Title: Quantum information and black holes

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Abstract: The concepts of quantum information theory play an important role in two seemingly distinct areas of physics: For studying the quantum properties of black holes as well as for devising quantum computing algorithms. Quantum entanglement and computational complexity may be mapped to geometric quantities. This is intimately related to the holographic principle, according to which the information stored in a volume is encoded on its surface, as is the case for black holes. In the talk I will describe the essential new concepts that relate quantum information to geometry and gravity. Technically, this involves generalising quantum information results to quantum field theories, i.e. from finite to infinite-dimensional Hilbert spaces. I will explain how the new relations may be used to obtain both a further understanding of quantum black holes, as well as further advances for the theoretical foundations of quantum computing.











































