

International Workshop on Quantum Gases in Synthetic Gauge Fields



Aug 25-27, 2010

Institute for Advanced Study, Tsinghua University

A charged quantum system often exhibits unusual phenomena when subjected to high magnetic fields. Well-known examples are the integer and fractional quantum Hall effects discovered in two-dimensional electron gases. Although atoms are neutral and do not couple to real electromagnetic fields, an effective gauge field can be created, for instance, by using atom-light interaction and Berry phase effect. This method can also be used to create a non-abelian external gauge potentials. This workshop will focus on recent theory and experimental advances in studying ultracold atoms in abelian and non-abelian gauge fields. It will be held on Aug 25-27 (2010) in the science building of Tsinghua University, organized by Alexander Fetter (Stanford), Tin-Lun (Jason) Ho (Ohio-State) and Hui Zhai (Tsinghua), hosted by Institute for Advanced Study at Tsinghua University. The topics and invited talks include:

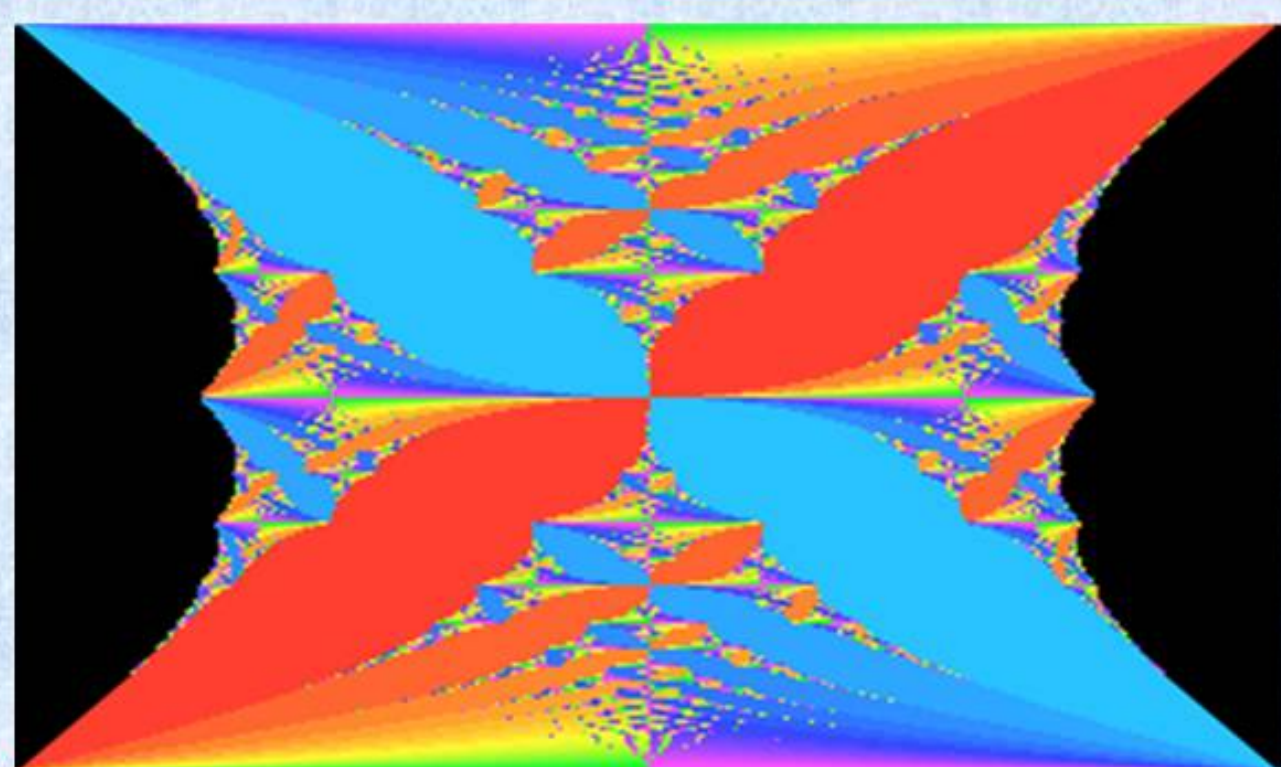
I. General Overview and Quantum Hall Physics

Gordon Baym (UIUC):
Cold atoms, Quantum Chromodynamics, and Gauge Fields

Tin-Lun Ho (Ohio-State):
Macroscopic Quantum Phenomena of Quantum Gases in Abelian and Non-abelian Gauge fields

Ian Spielman (NIST):
Experiments on Synthetic Gauge Fields

Xiao-Gang Wen (MIT/Tsinghua):
Introduction to Quantum Hall Effects



III. Gauge Field with Optical Lattices

Nigel Cooper (Cambridge):
Bose-Hubbard Models with Gauge Fields:
Frustrated Quantum Spins

Erich Mueller (Cornell):
Artificial Gauge Fields in Lattices

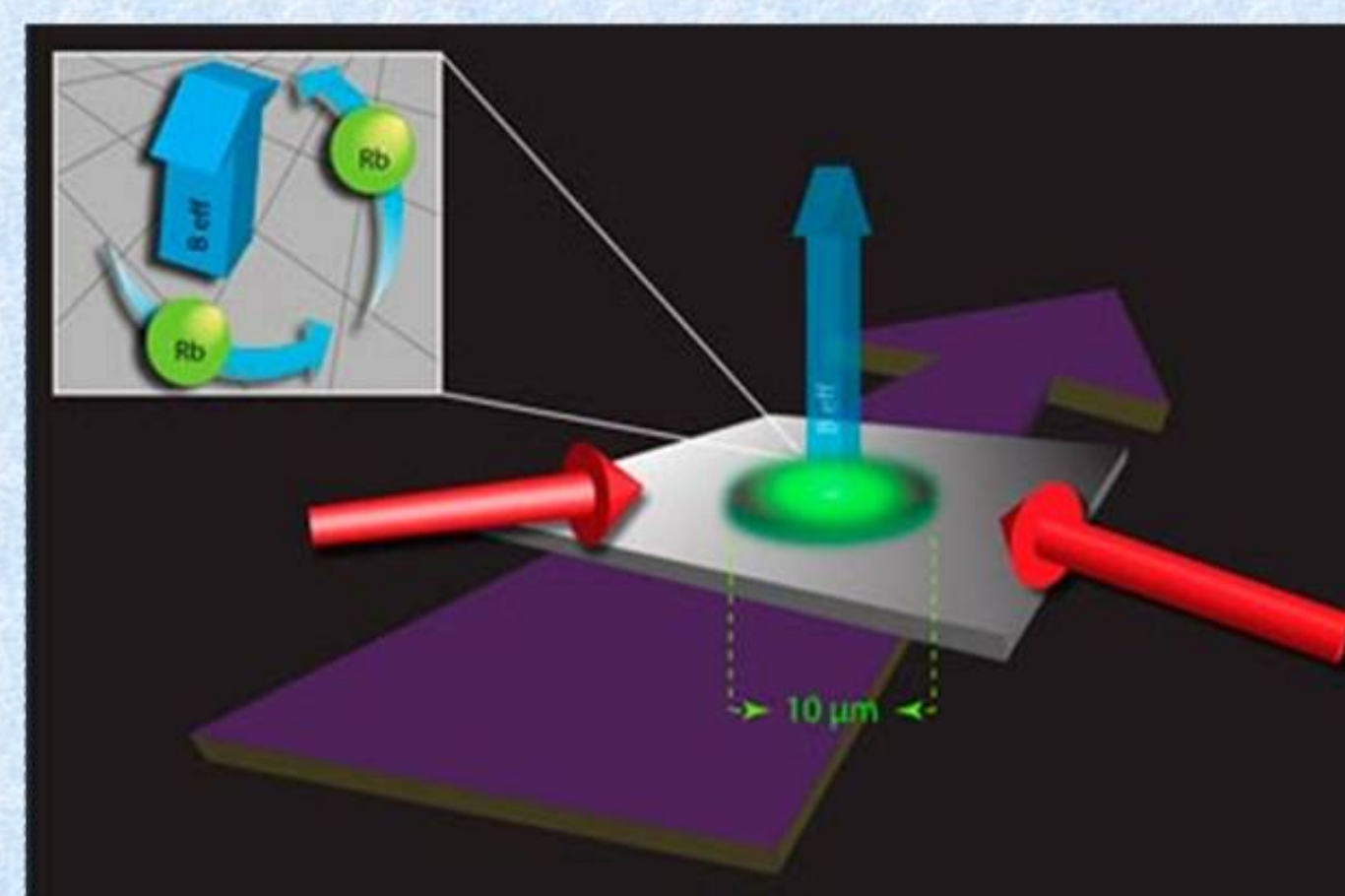
Mehmet Oktel (Bilkent):
Ultracold Atoms in Rotating Optical Lattices

C. Morais Smith (Utrecht):
Creating Staggered Magnetic Fields in Optical
Lattices - New Insights into High-Tc
Superconductivity

II. Scheme to Generate Gauge Field to Cold Atoms

Kenneth Günter (ENS):
Schemes to Generate Abelian Gauge Fields for
Cold Atoms

Julius Ruseckas (Vilnius):
Light-induced Abelian and non-Abelian Gauge
Potentials for Cold Atoms



IV. Quantum Gases in Non-abelian Gauge Field

Congjun Wu (UCSD):
Spontaneous Generation of a Half-quantum
Vortex in Spin-orbit Coupled Bose-Einstein
Condensates

Hui Zhai (Tsinghua):
Bose-Einstein Condensate in a Non-abelian
Gauge Field

