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Probing extended Higgs sectors by precision measurements of the Higgs boson couplings

Content :

We discuss how we are able to discriminate extended Higgs sectors by using future precision measurements of the couplings of the discovered Higgs boson $h(125)$ with the mass of 125 GeV. To this end, we construct a full set of numerical codes for evaluating all the couplings of $h(125)$ at the one-loop level in various general extended Higgs sectors, such as the Higgs model with an isospin singlet scalar field, the two Higgs doublet models with four types of Yukawa interaction under the softly-broken discrete symmetry, the inert doublet model and the Higgs model with triplets. In these extended Higgs models, characteristic patterns of deviations in the couplings for $h(125)$ appear not only at the tree level but also at the one-loop level. We numerically evaluate the patterns at the one-loop level, and examine how we can separate and identify extended Higgs model by detecting the patterns of the coupling deviations using the future precision data for these couplings at ILC.

This talk is based on the papers;

1. S. Kanemura, M. Kikuchi, K. Yagyu, Nucl. Phys. B 896, 80 (2015).
2. S. Kanemura, M. Kikuchi, K. Yagyu, in preparation.

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