Quantum Corrected Black Holes from String T-Duality

Michael F. Wondrak[1, 2, *]

[1] *Frankfurt Institute for Advanced Studies (FIAS), Ruth-Moufang-Straße 1, 60438 Frankfurt am Main, Germany*
[2] *Institut für Theoretische Physik, Johann Wolfgang Goethe-Universität Frankfurt am Main, Max-von-Laue-Straße 1, 60438 Frankfurt am Main, Germany*

(Dated: March 05, 2018)

Abstract submission to the
22nd International Conference on General Relativity and Gravitation
taking place together with the
13th Edoardo Amaldi Conference on Gravitational Waves
in Valencia on 07-12 July 2019.

Keywords: Quantum corrected black hole, string T-duality, zero-point length, path integral duality

I. ABSTRACT

In this talk, we present some stringy corrections to black hole spacetimes emerging from string T-duality. As a first step, we derive the static Newtonian potential by exploiting the relation between the T-duality and the path integral duality. We show that the intrinsic non-perturbative nature of stringy corrections introduce an ultraviolet cutoff known as zero-point length in the path integral duality literature. As a result, the static potential is found to be regular. We use this result to derive a consistent black hole metric for the spherically symmetric, electrically neutral case. It turns out that the new spacetime is regular and is formally equivalent to the Bardeen metric, apart from a different ultraviolet regulator. On the thermodynamics side, the Hawking temperature admits a maximum before a cooling down phase towards a thermodynamically stable end of the black hole evaporation process. The findings support the idea of universality of quantum black holes.

II. REFERENCE

The corresponding paper can be found here: [1]

[1] P. Nicolini, E. Spallucci, and M. F. Wondrak, (2019), arXiv:1902.11242 [gr-qc].

* wondrak@fias.uni-frankfurt.de