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Hawking radiation from squashed Kaluza-Klein black holes with quantum gravity effects

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We study the Hawking radiation from the five-dimensional charged static squashed Kaluza-Klein black hole by the tunneling of charged fermions and charged scalar particles, including the phenomenological quantum gravity effects predicted by the generalized uncertainty principle with the minimal measurable length. We derive corrections of the Hawking temperature to general relativity, which are related to the energy of the emitted particle, the size of the compact extra dimension, the charge of the black hole and the existence of the minimal length in the squashed Kaluza-Klein geometry. We show that the quantum gravity effect may slow down the increase of the Hawking temperature due to the radiation, which may lead to the thermodynamic stable remnant of the order of the Planck mass after the evaporation of the squashed Kaluza-Klein black hole. We also find that the sparsity of the Hawking radiation may become infinite when the mass of the squashed Kaluza-Klein black hole approaches its remnant mass.

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