

HOW CAN NON-CONNECTED LORENTZIAN HOLONOMY GROUPS LOOK LIKE ?

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The connected holonomy groups of Riemannian and of Lorentzian manifolds are classified. In particular, one knows the holonomy groups of simply connected Riemannian and Lorentzian manifolds completely. It is a much harder problem to describe the non-connected holonomy groups or at least to relate the structure of the components of the holonomy group to the geometry or topology of the manifold. In the talk I will discuss some results and some open problems of this kind for Riemannian and for Lorentzian manifolds.