A K SUNDARAM MEMORIAL LECTURE

BY
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PROF A K SUNDARAM

Professor A.K. Sundaram, former Dean and a past distinguished faculty member of IPR, was an internationally known plasma physicist who had played a major role in the establishment and early development of the Institute. He belonged to the original team of seven scientists who had been handpicked by Dr. Vikram Sarabhai in 1971 to initiate a fusion program at the Physical Research Laboratory (PRL), Ahmedabad. His active contributions in the research program planning and in the training of young `would be plasma scientists' at PRL were of considerable help in the formation of a core group for the fusion program that was launched in 1982. Subsequently as the first Dean of IPR he set up the administrative structure of the Institute and successfully oversaw its operation for a number of years. An accomplished theoretical physicist with a strong background in Applied Mathematics his research interests encompassed a wide range of topics spanning space plasma physics, fusion physics and fundamental aspects of fluid dynamics. Known for his detailed and rigorous calculations – all carried out in neat long hand- he tackled frontline problems related to magnetic reconnection in the magnetosphere, tearing and ballooning mode instabilities in tokamaks and fundamental aspects of basic fluid instabilities. His scientific accomplishments attracted international attention and led to invitations for collaborations and visits to a number of leading research centers in the world. After taking retirement from IPR in 1993, Dr. Sundaram immigrated to the USA and worked for several years at the Goddard Space Flight Center, Greenbelt, Maryland where he continued to actively research magnetospheric and ionospheric phenomena. However, his heart always remained at IPR – as he was fond of saying – the organization that he had known from its infancy and had helped to grow and in which he had invested so much of his love and care. To honour his memory his family has contributed funds to establish this annual memorial lecture to be organized by PSSI. The lecture is to be delivered by an eminent scientist preferably on a topic of research interest of Dr.Sundaram.

ABOUT THE SPEAKER

Prof. Arnab Rai Choudhuri obtained his BSc degree with Physics Honours from Presidency College, Calcutta University, and his MSc degree in Physics from IIT Kanpur. He then went to the University of Chicago with a Shirley Farr Fellowship and obtained the PhD degree under the supervision of Prof. E. N. Parker. After postdoctoral research in High Altitude Observatory, Boulder, USA he joined the Physics Department of Indian Institute of Science (IISc) in 1987 where he has been ever since and presently serves as an Honorary Professor. His research has been in the area of theoretical studies of magnetohydrodynamic processes in astrophysics – primarily related to the Sun, although he has also worked on active galaxies, extragalactic jets, neutron stars and pulsars. He is one of the creators of the flux transport dynamo model, the currently favoured theoretical model of the 11-year sunspot cycle, and applied this model to successfully predict the strength of the last sunspot cycle.

A renowned theoretical astrophysicist, Dr. Choudhuri has written several high citation papers in the field and also contributed richly towards educational activities. His two books The Physics of Fluids and Plasmas (1998) and Astrophysics for Physicists (2010) by Cambridge University Press are widely used as textbooks in many universities around the world. He has also held prestigious visiting positions at several leading university and research institutes in the U.S.A., U.K., Europe, Japan and China. Prof. Choudhuri has received many honours and awards in his illustrious career starting with the Valentine Telegdi Prize for the most outstanding performance in the Physics Candidacy Examination, the Alexander Humboldt Fellowship and the JC Bose Fellowship. He is an elected Fellow of all the three Indian Science Academies. Most recently he was honoured with the S. Chandrasekhar Prize by the Division of Plasma Physics of the Association of Asia Pacific Science Societies.

ABSTRACT OF THE TALK

The 11-year sunspot cycle is produced by a plasma process known as the dynamo process inside the Sun. After presenting the relevant observational data, I shall discuss how we can understand the formation of sunspots on the basis of MHD equations. Then I shall give an introduction to the flux transport dynamo model, the currently favoured theoretical model of the sunspot cycle. Not all sunspot cycles are of equal strength.I shall end with a discussion of what causes the irregularities of the sunspot cycles and whether we can predict future cycles in advance.

Date: 14 December 2023 (Thursday)
Time: 3:30 PM
Venue: IPR Seminar Hall

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