复旦大学物理系 Colloquium

Time: 14:00, Tuesday, 2023.5.9

Location: C108, Jiangwan Physics Building（线下报告）

Particle View in Crystals

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Abstract: I will present a world view for electrons in crystals based on the semiclassical dynamics and describe how the Berry curvatures modify the thermodynamic and transport properties. I will then extend this point of view to spacetime crystals by introducing the concept of an event wavepacket, the quantum version of the classical event point in spacetime. I will also describe spatial and temporal deformation, first in 3d crystals, using a geodynamic language, and obtain Hall viscosity, flexsoelectric and flexsomagnetic responses. When the results are extended to 4d spacetime crystals, the geodynamics becomes greatly simplified and unified, allowing a fresh look of table-top general relativity.

Biography: Qian Niu is a Distinguished Chair Professor at the University of Science and Technology of China. He obtained his B.S. from Peking University in 1981 and his Ph.D. in physics from the University of Washington, Seattle, in 1985. After completing postdoc studies at the University of Illinois and the University of California, Santa Barbara, he joined The University of Texas at Austin as an Assistant Professor in 1990. He was appointed as the Trull Centennial Chair in Physics in 2001 and became the Sid W. Richardson Foundation Regents Chair in Physics at the University of Texas at Austin in 2018. Prof. Niu has made foundational contributions to the theories of quantum Hall effects, quasicrystals, ultracold atoms, spin transport, and graphene materials, with an emphasis on topological and geometric phase effects in quantum transport. He has published more than 280 peer-reviewed papers, including 81 in Physical Review Letters, and has over 29000 citations (with an H index of 77). Prof. Niu is also a Fellow of the American Physical Society.