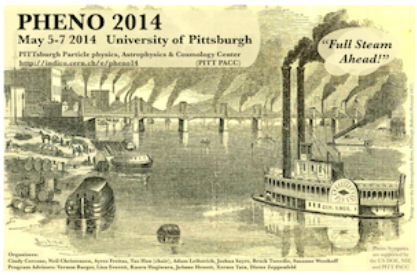

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The decoupling limit in the Georgi-Machacek model

Monday 5 May 2014 17:15 (15 minutes)

We study the most general scalar potential of the Georgi-Machacek model, which adds isospin-triplet scalars to the Standard Model (SM). We show that this model possesses a decoupling limit, in which the predominantly-triplet states become heavy and degenerate while the couplings of the remaining light neutral scalar approach those of the SM Higgs boson. We find that the SM-like Higgs boson couplings to fermion pairs and gauge boson pairs can deviate from their SM values by corrections as large as $\mathcal{O}(v^2/M_{\rm new}^2)$, where v is the SM Higgs vacuum expectation value and $M_{\rm new}$ is the mass scale of the predominantly-triplet states. In particular, the SM-like Higgs boson couplings to W and Z boson pairs can decouple much more slowly than in two Higgs doublet models. As such, precision measurements of these couplings may provide an effective method of distinguishing the Georgi-Machacek model from two Higgs doublet models.

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