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Black hole unitarity via small couplings: basic postulates to soft quantum structure

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The problem of preserving unitary evolution in the presence of an evaporating black hole remains a key problem in quantum gravity, expected to point to new fundamental principles. It has been argued that unitary evolution implies breakdown of spacetime at the horizon (a “firewall”), or other large near-horizon effects. I explore a basic set of postulates, including a “correspondence principle” for observers falling into large black holes, and find the possibility that unitarization occurs via weak interactions between quantum states of a black hole and degrees of freedom in its environment.

Primary author: Prof. GIDDINGS, Steve (Department of Physics, University of California, Santa Barbara)

Presenter: Prof. GIDDINGS, Steve (Department of Physics, University of California, Santa Barbara)

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