MP 2: Verschränkung und Quanteninformation

Zeit: Montag 16:15–17:15 Raum: HS 23

Hauptvortrag MP 2.1 Mo 16:15 HS 23

How entangled are quantum fields? — •Ko Sanders[1], Stefan Hollands[2], and Onirban Islam[3] — [1]Dublin City University, Dublin, Irland — [2]Universität Leipzig — [3]University of Leeds, Leeds, United Kingdom

Entanglement is a quintessential aspect of quantum physics and a key experimental resource, e.g. in quantum computing. It is the source of such counterintuitive phenomena as teleportation, where perhaps the most extreme case occurs in quantum field theory: the entanglement of the vacuum state allows us (theoretically) to teleport information even despite the absence of particles.

The amount of entanglement that is present in a system can be quantified using an entanglement measure. In this talk I will present an overview of one such measure, the relative entanglement entropy, which originated in quantum information theory. This entanglement measure extends to quantum field theories, even in curved spacetimes, where it exhibits a surprisingly close relation to the spacetime geometry. Many details of this relation are still under active investigation.

MP 2.2 Mo 16:55 HS 23

The quantum information bottleneck method — •Daniela Cadamuro — Institut für Theoretische Physik, Universität Leipzig, Brüderstraße 15, 04103 Leipzig, Deutschland

In information theory one is interested in compressing information, of which only some part is relevant. Specifically, here we consider a quantum compression-decompression channel where sender and receiver share some side information. We compute the rate at which information can be sent through the channel so that the compressed signal retains a fixed amount of correlation with the side information, and find the optimum compression channel. Classically, this procedure was called the Bottleneck method, which we extend here to the quantum information domain.