

Abstract

This thesis presents an indirect measurement of the width of the W boson using data collected at the DØ experiment, a multipurpose particle detector utilising the Fermilab Tevatron. The W width was determined from the ratio of $W \rightarrow \mu\nu$ to $Z \rightarrow \mu^+\mu^-$ cross sections to be

$$\Gamma_W = 2168 \pm 22(\text{stat}) \pm 62(\text{syst})_{-16}^{+24}(\text{pdf}) \pm 4(\text{other}) \text{ MeV},$$

in good agreement with the Standard Model prediction and other experimental measurements.

In addition there is a description of how work made towards this measurement has been used to improve the parameterised detector simulation, a vital tool in the obtention of physics results from signals observed in the detector, and in estimating the uncertainty due to choice of PDF, which is of interest for all measurements made at hadron colliders.