Consistent couplings between an Abelian three-form and a non-massive Rarita-Schwinger field in $D = 11^*$

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Abstract

The final goal of our research is to prove the uniqueness of the simple SUGRA in D = 11. The motivation is given by the fact that supersymmetry seems to be crucial in the attempts to reconcile quantum mechanics and gravitation. In D = 4 the uniqueness of the simple SUGRA was already proved in the framework of the BRST formalism. The cross-couplings between an Abelian three-form gauge and a non-massive Rarita-Schwinger field in D = 11 are investigated in the framework of the deformation theory based on local BRST cohomology. The consistent interactions are obtained on the grounds of smoothness, locality, (background) Lorentz invariance, Poincaré invariance, and at most two derivatives in the interacting Lagrangian.

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