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Giant negative magnetoresistance induced by the chiral anomaly in individual Cd_3As_2 nanowires. LI CAIZHEN, WANG LIXIAN, LIU HAIWEN, WANG JIAN, LIAO ZHIMIN, YU DAPENG, Peking Univ — Dirac electronic materials beyond graphene and topological insulators have recently attracted considerable attention. Cd_3As_2 is a Dirac semimetal with linear dispersion along all three momentum directions and can be viewed as a three-dimensional analogue of graphene. By breaking of either time-reversal symmetry or spatial inversion symmetry, the Dirac semimetal is believed to transform into a Weyl semimetal with an exotic chiral anomaly effect, however the experimental evidence of the chiral anomaly is still missing in Cd_3As_2. Here we show a large negative magnetoresistance with magnitude of 63% at 60 K and 11% at 300 K in individual Cd_3As_2 nanowires. The negative magnetoresistance can be modulated by gate voltage and temperature through tuning the density of chiral states at the Fermi level and the inter-valley scatterings between Weyl nodes. The results give evidence of the chiral anomaly effect and are valuable for understanding the Weyl fermions in Dirac semimetals.

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