R. C. Majumdar

RAMESH CHANDRA MAJUMDAR

(1904 — 1995)

Elected Fellow 1941

INTRODUCTION

PROFESSOR RAMESH CHANDRA MAJUMDAR was an eminent physicist who served Delhi University with distinction for more than a quarter of a century. He was an inspiring teacher and his research contributions extend over wide areas of contemporary theoretical physics. He was also a great organizer, who contributed significantly to the upliftment of the Physics Department at Delhi University, and more generally to the advancement in theoretical physics research in the country.

FAMILY BACKGROUND AND EARLY EDUCATION

Ramesh Chandra Majumdar was born on March 1, 1904 in village Patgram, situated on the bank of river Padma, in Manickganj division of Dhaka district (now in Bangladesh). His father Shri Mahesh Chandra Majumdar belonged to a modest middle class family and worked as Secretary of a tea estate in the foothills of Himalayas in Jalpaiguri distirct of West Bengal. Ramesh Chandra had an elder sister and three brothers. They lived with their mother Shrimati Sarojini Majumdar in Patgram and their father would visit the family during holidays. Later the entire family moved to Jalpaiguri and young Ramesh Chandra had his entire schooling there. After passing the matriculation examination from Phanindradeb High School in 1921, he took admission in Rajshahi College, now in Bangladesh. After his graduation, he joined University of Calcutta for post-graduation in physics. During his college days he was well known as a social worker and a keen sportsman. He was the captain of Rajshahi college football team and was later selected to play for the famous Mohun Bagan Club of Calcutta. However he could not join the club due to a serious knee injury. Professor Majumdar often said later that the injury was perhaps a blessing in disguise, as from then on he had to leave his sports career and devoted himself whole-heartedly to science. In the meantime he lost his father and was under pressure to take up some job. He was offered a job in the Police Service, on the

basis of his sports career. He however, declined the offer as he was very keen to pursue higher studies.

Later Life

After passing MSc in Physics from Calcutta University in 1927, Professor Majumdar joined research under the guidance of Professor MN Saha at Allahabad University. It was during this time that he came in contact with Professor DS Kothari and their long association proved to be very fruitful in the development of Physics teaching and research in post-independent India. In recognition of his contributions in Theoretical Physics, Professor Majumdar was awarded Premchand Raichand Scholarship as well as Ghosh Travelling Fellowship from Calcutta University. The two together brought him Rs 10,000/- which was a huge amount in those days and quite adequate to travel abroad for higher studies. He went to Germany around the year 1930 under the advice of Professor MN Saha and got his doctorate degree (D Phil Nat) with highest distinction, *summa cum laude*, from the University of Jena in 1932. While in Jena, he worked part-time at Karl Zeiss Factory, in order to meet his expenses in Germany.

Dr Majumdar worked with Professor W Heisenberg in Leipzig and came in contact with many great physicists of those days. After spending some time with Professor Neils Bohr in Copenhagen and also a few months in Cambridge, he returned to India around the year 1934. He served for a short period in Panjab Univeristy at Lahore. In 1936, he was married to Miss Bibha Sengupta, an eminent scholar in applied mathematics and the first lady to receive Premchand Raichand Scholarship from Calcutta University. Their only son Rabi Majumdar was born in the year 1940. After serving at the Bose Institute, Calcutta from 1936 to 1944, Dr Majumdar joined Delhi University as Reader in the Physics Department. He was appointed Professor of Physics in the year 1946. He spent about six months at Tata Institute of Fundamental Research, Bombay in 1947 at the inivtation of Dr HJ Bhabha. He served the Univeristy as Head of the Physics Department from 1948 to 1951 and again from 1961 to 1967. He was then appointed Pro-Vice-Chancellor of the University and finally retired from the University service in 1969. The same year he was appointed Professor Emeritus for life.

After retirement, Professor Majumdar visited Germany for two years (1971-73) and worked actively at the Max-Plank Institutes in Lindau/Harz and Munich. Professor Abdus Salam also invited him at the ICTP, Trieste during this period

After his return to Delhi University in 1973, he was still quite active and continued to take deep interest in the Department of Physics till 1982. Thereafter he moved permanently to Calcutta, to be with his son Professor Rabi Majumdar, who was working at the Saha Institute of Nuclear Physics as a theoretical biophysicist.

Soon after his return to Calcutta he was invited to deliver the prestigeous Jagadish Chandra Bose Memorial Lecture at Bose Institute, where he had spent almost a decade before joining Delhi University. He also unveiled the statue of Jagadish Chandra Bose in front of the newly constructed Centenary building of the Bose Institute. He participated in the activities of the INSA Calcutta Chapter (where he was the seniormost Fellow) and delivered lectures before the local scientific community narrating his work and experience. However, during the last years, when he moved to his new residence at Salt Lake, he mostly preferred to stay at home and enjoy the company of his family.

At Delhi University

Professor Majumdar was an inspiring teacher. He taught various courses at the MSc level from statistical mechanics and the theory of metals to quantum mechanics and field theory. He had a beautiful handwriting and derived almost all results in details on the black-board. Students never missed his classes. He often talked of his experiences in Germany and England and inspired the students to take up research as a career. As a result, many of the students taught by him later held important academic positions in India and abroad (some have already retired).

In addition to his capability as an inspiring teacher, Professor Majumdar's warm hospitality, whether in office or at home, was spontaneous. Inspite of his busy life, he was ever patient with his colleagues and students, and always keen to help them in their professional as well as personal lives.

In 1962, a year after Professor Majumdar became Head of the Department of Physics, this Department was recognised as a Centre for Advanced Study by the UGC. As a result of his initiative and hard work, an electronic computer, IBM 1620, was set up in the Department, probably for the first time in any Indian University. This highly accelerated the pace of research in theory. On th

experimental side, with UNESCO aid, a liquid Helium Plant was obtained from the erstwhile USSR and was set up.

Professor Majumdar initiated the idea of holding Summer Schools in Physics where the research scholars and the top physicists could spend about a month together usually in selected hill stations near Delhi. In the mornings advanced courses of lectures were organized on topics of current interest and rest of the time was spent on discussing research problems. All those who participated in these programmes still recall with pleasure the stimulating time they had there.

The first summer school was organized in the year 1959 in Mussoorie and the second one in the year 1961 in Dalhousie. After this, the summer schools were held every year till 1967. The last one was held in Simla in 1971. Professor KS Krishnan, Professor SN Bose and Professor DS Kothari were among those who participated in these programmes. In the 1965 Summer School held in Dalhousie, Proessor LP Gorkov (University of Leningrad, USSR), Professor B Sakata (Argonne National Laboratory, USA) and Professor L Balazs (University of California at Los Angles, USA) were among the invited speakers. Professor Gorkov's lecutures on the superconductivity were later published.

The 1966 Summer School, held at Udaipur, was dedicated to Professor DS Kothari on his 60th birthday. Among the speakers there were Professor ECG Sudarshan (University of Syracuse, USA), Professor R White (ICTP, Trieste, Italy) and Professor V Singh (TIFR, Bombay). At the next Dalhousie Summer School held in 1967, the speakers included Professro Y Nambu (University of Chicago, USA) and Professor Yu V Novozhilov (University of Leningard, USSR). At each of these summer schools, the total number of participants was around 50.

Professor Majumdar also organized a number of advanced lecture courses on various topics in the Department. Quite a few of them were written out and later published. In 1963, to celebrate the 70th birthday of Professor SN Bose, a collection of his papers along with those of others on related topics was brought out. The authors included PAM Dirac, E Fermi, W Pauli, S Schrodinger, F London, H Yukawa, N Bogoliubov, RP Feynman and others. In the year 1965 Professor AK Ghatak, presently at IIT Delhi, was invited to give a course of lectures on "Neutron Transport" and the very next year Academician AA Abrikosov from the USSR delivered a course of lecutrers on "The Theory of Normal Metals", which were later published in book forms.

Professor RC Majumdar was elected Fellow of the Indian National Science Academy as early as in 1941. He took keen interest in the work of the Academy and served the Council for almost 18 years. He first became member of the Council in 1950. He was the Secretary of INSA from 1952 to 1956 and again from 1961 to 1964. In between, from 1957 to 1960, he was the Editor of Publications. He also served as Treasurer for one term, namely from 1965 to 1968.

Research Contributions

Professor Majumdar's research work extends over a wide range of fields He began his research career at Allahabad University in 1928 with Professor MN Saha. He developed relativistic Bose-Einstein and Fermi Dirac statistics which were later used by Milne, Eddington, Chandrasekhar and others for the study of white-dwarf stars. Along with DS Kothari, he also studied the problem of thermal ionization under degenerate conditions. The theory of opacity coefficient of a degenerate gas was also worked out both for non-relativistic and relativistic cases. He also worked out the theory of two-phase stellar configuration with gaseous envelope and degenerate non-relativistic core. Professor Majumdar used quantum statistics to investigate the internal constitution of planets as well as obtain a relation between their radii and masses. He also applied quantum statistics to study the compressibility of alkali metals and also the electronic properties of solid and liquid metals.

Professor Majumdar also worked on the theory of radio-wave propagation in the ionosphere. He derived the basic formula for the dissociation of molecules in the upper atmosphere and showed that oxygen molecules are completely dissociated at a height of about 100 km. Effects of electron-ion and electron-electron collisions were considered on the propagation of radio-waves in ionospheric plasma in the presence of an external magnetic field, as in the case of the earth. He also derived the generalized Appleton-Hartree dispersion formula for the propagation of radio-waves in the ionosphere, incorporating the effects of the distribution of electron velocities and velocity dependence of collision frequency. The formula has found applications in the study of radio- wave propagation in the ionosphere.

In the late thirties and forties, a lot of work was being done throughout the world on meson theory. Professor Majumdar also actively worked in this area with his student AS Apte. He worked out the equations of motion of charged particles interacting with scalar and vector meson fields. Using Riesz method of analytic continuation, he and S Gupta derived the equations of rotational and translational motions of mesons which are free from singularities and contain no arbitrary constants except mass and spin angular momentum of the dipole. SK Chakarbarty and RC Majumdar derived an expression for differential cross section for the emission of a photon by a meson of spin 1, taking account of radiation damping. They used these results to analyze large bursts of particles produced by mesons of energies greater than 10 eV. Professor Majumdar also developed a theory for the radiations emitted by fast mesons moving in the field of a nucleus. With SN Gupta he investigated the self-energy from quantum electordynamics.

THE LAST DAYS

Professor Majumdar led a very regular and active life till the age of 85. Later he was losing his memory and gradually his mental faculties became rather inactive. However, he was physically quite normal and there was never any serious complaint about his health. He was only suffering from a minor cold and cough during the last days and was treated at home by the family physician.

Finally, the end came and he passed away peacefully in his sleep in the early morning of December 29, 1995. At that time, his wife, son, daughter-in-law and grandson were all by his side. Professor Majumdar had a happy married life of nearly sixty years and it is matter of rare coincidence that his wife, who was ailing for some time, also passed away the very next day.

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