

# Bibha Chowdhuri

## First Female Particle Physicist of India



Tanmoy Deb

**B**IBHA Chowdhuri had many firsts to her credit, such as being the first female particle physicist in India, the first Indian woman to receive PhD in physics and also the first female researcher recruited by the Tata Institute of Fundamental Research (TIFR). She has a star named after her!

She was born on 3 July 1913 in Calcutta, Bengal presidency (now Kolkata, West Bengal) to Banku Behari Chaudhuri and Urmila Devi. She was the third of six children (five girls and a boy). Her physician father believed in Brahma Samaj ideals, which advocated, among others, the education of girls. Her mother was related to the family of Sir Jagdish Chandra Bose.

She had a deep interest in science since her childhood, which was unusual for girls (girls education was frowned upon then). It was her parents' liberal outlook that encouraged her to pursue her studies. She had done her schooling at Bethune School, Kolkata. She earned her BSc (Hons) in Physics from Scottish Church College, Kolkata. Thereafter, she enrolled for an MSc (Physics) at Rajabazar Science College under the University of Calcutta. She was the only woman in a class of 24! She completed her MSc degree in 1934 and became the third woman to receive an MSc degree in Physics from Calcutta University. Little did she know that this was the beginning of a long, arduous and lonely journey on an untrodden path.



DM Bose

After her MSc, she joined Bose Institute, Kolkata, in 1939 to carry out research under Debendra Mohan Bose, Nephew of Sir JC Bose and Palit Professor of Physics. Initially, DM Bose was reluctant to admit her due to her gender. However, she joined the institute and

carried out investigations with DM Bose, which led to the discovery of pi-mesons or pions. It is an unstable subatomic particle with positive, negative, and neutral charges and is present in proton, neutron, and electron in an atom. During 1939-44, she, together with DM Bose, published three papers in the journal *Nature*.

Later on, she moved to England to pursue PhD under Sir Patrick Maynard Stuart Blackett at the University of Manchester (1939-44). The thesis title was "Extensive Air Showers associated with Penetrating Particles". She had developed the basic principle of identifying new subatomic particles by studying their tracks in a cloud chamber using the photographic emulsion technique. Subatomic particles leave a trail in a cloud chamber as is left by a jet engine aircraft in the sky. She calculated the mass, velocity and mean energy of meson particles using JG William's formula. It is still not clear how much her work had influenced Sir Patrick Blackett to receive the Nobel Prize in Physics in 1950.

After returning from England, she joined TIFR on recommendations of Sir Patrick Blackett to Homi Bhabha in 1949. She left TIFR in 1953 and joined the Saha Institute of Nuclear Physics, Kolkata. She also had a brief stint at Ecole Polytechnique, France (1855-56).

While in England, she received her first public acknowledgement of her work when a local daily, *The Manchester Herald*, published an article titled "Meet India's New Woman Scientist: She Has an Eye Cosmic Ray". Reporter Bridget Maxwell wrote that Ms Chowdhuri studied the extensive air shower caused when cosmic rays enter the earth's atmosphere from interstellar spaces. Ms Chowdhuri is trying to discover the how, why and where of this process.

Her biographers, Rajinder Singh and Supratim C Roy, wrote in 2018 in *Bibha Chaudhuri: A Jewel Unearthed — Her gender discrimination means that she was not elected as a member of any of the science academies though her work was of high quality*.