SFB-Seminar (Teilprojekt C2)

ZEIT:
25.4.2016, 14:00 Uhr - 17:00 Uhr

ORT:
IRIS-Haus 2.07, HU Berlin

PROGRAMM:

14:00 - 14:30 Kaffeepause

14:30 - 15:30 **Prof. Dr. Helga Baum (HU Berlin)**

Lorentzian manifolds with special holonomy
Holonomy groups of Riemannian manifolds are well known. Besides the isotropy representation of irreducible Riemannian symmetric spaces, the well-known Berger list describes all connected irreducible proper subgroups of O(n) which can appear as holonomy group of a Riemannian manifold, namely U(n/2), SU(n/2), Sp(n/4), Sp(n/4) · Sp(1), G2 and Spin(7). Any of this special holonomy groups is related to a rich, interesting and widely studied Riemannian geometry.
The classification of Lorentzian holonomy groups was a long-time open prob- lem. In this talk I will review the classification of these groups, obtained between 1993 and 2005 by L. Berard-Bergery and A. Ikemakhen, T. Leistner, A. Galaev. Moreover, I will describe properties, examples and constructions of Lorentzian manifolds with special holonomy.

15:30 - 16:00 Kaffeepause

16:00 - 17:00 **Dr. Andree Lischewski (HU Berlin)**

Cauchy problems for Lorentzian manifolds with parallel spinor
This talk intends to exhibit a new construction principle for Lorentzian manifolds with parallel spinor fields. Such geometries are important examples of Lorentzian manifolds with special holonomy and appear

Kontakt:
Humboldt-Universität zu Berlin . Institut für Mathematik
SFB 647 . Unter den Linden 6 . 10099 Berlin
Tel. +49 30 2093 1804 . Fax. +49 30 2093 2727
sfb647@math.hu-berlin.de

naturally in various contexts in mathematical physics. The idea for our construction is to start with a Riemannian manifold which is subject to suitable constraints and then to extend these data to a Lorentzian manifold in one higher dimension admitting a parallel spinor. These meth- ods are motivated by considering the well-studied Cauchy problem for the (vacuum) Einstein equations in General Relativity. Thus, in a first part of the talk I will provide a short self-contained introduction to the initial value problem for Ricci-flat Lorentzian manifolds and introduce the relevant methods from hyperbolic PDE theory. Subsequently, the second part of the talk applies these ideas to the construction of Lorentzian manifolds with parallel null spinor. The proof rests on the derivation and analysis of a suitable system of hyperbolic evolution equations. This is a joint project with Helga Baum (Berlin) and Thomas Leistner (Adelaide).

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