

**Sudan University of Science & Technology**  
**College of Graduate studies**



**Mass and Charge Generation Mechanisms Within Framework of  
Generalized Lagrangian and Generalized Special Relativity**

آليات توليد الكتلة والشحنة في إطار اللاجرانج المعمم والنسبية الخاصة المعممة

**B.S.C (SUST) Sudan-M.S.C (SUST) Sudan**  
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## **c./Mass and charge generation mechanisms within the framework of generalized lagrangian and generalized special relativity**

### **1\ Introduction:**

The universe building blocks are atoms. These atoms consist of electrons, protons and neutrons. The recent elementary particle models, like electroweak standard model, say that even these particles are consist of smaller elementary particles called quarks and leptons<sup>[1]</sup>this particles have certain masses. The origin of these masses is explained by the so called Higgs mechanism<sup>[2]</sup>.

Recently Higgs particles which are thought to be responsible for mass generation was discovered experimentally in CERN<sup>[3]</sup>. This discovery comes as un-ultimate reword confirming the key predictions of the electroweak standard model (ESM). This mechanism states that when symmetry is broken at minimum potential masses are generated.

The electron charge is responsible for electric field generation. The motion of electric field generate magnetic field[1].Electromagnetic field shown to be generated by time changing electric and magnetic field as shown By Maxwell [2]. Maxwell equations predicts that electromagnetic wave (E.M.W) can be produced by oscillating charges [3]. These (E.M.W) are shown to carry information, there for they are widely used in telecommunication systems [4]. According to Maxwell equations (M.E) electromagnetic field and light behaves as waves. But the black body relation and other related phenomena, shows that (E.M.W) behaves some times as particles called photons describe behavior of (E.M.W) and the atomic scale [5]. The theory which describes the behavior of photons is quantum electrodynamics [6]. This theory succeeded in describing a wide meaty of physical phenomena can care (E.M.W) an the atomic scale. However there are some setbacks associated with quantum electrodynamics one

of these problems is quantization of electron charge and electron self energy [7, 8, 9].

## **2\ Research problems:**

Although Higgs mechanism and electrodynamics are responsible for appearance of mass and charge terms in the lagrangian, but still unable to explain some of mass and charge phenomena. For example it cannot explain why the masses and charges of elementary particles assume their present values. The masses and charges themselves are not quantized. Moreover Higgs model is mathematically complex. Higgs mechanism does not also provides the mass to some particles like neutrino. The gravity force is not also incorporated in the standard model<sup>[4,5]</sup>.

## **3\ Literature review:**

Different attempts were made to go beyond Higgs model. In some of them the masses of elementary particles and their generation is explained by using simple mathematics<sup>[6]</sup>. In other attempts the masses are subjected to quantization and unification with gravity force<sup>[7]</sup>.

## **4\ Aim of the work:**

The aim of the work is to construct simple model which can unify gravity and ESM. This model should link mass generation with gravity and charge generation with electromagnetic field. This model should be based on generalized lagrangian [GL] and Einstein generalized special relativity [EGSR].

## **5\ Theises layout.**

The Theises consists of -4 chapters. Chapter -1 is the introduction , while chapter -2 is concerned with theoretical background the lit revising chapter 3 and chapter 4 is devoted for contribution .

## 6\ References

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