



**Resonance is a monthly journal of science education
published by Indian Academy of Sciences, C V Raman
Avenue, PB No. 8005, Bangalore 560 080, India.**

Editors

N Mukunda (Chief Editor), *Centre for Theoretical Studies, Indian Institute of Science*
Vani Brahmachari, *Developmental Biology and Genetics Laboratory, Indian Institute of Science*
J Chandrasekhar, *Department of Organic Chemistry, Indian Institute of Science*
M Delampady, *Statistics and Mathematics Unit, Indian Statistical Institute*
R Gadagkar, *Centre for Ecological Studies, Indian Institute of Science*
U Maitra, *Department of Organic Chemistry, Indian Institute of Science*
R Nityananda, *Raman Research Institute*
G Prathap, *Structures Division, National Aerospace Laboratories*
V Rajaraman, *Supercomputer Education and Research Centre, Indian Institute of Science*
A Sitaram, *Statistics and Mathematics Unit, Indian Statistical Institute.*

Corresponding Editors

S A Ahmad, Bombay 1 H R Anand, Patiala 1 K S R Anjaneyulu, Bombay 1 V Balakrishnan,
Madras 1 MK Chandrashekar, Madurai 1 Dhruvajyoti Chattopadhyay, Calcutta
1 Kamal Datta, Delhi 1 S Dattagupta, New Delhi 1 S V Easwaran, New Delhi 1 P Gautam,
Madras 1 J Gowrishankar, Hyderabad 1 H Ila, Shillong 1 J R Isaac, New Delhi 1 J B Joshi,
Bombay 1 Kirti Joshi, Bombay 1 R L Karandikar, New Delhi 1 S Krishnaswamy,
Madurai 1 Malay K Kundu, Calcutta 1 Partha P Majumder, Calcutta 1 P S Moharir,
Hyderabad 1 R N Mukherjee, Kanpur 1 M G Narasimhan, Bangalore 1 S B Ogale,
Pune 1 Mehboob Peeran, Bangalore 1 T P Radhakrishnan, Hyderabad 1 G S Ranganath,
Bangalore 1 Amitava Raychaudhury, Calcutta 1 P K Sen, Calcutta 1 P N Shankar,
Bangalore 1 Shailesh Shirali, Rishi Valley 1 V Srinivas, Bombay 1 R Srinivasan, Indore
1 G Subramanian, Madras 1 V S Sunder, Madras 1 R Tandon, Hyderabad
1 P S Thiagarajan, Madras 1 B Thimme Gowda, Mangalore 1 R Vasudeva, Mysore 1 Milind
Watve, Pune 1 C S Yogananda, Bangalore.

Production Editor Srinivas Bhogle **Assistant Editors** M Raj Lakshmi, Sujatha Byravan
Page Composition A S Rajasekar **Editorial Staff** G Chandramohan, G Madhavan,
G V Narahari, Srimathi **Circulation and Accounts** Peter Jayaraj, Ranjini Mohan,
B Sethumani, Shanthi Bhasker, B K Shivaramaiah, R Shyamala.

Satyendra Nath Bose (1894-1974), along with Megh Nad Saha, established modern theoretical physics in India. Born and educated in Calcutta, he had a brilliant academic career through school and university. His teachers at Presidency College included J C Bose and P C Ray. After four years as lecturer in Calcutta University, he moved in 1921 to Dhaka University, working there until 1945. He then returned to Calcutta University as Khaira Professor, and was later Vice-Chancellor of Visva-Bharati.

While teaching M.Sc. students at Dhaka, Bose felt dissatisfied with existing derivations of Planck's Radiation Law. Spurred by discussions with Saha, he developed a logically satisfactory derivation based completely on Einstein's photon concept and what was later recognized to be his own "principle of indistinguishability" of photons. He sent his work to Einstein in June 1924. Einstein immediately grasped its significance, translated it into German, and arranged for its publication in the Zeitschrift fur physik. Thus was quantum statistics born.

Einstein applied Bose's method to give the theory of the ideal quantum gas, and predicted the phenomenon of Bose-Einstein condensation. (See the article by Rajaram Nityananda on page 107). Bose's work was an important step on the path to quantum mechanics. Bose-Einstein (BE) and Fermi-Dirac (FD) statistics are the two major expressions of indistinguishability of identical particles in quantum theory. Particles obeying BE statistics are called 'bosons' — examples are the photon, the pi meson, and the W and Z particles. Bose's name became part and parcel of modern physics.