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Measurement of $\sigma(e^+e^- \rightarrow HZ) \times \text{Br}(H \rightarrow ZZ^*)$ at the 250 GeV ILC

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We report on studies of the $e^+e^- \rightarrow HZ$ process with the subsequent decay of the Higgs boson $H \rightarrow ZZ$, where the ZZ combination is reconstructed in the final states with two jets and two leptons. The analysis is performed using Monte Carlo data samples obtained assuming the ILD detector model, the integrated luminosity 2 ab^{-1} and the center-of-mass energy $\sqrt{s} = 250 \text{ GeV}$. Signals are measured for four processes, which correspond to two combinations for the $H \rightarrow ZZ^*$ final states and two decays of the directly produced Z boson, $Z \rightarrow \nu\bar{\nu}$ and $Z \rightarrow q\bar{q}$. To obtain the Higgs boson mass distributions, we used the variables $M(\text{jjll})$ and $\Delta M = M(\text{jjll}) - M(\text{jj}) + M(Z_{\text{nom}})$, where $M(Z_{\text{nom}}) = 91.2 \text{ GeV}$. Potential backgrounds are also estimated. The $e^+e^- \rightarrow HZ$ process measurement allows to obtain the width of the Higgs boson in a model-independent way.

Time Zone

Europe/Africa/Middle East

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