

Abstract Submitted  
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**A comprehensive study of chemical substitution effects on superconductivity in LaPt<sub>4</sub>Ge<sub>12</sub>**<sup>1</sup> KEVIN HUANG<sup>2</sup>, DUYGU YAZICI, BENJAMIN WHITE, ALEXANDER BREINDEL, NAVEEN POUSE, Physics Department, UC San Diego, LEI SHU, Physics Department, Fudan University, BRIAN MAPLE, Physics Department, UC San Diego — The compound PrPt<sub>4</sub>Ge<sub>12</sub> has attracted significant attention following observations of signatures of unconventional superconductivity such as time reversal symmetry breaking from  $\mu$ SR measurements. In contrast, LaPt<sub>4</sub>Ge<sub>12</sub> is a conventional BCS-type superconductor, interestingly, with the same superconducting transition temperature,  $T_c$ , as PrPt<sub>4</sub>Ge<sub>12</sub> ( $T_c = 8$  K). To elucidate the properties of superconductivity in PrPt<sub>4</sub>Ge<sub>12</sub>, the system La<sub>1-x</sub>Ce<sub>x</sub>Pt<sub>4</sub>Ge<sub>12</sub> was investigated and the results are compared to our previous work on Pr<sub>1-x</sub>Ce<sub>x</sub>Pt<sub>4</sub>Ge<sub>12</sub>. Measurements of magnetic susceptibility, electrical resistivity, and specific heat were performed demonstrating that  $T_c$  is suppressed more rapidly in La<sub>1-x</sub>Ce<sub>x</sub>Pt<sub>4</sub>Ge<sub>12</sub> than in Pr<sub>1-x</sub>Ce<sub>x</sub>Pt<sub>4</sub>Ge<sub>12</sub>. Specific heat measurements reveal a crossover in the temperature dependence of the superconducting state of La<sub>1-x</sub>Ce<sub>x</sub>Pt<sub>4</sub>Ge<sub>12</sub>, changing from a power law for  $x = 0$  to an exponential for the Ce-substituted samples, possible evidence of a transition from a multiband to a single-band superconducting energy gap. Th substitution for La did not produce the crossover.

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