

Jennet Dickinson – HEP Seminar – October 24, 2023  
FNAL

## **Higgs boson production via vector boson fusion with the CMS experiment**

A first search is conducted for boosted Higgs boson production via vector boson fusion in the  $H(bb)$  decay channel at the LHC proton-proton collider. The result is based on the full 13 TeV dataset collected by the CMS detector in 2016, 2017, and 2018, corresponding to an integrated luminosity of  $138 \text{ fb}^{-1}$ . Jet kinematics are used to define independent regions targeting vector boson fusion (VBF) and gluon fusion (ggF) production of Higgs bosons with  $p_T > 450 \text{ GeV}$ . The  $H(bb)$  decay is isolated by selecting large-radius jets and exploiting jet substructure and dedicated heavy flavor taggers for boosted resonances based on advanced machine learning techniques. The ggF and VBF signal strengths are extracted simultaneously by performing a fit to data in the large-radius jet mass.