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A New Order Relation on the Set of Neutrosophic Truth Values

Abstract

In this article, we discuss all possible cases to construct an atom of matter, antimatter, or unmatter, and also the cases of contradiction (i.e. impossible case).

1. Introduction

Anti-particle in physics means a particle which has one or more opposite properties to its "original particle kind". If one property of a particle has the opposite sign to its original state, this particle is anti-particle, and it annihilates with its original particle.

The anti-particles can be electrically charged, color or fragrance (for quarks). Meeting each other, a particle and its anti-particle annihilate into gamma-quanta.

This formulation may be mistaken with the neutrosophic <antiA>, which is strong opposite to the original particle kind. The <antiA> state is the ultimate case of anti-particles [6].

In [7], F. Smarandache discusses the refinement of neutrosophic logic. Hence, <A>, <neutA> and <antiA> can be split into: $<A_1>$, $<A_2>$, ...; $<neutA_1>$, $<neutA_2>$, ...; $<antiA_1>$, $<antiA_2>$, ...; therefore, more types of matter, more types of unmatter, and more types of antimatter.

One may refer to <A>, <neutA>, <anti-A> as "matter", "unmatter" and "anti-matter".

Following this way, in analogy to anti-matter as the ultimate case of anti-particles in physics, the unmatter can be extended to "strong unmatter", where all properties of a substance or a field are unmatter, and to "regular unmatter", where just one of the properties of it satisfies the unmatter.

2. Objective

The aim is to check whether the indeterminacy component I can be split to sub-indeterminacies I_1, I_2, I_3, and then justify that the below are all different:

$$I_1 \cap I_2 \cap I_3,\ I_1 \cap I_3 \cap I_2,\ I_2 \cap I_3 \cap I_1,\ I_2 \cap I_1 \cap I_3,\ I_3 \cap I_1 \cap I_2,\ I_3 \cap I_2 \cap I_1. \qquad (1)$$

3. Cases

Let e , $e^+, P, antiP$, $N, antiN$ be electrons, anti-electrons, protons, anti-protons, neutrons, anti-neutrons respectively, also $\cup$ means union/OR, while $\cap$ means intersection/AND, and suppose:

$$I = (e\ \cup\ e^+) \cap (P\ \cup\ antiP) \cap (N\ \cup\ antiN) \qquad (2)$$

The statement (2) shows indeterminacy, since one cannot decide the result of the interaction if it will produce any of the following cases:

1. $(e \cup e^{+}) \cap (\mathrm{P} \cup \mathrm{antiP}) \cap (\mathrm{N} \cup \mathrm{antiN}) \to e \cap \mathrm{P} \cap \mathrm{antiN}$,
   which is *unmatter* type (a), see reference [2];
2. $(e \cup e^{+}) \cap (\mathrm{N} \cup \mathrm{antiN}) \cap (\mathrm{P} \cup \mathrm{antiP}) \to e^{+} \cap \mathrm{N} \cap \mathrm{antiP}$,
   which is *unmatter* type (b), see reference [2];
3. $(\mathrm{P} \cup \mathrm{antiP}) \cap (\mathrm{N} \cup \mathrm{antiN}) \cap (e \cup e^{+}) \to \mathrm{P} \cap \mathrm{N} \cap e^{+} = contradiction$;
4. $(\mathrm{P} \cup \mathrm{antiP}) \cap (e \cup e^{+}) \cap (\mathrm{N} \cup \mathrm{anti\,N}) \to \mathrm{antiP} \cap \mathrm{e} \cap anti\mathrm{N} = contradiction$;
5. $(\mathrm{N} \cup \mathrm{antiN}) \cap (e \cup e^{+}) \cap (\mathrm{P} \cup \mathrm{antiP}) \to \mathrm{N} \cap \mathrm{e} \cap \mathrm{P}$,
   which is a *matter*;
6. $(\mathrm{N} \cup \mathrm{antiN}) \cap (\mathrm{P} \cup \mathrm{antiP}) \cap (e \cup e^{+}) \to \mathrm{antiN} \cap anti\mathrm{P} \cap e^{+}$,
   which is *antimatter*.

4. Comment

It is obvious that all above six cases are not equal in pairs; suppose:

$$e \cup e^{+} = I_1 = uncertainty,$$
$$\mathrm{P} \cup \mathrm{antiP} = I_2 = uncertainty,$$
$$\mathrm{N} \cup \mathrm{antiN} = I_3 = uncertainty.$$

Consequently, the statement (2) can be rewritten as:

$$I = I_1 \cap I_2 \cap I_3$$

but we cannot get the equality for any pairs in eq. (1).

5. Remark

This example is a response to the article [4], where Florentin Smarandache stated that "for each application we might have some different order relations on the set of neutrosophic truth values; (…) one can get one such order relation workable for all problems", and also to a commentary in [5], that "It would be very useful to define suitable order relations on the set of neutrosophic truth values".

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