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PREFACE

Preface to special issue: dedicated to Professor Wenqing Shen in honor of his 80th birthday

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We are honored to dedicate this issue to Professor Wenqing Shen to celebrate his 80th birthday, along with his distinguished career, great achievements in nuclear science, and fruitful contributions to science and technology management.

Professor Wenqing Shen was born in Shanghai on August 21, 1945. After graduating from middle school with outstanding grades, he was admitted to the preparatory program of Fudan University; this marked the first turning point in his life. During his three years in the preparatory program, he read several accounts on scientists and was particularly moved by that of Madame Curie. This inspired him to devote himself to science and pursue his studies with diligence. Owing to his excellent academic performance, he was recommended by the school to participate in various competitions pertaining to physics, chemistry, and mathematics in Shanghai, where he won several awards. He was overwhelmed and excited on receiving the prize in mathematics, which was presented to him by the acclaimed mathematician Chaohao Gu, whom he admired immensely; in fact, this was a decisive moment in his path to becoming a scientist. In 1962, upon securing excellent scores, Professor Wenqing Shen was admitted to the Department of Engineering Physics at Tsinghua University and chose to study nuclear physics.

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In 1968, after graduating from university, Professor Wenqing Shen was assigned to the Institute of Modern Physics (IMP) in Lanzhou but was immediately sent to a labor farm of the 7975th Unit in Xinjiang. During his 2 years on the farm, he strengthened his physical fitness, honed his willpower, and developed a spirit of perseverance in the face of hardship. In 1970, after a five-year break in his studies, Professor Wenqing Shen returned to IMP. At that time, there existed widespread criticism on individuals focusing solely on technical expertise, and the idea that “studying is useless” was prevalent. Despite the constraints, Professor Wenqing Shen continued to pursue his scientific goals. He completed the university courses he had missed over the break through self-study, began learning English from the basics of the alphabet, and undertook academic research. At that time, Mr. Chengzhong Yang, the director of IMP and a member of the Chinese Academy of Sciences, was in the same research group as Professor Wenqing Shen, conducting studies on low-energy heavy-ion nuclear reactions, the nuclear structure, and the synthesis of new nuclides. Professor Wenqing Shen often took dedicated breaks or put in extra hours after work to seek guidance from Yang on research methodology and other academic topics, with each conversation bringing him new insights. Such guidance was especially valuable to Professor Wenqing Shen, who was just beginning his scientific career and desperately needed advice on effectively conducting research. Mr. Yang taught Professor Wenqing Shen several things in this regard, including the books to be prioritized, questions to focus on, and integration of basic knowledge with scientific research. Professor Wenqing Shen benefited greatly from this advice and soon became the leader of a subproject on low-energy heavy-ion nuclear reactions.

At the beginning of China’s reform and opening up, the country began to select talents for international academic exchanges. In February 1979, Professor Wenqing Shen was sent by the government to visit the National Heavy Ion Research Center in West Germany (GSI). This was one of the first scientific delegations to which academicians were sent abroad after the reform. Professor Wenqing Shen quickly realized that China was considerably behind other countries in many scientific areas, such as computers and computer networking, and had little knowledge on computer usage. With great determination and perseverance, Professor Wenqing Shen dedicated three full months mastering computer applications, which earned him high praise from Professor Bock, the deputy director of GSI. Professor Wenqing Shen firmly believed that the Chinese were no less capable than others, and with great determination, he completed his assigned tasks to a high standard within the allotted two-year timeframe. He obtained impactful results in research areas such as the characteristics of heavy-ion-induced transfer reactions and the influence of potential energy surfaces on heavy-ion nuclear reactions. When Professor Wenqing Shen and his colleagues returned to China, they brought with them some of the most advanced equipment donated by Germany. Regarding this, the Germans had playfully remarked, "Just don't let it become scrap metal", reflecting their concerns on China's technical capabilities failing to fully utilize the given equipment. Shortly after, German experts visited China and were pleased to see Professor Wenqing Shen and other Chinese scientists using the equipment effectively; the experts were highly impressed and expressed their heartfelt praise and admiration. This success led to several subsequent visits by German experts, expanding the scope of their cooperation with China, and Professor Wenqing Shen developed strong friendships with many of them. (Fig. 1)

Between 1984 and 1985, Professor Wenqing Shen paid his second visit to GSI, where he made outstanding contributions to research on quasi-fission and its physical properties, the impact of quasi-fission on the synthesis of superheavy nuclei, and the timescale of mass relaxation in nuclear reactions. In Germany, a foundation had been set up by the Volkswagen company, managed by experts and scientists, which annually awarded funds to outstanding young scientists working in Germany or German scientists. Owing to the remarkable achievements and contributions of Professor Wenqing Shen toward quasi-fission research, he was honored with this award. Professor Wenqing Shen used the 200,000 German Marks he received to purchase several pieces of equipment that he brought back with him, creating excellent conditions for future research in China.

After returning to China, Professor Wenqing Shen served as the Deputy Director of the Institute of Modern Physics at the Chinese Academy of Sciences and Chairman of its academic committee (Fig. 2). He was also responsible for the construction of the experimental area for the large-scale scientific project "Heavy Ion Research Facility in Lanzhou (HIRFL)". At that time, the plans for seven experimental terminals had been largely completed. Professor Wenqing Shen organized the development of these experimental terminals and coordinated the establishment of a public technical support system covering mechanical, vacuum, and electrical fields. Moreover, he set up a common electronic instrument library, developed a detector laboratory, and established an experimental data acquisition and analysis system. These efforts ensured that experimental research could commence immediately after the completion of the main accelerator for this major scientific project. Professor Wenqing Shen also organized the first series of experiments on medium-energy heavy-ion reaction mechanisms, high-spin nuclear structures, and synthesis of new isotopes. At that time, radioactive beam physics was an important frontier in nuclear physics research worldwide. Professor Wenqing Shen immediately initiated the construction of a radioactive beamline at HIRFL. This project was quickly supported by the Chinese Academy of Sciences, and Professor Wenlong Zhan was in charge of its construction, enabling China to enter the global forefront of radioactive nuclear beam physics research.

In 1991, Professor Wenqing Shen was transferred to the Shanghai Institute of Nuclear Research (now the Shanghai Institute of Applied Physics, Chinese Academy of Sciences).

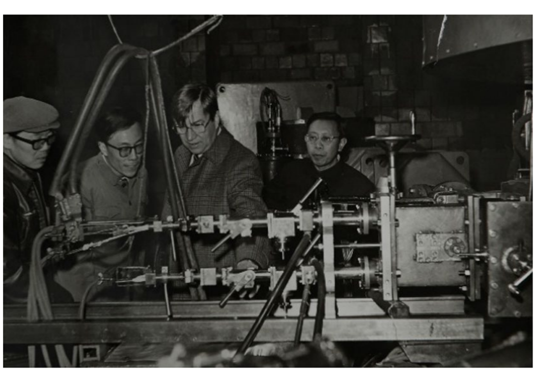

Fig. 1 A photo taken during the visit of Director of GSI, Dr. Gisbert zu Putlitz to IMP in 1982. From the right, Enjiu Wu, Gisbert zu Putlitz, Wenqing Shen and Zhen Li

Fig. 2 The group photo taken during the visit of Chinese American, Nobel Prize winner in Physics, Tsung-Dao Lee to IMP in June 1, 1990

He quickly established a research group, focusing on experimental and theoretical research in medium-energy heavy-ion nuclear reactions and radioactive nuclear beam physics; their work garnered high praise globally. For example, Professor Ditrass, the former Director of France's National Large Heavy Ion Accelerator Laboratory (GANIL) and former science advisor to French President François Mitterrand, praised their pioneering experimental work on the development of heavier radioactive secondary beams, stating that it was of substantial value. He also announced, "The National Large Heavy Ion Accelerator Laboratory in France will provide them with free beamtime and experimental equipment". At that time, nuclear physics research in China was in a challenging phase. However, owing to the dedication of a group of domestic nuclear physics researchers, the project "Radioactive Beam Physics and Nuclear Astrophysics" received funding from the national "973 Program". Professor Wenqing Shen was the chief scientist of this project, leading domestic researchers to conduct detailed studies. Their research achievements gained widespread recognition from peers both in China and abroad.

From 2003 to 2013, Professor Wenqing Shen served as the Deputy Director of the National Natural Science Foundation of China (NSFC), overseeing the Mathematical and Physical Sciences Division as well as matters regarding international cooperation, supervision, and audit. He believed that fairness, impartiality, and transparency were paramount for the NSFC, along with the integrity of its leadership. He emphasized that the reputation of the foundation should be protected like one's own eyesight, and that scientists should serve as moral role models, with outstanding scientists representing the highest standard. Professor Wenqing Shen often quoted Einstein, who considered "morality", rather than talent or hard work, as the most important quality for scientific research. Under the leadership of NSFC Director Yiyu Chen, strict review principles, procedures, and conflict-of-interest policies were maintained. The NSFC leadership maintained strict self-discipline, and academic misconduct was dealt with seriously, resulting in a positive reputation for the NSFC. During the tenure of Professor Wenqing Shen, the Mathematical and Physical Sciences Division established joint funds, such as the Astronomy Joint Fund and the Large-Scale Scientific Facility Joint Fund, which encouraged scientists across the country to share major equipment and fully utilize China's large-scale scientific facilities to conduct high-quality research. Each year, the division also supported disciplines that faced significant challenges but were crucial to national development, ensuring a balanced growth of mathematical and physical sciences in China. Additionally, Professor Wenqing Shen vigorously promoted international cooperation in basic scientific research, expanding collaborative efforts between China and other countries with joint review and funding mechanisms. He initiated major international collaborative research projects and promoted China-led international research collaborations.

Professor Wenqing Shen deeply appreciated Marie Curie's famous saying, "Science is very beautiful". As both a scientist and research administrator, Professor Wenqing Shen has exemplified the "beauty" of science through his diligence, rigor, enthusiasm, perseverance, openness, and sincerity. He has made significant innovations in the fields of radioactive beam physics and medium- to high-energy heavy-ion nuclear reactions. In addition, Professor Wenqing Shen is passionate about popularizing science and cultivating young talents. He has supervised more than twenty M.S. and Ph.D. students and worked with numerous postdoctoral fellows, many of whom have become leading academic figures. Professor Wenqing Shen himself has been recognized five times by the Chinese Academy of Sciences as an outstanding graduate advisor and has received the Lu Jiaxi Outstanding Graduate Advisor Award.

Professor Wenqing Shen has held several prominent positions, including Researcher, Ph.D. Advisor, Deputy Director, and Chairman of the Academic Committee at the Institute of Modern Physics, Chinese Academy of Sciences. From 1991, he continued his research in experimental nuclear physics at the Shanghai Institute of Nuclear Research, Chinese Academy of Sciences, where he also served as Party Secretary and Deputy Director. He has served as the Deputy Director of the National Natural Science Foundation of China, Director of the Mathematics and Physics Division of the Chinese Academy of Sciences, Director of the Shanghai Branch of the Chinese Academy of Sciences, Chairman of the Shanghai Science and Technology Association, and Director of the Nuclear Physics Division of the Chinese Physical Society. Other key positions he has held include Chairman of the Academic Advisory Committee of the Chinese Academy of Sciences; Director of the Lanzhou Heavy Ion Accelerator National Laboratory; Chairman of the Academic Committee of the Beijing Tandem Accelerator Nuclear Physics National Laboratory; Chairman of the Academic Committee of the National Key Laboratory of Nuclear Physics and Nuclear Technology at Peking University; and Chairman of the Academic Committee of the Shanghai Institute of Applied Physics, Chinese Academy of Sciences (Figs. 3, 4, 5, 6).

Professor Wenqing Shen received the second and third prizes of the National Natural Science Award once (2001) and twice (1982 and 1988), respectively. He received the special prize and first prize of the Natural Science Award of the Chinese Academy of Sciences once each and the second prize twice. In 2003, he received the Science and Technology Progress Award of the He Liang He Li Foundation. In 1987, he was recognized as an outstanding young- and middle-aged professional in Gansu Province. In 1991, he was honored by the Ministry of Education and the Ministry

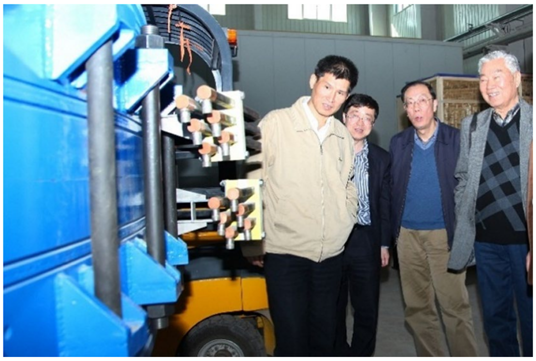

Fig. 3 Academicians Wenlong Zhan, Baowen Wei and Wenqing Shen visited Lanzhou Cancer Treatment Center in April 2, 2014

Fig. 4 Professor Shen gave comments at the tripartite nuclear physics symposium of Fudan University-Shanghai Institute of Applied Physics-Shanghai Institute for Advanced Research in 2023

Fig. 5 Professor Wenqing Shen was elected as the director of Lanzhou Heavy Ion Accelerator National Laboratory at the 2016 Academic Committee and the 25th Anniversary Academic Seminar of the National Laboratory in October 15, 2016

of Human Resources as an outstanding overseas scholar. In 1992, he was recognized as an outstanding young- and

Fig. 6 Professor Wenqing Shen gave a speech at the kick-off meeting of the construction of the high-intensity heavy ion accelerator facility (HIAF) in December 23, 2018

middle-aged professional by the Ministry of Personnel. In 1999, he was elected an academician of the Chinese Academy of Sciences.

Furthermore, Professor Wenqing Shen was a delegate to the 16th National Congress of the Communist Party of China, a member of the 10th Chinese People's Political Consultative Conference (CPPCC), and a member of the Standing Committee of the 11th and 12th CPPCC.

1 Research on low-energy heavy-ion nuclear reactions using the 1.5-m cyclotron at Lanzhou

With the advancement of accelerator technology, it became possible to generate ion beams of various naturally occurring nuclides in ion sources and accelerate them to very high energies. Heavy-ion physics emerged as a critical frontier in nuclear science, with countries like the USA, the Soviet Union, and France competing to synthesize new nuclides and elements using heavy-ion beams, thereby sparking a global race. Besides traditional reactions such as elastic scattering, direct reactions, and compound nuclear reactions, various new types of nuclear reactions were discovered with heavy-ion beams. Heavy-ion beams also found widespread applications in fields such as material irradiation, nuclear agriculture, and nuclear medicine. In the 1970s, IMP converted its 1.5-m light ion cyclotron into a heavy-ion accelerator, marking the beginning of China's efforts to catch up with global research at the forefront of nuclear physics. Professor Wenqing Shen successively served as the group leader of the first experimental nuclear physics division and as the deputy director of the second division, responsible for leading research on new heavy-ion nuclear reaction mechanisms.

At that time, the global nuclear physics community discovered a new type of nuclear reaction—deep inelastic scattering, which was completely different from traditional reactions. Additionally, nucleon transfer reactions were observed during direct interactions between heavy ions. Professor Wenqing Shen discovered that the large number of α particles produced in low-energy heavy-ion reactions originated from a large mass transfer. He arrived at this conclusion based on a series of experimental results, such as the energy spectra of α particles, angular distributions, and excitation functions that varied with bombardment energy, as well as through theoretical calculations. Consequently, the study "$^{12}C+{}^{209}Bi$ reactions at bombarding energies below 73 MeV" was awarded the third prize of the National Natural Science Award in 1982. Professor Wenqing Shen was ranked second in this project and was responsible for the most critical subtopic: the experimental study of α particle emission in the $^{12}C+{}^{209}Bi$ reaction.

In his research on deep inelastic scattering in light systems, Professor Wenqing Shen experimentally confirmed the existence of an "incomplete deep inelastic" reaction mechanism, which involved α particle emission from projectile, followed by deep inelastic scattering. This was verified through experiments using different combinations of projectiles and targets, as well as by varying bombardment energies. The project titled "Study on Deep Inelastic Scattering in Light Systems" won the third prize of the National Natural Science Award in 1988, with Professor Wenqing Shen ranking second. He was responsible for the project titled "Systematic Study of Dissipative Collisions in $^{16}O+{}^{27}Al$" and "Studies on Elastic Scattering, Quasi-Elastic, Single Particle, and Deep Inelastic Reactions in $^{14}N+{}^{27}Al$, ^{40}Ca, ^{51}V, ^{59}Co", where he discovered that besides the α particles emitted, along with the outgoing fragments and residual nuclei, α particles were produced by the incomplete deep inelastic reaction mechanism.

2 Research on quasi-fission and medium-to-high energy heavy-ion reactions at GSI

Starting in 1979, Wenqing Shen, as a visiting scholar, conducted multiple collaborative research projects at GSI. In the early 1980s, he achieved the best international resolution of mass and charge in a magnetic spectrometer at the time using software correction methods, discovering five new nuclides. He measured the physical properties and mass relaxation time of quasi-fission and analyzed its impact on the synthesis of superheavy elements. His published papers on fission and quasi-fission induced by heavy ions have been cited over 200 times in SCI, becoming classic references in the field of quasi-fission research. One of his long papers, published in the 1980s in the Physical Review journal in the USA, continues to be cited even today.

During Wenqing Shen's first visit to GSI, the magnetic spectrometer in GSI had just been put into operation. Wenqing Shen, together with his German colleagues who were responsible for the spectrometer, established its operational procedures and protocols. He then took charge of analyzing the first batch of experimental data from the spectrometer. During the data analysis, he discovered that the instability and drift of the spectrometer during experiments could be corrected using a software correction method. He developed a program and successfully applied it for data analysis, enabling the spectrometer to achieve the best mass and charge resolution in the world at that time. In the 1990s, Professor Wenqing Shen also participated in GSI's research on high-energy heavy-ion nuclear reactions. Many Chinese nuclear scientists have carried out international collaborations at GSI, as it is one of the world's leading nuclear science research institutes. GSI also provided significant assistance in the development of China's large-scale nuclear science facility, HIRFL. Leaders at GSI have often noted that Professor Wenqing Shen and his colleagues were among the first pioneers in international collaboration between the German center and the nuclear physics community in China.

3 Contributions to the construction of the large scientific project HIRFL

In the 1980s, IMP was responsible for the development of the large scientific project HIRFL, which included the construction of a new separation-sector cyclotron, modification of the 1.5-m cyclotron, and establishment of the experimental area. The experimental area consisted of seven experimental terminals: a large cylindrical scattering chamber for heavy-ion nuclear reaction studies, a large-area position-sensitive detector, a time-of-flight spectrometer, an online isotope separator for the synthesis of high-spin new isotopes and for nuclear structure research, a beam research terminal, a terminal for radiochemical studies, and an irradiation facility for heavy-ion physics applications. In 1986, Professor Wenqing Shen was appointed Deputy Director of IMP and was responsible for organizing the construction of the experimental area. He personally led the development of the large-area position-sensitive detector terminal. Professor Wenqing Shen made significant contributions to the construction of the experimental area and organized the first batch of experiments conducted on the accelerator facility.

HIRFL positioned China at the forefront of international nuclear physics research. Subsequently, the research conducted at this facility, including studies on medium and low-energy heavy-ion nuclear reactions, synthesis of new isotopes, high-spin and nuclear structure research, material irradiation, seed irradiation, and heavy-ion radiation therapy for cancer, enabled China to create a significant global presence in the field of heavy-ion physics research. In 1991, HIRFL received the Special Prize for Scientific and Technological Progress from the Chinese Academy of Sciences, with Professor Wenqing Shen ranking 13th. In 1992, the project "Heavy Ion Nuclear Reaction Mechanisms" won the First Prize for Natural Sciences from the Chinese Academy of Sciences, with Professor Wenqing Shen ranking fourth. The project "Light Ion Deep Inelastic Collision and Large-Area Ionization Chamber Experimental System" won the Second Prize for Science and Technology from the Chinese Academy of Sciences in 1986, with Professor Wenqing Shen ranking first. The project "Heavy Ion Nuclear Reaction Collective Effects, Exotic Nuclei Production, and Their Properties" won the Second Prize for Natural Sciences from the Chinese Academy of Sciences in 1997, with Professor Wenqing Shen ranking first.

4 Research on radioactive ion beam physics

In the 1980s, radioactive ion beam physics was at the forefront of nuclear science. In the 1990s, HIRFL built a radioactive beam line. The state funded the "973" project "Radioactive Ion Beam Physics and Nuclear Astrophysics", and Professor Wenqing Shen was designated as the chief scientist of the project. His main research focus shifted to radioactive ion beam physics. During that time, he was primarily engaged in research on radioactive ion beam physics and intermediate-energy heavy-ion nuclear reactions. In the field of radioactive ion beam physics, the research focused on the structure and characteristics of exotic nuclei; nuclear reactions involving these exotic nuclei, including the synthesis of new isotopes; studies on new decay properties; and the role of the *N*/*Z* degree of freedom in nuclear reactions, such as the formation of neutron skins and neutron halos and the generation of new mode of resonances. In the area of intermediate-energy heavy-ion nuclear reactions, the research concentrated on collective effects of these reactions and their implications for nuclear matter phase transitions, nuclear matter equation of state, and nucleon–nucleon interaction cross-sections in media.

The project "Collective Effects in Heavy Ion Reactions and the Production and Properties of Exotic Nuclei", with Professor Wenqing Shen as the first author, won the National Natural Science Second Prize in 2001. This study provided an empirical formula for the total cross-section of nuclear reactions suitable for intermediate and low energies, which was considered by international peers as one of the best empirical formulas for fitting experimental results at that time. It established a new method for studying nuclear reaction cross-sections using nuclear transport theory and offered the potential to extract the nuclear matter equation of state and nucleon–nucleon interaction cross-sections from the total cross-sections of nuclear reactions. A comprehensive review article by American scholars in the International Journal of Modern Physics E dedicated a section to cite the results and included five figures. The research also developed a new method for determining the discrete reaction plane using azimuthal angle distributions and correlations. By incorporating symmetry potential into the principal normalization, the relativistic mean field theory was used to calculate the halo neutron distribution in nuclei such as ^{11}Li. Conclusions on the nuclear matter equation of state and nucleon–nucleon interaction cross-sections in media for light systems at intermediate energies were arrived based on the studies on light reaction systems conducted through collective effects and multiple fragmentations. The experimental measurements and calculations of isotope distributions from 44 MeV ^{129}Xe + ^{90}Zn and ^{97}Au reactions provided data on the cross-sections of the heaviest exotic nuclei secondary beams at that time, offering experimental data and a theoretical basis for developing heavier secondary beams and discovering new heavier isotopes. The Director of GANIL strongly supported this experiment and believed that it would open up a new direction for investigation. The research led to the publication of over 80 papers and several conference reports. Twenty major papers were cited over 200 times in SCI-indexed international journals, with additional citations at international conferences.

5 Promoting International Collaboration in high-energy heavy-ion collision research

Professor Wenqing Shen's nuclear physics experiments required large accelerators, detection equipment, and electronics. In addition to conducting research at HIRFL, he also engaged in international collaborative research at major nuclear physics research centers around the world. Since 1979, he collaborated with GSI in Germany, RIKEN in Japan, GANIL in France, the U.S. National Superconducting Cyclotron Laboratory, the Cyclotron Institute at Texas A&M University, the Niels Bohr Institute in Denmark, and the National Institute for Nuclear Physics in the Netherlands. His innovative work significantly advanced the research in low- and intermediate-energy heavy-ion nuclear reactions and radioactive beam physics. At the beginning of the twenty-first century, the world's highest-energy relativistic heavy-ion collider (RHIC) began operation at the Brookhaven National Laboratory in the United States, focusing on the search for quark-gluon plasma and its properties and the investigation of exotic particles like antimatter particles. During that time, the STAR detector at RHIC urgently needed an upgradation of its time-of-flight (TOF) detector facilities to improve particle identification capabilities. In 2000, with funding from the National Natural

Science Foundation, the Ministry of Science and Technology, and the Chinese Academy of Sciences, and under the guidance of Mr. T. D. Lee, a collaborative team was formed by several institutes of the Chinese Academy of Sciences and multiple universities to create the China RHIC-STAR-TOF collaboration, with Professor Wenqing Shen as the project leader. This team developed the world's best multi-gap resistive plate chamber (MRPC) at that time. Tests at the European Center for Nuclear Research (CERN) and RHIC demonstrated that the MRPC detectors developed by the Chinese team met all requirements. In 2004, the USA and China signed the RHIC-STAR-TOF international cooperation project, which was led on the Chinese side by Professor Yu-Gang Ma from the Shanghai Institute of Applied Physics, Chinese Academy of Sciences. The collaboration successfully completed the TOF facility composed of over 4000 MRPCs, enhancing STAR's particle identification capabilities. The team later conducted several notable experiments, such as the discovery of anti-tritons and anti-alpha particles, with papers published in Science and Nature, receiving high international acclaim. The nuclear physics head of the U.S. Department of Energy hailed this USA–China collaboration a paradigm for international scientific cooperation, significantly advancing international collaboration in high-energy heavy-ion reactions.

6 Suggestions and proposals for laser compton gamma source and photonuclear research

In 1998, Professor Wenqing Shen proposed the idea of building a laser Compton scattering gamma source beamline on the Shanghai Synchrotron Radiation Facility (SSRF), and subsequently carried out a series of preliminary research work and prototype construction. In 2016, the Shanghai Laser Electron Gamma Source (SLEGS) was approved as one of the 16 beam lines for the construction of the Shanghai Light Source beamline project. By the end of 2021, the SLEGS beam line was completed and opened to user. Professor Wenqing Shen provided forward-looking suggestions for the construction of the SLEGS beam line and the subsequent research on photonuclear physics, especially the development of application research. He also proposed a three-step strategic plan for the future laser Compton scattering gamma source.

7 Suggestions and proposals for promoting science and technology system reforms

In 2011, Professor Wenqing Shen gave a keynote speech on "Reform of the Science and Technology Evaluation System and Award System" at the 18th meeting of the Standing Committee of the 11th Chinese People's Political Consultative Conference. He discussed the achievements and current challenges of the science and technology evaluation system and award system established at the beginning of the reform and the opening up period. Given that the evaluation system and awards act as a "guiding baton", he proposed the following reform suggestions: (1) Eliminate Incentives for Number of Papers and Patents: he recommended removing the incentive mechanisms related to the quantity of published papers and patents. (2) Gradually Reduce National Awards: he suggested a gradual reduction in the number of national awards, particularly the Science and Technology Progress Awards. (3) Transition from Short-term to Long-term Evaluation: he recommended shifting from short-term evaluations to long-term assessments. Different evaluation criteria and methods should be applied to fundamental research, applied research, experiments and applications, public welfare research, and industrialization. The duration for research funding and evaluation should be extended, and the reward system should be focused on encouraging discoveries and talent development. (4) Establish a Peer-Driven Evaluation System: he recommended exploring the establishment of a truly peer-driven evaluation and award system that would maintain academic neutrality and independence, ensuring a fair and impartial environment. (5) Strengthen Institutional Development: he emphasized the importance of scientific integrity, cultivating a good research culture, and establishing important foundational conditions for the reform of the science and technology evaluation and reward system.

In March 2013, Professor Wenqing Shen addressed the "Prospering Fundamental Research and Leading National Innovation Development" at the first meeting of the 12th Chinese People's Political Consultative Conference. He emphasized that fundamental research is the source of independent innovation and an important means of cultivating innovative talent, and it plays a supporting role in leading innovation development at the national level. He made four recommendations: (1) Increase Investment in Fundamental Research: he emphasized on the importance of fundamental research in national development strategies, which would have been realized by significantly increasing financial investments, raising the proportion of fundamental research in R&D from 5 to 10% over several years, implementing tax exemptions for enterprises conducting fundamental research, and having capable local governments that can support investments in fundamental research. (2) Advance Planning for Fundamental Research: He recommend that each major national project should allocate a certain proportion of funds for fundamental research according to its characteristics. (3) Explore New Park Models for Education, Research, and Industry: He suggested developing new park models that integrate education, research, and industry, transforming university science parks and technology industrial parks into bases for talent cultivation and results transformation. (4) Cultivate an Innovation-Friendly Culture: He emphasized on fostering a culture conducive to independent innovation, strengthening scientific ethics, and ensuring healthy development of science and technology. National leaders attended this meeting. Professor Wenqing Shen, along with other committee members from the science and technology community, conducted in-depth research on issues such as the provision of common technologies and standards in the restructuring phase of research institutions. He also suggested “Formulating the National Natural Science Foundation Law” and addressed the issue of insufficient funding, which severely constrained the development of national key laboratories. These proposals and recommendations were taken seriously by relevant national departments, contributing to the resolution of some issues and playing a role in the healthy development of science in China.