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Low Temperature Heat Transport in the superconducting skutterudite $\text{PrOs}_4\text{Sb}_{12}$: Evidence for nodes in the superconducting gap
ROBERT HILL, University of Waterloo, BRIAN MAPLE, University of California San Diego, SHIYAN LI, NICOLAS DOIRON-LEYRAUD, LOUIS TAILLEFER, Universite de Sherbrooke — Thermal conductivity measurements were performed on single crystal samples of the superconducting skutterudite material $\text{PrOs}_4\text{Sb}_{12}$ both as a function of temperature and as a function of magnetic field applied perpendicular to the heat current. In zero magnetic field we find clear evidence for residual electronic conduction as the temperature tends to zero Kelvin which is consistent with the presence of nodes in the superconducting gap. The field dependence of this electronic conductivity shows a rapid rise immediately above H_{c1} , increasing by a factor 10 in 100 mT ($\sim 0.05 H_{c2}$). This is consistent with a semi-classical theory based on a Doppler-shift of the quasiparticle spectrum through coupling to the superfluid flow around magnetic vortices.

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