Our Universe With the Broken Symmetry E8 X U(1) Must Contain Exactly 248 Different Kinds of Symmetry Representation Particles and Antiparticles: All Have Been Found

George R. Briggs

Abstract: In our epoch E8 symmetry exists and is the governing symmetry of the universe although it is a broken symmetry (see viXra 1405.0210) responsible for our feeble gravity. Studies of existing lepton, baryon, meson, and QCD particles indicate that there are 12 lepton, 100 baryon, 100 meson, and 14 QCD species here at present, or 226 in all. Adding the 22 new particles required to implement E8 symmetry yields a total of 248 different particles and antiparticles required for our universe to have E8 symmetry, and these have all been found.

The symmetry E8 is the highest known and is characterized as a Lie Group[1] having only a single member with 248 representations. Its symmetry is so advanced that every gauge boson within its influence appears in two forms, one particle form with positive intrinsic energy (mc^2) and one particle form with negative intrinsic energy[2]. The negative energy particle form is unobservable to us directly because in our epoch E8 symmetry is broken by electromagnetism to E8 x U(1) by the big bang and unbroken E8 symmetry is necessary for the negative intrinsic energy particles to be produced and observed. In fact negative intrinsic energy matter has been detected in our universe as dark energy (a spin 0 boson form) and as dark matter (a spin 1 boson form). These two forms enabled hadrons and leptons of ordinary matter as well as massive bosons to be converted from the previous universe to our present universe without violating flatness. This was accomplished via two non-quantum fermibosonic entities of unbroken E8 symmetry (see viXra 1310.0261).

The two forms of fermibosonic entity were forged by two new attractive forces and associated gauge bosons that were produced in the epoch before the big bang. In addition, another new attractive force associated gauge boson was activated in this epoch also to produce a universe-wide annihilation event between already-existing W+ and W- particles which we call the big bang and this was activated by the electromagnetic breaking of the E8 perfect symmetry then existing before the big bang. The 3 new forces required 3 new gauge boson particles, making 8 in all.

The 8 gauge bosons, 8 fundamental matter particles and their antiparticles produced initially by the universe, dark energy, dark matter, 2 big bang annihilators plus 2 symmetry-breakers (SU(2) x U((1) and E8 x U(1)) are also needed, for a total[3] of 22 particles to implement E8 x U(1) broken symmetry. The finding that there are 226 additional types of particles and antiparticles was made with the referencing aid of Wikipedia[4].

The possibility that all 248 representational particles of E8 symmetry have now been exhibited in nature by putative unusually large production[5] of particles containing 4 quarks (the tetraquark) as a marker is very intriguing. The tetraquark by itself is not a very useful spin 1\2 particle (we have enough fermions for our matter needs without it, and spin 0 or 1 is needed for dark energy or dark matter bosons). If no more such many-quark particles are found this idea will become very attractive. It will mean that E8 symmetry is associated with 2- and 3- quark particles only.

1. A. Garrett Lisi and James Owen Weatherall, “A Geometric Theory of Everything”, pp. 54-61, Scientific American, Dec. (2010)

2. Dan Hooper, “Dark Cosmos”, p. 91, Collins, (2006)

3. A. Garrett Lisi, “An Exceptionally Simple Theory of Everything”, Wikipedia, (2007)

4. “Standard Model”, “Hadrons”, “Baryons”, “Mesons”, “Strong Force”, Wikipedia (2014)

5. “The Dawn of the Tetraquark”, Physicscentral, (2014)