

## Subrahmanyan Chandrasekhar Prize of Plasma Physics

– Professor Qiu-Gang Zong is selected as 12th (2025) Laureate –

The Division of Plasma Physics (CEO: Mitsuru Kikuchi, Chair: Rajdeep Rawat) under the Association of Asia Pacific Physical Societies (President: Hyoungh Joon Choi) has selected Professor Qiu-Gang Zong of the Peking University/Macao University of Science and Technology as the 12<sup>th</sup> (2025) Laureate of S. Chandrasekhar Prize of Plasma Physics, which is awarded to scientist who have made seminal / pioneering contributions in the field of plasma physics.

Citation:

**Qiu-Gang Zong** : *For his exceptional scientific achievements in space plasma physics, especially his breakthrough contributions in identifying acceleration mechanisms of radiation belt electrons via drift resonance with ultra-low-frequency waves excited by interplanetary shocks impacting the Earth's magnetosphere, and in developing innovative energetic particle instruments for space investigations.*



### Certificates of 2025 S. Chandrasekhar Prize of Plasma Physics

Certificate, medal and cash prize will be given at the 9th Asia-Pacific Conference on Plasma Physics (AAPS-DPP2025) Sept. 21-26, 2025 at Fukuoka International Convention Center, Fukuoka, Japan.

Contact points :

AAPS-DPP Association Inc. : Representative Director and CEO, Mitsuru Kikuchi, TEL: +81-80-1115-3482

AAPS-DPP Homepage Address : <http://aapsdpp.org/AAPSDPPF/index.html>

## On the achievements of Professor Qiu-Gang Zong



*Prof. Qiu-Gang Zong*

Prof. Qiu-Gang Zong was born in 1965 at Jiangxi in China. He received his Bachelor degree of Science degree in Physics from Sichuan University, China, in 1986, and his Ph.D. in Geophysics under the supervision of Dr B Wilken and Prof. K -H Glassmeier from the Max-Planck-Institut für Sonnensystemforschung and Technische Universität Braunschweig, Germany, in 1999. After holding postdoctoral and research scientist positions at the Max-Planck Institute für Aeronomie in Germany and a JSPS fellowship at Waseda University in Japan, he continued his research in the United States, serving as a Senior Research Associate at Boston University and later as a Research Professor at the University of Massachusetts Lowell. In 2007, he moved to China as a "Yangtze" Professor at Peking University, where he also served as the Director of the Center of Planetary and Space Sciences. Since September 2023, he has served as Director and Chair Professor of the State Key Laboratory of Lunar and Planetary Sciences at the Macau University of Science and Technology (MUST) in Macao, China.

Prof. Zong is a pioneering figure in space plasma physics, renowned for his groundbreaking contributions to understanding particle acceleration, cross-scale energy transfer, and space weather dynamics. His seminal discovery of ultra-low-frequency (ULF) wave-driven "killer electron" acceleration in Earth's radiation belts (GRL 2007, JGR, 2009) resolved a decades-long mystery in space physics. This study revealed how interplanetary shocks excite poloidal-mode ULF waves, which are characterized by electric field oscillations in the east-west direction—a same direction as the electron drift motion around Earth. The shock-induced poloidal waves then accelerate electrons to hazardous energies via drift resonance, a wave-particle resonance process now applied across planetary magnetospheres. It was hailed by ESA as critical to understanding space hazards and ranked among Discover magazine's "Top 100 Science Stories of 2007."

As an instrument innovator, Prof. Zong led the development of Peking University's Imaging Electron Spectrometer (IES), deployed on twelve Chinese satellites. Data from these instruments have propelled the Chinese space weather forecast capabilities from zero to international competitive levels (Space Weather, 2018). Especially, his team's forecast model of "killer electrons" has been incorporated into the standard operational forecast model of the Chinese National Space Weather Center (CNSWC). Besides, Prof. Zong leads a PKU team to develop a novel energetic neutral atom (ENA) Imager, designed to provide high-sensitivity ENA imaging of the space storms in Earth and other planets, as well as the heliospheric outer boundaries. He also serves as PI for particle spectrometers on various mission and as co-I on major international missions, including Cluster, Double Star, BepiColombo, and Solar Orbiter.

Prof. Zong's research impact is globally recognized, with total citation of 11,024 in Web of Science (h-index=53) and 14,936 in Google Scholar (h-index=61) as of June 2025. His outstanding accomplishments have earned him numerous prestigious awards, including Fellowship of the American Geophysical Union (AGU) in 2023, the Hannes Alfvén Medal from the European Geosciences Union (EGU) in 2020, the SCOSTEP Distinguished Scientist Award (2020), and the COSPAR Vikram Sarabhai Medal (2018)

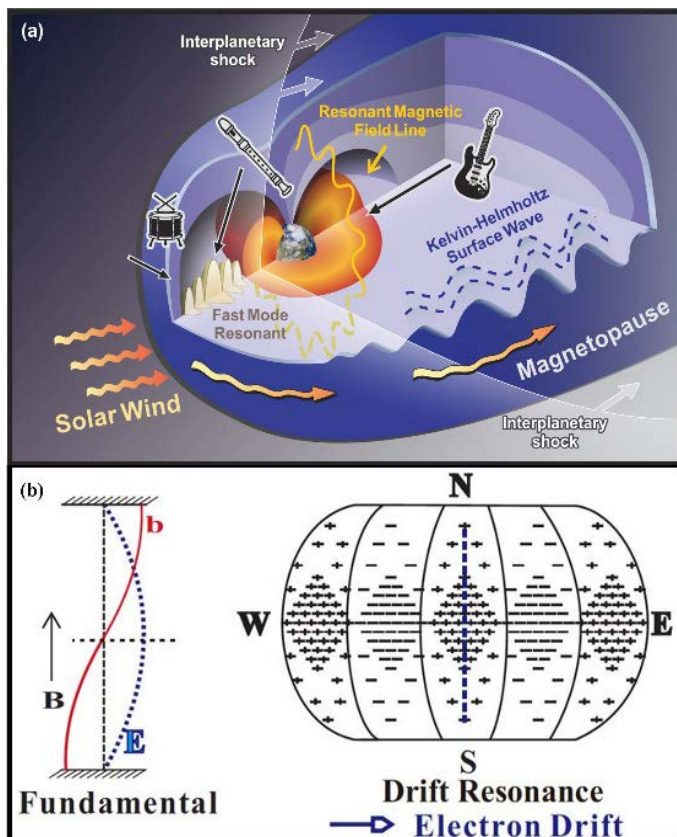


Figure 1(left). Prof. Zong revealed how "killer electrons", high-energy electrons hazardous to spacecraft and astronauts, are accelerated in Earth's radiation belts through interactions with ultra-low-frequency (ULF) waves. When interplanetary shocks strike the magnetopause like a drumstick's sudden impact, the entire system reverberates at its natural frequency. These vibrations may synchronize with oscillations of geomagnetic field lines, generating powerful Field Line Resonances (FLRs), as if a celestial musician were plucking the strings of Earth's magnetic guitar. When the drifting period of energetic electrons matches the FLR period, wave-particle drift resonance occurs, enabling a sustained energy transfer from solar wind to magnetospheric particles.

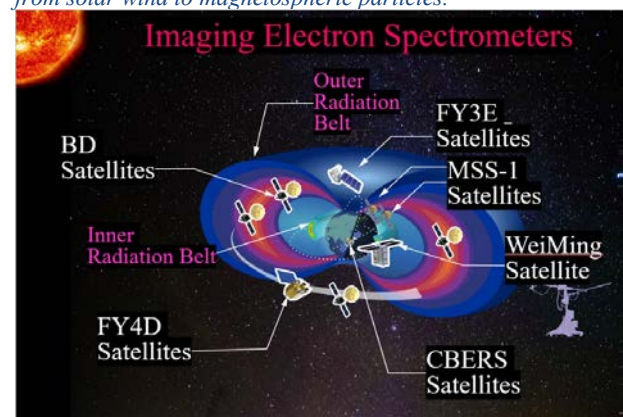


Figure 2. Prof. Zong led the development of Peking University's Imaging Electron Spectrometer (IES), deployed on twelve Chinese satellites. IES monitors "killer electrons" and have propelled the Chinese space weather forecast capabilities.



## Press Release

### Appendix:

#### 1. Subrahmanyan Chandrasekhar

Astrophysicist born in India. He received the Nobel Prize in Physics in 1983 for his theoretical studies of the physical processes of importance to the structure and evolution of stars, including the Chandrasekhar limit on the mass of white dwarf stars. His research covered several broad areas, as seen from his texts, which included *Principles of Stellar Dynamics* (1942), *Hydrodynamic and Hydromagnetic Stability* (1961), and an influential book based on his lecture notes in *Plasma Physics* (1960).

#### 2. AAPPS: Association of Asia-Pacific Physical Societies

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

The Association of physical societies in the Asia Pacific region founded by the Nobel Laureate in Physics C.N. Yang, and Professor Akito Arima in 1983. The AAPPS held the 12<sup>th</sup> Asia Pacific Physics Conference under the president (at that time) Shoji Nagamiya in Makuhari, Japan. The current president is Professor Hyoungh Joon Choi, Yonsei University, Korea.

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

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

The first division under the AAPPS based on the success of the plasma physics program in the APPC-12. This division was formed in January 2014 based on the recommendation of Professor Nagamiya at the AAPPS council. From Nov 28, 2018, AAPPS-DPP becomes legal entity <http://aappsdp.org/DPPhoujin/index.html> .

#### 4. Subrahmanyan Chandrasekhar Prize of Plasma Physics

Subrahmanyan Chandrasekhar Prize of Plasma Physics is a top plasma physics prize founded by the AAPPS-DPP in July 2014 and is endorsed by AAPPS. This prize is given to a plasma physicist annually for pioneering and/or seminal contribution to plasma physics. The prize recipients were Professor S. Ichimaru (2014), Professor P. Kaw (2015), Professor D. Melrose (2016), Professors C.Z. Cheng and Lou C. Lee (2017), Professor Toshiki Tajima (2018), Professors Liu Chen and Kazunari Shibata (2019), Professor Hyeon Park (2020), Professor Taik Soo Hahm (2021), Professor Arnab Rai Choudhuri (2022), Professor Katsumi Ida (2023), Professor Pisin Chen (2024) (<http://aappsdp.org/AAPPSDPPF/prizetable.html>).

The 2025 Selection Committee composed of leading plasma physicists in Asia-Pacific region.

Chairman :

Professor Lou-Chuang Lee (Academia Sinica)

Members :

Prof. Yasushi Todo(NIFS)

Prof. Yoshiharu Omura(Kyoto University)

Prof. Abraham Chian (Univ. of Adelaide)

Prof. Michael Wheatland (Univ. of Sydney)

Prof. Sung-Hee Park (Korea University)

Prof. Jae-Min Kwon(KFE)

Prof. Rajaraman Ganesh (IPR)

Prof. Ravindra G Kumar (TIFR)

Prof. Lin I (National Central University)

Prof. Yutong Li (Institute of Physics, CAS)

Prof. Wulyu Zhong(SWIP)



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To,  
Dr. Mitsuru Kikuchi, FirstP  
Representative Director  
& CEO, AAPPS-DPP  
Chairman, Reviews of Modern  
Plasma Physics

Professor Lou-Chuang Lee  
Academician: Academia Sinica  
The World Academy of Science (TWAS)  
International Academy of Astronautics (IAA)  
International Academy of Engineering (IAE)/RAE  
Foreign Member of the US National Academy of Engineering

July 16, 2025

Dear Professor Kikuchi :

I have great pleasure in conveying to you the decision of the Selection Committee regarding the S. Chandrasekhar Prize 2025:

The Selection Committee recommends that the AAPPS-DPPS, Chandrasekhar Prize for Plasma Physics for the year 2025 be awarded to Professor Qiugang Zong of China.

The proposed award citation for the awardee is listed below:

**Qiugang Zong** : "For his exceptional scientific achievements in space plasma physics, especially his breakthrough contributions in identifying acceleration mechanisms of radiation belt electrons via drift resonance with ultra-low-frequency waves excited by interplanetary shocks impacting the Earth's magnetosphere, and in developing innovative energetic particle instruments for space investigations."

With Best Regards,  
Sincerely,

Lou-Chuang Lee  
Chair,  
Selection Committee of S. Chandrasekhar Prize 2025.