Seminar/Talk

Lead-halide-perovskite analogues of high-energy phenomena

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The energy spectrum of lead-halide perovskites (LHPs) in the vicinity of the band gap resembles that of a Dirac equation. This observation establishes a fruitful analogy between condensed matter and high-energy physics. Indeed, on the one hand, it allows one to use well-established theoretical techniques to study strong-field effects in LHPs. On the other hand, it paves the way for the first experimental observations of textbook phenomena in high-energy physics.The talk will first introduce LHPs as a Dirac semiconductor. This will lay down the base for the discussion of a recent observation of the dynamical Schwinger effect in LHPs. Besides being of general interest, this observation implies a number of useful applications, in particular detection of strong electric fields, also demonstrated in the laboratory. Further, I will argue that LHPs can potentially be employed to study Dirac-Pauli physics – an extension of the Dirac equation due to Pauli, which has found limited use in high-energy physics. The presentation is based on arXiv: 2406.05032 and arXiv:2407.04450.

Tuesday, October 8, 2024 11:00am - 12:00pm
Central Bldg / O1 / Mondi 1

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