

Contributed Talk

Name: Tomas Ortin

Position: Staff

Affiliation: IFT UAM/CSIC

Title: On Wald entropy

Abstract: Wald's approach to the first law of black hole mechanics and to the computation of the black hole entropy can be straightforwardly applied to theories of pure gravity of higher order in the curvature (Iyer-Wald prescription). However, its application to theories with matter fields is less obvious (the Iyer-Wald prescription is not valid) because most matter fields have gauge freedoms and cannot be treated as simple ("world") tensors. We report on progress in the handling of matter fields with gauge freedoms, the treatment of magnetic charges and of the cosmological constant. We apply this treatment to the effective action of the heterotic string at first order in α' , which has very complex gauge symmetries, deriving the first law and finding a manifestly gauge-invariant entropy formula which differs from the one that follows from the Iyer-Wald prescription, which is not gauge invariant.