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SO(10) grand unification at next-to-leading order

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Since the main experimentally testable prediction of grand unified theories is the instability of the proton, precise determination of the proton lifetime for each particular model is desirable. Unfortunately, the corresponding computation usually involves theoretical uncertainties coming e.g. from ignorance of the mass spectrum or from the Planck-suppressed higher-dimensional operators, which may result in errors in the proton lifetime estimates stretching up to several orders of magnitude. On the other hand, we present a GUT model based on SO(10) gauge group which is subsequently broken by a scalar adjoint representation, where the leading Planck-suppressed operator is absent, hence the two-loop precision may be achieved.

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