Universität Leipzig
Fakultät für Physik und Geowissenschaften
Institut für Theoretische Physik

Seminar

Festkörperphysik

Am Donnerstag, **13.10.2011**, um **15:15 Uhr** spricht

Dr. Dganit Meidan

FU Berlin

über

"A topological classification of spin pumps"

Abstract:

We study the topological classification of spin pumps consisting of a family of one-dimensional insulators with a time reversal restriction on the pumping cycle. We find that when adiabatically varied in time, certain band insulators allow for the quantized noiseless pumping of spin even in the presence of strong spin orbit scattering. These spin pumps are closely related to the quantum spin Hall system, and their properties are protected by a time-reversal restriction on the pumping cycle. Based on these findings, we study spin pumps with a bulk energy gap which arises due to electron-electron interactions. We find that the correlated gapped phase can lead to novel pumping properties. In particular, systems with d different ground states can give rise to $d + 1$ different classes of spin pumps, including a trivial class which does not pump quantized spin and d non-trivial classes allowing for the pumping of quantized spin $\hbar/n$ on average per cycle, where $1 \leq n \leq d$. We discuss an example of a spin pump that transfers on average spin $\hbar/2$ without transferring charge.

Ort: SE 218, Linnéstraße 5

Interessenten sind herzlich eingeladen!

gez. Prof. Haase und Prof. Rosenow