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التوثيق الالكتروني والميكروفيلم

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Zagazig University
Benha Branch
Faculty of Science
Physics Department

MESONS SPECTROSCOPY INTERMS OF QUARK MODEL

A THESIS
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BY

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بسم الله الرحمن الرحيم

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الذي خلق فسوى والذي قدر فهدى

صدق الله العظيم

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ABSTRACT

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This thesis deals with the study of the nature of the interacting potential between the quark and the antiquark inside the quarkonium systems.

In this work a new simple phenomenological potential form is suggested to describe the interactions inside these meson systems. Also some previous potential models such as; Lichtenberge, Power law and Screening potential forms are modified by taking the spin-dependence terms under consideration. These potential forms are used to calculate the resonance masses and the leptonic decay widths of different quarkonium systems. The meson systems which are considered in this study are $c\bar{c}$, $b\bar{b}$, $c\bar{s}$, $b\bar{s}$, $b\bar{u}$, $c\bar{b}$.

The experimental data are used to adjust the potential parameters and quark masses through the χ^2- test. A comparison between the theoretical calculations of the considered potential forms and the available experimental results are given.

From this study, one can conclude that, the results of our potential form give a satisfied agreement with the experimental data in all considered meson systems.

This thesis consists of three chapters; in chapter one an introduction a bout the quark model and an review of some previous works are given, in chapter two the nonrelativistic wave equation using our proposed potential form is solved to calculate the resonance masses and the leptonic decay widths of these systems. Finally, discussions of the obtained results are given in chapter three.

CHAPTER I

INTRODUCTION