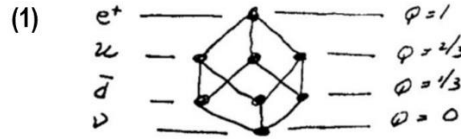


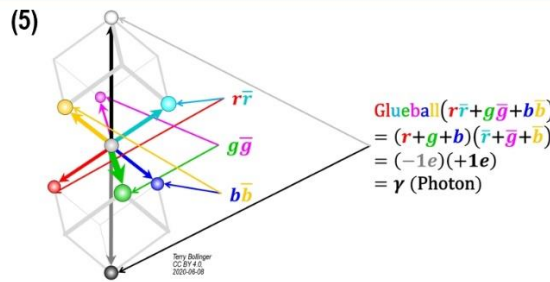
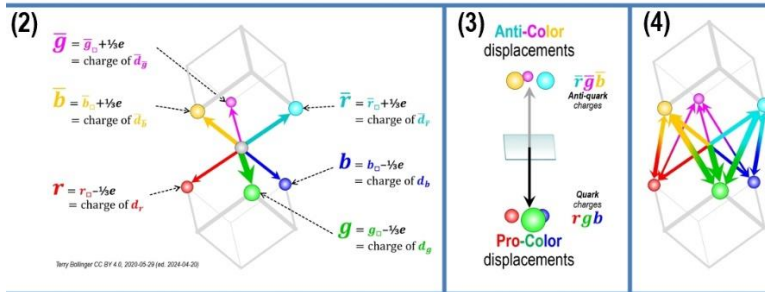
Photons Are Glueballs in Disguise

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2024-06-05.12:48 EDT Wed [1]



S. L. Glashow, "The Future of Elementary Particle Physics [HUTP-79/A059]," Harvard University Preprints, Jul. 1979. Available: <https://inspirehep.net/literature/144466>. Page 29, Section III. Let the Desert Bloom! S. L. Glashow's original hand drawing.



Recognizing that photons and gluons are pro-anti oscillations explains why glueballs become photons.

One simple but deeply uncomfortable explanation for why no one has ever observed glueballs is that we have the fundamental charges of nature wrong. Quarks always and only possess combinations of color and fractional electric charge. Since color charge never occurs in isolation in observed particles, the least noisy mathematical reduction of charge data uses the three orthogonal charge axes of Glashow's 1979 fermion cube mnemonic.

Glashow's three orthogonal unit charges correspond to the anti-color and fractional-electric charges of the three down antiquarks. The negatives of these three vectors become the charges of the down quarks.

Experimentally, this trivial "grand" unification of color and electric charges transforms net-colorless glueballs into oscillations along Maxwell's electric vector, the vertical diagonal of Glashow's cube.

In other words, accepting the simplest charge units that explain all observed fermion charge patterns means that, far from being unknown, glueballs are all around us in vast numbers. We call them photons.

References

[1] T. Bollinger, 2024-06-08.12:48 EDT comment on "E. Siegel, 8 basic unanswered questions about the known particles, Starts With A Bang! (Medium.com) 2024, 0605 [June 5] (2024). <https://medium.com/@terrybollinger/one-simple-but-deeply-uncomfortable-explanation-for-why-no-one-has-ever-observed-glueballs-is-that-00c67f26274d>