

# Search for Resonant and Non-Resonant VHH Production

*Thursday 17 March 2022 12:00 (20 minutes)*

Studies of Higgs boson pair production (hh) represent the next crucial step to constraining the Higgs sector and allow the chance to refine measurements of the Higgs boson self-coupling. While previous searches have focused on the hh production in the gluon-gluon fusion (ggF) and vector-boson fusion (VBF) modes, this analysis documents a new search, with 139 fb<sup>-1</sup> of pp collisions at  $\sqrt{s} = 13$  TeV collected by the ATLAS detector in LHC Run 2, for di-Higgs production in the Vhh final-state. It searches for both resonant and non-resonant hh production, with only  $hh \rightarrow b\bar{b}b\bar{b}$  considered for simplicity, in association with a leptonically decaying vector boson (W or Z). While this process has a lower cross-section than ggF and VBF hh production, it offers a clean final state with relatively small backgrounds, due to the presence of leptons. The analysis benefits from small backgrounds and attempts to set limits for the first time on Vhh production. Analysis techniques and expected significance will be presented.

## Career stage

Graduate student

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