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Leptoquark mass limit in SU(5)

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I address the issue of model dependence of partial proton decays due to exchange of a single scalar leptoquark within a minimal viable SU(5) framework. The minimal setup predicts a flavor part of the proton decay widths for channels with anti-neutrinos in the final state to depend solely on the known masses and mixing parameters of the quark sector and one extra phase. I accordingly establish an accurate lower limit on the mass of the scalar leptoquark in connection with the relevant experimental constraints on the matter stability. The ratio of proton decay widths for channels with the positive pion and the positive kaon in the final state turns out to be phase independent and predicts strong suppression of the former width with respect to the latter one. These results offer a possibility to test the minimal scenario if and when proton decay is observed.

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