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## Probing Higgs Sector New Physics in Vector Boson Longitudinal Mode

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Off-shell Higgs at the high mass tail may shed light on the underlying mechanism of the electroweak symmetry breaking. In the Standard Model, there is an exact cancellation of the logarithmic divergence between the box and Higgs-mediated triangle diagrams due to unitarity, such that the  $gg$  to  $ZZ(WW)$  process in the SM is dominated by the vector boson transverse-mode. The cancellation can be delayed to a higher scale, when there is sufficiently large new physics contribution resulting in VLVL longitudinal mode, which is commonly the case when the Higgs sector is modified. Thus the longitudinal mode in the high mass tail can be utilized as a sensitive probe for new physics. We thus propose to utilize the information in angular observables to maximize the sensitivity across various types of Higgs sector new physics.

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