hence this value of the thermal Hall conductivity is quite large. In particular it is much larger than the expected edge state contributions. Measurement of this zero-field thermal Hall conductivity would be an unambiguous indication that Sr2RuO4 is a chiral superconductor.

¹Ministry of Science and Technology, Taiwan

Sungkit Yip
Institute of Physics, Academia Sinica

Date submitted: 11 Nov 2016

Electronic form version 1.4