b-baryon ADMIXTURE (Λ_b, Ξ_b, Σ_b, Ω_b)

NODE=S061

b-baryon ADMIXTURE MEAN LIFE

NODE=S061205

NODE=S061205

Each measurement of the b-baryon mean life is an average over an admixture of various b baryons which decay weakly. Different techniques emphasize different admixtures of produced particles, which could result in a different b-baryon mean life.

NODE=S061T

"OUR EVALUATION" is an average of the data listed below performed by the LEP B Lifetimes Working Group as described in our review "Production and Decay of b-flavored Hadrons" in the $B^{\pm}$ Section of these Listings. The averaging procedure takes into account correlations between the measurements and asymmetric lifetime errors.

NODE=S061T

→ NOT CHECKED ←

VALUE (10^{-12} s)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
1.20±0.07 OUR EVALUATION					
$1.20\pm0.08\pm0.06$		[1] BARATE	98D	ALEP	$e^+e^- \to Z$
$1.46^{+0.22}_{-0.21}{}^{+0.07}_{-0.09}$		ABREU	96D	DLPH	Excess $\Lambda\ell^-\pi^+$, decay lengths
$1.10^{+0.19}_{-0.17}\pm0.09$		ABREU	96D	DLPH	Excess $\Lambda\mu^-$ impact parameters
$1.16\pm0.11\pm0.06$		AKERS	96	OPAL	Excess $\Lambda\ell^-$, decay lengths and impact parameters
$1.27^{+0.35}_{-0.29}\pm0.09$		ABREU	95S	DLPH	Excess $p\mu^-$, decay lengths
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$1.25\pm0.11\pm0.05$		[2] ABREU	96D	DLPH	Combined result
$1.05^{+0.12}_{-0.11}\pm0.09$	290	BUSKULIC	95L	ALEP	Repl. by BARATE 98D
$1.04^{+0.48}_{-0.38}\pm0.10$	11	[3] ABREU	93F	DLPH	Excess $\Lambda\mu^-$, decay lengths
$1.05^{+0.23}_{-0.20}\pm0.08$	157	[4] AKERS	93	OPAL	Excess $\Lambda\ell^-$, decay lengths
$1.12^{+0.32}_{-0.29}\pm0.16$	101	[5] BUSKULIC	92I	ALEP	Excess $\Lambda\ell^-$, impact parameters

OCCUR=2

OCCUR=4

[1] Measured using the excess of $\Lambda\ell^-$, lepton impact parameter. NODE=S061T;LINKAGE=KK

[2] Combined result of the three ABREU 96D methods and ABREU 95S. NODE=S061T;LINKAGE=E

[3] ABREU 93F superseded by ABREU 96D. NODE=S061T;LINKAGE=C

[4] AKERS 93 superseded by AKERS 96. NODE=S061T;LINKAGE=B

[5] BUSKULIC 92I superseded by BUSKULIC 95L. NODE=S061T;LINKAGE=D

b-baryon ADMIXTURE (Λ_b,Ξ_b,Σ_b,Ω_b)

NODE=S061210;NODE=S061

NODE=S061

These branching fractions are actually an average over weakly decaying b-baryons weighted by their production rates in Z decay (or high-energy $p\overline{p}$), branching ratios, and detection efficiencies. They scale with the LEP b-baryon production fraction B($b \to$ b-baryon) and are evaluated for our value B($b \to$ b-baryon) = $(10.1^{+3.9}_{-3.1})$%.

The branching fractions B(b-baryon $\to$ $\Lambda\ell^-\overline{\nu}_\ell$anything) and B($\Lambda_b^0 \to \Lambda_c^+\ell^-\overline{\nu}_\ell$anything) are not pure measurements because the underlying measured products of these with B($b \to$ b-baryon) were used to determine B($b \to$ b-baryon), as described in the note "Production and Decay of b-Flavored Hadrons."

	Mode	Fraction (Γ_i/Γ)	
Γ_1	$p\mu^-\overline{\nu}$anything	(4.9± 2.4) %	DESIG=8
Γ_2	$p\ell\overline{\nu}_\ell$anything	$(4.7^{+1.6}_{-2.0})$ %	DESIG=9
Γ_3	$p$anything	(58^{+24}_{-28}) %	DESIG=10
Γ_4	$\Lambda\ell^-\overline{\nu}_\ell$anything	$(3.1^{+1.0}_{-1.2})$ %	DESIG=5

Γ_5	$\Lambda \ell^+ \nu_\ell$ anything		DESIG=2
Γ_6	Λ anything		DESIG=3
Γ_7	$\Lambda_c^+ \ell^- \overline{\nu}_\ell$ anything		DESIG=6
Γ_8	$\Lambda/\overline{\Lambda}$ anything	$(32\ ^{+11}_{-13})$ %	DESIG=7
Γ_9	$\Xi^- \ell^- \overline{\nu}_\ell$ anything	$(5.5^{+2.0}_{-2.4}) \times 10^{-3}$	DESIG=1

b-baryon ADMIXTURE (Λ_b, Ξ_b, Σ_b, Ω_b) BRANCHING RATIOS

NODE=S061215

$\Gamma(p\mu^-\overline{\nu}$anything$)/\Gamma_{\rm total}$ — Γ_1/Γ

NODE=S061R8
NODE=S061R8

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.049^{+0.018+0.015}_{-0.015-0.019}$	125	[6] ABREU	95S	DLPH	$e^+e^- \rightarrow Z$

[6] ABREU 95S reports [B(b-baryon $\rightarrow p\mu^-\overline{\nu}$anything) $\times$ B($\overline{b} \rightarrow b$-baryon)] = $0.0049 \pm 0.0011^{+0.0015}_{-0.0011}$. We divide by our best value B($\overline{b} \rightarrow b$-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S061R8;LINKAGE=CA

$\Gamma(p\ell\overline{\nu}_\ell$ anything$)/\Gamma_{\rm total}$ — Γ_2/Γ

NODE=S061R9
NODE=S061R9

VALUE	DOCUMENT ID		TECN	COMMENT
$0.047 \pm 0.008^{+0.014}_{-0.018}$	[7] BARATE	98V	ALEP	$e^+e^- \rightarrow Z$

[7] BARATE 98V reports [B(b-baryon $\rightarrow p\ell\overline{\nu}_\ell$anything) $\times$ B($\overline{b} \rightarrow b$-baryon)] = $(4.72 \pm 0.66 \pm 0.44) \times 10^{-3}$. We divide by our best value B($\overline{b} \rightarrow b$-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S061R9;LINKAGE=A

$\Gamma(p\ell\overline{\nu}_\ell$ anything$)/\Gamma(p$ anything$)$ — Γ_2/Γ_3

NODE=S061R10
NODE=S061R10

VALUE	DOCUMENT ID		TECN	COMMENT
$0.080 \pm 0.012 \pm 0.014$	BARATE	98V	ALEP	$e^+e^- \rightarrow Z$

$\Gamma(\Lambda\ell^-\overline{\nu}_\ell$ anything$)/\Gamma_{\rm total}$ — Γ_4/Γ

NODE=S061R5
NODE=S061R5

The values and averages in this section serve only to show what values result if one assumes our B($b \rightarrow b$-baryon). They cannot be thought of as measurements since the underlying product branching fractions were also used to determinine B($b \rightarrow b$-baryon) as described in the note on "Production and Decay of b-Flavored Hadrons."

NODE=S061R5

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$0.031^{+0.010}_{-0.012}$ OUR AVERAGE					
$0.032 \pm 0.004^{+0.010}_{-0.012}$		[8] BARATE	98D	ALEP	$e^+e^- \rightarrow Z$
$0.029 \pm 0.003^{+0.009}_{-0.011}$		[9] AKERS	96	OPAL	Excess of $\Lambda\ell^-$ over $\Lambda\ell^+$
$0.030 \pm 0.007^{+0.009}_{-0.011}$	262	[10] ABREU	95S	DLPH	Excess of $\Lambda\ell^-$ over $\Lambda\ell^+$
$0.060 \pm 0.012^{+0.019}_{-0.023}$	290	[11] BUSKULIC	95L	ALEP	Excess of $\Lambda\ell^-$ over $\Lambda\ell^+$
• • • We do not use the following data for averages, fits, limits, etc. • • •					
seen	157	[12] AKERS	93	OPAL	Excess of $\Lambda\ell^-$ over $\Lambda\ell^+$
$0.069 \pm 0.020^{+0.021}_{-0.027}$	101	[13] BUSKULIC	92I	ALEP	Excess of $\Lambda\ell^-$ over $\Lambda\ell^+$

SYCLP1=A

[8] BARATE 98D reports [B(b-baryon $\rightarrow \Lambda\ell^-\overline{\nu}_\ell$anything) $\times$ B($\overline{b} \rightarrow b$-baryon)] = $0.00326 \pm 0.00016 \pm 0.00039$. We divide by our best value B($\overline{b} \rightarrow b$-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Measured using the excess of $\Lambda\ell^-$, lepton impact parameter. NODE=S061R5;LINKAGE=KK

[9] AKERS 96 reports [B(b-baryon $\rightarrow \Lambda\ell^-\overline{\nu}_\ell$anything) $\times$ B($\overline{b} \rightarrow b$-baryon)] = $0.00291 \pm 0.00023 \pm 0.00025$. We divide by our best value B($\overline{b} \rightarrow b$-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S061R5;LINKAGE=AA

[10] ABREU 95S reports [B(b-baryon $\rightarrow \Lambda\ell^-\overline{\nu}_\ell$anything) $\times$ B($\overline{b} \rightarrow b$-baryon)] = $0.0030 \pm 0.0006 \pm 0.0004$. We divide by our best value B($\overline{b} \rightarrow b$-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. NODE=S061R5;LINKAGE=CA

NODE=S061R5;LINKAGE=BL

[11] BUSKULIC 95L reports [B(b-baryon $\rightarrow$ $\Lambda \ell^- \overline{\nu}_\ell$ anything) $\times$ B($\overline{b} \rightarrow$ b-baryon)] = $0.0061 \pm 0.0006 \pm 0.0010$. We divide by our best value B($\overline{b} \rightarrow$ b-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S061R5;LINKAGE=KA

[12] AKERS 93 superseded by AKERS 96.

NODE=S061R5;LINKAGE=BA

[13] BUSKULIC 92I reports [B(b-baryon $\rightarrow$ $\Lambda \ell^- \overline{\nu}_\ell$ anything) $\times$ B($\overline{b} \rightarrow$ b-baryon)] = $0.0070 \pm 0.0010 \pm 0.0018$. We divide by our best value B($\overline{b} \rightarrow$ b-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value. Superseded by BUSKULIC 95L.

$\Gamma(\Lambda \ell^+ \nu_\ell \text{anything})/\Gamma(\Lambda \text{anything})$ Γ_5/Γ_6

NODE=S061R2
NODE=S061R2

VALUE	DOCUMENT ID	TECN	COMMENT
0.070±0.012±0.007	ACKERSTAFF 97N	OPAL	$e^+ e^- \rightarrow Z$

$\Gamma(\Lambda/\overline{\Lambda} \text{anything})/\Gamma_{\text{total}}$ Γ_8/Γ

NODE=S061R7
NODE=S061R7

VALUE	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.32^{+0.11}_{-0.13}}$ **OUR NEW AVERAGE** [$0.35^{+0.12}_{-0.14}$ OUR 1998 AVERAGE]			
$0.35 \pm 0.05^{+0.11}_{-0.13}$	[14] ABBIENDI 99L	OPAL	$e^+ e^- \rightarrow Z$
$0.22^{+0.12}_{-0.08}{}^{+0.07}_{-0.09}$	[15] ABREU 95C	DLPH	$e^+ e^- \rightarrow Z$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
$0.39 \pm 0.06^{+0.12}_{-0.15}$	[16] ACKERSTAFF 97N	OPAL	Repl. by ABBIENDI 99L

SYCLP1=A

SYCLP1=A

NODE=S061R7;LINKAGE=D

[14] ABBIENDI 99L reports [B(b-baryon $\rightarrow$ $\Lambda/\overline{\Lambda}$anything) $\times$ B($\overline{b} \rightarrow$ b-baryon)] = $0.035 \pm 0.0032 \pm 0.0035$. We divide by our best value B($\overline{b} \rightarrow$ b-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S061R7;LINKAGE=AA

[15] ABREU 95C reports $0.28^{+0.17}_{-0.12}$ for B($\overline{b} \rightarrow$ b-baryon) = 0.08 ± 0.02. We rescale to our best value B($\overline{b} \rightarrow$ b-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S061R7;LINKAGE=C

[16] ACKERSTAFF 97N reports [B(b-baryon $\rightarrow$ $\Lambda/\overline{\Lambda}$anything) $\times$ B($\overline{b} \rightarrow$ b-baryon)] = $0.0393 \pm 0.0046 \pm 0.0037$. We divide by our best value B($\overline{b} \rightarrow$ b-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

$\Gamma(\Xi^- \ell^- \overline{\nu}_\ell \text{anything})/\Gamma_{\text{total}}$ Γ_9/Γ

NODE=S061R1
NODE=S061R1

VALUE	DOCUMENT ID	TECN	COMMENT
$\mathbf{0.0055^{+0.0020}_{-0.0024}}$ **OUR AVERAGE**			
$0.0053 \pm 0.0013^{+0.0016}_{-0.0021}$	[17] BUSKULIC	96T ALEP	Excess $\Xi^- \ell^-$ over $\Xi^- \ell^+$
$0.0058 \pm 0.0023^{+0.0018}_{-0.0023}$	[18] ABREU	95V DLPH	Excess $\Xi^- \ell^-$ over $\Xi^- \ell^+$

NODE=S061R1;LINKAGE=C

[17] BUSKULIC 96T reports [B(b-baryon $\rightarrow$ $\Xi^- \ell^- \overline{\nu}_\ell$ anything) $\times$ B($\overline{b} \rightarrow$ b-baryon)] = $0.00054 \pm 0.00011 \pm 0.00008$. We divide by our best value B($\overline{b} \rightarrow$ b-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

NODE=S061R1;LINKAGE=B

[18] ABREU 95V reports [B(b-baryon $\rightarrow$ $\Xi^- \ell^- \overline{\nu}_\ell$ anything) $\times$ B($\overline{b} \rightarrow$ b-baryon)] = $0.00059 \pm 0.00021 \pm 0.0001$. We divide by our best value B($\overline{b} \rightarrow$ b-baryon) = $(10.1^{+3.9}_{-3.1}) \times 10^{-2}$. Our first error is their experiment's error and our second error is the systematic error from using our best value.

b-baryon ADMIXTURE (Λ_b, Ξ_b, Σ_b, Ω_b) REFERENCES

NODE=S061

ABBIENDI	99L	EPJ C9 1	G. Abbiendi+	(OPAL Collab.)	REFID=47024
BARATE	98D	EPJ C2 197	R. Barate+	(ALEPH Collab.)	REFID=45878
BARATE	98V	EPJ C5 205	R. Barate+	(ALEPH Collab.)	REFID=46151
ACKERSTAFF	97N	ZPHY C74 423	K. Ackerstaff+	(OPAL Collab.)	REFID=45488
ABREU	96D	ZPHY C71 199	+Adam, Adye, Agasi+	(DELPHI Collab.)	REFID=44691
AKERS	96	ZPHY C69 195	+Alexander, Allison, Altekamp+	(OPAL Collab.)	REFID=44676
BUSKULIC	96T	PL B384 449	+De Bonis, Decamp, Ghez+	(ALEPH Collab.)	REFID=44907
ABREU	95C	PL B347 447	+Adam, Adye, Agasi+	(DELPHI Collab.)	REFID=44210
ABREU	95S	ZPHY C68 375	+Adam, Adye, Agasi+	(DELPHI Collab.)	REFID=44466
ABREU	95V	ZPHY C68 541	+Adam, Adye, Agasi+	(DELPHI Collab.)	REFID=44538
BUSKULIC	95L	PL B357 685	+Casper, De Bonis, Decamp+	(ALEPH Collab.)	REFID=44468
ABREU	93F	PL B311 379	+Adam, Adye, Agasi+	(DELPHI Collab.)	REFID=43437
AKERS	93	PL B316 435	+Alexander, Allison, Anderson+	(OPAL Collab.)	REFID=43541
BUSKULIC	92I	PL B297 449	+Decamp, Goy, Lees+	(ALEPH Collab.)	REFID=43221