Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Gate-Tunable Negative Longitudinal Magnetoresistance as Transport Evidence of a Type-II Weyl Semimetal WTe2. YAOJIA WANG, Nanjing Univ, ERFU LIU, HUIMEI LIU, ZHENLIN WANG, Nanjing University, HAIZHOU LU, South University of Science and Technology of China, BAIGENG WANG, XIANGANG WAN, FENG MIAO, Nanjing University — The progress in exploiting new electronic materials has been a major driving force in solid-state physics. As a new state of matter, a Weyl semimetal (WSM), particularly a type-II WSM, hosts Weyl fermions as emergent quasiparticles and may harbor novel electrical transport properties. In this work, by performing systematic magneto-transport studies on thin films of a predicted material candidate WTe2, we observe notable negative longitudinal magnetoresistance, which can be attributed to the chiral anomaly in WSM. This phenomenon also exhibits strong planar orientation dependence with the absence along the tungsten chains, consistent with the distinctive feature of a type-II WSM. By applying a gate voltage, we demonstrate that the Fermi energy can be in-situ tuned through the Weyl points via the electric field effect. Our results may open opportunities for implementing new electronic applications, such as field-effect chiral devices. Reference: Y. J. Wang. et al., Nature Communications 7,13142 (2016).

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Date submitted: 10 Nov 2016 Electronic form version 1.4