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The Quantum Perspectives of Kerr Black Hole Formation and Evaporation

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Black holes are fascinating objects in nature. Although they are introduced as classical solutions in general relativity, their intrinsic nature should be quantum, which manifests during the black hole formation and evaporation processes. If string theory is claimed to be a quantum gravity candidate, it should be able to provide a consistent picture and elucidate some perspectives for black hole formation and evaporation. In this talk, we will focus on rotating Kerr black holes. On the one hand, we will show through a toy model that Kerr black holes can emerge naturally from the Virasoro minimal string theory. On the other hand, we use a field-theoretic approach to compute the time evolution of entanglement entropy between an evaporating Kerr black hole and its Hawking quanta, i.e., the Page curve, which provides a new resolution to the long-standing black hole information paradox. This talk is based on my recent papers, 2312.14287 and 2210.06762, and some work in progress.

Primary author: NIAN, Jun (International Centre for Theoretical Physics Asia-Pacific, University of Chinese Academy of Sciences)

Presenter: NIAN, Jun (International Centre for Theoretical Physics Asia-Pacific, University of Chinese Academy of Sciences)

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