

## Off-shell Higgs Couplings in $H^* \rightarrow ZZ \rightarrow \ell\ell\nu\nu$

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We explore the new physics reach for the off-shell Higgs boson measurement in the  $pp \rightarrow H^* \rightarrow (\ell^+\ell^-)(\nu\nu)$  channel at the high-luminosity LHC. The new physics sensitivity is parametrized in terms of the Higgs boson width, effective field theory framework, and a non-local Higgs-top coupling form factor. Adopting Machine-learning techniques, we demonstrate that the combination of a large signal rate and a precise phenomenological probe for the process energy scale, due to the transverse  $\cancel{E}_T$  mass, leads to significant sensitivities beyond the existing results in the literature for the new physics scenarios considered.

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