

Hawking Radiation of Charged Particles via Tunneling from a Cylindrically Symmetric Black Hole in Anti-de Sitter Space-Time

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(Received: 2005-12-14; Revised: 2006-2-13)

Abstract: Applying Parikh-Wilzcek's semi-classical quantum tunneling model, we study the Hawking radiation of charged particles as tunneling from the event horizon of a cylindrically symmetric black hole in anti-de Sitter space-time. The derived result shows that the tunneling rate of charged particles is related to the change of Bekenstein-Hawking entropy and that the radiation spectrum is not strictly pure thermal after taking the black hole background dynamical and self-gravitation interaction into account, but is consistent with the underlying unitary theory.

PACS: 04.70.-s, 97.60.Lf

Key words: cylindrically symmetric black hole, Bekenstein-Hawking entropy, energy conservation, charge conservation, tunneling rate

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