

6th May, 1958

Alladi Ramakrishnan,
Reader.

REPORT OF THE WORK DONE DURING THE STAY IN THE U.S.

The Institute for Advanced Study invited this year as visiting members to its School of Mathematics about fifty theoretical physicists and pure mathematicians. There were two terms for the academic year 1958-59 during which about sixty seminars in theoretical physics were held in which all the members participated. They dealt essentially with the theory of elementary particles and their interactions. Among the leading participants were Professor Oppenheimer, Director, Professors Lee and Yang (who won the Nobel Prize this year) and Professors F.J.Dyson and Strongman. It was clear from the seminars that the problems in modern physics that are engaging the most gifted minds today deal on the one hand with the interpretation of experimental data in high energy physics from the American laboratories and on the other with the formal and logical foundations of modern quantum field theory.

I also took advantage of the contiguity of the Princeton University where work on theoretical physics is being done in close liaison with the members of the Institute. I participated in the seminars of the theoretical physics division of the Princeton University which has on its staff theoreticians of established reputation like Professors Wigner, Wheeler, Wightman and Goldberger.

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During the period of my stay in Princeton, I was invited to lecture in various centres of research like: (1) The Naval Research Laboratory, Washington, (2) National Research Council of Canada, Ottawa, (3) Case Institute of Technology, Cleveland and (4) The Illinois Institute of Technology, Chicago. Visits to all these places gave me an opportunity to meet leading workers in theoretical nuclear physics.

As regards my own research work, I completed three papers entitled:

(i) Age distribution in population growth:

(This is being published in the Bulletin of Mathematical Biophysics, Chicago).

(ii) Physical approach to matrix equations:

To be published in the Proceedings of the Indian Academy of Sciences.

(iii) Some limiting stochastic operators:

To be read at the International Congress of Mathematicians, in August, 1958 at Edinburgh.

I now wish to initiate work on theoretical nuclear physics in the Madras University. Till now we were essentially engaged in problems on the theory of stochastic processes and the cosmic ray cascades. During the past four years, our group has been systematically attempting to build a suitable background for work

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on theoretical nuclear physics. The stage has reached when it is now possible to initiate work in this field which is engaging the attention of the most of the theoretical physicists in the world today. The permanent members of the Institute like Professors Dyson and Abraham Pais have offered me their advice and co-operation in our research work.

There are very few centres of research on fundamental physics in India today and such fundamental work can be carried on effectively in Universities. The mathematical traditions of our University, the talent available from its constituent colleges, the excellent facilities available in our well equipped University library make Madras an ideal centre for research on fundamental theoretical physics. It can now be claimed that the standard of our post-graduate instruction in the University is of the same level as that of Harvard and Princeton. It is possible to develop an active school of mathematical research if we have a full fledged department of theoretical physics and if facilities for work are made available to us in the form of pre-doctoral and post-doctoral fellowships. The introduction of a theoretical nuclear physics for the M.Sc. course in the University for a period of three years would be a suitable initiation of such a programme.

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(Alladi Ramakrishnan)