ACKNOWLEDGMENTS

I would like to express my deepest respect to my supervisor, Prof. Vandana Nanal. I convey my regards to her for the continuous support and patience throughout this work as well as for the new dimensions she has brought into my life. Without her inspiring discussions, invaluable guidance and constant encouragement, this accomplishment would never have been fulfilled. She gave me immense freedom to pursue my research work and showed great confidence in me. I am greatly indebted to her assistance and understanding in matters of non-academic concern which helped me to endure some difficult times during my thesis work.

I had the great opportunity to discuss my research work with Prof. R.G. Pillay. His commitment to research, dedication to physics, excellent teaching style, unique personality and even his sense of humour have greatly influenced me.

I consider myself very fortunate to have fruitful interactions with the leading scientists in the field of neutrino physics, Prof. V. Tretyak and Prof. K. Zuber. I strongly feel indebted to Prof. R. Palit, Prof. A. Shrivastava and Prof. V.M. Datar for their useful comments and constructive suggestions throughout my work. I would like to extend my most sincere gratitude to Mr. S.C. Sharma and Dr. K.G. Bhusan for their help with the experiments conducted for this thesis work.

I wish to acknowledge many crucial contributions made by my senior colleagues Dr. Sanjoy Pal, Ms. Shital Thakur, Dr. Vivek Singh and Dr. Y.
Gowda. I would like to sincerely thank my colleagues Mathimalar, Chandan, Sadhana and Abhijit for their fruitful collaborations. I gratefully acknowledge the Pelletron and Linac staff at TIFR for their support during the in-beam experiments. Thanks are due to Kiran Divekar, Mahesh Pose, K.V. Anoop, A. Mahadkar, Deepa mam, Samar, Aman, Prajakta mam, J.N. Karande and Mandar Sawant for their constant help and cooperation.

Many of my friends and INO colleagues selflessly wished for my achievements. I would especially mention Saurabh Sandilya for being the best confidant and accomplice one could ask for. My heartfelt thanks to Ali, Anuradha, Dipankar, Deepak, Jasmine, Kiran, Manisha, Moon Moon, Nitali, Rahul, Subha, Varchaswi and Vinita for making my stay at TIFR an enjoyable one.

Finally and most importantly, I devote my deepest thanks to my parents, Mr. Paban Dokania and Mrs. Renu Dokania, and sister Khusbu for being my pillars of support. This thesis would not have been possible without their encouragement, understanding and boundless love.