

Satyendranath Bose

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- Satyendra Nath Bose was an **Indian physicist** specialising in theoretical physics.
- He is best known for his **work on quantum mechanics** in the early 1920s, providing the foundation for Bose–Einstein statistics and the theory of the Bose–Einstein condensate.
- He was born in January 1894 in Calcutta (now Kolkata), West Bengal, India.
- He attended Presidency College, where he took an intermediate science course and studied with renowned scientists Jagadish Chandra Bose and Prafulla Chandra Ray.
- Bose received a **Bachelor of Science in mixed mathematics** in 1913 from Presidency College and a Master of Science in the same subject in 1915 from Calcutta University.
- He married Usha Devi at age 20.
- He was actively involved in running night schools that came to be known as the **Working Men's Institute**.
- He died in 1974.

His works:

- After completing his master's degree, Bose became a **research scholar at the University of Calcutta in 1916**, and began his studies on the theory of relativity.
- He served as a **lecturer in the physics department** of the University of Calcutta from 1916 to 1921.
- **Along with** a former classmate, the future astrophysicist **Meghnad Saha, he published the English translations of Albert Einstein's original papers on special and general relativity** in 1919.
- In 1921, he was offered the post of a **Reader in the department of physics at the University of Dhaka**, where

he helped to set up new laboratories to teach advanced courses in science.

- In 1924, he wrote a **paper on deriving Planck's quantum radiation law** that offered a solution that had never been thought of before.
- He **sent this paper to Albert Einstein** who recognized the significance of Bose's studies and translated the Paper into German.
- Bose and Einstein first came up with the prediction of a state of matter of a dilute gas of bosons and its complex interactions in what came to be known as the **Bose-Einstein condensate in 1924-25.**

Bose-Einstein condensate:

A Bose-Einstein condensate is a **group of atoms cooled to within a hair of absolute zero.** When they reach that temperature the atoms are hardly moving relative to each other and they have almost no free energy to do so.

At that point, the atoms begin to clump together and fall into the same quantum states and **can't be distinguished from one another.** They start obeying what are called Bose-Einstein statistics and behave like "**super atoms**".



- Bose achieved international recognition when his findings were promoted by Einstein and he got an opportunity to **work for two years in European X-Ray and crystallography laboratories.**
- Here he got acquainted with Louis de Broglie and Marie Curie.
- He returned to Dhaka in 1926 and though had no doctorate, was made the **Head of the Department of Physics in Dhaka university** on Einstein's recommendation.
- He served as the Dean of the Faculty of Science at Dhaka

University until 1945.

- At the time of partition he returned to India and taught at the University of Calcutta till 1956.
- He then became **Vice-Chancellor of Visva-Bharati University in Shantiniketan.**
- Along with nuclear physics, he also researched organic chemistry, geology, engineering and other sciences.

Honours:

- **Bosons**, a class of elementary subatomic particles in particle physics were named after him by Paul Dirac to commemorate his contributions to science.
- In 1937, **Rabindranath Tagore** dedicated his only book on science, "**Visva-Parichay**", to Satyendra Nath Bose.
- Bose was honoured with the title **Padma Vibhushan** by the Indian Government in 1954.
- In 1959, he was **appointed as the National Professor**, the highest honour in the country for a scholar, a position he held for 15 years.
- Bose became an **adviser to the newly formed Council of Scientific and Industrial Research.**
- He was the **President of Indian Physical Society and the National Institute of Science.**
- He was elected **General President of the Indian Science Congress.**
- He was the Vice-President and then the **President of Indian Statistical Institute.**
- In 1958, he became a **Fellow of the Royal Society.**
- He was **nominated as a member of Rajya Sabha.**
- He was **nominated for the Nobel Prize in Physics**, for his contribution to Bose–Einstein statistics and the unified field theory.
- Although seven Nobel Prizes were awarded for research related to his concepts of the boson – Bose–Einstein statistics and Bose–Einstein condensate, Bose himself **was not awarded a Nobel Prize.**

- In 1986, the Indian parliament established the **S.N. Bose National Centre for Basic Sciences in Salt Lake, Calcutta.**