ACKNOWLEDGEMENTS

The work of this thesis has been carried out under the kind supervision of Professor J.N. Desai. It was a great privilege for me to work under his guidance. I was greatly benefited from his keen insight and critical assessment of the current views. His unflinching ability for taking the "On the spot" decision during the field experiments made this work easy. I enjoyed my studentship for his imaginative approach to science, inspiring guidance coupled with his kind attitude and the freedom of work and thought. Indeed it is a great experience to work under him. No word is sufficient to express my gratitude to him. I treasure these experiences.

I am fortunate to have the fruitful association of my senior colleague Dr.T.Chandrasekhar. I was greatly benefited by his unfailing inspiration, his friendly attention and the quality of his labour. To me, he is a gracious friend with good counsel. His ever willingness for discussing any topic earthly or heavenly made my work attractive. I am immensely grateful to him for the unrecountable help that I have received on many occasions.

I am profoundly grateful to Professor D.Lal, FRS and Prof. S.P.Pandya for their ardent interest and encouragements during my Ph.D tenure. I am thankful to our Director Prof.R.K.Varma for his constant encouragement throughout my study.

My sincere gratitude to Prof.P.V.Kulkarni, the Chairman
of our group, for his constant encouragement and valuable critical assessment of my work. His timely help on many occasions were extremely useful.

I am highly indebted to Prof. Klaus Jockers of Max-Planck-Institute für Aeronomie, FRG for providing me the current information on cometary science. His critical comments and encouragements on my work at several occasions were indeed helpful. I specially thank him for providing the few illustrations used in this thesis (prior to the publication). I am also grateful to Prof. Micneal A' Hearn of University of Maryland U.S.A. for his kind encouragement. Prof. A'Hearn has kindly provided some of the unpublished wide field Comet photographs and IHW CN filter at short notice. The help rendered by Prof. David Rees, for identifying the filed stars in our 13 March 1986 comet frame, is gratefully acknowledged. I acknowledge Dr. F. Sabbadin of Asiago Observatory, Italy for providing me a beautiful spectra of Comet Halley. I also thank Prof. T. Gehrels of University of Arizona, U.S.A. for some interesting and useful discussions.

I appreciate greatly Prof. J.C. Bhattacharyya, Director, Indian Institute of Astrophysics, Bangalore for being enthusiastic about our efforts, to take observations on Comet Halley at Kavalur 1 meter telescope. I wish to thank him for his generous allocations of telescope time. My sincere thanks to Prof. K.R. Sivaraman, for his kind help during our observations at Kavalur. My special thanks to Dr. Ram Sagar and Mr. Jayarajan of IIA, Bangalore who helped me during the digitization of the Comet imageries.
Mr. Jayarajan's enthusiastic willingness for working till late night made it possible to digitize a large number of Comet photographs within a short time. It is a pleasure to thank my friend Mr. Partha Dharandhar of IIA, and my senior colleague Dr. Harish Bhatt whose company I enjoyed during my stay at Bangalore.

I wish to express my sincere gratitude to Dr. T. Velusamy for his warm hospitality and kind support during the image processing work at the National Imaging Processing facility, Coimbatore. I also thank Dr. A. Patnayak and Miss P. Latha for their help during my stay at Ooty.

I must express my heartily thanks to Dr. N. M. Ashok, Dr. B. G. Anandarao and Dr. U. C. Joshi for their extremely helpful nature. Various kinds of help that I received from them on numerous occasions are valuable. Special mention must be made for the help and enjoyable company provided by Dr. N. M. Ashok during the observational period of this work and useful suggestions during the data analysis, without fail. I also greatly enjoyed the company of Dr. P. D. Angreji during and after the observation of Comet Halley. I am very grateful to Prof. M. R. Deshpande for constant encouragement. Dr. D. B. Vaidya's help during observations at Kavalur and digitization work at IIA, Bangalore is gratefully acknowledged.

I would like to express my gratitude to Prof. A. C. Das and Dr. N. N. Rao. I had useful discussion on several aspects of plasma physics, which helped me in understanding the cometary
plasma processes. The useful discussions with Prof. B. Buti on the acceleration mechanism of cometary ions is gratefully acknowledged. My special thanks to Dr. J. N. Goswami for encouragement and useful suggestions and for giving me his personal copy of the "Comet" book edited by Wilkening. I thank Prof. Krishnaswami for kindly providing me the useful papers on the formation of ocean. My grateful thanks to Prof. B. H. Subbaraya for providing the spectrometer to calibrate the IHW filters. I thank Dr. R. Sridharan for many discussions regarding the airglow 6300 Å emission lines. Dr. P. N. Shukla has kindly provided the latest literatures on "mass extinction", which is duly acknowledged. My sincere thanks to Dr. Kailash Sahu of European Southern Observatory, La Silla, for his help during my initial days at PRL. I was greatly benefitted by his brotherly guidance and scholarly discussions. The leisurely discussions with Mrs. Meenakshi Sanu was extremely informative and educative which are duly acknowledged.

I wish to express my sincere thanks to my friend late Anjani Kulshrestha. On enumerable occasions we had discussions on topics covering every aspect of the nature. His philosophical attitude towards the creation, urge for getting a meaning to everything made this mortal world uninterestly for him. He decided to quit this place in search of a better one! I admire you my friend, I hope you found one!

It is my pleasant duty to record my thanks to my colleagues of our group, namely Asoke Sen, Rekha, Raju, Seema and
Banerjee. The help rendered by them, whenever it was needed, is acknowledged. I had fruitful discussions with Dr. Ranjan Gupta of Indian Institute of Geomagnetism, Bombay for which I am grateful to him. The modern cartoon of Comet given at the end of this thesis was drawn by my artist friend Shishir Deshpande of Institute for Plasma Research, Ahmedabad. I thank him for this.

I am immensely grateful to Dr. K.P. Subramanian for painstaking job of going through the manuscript of some sections of this thesis and making many constructive suggestions. During my last five year’s association he has been always very affectionate towards me.

The engineering help by Mr. N.S. Jog with the able assistance of Messrs. F.M. Pathan, P.K. Kihani and R.T. Patel made it possible to construct the instrumentation in a short time. It is a pleasure to acknowledge their help. I am extremely grateful to Mr. H.I. Pandya for his unhesitant and efficient assistance in computational work during the data analysis. I also thank Mrs. S.K. Jani for her help through the course of the present work. I am grateful to Mr. K.S.B. Manian for his enthusiastic help during several critical occasions. I am also very thankful to other group members namely Messrs. R.K. Mahadkar, N.C. Shah, Mrs. Mary Thomas and Mr. R.M. Parmar who have helped me in various ways.

It is a pleasure to acknowledge the help received from the personnel at our workshop, particularly Messrs. P.S. Panchal,
Atmanam Panchal and Jadhavbhai Panchal. Their efficient workmanship made it possible to construct the instruments within a short time, which was critical for Comet Halley observations.

I owe my sincere thanks to all my batchmates namely, Vinod, Sunil, Bhaskaran and Ashok Sharma. I enjoyed their company during all these years in particular the useful discussions with Vinod. I am very much indebted to my friends at hostel namely, Krishnakumar, Sarkar, Bhusan, Anjan, Pandey, Sushanta, Subrat, Mathew, Guru, Krishnan, Vijaya Kumar, Janardhan, Abhijit Ganguli, Gufran, Maqbool, Manoharlal, Supriya, Durga, Swataketu who made the life joyful. Post dinner discussions with Sarkar which invariably ended with no conclusion, are really memorable. Krishnakumar's nice company and unhesitant help of any kind at any time needs special mention. My special thanks to Navin Jual for providing me a homely atmosphere. I am also thankful to my senior friends Amrendra, Vijayashankar, Nikam and Ajayakumar. I would specially thank Sushanta, Raju, Guru and Manoharlal for helping me during the preparation of this thesis.

I am extremely grateful to Mrs.R.Bharucha, Mrs.Ghia and other members of the library staff for their ready help and co-operation throughout the work. Special thanks to Mrs.Kohilaben for xeroxing the many diagrams and papers at a very short notice.

Mr.A.M.Kolge's help during the observation at Mt.Abu
is gratefully acknowledged.

Dr.A.Bhatnagar provided the special Kodak film 2415 for the present work. I sincerely acknowledge for his kind help.

The help received from documentation section of the laboratory is gratefully acknowledged. I offer a special word of thanks to Mr.D.R.Ranpura for making the illustrations of this thesis and also for his help during the observations.

I gratefully appreciate Mrs.Mira Karanjgaohar for carefully and diligently typing the thesis. I also thank Mr.V.C.Mathew for active help rendered during the typing work.

Finally I am extremely grateful to my parents for providing me the constant encouragement throughout my career and in particular my father’s keen interest in my present work.
SPECTROSCOPIC STUDY OF COMETS
WITH SPECIAL REFERENCE TO HALLEY'S COMET