



RUHR-UNIVERSITÄT BOCHUM  
FAKULTÄT FÜR PHYSIK UND ASTRONOMIE

RUB

# PHYSIKALISCHES KOLLOQUIUM

Wintersemester 2011/2012

Montag, 19.12.2011, 12 Uhr c.t. H-NB

## Entanglement - a Magnifying Glass for New Topological Quantum States of Matter

**Prof. Dr. Ronny Thomale**  
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Condensed matter has recently experienced fundamental progress in the theoretical description and experimental accessibility of new quantum states of matter where systems are characterized by non-local properties linked to its topology. The models found therein span a wide range from the fractional quantum Hall effect to spin liquids, superconductors, and lately topological insulators, giving rise to a plethora of interesting new potentials of applicability such as topological quantum computing and materials with potentially anomalous transport behavior.

Within the field, entanglement has become the predominant quantity to describe these systems and, in particular, to classify their topological universality classes. In this talk, we try to introduce the concept of entanglement and quantities derived from there such as entanglement entropy and entanglement spectra in condensed matter quantum systems, and specifically elaborate on recent progress concerning its application to prototype quantum Hall, topological insulator, and spin models currently discussed in the field.

Einführung: Prof. Dr. I. Eremin

Die Fakultät lädt alle Interessierten herzlich ein.

Ab 11.45 Uhr Kaffee/Tee im Hörsaal