

A gifted experimentalist and human being

An obituary of P. S. Narayanan by R. Srinivasan

Prof. P. S. Narayanan was born on 1 January 1926. After getting his B Sc (Hons) degree from the Madras University, he joined the Department of Physics, Indian Institute of Science in 1947 and obtained his Ph D degree in 1951. His early work was on Raman spectroscopy of crystals using the resonance radiation of mercury. His experimental studies on the second order Raman spectra of the alkali halides were of importance in understanding the lattice dynamics in these crystals.

His interest later shifted to the growth and study of ferroelectric crystals. He set up various facilities for growing a variety of ferroelectric crystals and studied their dielectric and ferroelectric properties, anisotropic thermal expansion and infrared and Raman spectra as a function of temperature and pressure. Among the materials studied were crystals of the alkali tri-hydrogen selenite family, dicalcium strontium propionate, and several double sulphates. His group found interesting correlations between the nature of the hydrogen bonds, the dielectric anomaly and the anisotropy of thermal expansion. Careful studies were made by his students on the effect of deuteration, pressure and radiation damage in the hydrogen bonded ferroelectrics. Studies on laser Raman spectroscopy of various ferroelectric materials provided valuable information on the mechanism of phase transition in these crystals.

Narayanan later moved to the study of nonlinear optical properties of organic dye solutions and their use in optical phase conjugation. He and his students made a systematic study of thermally induced DFWM (degenerate four wave mixing) in dye solutions to study the effect of concentration, the influence of the solvent and its properties and the effect of varying the interaction angle and probe beam intensities on the phase conjugate reflectivities. Studies on Raman induced phase conjugation (RIPC) were carried out by his group. In RIPC phase matching among the four beams in non-

degenerate four wave mixing can be achieved for a given beam geometry over a wide range of excitation frequencies. Phase matching can also be achieved for given beam frequencies for a wide range of input or 'image' beam angles. The stimulated Brillouin scattering gain was measured in halogenated methanes and compared with calculated values in a study of optical phase conjugation by stimulated Brillouin scattering. A novel approach for phase conjugate interferometry using a composite material



which contains both a photorefractive crystal and a dye-doped polymer thin film in a degenerate four wave mixing geometry has been reported by his group.

He was the Principal investigator for several projects sponsored by different funding agencies. He set up a laser Raman facility at the Indian Institute of Science, Bangalore, with DST support and carried out his research on optical phase conjugation with financial support from the Defence Research and Development Organization.

He served the Department of Physics of the Indian Institute of Science as a

professor from 1971–1986. He also held several administrative positions such as Dean of the Science Faculty, Professor-in-charge of the Department of Physics and Chairman, Division of Physical and Mathematical Sciences in the Indian Institute of Science during different periods of time.

In the last few years his health became frail. Recently he underwent a kidney transplant operation. Within a short period after the operation he passed away on 23 October 1994.

Over a period of about fortyseven years of sustained research, Narayanan has trained over thirty-five research scholars in crystal growth, ferroelectricity, laser Raman spectroscopy, and optical phase conjugation. He was a gifted experimentalist who devoted his time and effort to carry out systematic and painstaking research in areas which might not have been currently fashionable. He was elected a Fellow of the Indian Academy of Sciences, and a Fellow of the Indian National Science Academy. He was a sectional president in Physics of the seventythird Indian Science Congress in 1986.

Apart from his scientific achievements, his students and friends will remember him for his qualities as a human being. He was always ready to help any one who had a problem. His friendly smile and lack of ostentation created an instant rapport and endeared him to many. His patience was phenomenal and in the four decades I have known him, I cannot recall an occasion when he was harsh to any one. He was kind and considerate to all. Even when his health began to fail, he maintained a consistently cheerful attitude and refused to be overcome by his afflictions. In his death the scientific community has lost a devoted scientist. His students and friends mourn his death deeply.

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