

Abstract Submitted  
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**Insights and possible resolution to the information loss paradox via the tunneling picture**<sup>1</sup> DOUGLAS SINGLETON, CSU Fresno, ELIAS VAGENAS, Research Center for Astronomy and Applied Mathematics, Academy of Athens, TAO ZHU, JI-RONG REN, Institute of Theoretical Physics, Lanzhou University — This paper investigates the information loss paradox in the WKB/tunneling picture of Hawking radiation. In the tunneling picture one can obtain the tunneling amplitude to all orders in  $\hbar$ . However all terms beyond the lowest, semi-classical term involve unknown constants. Despite this we find that one can still arrive at interesting restrictions on Hawking radiation to all orders in  $\hbar$ : (i) Taking into account only quantum corrections the spectrum remains thermal to all orders. Thus quantum corrections by themselves will not resolve the information loss paradox. (ii) The quantum corrections do imply that the temperature of the radiation goes to zero as the mass of the black hole goes to zero. This is in contrast to the lowest order result where the radiation temperature diverges as the mass of the black hole goes to zero. (iii) Finally we show that by taking both quantum corrections and back reaction into account it is possible under specific conditions to solve the information paradox by having the black hole evaporate completely with the information carried away by the correlations of the outgoing radiation.

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