physikalisches Kolloquium

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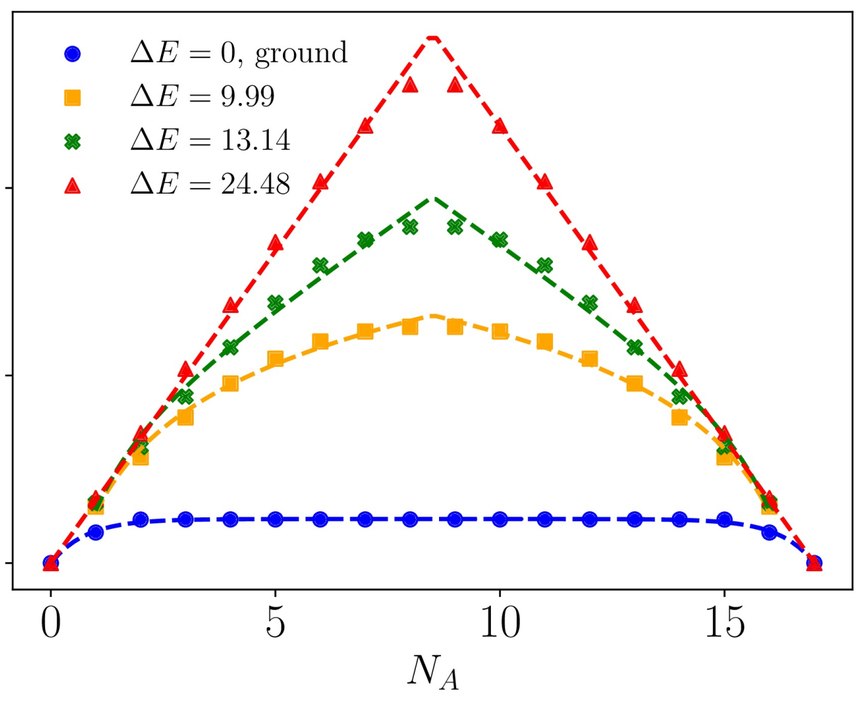
Decoherence and Thermalization of gauge theories

Mo. 17.6.24
16:00 Uhr
Ort: H34

During the past 15 years, a better understanding of the von Neumann entropy for gravitational systems based on the combination of Quantum Field Theory, String Theory and Quantum Information Theory was developed. This understanding is consistent with unitary time evolution, solving the long-standing black hole information puzzle.

Holography allowed to adapt these new insights to understand the thermalization of other unitary theories, e.g. QCD in heavy-ion collisions. Fundamentally, entanglement in QFTs (e.g. for Einstein Podolsky Rosen pairs) maps to modified geometry in string theory (e.g. Einstein Rosen bridges), giving rise to a novel understanding of many subfields of physics. Many topics, e.g. possible extensions of EPR=ER duality, are presently hotly debated, making this an especially lively research field.



Entanglement entropy as a function of the subsystem size for pure SU(2) energy eigenstates. If part of the state is ignored the system looks thermal. As expected, area scaling changes to volume scaling with increasing excitation energy.