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String Black Hole Thermodynamics at First Order in Alpha'

The Iyer-Wald prescription has been successfully used to derive black hole entropy formulas for higher-derivative, pure gravity theories. However, this does not account for gauge symmetry in the presence of matter gauge fields and, in some cases, the resulting black hole entropy formulas are not Lorentz and gauge invariant. In particular, this is the case for the effective action of the heterotic string at first order in alpha', due to the presence of gravitational and YM CS terms. In this talk I will show how to handle matter gauge fields systematically and, as a result, I will obtain a manifestly gauge- and Lorentz-invariant entropy formula for HST at first order in alpha'. I will also report on progress on the inclusion of charges not associated to gauge symmetry (like magnetic ones) in a duality-invariant guise. This talk is based on [2012.13323], [2012.14892], [2106.07495] and work in progress.

Type of contribution

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