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The memory pages of our brain does not follow the chronological order, therefore, the colleagues and friends who were associated with me even before the starting of this course appear at the bottom of the page. It is my greatest pleasure to have Sanjoy-da, Purnendu-da, Pradip-da, Dabasish-da, Santosh, Bhola, Satya, Safi, Bhabesh, Lipy-di, Dipankar-da, Sampa, Pappu-da and Sanjib-da around all the time, whenever I needed them. I would like to convey my sincere thanks to Suvendu Bose and Tinku Sinha for their suggestions and effort to maintain the homely atmosphere during the stay at CERN. I would also like to thank Abhee K. Dutt-Mazumdar and specially to Pradip Roy for the theoretical lessons of heavy ion collisions before the start of this thesis work. In similar way, I am also thankful to Dinesh Srivastava for the important discussions and suggestions regarding the HIJING Monte Carlo. People who know Bikash Sinha, would agree that the Indian effort to the QGP study at large scale has been started by him. But even within his busy schedule he always had time for the students and always tried to motivate us towards the fundamental laws of nature. I would like to thank him for his constant support at every stage whenever it was needed.

Now only the half of the sun is visible in the horizon and the birds are coming back to their nests. I remember the appreciation and courage of both of my families (by birth and in-law's) that always recharges me at the moment, when I am tired and shattered. I owe my life to my, father, mother, father-in-law, mother-in-law and two grown up children my sister and brother-in-law. In this occasion, I also like to thank our well wisher Kaushik Mazumder for sharing the wonderful moments with us.

This sunset at the seashore is the moment when the night slowly embraces the day light at a place where the earth kisses the sea. The ambiance reminds me the better half of mine, and I like to thank her for everything. A large part of this work is based on the sacrifice of the sweetest moments of our life. I am fortunate to have Gargi as wife and without her appreciation, adjustment, sacrifice nothing was possible to complete.

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Lastly, I beg apology to all the people whom I have missed to mention in this page.