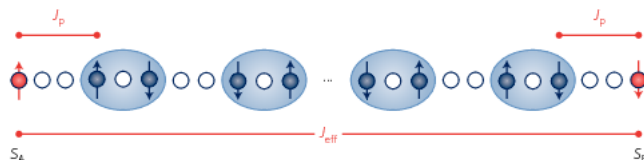
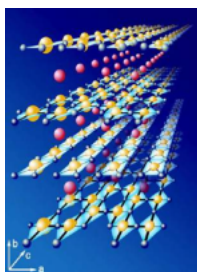


8.513: Many-Body Theory for Condensed Matter Systems

2019 Fall, 2:30 PM to 4:00 PM on Tuesdays and Thursdays in 3-370, MIT



We will stress the quantum effect in solids, such as the phenomena related to topological phases of matter. We will cover the following topics:

- 1) Semi classical approach
- 2) Emerging dynamics of quasiparticle (beyond Newton Law).
- 3) Geometric phase, Chern number, and fiber bundle.
- 4) Quantum Hall insulator – a topological phase of matter.
- 5) K-theory for topological phases of free fermions.
- 6) Interaction bosonic superfluid.
- 7) Quantum 1D Ising model and symmetry breaking.
- 8) Critical point in 1D Ising model and its dual free fermion model.
- 9) Topological superconductors
- 10) Half-qubits – Majorana zero modes
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There will be weekly homework, due on Thursday at lecture.
There will also be a term paper.