Hong-Jian He and Zheng-Ming Sheng won the 2016 Achievement in Asia Award (Robert T. Poe Prize)

****

Professor Hong-Jian He (Department of Physics, Tsinghua University, Beijing) and Prof. Zheng-Ming Sheng (Department of Physics and Astronomy, Shanghai Jiao-Tong University) are the co-winners of the 2016 Achievement in Asia Award (Robert T. Poe Prize) given by the International Organization of Chinese Physicists and Astronomers (OCPA).

The OCPA AAA (Robert T. Poe Prize) is awarded annually to a Chinese physicist/astronomer or a team working in Asia in recognition of their outstanding achievements in physics and astronomy. The Award carries a total cash prize of US$2,000 and a certificate citing the awardee's accomplishments in research.

Prof. Zheng-Ming Sheng did his Ph.D. in Optics in 1993 under the supervision of Prof. Zhi-Zhan Xu from Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (CAS). He was then a postdoc researcher working with Prof. J. Meyer-ter-Vehn in Garching, Germany and later with Prof. K. Mima in Osaka, Japan. He joined Prof. Jie Zhang's group in the Institute of Physics, CAS, in Beijing through CAS's Hundred Talents Program in 2001. He has been a distinguished professor of Shanghai Jiao Tong University since 2007.

Dr. Sheng has been working on relativistic laser-plasma physics and applications via theory and simulation since 1990. He and his collaborators discovered the mechanisms of betatron resonance acceleration of electrons in a laser plasma channel and laser-driven stochastic acceleration of electrons in plasma. Some effective schemes to control electron injection for high quality beam production in laser-plasma based electron accelerators were proposed by him and his collaborators. A few novel mechansisms such as mode conversion to produce ultrashort brilliant radiation from terahertz to X-rays have been discovered. Many of these have been demonstrated experimentally and are providing importance guidance for this area of research. He and his collaborators are among the first for the discovery of the efficient radiation pressure acceleration of ions by high power lasers. He also contributes to the development of advanced schemes of inertial fusion energy. He received the 2nd Class National Award for Natural Science (2006), Rao Yu-Tai Award of the Chinese Physical Society (2007), Outstanding Science and Technology Achievement Award, CAS (2007), and Chang Jiang Scholars Program from Ministry of Education and Li Ka Shing Foundation (2008). He is a fellow of American Physical Society (2013) and a fellow of Institute of Physics, UK (2015).

Relativistic laser-plasma has emerged as a frontier of interdisciplinary studies since 1990s with the advent of ultrashort relativistic intense lasers. In particular, it has shown to be promising for a number of important applications, such as the next generation of advanced particle accelerators and radiation sources, creation of extreme and exotic states of matter usually found in astrophysical environments, and advanced concept of fusion energy. The physics of relativistic laser-plasma interactions is at the core of all these studies, to which Prof. Sheng has made outstanding contribution.

Prof. Sheng and collaborators first discovered the mechanism of betatron resonance acceleration of electrons (also called direct laser acceleration) in a laser self-focusing channel in plasma, which is widely recognized as a seminal contribution to the field of laser plasma with lots of applications from bright X-ray generation and fast ignition of fusion targets. This article reporting this work was selected among the Highly Cited Papers from 50 Years of Plasma Physics by AIP (The American Institute of Physics) in 2009. This mechanism was demonstrated by many experiments. This mechanism was used to control electron injection into laser wakefield acceleration by a French group as the well-known colliding laser injection scheme for high quality electron beam production. Coherent radiation production is also highly important for the applications of relativistic laserplasma. Prof. Sheng discovered a novel mechanism of electromagnetic radiation called linear mode conversion from electron plasma wave. This mechanism was demonstrated

firstly by a French group to produce bright XUV radiation in 2006, now well-known as coherent wake emission, which is recognized as one of the two major mechanisms of producing coherent X-ray radiation from relativistic laser-solid interaction.

There is increasing demand to manipulate high power lasers for various applications. Normal optical components are subject to thermal damage limit, for example, the thermal damage threshold of the conventional gratings is usually just a few J /cm^2. Proper plasma structures can be used to overcome this kind of difficulties. Prof. Sheng and collaborators first proposed the idea of plasma gratings, which can sustain an irradiation flux three orders of magnitude higher than the conventional gratings for laser pulse compression. This concept was demonstrated experimentally in 2009. He and collaborators also proposed the ideas of plasma lens and plasma optical modulators, where the latter can lead to the generation of intense laser pulses with ultra-broad bandwidth.

The winners of the 2016 AAA (Robert T. Poe Prize) were selected by following panel of distinguished physicists (in alphabetical order):

Professor Che-Ting Chan	Hong Kong University of Science and Technology
Professor Meng Jie	Peking University
Professor Ting-Kuo Lee	Institute of Physics, Academia Sinica, Taiwan
Professor Zheng-Tian Lu	University of Science and Technology, Hefei
Professor Jian-Wei Qiu	Iowa State University and Brookhaven National Laboratory

OCPA's AAA activity is a continuing program and represents a long tradition of OCPA to recognize outstanding achievements of the members of the Chinese physics and astronomy community. Previous AAA winners include:

OU-YANG, Zhong-Can	(1993, Institute of Theoretical Physics, China)
ZHU, Qing-Shi	(1994, University of Science and Technology, China)
I, Lin	(1995, National Central University, Taiwan)
WEI, Ching-Ming	(1996, Academia Sinica, Taiwan)
CHING, Emily Shuk-Chi	(1999, Chinese University of Hong Kong)
WANG, Jian	(1999, University of Hong Kong)
CHAN, Che-Ting	(2000, Hong Kong University of Science & Technology)
HOU, Jian-Guo	(2001, University of Science & Technology, China)
YANG, Xue-Ming	(2001, Academia Sinica, Taiwan)
HOU, Wei-Shu	(2002, National Taiwan University, Taiwan)
WANG, Enge	(2002, Institute of Physics, CAS, China)
ZHANG, Jie	(2004, Institute of Physics, CAS, China)
LI, Baowen	(2005, National University of Singapore)
WANG, Ning	(2006, Hong Kong University of Science & Technology)
LI, Hsiang-nan	(2007, Academia Sinica, Taiwan)
GAO, Hongjun	(2008, Institute of Physics, CAS, China)
East Team	(2009, Institute of Plasma Physics, CAS, China)
MENG, Jie	(2009, Beijing University, China)
FENG, Dong-Lai	(2010, Fudan University, China)
WEN, Hai-Hu	(2010, Institute of Physics, CAS, China)
HO, Pei-Ming	(2011, National Taiwan University, Taiwan)
DAI, Xi	(2012, Institute of Physics, CAS, China)

FANG, Zhong	(2012, Institute of Physics, CAS, China)
JIA, Jin-Feng	(2013, Shanghai Jiao Tong University, China)
ZHOU, Xing-Jiang	(2013, Institute of Physics, CAS, China)
HAN, Yilong	(2014; Hong Kong University of Science and Technology)
YAO, Wang	(2014; University of Hong Kong)
MA, Yugang	(2015; Shanghai SINAP)
SUN, Qing-Feng	(2015; Peking University)