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**Consequences of breaking time reversal symmetry in LaSb: a resistivity plateau and extreme magnetoresistance** FAZEL TAFTI, QUINN GIBSON, SATYA KUSHWAHA, NEEL HALDOLAARACHCHIGE, ROBERT CAVA, Princeton University, CAVA LAB TEAM — Time reversal symmetry protects the metallic surface modes of topological insulators (TIs). The transport signature of robust metallic surface modes of TIs is a plateau that arrests the exponential divergence of the insulating bulk with decreasing temperature. This universal behavior is observed in all TI candidates ranging from $Bi_2Te_2Se$ to $SmB_6$. Recently, several topological semimetals (TSMs) have been found that exhibit extreme magnetoresistance (XMR) and TI universal resistivity behavior revealed only when breaking TRS, a regime where TIs theoretically cease to exist. Amongst these new materials, TaAs and NbP are nominated for Weyl semimetal due to their lack of inversion symmetry, $Cd_3As_2$ is nominated for Dirac semimetal due to linear band crossing, and $WTe_2$ is nominated for resonant compensated semimetal due to perfect electron-hole symmetry. Here we introduce LaSb, a simple rock-salt structure material without broken inversion symmetry, without perfect linear band crossing, and without perfect electron-hole symmetry. Yet LaSb portrays all the exotic field induced behaviors of the aforementioned semimetals. It shows the universal TI resistivity with a plateau at 15 K, revealed by a magnetic field, ultrahigh mobility of carriers, quantum oscillations with 2D Fermi surface, and XMR of about one million percent. Due to its dramatic simplicity, LaSb is the ideal model system to formulate a theoretical understanding of the exotic consequences of breaking TRS in TSMs.

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