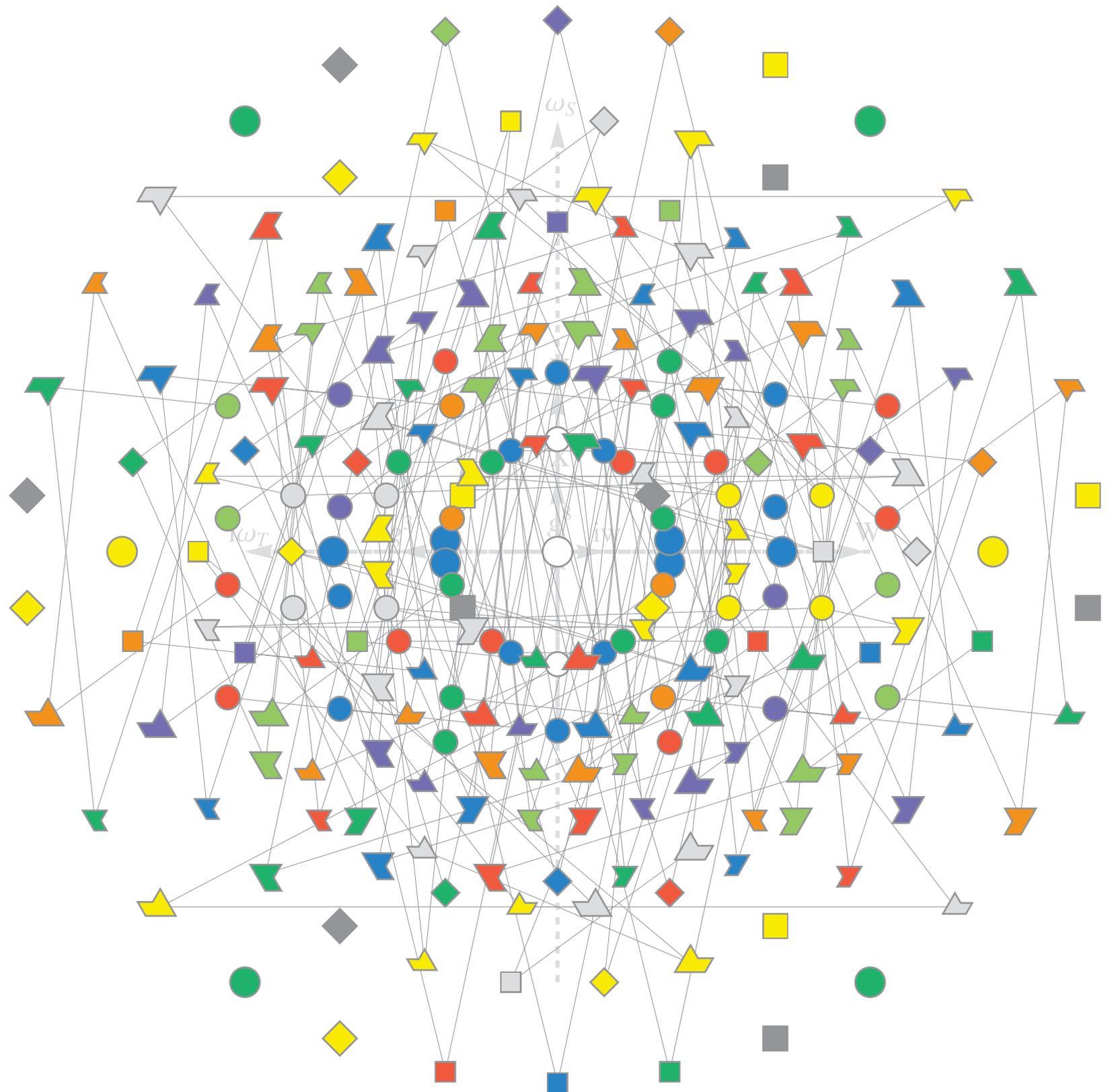


E8 theory

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 $SU(2) \times U(1)$ 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 $SU(3)$, which interact 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 and boost 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 particle of the largest "exceptional" Lie group, E_8 . The three generations of fermions, with identical charges but different masses, may be related to particles of E_8 via a special symmetry called triality. The 248 particles of E_8 have eight different kinds of charge, including the six kinds of Standard Model and gravitational charge. Here, its eight dimensional charge diagram is projected to two dimensions and plotted, exhibiting its exquisite structure. The E_8 Lie group has deep connections to many areas of mathematics and is perhaps the most beautiful mathematical structure known. If E_8 theory is correct, our universe could be the twisting and dancing of this exceptional geometry.



Charges		Bosons	
W	weak	○	photon
Y	hyper	●	weak boson
g^3	strong	●	gluon
g^8	strong	●	graviton
ω_S	spin	■	frame-Higgs
ω_T	boost	○	weaker boson
X	GUT	●	X boson
w	PQ	■	other Higgs

Fermions			
⊠	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