COLOR ROTATION FOR PRIMARY PARTICLES

Introduction

One of the principles of particle physics is that quarks have the property of color, and antiquarks the property of anti-color. Quark color is not color in the sense of the visible spectrum of light, but a designation that is necessary to distinguish quarks and antiquarks from each other when they form into larger particles such as nucleons. This feature of quarks and antiquarks is analogous to the spin numbers of the subatomic particles. Rather than describing something that is real in and of itself, spin is used to distinguish groups of particles from one another, and to account for how one particle decays into two particles. This does not mean that spin does not represent something that is a real physical quality or quantity.

The quarks that form into baryons (neutrons and protons) are identical to one another in their physical properties, but despite this they must retain individual identities, and so have been given the property of color. Protons are made from two “u” quarks and one “d” quark (uud); neutrons are made from two “d” quarks and one “u” quark (udd). Technically these particles only require two colors to distinguish the “2u” and “2d” quarks from each other. However, there are unstable baryons with three quarks (the “uuu” and “ddd”), and these require three quark colors, and this is the maximum number of quark colors.

Another principle of physics is that all particles (except mesons) have antiparticles. Baryons therefore have their antiparticle, called antibaryons. Antibaryons do not exist naturally but one of them, the antiproton, has been synthesized in particle accelerators. Since there are antibaryons, there has to be anti-colors to distinguish the 3 antiquarks that compose them, and so for every color there is an “anti-color.”

Color and anti-color are written:

R, B, Y (Quark colors $\overline{R}, \overline{B}, \overline{Y}$ (Antiquark anti-colors)

As is the case for spin, the physical basis for color is not known, does not mean that there is not one. The fact that color and anti-color are necessary for modern physics to deal with quarks and antiquarks implies that there must be something real and definite about this designation. While the existing physics does not deal with the real nature of color and anti-color, the theory that is being defined here cannot that luxury, as the physical basis for color must be defined for the theory to have meaning.

Color-Rotation

Because quarks and antiquarks have color it is likely, indeed required, that primary particles also have the same property or else a property that is related to it. Defining the nature of this system for is complicated by two characteristics of primary particles: 1. There are only two of them, the “x” and the “y;” 2. They compose both quarks and antiquarks. Because of these characteristics, color for primary particles has extended qualities that will be described as “color-related” instead of just color. The color-related properties of primary particles allow them to move between color and anti-color, and as a consequence between quarks and antiquarks

The first step in defining the color-related properties and designations for primary particles is to determine how many of them there are. It has been seen that the "u" quark is composed of "2x" particles, and its antiquark "2y" particles. This means that the "uuu" and "yyy" baryons (and their anti-baryons) require 6 primary particles, each with its own color-related designation. The second step in delineating the color-related properties of primary particles is to define the actual physical property and the quarks and antiquarks that carry it. The property is that of vortex rotation, which is the rotational direction of the primary field lines that form into primary particles.

A further delineation follows: 1. Left hand rotation (L) and right hand rotation (R); 2. The u-quark has "R" rotation and the $\bar{u}$ -antiquark has "L" rotation; these are composed of two primary particles (u = 2x; $\bar{u}$ = 2y); 3. The d-quark has color and th $\bar{d}$ -antiquark has anti-color, but neither has rotation.

The six types of left and right rotation are:

Left hand: L_1 L_2 L_3 L_4 L_5 L_6 Right hand: R_1 R_2 R_3 R_4 R_5 R_6

As can be seen, the property of rotation is reserved exclusively to the quarks and antiquarks that are composed of two primary particles (u = 2x; $\bar{u}$ = 2y). Quarks and antiquarks that are composed of single primary particles have color and anti-color (d = y; . $\bar{d}$ = x).

The proposed rules allow primary particles to compose both quarks and antiquarks. When an "x" primary particle loses its "R" rotation, it becomes a $\bar{d}$ -antiquark. When "2x" primary particles lose rotation, they become two $\bar{d}$ -antiquarks. The same but opposite holds true for the "y" primary particles.

Primary Wave Color Properties

Primary waves mediate between the rotational shifts that move primary particles between quarks and antiquarks. Similar to the vector boson particles of the known physics, the force carried by a primary particle is transferred to a quarks and antiquarks. This process occurs in two stages, the pion stage occurring first with quark-antiquark pairings, and the baryon stage second with the neutron.

Primary waves are the fundamental wave component of matter. They are formed out of the virtual particle stream, the quantum soup, by one "Δq " charge and c $-\Delta q$ " charge. When a primary wave is formed, these charge levels are added up to the level of either the Coulomb charge ($\pm e$), or the primary particle and quark charg $\pm q$). While some gamma photons are able to decay into positron-electron pairs, some primary waves are able to decay into an "x+y" pair of primary particles. Some, however, are not able to do this, and remain as "xy" primary waves. ("xy" is a designation, not a mathematical

operation).
Xxxx

Primary waves are derived from the vortexes that bring energy in from the primary field to form matter. They are a property of the vortexes and are part of the information of the primary field. When the vortex energy has reached sufficiently high levels, it is transformed into inertial mass while the waves carry the gluons of the strong nuclear force into quarks and antiquarks.

Primary waves have a high degree of circular polarization, a property that is related to rotation, and color all occur within the vortexes. Mass-energy is attached to color and anti-color, while force is held by vortex rotation, and the two are moderated by primary waves. In part, this explains why the “d” and “$\overline{d}$ ” account for most of the mass that eventually shows itself in nucleons. This quark-antiquark pair is associated primarily with color and mass-energy in the vortexes, while the less massive “u” and “$\overline{u}$ ” pairs is associated primarily with rotation and force, phenomena that have little to do with mass.

In the vortexes primary waves rotate in either the “L” or “R” direction. Illustrations of this are shown in Figures ???. To begin with, primary field vortexes have a down spiral and an up spiral. When matter is formed from energy, the down spiral is “R” and the up spiral “L,” When antimatter is formed, the opposite occurs, and “L” is down and “R” up. In either case, the up spiral is a reaction to the down. In addition to rotational direction, primary waves are circularly polarized, and rotate around the outside of the cone shaped as they move towards its tip.

The diagrams show how each of the 4 wave types behave. Those listed under No. 1 (above) are right hand spin waves with color. The opposite to these are left hand spin waves with anti-color (No. 4). Nos. 2 and 3 are dual spin waves, one with color and the other with anti-color.

The spin of color waves corresponds to the spin of the boson and meson subatomic particles. Nos. 1 and 4 are spin 1 (color and anti-color); Nos. 2 and 3 are spin zero, with color canceling anti-color.

Composite Particle Color and Structure

Composite particles have a wave component and a particle component. The former is responsible for the acquisition of the energy that eventually becomes the mass of its final product, a particular hadron, while the latter determines the Coulomb charge of the hadron $(e^{+}, 0, e^{-})$.

There are two types of composite particles, the “fundamental composite,” which is entirely particle in its structure, and the “wave composite,” which has a dual wave-particle structure. The two composite particles are made from 3 primary particles, either two “x” and one “y,” or two “y” and one “x.”

The fundamental composite particles written::

C_x = xxy C_y = yyx

Wave-composite particles are written:

C_x = x(xy) C_y = y(yx)

The wave-composite particle consists of a single "x" or "y" primary particle plus one "xy" primary wave. The reverse ordering of the "xy" wave "yx" wave for the 2 particles indicates that they are traveling in opposite directions.

Composite particles, along with primary waves, form quarks and antiquarks, The composite particle composition of quarks and antiquarks is based upon the quark/antiquark pairs:

Quarks: du, cs, tb ; Antiquarks: $\overline{du}, \overline{cs}, \overline{tb}$.

One fundamental composite particle forms one quark/antiquark pair:

xxy = du, cs, tb ; yyx = $\overline{du}, \overline{cs}, \overline{tb}$.

The individual quarks and antiquarks are:

1. u = 2x; $\overline{u}$ = 2y. 2. d = y; $\overline{d}$ = x.

The color rule for composite particles goes back o the original concept that color is attached to particles that become matter, and anti-color is attached to those that become antimatter. Because the "xxy" composite forms quarks (matter), it has the property of color; because the "yyx" composite forms antiquarks (antimatter), it has the property of anti-color.

The color rule for primary waves applies to both the fundamental composite and the wave composite, which means that each of the 12 color waves is able to combine with an "x" or "y" primary particle that different color (or anti-color) from the wave color. This secondary rule leads to the production of a total of 36 composite particles:

C_x = x(xy) C_y = y(yx)

$R_x \; B_x \overline{B_y}$) $\overline{R_y} \; \overline{B_y} \; B_x$)

$R_x \; G_x \overline{G_y}$) $\overline{R_y} \; \overline{G_y} \; G_x$)

$B_x \;\; R_x \overline{R_y}$)

$B_x \;\; G_x \overline{G_y}$)

$G_x \;\; R_x \overline{R_y}$)

$G_x \;\; B_x \overline{B_y}$)

$\overline{B_y} \;\; \overline{R_y} \; R_x$)

$\overline{B_y} \;\; \overline{G_y} \; G_x$)

$\overline{G_y} \;\; \overline{R_y} \; R_x$)

$\overline{G_y} \;\; \overline{B_y} \; B_x$)