Angular Coefficients Measurement of Drell-Yan Dielectron Pairs at CDF

JIYEON HAN, Rochester University, CDF COLLABORATION — We report on the measurement of the angular distributions of final state electrons in $p\bar{p} \rightarrow \gamma^*/Z \rightarrow e^+e^-$ events produced in the $Z$ boson region mass range of 66 to 116 GeV/c² from 2.1 $fb^{-1}$ of proton anti-proton collisions at $\sqrt{s} = 1.96$ TeV taken by the CDF detector at Fermilab. The transverse momentum ($P_T$) dependent angular coefficients $A_0$, $A_2$, $A_3$, and $A_4$ are compared with several predictions based on Quantum Chromodynamics (QCD). The $P_T$ dependence of $A_0$ and $A_2$ is in agreement with the predictions of perturbative QCD and shows that the production of $Z$ bosons at large $P_T$ proceeds via a combination of the quark-antiquark annihilation and the quark-gluon Compton processes. We find a good agreement with the Lam-Tung relation ($A_0 = A_2$), which implies that the spin of the gluon is 1.

Lawrence Nodulman
Argonne National Lab

Date submitted: 06 Jan 2011

Electronic form version 1.4