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## Measurements of Higgs boson production through vector boson fusion in the $H \rightarrow WW^* \rightarrow e\nu\mu\nu$ final state at $\sqrt{s}=13$ TeV with the ATLAS detector

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The Higgs boson in its vector boson fusion production mode and its decay to a pair of W bosons that in turn decay leptonically to a  $e\nu\mu\nu$  final state, is probed. The Large Hadron Collider delivered proton-proton collisions at a center-of-mass energy of 13 TeV between 2015 and 2018 which were recorded by the ATLAS detector, corresponding to an integrated luminosity of  $139 \text{ fb}^{-1}$ . Deep Neural Network is exploited in the analysis. The total cross section for Higgs boson production by vector-boson fusion times the  $H \rightarrow WW^*$  branching ratio is measured to be  $0.75^{+0.19}_{-0.16} \text{ pb}$ . The results are consistent with Standard Model expectations of  $0.81 \pm 0.02 \text{ pb}$

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