

Abstract Submitted
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Gate-modulated magnetotransport and anomalous quantum oscillations in Dirac semimetal Cd_3As_2 nanowires LIXIAN WANG, CAIZHEN LI, DAPENG YU, ZHIMIN LIAO, State Key Laboratory for Mesoscopic Physics, Department of Physics, Peking University — Magnetotransport studies of three-dimensional (3D) relativistic electrons in Dirac semimetals is critical for identifying exotic topological phenomena and quantum transport. Using gate-modulation method, we conducted systematic transport measurements over our fabricated Cd_3As_2 nanowire based devices under a variable magnetic field. We observe an obvious ambipolar-field-effect as tuning the gate-voltage bias without applied field and distinctive MR behaviors at different gate-voltage bias with applied field. Remarkably, anomalous quantum oscillations occurs at high fields, which may be in close relationship to the sought-after Fermi-arc surface state in Dirac semimetals. The presence of anomalous oscillations may suggest that Cd_3As_2 nanomaterials with a gate-tunable Fermi-surface may be a promising candidate as an excellent platform to explore the elusive surface state in topological semimetals.

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