

Physics Colloquium

Dr. Karl Landsteiner

“Quantum Anomalies in Matter”

Symmetry is a key concept in physics. Some symmetries exist however only in the classical world and can not be realized in the quantum theory. When this happens, we speak of a (quantum) anomaly. The most prominent examples are the triangle anomalies arising in the quantum field theory of chiral fermions. In particle physics they explain the short lifetime of the neutral pion, give rise to consistency conditions on gauge theories and allow powerful insight into the low energy dynamics. Climbing a long and windy theory road it has been realized over the last decade that anomalies also give rise to new and dissipationfree transport phenomena in hot and dense relativistic matter. I will review this anomalous transport theory and then discuss how it can be applied to the electronics of Weyl semimetals, an exciting new class of topological quantum materials.

Dr. Karl Landsteiner is a Senior Researcher at the Institute of Theoretical Physics (IFT), Madrid, Spain. Karl completed his Undergraduate and doctoral studies from Technical University Vienna, and pursued his postdoctoral research works at University of California, Berkeley, Technical University of Vienna and CERN. Prior to joining IFT Madrid, Karl was an Assistant Professor in Humboldt University Berlin. Research interests of Karl focus on Quantum field theory of exotic and topological states of matter and Gauge/gravity duality

Thursday, April 1st at 4:25 pm via Zoom

**If you are outside the Lehigh Physics Department,
please email Professor Bitan Roy (bir218@lehigh.edu)**