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## The $H \rightarrow hh, Sh, SS \rightarrow 4W \rightarrow 4\ell + 4\nu$ analysis with the ATLAS detector: optimization and prospects for the full Run-2 data

Tuesday, 26 June 2018 15:00 (2 hours)

The  $H \rightarrow hh, Sh, SS \rightarrow 4W \rightarrow 4\ell + 4\nu$  analysis using  $\sqrt{s} = 36.1 \text{ fb}^{-1}$  of  $pp$  collision data at a center-of-mass energy of  $13 \text{ TeV}$  recorded with the ATLAS detector at the Large Hadron Collider is presented. The analysis introduces the new Higgs-like scalar,  $S$ , as well as the Standard Model Higgs boson,  $h$ , through the decay of the heavy scalar,  $H$ . The search is characterized by four lepton and missing transverse momentum carried out by the neutrinos in the final state. This is a very clean signature with low expected background. The analysis strategy relies on the invariant mass of the four leptons and also uses dilepton kinematics to reject  $ZZ$  background. The paper discusses the published results with  $\sqrt{s} = 36.1 \text{ fb}^{-1}$  of the Run-2 data. The analysis optimization and also the prospects for the full Run-2 data are also presented.

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