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Multiband superconductivity in the doped Skutterudite compound $\text{Pr}_{0.5}\text{La}_{0.5}\text{Pt}_4\text{Ge}_{12}$.

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A suite of electronic and magnetic property studies were conducted on a $\text{Pr}_{0.5}\text{La}_{0.5}\text{Pt}_4\text{Ge}_{12}$ (Skutterudite) polycrystalline sample with an objective of investigating its superconducting state. The two parent compounds $\text{PrPt}_4\text{Ge}_{12}$ ($T_c = 8\text{K}$) and $\text{LaPt}_4\text{Ge}_{12}$ ($T_c = 7.8\text{K}$) both form in the filled-cage cubic Skutterudite structure and both have a superconducting ground state. However, their superconducting order parameters differ: $\text{PrPt}_4\text{Ge}_{12}$ has been characterized in the literature as an unconventional, multi-band superconductor and furthermore with evidence for time reversal symmetry breaking in its superconducting state. The isostructural compound $\text{LaPt}_4\text{Ge}_{12}$ on the other hand is a conventional superconductor. In this work we report the results of magnetization, magnetic susceptibility and heat capacity as functions of temperature and applied magnetic field in order to study the entanglement of the two types of superconductivity, and in an attempt to search for evidence of time-reversal symmetry breaking that may result from an internal magnetic field generated in the superconducting state.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

Primary author: Mr KATAMETSI, Masego (University of Johannesburg)

Co-author: STRYDOM, Andre (University of Johannesburg)

Presenter: Mr KATAMETSI, Masego (University of Johannesburg)

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