

No channel left behind: revisiting Vh production at LHC, HL-LHC and FCC-hh

Tuesday, November 8, 2022 11:30 AM (15 minutes)

Diboson production processes provide good targets for precision measurements at present and future hadronic colliders. We consider Vh production, focusing on the $h \rightarrow b\bar{b}$ decay channel, whose sizeable cross section makes it easily accessible at the LHC. We perform an improved analysis combining the 0-, 1- and 2-lepton channels with a scale-invariant b -tagging algorithm that allows us to exploit events with either a boosted Higgs or resolved b -jets. This procedure offers a competitive sensitivity to 4 dimension-6 SMEFT operators, $\mathcal{O}_{\varphi q}^{(3)}$, $\mathcal{O}_{\varphi q}^{(1)}$, $\mathcal{O}_{\varphi u}$ and $\mathcal{O}_{\varphi d}$.

At FCC-hh, the $h \rightarrow b\bar{b}$ decay channel is competitive with the cleaner $h \rightarrow \gamma\gamma$ channel, provided systematic uncertainties can be kept under good control. In this context, we show that a rapidity binning can significantly reduce correlations, improving the sensitivity to $\mathcal{O}_{\varphi q}^{(1)}$ and $\mathcal{O}_{\varphi u}$.

Finally, we assess the impact of the Vh production channel on aTGC measurements, comparing with the determination at lepton colliders.

Based mostly on 2207.YYZZZ (to be published soon) and partially on 2011.13941 and 2004.06122.

Type of talk

Future prospects

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