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Probing the Chiral Anomaly via Nonlocal Transport in Weyl Semimetals[1] SIDDHARTH PARAMESWARAN, UC Berkeley, TARUN GROVER, Kavli Institute for Theoretical Physics, UC Santa Barbara, ASHVIN VISHWANATH, UC Berkeley — Weyl semimetals are three-dimensional analogs of graphene in which a pair of bands touch at points in momentum space, known as Weyl nodes. Electrons originating from a single Weyl node possess a definite topological charge, the chirality. Consequently, they exhibit the Adler-Jackiw-Bell anomaly, which in this condensed matter realization implies that application of parallel electric ($\mathbf{E}$) and magnetic fields ($\mathbf{B}$) pumps electrons between nodes of opposite chirality at a rate proportional to $\mathbf{E} \cdot \mathbf{B}$. We argue that this pumping is measurable via transport experiments, in the limit of weak internode scattering. Specifically, we show that injecting a current in a Weyl semimetal subject to an $\mathbf{E} \cdot \mathbf{B}$ term leads to nonlocal features in transport.

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