On the Geometric Approach to the Boundary Problem in Supergravity

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Abstract

I will report on the geometric superspace approach to the boundary problem in supergravity, discussing the geometric construction of D = 4 supergravity Lagrangians in the presence of a non-trivial boundary of spacetime. Il will first focus on the pure N = 1 and N = 2 theories with negative cosmological constant, where supersymmetry invariance of the action requires the addition of topological (boundary) contributions which generalize at the supersymmetric level the Euler-Gauss-Bonnet term. I will then consider the case of vanishing cosmological constant where, in the presence of a non-trivial boundary, the inclusion of boundary terms involving additional fields, which behave as auxiliary fields for the bulk theory, allows to restore supersymmetry. In all the cases listed above, the full, supersymmetric Lagrangian can be recast in a MacDowell-Mansouri(-like) form. I will also present some application of the results to specific problems regarding cases where the boundary is located asymptotically, relevant for holographic analysis.