$\Gamma(e^+e^-\gamma)/\Gamma_{total}$ — Γ_{33}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.2 × 10⁻⁴	95	[123] ACTON	91B	OPAL	E^{ee}_{cm}= 91.1 GeV

[123] ACTON 91B looked for isolated photons with $E>2\%$ of beam energy ($>$ 0.9 GeV).

$\Gamma(\mu^+\mu^-\gamma)/\Gamma_{total}$ — Γ_{34}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.6 × 10⁻⁴	95	[124] ACTON	91B	OPAL	E^{ee}_{cm}= 91.1 GeV

[124] ACTON 91B looked for isolated photons with $E>2\%$ of beam energy ($>$ 0.9 GeV).

$\Gamma(\tau^+\tau^-\gamma)/\Gamma_{total}$ — Γ_{35}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<7.3 × 10⁻⁴	95	[125] ACTON	91B	OPAL	E^{ee}_{cm}= 91.1 GeV

[125] ACTON 91B looked for isolated photons with $E>2\%$ of beam energy ($>$ 0.9 GeV).

$\Gamma(\ell^+\ell^-\gamma\gamma)/\Gamma_{total}$ — Γ_{36}/Γ

The value is the sum over $\ell = e, \mu, \tau$.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<6.8 × 10⁻⁶	95	[126] ACTON	93E	OPAL	E^{ee}_{cm}= 88–94 GeV

[126] For $m_{\gamma\gamma} = 60 \pm 5$ GeV.

$\Gamma(q\overline{q}\gamma\gamma)/\Gamma_{total}$ — Γ_{37}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<5.5 × 10⁻⁶	95	[127] ACTON	93E	OPAL	E^{ee}_{cm}= 88–94 GeV

[127] For $m_{\gamma\gamma} = 60 \pm 5$ GeV.

$\Gamma(\nu\overline{\nu}\gamma\gamma)/\Gamma_{total}$ — Γ_{38}/Γ

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.1 × 10⁻⁶	95	[128] ACTON	93E	OPAL	E^{ee}_{cm}= 88–94 GeV

[128] For $m_{\gamma\gamma} = 60 \pm 5$ GeV.

$\Gamma(e^\pm\mu^\mp)/\Gamma(e^+e^-)$ — Γ_{39}/Γ_1

Test of lepton family number conservation. The value is for the sum of the charge states indicated.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<0.07	90	ALBAJAR	89	UA1	$E^{p\overline{p}}_{cm}$= 546,630 GeV

$\Gamma(e^\pm\mu^\mp)/\Gamma_{total}$ — Γ_{39}/Γ

Test of lepton family number conservation. The value is for the sum of the charge states indicated.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<3.2 × 10⁻⁵	95	ABREU	93B	DLPH	E^{ee}_{cm} = 88–94 GeV
<0.6 × 10⁻⁵	95	ADRIANI	93I	L3	E^{ee}_{cm} = 88–94 GeV
<2.6 × 10⁻⁵	95	DECAMP	92	ALEP	E^{ee}_{cm}= 88–94 GeV
<4.6 × 10⁻⁵	95	AKRAWY	91B	OPAL	E^{ee}_{cm}= 88–94 GeV

$\Gamma(e^\pm\tau^\mp)/\Gamma_{total}$ — Γ_{40}/Γ

Test of lepton family number conservation. The value is for the sum of the charge states indicated.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.1 × 10⁻⁴	95	ABREU	93B	DLPH	E^{ee}_{cm} = 88–94 GeV
<1.3 × 10⁻⁵	95	ADRIANI	93I	L3	E^{ee}_{cm} = 88–94 GeV
<1.2 × 10⁻⁴	95	DECAMP	92	ALEP	E^{ee}_{cm}= 88–94 GeV
<7.2 × 10⁻⁵	95	AKRAWY	91B	OPAL	E^{ee}_{cm}= 88–94 GeV

$\Gamma(\mu^\pm\tau^\mp)/\Gamma_{total}$ — Γ_{41}/Γ

Test of lepton family number conservation. The value is for the sum of the charge states indicated.

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
<1.4 × 10⁻⁴	95	ABREU	93B	DLPH	E^{ee}_{cm} = 88–94 GeV
<1.9 × 10⁻⁵	95	ADRIANI	93I	L3	E^{ee}_{cm} = 88–94 GeV
<1.0 × 10⁻⁴	95	DECAMP	92	ALEP	E^{ee}_{cm}= 88–94 GeV
<3.5 × 10⁻⁴	95	AKRAWY	91B	OPAL	E^{ee}_{cm}= 88–94 GeV

Z HADRONIC POLE CROSS SECTION

This quantity is defined as

$$\sigma_h^0 = \frac{12\pi}{M_Z^2}\;\frac{\Gamma(e^+e^-)\,\Gamma(\text{hadrons})}{\Gamma_Z^2}$$

It is one of the parameters used in the Z lineshape fit. (See the 'Note on the Z Boson.')

VALUE (nb)	EVTS	DOCUMENT ID		TECN	COMMENT
41.55±0.14 OUR FIT					
41.49±0.10 OUR AVERAGE					
41.23±0.20	1.15M	ABREU	94	DLPH	E^{ee}_{cm}= 88–94 GeV
41.39±0.26	1.2M	ACCIARRI	94	L3	E^{ee}_{cm}= 88–94 GeV
41.70±0.23	1.2M	AKERS	94	OPAL	E^{ee}_{cm}= 88–94 GeV
41.60±0.16	1.28M	BUSKULIC	94	ALEP	E^{ee}_{cm}= 88–94 GeV
42 ±4	450	ABRAMS	89B	MRK2	E^{ee}_{cm}= 89.2–93.0 GeV
• • • We do not use the following data for averages, fits, limits, etc. • • •					
41.45±0.31	512k	ACTON	93D	OPAL	Repl. by AKERS 94
41.34±0.28	460k	ADRIANI	93M	L3	Repl. by ACCIARRI 94
41.60±0.27	520k	BUSKULIC	93J	ALEP	Repl. by BUSKULIC 94
41.33±0.23	650k	[129] LEP	92	RVUE	E^{ee}_{cm}= 88–94 GeV
41.84±0.45	150k	ABREU	91F	DLPH	Repl. by ABREU 94

[129] LEP 92 is a combined analysis by the four LEP experiments as of Dec 1991.

Z VECTOR COUPLINGS

These quantities are the effective vector couplings of the Z to charged leptons. Their magnitude is derived from a measurement of the Z lineshape and the forward-backward lepton asymmetries as a function of energy around the Z mass. The relative sign among the vector to axial-vector couplings is obtained from a measurement of the Z asymmetry parameters, A_e and A_τ, or ν_e scattering. The fit values quoted below correspond to global nine- or five-parameter fits to lineshape, lepton forward-backward asymmetry, and A_e and A_τ measurements. See "Note on the Z boson" for details.

Within the current data set, the reason for the smallness of g_V^μ compared to g_V^e and g_V^τ is due to the large value of A_e which is heavily weighted by the SLD result. This large value of A_e leads to a large value of g_V^e. Since g_V^μ is obtained using the relation $A_{FB}^\mu = 0.75\times A_e\times A_\mu$, a large value of g_V^e leads to a SMALL value of g_V^μ. Concerning the τ, its g_V gets mainly determined directly from A_τ which is obtained from a measurement of the τ polarization (see "Note on the Z boson").

g_V^e

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$-0.0398^{+0.0024}_{-0.0023}$ OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$-0.0364^{+0.0096}_{-0.0082}$	38k	[130] ACCIARRI	94	L3	E^{ee}_{cm}= 88–94 GeV
$-0.036\ \pm0.005$	45.8k	[131] BUSKULIC	94	ALEP	E^{ee}_{cm}= 88–94 GeV
$-0.040\ ^{+0.013}_{-0.011}$		[132] ADRIANI	93M	L3	Repl. by ACCIARRI 94
$-0.034\ ^{+0.006}_{-0.005}$		[130] BUSKULIC	93J	ALEP	Repl. by BUSKULIC 94
$-0.035\ \pm0.005$	70k	[133] QUAST	93	RVUE	E^{ee}_{cm}= 88–94 GeV
$-0.006\ ^{+0.003}_{-0.004}$	16k	[134] BANERJEE	92	RVUE	E^{ee}_{cm}= 88–94 GeV
$-0.045\ ^{+0.013}_{-0.011}$	6947	[135] DECAMP	92B	ALEP	Repl. by BUSKULIC 93J
$-0.035\ ^{+0.013}_{-0.014}$	6947	[136] DECAMP	92B	ALEP	Repl. by BUSKULIC 93J

[130] The τ polarization result has been included.
[131] BUSKULIC 94 use the added constraint of τ polarization.
[132] ADRIANI 93M use their measurement of the τ polarization in addition to forward-backward lepton asymmetries.
[133] QUAST 93 is a combined analysis of LEP results as of Feb. 1993. QUAST 93 use also the average LEP values for τ polarization and the forward–backward τ polarisation asymmetry.
[134] BANERJEE 92 is a combined analysis of the four LEP experiments as of March 1991. Only forward-backward lepton asymmetries are used.
[135] DECAMP 92B use their measurement of the τ polarization in addition to the forward-backward lepton asymmetries.
[136] Using only forward-backward lepton asymmetries.

g_V^μ

VALUE	EVTS	DOCUMENT ID		TECN	COMMENT
$-0.0273^{+0.0056}_{-0.0058}$ OUR FIT					
• • • We do not use the following data for averages, fits, limits, etc. • • •					
$-0.0402^{+0.0153}_{-0.0211}$	34k	[137] ACCIARRI	94	L3	E^{ee}_{cm}= 88–94 GeV
$-0.034\ \pm0.013$	46.4k	[138] BUSKULIC	94	ALEP	E^{ee}_{cm}= 88–94 GeV
$-0.048\ ^{+0.021}_{-0.033}$		[139] ADRIANI	93M	L3	Repl. by ACCIARRI 94
$-0.019\ ^{+0.018}_{-0.019}$		[137] BUSKULIC	93J	ALEP	Repl. by BUSKULIC 94
$-0.029\ \pm0.010$	70k	[140] QUAST	93	RVUE	E^{ee}_{cm}= 88–94 GeV
$-0.191\ ^{+0.088}_{-0.081}$	16k	[141] BANERJEE	92	RVUE	E^{ee}_{cm}= 88–94 GeV
$-0.018\ ^{+0.023}_{-0.026}$	6691	[142] DECAMP	92B	ALEP	Repl. by BUSKULIC 93J
$-0.023\ ^{+0.029}_{-0.037}$	6691	[143] DECAMP	92B	ALEP	Repl. by BUSKULIC 93J

[137] The τ polarization result has been included.
[138] BUSKULIC 94 use the added constraint of τ polarization.
[139] ADRIANI 93M use their measurement of the τ polarization in addition to forward-backward lepton asymmetries.
[140] QUAST 93 is a combined analysis of LEP results as of Feb. 1993. QUAST 93 use also the average LEP values for τ polarization and the forward–backward τ polarisation asymmetry.
[141] BANERJEE 92 is a combined analysis of the four LEP experiments as of March 1991. Only forward-backward lepton asymmetries are used.
[142] DECAMP 92B use their measurement of the τ polarization in addition to the forward-backward lepton asymmetries.
[143] Using only forward-backward lepton asymmetries.