universität innsbruck
Theoretische Physik

Theory Colloquium

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"Topological order and tensor networks:
A local perspective on global entanglement"

Abstract

Strongly correlated quantum systems exhibit a wide range of phases with unconventional behavior. These phases are characterized by non-trivial global entanglement patterns and cannot be described within the Landau paradigm due to their lack of local order parameters.

In my talk, I will discuss how quantum information theory allows us to describe such systems in a way which reconciles their global entanglement with a local description, based on the framework of tensor networks. I will show how tensor networks allow to capture both the structure of the physical interactions as well as global topological entanglement within a unified local description, and how this allows us to build a comprehensive framework to study topologically ordered systems and their excitations. I will then discuss applications of this framework: First, I will show how it allows to characterize the precise nature of topological spin liquids; and second, I will discuss how it can be used to explain topological phase transitions driven by anyon condensation through phases in their entanglement, allowing us to devise measurable order parameters for anyon condensation and thus to study topological phase transitions at a microscopic level.

Wednesday | 22.11.2017 | 17:15
Seminar room 2S17 | ICT building