Abstract Submitted
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Nodal and multi-gap superconductivity in $Ta_4Pd_3Te_{16}$ with weakly ferromagnetic normal state[1] GUANG-HAN CAO, WEN-HE JIAO, CHUN-MU FENG, ZHU-AN XU, Department of Physics, Zhejiang University, INSTITUTE OF CONDENSED MATTER PHYSICS TEAM — We recently discovered bulk superconductivity at T_c =4.6 K in a transition metal telluride $Ta_4Pd_3Te_{16}$ [W. H. Jiao et al., J. Am. Chem. Soc. 136, 1284 (2014)]. This material has a layered structure with one-dimensional $PdTe_2$ chains. Significant electron correlations are indicated by the enhanced Sommerfeld coefficient. Here we report the measurements of magnetoresistance, Hall effect, magnetization and specific heat using high-quality crystals. Our results show that $Ta_4Pd_3Te_{16}$ is an anisotropic type-II superconductor. The anisotropy of upper critical fields $H_{c2}(T)$ is strongly T-dependent, resulted from the multi-band effect. The zero-field electronic specific heat $C_e(T)$ far below the T_c is found to be proportional to T^3, suggestive of presence of point nodes in at least one of the superconducting gaps, which is further supported by a nonlinear ($\propto H^{1/2}$) field dependence of Sommerfeld coefficient in the mixed state. Notably, the material shows anisotropic weak-ferromagnetism above T_c, implying that spin-triplet superconductivity is likely in this material.

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