Weyl-Kondo semimetal behavior in $Ce_3Bi_4Pd_3$

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The quest for topologically nontrivial phases in strongly correlated electron systems has recently expanded from Kondo insulators, with topologically protected surface states, to a new class of Weyl-Kondo semimetals [1]. I will report on our observation of thermodynamic evidence for this state, namely a linear electronic dispersion with strongly renormalized velocity, in the new non-centrosymmetric cubic material $Ce_3Bi_4Pd_3$ [2]. Its isostructural sister compound $Ce_3Bi_4Pt_3$ is a canonical Kondo insulator. Studying the substitution series $Ce_3Bi_4(Pt_{1-x}Pd_x)_3$ we showed that, while the replacement of the 5*d* element Pt by the much lighter 4*d* element Pd strongly reduces the conduction electron spin-orbit coupling, it is isostructural, isoelectronic, and isosize [2]. This indicates that the Weyl-Kondo semimetal state may emerge from a (non-centrosymmetric) Kondo insulator in the presence of reduced spin-orbit coupling.

[1] H.-H. Lai, S. E. Grefe, S. Paschen, and Q. Si, Weyl-Kondo semimetal in a heavy fermion system, arXiv:1612.03899.

[2] S. Dzsaber, L. Prochaska, A. Sidorenko, G. Eguchi, R. Svagera, M. Waas, A. Prokofiev, Q. Si, and S. Paschen, Kondo insulator to semimetal transformation tuned by spin-orbit coupling, Phys. Rev. Lett. **118**, 246601 (2017).