

On the geometry of four-dimensional homogeneous Lorentzian manifolds

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The purpose of this talk is to give an overview of several recent results concerning the geometry of four-dimensional homogeneous Lorentzian manifolds. In particular, the focus will be on: different approaches to the problem of classifying these spaces, the geometry of non-reductive examples, the classification of examples with special geometric properties (Einstein, Ricci solitons, conformally flat, Walker), the study of four-dimensional Lorentzian Lie groups.