



## Acknowledgements

My Dream : *"My research should always be useful and serve good purposes for all humankind".*

I would like to thank all the persons who have contributed in their own way in my doctoral study.

I especially want to thank my advisor, **Dr. M. B. Sureshkumar**, for his guidance during my research and study at The M. S. University of Baroda. His perpetual energy and enthusiasm in research had motivated me. In addition, he was always accessible and willing to help me. As a result, research life became smooth and rewarding for me.

I would like to express my sincere gratitude to **Prof. Prasanta K. Panigrahi**, Professor of Physics in Indian Institute of Science Education and Research (IISER) and was a Faculty at Physical Research Laboratory (PRL), India, for the continuous support of my Ph.D study and research, for his patience, motivation, enthusiasm and immense knowledge. His guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better mentor for my Ph.D study.

I take this opportunity to show my regards for **Dr. Asima Pradhan**, Associate Professor, Department of Physics and Centre for Laser Technology, Indian Institute of Technology, Kanpur, India, who open

heartedly embraced me in her knowledge fold and has showed not only generosity of parting with information to make this thesis possible, but she provided the guidance when it was needed.

I take this opportunity to show my gratitude towards members of **Physics Department and Faculty of Science of The M. S. University of Baroda**, without their support this thesis would not have been completed.

I acknowledge **Ganesh Shankar Vidyarthi Memorial Medical College**, Kanpur, India for providing me the tissue samples.

I am happy to acknowledge my debt to **Dr. A. B. Vora**, **Dr. P. Sharma** for providing me an opportunity to work in PRL. Also, I would like to thank **Dr. R. P. Singh** and **Dr. J. Bannerji** for opening all doors for me to access the knowledge sources in PRL.

This thesis would not have been possible without **Amit Verma**, Graduate Student at University of Florida and **Siddharth Arora**, PhD student at the University of Oxford, who were constantly burdened with to my complaints and frustrations at every stage. Thanks for lending me your ears and shoulders.

I acknowledge the valuable contribution of **Dr. P. Manimaran**, Assistant Professor at C. R. Rao Advanced Institute of Mathematics, University of Hyderabad, **Vivek Vyas**, PhD student at Indian Institute of Science, Education and Research (IISER), Kolkata and **Prashant Shukla**, **Rajbeer Singh**, **Dhatri Rath**, PhD students at IIT Kanpur, in this thesis.

I am very thankful to my fellow staff members and the management of **C. U. Shah Science College** for giving me the space and encouragement to complete my research.

Here I would like to wish "Good Luck" to my fellow research students **Gaurang Patel** and **Purvi Patel** working at the Physics Department of **The M. S. University of Baroda**.

The research presented in this licentiate thesis has been carried out at **Physical Research Laboratory**, Ahmedabad. The main setting for this research work has been at Department of Physics and Centre for Laser Technology, **Indian Institute of Technology, Kanpur**.

Last, but not the least, I thank my family: my beloved husband **Hridaynath** for his understanding, unconditional support and encouragement to pursue my interests and the endless patience when it was most required. Thanks also to our always positive and joyful children **Dhwanilnath**, **Chandranil** and **Devanshi** who are a powerful source of inspiration and energy. A special thought is devoted to my parents for their never-ending support.

*If there's a will, there's a way - a philosophy of life I have always carried with me every day.*