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Two-dimensional moving mirrors and the information loss problem

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In this presentation, we investigate the information flow of two-dimensional moving mirrors. Here we point out that various mirror trajectories can help to mimic different candidate resolutions to the information loss paradox following the semi-classical quantum field theory: (i) a suddenly stopping mirror corresponds to the assertion that all information is attached to the last burst, (ii) a slowly stopping mirror corresponds to the assertion that thermal Hawking radiation carries information, and (iii) a long propagating mirror corresponds to the remnant scenario. Based on such analogy, we find that the last burst of a black hole cannot contain enough information, while slowly emitting radiation can restore unitarity. For all cases, there is an apparent inconsistency between the picture based on quantum entanglements and that based on the semi-classical quantum field theory. Based on the quantum entanglement theory, a stopping mirror will generate a firewall-like violent emission which is in conflict with notions based on the semi-classical quantum field theory.

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