世纪物理情・系列讲座

An anomaly index for locality-preserving symmetries of spin chains

【摘要】

Several years ago, Nayak and Else argued that Symmetry Protected Topological phases in d dimensions can be classified using non-on-site actions of the symmetry group in d-1 dimensions. Such non-on-site actions can have an "anomaly", in the sense that the symmetry action cannot be consistently localized. Nayak and Else assumed that the symmetry group is finite and the non-on-site action is given by a finite-depth local unitary circuit. I will explain how to generalize the construction of the anomaly index in two directions: to Lie groups as well as to arbitrary actions which preserve locality. I will show that certain anomalies, including the U(1) anomaly of chiral modes of quantum Hall systems, cannot arise in lattice spin chains. I will also discuss some dynamical consequences of a non-vanishing anomaly index and state a general theorem which includes Lieb-Schultz-Mattis-type theorems as a special case.

【报告人简介】



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Anton Kapustin's work lies at the interface of physics and mathematics. He applied ideas from gauge theory to the study of the geometric Langlands program in mathematics and has applied sophisticated mathematics to the classification of exotic quantum states of matter.

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