Partial Collisions of Unmater-Matter, Unmatter-Antimatter, and Unmatter1-Unmatter2 to Generate High Energy

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In this paper we present the possibility of partial collisions between unmatter with matter, and unmatter with antimatter, and two or more different types of unmatters colliding between themselves to create high energy. In general, the collisions between unmatter with matter, or with antimatter, or with other type of unmatter, because being partial, they release less energy than the matter-unmatter collision which is a total collision. But the unmatter may be easier to produce in laboratory than antimatter.

1 Introduction

According to the CERN website [1], the universe is composed from 5% matter, 26.8% dark matter, and 68.2% dark energy.

The antimatter (also called dark matter) is composed from antiparticles.

The matter-antimatter asymmetry is enormous, contrary to the Big Bang Theory, which sustains that it should have been created equal amounts of matter and antimatter.

The unmatter-matter and unmatter-antimatter asymmetries should also be studied. At the Big Bang, if any, not only matter and antimatter would have been generated, but unmatter as well. Similarly, Unmatter Plasma [8, 9, 10] is a novel form of plasma, exclusively made of matter and its antimatter counterpart. It was first generated in the 2015 experiment.

The Big Bang Theory would have occurred 13.7 billion years ago, and the accelerated expansion of the universe would be due to dark matter — which contradicts the hypothesis of the initial explosion, according to which the universe should slow down...

The antimatter is considered a doppelganger of the matter. According to [2], "a gram of antimatter colliding with a gram of matter would produce as much energy as a nuclear bomb".

2 Elementary Particles

The smallest units of matter (i.e., not made up by other smaller units of matter) are called elementary particles. A particle has: charge, mass, and angular momentum (spin).

The building blocks of matter, or most elementary particles known today are:

6 quarks and 6 leptons

with their corresponding antiparticles

6 antiquarks and 6 antileptons

(see Table 1 and Table 2 on top of the next Page).

The quarks are bonded together by *gluons*, and the study of strong interactions between quarks is called Quantum Chromodynamics (QCD).

In an atom, the electrons are leptons, while the protons, neutrons, and pions are made up of quarks.

A *baryon* is made up of an odd number of quarks (usually three); while a meson is made up of an even number of quarks (usually a quark and an antiquark, therefore such a meson is the most elementary form of unmatter, let us call it ***unmatter-meson***.

A *pion* (or *pi-meson*) is an unstable subatomic particle of one of the following three forms: and each one is composed from a quark and an antiquark (as such, they are mesons, and therefore elementary forms of unmatter, let us call them ***unmatter-pions***.

The *hadron* is a particle made up of two or more quarks that, through a strong interaction, are hold together.

Antimatter is matter composed of antiparticles.

While the *antiparticle*, as partner of a particle, is matter with reversed charge, parity, and time of its corresponding particle.

The *photon particle* is its own photon antiparticle, but this is an exception. All other particles have different corresponding antiparticles.

In collision, particle and antiparticle annihilate each other and produce gamma photons, neutrinos, and other particles.

3 Standard Model

According to the Standard Model, there are 17 distinct subatomic particles:

12 fermions and 5 bosons.

The fermion is a particle that only in combination with its antiparticle can be created or destroyed. Like the electron.

While the boson is a particle that can be created and destroyed in arbitrary numbers. Like photon.

Boson is in general a force carrier particle.

The fundamental forces that act in the nature are: gravity, electromagnetism, strong force, and weak force.

4 Defining Unmatter

In short, unmatter is formed by matter and antimatter that bind together and it was introduced by Smarandache in 2004 on the CERN website [4], and developed later [5–17].

Quarks	up (u)	down (d)	charm (c)	strange (s)	top (t)	bottom (b)
Antiquarks	up	down	charm	strange	top	bottom

Table 1: Quarks and antiquarks.

Leptons	charged	antielectron	antimuon	antitaun
Antileptons	neutrals	anti-electron-neutrino	anti-muon-neutrino	anti-tau-neutrino

Table 2: Leptons and antileptons.

The building blocks of matter and antimatter (most elementary particles known today) are 6 quarks and 6 leptons; their 12 antiparticles also exist.

Then *unmatter* will be formed by at least a building block and at least an antibuilding block which can bind together.

Let us start from neutrosophy [3], which is a generalization of dialectics, i.e., not only the opposites are combined but also the neutralities. Why? Because when an idea is launched, a category of people will accept it, others will reject it, and a third one will ignore it (don't care). But the dynamics between these three categories changes, so somebody accepting it might later reject or ignore it, or an ignorant will accept it or reject it, and so on. Similarly the dynamicity of <A>, <antiA>, <neutA>, where <neutA> means neither <A> nor <antiA>, but in between (neutral). Neutrosophy considers a kind not of di-alectics but tri-alectics (based on three components: <A>, <antiA>, <neutA>).

Hence unmatter is a kind of intermediary (not referring to the charge) between matter and antimatter, i.e. neither one, nor the other.

Neutrosophic Logic (NL) is a generalization of fuzzy logic (especially of intuitionistic fuzzy logic) in which a proposition has a degree of truth, a degree of falsity, and a degree of neutrality (neither true nor false); in the normalized NL the sum of these degrees is 1.

5 Unmatter Atom

It is possible to define the unmatter in a more general way, using the exotic atom. The exotic atom is an atom obtained after substituting one or more particles by other particles of the same charge (constituents).

The classical unmatter atoms were formed by particles like (a) electrons, protons, and antineutrons, or (b) antielectrons, antiprotons, and neutrons.

In a more general definition, an unmatter atom is a system of particles as above, or such that one or more particles are replaces by other particles of the same charge.

Other categories would be (c) a matter atom with where one or more (but not all) of the electrons and/or protons are replaced by antimatter particles of the same corresponding charges, and (d) an antimatter atom such that one or more (but not all) of the antielectrons and/or antiprotons are replaced by matter particles of the same corresponding charges.

In a more composed system we can substitute a particle by an unmatter particle and form an unmatter atom.

Of course, not all of these combinations are stable, semi-stable, or quasi-stable, especially when their time to bind together might be longer than their lifespan.

6 Unmatter Charge

The charge of unmatter may be positive as in the pentaquark Theta-plus, 0 (as in the atom of positronium), or negative as in anti-Rho meson, i.e. uˆd, (M. Jordan).

7 Containment

The unmatter could be store as the antimatter atom "by atomic traps (based on electric or magnetic dipoles) and by lasers (magneto-optical traps and optical tweezers)" [18].

8 Matter and Antimatter

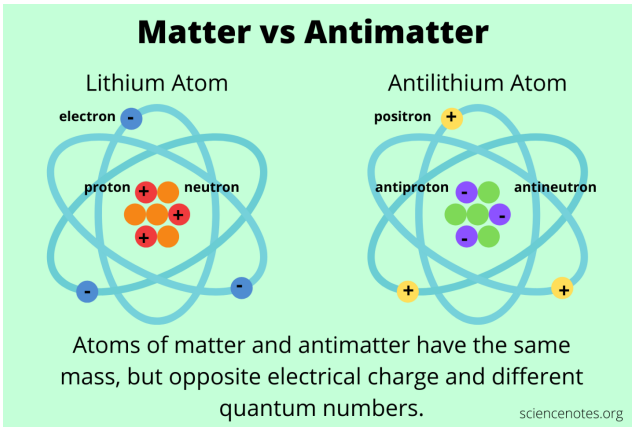

Fig. 1: Matter vs Antimatter. Courtesy of Anne Helmenstine, "What Is Antimatter? Definition and Examples" [18].

Lithium Atom:
electron1 (−), electron2 (−), electron3 (−);
proton1 (+), proton2 (+), proton3 (+);
neutron1 (0), neutron2 (0), neutron3 (0), neutron4 (0).

Lithium Antiatom:
positon1 (+), positon2 (+), positon3 (+);
antiproton1 (−), antiproton2 (−), antiproton3 (−);
antineutron1 (0), antineutron2 (0), antineutron3 (0), antineutron4 (0).

9 Proton and AntiProton

The Proton is made up of: up-quark, up-quark, down-quark; and AntiProton is made up of: anti-up-quark, anti-up-quark, anti-down-quark.

10 Real Examples of Unmatter

(i) Meson, which in general is made up of: quark and anti-quark, and as particular cases of mesons one has:
Pion1 = anti-up-quark, down-quark;
Pion2 = up-quark, anti-down-quark. Pion2 is the Anti-Pion1.

(ii) **Pentaquark**, which is made up of:
up-quark, up-quark, down-quark, down-quark, anti-strange-quark.

11 Partial Collisions of Unmatter-Unmatter

(i) Pion1 vs. Pentaquark: anti-up-quark vs. up-quark (only), since between down-quark and down-quark there is no collision.

(ii) Pion2 vs. Pentaquark: anti-down-quark vs. down-quark (only), since between up-quark and up-quark there is no collision.

12 Total Collision of Unmatter-Unmatter

Pion1 vs. Pion2: anti-up-quark vs. up-quark;
and down-quark vs. anti-down-quark.

13 Partial Collisions of Unmatter-Matter

(i) Pion1 vs. Proton: anti-up-quark vs. up-quark (only), since between down-quark and down-quark there is no collision.

(ii) Pion2 vs. Proton: anti-down-quark vs. down-quark (only), since between up-quark and up-quark there is no collision.

14 Partial Collisions of Unmatter-Antimatter

(i) Pion1 vs. Antiproton: down-quark vs. anti-down-quark (only), since between anti-up-quark and anti-up-quark there is no collision.

(ii) Pion2 vs. Antiproton: up-quark vs. anti-up-quark (only), since between anti-down-quark and anti-down-quark there is no collision.

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