

Professor C. V. Raman and the Department of Physics, IISc, 1933–1948

M. A. VISWAMITRA

Chairman, Department of Physics, Indian Institute of Science, Bangalore 560 012.

Professor Raman joined the IISc as Director on 31st March 1933. The Department of Physics was inaugurated in July 1933 with Prof. C. V. Raman as the first head of the Department and with eight students; namely, R. S. Krishnan, S. Jagannathan, R. Ananthakrishnan, G. Narasimhaiah, D. S. Subbaramaiah, N. S. Nagendra Nath, P. S. Srinivasan and P. Pattabhiramaiah. Later in the year, B. V. R. Rao and C. S. Venkateswaran joined.

Research was initiated in the following subjects: Doppler Effect in light scattering, colloid optics, diffraction of light by ultrasonic waves, and Raman spectroscopy. This was followed in subsequent years by crystal physics, dynamics of crystal lattices, *e.g.*, the soft mode, physics of diamond, second-order Raman spectra of crystals, X-ray topography, and Brillouin scattering.

The total number of research scholars during the period 1933–1948 was 98. Among them in addition to those already mentioned, are: K. Venkatachala Iyengar, P. Nilakantan, B. V. Thosar, S. Ramaswamy, T. M. K. Nedungadi, B. D. Saxena, Vikram A. Sarabhai, Anna Mani, P. Raman Pisharoty, G. N. Ramachandran, D. D. Pant, S. Ramaseshan, K. G. Ramanathan, V. Chandrasekharan, T. Radhakrishnan and P. S. Narayanan.

Several distinguished scientists spent considerable periods of time here. In particular, Prof. Max Born spent six months as a Visiting Professor in the Department in 1936. Dr. H. J. Bhabha joined the Department as a special Reader in Theoretical Physics, to deliver 25 lectures, in 1940. In 1942, he became a special Reader with the status of a Professor as a personal distinction, and was at the IISc till 1945.

Raman stressed in his students, the desire for excellence in research as a prime requirement and also encouraged them to develop a strong initiative for independent research. His presence and the intellectual environment he provided, brought out their best and resulted in some significant contributions from the laboratory during his tenure here. Some of these are the following:

1. The reciprocity theorem in colloid optics – R. S. Krishnan
Proc. Indian Acad. Sci., 1935, **1**, 782.

2. The diffraction of light by high frequency sound waves. Parts I, II, III, IV and V. – C. V. Raman and N. S. Nagendra Nath
Proc. Indian Acad. Sci., 1935, **A2**, 406, 413; 1936, **A3**, 75, 119, 459.
3. A new technique of complementary filters for photographing the Raman spectra of crystal powders – R. Ananthakrishnan
Curr. Sci., 1936, **5**, 131.
4. Light scattering and fluid viscosity – C. V. Raman and B. V. Raghavendra Rao
Nature, 1938, **141**, 242.
5. Effect of temperature on the Raman spectrum of quartz – T. M. K. Nedungadi
Proc. Indian Acad. Sci., 1940, **A11**, 86.
6. Raman Effect and crystal symmetry – B. D. Saxena
Proc. Indian Acad. Sci., 1940, **A11**, 229.
7. The α - β transformation of quartz – C. V. Raman and T. M. K. Nedungadi
Nature, 1940, **145**, 147.
8. Interferometric studies of light scattering – C. S. Venkateswaran
Proc. Indian Acad. Sci., 1942, **A15**, 316, 322, 362, 371.
9. New concepts of the solid state – C. V. Raman
Curr. Sci., 1942, **11**, 85.
10. The physics of diamond – C. V. Raman
Curr. Sci., 1942, **11**, 261.
11. The Raman spectrum of diamond – R. S. Krishnan
Proc. Indian Acad. Sci., 1944, **A19**, 216.
12. X-ray topographs of diamond – G. N. Ramachandran
Proc. Indian Acad. Sci., 1944, **A19**, 280.
13. The photoconductivity of diamond – D. D. Pant
Proc. Indian Acad. Sci., 1944, **A19**, 315, 325.
14. The crystalline forms of the Panna diamonds – S. Ramaseshan
Proc. Indian Acad. Sci., 1944, **A19**, 334.
15. Raman spectra of second order in crystals: calcite gypsum, quartz – R. S. Krishnan
Proc. Indian Acad. Sci., 1945, **A22**, 182, 274, 329.
16. The Faraday Effect in diamond – S. Ramaseshan
Proc. Indian Acad. Sci., 1946, **A24**, 104.
17. Infrared spectrum of diamond – K. G. Ramanathan
Nature, 1945, **156**, 23.
18. A Theory of the crystal forms of diamond – S. Ramaseshan
Proc. Indian Acad. Sci., 1946, **A24**, 122.
19. The phosphorescence of diamond – V. Chandrasekharan
Proc. Indian Acad. Sci., 1946, **A24**, 193.
20. A home made infrared spectrometer – K. G. Ramanathan
Curr. Sci., 1946, **15**, 184.
21. The vibration spectra of the alkali halides – R. S. Krishnan and P. S. Narayanan
Proc. Indian Acad. Sci., 1949, **A28**, 296.
22. The influence of optical activity on light scattering in quartz – V. Chandrasekharan
Proc. Indian Acad. Sci., 1949, **A28**, 409.

23. The Raman spectrum of ammonium dihydrogen phosphate – P. S. Narayanan
Proc. Indian Acad. Sci., 1949, **A28**, 469.

Many of these are superb contributions and measure up to the best published anywhere at that time in the areas of optics and crystals. The list given also tells us how Raman not only inspired his students to take up forefront research problems but also encouraged them to publish the results by themselves.

Opening new lines of experimental physics research goes much beyond manipulation of available equipment. Raman stressed the determining role played by our ability to create our own instruments and newer techniques. He created departmental workshops in addition to the central workshop and produced some excellent results with a home-made spectrometer and a three-metre spectrograph. No less was Raman's emphasis on developing experiments in close interaction with theory.

After Prof. Raman's retirement, the main course of research in our Department continued on the lines set by him, for several years. But the decades that have now followed naturally have brought about many changes, with some research activities withdrawn and some recast and strengthened. Our major efforts are in condensed-matter physics, experimental as well as theoretical. We have also taken up some newer areas like the physics of biomolecular systems. Many of the boundaries between conventional sciences disappear when biological systems are studied to their end. To the physicists concerned with understanding the way nature works, biology offers a unique scope and some most fascinating and challenging problems. Raman himself in his later years took up some of these studies and was deeply concerned with questions related to vision and colour. Everything that involved light fascinated the great scientist. Our own studies on DNA, I hope, will one day lead to exploring problems involving the effect of light; like how the genes function under light.

It is with pride and pleasure that the Department of Physics remembers its founder in the centenary year of his birth.

My own contact with Prof. Raman was years after he retired from the Department. There were a few occasions when I was fortunate to meet and talk to him in person. They were great moments. I also like to recall here his lectures at the Raman Research Institute which we used to attend, when we were students of the Department. It was not just that Raman narrated brilliantly. He assumed no prior knowledge and yet we came out with the feeling that we understood everything he said, very clearly. When Raman spoke there never was any communication gap. We are far away from those days but Raman's achievements continue to inspire our progress as in the past.