Measurement of the transverse single-spin asymmetry in $p^\uparrow + p \to W^\pm/Z^0$ at RHIC

STAR Collaboration

P_T^W [GeV/c]	$\langle P_T^W \rangle$ [GeV/c]	$A_N(W^+ \to e^+\nu_e)$	$A_N(W^- \to e^-\nu_e)$
$1.0 \div 2.5$	1.8	$0.07 \pm 0.14 \ (st.) \pm 0.004 \ (sy.)$	$0.54 \pm 0.24 \ (st.) \pm 0.033 \ (sy.)$
$2.5 \div 4.0$	3.3	$0.01 \pm 0.13 \ (st.) \pm 0.001 \ (sy.)$	$0.37 \pm 0.23 \ (st.) \pm 0.054 \ (sy.)$
$4.0 \div 5.5$	4.7	$0.03 \pm 0.15 \ (st.) \pm 0.002 \ (sy.)$	$-0.01 \pm 0.25 \ (st.) \pm 0.001 \ (sy.)$
$5.5 \div 7.0$	6.2	$0.45 \pm 0.19 \ (st.) \pm 0.020 \ (sy.)$	$0.50 \pm 0.39 \ (st.) \pm 0.022 \ (sy.)$
$7.0 \div 10.0$	8.3	$0.42 \pm 0.19 \ (st.) \pm 0.039 \ (sy.)$	$0.33 \pm 0.41 \ (st.) \pm 0.03 \ (sy.)$

Table 1: The amplitude of the transverse single-spin asymmetry for $W^\pm$ boson production as a function of P_T^W, in the $|y^W| < 1$ region, measured by STAR in proton+proton collisions at $\sqrt{s} = 500$ GeV with a recorded luminosity of 25 pb^{-1}. The average boson's rapidity value for each P_T^W-bin is $\langle y^W \rangle = 0.0$.

y^W	$\langle y^W \rangle$	$A_N(W^+ \to e^+\nu_e)$	$A_N(W^- \to e^-\nu_e)$
$-0.6 \div -0.2$	-0.38	$0.15 \pm 0.15 \ (st.) \pm 0.053 \ (sy.)$	$0.12 \pm 0.29 \ (st.) \pm 0.042 \ (sy.)$
$-0.2 \div 0.2$	0.00	$0.27 \pm 0.11 \ (st.) \pm 0.004 \ (sy.)$	$0.23 \pm 0.21 \ (st.) \pm 0.003 \ (sy.)$
$0.2 \div 0.6$	0.38	$0.014 \pm 0.13 \ (st.) \pm 0.002 \ (sy.)$	$0.40 \pm 0.24 \ (st.) \pm 0.051 \ (sy.)$

Table 2: The amplitude of the transverse single-spin asymmetry for $W^\pm$ boson production as a function of y^W, in the 0.5 GeV/c $< P_T^W < 10$ GeV/c region, measured by STAR in proton+proton collisions at $\sqrt{s} = 500$ GeV with a recorded luminosity of 25 pb^{-1}. The average boson's transverse-momentum value for each y^W-bin is $\langle P_T^W \rangle = 5.3$ GeV/c.

	$A_N(Z^0 \to e^+e^-)$
0.5 GeV/c $< P_T^Z < 10$ GeV/c $-0.8 < y^Z < 0.8$	$0.60 \pm 0.33 \ (stat.)$

Table 3: The amplitude of the transverse single-spin asymmetry for Z^0 boson production, measured by STAR in proton+proton collisions at $\sqrt{s} = 500$ GeV with a recorded luminosity of 25 pb^{-1}.