Editorial*

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When I was a high school student, we learned from Dalton's atomic theory that atoms were indivisible. As we moved to higher classes, we learned that atoms were indeed divisible and that they consisted of nuclei and electrons. Further, we were taught that the nuclei were made up of protons and neutrons and that protons, electrons and neutrons were the elementary particles. By definition, elementary particles could not be divided further. But as years went by, we learned that protons and neutrons were not so indivisible and that they were made up of fundamental particles called the 'quarks'. For a while, quarks remained a figment of imagination. But high energy physics experiments have revealed that they are very much 'real'. This issue of *Resonance* highlights the story of discovery of quarks.

In this issue, G Rajasekaran delves into the story of the discovery of quarks, and the role of Murray Gell-Mann in the development. Interestingly, it appears that Gell-Mann himself was ambivalent about the existence of quarks. He initially considered quarks a mere theoretical concept required for his 'current algebra'. But as experimental evidence mounted, he had to concede that quarks were real.

In the face-to-face interaction with N Mukunda in this issue, we learn the role of mathematics in physics. Mathematics is more than a language. The secrets of Nature get embedded in symbols in the equations that account for the observed phenomena. Often they reveal much more than what was envisaged in the beginning. The discovery of positron was one such instance. Obtaining the image of a black hole is perhaps the most recent episode of discovering something that was predicted by a detailed analysis of

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the mathematical equations.

In the face-to-face interaction, N Mukunda reveals his career progression and his involvement in physics along with his mentor E C G Sudarshan for decades. The story of Sudarshan is partly the story of weak interactions and the story of Gell-Mann is partly the story of strong interactions. I hope the young readers of science enjoy reading both the stories.

In addition to the above-mentioned stories of strong and weak interactions, this issue of *Resonance* carries articles in mathematics, physics, chemistry and biology. While A P Wickens writes on chemical neurotransmission and the contributions of Sir Henry Hallet Dale, S C Agarkar discusses the influence of learning theories on science education. The article by Breda *et.al*., focuses on spherical tiling with GeoGebra, while Sushan Konar in the first of a series of articles on the science of musical scales, discusses the human perception of sound. This issue also carries the fifth article in the series on designing experiments in animal behaviour by R Gadagkar. The article offers a fascinating insight on how ants estimate the distance walked (the fourth article, readers would remember, was on how bees estimate the distance flown).

While we relished working on and the release of another issue of *Resonance*, we thank all the contributing authors for their continued support. There is an invisible and invincible support from the anonymous referees. We thank them too. But for the readers, there is no journal. We thank the readers of *Resonance* for their dedicated support. We would love to hear from you – both what you love and what you would like to improve in *Resonance*. Write to us at: resonanc@ias.ac.in with a subject heading: 'Our Readers Write'. Selected correspondence will be published in the forthcoming issues of *Resonance*.