E8 Theory

Every kind of elementary particle field is identified by its electric, weak, strong, and spin charge, which determine how it interacts with electromagnetic, weak, strong, and gravitational fields. In interactions, when two particles combine to make a third, or one particle decays into others, these charges are conserved. The structure of these particle interactions is determined by the geometry of the U(1), SU(2), SU(3), and Spin(1,3) Lie groups and representations of the Standard Model and gravity. In the unified electroweak theory, the SU(2) x U(1) symmetry is broken by the Higgs boson, selecting electric charge as a specific combination of weak charge and hypercharge. The strong force is mediated by the eight gluon particles of SU(3), interacting with colored quarks having two strong charges. The gravitational Spin(1,3) field describes the rotation of the gravitational frame, and interacts with fermions according to their spin charge, which can be left or right–handed, and up or down, depending on how the fermion is spinning and moving through space. Remarkably, each elementary particle field, including the photon, weak bosons, gluons, gravitons, frame–Higgs, and all fermion states, corresponds to a symmetry of the largest exceptional Lie group, E8. The three generations of fermions, with identical charges but different masses, may be related to particles of E8 via a special symmetry called triality. The 248 E8 particles have eight different kinds of charge, including the six kinds of Standard Model and gravitational charge. This eight dimensional charge pattern can be projected to two dimensions and plotted, exhibiting its exquisite structure. The E8 Lie group has deep connections to many areas of mathematics and is considered by many to be the most beautiful mathematical structure known. If E8 Theory is correct, our universe could be the twisting and dancing of this exceptional geometry.

Charges	
W	weak
Y	hyper
g^3	strong
g^8	strong
ω_L	spin
ω_R	spin
X	GUT
w	PQ

Bosons	
○	photon
●	weak boson
●	gluon
●	graviton
■	frame–Higgs
○	weaker boson
●	X boson
■	other Higgs

Fermions (three generations)			
◇	neutrino	△	left up
◇	electron	△	left down
◇	up quark	△	right up
◇	down quark	△	right down
◇	up quark	▽	right up anti
◇	down quark	▽	right down anti
◇	up quark	▽	left up anti
◇	down quark	▽	left down anti