Abstract Submitted
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Fractal chiral anomaly in cold atomic Weyls[1] MICHAEL KOLODRUBETZ, Univ of California - Berkeley, STHITADHI ROY, Max Planck Institute for the Physics of Complex Systems - Dresden, JOEL MOORE, ADOLFO GRUSHIN, Univ of California - Berkeley — The Hofstadter butterfly of lattice electrons in a strong magnetic field is a cornerstone of condensed matter physics, exploring the competition between periodicities imposed by the lattice and the field. In this talk we introduce and characterize the Weyl butterfly, which emerges when a large magnetic field is applied to a three-dimensional Weyl semimetal. Using an experimentally motivated lattice model for cold atomic systems, we solve this problem numerically. We find that Weyl nodes reemerge at commensurate fluxes and propose using wavepackets dynamics to reveal their chirality and location. Moreover, we show that the chiral anomaly – a hallmark of the topological Weyl semimetal – does not remain proportional to magnetic field at large fields, but rather inherits a fractal structure of linear regimes as a function of external field. The slope of each linear regime is determined by the difference of two Chern numbers in gaps of the Weyl butterfly and can be measured experimentally in time-of-flight.

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