

شبكة المعلومات الجامعية







شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

## جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها على هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

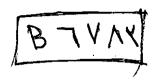
تحفظ هذه الأفلام بعيدا عن الغبار في درجة حرارة من ١٥-٥٠ مئوية ورطوبة نسبية من ٢٠-٠٠% To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%



## بعض الوثائـــق الإصليــة تالفــة



# بالرسالة صفحات لم ترد بالإصل





## Interaction of an Atom (or More) with a Finite Number of Energy Levels with Light

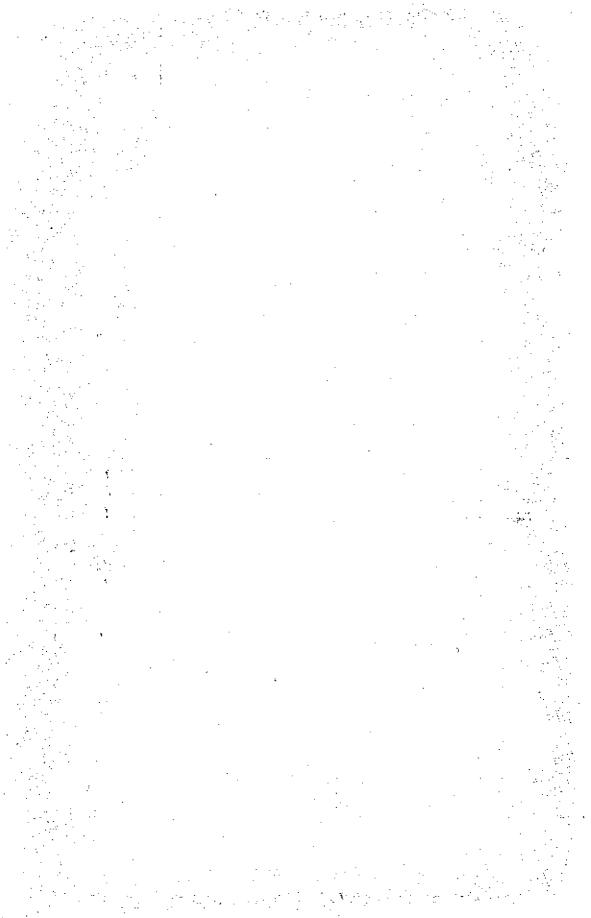
### A THESIS

Submitted to the Faculty of Science (Sohag) South Valley University

Submitted to Fulfill the Requirements of the Degree of Doctor of Philosophy (Quantum Mechanics)

By Mahmoud Mohamed Ahmed Abdel-Aty

1420-1999





South valley university Faculty of science (Sohag)

#### Approval Sheet

Name: Mahmoud Mohamed Ahmed Abdel-Aty

Title: Interaction between an Atom (or More) with a Finite Number of

Energy Levels with Light

Degree: Ph. D.

#### Supervisors:

1- Prof. Dr. Abdel-Shafy F. Obada

2- Prof. Dr. Ahmed M. Abdel-Hafez

3- Dr. Abdel-Rahman H. Essawy

4-Dr. Mohamed Refat Abdel-Salam

Al-Azhar University, Cairo El-Minia University, El-Minia

El-Minia University, El-Minia South Valley University, Sohag

#### Examiner:

I-Prof. Dr. Afaf Ahmed Sabry

2- Prof. Dr. Hamed A. El-Khabery

3- Prof. Dr. Abdel-Shafy F. Obada

4- Prof. Dr. Ahmed M. Abdel-Hafez

Ain Shams University, Cairo Assiut University, Assiut Al-Azhar University, Cairo El-Minia University, El-Minia

Faculty Board of Graduate Studies

Prof. M. Mustafa Vice - Dea: For Graduate Studies and Researches



## ACKNOWLEDGEMENTS

e to bring ceptional rk intovn . Abdel-

of sub cal

 $\mathcal{N}^{(n)}$ 

-9*il*f,

ect i

yla C. -Takta:

Less real, M.

an of the case also (Sohag)

E don

\* Bulance

legrence. Le their

afe who strong

ave been

#### ACKNOWLEDGMENTS

All praise is due to Allah Almighly who guided and aided me to bring forth this thesis. My advisor Prof. A.-S. F. Obada, has been exceptional in the encouragement he has provided in helping to get my work known internationally. The help, support and advice of Prof. A. M. Abdel-Hafez, are indeed acknowledged and appreciated. Thanks are also due to Prof. A. H. Essawy, and Dr. M. R. Abdel-Salam.

The collaboration with Prof. Peter Lambropoulos Head of the Theory Group at Max-Plank-Institut für Quantenoptik, Garching, Germany, has been a pleasant and very inspiring experience, personally and professionally. Also, I would like to thank R. Weise-McKnight. I found the atmosphere in the Theory Group at the Max-Plank-Institut continuously kept me in a state of great enthusiasm for doing good research. Furthermore, I would like to express my great thanks to Prof. G. S. Agarwal, Prof. A. Buchleitner, P. Schlagheck, A. Krug, W. T. Younes, N. Metwaly, and T. Wellens for their kind help.

I would like to express my great thanks to Prof. A. Kamal, Dean of the Faculty of Science, (Sohag) for his kind encouragement. Thanks are also due to Prof. H. El-Ghashab XDean of the Faculty of Science, (Sohag) for his kind encouragement. The help, support and advice of Prof. Z. M. G. Kishka Head of the Mathematics Department, Faculty of Science at Sohag are indeed acknowledged and appreciated. Thanks also to all members of the Department of Mathematics, Sohag Faculty of Science. Also I am grateful to my parents, my brothers and my sisters for their patience and help.

Finally, I would like to express my sincere gratitude to my wife who has had to endure the long periods of separation when I was in Germany. Had it not been for her encouragement, none of the work would have been possible.



# ABSTRAC

#### South

atment fora.

··..

head med med variand varipased on

abovefarther photon ed with faman

roated larities fiens of spatiotrongth ra onesed.

two-