Acknowledgements

This thesis arose in part out of years of research that has been done, since I came to Dr. Gill’s group. By that time, I have worked with a great number of people whose contribution in assorted ways to the research and the making of the thesis deserved special mention. It is a pleasure to convey my gratitude to them all in my humble acknowledgement.

Firstly, I would like to express my sincere thanks and respect to my promotor, Prof. Tarsem Singh Gill for accepting me as a Ph.D. student and guiding me during the time I worked in my Ph.D. project, which fulfilled my dream to approach the field of plasma physics. I have learnt much from his suggestions, discussions with him and from his personality. Above all and the most needed, he provided me unflinching encouragement and support in various ways. His truly scientist intuition has made him as a constant oasis of ideas and passions in science, which exceptionally inspire and enrich my growth as a student, a researcher and a scientist want to be. I am indebted to him more than he knows.

I also owe my sincere gratitude and warm thanks to my Co-promotor, Dr. N. S. Saini for his supportive co-operation throughout the work. The opportunity to work with him was a great honour and challenge for me. The thesis became distinctly easier to finish with his friendly helpfulness and confidence in my ability to carry this project through.

Thanks are due to Dr. Lakhwant Singh, Prof. & Head, Dept. of Physics, G.N.D.U. Amritsar for providing the necessary facilities to carry out this research work. Special thanks go to teaching and non-teaching staff members of Dept. of Physics, G.N.D.U. Amritsar for helping me in completing this research work in every possible way.

I also owe my sincere thanks to the Abdus Salam International Centre for Theoretical Physics, Trieste Italy for providing the facility during my visit to attend plasma activities, which was very helpful to carry out this research work at different stages. I especially want to thanks Dr. L. Stenflo, Dr. I. Kourakis and Dr. A. A. Mamun for their guidance. They taught me how widely and how interestingly the plasma physics is related to other domains. I was surprised at their manifold knowledge, which affects me to love plasma physics much more than before.

Special thanks go to Dr. R.C. Singh, Dept. of Physics, G.N.D.U. Amritsar; Dr. J. S. Randhawa, Principal, Lyallpur Khalsa College, Jalandhar; Prof. B. S. Chahal, Head, Dept. of Physics, Lyallpur Khalsa College, Jalandhar; Dr. Harvinder Kaur, Head, Dept. of Physics, Khalsa College, Amritsar and Dr. Arvinder Singh, Dept. of Physics, N.I.T. Jalandhar for motivating me in every possible way.

I would also acknowledge Dr. Parveen Bala, P.A.U. Ludhiana; Dr. Munish Aggarwal, Dr. Aman Bains, Ranju and Ravinder for their advice and their willingness to share their bright thoughts with me, which are very fruitful for shaping up my ideas.
and research.

I also owe my thanks to my friends, Ammy, Rummy, Shweta, Vibha, Megha, Jagdeep and Harkirat for their moral encouragement and help, whenever I approached them.

My deep thanks are devoted to my parents for their love, belief in my success and continuous encouragement. Many thanks are due to Prince, Mohnish, Prianka and Sisters and their families for their love and always being there for me when I need. Special thanks are addressed to my parents in-law and family for profound understanding, support and help in managing the family matters when I was away for a long time.

I am deeply grateful to my Partner Er. Naveen Khullar for his endless love and encouragement throughout this entire journey. Without whom I would have struggled to find the inspiration and motivation needed to complete the thesis.

Finally, my greatest regards to the Almighty for bestowing upon me the courage to face the complexities of life and complete this project successfully.

Underneath the undeniably happy occasion of completing my Ph.D. is a deep sadness that my father, did not live to see me become Dr. chanchal Bedi. I know how much he would have loved seeing this day come, and it is to him that I dedicate this work.

Chanchal Bedi