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Constraints on coloured scalars from global fits

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We consider a simple extension of the electroweak theory, incorporating one $SU(2)_L$ doublet of colour-octet scalars with Yukawa couplings satisfying the principle of minimal flavour violation.
Using the HEPfit package, we perform a global fit to the available data, including all relevant theoretical constraints, and extract the current bounds on the model parameters. Coloured scalars with masses below 1.05 TeV are already excluded, provided they are not fermiophobic. The mass splittings among the different (charged and CP-even and CP-odd neutral) scalars
are restricted to be smaller than 20 GeV. Moreover, for scalar masses smaller than 1.5 TeV, the Yukawa coupling of the coloured scalar multiplet to the top quark cannot exceed the one of the SM Higgs doublet by more than 80\%. These conclusions are quite generic and apply in more general frameworks (without fine tunings). The theoretical requirements of perturbative unitarity and vacuum stability enforce relevant constraints on the quartic scalar potential parameters that are not yet experimentally tested.

Primary authors: MIRALLES, Victor (IFIC-UV); PICH, Antonio (IFIC); Dr EBERHARDT, Otto

Presenter: MIRALLES, Victor (IFIC-UV)

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