



Contribution ID: 58

Type: **not specified**

## Measuring Higgs Boson Self-couplings with 2→3 VBS Processes

*Friday 27 August 2021 14:30 (20 minutes)*

We study the measurement of Higgs boson self-couplings through 2→3 vector boson scattering (VBS) processes in the framework of Standard Model effective field theory (SMEFT) at both proton and lepton colliders. The SMEFT contribution to the amplitude of the 2→3 VBS processes, taking  $WLWL \rightarrow WLWLh$  and  $WLWL \rightarrow hhh$  as examples, exhibits enhancement with the energy  $\sqrt{s} \sim E^2 \Lambda^2$ , which indicates the sensitivity of these processes to the related dimension-six operators in SMEFT. Simulation of the full processes at both hadron and lepton colliders with a variety of collision energies are performed to estimate the allowed region on  $c_6$  and  $c_{\Phi^1}$ . Especially we find that, with the help of exclusively choosing longitudinal polarizations in the final states and suitable  $p_T$  cuts,  $WW_h$  process is as important as the more widely studied triple Higgs production ( $hhh$ ) in the measurement of Higgs self-couplings. Our analysis indicates that these processes can play important roles in the measurement of Higgs self-couplings at future 100 TeV pp colliders and muon colliders. However, their cross sections are generally tiny at low energy machines, which makes them much more challenging to explore.

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**Session Classification:** Electroweak, Top quark, and Higgs Physics

**Track Classification:** Electroweak, Top quark, and Higgs Physics