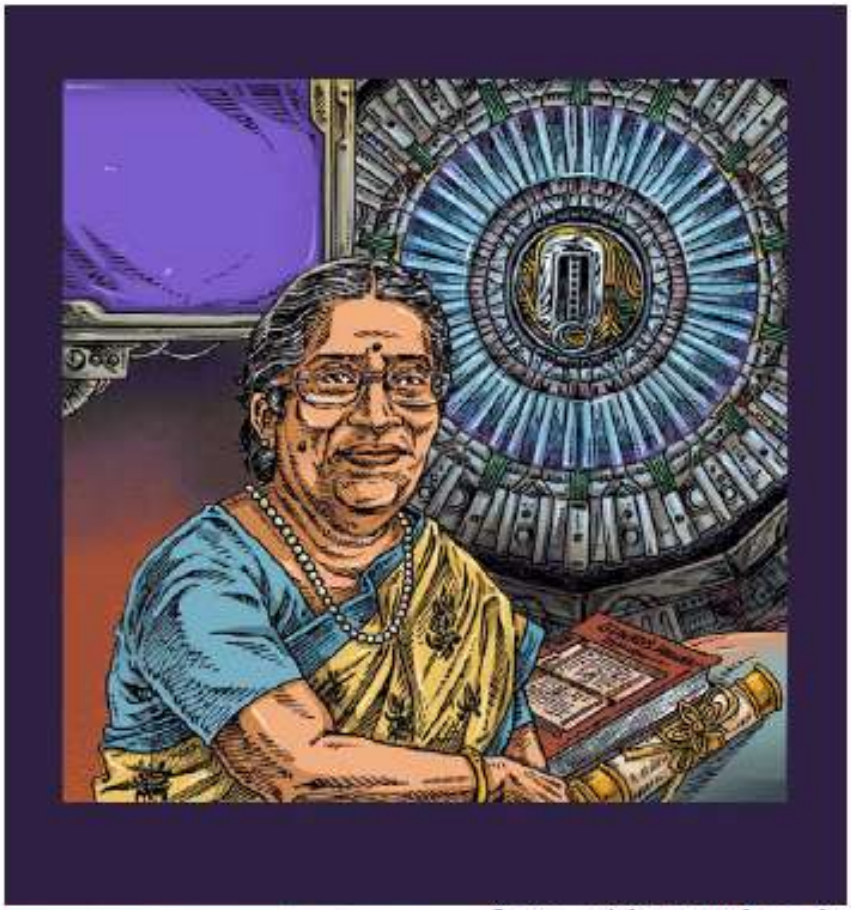
Rohini M. Godbole

Particle physicist crusading for women in STEM

In 2001, when Prof. Rohini shared her experience at the first international conference on Women in Physics her words resonated with the women audience from Ghana, Mauritius and Egypt. They said, "When western women talk, we feel that they are from a different culture. But when we listen to you, we feel - 'if she can do it, we can do it too!'

This set Rohini thinking. To inspire young girls to become future scientists of India, she founded with Prof. Ram Ramaswamy **'Women in Science'** project on behalf of the Indian Academy of Sciences. She approached many Indian women scientists, spoke to them extensively (pre-wifi era) and documented their life as a book titled *Lilavati's Daughters: The women scientists of India' (2008).* This is a compilation of brief biographical and autobiographical sketches where they talk of what brought them to science, what kept their interest alive and what has helped them achieve some measure of distinction in their careers. This collection readily available on the internet for free can inspire and motivate every girl student, parents and teacher.

Rohini Godbole attributes her thirst for science to the State Scholarship Examination. As many schools of that decade focussed on life skills to encourage enrolment, her school also taught home science instead of general science till the 7th grade. To help her clear the scholarship exam, her teachers taught her science outside the school hours and on holidays. She turns nostalgic recalling, "My math teacher Mrs. Sowani asked me to come to her house as her husband Bhau Sowani was known to be an excellent science teacher. Not only did he teach me things that I needed to know to succeed in the



examination but he opened my eyes to the world of science in general. He pointed me to a popular Marathi science magazine *Srishti Dnyan,* nurtured my interest in mathematics and encouraged me to participate in science essay competitions. Incidentally, I did get the scholarship (only 10 were given).

I was mighty proud as the amount was just 1 rupee less than my school fee."

Our country has always believed in the power of knowledge and skills for a better life. **Even in pre-independence era, many women in our country have received degrees from universities much before Oxford started awarding degrees to women graduates.** Rohini's parents saw to it that all their four daughters were well educated, despite their limited resources. In fact, after four kids were born, her mother completed BA and later finished post-graduation too. With such inspiring parents, Rohini turned as an advocate for the greatness of women.

Young girl Rohini got to learn about the National Science Talent Search (NSTS) scholarship programme. She spent her summer vacations during her B.Sc. Physics at I.I.T. Delhi and I.I.T. Kanpur, which gave her a broader perspective. After her under graduation as a topper from Sir Parshurambhau College of Pune University, she was offered a bank job with a big paycheque. Following her bigger aspirations, she boldly declined it and applied for Masters at IIT Bombay and IIT Kanpur. She chose IIT Bombay. Her NSTS scholarship of ₹200 or ₹250 per month helped her to bear the expenditure there.

Having studied in Marathi medium college, she was more worried about speaking in English, fitting-in at IIT, adjusting to the way subjects were taught there, completing the quizzes/ home assignments/ open book exams which were all new to her. She perceived these as bigger insecurities than being a woman in STEM.

Rohini, a 1974 Silver medallist of IIT Bombay reminisces her postgrad days, "We were a class of 17, just 3 girls. To be frank, gender was simply never an issue which affected our interactions. Intellectually, the atmosphere was great and so were some of the teachers. Professor S. H. Patil in particular has been a big influence. If I'm a theoretical physicist today, it is because of the 'home paper' that I did with him which made me see the beauty in the subject. I had to work quite hard to reach up to his standards."

She obtained Ph.D (1979) in theoretical particle physics from SUNY, Stonybrook University, USA. Returning to Motherland, she joined Tata Institute of Fundamental Research as a post-doc fellow. On how her family took her option to do research, she writes, "My family had never treated girls differently and so I never thought I was doing

anything different or special in going abroad for my Ph.D. Some relatives and acquaintances did of course try to 'warn' my parents of the problems it would create for my marriage chances!

But fortunately my parents paid no attention to it. It is thus undeniable that the support of one's family, especially one's parents, is extremely essential for girls choosing a field like research."

"Equally important was the encouragement and support received from my head of the department Prof. Rangwala. Such moral support in the early days goes a long way to give a young researcher the required confidence." Post-TIFR, Dr.Rohini worked briefly at the Royal Institute of Science (Mumbai) and then joined the University of Bombay as a lecturer in 1982 continuing her collaborative research at TIFR till 1995. Later, she joined IISc Bangalore, Centre for Theoretical Studies and chaired it till 2002. Superannuating there in 2021, she continues there as an honorary professor.

Prof. Godbole is part of the **International Detector Advisory Group (IDAG)** for the International Linear Collider in the European research lab, CERN. She has spent considerable periods of time in internationally reputed labs as a distinguished theoretical particle physicist, studying elementary particles. Her work on the **Standard Model and Beyond the Standard Model phenomenology** and on the structure of the proton, photon and nucleus has led to **'Drees–Godbole effect', 'Godbole–Pancheri model'**, that are unparalleled.

Rohini's theoretical models for the production of new particles and on devising search strategies for them at high energy colliders are globally acclaimed. As a theoretical physicist, her work had implications on design of colliders in the search for the Higgs particle. "For any particle physicist who has been Higgs-hunting for the last 30 years, this was like a dream come true. It is something we have been dreaming of and aiming for," exclaims Rohini about the announcement of Higgs particle. On the way ahead for research, her advice is " Now we are also looking at cosmic microwave background radiation in the universe or light/ neutrinos/ gravitational waves coming from the stars and galaxies for answers. To make progress on this path we need experts in machine learning to handle the big data, theorists who explore the mysteries of gravitation, experimentalists who probe the universe and cosmos through multiwavelength astronomy. This is the decade of astroparticle physics."

Awards / Accolades

- Awarded the Padma Shri for her contribution as a leading particle physicist and a crusader for women in STEM.
- France's Ordre National du Mérite in 2021 for her work in the physics explorations.
- D.Sc. (Doctor of Science) by IIT Kanpur.
- Among the few women elected as Fellow of all the three academies of Science of India and also the Science Academy of the Developing World (TWAS).
- Nominated to the Joint National Committee on IUPAP (International Union of Pure and Applied Physics and IAU (International Astronomical Union).

Her piece of advice: "Assess whether your dream can be a reality. Because I can always dream of going to the moon, but I may not have the wherewithal to do it. Follow your mind and heart. Don't let others tell you what you should and should not do."