

**Measurement of the Tau Lepton Lifetime Using the SLD Detector at the
Stanford Linear Collider***

Jeffrey David Turk

Stanford Linear Accelerator Center
Stanford University
Stanford, CA 94309

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MEASUREMENT OF THE TAU LEPTON LIFETIME
USING THE SLD DETECTOR AT THE STANFORD
LINEAR COLLIDER

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Doctor of Philosophy

By
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November 1994

ABSTRACT

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The lifetime of the tau lepton is measured to be $(2.50 \pm 0.35) \times 10^{-13}$ s. The measurement combines the results of two different techniques used on separate samples of tau events collected at the Stanford Linear Collider by the SLD detector during the 1992 physics run. The first technique measures the decay length from the known interaction position to the reconstructed decay vertex position. This requires that the taus have at least three charged decay products. The second technique infers the decay length by correlating the differences in signed impact parameters (for single charged track decays) with the angles between the tracks.

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Contents

Acknowledgements	iii
1 Introduction	1
1.1 Hadronic τ Decays	4
2 Analytical Techniques	6
2.1 Analysis of 3-Prong Decays	6
2.2 Analysis of 1-Prong Decays	8
3 Experimental Considerations	11
3.1 Vertex Detector (VXD)	11
3.2 Precision of the SLC Beam Position	16
3.3 The Liquid Argon Calorimeter (LAC)	18
3.4 The Warm Iron Calorimeter (WIC)	21
3.5 Central Drift Chamber (CDC)	22
3.6 Data Acquisition	24
3.7 Event Reconstruction	26
4 Data Production, Simulation and Selection	28
4.1 Production	28
4.2 Monte Carlo	29
4.3 Trigger	29
4.4 Rough-Filter	31
4.5 Tau-Filter	31

4.6	1-1 Event Selection	32
4.7	1-3 and 3-3 Event Selection	35
5	Analysis	40
5.1	The Tau Lifetime from 1-1 Decays	40
5.1.1	The Fit Lifetime	40
5.1.2	Systematic Error Estimation and Correction	40
5.1.3	The Corrected Lifetime	43
5.2	The Tau Lifetime from 3-Prong Decays	43
5.3	Checks for Biases by Monte Carlo Studies	45
6	Conclusions	48
A	Error Calculations for 1-1 Topology Tau Analysis	50
A.1	ψ Parameterization of Angles	50
A.2	Proof of the Method	51
A.3	Calculation of the Error Due to Randomness in the Decays	53
A.4	Calculation of the Best Possible Statistical Error for a Perfect Detector and no Radiative Effects	54
A.5	Combining the Natural Random Error with the Measurement Error	56
B	Prognosis For Further Tau Lepton Lifetime Studies at SLD	57
C	The SLD Collaboration	59
	Bibliography	67