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Higgs alignment and the top quark

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In Gildener-Weinberg multi-Higgs models of electroweak symmetry breaking, the new, Beyond-Standard-Model Higgs bosons are surprisingly light, $< 600\text{--}700\text{ GeV}$, well within reach of the LHC. There is a surprising connection between the top quark and Higgs alignment in these models. Were it not for the top quark and its large mass, the coupling of the 125 GeV Higgs boson H to gauge bosons and fermions would be indistinguishable from those of the Standard Model Higgs. The top quark's coupling to a single Higgs doublet breaks this perfect alignment in higher orders of the Coleman-Weinberg loop expansion of the effective potential. But the effect is still small, $< \mathcal{O}(1\%)$, and probably experimentally inaccessible. The experimental consequence of this is that many popular LHC searches for Beyond-Standard-Model Higgs bosons are fruitless — and they will remain so.

In-person participation

Yes

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