Acknowledgement

First and foremost, I express my deep sense of gratitude to God who gave me patience, power to believe in myself and strength to complete this work. This thesis would not have been possible without the inspiration and support of a number of wonderful individuals – my thanks and appreciation to all of them for being part of this journey and making the completion of this thesis possible.

I take this opportunity to express my sincere thanks to my supervisor Prof. Tauheed Ahmad, for his excellent guidance, constant encouragement, patience and care during the entire Ph.D. work. Without his unconditional help, support and timely guidance this thesis would not have been completed. It is my honor and privilege to work under the guidance of such auspicious supervisor who made sure I work hard, give my best and complete my work.

I am deeply indebted to Prof. Mohd. Afzal Anasari, Chairperson, Department of Physics, Aligarh Muslim University, Aligarh for providing me the support and research facilities in the department and general guidance.

I would also like to thank all my teachers Prof. Rahimullah Khan, Prof. Shabbir Ahmad, Dr. S. M. Afzal and Dr. S. Jabeen in Spectroscopy group of Physics Department, AMU. My sincere thanks to my lab colleagues Dr. Anjum Naz, Dr. Haris Kunari, Dr. Hala, Miss Ankita Saxena and Mr. Aadil Rashid who provided me great help and constant inspiration during the completion of this work.

Further, I extend my thanks to the collaborators, Prof. A. N. Ryabtsev, Institute of Spectroscopy, Moscow who provided me the useful data on this work. I gratefully acknowledge the funding agencies, the University Grant Commission (UGC) of the Government of India and Inter University of Accelerator Centre, New Delhi, for providing financial support. I would like to conclude by expressing my sincere gratitude to all other teachers and non teaching staff of the department of physics, A.M.U. Aligarh for their affection, support and encouragement.

Finally, special and profound thanks to my mother Mrs. Ratan Kumari, my sister Dr. Jyoti Varshney and my brother Mr. Devesh Kumar who always backed me up. Their moral support and encouragement cannot be expressed in words. I am thankful to all those who remembered and wished me on every success, without their blessings, it would have been impossible for me to pursue this work.

Swapnil