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T-duality equivalences beyond string theory

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The leading order low-energy effective action of string theory is symmetric under T-duality transformations, and although these are such that geometric properties of solutions may change substantially, they still preserve the Hawking temperature and entropy of black holes. The question naturally arises whether this fact holds when one includes higher-order corrections. In this work we present a two-parameter family of actions which contains the alpha prime corrected actions of string theories for some values of the parameters and derive the corrected T-duality rules. Then we show that temperature and entropy of solutions with black hole horizons are preserved under the corrected rules, and this is so even for values of the parameters which do not correspond to effective string theory actions, indicating that T-duality might also provide physical equivalences in cases which do not have a known sigma model.

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