

GAUGE/GRAVITY THERMODYNAMICS DICTIONARY WITH CENTRAL CHARGE

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Abstract

It has long been conjectured that thermodynamic variables of black holes in AdS spacetimes are dual to thermodynamic variables of conformal field theories in equilibrium states. An interesting implication of this is that possible phase transitions of AdS black holes translate into those of the field theories. It would be desirable to have a precise dictionary between the AdS and field theory thermodynamic variables which makes this duality explicit. In particular, such a dictionary should map the first law of the black hole to that of the field theory. Traditionally, the pressure of an AdS black hole is conjectured to be dual to both the volume of the field theory, as well as to its central charge. This makes the above-mentioned dictionary impossible, since one variable of the black hole is dual to two independent variables of the field theory. I will present an alternative dictionary which resolves this problem, and discuss applications and extensions of this approach.