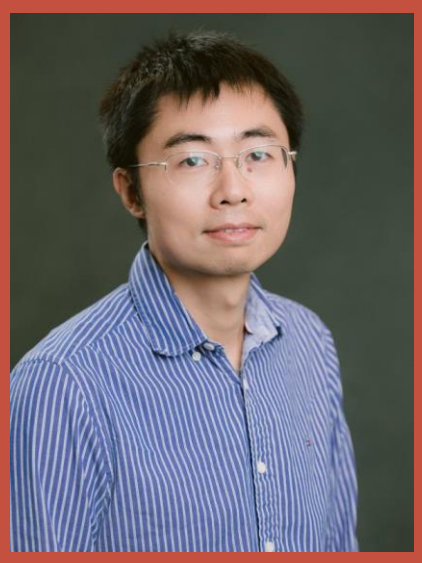
世纪物理情·系列讲座

Topological Magnons and Where To Find Them

【摘要】

The discovery of topological insulators not only revealed new topological invariants encoded in many-body wavefunctions, but also opened a new window into novel material platforms for quantum devices. With the help of ab initio density functional theory for electronic band structures, thousands of new topological electronic materials with protected surface states have been predicted. In contrast, in strongly correlated magnetic materials, density functional theory fails to reliably determine the magnetic interactions, making predictions of topology a challenging task in strongly correlated magnets. Here we present a symmetry-based approach, which predicts topological magnons in a magnetically ordered material, upon applying external perturbations such as magnetic/electric fields and/or mechanical strains. We apply this approach to carry out an efficient semi-automatic search for magnetic materials in the Bilbao Crystallographic Server (BCS). Among 198 compounds with an over 300 K transition temperature, we identify 12 magnetic insulators that support room temperature topological magnons. They provide new platforms for potential applications in topological magnon spintronics.

【报告人简介】



Yuan-Ming Lu obtained his Bachelor degree at Tsinghua University in 2007, and then finished his Ph.D. at Boston College in 2011. He did his postdoctoral research in University of California, Berkeley and Lawrence Berkeley National Laboratory during 2011-2014. He joined the faculty of Ohio State University in 2015 and is currently an associate professor of physics. His current research focuses on topological phases in strongly correlated systems.

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