MP 1: Tutorial Quantum Information and Entanglement (joint session AKjDPG/MP)

Zeit: Sonntag 16:00–18:00 Raum: HS 2

Tutorium MP 1.1 So 16:00 HS 2

The role of Entanglement in AdS/CFT — •Mario Flory — Jagiellonian University, Łojasiewicza 11, 30-348 Kraków, Poland

In this tutorial, we start with an accessible introduction to the Anti-de Sitter/Conformal Field Theory (AdS/CFT) correspondence, which is a conjecture that relates the physics of a quantum field theory with conformal symmetry to the physics of a higher dimensional gravity theory with a negative cosmological constant. One result of particular importance in AdS/CFT is the Ryu-Takayanagi formula, which equates entanglement entropy on the CFT-side of the correspondence to a generalisation of the Bekenstein-Hawking black hole entropy on the AdS-side. We will explore how this result shapes our modern understanding of the AdS/CFT correspondence, and of how the curved geometry of the AdS-space arises from quantum information theoretic aspects of a CFT.

Tutorium MP 1.2 So 17:00 HS 2

An introduction to quantum information and entanglement — •Tobias Osborne — Institut für Theoretische Physik, Appelstr. 2, 30167 Hannover

In this tutorial I will give an introduction to the theory of quantum information and quantum entanglement. Particular emphasis will be given to the foundational protocols of quantum information theory, inluding, teleportation and superdense coding, and also on the operational definition and quantification of entanglement. Applications in high energy physics and holography will be sketched.