Acknowledgements

Acknowledgements are due, first and foremost to my thesis supervisor Dr. Himadri Sekhar Das for bringing me to this amazing field and continuous endless support throughout my research work. I am especially grateful to him for his thorough reading of the entire work and many insightful and constructive suggestions, advice, co-operation and help without which this work would have not been possible. His contributions will always remain fixed in my mind.

My gratitude is deepest to my family members for nurturing my educational development and constant reinforcement. I sincerely record them for their inspiration and support throughout the course of time.

I offer my sincere gratitude to the Honourable Vice Chancellor Prof. Somnath Dasgupta for giving me a peaceful atmosphere to carry out my research work.

I am deeply indebted to Prof. Ramendu Bhattacharjee, Head, Department of Physics, Assam University, Silchar; Prof. Ashoke Kumar Sen, former Head, Department of Physics, Assam University, Silchar; Dr. Atri Deshmukhiya, Reader; Dr. B. Indrajit Sharma, Reader and other faculty of this department for their encouragement and valuable suggestions throughout the course of this work.

I am also thankful to Prof. Devojyoti Biswas, Dean, School of Physical Sciences and Dr. Siddhartha Sankar Nath, Reader; Department of CIL, Assam
University for their kind co-operation.

My thanks go to those who faithfully attended my seminars at the Department of Physics, Assam University, during the course of work. I would be remiss if I did not acknowledge them for their constructive comments.

It is a pleasure to acknowledge Dr. Joydeep Choudury; Mr. Subrata Bhattacharjee; Mr. Sibhasish Bhattacharjee; Mr. Koushik Das; Mr. Pradip Sinha and other non-teaching staff of the Physics Department, Assam University for their cordial co-operation during the course of work.

My research has benefited immeasurably from interactions with Dr. Sujit Ranjan Das; Mr. Dipankar Paul; Mr. Chinmoy Battacharjee; Mrs. Tapashree Paul; Miss Saonli Dutta Majumder; Mr. Arindwam Chakraborty; Mr. Parizath Deb Roy, Ajay Barman and other bright scholars like Dr. Ratan Das; Mr. Suhas Chandra Das; Dept. of Physics, Assam University. I record them for their co-workshop.

I am profusely thankful to Mr. Prosun Kanti Deb, for his valuable moral support.

I am very much happy to acknowledge the help and support of Dr. Maumita Nath(Das) and Dr. Goutam Gope, CIL and all my friends and post graduate students of Physics, Assam University in the process of the work.

Others who deserve a word of thanks are my neighborhoods.

I acknowledge T. Mukai & Y. Okada for help on the execution of BPCA &
BCCA codes. I also thank D. W. Mackowski & M. Mishchenko for their T-matrix code for cluster of spheres.

I am highly indebted to Assam University, Silchar, for allowing me to carry out this research work.

Last, but not least, I am obliged to all of my teachers.

Finally, I particularly thank to the production staff of Abhishek Printers, Silchar for printing and binding of the thesis.

Place: Assam University, Silchar (Abinash Suklabaidya)

Date: Ph.D. Scholar

Department of Physics

Assam University, Silchar

India, 788011