



Debendra Mohan Bose – an oblivion legend

Sanchita Barman

*Assistant Professor of Physics, Siliguri College, P.O.- Siliguri, Dist.- Darjeeling, Pin- 734001,
University of North Bengal, West Bengal.*

Abstract

In the golden era of the science movement in India, many great scientists were born in the country and their prodigious achievements have been a source of perdurable pride for us. Debendra Mohan Bose (D. M. Bose) (26 November 1885 – 2 June 1975) is one of them. He was an eminent physicist who were acclaimed and made contributions in the field of Particle physics, artificial radioactivity and neutron physics. His contributions in physics are magnificent. For the students of the present and future in physics it has a great relevance. Here it is just to a small effort to unveil of a great genius and a scientist of high stature which is already on.

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In the golden era of the science movement in India, many great scientists were born in the country and their tremendous achievements have been a source of pride for us. Debendra Mohan Bose (D. M. Bose) is one of them. He was a renowned physicist who were praised and made contributions in the field of Particle physics, artificial radioactivity and neutron physics. His contributions in physics are magnificent. For the students of the present and future in physics it has a great importance. Here it is just to a small effort to unveil of a great genius and a scientist of high stature which is already on.

He was the nephew of the famous physicist Jagadish Chandra Bose, who set in the position of modern science in India. Debendra Mohan Bose was born in Calcutta (present day Kolkata) on 26 November 1885 in a famous Brahmo family. He was the youngest son of Dr. Mohini Mohan Bose. His father Dr. Mohini Mohan Bose was a homoeopathic doctor who was the first Indian trained in the USA in the field of homeopathy. His mother Subarnapova Bose was amenable in social service and child welfare. One of his paternal uncles, Ananda Mohan Bose, was the

first Indian Wrangler in the Mathematical Tripos of Cambridge University. His maternal uncle was the pioneer Indian scientist Acharya Jagadish Chandra Bose (J.C. Bose), whose discoveries in Physics and Botany are world-renowned. Unfortunately, he lost his father at an early age. After his father's death, he was educated under the supervision of his maternal uncle Acharya Jagadish Chandra Bose (J.C. Bose). Debendra Mohan Bose was a brilliant student since his early childhood. Initially Debendra enrolled for a degree in engineering in Bengal Engineering College, Shibpur (present day Indian Institute of Engineering Science and Technology, Shibpur, abbreviated as IIST Shibpur (locally known as "BESU")). But a severe attack of malaria put an end to his pursuit of engineering. At the suggestion of Nobel laureate Rabindranath Tagore, who was also a close friend of J. C. Bose, Debendra Bose took admission in the Presidency college to study Physics. In 1906, Debendra Bose obtained his Master of Arts degree from the University of Calcutta with a first class first. He stood first in the order of the merit in the examination. He also obtained his Bachelor of Arts degree from Calcutta University. He worked as a research



scholar under Jagadish Chandra Bose for one year, during which he participated in his uncle's biophysical and plant physiological investigation.

Later in 1907 he joined in the Christ's College, Cambridge, and worked with prominent physicists including J. J. Thomson and Charles Thomson Rees Wilson at the Cavendish Laboratory. In 1910, he joined the Royal College of Science in London, from where he acquired ARCS diploma and a B.Sc. (First class) in Physics in 1912.

Returning Calcutta, he got an appointment in the City College, Kolkata as a lecturer in physics in 1913. From there he moved and was appointed to the newly founded Calcutta University College of Science at Rajabazar accepting the professorship of Rash Behari Ghosh of Physics in 1914. In the same year he was awarded the Ghosh Travel Fellowship for studying abroad, and chose to study advanced physics for two years at the Humboldt

University in Berlin. In Berlin, Debendra was joined to Professor Erich Regener's laboratory. But then the first World War broke out and Debendra Mohan Bose was interned in Germany. His stay in Germany got extended to five years due to World War I. It was an era of great insights into the atom. During this period, he worked at the Cavendish Laboratory on the development of a new type of cloud chamber, and was successful in photographing the tracks of recoil protons produced during the passage of fast moving alpha particles in the chamber where the great J. J. Thomson was his guide. The results of his preliminary investigations were published in 1916 in the journal *Physikalische Zeitschrift*. The full paper was later published in 1922 in another reputed journal *Zeitschrift für Physik*. In the same laboratory worked C.T. R. Wilson who won the Nobel Prize for developing the cloud chamber that detected subatomic particles.

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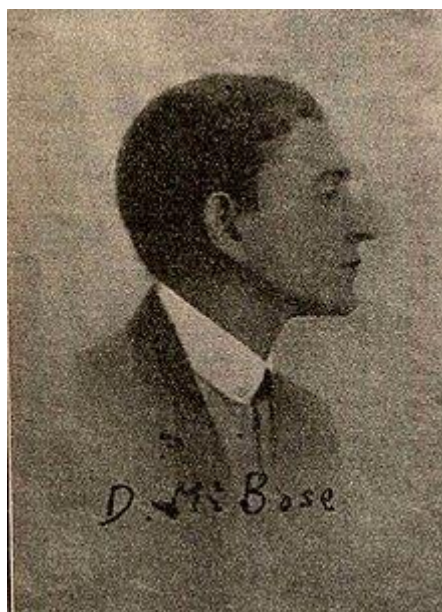
Seated (L to R):[Meghnad Saha](#), [Jagadish Chandra Bose](#), [Jnan Chandra Ghosh](#). Standing (L to R): Snehamoy Dutt, [Satyendranath Bose](#), [Debendra Mohan Bose](#), N R Sen, [Jnanendra Nath Mukherjee](#), N C Nag

Debendra Mohan Bose returned to India in March 1919 after obtaining his PhD. In July 1919, D. M. Bose re-joined the Calcutta University as Rashbehary Ghosh Professor of Physics. In 1932, he succeeded Professor C. V. Raman as the Palit Professor of Physics. D. M. Bose encouraged several of his junior colleagues at the Calcutta University to pursue research. He gave Satyendra Nath Bose two books of Max Planck, *Thermodynamik* and *Warmestrahlung* which was unavailable in India then. This carried interest to S. N. Bose's in Planck's hypothesis and his deduction on a combinatorial basis of Planck's formula in 1925.

J. C. Bose died on 23rd Nov 1937. After the death of the institute's founder J. C. Bose, D. M. Bose became the Director of Bose Institute in 1938 which is founded in 1917, by J. C. Bose where J. C. Bose served as its Director for its twenty years until his death. Debendra Mohan Bose was the longest serving Director (1938–1967) of Bose Institute. Today Bose Institute is a public research institute of India and oldest one. In 1967, D. M. Bose resigned from the Directorship of the Bose Institute, but he continued to be its mentor and advisor. World Wars have been important to Debendra Mohan Bose's work in a peculiar way. The second World War broke out in 1939. This time he was in his own country doing research freely. Due to the World War II restrictions, full tone photographic plates were not available in India at that time. A discussion during the 1938 Science Congress Session prompted D. M. Bose and his colleague Bibha Chowdhurito study cosmic

rays using photographic plates. Since the particle accelerators were not available at this time, high-energy subatomic particles were only obtainable from atmospheric cosmic rays. Together they experimentally observed and published on cosmic rays, later identified as muons. During 1939–1942, he with Biva Choudhuri exposed a large number of Ilford R2 and New Half-tone photographic plates in the high altitude mountainous regions at Darjeeling (Mayapuri Research Station, elevation 2130m) and Sandakphu (Dak Bungalow, elevation 3660m) and observed a number of long curved ionizing tracks that appeared to be different from the tracks of alpha particles or protons. The idea was actually given by a famous scientist, Walter Bothe. Bothe had asked D. M. Bose to consider photographic emulsion as a continuously active cloud chamber where tracks are automatically registered and stored permanently. Bose and Choudhuri were observing at the first tracks of meson whose discovery was later announced by Cecil Frank Powell. It happened in the closing year of the war 1945. Two years later British physicist Powell independently used exactly the same method which was described by D. M. Bose with improved full-tone photographic emulsion plates and announced the existence of two kinds of mesons, mu meson and pi meson (now pion). Powell was awarded the Nobel Prize in Physics for his discovery in 1950 cited development of the photographic method of studying nuclear processes and his discoveries regarding the mesons made with this method.

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Due to exposure to several cultural figures during his childhood, D.M. Bose was too much interested in social and cultural matters. He was the treasurer of Viswabharati University and was closely associated with the management of the City College. He was one of the editors-in-chief of *A Concise History of Science in India*, a publication of the Indian National Science Academy (INSA). Apart from that he was a dedicated worker of the Sadharan Brahma Samaj (Established in 15th May 1878, founders were Ananda Mohan Bose, Umesh Chandra Dutta, Sivnath Sastri, at Calcutta) and was served several years as its office bearer (President, Secretary & Treasurer). He was the General President of the Indian Science Congress Session in 1953 at Lucknow.

Professor D. M. Bose was in the habit of taking long walks. But while in Germany he started suffering from arthritis and other health problems forced him to take retirement. In the later years of his life, he became more interested in various subject, also in philosophy focusing on the relationship between religion and science. He passed away on the morning of 2nd June 1975 at the age of 89.

Italian physicist Alessandro Volta who was a pioneer of electricity and power and also credited as the inventor of the electric battery and the discovery of methane was born in Como. In 1927 (11-20 September 1927) at the occasion of his 100th death anniversary

world's eminent physicists were invited at/in the International Conference held at Lake Como in Italy. Debendra Mohan Bose was one of them. D. M. Bose and Meghnad Saha both in 1927 participated at/in this International Conference. This conference is famous for Niels Bohr's first presentation of his ideas on complementarity. The conference featured 60 invited participants from 14 countries, including 11 Nobel laureates. It is suggested that due to the quality of Debendra Mohan Bose's scientific work in the fields of radioactivity and electromagnetism he got this prestigious invitation. In the late 1980s it was reported that the "wrong" Bose, that is, D. M. Bose attended the meeting. The invitation was supposed to be for S. N. Bose. The historical documents suggest that D. M. Bose was not the "wrong" person, because in those days he had his own national and international status in scientific research work. The Como Committee was not mistaken by sending him the invitation as claimed in some Indian circles.

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References –

1. https://en.wikipedia.org/wiki/Bibha_Chowdhuri
2. <https://www.cta-observatory.org/building-from-diversity-article-bibha-chowdhuri/>
3. <https://www.asiaresearchnews.com/content/bibha-chowdhuri>

4. Rajinder Singh, Celebrating 125th birth anniversary of DM Bose - Invitation to the Como conference, *Science and Culture* 76, 494-501, 2010.
5. Cecil Frank Powell (1959). *The Study of Elementary Particles by the Photographic Method*. Pergamon Press. OCLC 2404250.
6. <https://amazingwomeninhistory.com/bibha-chowdhuri-indian-physicist/>
7. Rajinder Singh: D.M. Bose - His scientific work in international context, Shaker Publisher, Aachen 2016. DM Bose Scientific work.
8. <https://www.thehindubusinessline.com/news/science/bibha-chowdhuri-celebrating-a-forgotten-life-in-physics/article25671120.ece>.
9. <https://www.thelovepost.global/decolonise-your-mind/articles/bibha-chowdhuri-missed-nobel-prize-and-unfulfilled-prophecy>.
10. "D. M. Bose: A Scientist Incognito (editorial)" (PDF). *Science and Culture*. **76** (11–12). November–December 2010. Retrieved 5 February 2011.
- 11a. <https://www.telegraphindia.com/science-tech/the-woman-who-could-have-won-a-nobel/cid/1676488>.
12. <http://scientificman.com/2013/01/19/a-tribute-to-debendra-mohan-bose-the-unknown-indian-who-missed-the-nobel-prize/>
13. Indian National Science Academy (1983). Biographical memoirs of fellows of the Indian National Science Academy, Volume 7.
14. "The Nobel Prize in Physics 1950". *Nobelprize.org (Nobel Media)*. Retrieved 6 February 2011.
15. For more detail see, Rajinder Singh, S.C. Roy (<https://www.shaker.de/de/content/catalogue/index.asp?lang=de&ID=8&ISBN=978-3-8440-6126-0&search=yes>)
16. *Indian Science Congress Association (2003). The Shaping of Indian Science: 1948-1981. Universities Press. pp. 702–703. ISBN 978-81-7371-433-7.*
17. Bose, D.M.: Birth Centenary Commemorative Volume, 1885-1985. Bose Institute, Calcutta (1985)
18. Powell, C. F. (with Fowler, P. H., Parkins, D. H.): *The Study of the elementary Particles by the Photographic Method*. Pergamon Press, Oxford (1959).
19. https://www.researchgate.net/publication/325907835_D_M_BOSE_AND_COSMIC_RAY_RESEARCH
20. Bose, D. M., *Phys. Z.*, 1916, 17, 388-390.