

A holographic stress-energy tensor near the Cauchy horizon inside a rotating black hole

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ABSTRACT

We investigate a stress-energy tensor for a CFT at strong coupling inside a small five-dimensional rotating Myers-Perry black hole with equal angular momenta by using the holographic method. As a gravitational dual, we perturbatively construct a black droplet solution by applying the “derivative expansion” method, generalizing the work of Haddad [4], and analytically compute the holographic stress-energy tensor for our solution. We find that the stress-energy tensor is finite at both the future and past outer (event) horizons, and that the energy density is negative just outside the event horizons due to the Hawking effect. Furthermore, we apply the holographic method to the question of quantum instability of the Cauchy horizon since, by construction, our black droplet solution also admits a Cauchy horizon inside. We analytically show that the null-null component of the holographic stress energy tensor negatively diverges at the Cauchy horizon, suggesting that a singularity appears there, in favor of strong cosmic censorship.

References

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