Preface and Acknowledgments

The dissertation contains the reports of the researches carried out by the candidate on a few problems of nuclear matter and nuclear scattering during the period of August 1964 to July 1969. For the sake of convenience the thesis has been divided into three parts.

In the part I, the first two chapters are devoted to a brief review on the Brueckner theory and existing methods of applying it to nuclear matter. In the third chapter a new method of treating the reaction matrix and numerical calculations performed to establish the merit of the method are presented.

The second part of the thesis contains an account of the candidate's work on Coulomb-Nuclear S-matrix. The material contained in this part is an elucidation of the work presented in the form of two papers.

(i) Regge Trajectories for Coulomb Nuclear S-matrix
[ Nuovo Cimento, 60B, 114 (1969)]

(ii) Regge-Type Representations for Coulomb Nuclear S-matrix
[ Phys. Rev. 175, 1544 (1968)]

The third part of the thesis contains the report of investigations carried out by the candidate in the field of
optical potential for composite particles from a range of nuclei Al to Zn in the energy range of 4 to 30 Mev. The work concerning deuteron is to appear in Nuclear Physics in the form of a paper entitled "Optical Potential for Deuteron".

The candidate worked under the direct guidance of Prof. Suprokash Mukherjee of the Theoretical Nuclear Physics Division of Saha Institute of Nuclear Physics and presently at the Australian National University, Canberra and to him he owes his initiation to research work. The gratefulness that the candidate feels towards him cannot be exaggerated.

The candidate is grateful to Dr. C. S. Shastry and Mr. S. K. Samaddar for their collaborations in some of the work presented in parts II and III respectively.

It is a pleasure to thank Miss R. Shanta, Mr. P. S. Nayar, Mr. S. K. Gupta and other colleagues of the Institute for their kind co-operation.

Finally thanks are due to Mr. S. Manna for patiently typing of the manuscript.

calcutta
August 13, 1969.

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