

Acknowledgement

First and foremost, I express my deep sense of gratitude to my almighty **Bhagwan Sri Sathya Sai Baba** for providing me strength and motivation for this research work. I wish to look back with a sense of contentment and to be thankful to several people, some of who were with me from the beginning and some who joined me at different stages during this journey whose kindness, love and blessings in some way or the other have brought me to this day.

It gives me immense pleasure and gratification in commemorating all the helping hands who have contributed significantly to make this work possible. I would like to sincerely thank my Ph.D. supervisors **Prof. Arun Pratap** and **Prof. Prafulla K. Jha** for giving me an opportunity to work under their guidance and introducing me to the fantastic world of research in condensed matter physics. They continuously motivated me and provided a true platform to reach a place where I am capable of writing this Ph.D. thesis. I truly admire their scientific inputs, patience and generous support which always motivated me. They constantly guided me in each and every possible ways.

I express my thankfulness to **Dr. B. S. Chakrabarty**, **Dr. Chetan Limbachiya** and **Dr. Naveen Acharya** for his kind support and encouragement. I would also like to thank all the teaching and non-teaching staff of Physics and Applied Physics department for supporting me during the research work.

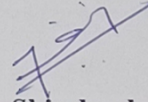
The atmosphere in our **CMMP** group helped me a lot to understand the complex problems in an easier way. I especially thank all my seniors, **Dr. Satyam Shinde**, **Dr. Ankur Pandya**, **Dr. Sanjay Gupta**, **Dr. Shree Mishra**, **Dr. Nikita Shah**, **Dr. Himadri Soni**, **Dr. Venu Mankad**, **Dr. Shweta D. Dabhi**, **Dr. Nidhi Astik**, **Dr. Purvi A. Bhatt** and **Dr. Swapnil Patil** for always being there as a motivator as well as providing their support as a good friend.

I am deeply thankful to **Deepak Upadhyay**, **Vaishali Sharma** and **Margi Patel** for their constant support, help and constant guidance especially during the time of writing the thesis. I am thankful to my lab-mates **Som Narayan**, **Sharad Pillai**, **Trupti Gajaria**, **Anjali Patel** and **Darshil**.

Most importantly, I present my deep gratitude and sincere acknowledgement to my parents **Mr. Shivshankar Tiwari** and **Mrs. Asha Tiwari** who acted as the driving force for me. The present work would have not been possible without my mother's encouragement. My loving thanks to my younger brother **Navin Tiwari**, sister-in-law **Hemali Tiwari** and cute nephew **Krishav Tiwari** who always supported me in my research journey.

I am always grateful to my husband **Mr. Shailesh Tiwari** and my kids **Yaksh Tiwari** and **Maan Tiwari** for constantly supporting and motivating me in my endeavor. They helped me to believe in myself and encouraged me in each and every moment of my work.

I am very thankful to my father-in-law **Mr. Shantiswaroop Tiwari** and late mother-in-law **Mrs. Kanti Tiwari** for their valuable appreciation, support and understanding.



(Chetna Shivshankar Tiwari)

Place: Vadodara

Date: 24/07/2023