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The geometry and topology of supergravity.

The term supergravity refers to a class of gravitational theories invariant under a conjectured symmetry called supersymmetry. Once considered as a potential candidate for a theory of everything, supergravity is nowadays understood as the low energy limit of string theory and as such, supergravity has played a fundamental role in our current understanding of the latter. Aside from its remarkable relevance in modern theoretical physics, supergravity has had, and continues to have, a tremendous impact on the development of differential geometry and topology.

In this set of lectures, I will give an elementary introduction to four-dimensional supergravity, focusing on its most important applications to differential geometry and topology and describing some of its most salient features from a mathematical physics perspective. In particular, I will give a pedagogical introduction about how idealized exact gravitational waves naturally occur as supersymmetric solutions of four-dimensional ungauged supergravity.

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