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Complex magnetism and strong electronic correlations in Ce_2PdGe_3 ANDREW GALLAGHER, TIGLET BESARA, NHMFL, Florida State Univ., JIFENG SUN, FAMU-FSU College of Eng., Dept. Chem. & Biomed. Eng., ORNL, THEO SIEGRIST, NHMFL, FAMU-FSU College of Eng., Dept. Chem. & Biomed. Eng., DAVID SINGH, ORNL, JOE THOMPSON, FILIP RONNING, ERIC BAUER, LANL, RYAN BAUMBACH, NHMFL, Florida State Univ. — We report structure/chemical results, magnetization, heat capacity, and electrical transport data for single crystals of the new tetragonal compound Ce_2PdGe_3. Single crystal X-ray diffraction shows that this material crystallizes in the space group $P42/mmc$ – and is related to the α-$ThSi_2$-type structure. Complicated magnetism, with a two-part antiferromagnetic phase transition at $T_{N,1} = 10.7$ K and $T_{N,2} = 9.6$ K and subsequent ferromagnetic ordering near $T_C \approx 2.25$ K is observed. The ordered ground state emerges from a lattice of Ce ions that are hybridized with the conduction electrons, as revealed by the enhanced electronic coefficient of the specific heat $\gamma \approx 50$ mJ/mol-Ce-K^2 (extrapolated to $T = 0$ for $T < T_C$). Electronic structure calculations suggest that there is significant f-electron weight in the density of states near the Fermi energy, consistent with the enhanced specific heat, and that the Fermi surface includes sheets with distinct nesting vectors. We will discuss prospects for tuning the ferromagnetism to zero temperature to produce a ferromagnetic quantum phase transition: e.g., through applied pressure and/or chemical substitution.

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