Indian Physics Association, Mumbai

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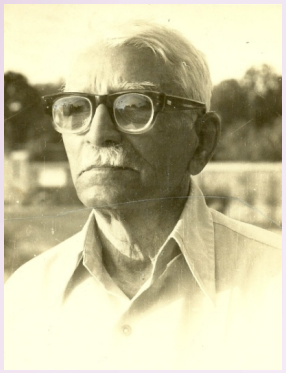
Department of Physics, Panjab University, Chandigarh

Prof. P.A. Pandya endowment Lecture



Prof. P.A. Pandya
1904-1996

Professor P.A.Pandya was born on 27th May, 1904 and had his early school education at Nadiad, Gujarat. In 1932 he was awarded the M.A. degree in Pure Mathematics of the University of Bombay. Shri P.A.Pandya joined the MTB College of Surat in 1927 as Demonstrator in Physics and was promoted as full Professor in 1939. On retirement in 1959, he was appointed as the first Principal of the newly established M. N. Science College of North Gujarat Education Society at Patan. Prof. Pandya was responsible for establishing this college as a full-fledged institution before his retirement in 1964. In view of his distinguished services to the cause of education, Prof. Pandya was recalled to serve as the first Principal of the R.P. Science College established at Anand. Prof. P. A. Pandya has written a book on Relativity in Gujarati which has been published by the University Text Books Board of Gujarat. His son Prof. S.P. Pandya is a well known nuclear physicists and he retired as director of Physical Research Laboratory, Ahmadabad.

SPEAKER

Prof. R.G. Pillay, *TIFR, Mumbai*

Speaks on

"Search for Neutrino-less Double Beta Decay"

Abstract

Study of beta decay provided the first physical evidence for the existence of an elusive and exotic particle postulated by Wolfgang Pauli in 1930, and named as the neutrino by Enrico Fermi in 1932. In nature, there are only 35 even-even nuclei in which single beta decay is forbidden or suppressed and can undergo double beta decay. In this mode ($2\nu\beta\beta$), two neutrons simultaneously undergo beta decay producing two protons, two electrons and two anti-neutrinos in the final state. The $2\nu\beta\beta$ process has been experimentally observed in 13 nuclei so far with a half-life in the range - $T1/2 \sim 10^{18}$ *to* 10^{24} *y*. Neutrino-less double beta decay ($0\nu\beta\beta$), is perhaps today the only experiment which can provide an answer to this key question. This decay mode ($0\nu\beta\beta$) violates conservation of lepton number and has implication in understanding the matter-antimatter asymmetry in the universe. Today, the study of the exotic properties of the neutrino opens a gateway to Physics beyond the Standard Model. In this presentation, I hope to the briefly highlight the physic motivation and world-wide experimental efforts to search for neutrino-less double beta decay. I will describe the complexity and challenges in designing such experiments which require pooling of expertise across a variety of interdisciplinary areas, with particularly emphasis on our present efforts on the experiment *Tin.Tin* (*The India-based Tin Detector)*, aimed to search for $0\nu\beta\beta$ in ^{124}Sn.

About the Speaker:

Professor R. G. Pillay was educated at I.I.T. Kharagpur, Kanpur and TIFR, Mumbai. He was a post-doctoral research Fellow at SUNY, Stony Brook, US from 1983-85 and during his career he researched on Nuclear Physics, Heavy ion Accelerators, Instrumentation, Electronics and Digital Control, Cryogenics technologies and engineering and Vacuum technology. He has published over 100 papers in refereed international journals. He setup the first national HPGe-based high spin spectrometer for nuclear structure studies and developed & commissioned the "Heavy Ion Superconducting Linac Booster" for the Pelletron Accelerator at TIFR. He made the first superconducting accelerator in India, which operational since 2002. He is project coordinator for "search for neutrino-less double beta decay in ^{124}Sn"; a low background, next generation experiment to be set up in the underground INO lab and also national coordinator for TIFR-BARC-VECC-GANIL France collaboration & India-GSI FAIR Germany. He is member of PAC of the ILC (international linear collider); a next generation e--e+ collider (under design) for high precision particle physics. He is also member of national committees for "Nuclear Structure research" and "Accelerator development". He held several senior administrative positions in TIFR and been a member of several academic and administrative bodies in TIFR, DAE and DST.

Venue: Prof. B.M. Anand Auditorium, Dept. of Physics, Panjab University.

Date: 20th April 2018 **Time: 11:00 am**