MP 4: Quanteninformation und AdS/CFT

Zeit: Dienstag 11:00–12:40 Raum: HS 23

Hauptvortrag MP 4.1 Di 11:00 HS 23

Dynamics and fields for holographic codes — •Tobias Osborne — Institut für Theoretische Physik, Appelstr. 2, 30167 Hannover

I describe how to introduce dynamics for the holographic states and codes introduced by Pastawski, Yoshida, Harlow and Preskill as quantum-information inspired toy models of the AdS/CFT correspondence. This task requires the definition of a continuous limit of the kinematical Hilbert space of a finite which may be achieved via the semicontinuous limit of Jones. Dynamics is then introduced by building a unitary representation of a group known as Thompson's group T, which is a discretised analogy of the conformal group conf(R^{1,1}). Field operators may be defined for the boundary theory yielding a theory with discrete scaling symmetry.

MP 4.2 Di 11:40 HS 23

Complexity change under conformal transformations in AdS_3/CFT_2 — •Mario Flory[1] and Nina Miekley[2] — [1]Jagiellonian University, Łojasiewicza 11, 30-348 Kraków, Poland — [2]Universität Würzburg, Am Hubland, 97074 Würzburg, Germany

We compute the change of "holographic complexity" caused by a small conformal transformation in AdS_3/CFT_2. This computation is done perturbatively to second order. We present our results and discuss some important observations. As operators generating such conformal transformations can be explicitly constructed in CFT terms, these results allow for a comparison between holographic methods of defining and computing computational complexity and purely field-theoretic proposals. A comparison of our results to such proposals is given.

MP 4.3 Di 12:00 HS 23

Holographic Majorana dimer models and quantum error correction — •Alexander Jahn, Marek Gluza, Fernando Pastawski, and Jens Eisert — Dahlem Center for Complex Quantum Systems, Freie Universität Berlin, 14195 Berlin, Deutschland

In this talk, we present a class of ground states of quadratic Hamiltonians characterized by a non-local pairing of Majorana fermions. These dimer-like states appear in stabilizer codes used for quantum error correction. We establish a rigorous framework accompanied by an intuitive diagrammatic representation, which makes tensor contraction and explicit computation of entanglement entropies straightforward. Applied to the holographic pentagon code - a toy model for the AdS/CFT correspondence - our approach provides a concrete bulk/boundary operator mapping, yielding new insights into the correlation structure of holographic tensor networks.

MP 4.4 Di 12:20 HS 23

Subregion complexity at finite temperature in AdS/CFT — •Nina Miekley and Johanna Erdmenger — Julius-Maximilians-Universität Würzburg, Germany

The AdS/CFT correspondence relates strongly coupled field theories to theories containing gravity. In previous work, we studied the holographic entanglement entropy in d-dimensional finite temperature CFTs dual to Schwarzschild-AdS. We continue this study by investigating the volume inside the Ryu-Takayanagi surface. This volume is proposed to be the complexity of the associated reduced state of the boundary field theory. We derive a closed, analytic form of this subregion complexity for strips and investigate its properties.