## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td></td>
</tr>
</tbody>
</table>

## CHAPTER-1

### INTRODUCTION

1.1 Introduction and Motivation  
1.2 Scalar fields and energy conditions  
1.3 Non-minimal classical solutions  
1.4 Non-minimal scalars and traversable wormholes.

## CHAPTER-II

### TRAVERSABLE WORMHOLES WITH ARBITRARILY SMALL ENERGY CONDITION VIOLATIONS

2.1 Introduction  
2.2 Constructing the wormhole  
2.3 Specialization 1: Spatial Schwarzschild  
2.4 Specialization 2: Piecewise $R = 0$ wormhole  
2.5 Concluding Remarks.
CHAPTER-III
BLACK HOLES IN THE PRESENCE OF DILATONS AND ELECTROMAGNETIC FIELDS

3.1 Introduction
3.2 Black Holes with Orthogonal extra-space Metric
3.3 The Effect of Massless Scalar Fields:
3.4 The Effect of Electromagnetic Fields
3.5 The Bosonic sector of the Heterotic String
3.6 Concluding Remarks.

CHAPTER-IV
ENERGY CONDITIONS OF GENERAL RELATIVITY

4.1 Introduction
4.2 The Energy Conditions
4.3 The Energy Conditions and Density Bounds
4.4 Look-back time as a function of Redshifts
4.5 Concluding Remarks.