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A minimal "hydrogen atom" version of a time reversal invariant Weyl semimetal[1] SONGTIAN S. ZHANG, ILYA BELOPOLSKI, Princeton Univ, PENG YU, Nanyang Technical Univ, DANIEL S. SANCHEZ, Princeton Univ, YUKIAKI ISHIDA, Univ of Tokyo, TAY-RONG CHANG, National Tsing Hua Univ, SU-YANG XU, Princeton Univ, DAIXIANG MOU, Iowa State Univ, HAO ZHENG, Princeton Univ, GUOQING CHANG, National Univ of Singapore, GUANG BIAN, Princeton Univ, HORNG-TAY JENG, National Tsing Hua Univ, TAKESHI KONDO, Univ of Tokyo, ADAM KAMINSKI, Iowa State Univ, HSIN LIN, National Univ of Singapore, ZHENG LIU, Nanyang Technical Univ, SHIK SHIN, Univ of Tokyo, ZAHID HASAN, Princeton Univ — Typical Weyl semimetals host many Weyl points; for instance, TaAs has 24 Weyl points. However, the minimal nonzero number of Weyl points for a time reversal invariant crystal is four. Finding such a material would provide the simplest "hydrogen atom" example of a Weyl semimetal. Applications may also be simpler in a system with as few Weyl points as possible. $TaIrTe_4$ is predicted to be a minimal Weyl semimetal. However, the Weyl points are well above the Fermi level, making them inaccessible to conventional ARPES. Here, we use pump-probe ARPES to directly observe Weyl points and topological Fermi arcs in $TaIrTe_4$ above the Fermi level. We find a total of four Weyl points, demonstrating the first minimal Weyl semimetal.

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