SLAC-R-672
UC-414

A Measurement of the Branching Ratio R(B) = Gamma (Z(0) → B Anti-B)/Gamma (Z(0) → Hadrons) Using a Minimum Missing P(T) Corrected Mass Tag*

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SLAC-Report-672
February 1998

Prepared for the Department of Energy
under contract number DE-AC03-76SF00515

* Ph.D. thesis, University of Washington, Seattle, WA 98195

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Abstract

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

by Eric Ross Weiss

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Presented here is a new measurement of $R_b = \Gamma(Z^0 \to b\bar{b})/\Gamma(Z^0 \to hadrons)$ 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_c. We obtain a result of $R_b = 0.2142 \pm 0.0034_{stat.} \pm 0.0015_{syst.} \pm 0.0002_{R_c}$ (corrected for the $e^+e^- \to \gamma$ exchange contribution).

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ACKNOWLEDGMENTS

Obtaining a Ph.D in experimental particle physics is the loftiest goal I have ever achieved. I feel very lucky to have had this opportunity. I am grateful to all the people who helped me along the way and would like to take this opportunity to thank them.

I am deeply in debt to my advisor Vic Cook, who allowed me the freedom to do what I want yet was willing to lend a hand. I am grateful for both the knowledge and friendship he gave me. It was a pleasure working for him, he has been the best boss I ever had. I would also like to thank the members of the High Energy Physics Group at the University of Washington. Specifically I would like to thank Steve Wasserbaech and Toby Burnett for taking the time to read my dissertation. Their comments were much appreciated.

I would also like to thank some of my undergraduate professors who put me on the road to graduate school. Thanks goes to Jeneane Thompson who convinced me to switch my major to physics in the first place. I would also like to thank Lynn Cominsky for making physics so fun. Special thanks to Joe Tenn who convinced me to go to graduate school in general and the University of Washington specifically.

I would like to thank all the members of the SLD collaboration. It has been an honor to work with all of them. Special thanks goes out to the members of the online and offline software groups for providing me with the data I needed to write this dissertation. I would also like to thank the members of the heavy flavor working group for all their feedback and help with this analysis. I would like to specifically thank the members of the SLD R_b group. Homer Neal, Erez Etzion and John Coller.

It was a pleasure working with you all. I owe a special debt of gratitude to our Mentor Su Dong, who for me will always be a symbol of excellence and dedication. Special thanks goes to Joe Perl for the friendship, coffee and perspective; it kept me sane.

Last but definitely not least I would like to thank my family. My mother Suzanne Weiss for all the love, support and friendship she has given me. My father Ben Weiss who unwittingly introduced me to physics when I was five years old, via a radio program he was listening to on our way to go fishing. It goes to show you dad, kids are impressionable, be careful what you let them see and hear, they may end up in school forever. My sisters Lisa, Ellyn and Vikki for all the friendship and humor. Special thanks to Lisa for all the ski trips, they where a life saver. My stepmother Maureen Weiss for the friendship and laid-back attitude. My stepfather John Weiss for all the football talk; it was a pleasant distraction. Finally my grandmother Esther Weiss, the matriarch of our clan, who was always so proud of me. I hope I have provided some justification for her pride.

DEDICATION

This dissertation is dedicated to my wife Keni Renner, whose love and support make me whole.

Keni is without a doubt the best thing I got out of my graduate student experience. I don't know if I would have finished this degree without her constant encouragement. When things seemed at their bleakest and I was ready to quit, she would remind me of how far I've come and how little was left to go. Her patience and sacrifice have been of an epic proportion and I am eternally in her debt.

Keni this degree is as much yours as it is mine. Perhaps we can have a somewhat more normal life now.