武汉物数所理论交叉学术报告

Emergent gauge fields in an atomic spinor Bose-Fermi mixture

Dr. Zhifang Xu
University of Pittsburgh

2015年1月7日(周三) 上午10:30-12:00
频标楼4楼报告厅

About the speaker

Nov 2013- Postdoctoral Fellow, University of Pittsburgh
Nov 2011-Oct 2013 Postdoctoral Fellow, University of Tokyo
Jul 2009-Oct 2011 Postdoctoral Fellow, Tsinghua University
Jun 2004-2009 Ph.D. in Physics, Tsinghua University
Sep 2000-Jun 2004 B.S. in Physics, Sun-Yat Sen University

Abstract:
Synthetic abelian and non-abelian gauge fields for ultracold atoms have attracted a huge interest. Recent experiments on ultracold atomic gases have made remarkable breakthroughs in realizing synthetic magnetic fields and spin-orbit couplings for neutral atoms. In this talk, I will show you a natural way on generating gauge fields in a mixture of spinor Bose-Fermi gas. The underline mechanism is that Fermi surface nesting induces spontaneous formation of various bosonic spin textures. 1D bosonic spin texture generates an effective 1D spin-orbit coupling in fermions. 2D non-coplanar chiral bosonic spin texture generates an effective U(1) gauge field in fermions and leads to a quantum Hall effect. Due to effective gauge fields in the non-coplanar state, bosons are predicted to condense at a finite momentum leading to chiral superfluidity, which provides experimental fingerprints for the emergence of gauge fields in time-of-flight measurements.

主办单位:武汉物数所理论与交叉研究部