

Globally hyperbolic Lorentzian manifolds with special holonomy

HELGA BAUM

Humboldt University of Berlin

Abstract

The (connected) holonomy groups of Riemannian manifolds are well known for a long time and related geometric structures are well studied. The (connected) holonomy groups of Lorentzian manifolds were classified only recently by Thomas Leistner (2003). In 2005 Anton Galaev finished this classification by describing local analytic metrics for all of these Lorentzian holonomy groups (including the still missing coupled types). These results and applications will be presented in the talk of Thomas Leistner.

The next step in this program is to describe Lorentzian metrics with special holonomy and prescribed global geometric properties (geodesically complete, globally hyperbolic, homogeneous, ...). In the talk I will explain a method to construct globally hyperbolic Lorentzian manifolds with special holonomy using Riemannian spin manifolds with Codazzi spinors. This is a joint work with Olaf Müller and is based on an idea of Ch. Bär, P. Gauduchon and A. Moroianu. The talk will include an introduction to the necessary methods of Riemannian and Lorentzian spin geometry.