ACKNOWLEDGEMENTS

The work reported in this thesis is a result of help, support, and encouragement provided by a number of colleagues and friends. It is my pleasure to acknowledge them here.

I am particularly indebted to Dr. P. A. Naik for his valuable guidance, constant support and encouragement during the entire course of the Ph. D. work. His way of teaching always encouraged me to think over new ideas and made this entire journey of Ph. D. research and development work a memorable learning experience.

My deep regards and gratitude are due to Shri P. R. Hannurkar (Tech. Adviser) for his ever-helping nature, keen interest, deep involvement, and utmost care throughout my research work. He motivated me to work hard and keep patience under difficult circumstances. He carefully and patiently nurtured this research work to reach the present level. He helped me to solve all kinds of practical problems in the ECR Ion Source development, sharing knowledge and making me comfortable in handling of the required scientific instrumentations. This research and development work would not have been possible without his support and encouragement.

I am extremely thankful to Dr. P. D. Gupta (Chairman, Doctoral Committee) and Director, RRCAT for his keen interest in my research work. His valuable instructions during the yearly reviews inspired me in my work.

I express my sincere thanks to Shri S. C. Joshi, Head, Proton Linac & Superconducting Cavities Division, RRCAT, Indore for constant support, guidance, valuable suggestions and timely feedback about the manuscripts for communicating to journals.

My sincere thanks to Dr. V. S. Pandit, Head, Accelerator Physics Division, Variable Energy Cyclotron Centre, and Dr. V. K. Senecha, Head, Ion Source Laboratory, RRCAT, for their valuable comments, and scientific discussions, which helped in improving the quality of
my work. Their persistent encouragement, perpetual motivation, and valuable technical inputs have immensely benefited me.

I wish to thank whole-heartedly my colleagues Mr. Akhilesh Jain and Mr. Deepak Sharma for their unconditional support and cooperation during the microwave components simulations.

I would like to give special thanks to Dr. Suman Bagchi, Mr. Vipul Arora, Mr. Mohammad Tayyab, Miss Ranjana Rathore, Dr. D. V. Ghodke, Mr. R. M. Vadjikar, and Mr. Rajnish Kumar for providing me their valuable support, guidance and encouragement at different stages of my research work.

I wish to thank all other members of Proton Linac & Superconducting Cavities Division and Radio Frequency Systems Division for their kind support. I would like to thank the staff of Accelerator Workshop who always completed my mechanical jobs in time.

I would like to express my special gratitude to my parents (Shri K. C. Jain / Smt. Nirmala Jain) for keeping my spirits high. I also humbly dedicate this Ph. D. thesis to them.

I am thankful to my wife Anita and sons Akshay and Aditya for their support and sacrifice of family time they have done during this Ph. D. work. I thank to my brothers, sisters, brothers/sisters-in-law and my nephews/nieces (Pradeep, Madhu, Monika, Aproova, Anil, Asha, Ashita, and Anshul) for their constant help, co-operation, and for providing a cheerful atmosphere at home.

Last but not the least, I would like to thank the Almighty, without whose blessings I would not have completed my Ph. D. work.

(Sunil Kumar Jain)