Measurement of the polarisation of W bosons produced with large transverse momentum in pp collisions at root s =7 TeV with the ATLAS experiment

ATLAS collaboration. (2012). Measurement of the polarisation of W bosons produced with large transverse momentum in pp collisions at sqrt (s)= 7 TeV with the ATLAS experiment. Eur. Phys. J. C <10.1140/epjc/s10052-012-2001-6> Accessed 11 Aug 2021.

Abstract

This paper describes an analysis of the angular distribution of W->enu and W->munu decays, using data from pp collisions at sqrt(s) = 7 TeV recorded with the ATLAS detector at the LHC in 2010, corresponding to an integrated luminosity of about 35 pb^-1. Using the decay lepton transverse momentum and the missing transverse energy, the W decay angular distribution projected onto the transverse plane is obtained and analysed in terms of helicity fractions f0, fL and fR over two ranges of W transverse momentum (ptw): 35 < ptw < 50 GeV and ptw > 50 GeV. Good agreement is found with theoretical predictions. For ptw > 50 GeV, the values of f0 and fL-fR, averaged over charge and lepton flavour, are measured to be : f0 = 0.127 +/- 0.030 +/- 0.108 and fL-fR = 0.252 +/- 0.017 +/- 0.030, where the first uncertainties are statistical, and the second include all systematic effects..