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What is the T-dual of an event horizon?

Abstract

T-duality is one of the features that sets string theory apart. Surprisingly, the early observation by Rocek and Verlinde (1991) that horizons get mapped to singularities has not received much attention. We will use Einstein-Maxwell theory to show how T-duality rules are derived in a four-dimensional setting and apply this result to obtain and analyse the T-duals of four-dimensional spacetimes containing horizons as well as curvature singularities. While this can be viewed as applying a solution-generating technique to Einstein-Maxwell theory, an embedding of the solutions into string theory provides additional insights into the nature of the singularities.