

Acknowledgements

*It gives me an immense pleasure to acknowledge my indebtedness to my thesis supervisor **Dr. Surjit Mukherjee**, Associate Professor, Department of Physics, The Maharaja Sayajirao University of Baroda for his elite guidance, ceaseless encouragement and constant inspiration throughout my research work in nuclear physics. I express my deep sense of gratitude and respectful regards to him for putting me into ease at work and affection which inspired me throughout the course.*

*I would like to express my profound gratitude to **Dr. B. K. Nayak**, Scientific Officer (H), Nuclear Physics Division, Bhabha Atomic Research Centre, for starting my experimental work at Tata Institute of Fundamental Research along with the valuable discussions which have improved my understanding of Physics. I thank him from my bottom of my heart for helping me in my data analysis, manuscripts preparation etc., despite his busy schedule. Also I appreciate him for boosting my research in this field.*

*I also express my indebtedness to **Dr. D. C. Biswas**, Scientific Officer (H), Nuclear Physics Division, Bhabha Atomic Research Centre, for his constant support and valuable suggestions at every stage of my research work. I am grateful to him for his active interest shown in my experiments participation and strong discussion of their results along with motivating me to carry my research further in this direction.*

*It is my pleasure to acknowledge the encouragement and cooperation rendered to me by **Prof. A. C. Sharma**, Head of Physics Department, The M. S. University of Baroda, Vadodara, during the entire period of my research work. I can never forget the freedom he has given me for using all possible facilities here in the department. Thanks are also due to **Prof. N. L. Singh**, in-charge, M.Sc. Nuclear Physics laboratory for his co-operation. I express my regards to all my loving teachers and other staff members of the Physics Department for their cooperation. I am very much grateful to **Prof. Nikhil D. Desai**, Dean, Faculty of Science for his strong support and help.*

*Words are insufficient to express my solemn thanks to **Prof. P. R. S. Gomes**, Head of the Nuclear Physics group, Instituto de Fisica, UFF, Brazil, **Prof. J. Lubian**, Instituto de Fisica, UFF, Brazil for their constant support, active involvement, and valuable suggestions throughout my research work. Their fruitful discussions helped me lot to clear my various aspects in theoretical calculations and manuscripts preparations and corrections. I also like to acknowledge **Prof. V. Guimarães**, Instituto de Fisica, USP, Brazil for his kind co – operation.*

*I am really indebted to all the active collaborator Scientists of Nuclear Physics Division, BARC, especially **Drs. S. Santra, E. T. Mirgule, L. S. Danu, Y. K. Gupta, A. Saxena**, for their sincere efforts in the enhancement of my research work. I am also grateful to **Dr. R. K. Choudhury**, former Head, Nuclear Physics Division, BARC, for his extreme support to perform*

the experiments at TIFR, Mumbai and his kind co – operation during my stay at BARC, Mumbai, for the purpose of data analysis.

*I am extremely thankful to **Dr. Rakesh Kumar**, Scientific Officer (F), Inter – University Accelerator Centre, New Delhi, for his strong support and providing the enrich targets which was successfully used in the experiments.*

*It is a pleasure to acknowledge the active cooperation and help given by my fellow research scholars, from whom **Dr. S. Appannababu** stood first as he helped me lot to clear my basic level analysis and important guidance to carry out my experiments and analysis along with the thesis writing. I also like to thank **Dr. G. Kiran kumar** for his support at the initial stage of my research work. Moreover I cannot forget the enjoyable and fruitful time spent with **Mr. Paresh M. Prajapati**. Also I like to thank **Ms. Deepika Patel** for his active co – operation in my experiments. Apart from this I would also like to thanks **Mr. P. K. Rath** for his active and joyful support during my experiments at TIFR.*

*I also acknowledge my childhood, school, and university friends namely, **Salil, Nevil, Abhijit, Yagnesh, Chirag, Sujeet, Dhaval, Manish, Chintan, Nirav, Alkesh, Hariketan, Gaurang, Purvi, Ajay, Vishal, Mrudul, Devang and all** without the best wishes of whom this journey of success cannot be travelled alone. Also I cannot forgot the support and amiable moments spare with my other research students **Devang, Dharmendra, Dolly, Chaitali, Sangeeta, Sagar, Kavita, Nishant and all**. Above all I would also like to thank my well – wisher and my senior colleague **Dr. Maunik Jani**.*

*Above all, the credit also goes to my all relatives, my all younger brothers and sisters, and my lovable **Anju Maushi & Chinmay**, along with our good family friends **Joshi's and Thakkar's** for their unlimited love, support and encouragement.*

*I am grateful to the **Parul Institute** where I am presently working and where the final preparation of my thesis was carried out. I also thank to all the trustees, management, principal, head and all the staff members for their constant support.*

*I also thank the pelletron crew at **TIFR, Mumbai and São Paulo, Brazil** for the smooth running of the machine during the experiments. I would also thanks **UGC and Physics Department, MSU**, for fellowship through RFSMS scheme for two years.*

*Finally, I would express my deepest gratitude to my parents **Aai and Baba**, my loving and caring wife **Ami** and hidden entity that is **GOD**. Without the love and blessings of all these, it would be difficult for me to travel this journey of success.*