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Hysteretic magnetoresistance and unconventional anomalous Hall effect in the frustrated magnet TmB4 SAI SWAROOP SUNKU[1], Div of Physics and Applied Physics, Nanyang Technological University, TAI KONG, Ames Laboratory and Dept of Physics and Astronomy, Iowa State University, TOSHIMITSU ITO, National Institute of Advanced Industrial Science and Technology (AIST), PAUL C. CANFIELD, Ames Laboratory and Dept of Physics and Astronomy, Iowa State University, B. SRIRAM SHASTRY, Physics Dept, University of California, Santa Cruz, PINAKI SENGUPTA, CHRISTOS PANAGOPOULOS, Div of Physics and Applied Physics, Nanyang Technological University — We study TmB_4, a frustrated magnet on the Archimedean Shastry-Sutherland lattice, through magnetization and transport experiments. The lack of anisotropy in resistivity shows that TmB_4 is an electronically three-dimensional system. The magnetoresistance (MR) is hysteretic at low-temperature even though a corresponding hysteresis in magnetization is absent. The Hall resistivity shows unconventional anomalous Hall effect (AHE) and is linear above saturation despite a large MR. We suggest that both hysteretic MR and AHE arise from the formation of complex non-coplanar structures at magnetic domain walls.

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