Why does set theory necessary to describe charge structure of particles?

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Abstract
It is pointed out that the set theory gave the exact symmetry while the group theory did not. The triplicity of quarks and leptons is also pointed out. The reason of seven families of particles and in each family eight number of particles is elaborated.

1 Introduction
A group property violation in the charge structure of the gluons [1] changes [2, 3, 4] the entire scenario of the well established theory of strong interactions [5] i.e. Quantum Chromodynamics (QCD). Many of the experimental results [6, 7, 8] are only confirmed by the failure of perturbative QCD [8]. An interacting gluon model is reviewed in Ref. [9], in which the failure of perturbative QCD is elaborated. The exploration of physics with b-flavoured hadrons offers a very fertile testing ground for the standard model (SM) description of electroweak interactions [10, 11, 12, 13, 14]. The theoretical [15, 16] and experimental [17, 18, 19, 20] results for the radiative $B$-decays to kaons resonances are quite opposite [16]. Some of the possible candidates of the discrepancy are discussed in Ref. [16].

Issue of charge structure of fundamental particles has been discussed in the recent articles [1, 2, 3]. The failure of group theory in predicting the charge structure of particles is elaborated in Ref. [4]. It is also pointed out
that the group theory can only provide constraints [4]. But the importance of set theory in prediction of charge structure of particles discussed here.

2 Where did we make a mistake?

Let us take nine unit cubes and make a symmetric pattern. The symmetric pattern we observed, like $3^2$ (see Fig. 1 (a)). Take one cube away and we have now eight cubes, like $3^2 - 1$ (see Fig. 1 (b)). We never make a symmetric pattern on the surface with the help of eight cubes unless put them upon each other and get a cubic pattern, like $2^3$ (see Fig. 1 (c)).

Quarks come in three colors, red ($r$), blue ($b$), and green ($g$). QCD describes the interactions of colored particles and such interactions are called chromodynamic interactions. Chromodynamic interactions are mediated by gluons. Each gluon carries one unit of color and one unit of anticolor. In terms of color SU(3) symmetry, we obtain nine states constitute a “color octet” and a “color singlet” [21]. “color octet” states are given to gluons while the “color singlet” is thought to be as the photon. This situation exactly resembled as shown in Fig. 1 (b). But we can never make an exact symmetry of ‘8’ on the surface which is explained by group theory. The exact symmetry of ‘8’ can only be taken in cubic form as predicted by set theory [1] and cube roots of unity [2] (see Fig. (c)).

3 Another aspect

The possible patterns with the help of eight cubes are shown in Fig. 2. The Figs. 2(a–c) are the representations of $(3^2 - 1)$ while Fig. 2(d) is the representation of $3^2 - 1 = (3 - 1) (3 + 1) = 2 \times 4 = 8$. The number of visual and hidden faces of the patterns of type $3^2 - 1$ and $2^3$ are listed in Table 1. If we look upon the Table 1, we see that only Fig. 1(c) have equal number of visual and hidden faces of unit cubes.

4 Why seven families of particles?

There are seven families of particles i.e., one gluon family [2], three quark families and three lepton families [3]. Are there only seven families of particles or more ? Yes, there are only seven families of particles and no more. Why?
Table 1: The number of visual and hidden faces of the patterns of type $3^2 - 1$ and $2^3$.

| Pattern         | Visual faces | Hidden faces |
|-----------------|--------------|--------------|
| Figure 2 (a)    | 28           | 20           |
| Figure 2 (b)    | 30           | 18           |
| Figure 2 (c)    | 32           | 16           |
| Figure 2 (d)    | 28           | 20           |
| Figure 1 (c)    | 24           | 24           |

Let us have a look on the cube. A cube has six faces and eight corners. So, a cube have six face centers and one body center. The only one body center of the cube resembles the gluon family while the six face centers resembles the remaining six families of particles i.e. three quark families and three lepton families.

The triplicity of quarks and leptons has recently been discussed by Ma [22]. Ma proposed, how all three properties involving the number three are connected in a fivefold application of the gauge symmetry SU(3). But we have different point of view. Let us look on Fig. 1(c), the $2^3$ has eight unit cubes and there 24 faces are visible and 24 faces are hidden. Three faces of each unit cube are visible and three are hidden. We suspect that the visible faces gave the information about lepton and their three families while the hidden faces gave the information about quarks and their families.

5 Conclusions

We can never predict the volumetric properties of matter with the help of group theory but only set theory can predict. We can only take the constraints from the group theory. The set theory gave the exact symmetry while the group theory did not. The triplicity of quarks and leptons is discussed. The reason of seven families of particles and in each family eight number of particles is elaborated.

These are the worries appeared from time to time during the review of Ref. [15] discussed in Refs. [1, 2, 3, 4] and in this article.
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6 Figure Captions

1. The patterns of (a) $3^2$ (b) $3^2 - 1$ and (c) $2^3$.

2. Possible diagrams for $3^2 - 1$. 
Figure 1
Figure 2