

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

**tau
neutrino**

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

QUARKS

LEPTONS

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron neutrino

ν_μ

muon neutrino

ν_τ

tau neutrino

Z

Z boson

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

G

graviton

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

QUARKS

LEPTONS

GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

HYPOTHETICAL
TENSOR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

H

Higgs

G

graviton

d

down

s

strange

b

bottom

γ

photon

e

electron

μ

muon

τ

tau

W

W boson

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson






























GAUGE BOSONS
VECTOR BOSONS

SCALAR BOSONS

HYPOTHETICAL
TENSOR BOSONS

QUARKS

LEPTONS

three generations of matter (fermions)			three generations of antimatter (antifermions)			interactions / forces (bosons)	
I	II	III	I	II	III		
 u up	 c charm	 t top	 \bar{u} antiup	 \bar{c} anticharm	 \bar{t} antitop	 g gluon	 H Higgs
 d down	 s strange	 b bottom	 \bar{d} antidown	 \bar{s} antistrange	 \bar{b} antibottom	 γ photon	GAUGE BOSONS VECTOR BOSONS
 e^- electron	 μ^- muon	 τ^- tau	 e^+ electron	 μ^+ muon	 τ^+ tau	 Z^0 Z boson	
 ν_e electron neutrino	 ν_μ muon neutrino	 ν_τ tau neutrino	 $\bar{\nu}_e$ electron antineutrino	 $\bar{\nu}_\mu$ muon antineutrino	 $\bar{\nu}_\tau$ tau antineutrino	 W^- W boson	

SCALAR BOSONS

three generations of matter
(fermions)

interactions / forces
(bosons)

I

II

III

u

up

c

charm

t

top

g

gluon

h

light
Higgs

d

down

s

strange

b

bottom

γ

photon

H

heavy
Higgs

e

electron

μ

muon

τ

tau

W

W boson

A

pseudoscalar
Higgs

ν_e

electron
neutrino

ν_μ

muon
neutrino

ν_τ

tau
neutrino

Z

Z boson

H^\pm

charged
Higgs

QUARKS

LEPTONS

(PSEUDO)SCALAR BOSONS

GAUGE BOSONS
VECTOR BOSONS

superpartners of SM fermions
(sfermions, bosons)

superpartners of SM bosons
(bosinos, fermions)

I

II

III

\tilde{u}

up
squark

\tilde{c}

charm
squark

\tilde{t}

stop

\tilde{g}

gluino

\tilde{H}

Higgsino

\tilde{d}

down
squark

\tilde{s}

strange
squark

\tilde{b}

sbottom

$\tilde{\gamma}$

photino

\tilde{e}

selectron

$\tilde{\mu}$

smuon

$\tilde{\tau}$

stau

\tilde{W}

wino

$\tilde{\nu}_e$

electron
sneutrino

$\tilde{\nu}_\mu$

muon
sneutrino

$\tilde{\nu}_\tau$

tau
sneutrino

\tilde{Z}

zino

SQUARKS

SLEPTONS

SCALAR BOSONS

GAUGINOS

superpartners of SM fermions
(sfermions, bosons)

superpartners of SM bosons
(bosinos, fermions)

I

II

III

GAUGINOS HIGGSINOS

SQUARKS

SLEPTONS

\tilde{u}

up
squark

\tilde{c}

charm
squark

\tilde{t}

stop

\tilde{g}

gluino

\tilde{h}

light
Higgsino

\tilde{d}

down
squark

\tilde{s}

strange
squark

\tilde{b}

sbottom

$\tilde{\gamma}$

photino

\tilde{H}

heavy
Higgsino

\tilde{e}

selectron

$\tilde{\mu}$

smuon

$\tilde{\tau}$

stau

\tilde{W}

wino

\tilde{H}^{\pm}

charged
Higgsino

$\tilde{\nu}_e$

electron
sneutrino

$\tilde{\nu}_\mu$

muon
sneutrino

$\tilde{\nu}_\tau$

tau
sneutrino

\tilde{Z}

zino

superpartners of SM fermions
(sfermions, bosons)

superpartners of SM bosons
(bosinos, fermions)

I

II

III

GLUINO NEUTRALINOS

\tilde{u}

up
squark

\tilde{c}

charm
squark

\tilde{t}

stop

\tilde{g}

gluino

$\tilde{\chi}_1^0$

lightest
neutralino

\tilde{d}

down
squark

\tilde{s}

strange
squark

\tilde{b}

sbottom

$\tilde{\chi}_2^0$

2nd lightest
neutralino

\tilde{e}

selectron

$\tilde{\mu}$

smuon

$\tilde{\tau}$

stau

$\tilde{\chi}_1^\pm$

light
chargino

$\tilde{\chi}_3^0$

2nd heaviest
neutralino

$\tilde{\nu}_e$

electron
sneutrino

$\tilde{\nu}_\mu$

muon
sneutrino

$\tilde{\nu}_\tau$

tau
sneutrino

$\tilde{\chi}_2^\pm$

heavy
chargino

$\tilde{\chi}_4^0$

heaviest
neutralino

CHARGINOS

SQUARKS

SLEPTONS