# Supplementary Information

# Anomalous upper critical field in the quasicrystal superconductor $Ta_{1.6}Te$

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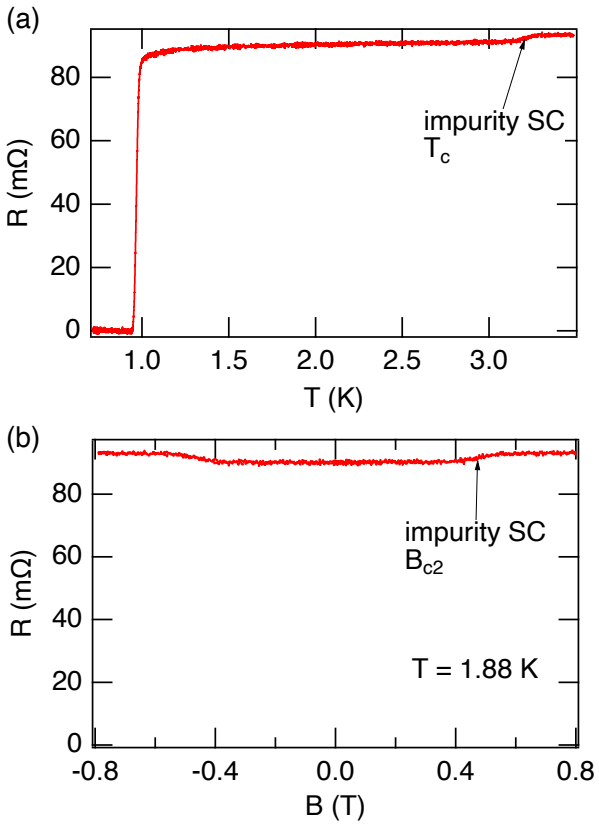


Supplementary Figure 1. Superconducting impurity. (a) Resistance vs temperature curve showing a resistance drop near 3.2 K due to a superconducting impurity. (b) Resistance vs magnetic field curve measured at 1.88 K showing a resistive transition due to the impurity near 0.47 T.

## SUPPLEMENTARY NOTE 1

The present sample contains a small amount of a superconducting impurity whose transition temperature is about 3.2 K [Supplementary Figure 1(a)]. The resistance drop associated with the superconducting transition is about 2% of the sample resistance. The upper critical field of the superconducting impurity is about 0.47 T at 1.88 K [Supplementary Figure 1(b)]. We could not identify the chemical composition nor the compound of the superconducting impurity.

## SUPPLEMENTARY NOTE 2

It might be instructive to estimate the lower limit of $\lambda_{so}$ that can explain the observed violation of the Pauli limit. Assuming that the experimental $B_{c2}(0)$ equals $B_p/\sqrt{2}$,

$$\sqrt{\lambda_{so}} = \frac{1}{1.33}\frac{B_p}{B_{po}} = \frac{\sqrt{2}}{1.33}\frac{B_{c2}(0)}{B_{po}}. \quad (1)$$

Using the experimental value $B_{c2}(0)/B_{po} = 2.3$, we obtain $\lambda_{so} = 6.0$, which corresponds to $\tau_{so} = 2.8 \times 10^{-13}$ s.