

Underlying event studies using LHC data

Abstract

The accurate calculations of cross sections involving QCD processes with large momentum transfers in proton-proton (pp) collisions provides valuable information to perform precise Standard Model measurements or to search for new physics phenomena. However it is not enough, studies on the accompanying interactions of the rest of the main hard scattering are also mandatory. Such interactions are called underlying event (UE) and can receive contributions from initial/final state radiation, multiple partonic interactions and beam remnants. In the present talk we study results from LHC experiments (ALICE, ATLAS and CMS) on UE in pp collisions at $\sqrt{s} = 0.9, 7$ and $13\sqrt{\text{TeV}}$. We find that the charged-particle production sensitive to the underlying event and to the hard partonic interaction can be both understood in terms of the change of the inclusive average multiplicity. Within uncertainties, the particle production as a function of the leading jet/particle shows no significant \sqrt{s} -dependence once it is scaled according to the relative change in multiplicity. The scaling properties reported here are well reproduced by PYTHIA 8.212 tune Monash 2013 and suggest an universality of the underlying event in hadronic interactions at high \sqrt{s} . We will discuss the importance of the results to model the hadronic interactions at high energies in order to make more precise predictions based on QCD-inspired Monte Carlo generators.

Primary author(s) : Dr. VALENCIA PALOMO, Lizardo (Universidad Autónoma de Chiapas)

Co-author(s) : Dr. ORTIZ VELASQUEZ, Antonio (ICN, UNAM)

Presenter(s) : Dr. VALENCIA PALOMO, Lizardo (Universidad Autónoma de Chiapas)