A Measurement of the Branching Ratio $R(B) = \frac{\Gamma(Z(0) \rightarrow B \text{ Anti-} B)}{\Gamma(Z(0) \rightarrow \text{Hadrons})}$ Using a Minimum Missing $P(T)$ Corrected Mass Tag

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Abstract

A Measurement of the branching ratio $R_4 = \frac{\Gamma(Z^0 \rightarrow b\bar{b})}{\Gamma(Z^0 \rightarrow \text{hadrons})}$ using a minimum missing $P_t$ corrected mass tag.

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Presented here is a new measurement of $R_4 = \frac{\Gamma(Z^0 \rightarrow b\bar{b})}{\Gamma(Z^0 \rightarrow \text{hadrons})}$ using a self-calibrating double tag technique where the $b$ selection is based on topological and kinematic reconstruction of the mass of the $B$-decay vertex. The measurement was performed using a sample of 72074 hadronic $Z^0$ events out of the 150k hadronic $Z^0$ decays collected with the SLD at the SLAC Linear Collider during 1993-1995. The method utilizes the 3-D vertexing abilities of the SLD CCD pixel vertex detector and the small stable SLC beams to obtain a high $b$ tagging efficiency of 35.3% for a purity of 98.0%. The high purity reduces the systematic uncertainty introduced by charm contamination and correlations with $R_e$. We obtain a result of $R_4 = 0.2142 \pm 0.0034_{\text{stat.}} \pm 0.0015_{\text{sys.}} \pm 0.0002_{R_4}$ (corrected for the $e^+e^-\gamma$ exchange contribution).
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DEDICATION

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