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## Signal and background ATLAS Monte Carlo Comparison studies in the $H \rightarrow ZZ \rightarrow 4l$ Channel.

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The search for new heavy particles in the  $H \rightarrow ZZ \rightarrow 4l$  decay channel represents one of the most promising searches in High Energy Physics. This study focuses on the hadronic properties of this channel which leads to the final state consisting of four isolated leptons plus at least two light flavor jets.  $gg \rightarrow H$  signal and  $qq \rightarrow ZZ$  background studies using High mass ( $m_{4l} > 140$  GeV) ATLAS Monte Carlo samples with different pile-up conditions are conducted. Comparisons of the shapes of the distributions are made between two sets of  $qq \rightarrow ZZ$  background as well as two sets of  $gg \rightarrow H$  ( $m_{4l} = 200$  GeV) signal Monte Carlo samples. Expected yields in each of the two sets of  $qq \rightarrow ZZ$  background and signal efficiencies in each set of the  $gg \rightarrow H$  signal Monte Carlo samples are also calculated and compared.

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