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A Measurement of the Parity Violating Parameter A(B) with Electrons at the SLD using a Neural Network*

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A MEASUREMENT OF THE PARITY VIOLATING PARAMETER A_B WITH ELECTRONS AT THE SLD USING A NEURAL NETWORK

A dissertation submitted in partial satisfaction of the
requirements for the degree of

DOCTOR OF PHILOSOPHY

in

PHYSICS

by

Jorge Pablo Fernandez

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Abstract

A Measurement of the Parity Violating Parameter A_b with Electrons at the SLD Using a Neural Network

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The parity violating parameter A_b of the $Z^0 \to b\bar{b}$ coupling has been measured directly using the angular dependence of the Z^0-pole polarized cross section. Bottom hadrons are tagged via semileptonic decays. The semileptonic channel used in this analysis is the electron channel. The analysis takes advantage of a new Neural Network algorithm to classify electrons according to the sources: $b \to e$, $b \to c \to e$, $c \to e$ and background events. Based on the 1996-1998 SLD sample of 350,000 Z^0 decays produced with highly polarized electron beams, this technique yields: $A_b = 0.877 \pm 0.050(\text{stat}) \pm 0.028(\text{syst})$.

Para mis queridos padres

Arturo

y

Gloria

and for my loving wife

Katherine

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