

Search for Light Scalars Produced in Association with a Z boson at the 250 GeV stage of the ILC

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In many models with extended Higgs sectors, e.g. in Two Higgs Doublet Models, in the NMSSM as well as in Randall Sundrum models, there exists an additional scalar h , which can easily be lighter than the Standard Model (SM) like Higgs. Its coupling to the Z boson is expected to be small if the 125 GeV Higgs boson is SM like. Such a light scalar with suppressed couplings to the Z boson would have escaped detection at LEP due to its limited luminosity. With a factor of 1000 higher luminosity and polarized beams, the International Linear Collider (ILC) is expected to have substantial discovery potential for such states. Furthermore, searches for additional scalars at LEP and LHC are usually dependent on the model details, such as decay channels. Thus, it is necessary to have a more general analysis with model-independent assumptions. We present a search for a such a light higgs boson produced in association with Z boson at the ILC with a center-of-mass energy of 250 GeV, using the full Geant4-based simulation of the ILD detector concept. In order to be as model-independent as possible, the analysis is performed using the recoil technique, in particular with the Z boson decaying into a pair of muons. Expected exclusion cross section limits for different higgs masses between 10 and 120 GeV will be given in terms of a scale factor with respect to the Standard Model Higgs-strahlung process cross section.

Authors: KAWAGOE, Kiyotomo (Kyushu University (JP)); WANG, Yan (Deutsches Elektronen-Synchrotron (DESY), Institute of High Ener)

Presenter: WANG, Yan (Deutsches Elektronen-Synchrotron (DESY), Institute of High Ener)

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