

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالى:

{وَعِنْدَهُ مَفَاتِحُ الْغَيْبِ لَا يَعْلَمُهَا إِلَّا هُوَ ۗ وَيَعْلَمُ مَا فِي الْبُرِّ
وَالْبَحْرِ ۗ وَمَا تَسْقُطُ مِنْ وَرَقَةٍ إِلَّا يَعْلَمُهَا وَلَا حَبَّةٍ فِي ظُلُمَاتِ الْأَرْضِ
وَلَا رَطْبٍ وَلَا يَابِسٍ إِلَّا فِي كِتَابٍ مُبِينٍ }

صدق الله العظيم
[سورة الأنعام الآية 59]

Dedication

To

Dearest people in my life.....

I dedicate this work

Acknowledgments

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LIST OF CONTENTS

Title	Page
الآية.....	II
Dedication.....	III
Acknowledgments.....	IV
List of Contents.....	VI
List of tables.....	VI
List of figures.....	VII
Abstract.....	VIII
Arabic abstract.....	IX
CHAPTER ONE	
INTRODUCTION	
1.1.General introduction.....	1
1.2. Particle accelerator and high energy physics.....	1
1.3. Important of the study.....	2
1.4. Objectives.....	2
1.5. Outlines.....	2
CHAPTER TWO	
STANDARD MODEL AND BEYOND	
2.1. Introduction.....	3
2.2. What is the standard model(SM).....	3
2.3 Symmetries and particles content in SM.....	6
2.4. The Higgs mechanism.....	7
2.5. The lagrangian of the SM	8
2.6. Gauge Fixing & Ghosts.....	9
2.7. Problems with the Standard Model	10
2.7.1. Dark Matter	10
2.7.2. Gauge Hierarchy problem	10
2.7.3. Gravity is not included	11
2.7.4. Gauge group	11
2.8. Beyond the Standard Model.....	11
2.8.1. Super symmetry (SUSY).....	11

2.8.2. Universal Extra Dimensions (UED).....	12
2.8.2.1. Scalar particle in UED.....	12
2.8.2.2. Gauge fields and Gauge fixing.....	13
2.8.2.3. Fermion particle in UED.....	14
CHAPTER THREE Renormalization Group Equations	15
3.1. Introduction.....	15
3.2. Renormalization Group	15
3.2.1. What is renormalization?.....	15
3.3. Calculation of Beta Function for the gauge couplings constant in the SM.....	16
3.4. Calculation of coefficient b_G in the Standard Model (SM).....	24
3.5. The CKM Matrix.....	25
3.6. One-loop Yukawa couplings.....	26
3.7. Calculation of the Yukawa couplings factor in the Landau gauge.....	26
CHAPTER FOUR Numerical Result and discussion	34
4.1. Introduction	34
4.2. The numerical result for gauge coupling evolution in 4D and 5D Standard Model.....	34
4.3. The numerical result for Yukawa coupling evolution in 4D and 5D Standard Model.....	38
4.4. Conclusion.....	44
4.5. Recommendations.....	44
Bibliography.....	45

LIST OF TABLES

Title	Page
Table 2.1 shows characteristics of Quarks in The Standard Model.....	4
Table 2.2 shows particle interactions.....	5
Table 2.3 shows possible Quarks and Lepton interaction with all the forces.....	5
Table 4.1 shows the initial values at M_z scale used in our numerical calculations.....	35

LIST OF FIGURES

Title	Page
Figure 2.1: shows The Higgs potential $V(\Phi)$	8
Figure 3.1: shows Feynman diagrams for gauge couplings contribution in SM.....	17
Figure 3.2: show the Yukawa coupling in the Landau gauge.....	27
Figure 4.1: shows relation between the gauge coupling constants behavior and energy scale in 4D Standard Model.....	36
Figure 4.2: shows the evolution of the gauge coupling constants as function of energy scale in 5D Standard Model.....	37
Figure 4.3: shows the evolution of the down quark Yukawa coupling as function in energy Scale in 5D SM for three different values of the compactification scales R.....	38
Figure 4.5: show the evolution of bottom quark Yukawa coupling as function of energy scale in 5D SM for three different values of the compactification scales R.....	39
Figure 4.6: show the evolution of electron Yukawa coupling as function of energy scale in 5D SM for three different values of the compactification scales R.....	40
Figure 4.7: show the evolution of muon Yukawa coupling as function of energy scale in 5D SM for three different values of the compactification scales R.....	40
Figure 4.8: show the evolution of tau Yukawa coupling as function of energy scale in 5D SM for three different values of the compactification scales R.....	41
Figure 4.9: show the evolution of up quark Yukawa coupling as function of energy scale in 5D SM for three different values of the compactification scales R.....	42
Figure 4.10: show the evolution of charm quark Yukawa coupling as function of energy scale in 5D SM for three different values of the compactification scales R.....	42
Figure 4.11: show the evolution of top quark Yukawa coupling as function of energy scale in 5D SM for three different values of the compactification scales R.....	43

Abstract

It is an intriguing possibility that our universe may consist of more than three spatial dimensions, compactified on such a small scale that they are so far have not seen (escaped detection). This compactification will lead to a tower of new particle states in the effective four dimensional theories. In this thesis, a particular realization of this idea the scenario of so-called universal extra dimensions (UED) is studied in some detail, with a focus on exploring the particle at high energy scales (the evolution of Yukawa couplings). We derived the renormalization group equations for the gauge and Yukawa couplings at one-loop level. It is found that the evolution of the gauge couplings has a rapid variation in the presence of the KK modes and this leads to a much lower unification scale than the SM. The running of Yukawa couplings for the three families has a sizable variation in five dimensional models. We quantitatively discussed these quantities for $R^{-1} = 1 \text{ TeV}, 5 \text{ TeV}$ and 13 TeV observing similar behaviors for all values of the compactification radius below these scale their trajectory run in the usual SM logarithmic fashion.

ملخص البحث

احتماليه وجود أبعاد مكانية زائده للكون بدلاً عن ثلاثه ابعاد أذهلت العلماء. تنبأت نظرية الأبعاد الزائدة بأنه إذا ما وجدت أبعاد مكانية زيادة علي الثلاثة أبعاد المعروفة فإن هذا كفيل باستكشاف جسيمات جديدة عند طاقات عالية. في هذا البحث تم إلقاء الضوء علي دراسة نشأة ثابت يوكاوا للكواركات في نظرية الأبعاد الزائده (نظرية النموذج القياسي للجسيمات الاولية في خمسة أبعاد). تم حساب ثابت يوكاوا للكوارك من الرتبة الاولي باستخدام معادلات المجموعات المعاييره في نظريه الابعاد الزائده ودُرست تأثيرات هذه النظرية علي ثابت يوكاوا للكواركات عند طاقات مختلفة (1 تيرا إلكترون فولت ، 5 تيرا إلكترون فولت و13 تيرا إلكترون فولت) .