

Thermodynamics and chaotic orbits for semiclassical black hole with quantum anomaly correction

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Black hole is an interesting physical object which is both a thermodynamical system and nest of chaos. In this talk, I will firstly introduce the conformal anomaly corrections on the black hole geometry in 4d spherical symmetric spacetime. After introducing the black hole solution, I will discuss the thermodynamics and chaotic properties of this black hole. We investigate the phase transition and critical phenomena of this anomaly corrected black hole and discover that anomaly can trigger the violation of Rushbrook scaling law at the critical point. This provides the first example of such scaling law violation in four dimensional spacetime. Moreover, we study the chaotic particle orbits around this black hole solution, we find that anomaly can enhance the chaotic features of the black hole which can also leave an imprint on the gravitational wave signals of the EMRI systems.

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