

## Putcha Venkateswarlu – An obituary

Putcha Venkateswarlu (Department of Physics, Alabama A&M University) passed away on 8 August 1997 in Huntsville.

Venkateswarlu joined the Alabama A&M University in 1982, soon after his retirement from IIT, Kanpur and built an active school of research in lasers and spectroscopy, atomic, molecular and solid state physics, nonlinear optics and magnetic resonance. He was associated with some of the renowned spectroscopists over the last 50 years; his contributions during his post-doctoral research abroad and his faculty positions in Aligarh Muslim University and Indian Institute of Technology, Kanpur left an everlasting impression on the growth of spectroscopic research in India and abroad.

Putcha Venkateswarlu hails from Andhra Pradesh. He was born in Dantaloore and had his early education up to B Sc in A.C. College, Guntur. He then went to Banaras Hindu University for his M Sc, and on its completion, he joined R. K. Asundi for his D Sc. As a Research Scholar, he made notable contributions to our understanding of the diffuse and continuous bands of halogens. This not only earned him the D Sc of Banaras Hindu University in 1947 but also attracted the attention of the doyen of spectroscopists, R. S. Mulliken who considered his work on halogens was significant and offered him a post-doctoral Fellowship to work in his laboratories in Chicago. It was during this tenure that Venkateswarlu discovered the first triatomic free radical  $\text{CF}_2$ . This is an important contribution as it ushered in the spectroscopy of free radicals. Venkateswarlu later spent a year in Herzberg's laboratories in Ottawa where he investigated the infrared spectra of  $\text{CH}_3\text{CN}$  and  $\text{CH}_3\text{CCl}$  for the first time and analysed their vibration-rotation bands. He later continued his infrared studies at MIT along with R. C. Lord on molecules, allene and propylene. During his studies of infrared spectra, he found that of all molecules belonging to different point groups which do not have dipole mo-

ment in their ground states, only those of  $D_{2d}$  and  $T_d$  point groups do not have centre of symmetry. From group theoretical considerations, he along with Mizushima showed that molecules like  $\text{CH}_4$  possess non-vanishing dipole moment in the excited states of  $T_d$  and  $D_{2d}$  type molecules. Indeed after the advent of laser spectroscopy using resonance techniques, Luntz & Brewer and Curl & Oka confirmed the above prediction and measured the dipole moment of  $\text{CH}_4$  and the microwave transition in the excited  $F_2$  state.



Venkateswarlu got interested in microwave spectroscopy and had gone over to Duke University to collaborate with W. Gordy. Here he spent the next two years, 1952–54, on deriving molecular structures from microwave spectra and obtaining useful information on l-type doubling in molecules.

Thus nearly after a decade of intense research activity, he returned to India in 1954 and joined the Physics Department of Aligarh Muslim University (AMU). During 1934–39, R. Samuel and R. K. Asundi built an active school of optical spectroscopy in AMU and this greatly facilitated Venkateswarlu to revive the research activity. Further, he initiated research in microwave and resonance spectroscopies (NMR and ESR). In 1961, an Indian Institute of Technology was started in Kanpur and Venkateswarlu was invited to join and organize the Physics Department. The IIT had the support of the American consortium of

universities and this provided an excellent opportunity for Venkateswarlu to work in EPR and crystal spectra and the newly-emerging areas of laser spectroscopy and nonlinear optics. He made extensive contributions to application of EPR to a variety of problems in solid state physics. One of his recent studies relate to the mechanism of hologram formation in photo-refractive crystals. Using EPR, he demonstrated some photo-induced electron transfer processes. Using these results, he proposed a new model for photorefractive in Ba-TiO<sub>3</sub> type of crystals. During his last year, he gave an invited talk at the International Conference on Spectroscopy – Perspectives and Frontiers, in Bombay on 'Lasing of polymer microspheres doped with laser dyes'.

Venkateswarlu was Fellow of several physical societies and academies in India and abroad. He was elected to the Indian Academy of Sciences in 1957 and to the Indian National Science Academy in 1970. He was awarded the C. V. Raman centenary medal in 1988. He participated in several international conferences in spectroscopy, optics and lasers. He published extensively and lectured at various universities. During his tenure at IIT, Kanpur he visited for brief periods the National Research Council's Laboratories in Ottawa University of British Columbia, in Canada and University of California in Santa Barbara and used the opportunity to obtain spectra under higher resolution. Nearly 50 graduate students obtained Ph D under his guidance and a majority of them now occupy senior academic positions in India and abroad.

Putcha Venkateswarlu was a dedicated research scientist, an affectionate teacher and a sincere friend. Students were his family and the laboratory was his home.

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