

Diffraction at CMS

Abstract

The observation of a diffractive signal dominated by the inclusive single diffractive dissociation reaction $pp \rightarrow pX$ is presented. The analysis is based on a fraction of the data collected by the CMS experiment in 2010 and corresponds to an integrated luminosity of 10, 0.4 and 20 μb^{-1} at 0.9, 2.36 and 7 TeV, respectively. Detector level distributions are compared to fully simulated and reconstructed Monte Carlo predictions obtained with the PYTHIA6, PHOJET and PYTHIA8 generators.

We propose a new method to measure the visible part of the total in-elastic pp cross section based on the assumption that pile-up events are randomly distributed according to a Poissonian probability. This method measures the cross section for visible events, i.e., events that make a vertex in the CMS tracking system. This value is then converted to hadron level using a monte-carlo.

Using data collected by the CMS experiment in 2010, corresponding to an integrated luminosity of 35 pb^{-1} , a detailed study of the event structure and the energy distribution in the forward region of w and Z events is presented. These contain also event samples which are dominated by diffractive interactions.