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## The depleted Higgs boson: searches for universal coupling suppression, invisible decays, and mixed-in scalars

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There are two simple ways that the standard signals of the Standard Model Higgs boson can be depleted. Its couplings to fermions and gauge bosons can be suppressed by a universal factor, and part of its branching fraction can be drained into invisible final states. A large class of theories can impose one or both of these depletion factors, even if mild, by way of additional scalar bosons that are singlets under the Standard Model but mix with the Higgs boson. We perform a comprehensive survey of the present status of the depleted Higgs boson, and discuss future prospects for detecting the presence of either depletion factor. We also survey the constraints status and future detection prospects for the generic case of extra mixed-in scalars which generically lead to these depletion factors for the Higgs boson. We find, for example, that precision study of the Higgs boson in many cases is more powerful than searches for the extra scalar states, given the slate of next-generation experiments that are on the horizon.

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