SUMMARY TABLES OF PARTICLE PROPERTIES

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Particle Data Group

M. Aguilar-Benitez, R.M. Barnett, C. Caso, G. Conforto, R.L. Crawford, S. Eidelman, C. Grab, D.E. Groom, A. Gurtu, K.G. Hayes, J.J. Hernández, K. Hikasa, G. Höhler, S. Kawabata, D.M. Manley, A. Manohar, L. Montanet, R.J. Morrison, H. Murayama, K. Olive, F.C. Porter, M. Roos, R.H. Schindler, R.E. Shrock, J. Stone, N.A. Törnqvist, T.G. Trippe, C.G. Wohl, and R.L. Workman
Technical Associates: B. Armstrong, K. Gieselmann, P. Lantero, G.S. Wagman

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GAUGE AND HIGGS BOSONS

γ

$I(J^{PC}) = 0,1(1^{--})$

Mass $m < 3 \times 10^{-27}$ eV
Charge $q < 2 \times 10^{-32}$ e
Mean life τ = Stable

g or gluon

$I(J^{P}) = 0(1^{-})$

Mass $m = 0$ [a]
SU(3) color octet

W

$J = 1$

Charge = ± 1 e
Mass $m = 80.22 \pm 0.26$ GeV
$m_Z - m_W = 10.96 \pm 0.26$ GeV
$m_{W^+} - m_{W^-} = -0.2 \pm 0.6$ GeV
Full width $\Gamma = 2.08 \pm 0.07$ GeV

W^- modes are charge conjugates of the modes below.

W^+ DECAY MODES		Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
$\ell^+\nu$	[b]	(10.8 ± 0.4) %		40110
$e^+\nu$		(10.8 ± 0.4) %		40110
$\mu^+\nu$		(10.6 ± 0.7) %		40110
$\tau^+\nu$		(10.8 ± 1.0) %		40110
hadrons		(67.8 ± 1.5) %		–
$\pi^+\gamma$		$< 5 \times 10^{-4}$	95%	40110

Z

$J = 1$

Charge = 0
Mass $m = 91.187 \pm 0.007$ GeV [c]
Full width $\Gamma = 2.490 \pm 0.007$ GeV
$\Gamma(\ell^+\ell^-) = 83.84 \pm 0.27$ MeV [b]
$\Gamma(\text{invisible}) = 498.2 \pm 4.2$ MeV [d]
$\Gamma(\text{hadrons}) = 1740.7 \pm 5.9$ MeV
$\Gamma(\mu^+\mu^-)/\Gamma(e^+e^-) = 1.000 \pm 0.005$
$\Gamma(\tau^+\tau^-)/\Gamma(e^+e^-) = 0.998 \pm 0.005$ [e]
$g_V^\ell = -0.0377 \pm 0.0016$
$g_A^\ell = -0.5008 \pm 0.0008$

Asymmetry parameters

$A_e = 0.161 \pm 0.012$ [f] (S = 1.7)
$A_\tau = 0.141 \pm 0.021$ [f] (S = 1.2)

Charge asymmetry at Z pole

$A_{FB}^{(0,\ell)} = (1.59 \pm 0.18) \times 10^{-2}$
$A_{FB}^{(0,c)} = (5.8 \pm 2.2) \times 10^{-2}$
$A_{FB}^{(0,b)} = (10.7 \pm 1.3) \times 10^{-2}$

Z DECAY MODES			Fraction (Γ_i/Γ)	Confidence level	p (MeV/c)
e^+e^-			(3.366 ± 0.008) %		45600
$\mu^+\mu^-$			(3.367 ± 0.013) %		45600
$\tau^+\tau^-$			(3.360 ± 0.015) %		45600
$\ell^+\ell^-$		[b]	(3.367 ± 0.006) %		45600
invisible			(20.01 ± 0.16) %		45600
hadrons			(69.90 ± 0.15) %		–
$(u\overline{u}+c\overline{c})/2$			(9.7 ± 1.8) %		–
$(d\overline{d}+s\overline{s}+b\overline{b})/3$			(16.8 ± 1.2) %		–
$c\overline{c}$			(11.9 ± 1.4) %		–
$b\overline{b}$			(15.45 ± 0.21) %		–
$\pi^0\gamma$			$< 5.5 \times 10^{-5}$	95%	45600
$\eta\gamma$			$< 5.1 \times 10^{-5}$	95%	45600
$\omega\gamma$			$< 6.5 \times 10^{-4}$	95%	45600
$\eta'(958)\gamma$			$< 4.2 \times 10^{-5}$	95%	45600
$\gamma\gamma$			$< 5.5 \times 10^{-5}$	95%	45600
$\gamma\gamma\gamma$			$< 1.7 \times 10^{-5}$	95%	45600
$\pi^\pm W^\mp$		[g]	$< 7 \times 10^{-5}$	95%	10300
$\rho^\pm W^\mp$		[g]	$< 8.3 \times 10^{-5}$	95%	10300
$K^0 X$			(61.5 ± 0.6) %		–
$K^*(892)^+ X$			(51 ± 5) %		–
ΛX			(20.9 ± 0.6) %		–
$\Xi^- X$			(1.42 ± 0.14) %		–
$\Sigma(1385)^\pm X$			(2.6 ± 0.4) %		–
$\Xi(1530)^0 X$			(4.4 ± 1.0) $\times 10^{-3}$		–
$\Omega^- X$			(3.5 ± 1.0) $\times 10^{-3}$		–
$J/\psi(1S) X$			(3.8 ± 0.5) $\times 10^{-3}$		–
$\chi_{c1}(1P) X$			(7.5 ± 3.0) $\times 10^{-3}$		–
$(D^0/\overline{D}^0) X$			(28 ± 4) %		–
$D^\pm X$			(13.9 ± 2.1) %		–
$D^*(2010)^\pm X$		[g]	(12.5 ± 1.3) %		–
$B_s^0 X$			seen		–
anomalous γ+ hadrons		[h]	$< 3.2 \times 10^{-3}$	95%	–
$e^+e^-\gamma$		[h]	$< 5.2 \times 10^{-4}$	95%	45600
$\mu^+\mu^-\gamma$		[h]	$< 5.6 \times 10^{-4}$	95%	45600
$\tau^+\tau^-\gamma$		[h]	$< 7.3 \times 10^{-4}$	95%	45600
$\ell^+\ell^-\gamma\gamma$		[i]	$< 6.8 \times 10^{-6}$	95%	45600
$q\overline{q}\gamma\gamma$		[i]	$< 5.5 \times 10^{-6}$	95%	–
$\nu\overline{\nu}\gamma\gamma$		[i]	$< 3.1 \times 10^{-6}$	95%	45600
$e^\pm\mu^\mp$	LF	[g]	$< 6 \times 10^{-6}$	95%	45600
$e^\pm\tau^\mp$	LF	[g]	$< 1.3 \times 10^{-5}$	95%	45600
$\mu^\pm\tau^\mp$	LF	[g]	$< 1.9 \times 10^{-5}$	95%	45600