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Band structure of $ZrTe_5$ measured by high-momentum-resolution photoemission spectroscopy HONGYU XIONG, Stanford University, SLAC National Accelerator Laboratory, JONATHAN SOBOTA, Stanford University, SLAC National Accelerator Laboratory, Lawrence Berkeley National Laboratory, SHUOLONG YANG, Stanford University, SLAC National Accelerator Laboratory, HADAS SOIFER, SLAC National Accelerator Laboratory, ALEXANDRE GAUTHIER, Stanford University, SLAC National Accelerator Laboratory, MING-HUI LU, YANG-YANG LV, SHUHUA YAO, Nanjing University, DONGHUI LU, MAKOTO HASHIMOTO, PATRICK KIRCHMANN, SLAC National Accelerator Laboratory, YAN-FENG CHEN, Nanjing University, ZHI-XUN SHEN, Stanford University, SLAC National Accelerator Laboratory — We have performed a systematic high-momentum-resolution photoemission study on $ZrTe_5$ using a photon energy of 6 eV. We have measured the band structure near Γ, and quantified the gap between conduction and valence band as 25 ± 5 meV. We have also observed photon-energy-dependent spectral changes, and attributed these changes to final-state effects and the 3D nature of the material's band structure. Our observation suggests that $ZrTe_5$ is neither a 3D strong topological insulator, nor a Dirac semimetal. We further propose a model which promises to reconcile discrepancies on the existence of surface state in different literature studies of this material.

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