THE RELATIVISTIC QUANTUM MECHANICS OF
THE ELEMENTARY PARTICLES

By

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A Thesis Submitted in Accordance With
The Requirements of the Degree of
DOCTOR OF PHILOSOPHY

The University of Adelaide, South Australia,
Australia.

October - 1957.
Preface

The thesis contains the results of the researches carried out under a Research Fellowship in 1956 and 1957 in the Department of Mathematical Physics, University of Adelaide, South Australia. The work was supervised by Professor H. S. Green.

The following work is divided into three chapters. Chapter I deals with the covariant investigations of the relativistic two-nucleon equation of Bethe and Salpeter. A number of properties unfamiliar in the current non-covariant quantum mechanics have been disclosed. A detailed study of the two-nucleon problem in the instantaneous interaction approximation has been made; experimental data have been analysed with the help of the instantaneous interaction potential predicted by our theory.

In Chapter II an attempt has been made to describe the heavy-meson as composite-particles and accordingly it is suggested that heavy-mesons are excited states of two pions. Some of the observed phenomena have been explained.

Chapter III is a continuation of Chapter II. In it we have restricted ourselves in finding the distributions of the heavy mesons and hyperons in the longitudinal development of the extensive cosmic-ray air-shower. Appropriate cascade theory is developed and numerical results have been compared with the
available experimental findings.

The author is grateful to Professor H. S. Green for suggestions, stimulating discussions and unflagging encouragement throughout the progress of the work.
TABLE OF CONTENTS

CHAPTER I

Solutions of the Bethe-Salpeter Two-Nucleon Equation.

1. Introduction. ........................................... 1.1
2. Summary of the Works of the Previous Authors. ............. 1.15
3. Summary of the Present Work on B-S Equation. ............... 1.16
4. Reduction of the B-S Equation for Matrix Solutions. ....... 1.21
5. A General Method of Solution. ................................ 1.24
6. The Eigenvalue Problem of Bound States. .................... 1.36
7. Scattering and Effective Core Potential. .................... 1.40
8. States of Higher Angular Momentum. ......................... 1.42
9. Radially Symmetric Solutions of the B-S Equation. ........... 1.46
10. Solutions of the B-S Equation. ............................ 1.48
11. Solutions in Momentum Space. ................................ 1.54
12. A Note on Heun’s Differential Equation. .................... 1.56
13. Boundary Conditions and Eigenvalue Problem. .............. 1.59
15. Numerical Results and Discussion. ........................... 1.91
16. Conclusion. ............................................. 1.100
17. Additional Remarks. ..................................... 1.103

References. ................................................... 1.105
CONTENTS

CHAPTER II

"Composite" - Model for K-Mesons.

1. Introduction
2. Present State of Knowledge of Strange Particles.
3. Associated Production and Strangeness Number.
5. Theory of Pais and Others.
7. Theory and Results of the Present Work.
8. Feynman Amplitude for Two-Boson System.
11. Classification of the Particles.
12. The Rate of Decay of K-Mesons.

References.

CHAPTER III

Distribution of K-Mesons Produced in High Energy Nuclear Interaction.

1. Introduction and Theory of the Present Work.
2. Production of K-Meson in Meson-Nucleon Collision.
**CONTENTS**

Chap. III.

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Mixed Nucleon-Pion-Hyperon-K-Meson Cascades in the Nucleus.</td>
<td>3.20</td>
</tr>
<tr>
<td>4. Longitudinal Development of Air-Shower.</td>
<td>3.25</td>
</tr>
<tr>
<td>5. Numerical Results and Discussion.</td>
<td>3.32</td>
</tr>
<tr>
<td>References</td>
<td>3.40</td>
</tr>
</tbody>
</table>