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Thermodynamics of multi-horizon spacetimes

There exist several well-established procedures for computing thermodynamics for a single horizon spacetime. However, for a spacetime with multi-horizon, the thermodynamics is not very clear. It is not fully understood whether there exists a global temperature for the multi-horizon spacetime or not. Here we show that a global temperature can exist for Schwarzschild-de Sitter spacetime, Reissner-Nordstrom-de Sitter spacetime, and rotating BTZ black hole. This temperature does not coincide with the conventional Hawking temperature related to the outer horizon.

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