**Study of systematic uncertainties for Higgs Boson Searches in
$H \to \gamma\gamma$ and $H \to W^+W^- \to l^+\nu l^-\nu$ Final States in ATLAS**[1] HEE YEUN
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This study focuses on the theoretical systematic uncertainties for Higgs particle
searches in $H \to \gamma\gamma$ and $H \to W^+W^+ \to l^+\nu l^-\nu$ channels at ATLAS and for
background processes. The precision of Monte Carlo event generator predictions
benefit dramatically from the inclusion of higher-order corrections in various ways
in total and differential cross sections. In this study, two different combinations
of Monte-Carlo tools, PowhegBox-Pythia and PowhegBox-Herwig, are used with
various Parton Distribution Function sets in CTEQ6.6 and MSTW2008NLO for
systematic uncertainties resulting from parton showering and PDF uncertainties.
Large scale Monte-Carlo event simulations have been performed to estimate the
background. Cut based analyses have been done and theoretical predictions have
been compared to the 2011 ATLAS data. This enables us to understand the under-
lying parton dynamics in the processes, and to quantify the theoretical systematic
uncertainties in background estimates and Higgs signal cross sections.

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