

Thermogeometric phase transition in a unified framework

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Using geomterothermodynamics (GTD), we investigate the phase transition of black hole in a metric independent way. We show that for any black hole, curvature scalar (of equilibrium state space geometry) is singular at the point where specific heat diverges. Previously such a result could only be shown by taking specific examples on a case by case basis. A different type of phase transition, where inverse specific heat diverges, is also studied within this framework. We show that in the latter case, metric (of equilibrium state space geometry) is singular instead of curvature scalar. Since a metric singularity may be a coordinate artifact, we propose that GTD indicates that it is the singularity of specific heat and not inverse specific heat which indicates a phase transition of black holes.

[1] R. Banerjee, B.R. Majhi, S. Samanta, *Phys. Lett. B* **767**, 25 (2017)