

# Lawrence Berkeley National Laboratory

## LBL Publications

### Title

A Study of 10,000 t+ Decays

### Permalink

<https://escholarship.org/uc/item/0pg8n0rn>

### Authors

Butler, W Ralph  
Bland, Roger W  
Goldhaber, Gerson  
et al.

### Publication Date

1968-11-01

cy-Z

RECEIVED  
LAWRENCE  
RADIATION LABORATORY

DEC 5 1968

LIBRARY AND  
DOCUMENTS SECTION

University of California

Ernest O. Lawrence  
Radiation Laboratory

A STUDY OF 10,000  $\tau^+$  DECAYS

W. Ralph Butler, Roger W. Bland, Gerson Goldhaber, Sulamith Goldhaber,  
Allan A. Hirata, Thomas O'Halloran, George H. Trilling,  
and Charles G. Wohl

November 1968

TWO-WEEK LOAN COPY

*This is a Library Circulating Copy  
which may be borrowed for two weeks.  
For a personal retention copy, call  
Tech. Info. Division, Ext. 5545*

Berkeley, California

UCRL-18420 (Add.)  
cy-Z

## **DISCLAIMER**

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor the Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or the Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or the Regents of the University of California.

UNIVERSITY OF CALIFORNIA

Lawrence Radiation Laboratory  
Berkeley, California

AEC Contract No. W-7405-eng-48

A STUDY OF 10,000  $\tau^+$  DECAYS

W. Ralph Butler, Roger W. Bland, Gerson Goldhaber, Sulamith Goldhaber,  
Allan A. Hirata, Thomas O'Halloran, George H. Trilling,  
and Charles G. Wohl

November 1968

Addendum:

We have used an improved method to fit the various distributions described in Tables I and II; also we have used smaller bins for the two-dimensional fitting. This addendum supplies Tables I and II to replace the existing ones.

The improvement consists of two facets. First, the weighting procedure for both coulomb effects and phase space was eliminated by integrating the assumed distribution over each bin to predict the expected number of events in that bin. This expected number is then compared with the observed number in that bin. Second, the distribution is constrained to give exactly the total number of events in the plot; this constraint was not applied in the original version of Tables I and II. Finally, the Dalitz plot was partitioned into 170 bins rather than the 44 used in the previous 2-D fit.

These improvements did not modify the previous results except that the  $x^2 y^2$  term, mentioned in the text, cannot be considered statistically significant.

Table I. Fit to x and y projection.

A. <u>Fit of the y projection to <math>(1 + ay + by^2)</math></u>					
Coulomb factor included:	<u>a</u>	<u>b</u>	<u>d.f.</u>	<u><math>\chi^2</math></u>	<u>C.L.</u>
Linear fit	0.277 ± .020	-	18	22.0	23%
Quadratic fit	0.294 ± .022	.099 ± .046	17	17.0	45%
No Coulomb factor:					
Linear fit	0.244 ± .020	-	18	18.9	40%
Quadratic fit	0.253 ± .022	0.061 ± .045	17	17.0	45%
B. <u>Fit of the x projection to <math>(1 + cx^2)</math></u>					
Coulomb factor included:	<u>c</u>		<u>d.f.</u>	<u><math>\chi^2</math></u>	<u>C.L.</u>
Constant fit	-		19	14.8	74%
Quadratic fit	0.005 ± .044		18	14.8	68%
No Coulomb factor:					
Constant fit	-		19	15.2	71%
Quadratic fit	.046 ± .045		18	14.1	72%

Table II. Two-dimensional fit to Dalitz plot with Coulomb factor included.

Fit Dalitz plot to $(1 + a_1 y + a_2 y^2 + a_3 x^2 + a_4 x^2 y + a_5 x^2 y^2)$								
	$a_1$	$a_2$	$a_3$	$a_4$	$a_5$	d.f.	$\chi^2$	$\chi^2/\text{d.f.}$
$a_1$	$0.280 \pm 0.020$	-	-	-	-	168	158.1	.941
$a_1, a_2$	$0.297 \pm 0.022$	$0.099 \pm 0.046$	-	-	-	167	153.0	.916
$a_1, a_3$	$0.280 \pm 0.020$	-	$-0.048 \pm 0.041$	-	-	167	156.8	.939
$a_1, a_5$	$0.282 \pm 0.020$	-	-	-	$0.365 \pm 0.222$	167	155.2	.929
$a_1, a_2, a_3$	$0.296 \pm 0.022$	$0.093 \pm 0.048$	$-0.019 \pm 0.046$	-	-	166	152.9	.921
all above <sup>a</sup>	$0.274 \pm 0.030$	$0.038 \pm 0.058$	$-0.070 \pm 0.056$	$0.100 \pm 0.122$	$0.408 \pm 0.289$	164	150.3	.916

<sup>a</sup>We have also fitted using all allowed terms up to fourth order and find the other terms are consistent with zero.

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

- A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or
- B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.