Ausgewählte Ergebnisse

Forschungskreis Heimsche Theorie, IGW Innsbruck, 2003
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Inhalt

Tabelle I

Quantenzahlen der Grundzustände N=0

Partikel	k	n	m	p	σ	P	Q	εq_x	εC	$\mathfrak{R}$
$e^-, \overline{e}^+$	1	0	0	0	0	1	1	-1	0	0
$e_0, \overline{e}_0$	1	0	0	0	1	1	1	0	0	0
$\mu^-, \overline{\mu}^+$	1	11	6	11	6	1	1	-1	0	1
$\eta, \overline{\eta}$	1	18	22	17	14	0	0	0	0	0
$K^+, \overline{K}^-$	1	17	26	30	28	1	0	1	1	1
$K^0, \overline{K}^0$	1	18	5	5	2	1	0	0	1	1
$\pi^\pm, \overline{\pi}^\mp$	1	12	9	2	3	2	0	± 1	0	0
$\pi^0, \overline{\pi}^0$	1	12	3	6	4	2	0	0	0	0
$\Lambda, \overline{\Lambda}$	2	1	3	0	-11	0	1	0	-1	0
$\Omega^-, \overline{\Omega}^+$	2	4	4	-1	-15	0	3	-1	-3	0
$p, \overline{p}$	2	0	0	0	0	1	1	1	0	0
$n, \overline{n}$	2	0	0	-2	17	1	1	0	0	0
Ξ^-, Ξ^+	2	2	7	-17	2	1	1	-1	-2	1
$\Xi^0, \overline{\Xi}^0$	2	2	6	-1	6	1	1	0	-2	1
$\Sigma^+, \overline{\Sigma}^-$	2	2	-7	-12	10	2	1	1	-1	0
$\Sigma^0, \overline{\Sigma}^0$	2	2	-7	-14	-2	2	1	0	-1	0
$\Sigma^-, \overline{\Sigma}^+$	2	2	-6	-5	-8	2	1	-1	-1	0
$o^{++}, \overline{o}^{--}$	2	2	1	9	4	3	3	2	0	0
$o^+, \overline{o}^-$	2	2	-1	-1	-6	3	3	1	0	0
$o^0, \overline{o}^0$	2	2	-1	-10	2	3	3	0	0	0
$o^-, \overline{o}^+$	2	2	-1	-16	-15	3	3	-1	0	0

Tabelle II

Theoretical Data of Elementary Particles
with Mean Lives > 10^{-16} sec Calculated by B. Heim 1989
(J = spin, P = parity, I = isospin, S = strangeness, B = baryon number)

Type	Symbol	Mass MeV	J	P	I	S	B	Mean Life 10^{-8} sec
Photons	γ	0	1	-1	-	-	0	∞
Leptons	ν_e	0.00381×10^{-6}	1/2	-	-	-	0	∞
	ν_μ	0.00537	1/2	-	-	-	0	∞
	ν_τ	0.010752	1/2	-	-	-	0	∞
	ν_4	0.021059	1/2	-	-	-	0	∞
	ν_5	0.207001	1/2	-	-	-	0	∞
	e	0.51100343	1/2	±1	-	-	0	∞
	$e0$	0.51617049	1/2	1	-	-	0	∞
	μ	105.65948493	1/2	±1	-	-	0	219.94237553
Mesons	$\pi^\pm$	139.56837088	0	-1	1	0	0	2.60282911
	π^0	134.96004114	0	-1	1	0	0	$0.84016427 \times 10^{-8}$
	η	548.80002432	0	-1	0	0	0	$0.00233820 \times 10^{-8}$
	$K^\pm$	493.71425074	0	-1	1/2	±1	0	1.23709835
	K^0	497.72299959	0	-1	1/2	1	0	5.17900027
	$\overline{K}^0$	497.72299959	0	-1	1/2	-1	0	0.00887666
Baryons	p	938.27959246	1/2	1	1/2	0	1	∞
	n	939.57336128	1/2	1	1/2	0	1	917.33526856×10^8
	Λ	1115.59979064	1/2	1	0	0	1	0.02578198
	Σ^+	1189.37409717	1/2	1	1	1	1	0.00800714
	Σ^-	1197.30443002	1/2	1	1	1	1	0.01481729
	Σ^0	1192.47794854	1/2	1	1	1	1	$0.42908026 \times 10^{-10}$
	Ξ^-	1321.29326013	1/2	1	1/2	-2	1	0.01653050
	Ξ^0	1314.90206200	1/2	1	1/2	-2	1	0.02961947
	Ω^-	1672.17518902	3/2	1	0	-3	1	0.01317650
	o^{++}, o^{---}	1232.91663788	3/2	1	3/2	0	1	$5.99071759 \times 10^{-16}$
	o^+, o^{--}	1234.60981181	3/2	1	3/2	0	1	$5.72954997 \times 10^{-16}$
	$o^-, \overline{o}^+$	1229.99529979	3/2	1	3/2	0	1	$6.74230244 \times 10^{-16}$
	$o^0, \overline{o}^0$	1237.06132359	3/2	1	3/2	0	1	$5.08526841 \times 10^{-16}$

Tabelle III

Experimental Data of Elementary Particles
with Mean Lives > 10^{-16} sec
(J = spin, P = parity, I = isospin, S = strangeness, B = baryon number)

Type	Symbol	Mass/MeV (PDG,CERN 2002)	J	P	I	S	B	Mean Life 10^{-8} sec
Photons	γ	0	1	-1	-	-	0	∞
Leptons	ν_e	$\leq 5 \times 10^{-8}$	1/2	-	-	-	0	∞
	ν_μ	< 0.17	1/2	-	-	-	0	∞
	ν_τ	<18.2	1/2	-	-	-	0	∞
	e	0.51099907±0.00000015	1/2	±1	-	-	0	∞
	μ	105.658389±0.000034	1/2	±1	-	-	0	219.703±0.004
Mesons	$\pi^\pm$	139.57018±0.000351	0	-1	1	0	0	2.6033±0.0005
	π^0	134.9766±0.0006	0	-1	1	0	0	(0.84±0.06)×10^{-8}
	η	547.30±0.12	0	-1	0	0	0	
	$K^\pm$	493.677±0.016	0	-1	1/2	±1	0	1.2384±0.0024
	K^0	497.672±0.031	0	-1	1/2	1	0	5.2±0.5(Rohlf1994)
	$\overline{K}^0$	497.672±0.031	0	-1	1/2	-1	0	0.0089±0.0002 (")
Baryons	p	938.27231±0.00026	1/2	1	1/2	0	1	∞
	n	939.56563±0.00028	1/2	1	1/2	0	1	(886.7±1.9)×10^8
	Λ	1115.683±0.006	1/2	1	0	0	1	0.02632±0.0002
	Σ^+	1189.37±0.07	1/2	1	1	1	1	0.00799±0.00004
	Σ^-	1197.449±0.03	1/2	1	1	1	1	0.01479±0.00011
	Σ^0	1192.642±0.024	1/2	1	1	1	1	(7.4±0.7)×10^{-12}
	Ξ^-	1321.32±0.13	1/2	1	1/2	-2	1	0.01639±0.00015
	Ξ^0	1314.9±0.6	1/2	1	1/2	-2	1	0.029±0.0009
	Ω^-	1672.45±0.29	3/2	1	0	-3	1	0.00822±0.00012
	Δ^{++}	≈1232	3/2	1	3/2	0	1	
	Δ^+	≈1232	3/2	1	3/2	0	1	
	Δ^0	≈1232	3/2	1	3/2	0	1	
	Δ^-	≈1232	3/2	1	3/2	0	1	

The data are taken from the Particle Data Group homepage http://pdg.lbl.gov , CERN, (2002), except for the life times of K^0 and $\overline{K}^0$, which are taken from J.W. Rohlf 1994: Modern Physics from α to Z^0, New York: John Wiley & Sons.

Tabelle IV

Approximierte Mesonenresonanzen
(k=1)

Partikel	P	$N(N)_\pm$	$K_B(K_B)_\pm$	Theoretische Masse in MeV
ε	0	49	10	691,7094
$\omega(783)$	0	64	51	783,9033
$\eta'(958)$	0	144	28	956,8400
$S^*(993)$	0	170	-1	992,6142
$\Phi(1019)$	0	153	63	1019,6306
$f(1270)$	0	253	26	1274,5452
$D(1285)$	0	255	27	1286,1728
$E(1420)$	0	272	82	1414,1873
$f'(1514)$	0	323	2	1517,8602
$\omega(1675)$	0	342	71	1664,0125
$K^*_-(892)$	1	23(11)	29(3)	891,1955(892,2211)
$K_A(1240)$	1	83(69)	6(15)	1241,1180(1239,9767)
$K^*(1420)$	1	98(101)	25(23)	1420,2213(1414,4956)
$L(1770)$	1	161(164)	65(11)	1775,2145(1764,9862)
$p(770)$	2	8(5)	30(34)	769,9833(769,3101)
$\delta(970)$	2	39(21)	19(5)	976,4931(973,6704)
$A_1(1100)$	2	76(48)	41(5)	1106,9780(1106,7462)
$B(1235)$	2	93(79)	27(10)	1239,5340(1239,1994)
$A_2(1310)$	2	127(86)	22(59)	1310,4695(1309,6730)
$F_1(1540)$	2	182(145)	37(4)	1539,5100(1537,9095)
$p'(1600)$	2	215(156)	43(29)	1604,8640(1605,1008)
$A_3(1640)$	2	221(160)	4(7)	1637,2669(1634,2138)
$g(1680)$	2	228(165)	28(5)	1686,0154(1678,6425)

Tabelle V$_a$

Approximierte Barionenresonanzen
(k=2)

Partikel	P	N(N)$_\pm$	K$_B$(K)$_\pm$	theoretische Masse in MeV
N(1470)	1	13(12)	10(38)	1470,4888(1480,1770)
N(1520)	1	14(13)	29(8)	1509,6087(1515,7293)
N(1535)	1	18(17)	-2(8)	1533,9788(1535,3254)
N(1670)	1	23(22)	8(0)	1657,9536(1679,5754)
N(1688)	1	24(23)	-23(11)	1694,3687(1719,4898)
N(1700)	1	25(27)	63(-12)	1734,6717(1751,2494)
N(1770)	1	26(24)	14(65)	1771,8218(1769,0721)
N(1780)	1	31(29)	-9(0)	1784,3644(1782,2884)
N(1810)	1	32(30)	38(40)	1808,3795(1808,5253)
N(1990)	1	37(35)	60(50)	1974,9129(1989,7028)
N(2000)	1	42(39)	-3(-37)	2011,0552(2001,9706)
N(2040)	1	44(41)	7(30)	2044,8079(2034,6322)
N(2100)	1	40(44)	78(25)	2107,8085(2120,5890)
N(2190)	1	49(46)	-14(21)	2200,5168(2195,5259)
N(2220)	1	50(47)	66(43)	2244,1911(2245,4563)
N(2650)	1	73(69)	2(-9)	2653,5304(2652,4071)
N(3030)	1	90(85)	41(54)	3036,2404(3033,5279)
N(3245)	1	95(90)	61(28)	3234,0166(3231,8730)
N(3690)	1	119(113)	3(4)	3689,8085(3684,1957)
N(3755)	1	113(115)	37(31)	3751,7230(3728,0808)
Λ(1330)	0	25	10	1329,8831
Λ(1405)	0	22	79	1403,3999
Λ(1520)	0	37	36	1516,3419
Λ(1670)	0	54	4	1669,9762
Λ(1690)	0	55	61	1693,2832
Λ(1750)	0	58	25	1754,7613
Λ(1815)	0	70	-10	1815,4961

Tabelle V$_b$

Approximierte Barionenresonanzen
(k=2 Fortsetzung)

Partikel	P	N(N)$_\pm$	K$_B$(K)$_\pm$	Theoretische Masse in MeV
Λ(1830)	0	<u>71</u>	11	1830,4081
Λ(1860)	0	<u>73</u>	-5	1864,6313
Λ(1870)	0	<u>74</u>	1	1884,4529
Λ(2010)	0	<u>87</u>	17	2010,5372
Λ(2020)	0	<u>88</u>	18	2018,1998
Λ(2100)	0	<u>94</u>	0	2095,9533
Λ(2110)	0	84	34	2113,6593
Λ(2350)	0	<u>116</u>	30	2344,7465
Λ(2585)	0	<u>136</u>	5	2591,7184
Ξ(1530)	1	<u>4</u>(2)	9(5)	1531,5487(1534,7628)
Ξ(1630)	1	7(4)	30(20)	1621,5840(1661,1690)
Ξ(1820)	1	<u>16(10)</u>	35(9)	1828,9065(1810,8367)
Ξ(1940)	1	19(13)	59(27)	1944,8454((1945,2579)
Ξ(2030)	1	<u>25(19)</u>	-4(-3)	2027,8157(2037,5528)
Ξ(2250)	1	31(24)	65(-4)	2247,4841(2241,9080)
Ξ(2500)	1	42(35)	42(13)	2481,8202(2517,9008)
Δ(1650)	3	<u>44</u>	11	1651,0807
Δ(1670)	3	<u>48</u>	44	1678,6242
Δ(1690)	3	<u>71</u>	0	1690,0383
Δ(1890)	3	124	1	1887,9876
Δ(1900)	3	125	56	1900,8602
Δ(1910)	3	<u>129</u>	-27	1915,2764
Δ(1950)	3	134	59	1949,2695
Δ(1960)	3	<u>137</u>	38	1965,3571
Δ(2160)	3	211	33	2153,9221
Δ(2420)	3	<u>302</u>	12	2422,5186
Δ(2850)	3	419	63	2856,6694
Δ(3230)	3	572	34	3229,6911

Tabelle V$_c$

Approximierte Barionenresonanzen
(k=2 Fortsetzung)

Partikel	P	(N)$_+$N(N)$_-$	(K$_B$)$_+$K$_B$(K$_B$)$_-$	Theoretische Masse in MeV
Σ(1385)	2	(13)$_+$6(13)$_-$	(11)$_+$59(22)$_-$	(1383)$_+$1382(1386)$_-$
Σ(1440)	2	(16)8(16)	(9)71(-5)	(1441)1434(1441)
Σ(1480)	2	(18)20(18)	(64)12(52)	(1492)1490(1489)
Σ(1620)	2	(32)35(32)	(18)10(20)	(1624)1622(1616)
Σ(1670)	2	(34)27(35)	(8)15(-23)	(1664)1660 (1678)
Σ(1690)	2	(35)38(36)	(-10)43(57)	(1691)1683((1705)
Σ(1750)	2	(43)41(38)	(-25)34(5)	(1752)1747(1750)
Σ(1765)	2	(45)49(46)	(9)10(-2)	(1769)1766(1770)
Σ(1840)	2	(50)45(51)	(19)11(47)	(1847)1844(1848)
Σ(1880)	2	(42)57(43)	(65)61(7)	(1884)1887(1885)
Σ(1915)	2	(53)59(54)	(28)16(24)	(1909)1923(1908)
Σ(1940)	2	(54)60(55)	(23)44(-10)	(1932)1951(1931)
Σ(2000)	2	(63)70(64)	(8)1(-45)	(2003)2012(2002)
Σ(2030)	2	(66)72(59)	(21)12(5)	(2035)2031(2031)
Σ(2070)	2	(68)75(69)	(2)38(40)	(2066)2071(2064)
Σ(2080)	2	(69)76(70)	(9)29(10)	(2083)2089(2074)
Σ(2100)	2	(70)77(71)	(31)52(6)	(2103)2106(2093)
Σ(2250)	2	(76)84(78)	(-12)33(35)	(2243)2250(2252)
Σ(2455)	2	(94)104(85)	(18)56(3)	(2444)2458(2455)
Σ(2620)	2	(110)121(103)	(27)-12(26)	(2624)2625(2621)
Σ(3000)	2	(136)150(140)	(-85)38(12)	(2994)3001(3003)

Tabellen VI

C (Kapitel E)

Symbol	numerischer Wert	Symbol	numerischer Wert
η	0,98998964	ϑ	7,93991266
$\eta_{1,1}$	0,98756399	$\vartheta_{1,1}$	7,92534503
$\eta_{1,2}$	0,98516776	$\vartheta_{1,2}$	7,91095114
$\eta_{2,2}$	0,84242385	$\vartheta_{2,2}$	7,04779227
α_+	0,01832211	α_-	0,00812835

numerische Auswertung der Gleichungen
X und B23,B24,B28 (Kapitel E+F)

k	Q_n	Q_m	Q_p	Q_σ	B	H	A
1	3	3	2	1	27	9	2787,59025432
2	24	31	34	15	26	104	14727,57867072

Tabelle VII

numerische Auswertung der Gleichungen
IX und B8,B9,B10,B13 (Kapitel E+F)

$N_i(k,q)$	numerischer Wert	$N_i(k,q)$	numerischer Wert
$N_1(1,1)$	0,99688127	$N_4(1,1)$	4
$N_1(1,0)$	1	$N_4(1,0)$	4
$N_1(2,1)$	0,99627809	$N_4(2,1)$	4
$N_1(2,0)$	1	$N_4(2,0)$	2
$N_1(2,2)$	0,95891826	$N_4(2,2)$	6
$N_2(1,1)$	0,67506174	$N_5(1,1)$	1,15773470
$N_2(1,0)$	0,66666667	$N_5(1,0)$	1,15773470
$N_2(2,1)$	0,67670370	$N_5(2,1)$	1,73247496
$N_2(2,0)$	0,66666667	$N_5(2,0)$	1,15773470
$N_2(2,2)$	0,79136728	$N_5(2,2)$	76,73214581
$N_3(1,1)$	1,95731764	$N_6(1,1)$	0.00000164
$N_3(1,0)$	2	$N_6(1,0)$	0,00000164
$N_3(2,1)$	2,59881924	$N_6(2,1)$	0,02518725
$N_3(2,0)$	2,71828183	$N_6(2,0)$	-0.10493009
$N_3(2,2)$	2,12190443	$N_6(2,2)$	0,15580107

Tabelle VIII

numerische Auswertung der Gleichungen
B22,B29,B30,B31 (Kapitel F)

Partikel	a_1	a_2	a_3	$W_{N=0}$
e^-	35	11	89,96774158	38,70294226
e^0	34	28	77,11059862	38,51308957
μ	1	23	7,26891022	2830,2632345
$\pi^\pm$	25	0	95,62488526	3514,46294316
K^+	16	31	7,26891022	8857,95769020
π^0	22	2	-0,03225806	3419,16217346
K^0	22	17	98,29474138	9332,35821820
η	28	33	48,65020426	9905,00599107
p	0	23	84,22944059	14792,56308050
Σ^+	21	30	26,15371691	18124,03136129
Σ^-	21	47	94,49556347	18183,30294347
Ξ^-	26	25	15,61504747	18998, 73451193
Ω^-	47	3	69,73881899	23157,61451004
o^{++}	23	27	82,92386515	18115,38391620
o^+	23	22	22,64335811	18467,56082305
o^-	21	27	69,73881899	18448,51703290
n	0	36	101,15000035	14828,61089116
Λ	13	45	-0,033333333	16827,97671482
Σ^0	21	46	83,86257747	18179,59733741
Ξ^0	26	22	71,62409771	18990,08927597
o^0	23	39	93,76289283	18508,94119539

Tabelle IX
numerische Auswertung der Gleichungen
XXXV und B48,B49 (Kapitel E+F)

Partikel	Y	φ	$L_{(N)}$
$e^-,\bar{e}^+$	-408,54063248	0	1021
$e_0,\bar{e}_0$	-53,97104336	0	1373
$\mu^-,\bar{\mu}^+$	1086,93016693	2,57120915	2340
$\eta,\bar{\eta}$	$0,26273140\cdot10^{-8}$	5,06612007	3236
$K^+,\bar{K}^-$	184,84508008	-40,78574065	3258
K^0	147,94249859	-12,73395842	3166
$\bar{K}^0$	0,25356917	-12,73395842	3166
$\pi^\pm,\bar{\pi}^\mp$	17,08389288	-2,32863274	1485
$\pi^0,\bar{\pi}^0$	$3,70004027\cdot10^{-8}$	-5,12094079	1833
$\Lambda,\bar{\Lambda}$	0.06178705	0	1964
$\Omega^-,\bar{\Omega}^+$	0,09369559	-137,03604095	2062
$p,\bar{p}$	17,31698079	9,28034058	1841
$n,\bar{n}$	1228,02191382	11,16885467	1932
Ξ^-,Ξ^+	0,10666692	23,44132266	2247
$\Xi^0,\bar{\Xi}^0$	0,20184712	90,44612205	2382
$\Sigma^+,\bar{\Sigma}^-$	0,04603481	-6,00947753	5785
$\Sigma^0,\bar{\Sigma}^0$	$211,63404729\cdot10^{-8}$	11,78154008	6375
$\Sigma^-,\bar{\Sigma}^+$	0.06836890	-2,01125294	5991
$o^{++},\bar{o}^{--}$	$14,72282381\cdot10^{-16}$	-1364,07751672	35510
$o^+,\bar{o}^-$	$11,51525605\cdot10^{-16}$	-623,74523006	5115
$o^0,\bar{o}^0$	$10,13617609\cdot10^{-16}$	-985,00227539	5551
$o^-,\bar{o}^+$	$10,19390807\cdot10^{-16}$	-548,14408156	5102
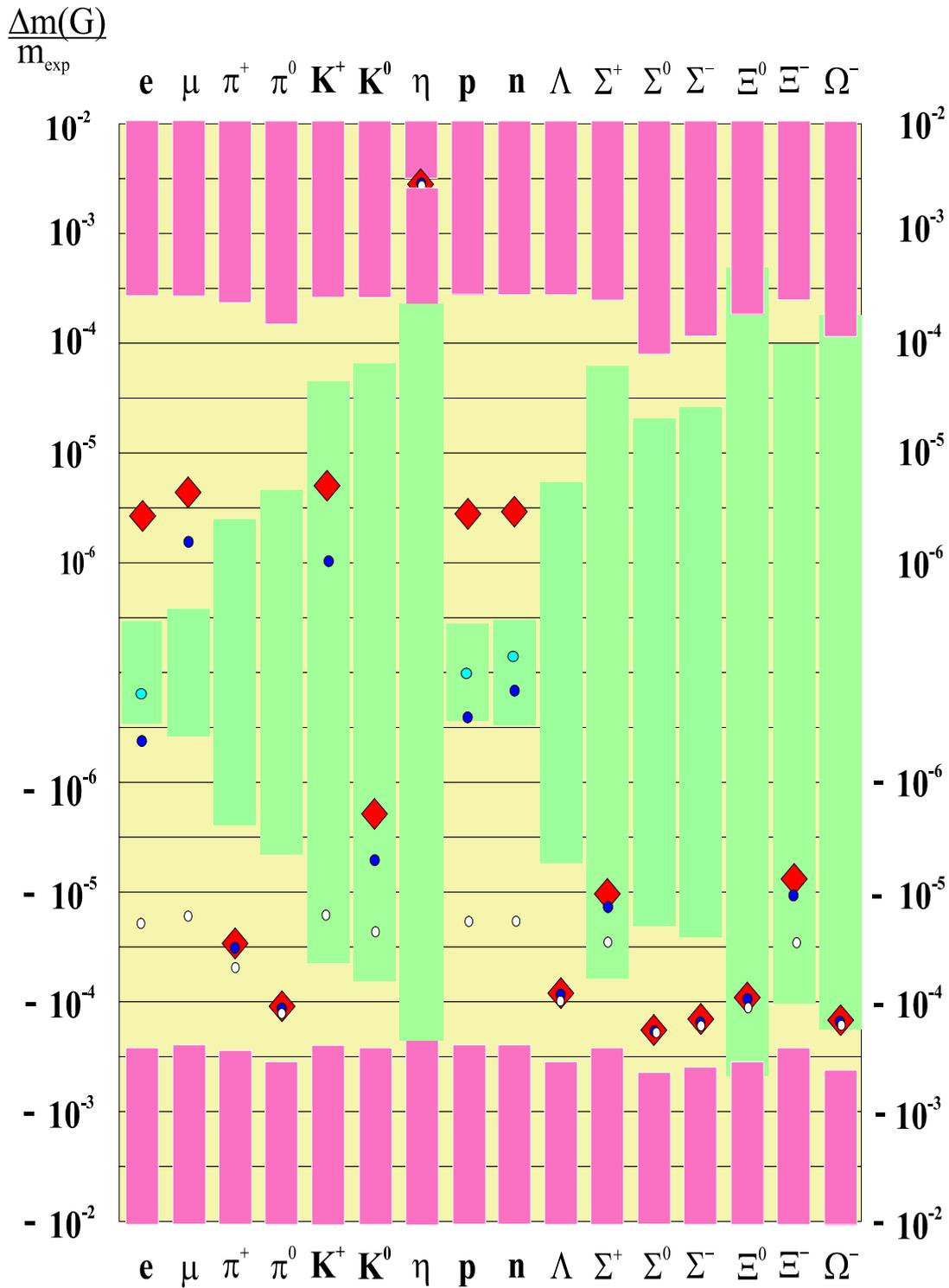
Relative Abweichung der gerechneten Partikelmassen von den experimentellen Mittelwerten für unterschiedliche Werte der Gravitationskonstante G_v

$G_v/10^{-11} m^3 kg^{-1} s^{-2}$ = 6.663/6.683 (■ CODATA 2002 low/high), 6.6732 (◆ Heim 1982),
6.6733082 (○ Forschungskreis Heimsche Theorie 2003), 6.6733198 (● Dröscher 2002),
6.67407 (○ Gundlach und Merkowitz 2000, Kündig et al. 2002/03) ■ Meßunsicherheit
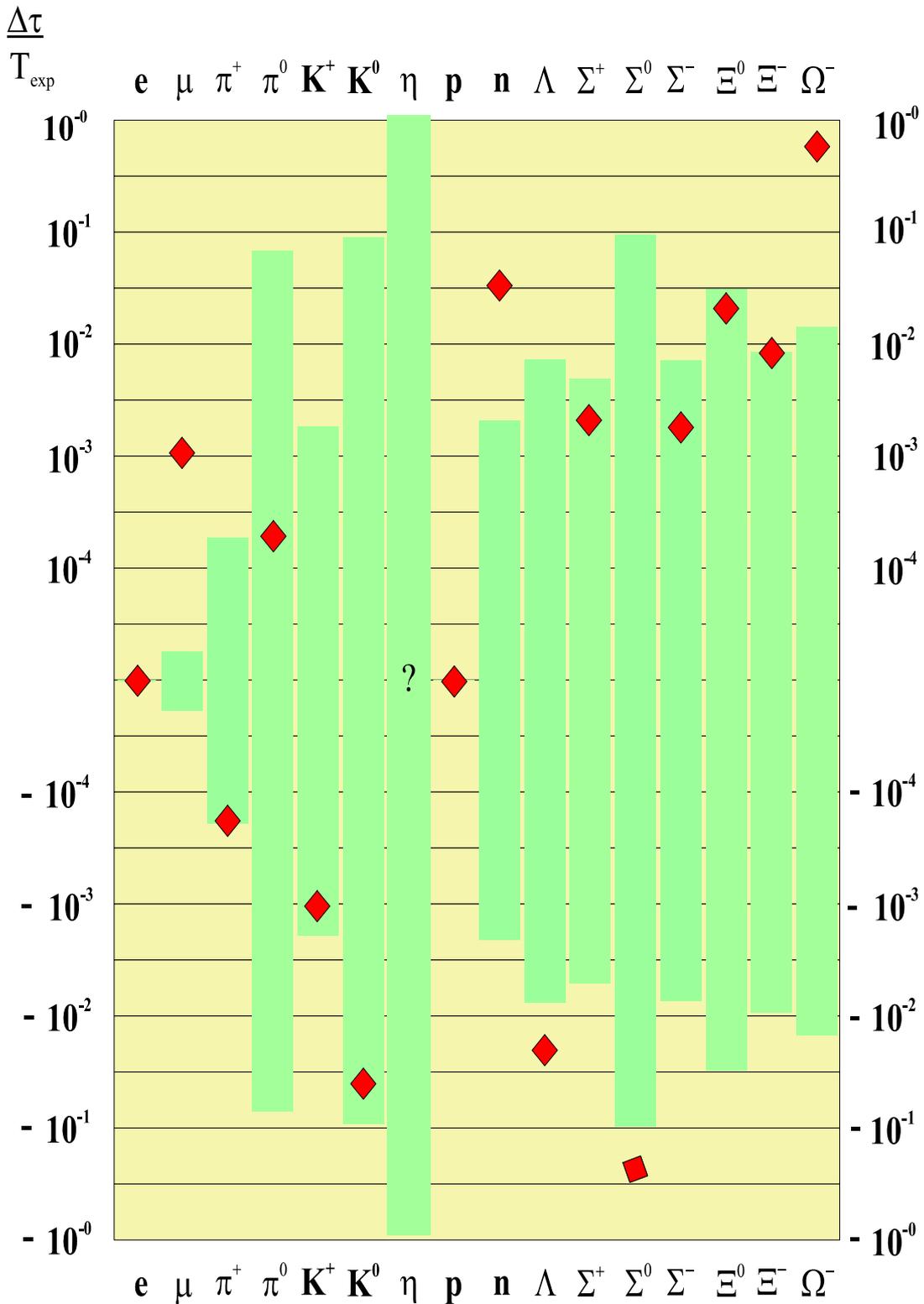
Relative Abweichung der theoretisch bestimmten Lebensdauern
von den experimentellen Mittelwerten

♦ Heim 1989, ? kein experimenteller Vergleichswert, ■ Heim 1998
■ Meßunsicherheit