Special geometries in mathematical physics

Initiative: Nachwuchsgruppen an Universitäten (beendet)

Bewilligung: 01.07.2008

Laufzeit: 1 Jahre

The interest in non integrable geometries was revived in the past years through recent developments in string theory. Whereas integrable geometries (Calabi-Yau manifolds, Joyce manifolds ...) belong mainly to the area of algebraic geometry and describe exact solutions with vanishing B-field, the rich and diverse class of non-integrable geometries (as studied from the seventies in differential geometry) has only recently become accessible to many interesting models in theoretical physics with non-vanishing field strengths. The goal of the junior research group is to construct homogenous models in string theory from reductive spaces and to study their properties from the point of view of differential geometry, spectral theory and representation theory. The research shall be focused on the following three areas: (i) study of homogeneous models in string theory and their field equations in the bosonic as well as in the fermionic sector, (ii) investigation of the holonomy group, curvature and parallel ob- jects of affine connections with torsion, in particular on homogeneous reductive spaces, (iii) application of Kostant's connection and the Dirac operator induced by it to realization problems for representa- tions of semisimple Lie groups; study of the spectral properties of invariant differential operators appearing in this context.

Projektbeteiligte

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Es werden die Institutionen genannt, an denen das Vorhaben durchgeführt wurde, und nicht die aktuelle Adresse.

25.04.2024

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