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Combined effective field theory interpretation of $H \to WW^* and WW$ measurements using ATLAS data

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While LHC physics is entering the precision era, no fatal flaws in the standard
model of particle physics have been revealed. In the years to come, direct searches for new particles will continue to play an important role. However, they will be accompanied by precision measurements of known particles and indirect searches. Using the Standard Model Effective Field Theory (SMEFT) these measurements can be combined and interpreted in a coherent theory framework. This framework can be used to describe a variety of beyond the standard model theories that introduce new-physics states at a high mass scale, potentially exceeding the energy reach of the collider.

In a new combination, using 36.1 fb^{-1} of LHC collision data reconstructed at the ATLAS experiment, effective field theory operators are constrained in a combined analysis of two studies: the measurement of the $H \to WW^* \to e^{\pm}\nu_e\mu^{\mp}\nu_\mu$ process and a differential cross-section measurement of the $WW \to e^{\pm}\nu_e\mu^{\mp}\nu_\mu$ process. For the first time, two conceptually different measurements styles are combined in a coherent statistical framework, increasing the sensitivity of the interpretation and paving the way for future combinations within ATLAS.

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