



NLO Assistance to LHC Searches with Complex Final States using BlackHat and Sherpa

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The prediction of backgrounds to new physics signals in topologies with large missing transverse energy and jets is important to new physics searches at the LHC. The BlackHat collaboration has investigated theoretical issues in extrapolating backgrounds from experimental control regions to signal regions. For example, we compute, ratios of $\gamma + n\text{-jet}$ to $Z + n\text{-jet}$ production rates and kinematic distributions in NLO QCD, and compare with a parton shower matched to leading-order matrix elements. These predictions validate uncertainty estimates used by CMS for the irreducible $Z + n\text{-jet}$ component of MET+jets searches. We also describe the phenomenon of left-handed W polarization at large transverse momentum, its theoretical prediction and recent measurement by CMS and ATLAS, and its potential role in background separation.

Primary author: Prof. DIXON, Lance (SLAC National Accelerator Laboratory (US))

Presenter: Prof. DIXON, Lance (SLAC National Accelerator Laboratory (US))

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