



January 13, 2016

Association of Asia-Pacific Physical Societies (AAPS)

Division of plasma physics (AAPS-DPP)

Subramanyan Chandrasekhar Prize of Plasma Physics

– Prof. Predhiman K. Kaw is selected as Laureate of 2015 –

The Division of Plasma Physics (Chair: Mitsuru Kikuchi) under Association of Asia Pacific Physical Societies (President: Seunghwan Kim) selected Prof. Predhiman K. Kaw of the Institute of Plasma Research as the 2015 Laureate of S. Chandrasekhar Prize of Plasma Physics, which is awarded to a scientist who has made seminal / pioneering contribution in the field of plasma physics.

Citation : For his seminal contributions in the areas of laser-plasma interactions, strongly coupled dusty plasmas, and turbulence, nonlinear effects in magnetic fusion devices.

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On the achievement of Prof. Predhiman Kaw



Prof. Predhiman Kaw
(Institute for Plasma Research, Gandhinagar, India)

Prof. PK Kaw is an internationally recognized plasma physicist who has made several outstanding contributions to plasma physics, especially nonlinear laser-plasma interactions, strong coupling effects in dusty plasmas and turbulence and nonlinear effects in magnetically confined plasma.

Professor Kaw's illustrious scientific career had an early start when he obtained his Ph.D. from the Indian Institute of Technology, Delhi at the young age of 18 yrs. With over 380 research publications in international journals, Prof. Kaw has contributed richly to diverse areas of plasma physics and inspired many new areas of research with his original ideas. After research stints at various laboratories in the world, including the Physical Research Laboratory, Ahmedabad and the Princeton Plasma Physics Laboratory, Princeton, U.S.A. he returned to India for good in 1982 and spearheaded the establishment of a national magnetic fusion program in the country. As the founder Director of the Institute for Plasma Research he has played a leading role in putting India's fusion program on the international map including full membership and participation in the ITER collaboration. As DST Year of Science Chair Professor he continues to be very active in research as well as in mentoring and training the younger generation of plasma physicists in the country.



Press Release

Appendix 1: We show two important scientific contributions by Professor Kaw:

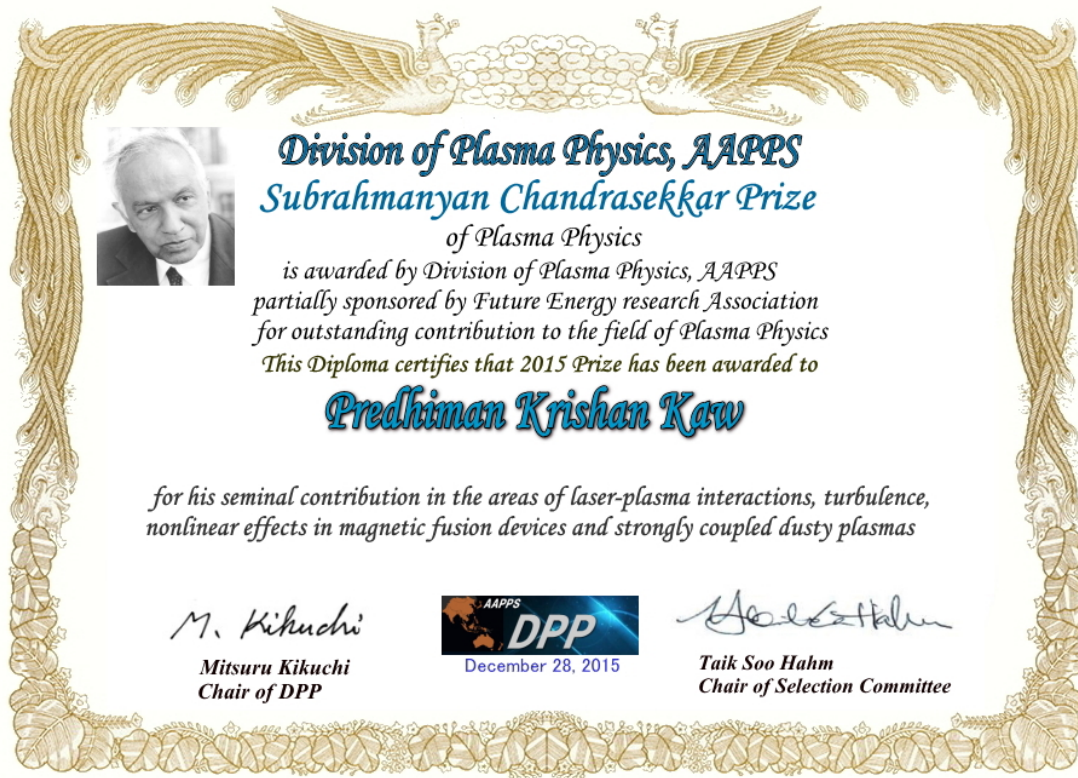
1. **Laser-Plasma Interaction:** Professor Kaw is a pioneer in laser-plasma interaction research. He identified and explored this extremely rich area of physics during its infancy. His prolific work in this area in the late sixties and early seventies was quite foresighted and laid the foundations for a new field with applications from inertial fusion to basic plasma physics. He carried out pioneering research on the key interaction processes, including a variety of laser-driven plasma instabilities. Some of these instabilities lead to enhanced absorption, others to enhanced reflection and laser beam filamentation. In today's table-top high intensity laser and massive fusion laser experiments, these are the building blocks that are aiding our understanding of the underlying physical processes. Professor Kaw discovered several new basic effects, such as light beam trapping as reported in his 1973 paper entitled "*Filamentation and Trapping of Electromagnetic Radiation in Plasmas*" in which he obtained a variety of elegant analytic and numerical solutions depicting light filaments and light trapping in a plasma as nonlinear equilibrium states arising from the interaction of the light beam with the plasma. Many of these states were subsequently verified in numerical simulations and observed in high power laser experiments.

2. **Strongly-coupled dusty plasmas:** Professor Kaw's highly cited 1998 paper on "Low frequency modes in strongly coupled dusty plasmas" was truly ground breaking in that it opened the door to at least two major lines of research: (1) the existence of a transverse acoustic wave, which is impossible in most other kinds of plasmas and therefore something most theorists would never have imagined, and (2) importing from the statistical physics literature for fluids a new theoretical approach for plasmas with strong Coulomb coupling, namely the Generalized Hydrodynamics Framework. The ideas in this paper were a very substantial step forward, and they have since been experimentally validated. This paper remains an inspiration for many experimenters, and has served as a foundation for many subsequent papers in the field. Many of the leading theorists in the field of strongly coupled plasmas continue to rely on the Generalized Hydrodynamics method developed in this paper as a starting point for their own theories.

Press Release



Appendix-2: Certificate of S. Chandrasekhar prize of plasma physics: Certificate and medal will be given at the 13th APCC in Australia on Dec. 2016.





Press Release

Glossary

1. Subrahmanyan Chandrasekhar

Astrophysicist born in India. He received Nobel Prize in physics due to his seminal contribution on black hole (Chandrasekhar limit) in 1983. This research area is broad and the contribution to the plasma physics is significant which can be seen from his texts “Principles of Stellar Dynamics (1942)” and “Hydrodynamics and Hydromagnetic Stability (1981)”.

2. AAPPS: Association of Asia-Pacific Physical Societies

(HP: <http://www.aapps.org/main/index.php>)

Association of physical societies in the Asia Pacific region founded by the Nobel Prize in physics Laureate, C.N. Yang and Prof. Akito Arima in 1983. AAPPS held 12th Asia Pacific Physics Conference under the president (at that time) Shoji Nagamiya in Makuhari, Japan. Current president is Prof. Swan Kim, Postech, Korea.

3. AAPPS-DPP: Division of Plasma Physics, AAPPS

(HP : <http://aappsdp.org/AAPPSDPPF/index.html>)

The first division under AAPPS based on the success of the plasma physics program in the APPC-12. This division is formed January 2014 based on the recommendation of Prof. Nagamiya at the AAPPS council.

4. S. Chandrasekhar Prize of Plasma Physics

Plasma physics prize founded by the AAPPS-DPP on July 2014. This prize is given to a plasma physicist annually who has made pioneering and/or seminal contribution to the plasma physics. 2014 prize recipient is Prof. S. Ichimaru (<http://aappsdp.org/AAPPSDPPF/prizetable.html>).

The 2015 selection committee chairman is Prof. Taik Soo Hahm (Seoul National University) and members are Profs Kunioki Mima (Japan), Yoshiharu Omura (Japan), Liu Chen (China), Baonian Wan (China), Robert Dewar (Australia), Tony Murphy (Australia), Rabindranath Pal (India), Yogesh Saxena (India), Chang-hee Nam (Korea), Lin I (Taiwan).