Abstract Submitted
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**Topological Mott Insulator in Three-Dimensional Systems with Quadratic Band Touching** LUKAS JANSSEN, IGOR HERBUT, Simon Fraser University — We will discuss the effects of the long-range Coulomb interaction in three-dimensional systems in which conduction and valence bands touch quadratically at the Fermi level. Such band structure is realized in various strongly spin-orbit-coupled materials, such as HgTe, $\alpha$-Sn, and some pyrochlore iridates. We will argue that these systems may be unstable towards spontaneous formation of the strong topological Mott insulator already at weak long-range Coulomb interaction. The mechanism of the instability can be understood as the collision of a non-Fermi-liquid fixed point, discovered by Abrikosov in the '70s and revisited recently, with another, critical, fixed point, which approaches it in the coupling space as the system's dimensionality approaches a certain "critical dimension" from above. Some universal characteristics of this scenario, the width of the non-Fermi-liquid crossover regime, and the observability of the topological Mott phase will be discussed. Reference: I. F. Herbut and L. Janssen, Phys. Rev. Lett. 113, 106401 (2014).

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