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Chiral magnetic effect in ZrTe5 QIANG LI, CHENG ZHANG, GENDA GU, T. VALLA, Brookhaven National Lab, DMITRI KHARZEEV, Brookhaven National Lab and Stony Brook University, I. PLETIKOSIC, Princeton University — The chiral magnetic effect is the generation of electric current induced by chirality imbalance in the presence of magnetic field. Here we report on the measurement of magneto-transport in zirconium pentatelluride, ZrTe5 that provides a strong evidence for the chiral magnetic effect. Our angle-resolved photoemission spectroscopy experiments show that this material's electronic structure is consistent with a 3D Dirac semimetal. We observe a large negative magnetoresistance when magnetic field is parallel with the current. The measured quadratic field dependence of the magnetoconductance is a clear indication of the chiral magnetic effect. The observed phenomenon stems from the effective transmutation of Dirac semimetal into a Weyl semimetal induced by the parallel electric and magnetic fields that represent a topologically nontrivial gauge field background. We expect that chiral magnetic effect may emerge in a wide class of materials that are near the transition between the trivial and topological insulators.

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