

Editorial*

Patrick Das Gupta, Guest Editor

Autumn is here. According to the Indian tradition, the Moon appears brighter in autumn than in other seasons. In resonance with this lunar resplendence, the scientist of the month featured in this issue was a very brilliant, cosmic ray physicist, who was honoured by the International Astronomical Union four years ago with the assignment of her name Bibha to an observed bright white dwarf belonging to our Milky Way galaxy. What is also interesting is that her name (*Vibha*, in Sanskrit) means bright and shining too.

I am referring to the outstanding, albeit enigmatic, Late Dr Bibha Chowdhuri (1913–1991), who made pioneering contributions to the field of cosmic rays. Cosmic rays are a random but ubiquitous collection of extremely energetic electrons, protons, atomic nuclei, etc., arriving steadily on earth with near light speed from outer space with observed energy reaching up to $\sim 10^{21}$ electron volts. According to the most acceptable theoretical models, cosmic ray particles are accelerated to incredibly high energies by their interactions with the astrophysical shock waves propagating through the galactic interstellar media.

This issue of *Resonance* carries a thoroughly comprehensive and pedagogical article on the scientific journey as well as path-breaking research studies of Bibha Chowdhuri (the very first woman faculty of TIFR, Mumbai) by Prof. Naba K. Mondal, a renowned experimental high energy physicist who himself has contributed immensely to the subjects of cosmic rays, TIFR proton decay experiments at the Kolar Gold mines, neutrino observatory and many other topics. This exciting article succinctly weaves Bibha Chowdhuri's life story with her painstaking but innovative experimental investigations and the underlying physics behind the



Email:

patrickdasgupta1@gmail.com

*Vol.28, No.10, DOI: <https://doi.org/10.1007/s12045-023-1684-3>



experimental equipment and procedures like nuclear emulsions, proton calibration tracks, cloud chambers, extensive air shower arrays, neon flash tubes, muon detectors, etc.

The design of detectors and their arrays, alluded to above, often fall back on geometric specifications. This naturally brings us to a very interesting article of this issue that describes challenges involving optimal foldings of rectangles into triangles and vice versa, a mirror-symmetric and rhombic kite into a rectangle, and many more, that require solving a cubic equation or delving into the use of calculus for the purpose of optimization. It is a treat for the geometry enthusiasts.

If one is discussing mathematics, can prime numbers fall far behind? Consider the pairs (3, 5) or (5, 7) or (11, 13) and so on. What is common to these pairs—easy to answer, right? Apart from each of the numbers in the pairs being prime individually, their difference in a pair is simply 2, which is the only even prime number. The article ‘Heuristically Sifting Twin’ provides a fabulous pedagogical exposition of such twin primes and an associated conjecture, along with glimpses of zeta functions, prime counting function and Hardy–Littlewood conjecture. It also speaks of a simple, non-rigorous sieving technique that suggests that the number of twin primes is infinite.

Rubber tree plantations of South India are world famous since the beginning of the 20th century because of their large and relatively easy yield of rubber from ‘tapping’ the rubber tree barks and collecting the latex fluid. Can there be an inorganic-based alternative to the usual organic rubber? The article ‘Non-carbon Skeletal Polymers ...’ provides an answer to the question by describing polyphosphazenes that have rubber-like properties and are promising smart materials with diverse applications, be it biomedical or industrial.

Returning from inorganic to organic, the article ‘The Hunters in Green’ sketches the fascinating world of carnivorous plants, peering into the mechanisms involved in their trapping insects and their peculiar manner of digesting the latter.

Plants can turn detectives too! This is the subject of a thriller of an article, 'Plant Forensics', putting forward the details of the use of botanical evidence in forensic science, e.g. the affinity of pollen grains and moss shoots to stick to clothes allow them to provide valuable evidence concerning criminals or crime locations. The article also delineates a few actual crime cases which were dealt with with the aid of plant forensics.

The October issue has more to offer. A very happy reading and thinking to the readers!

