

ONLINE SOLVAY COLLOQUIUM



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Black holes, information and wormholes

In the 1970s, Hawking showed that black holes, like any finite-temperature system, radiate energy and so eventually evaporate away entirely. However, his calculations showed something very weird: unlike any other physical system, the radiation seemed to contain no information about the initial state of the black hole. Instead the information that fell into the black hole was simply lost forever. This contradiction between Hawking's calculations and the ordinary rules of quantum mechanics has been a driving force behind much of the research in quantum gravity over the ensuing decades. Finally, in the last couple of years, we have begun to understand where Hawking's calculation went wrong, and to derive precise predictions, consistent with unitary quantum mechanics, for the information content of Hawking radiation. However, the new calculations, which involve weird spacetime topologies called 'spacetime wormholes', lead to as many new questions as answers.

Zoom link: <https://zoom.us/j/96300008660?pwd=NHFnYjJIN1psRmVTOGw5YUw2WlU2dz09>



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