# GAUGE AND HIGGS BOSONS

## $\gamma$

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

Mass $m < 1 \times 10^{-18}$ eV
Charge $q < 1 \times 10^{-35}$ $e$
Mean life $\tau =$ Stable

## $g$ or gluon

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

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

## graviton

$J = 2$

Mass $m < 6 \times 10^{-32}$ eV

## $W$

$J = 1$

Charge $= \pm 1$ $e$
Mass $m = 80.385 \pm 0.015$ GeV
$m_Z - m_W = 10.4 \pm 1.6$ GeV
$m_{W^+} - m_{W^-} = -0.2 \pm 0.6$ GeV
Full width $\Gamma = 2.085 \pm 0.042$ GeV
$\langle N_{\pi^\pm} \rangle = 15.70 \pm 0.35$
$\langle N_{K^\pm} \rangle = 2.20 \pm 0.19$
$\langle N_p \rangle = 0.92 \pm 0.14$
$\langle N_{\text{charged}} \rangle = 19.39 \pm 0.08$

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

| $W^+$ DECAY MODES | | Fraction ($\Gamma_i/\Gamma$) | Confidence level | $p$ (MeV/$c$) |
|---|---|---|---|---|
| $\ell^+\nu$ | [b] | (10.86± 0.09) % | | – |
| $e^+\nu$ | | (10.71± 0.16) % | | 40192 |
| $\mu^+\nu$ | | (10.63± 0.15) % | | 40192 |
| $\tau^+\nu$ | | (11.38± 0.21) % | | 40173 |
| hadrons | | (67.41± 0.27) % | | – |