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SPECIAL ISSUE

China's Top Ten S&T Events in 2008

China's top ten S&T events in 2008, selected through the vote by 552 academicians of the Chinese Academy of Sciences and Chinese Academy of Engineering, were unveiled on January 18, 2009 in Beijing. They are:

- 1) China made its first space walk



At 21:10:04, September 25, 2008, China successfully blasted off a Shenzhou 7 spacecraft carrying three Chinese taikonauts (ZHAI Zhigang, LIU Boming, and JING Haipeng) from the Jiuquan Satellite Launch Center. ZHAI, one of the taikonauts, opened the gate of the spacecraft at 16:41 September 27, and walked out in Chinese made spacesuite to pick up a sample attached to the exterior of the spacecraft. The re-entry capsule of the spacecraft successfully returned to the Earth at 17:37, September 28, marking the successful mission of China's third manned space flight. The effort, enabling China a third country in the world capable of space walk, laid a solid foundation for China to build its own space station in the future. During the flight, a parasitic satellite equipped with advanced new technologies, was launched aboard to relay satellite data and work on other scientific experiments. The parasitic satellite has sent back impressive scientific data.

2) Major breakthroughs for next generation Internet



China Next Generation Internet, or CNGI, was jointly launched by eight government agencies, including the Development and Reform Commission, Chinese Academy of

Engineering, Ministry of Science and Technology, Ministry of Education, Chinese Academy of Sciences, and National Natural Science Foundation, with the participation of more than ten thousand scientists and experts through the collaborations of industry, universities, research institutes, and users. The 5-year efforts have resulted in the world's largest next generation Internet made up of six core networks, including China Mobile and CERNET2, and 273 customer premises networks, covering 30 and more cities, with some 1 million users. The project has produced 619 domestic patents, and 5 international patents. It has developed a range of original technologies, including IPv6 source address authentication, and transition to next generation Internet. It also produced two international Internet standards, allowing China becoming part of the international community for Internet standardization. Meanwhile, the efforts have spurred up the establishment of a next generation Internet industry in the country, allowing Chinese made IPv6 network equipment to take the second-largest share of the global market.

3) World-class express train connects Beijing and Tianjin



A novel inter-city express train running on a top speed up to 350 km an hour was put into official operation on August 1, 2008. Shortening the trip between Beijing and Tianjin to a 30-minute experience, the proprietary world class inter-city express train runs on a new rail system built with an array of advanced technologies, including slab track technology, and on-site 500m rail welding technique. The event marks a substantive leap of China's railway modernization. It takes only three years for China to complete a course that has taken 30 years for other countries to complete, allowing China to approach or even exceed the 'world speed'.

4) First Han Chinese individual's genome



Shenzhen Municipal Government and the journal *Nature* jointly announced at a press conference that the first Han Chinese individual's genome, or Yanhuang I, sequenced by Beijing Genomics Institute (Shenzhen), was published in the November 6, 2008 issue of the journal *Nature* as a cover story. The 7-page long story depicts the first full genome chart of an Asian man. Sequence has resulted in 117.7 billion base pairs, with an averaged sequence depth of 36 times, an effective coverage reaching 99.97%, and a mutation detection precision at 99.9%. Chinese scientists studied the differences between Han Chinese and the white population based on the existing data, and found 417,000 unique locus of genetic polymorphism. The findings will facilitate the development of genome studies and associated industry, and the advancement of biomedical science.

5) BEPC upgraded



BEPC made a successful collision on July 22, 2008, after realigning the accelerator and Beijing Spectrometer, and observed physical events derived from the electron-positron

collision. The development marks the successful upgrade of BEPC . The upgraded BEPC will keep its leading position as a most advanced dual-ring collider in the world. The project has applied an array of internationally advanced technologies, including super-conducting magnets and low temperature system, allowing the hard X ray intensity needed by users being raised by magnitude. The upgraded BEPC will play an enhanced role as a large scientific platform open to the society.

6) China's supercomputer ranking world top ten



The official website of high performance computer published on November 17, 2008 an updated TOP500 list. China's Dawning 5000A, developed by DAWNING and to be deployed at Shanghai Supercomputer Center, sits among the top ten supercomputers in the world with a speed of 230 trillion peak operations per second. The speed has not only made it the fastest computer possessed by China only next to the United States, but also made Shanghai Supercomputer Center the world's largest platform for generic high performance computers. Dawning 5000A, designed to be a super grid server to meet the major needs of economic and social development, is able to work on massive scientific, engineering, and commercial calculation missions.

7) Telescope with largest spectrum coverage



LAMOST, a large national science project, was put into official operation on October 16, 2008 at the Xinglong Observatory, part of CAS National Astronomic Observatories. Built with a budget worth RMB 235 million, the proprietary telescope is the largest optical telescope in the country with the widest view in the world, able to observe the spectrums of more than 3,000 celestial bodies at a time. Comparing with other similar systems in the world able to observe the spectrums of up to 600 and more celestial bodies, LAMOST is currently the telescope able to observe the spectrums of most celestial bodies in the world.

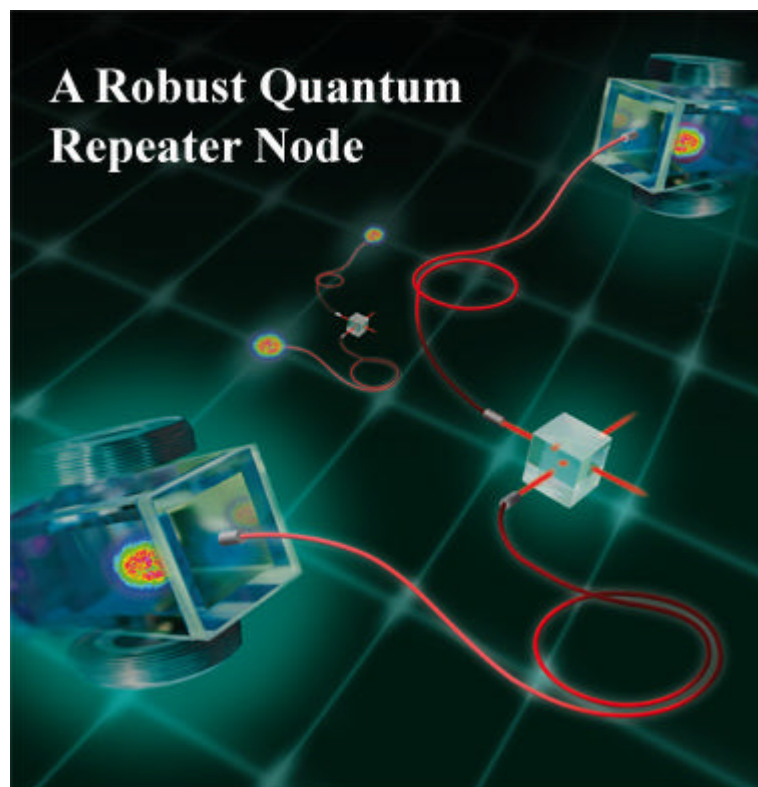
8) Maiden flight of Chinese made regional aircraft



ARJ21 Xiangfeng, a proprietary Chinese made regional aircraft made its successful maiden flight on November 28, 2008 in Shanghai, indicating that Chinese made aircraft has become part of the world mainstream for novel passenger jets. Chinese scientists and

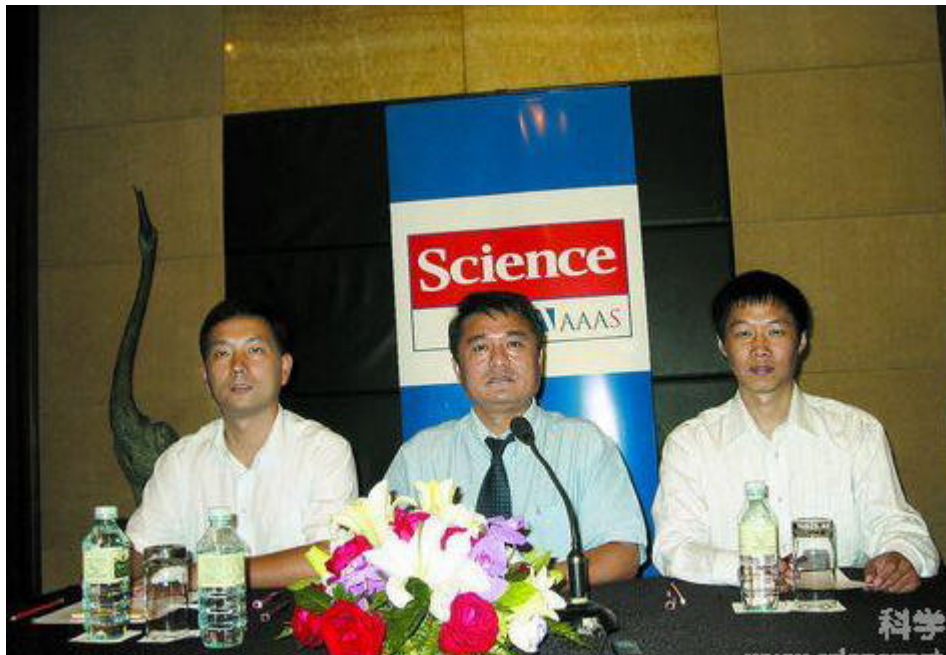
engineers have independently designed, integrated, and assembled the passenger jet, with an array of proprietary key technologies. So far the manufacturer has received the orders for 208 ARJ21 passenger jets. GE Commercial Aviation Services alone has placed an order for 25 ARJ21 passenger jets.

9) Quantum repeaters perfectly realized



Prof. PAN Jianwei and his coworkers YUAN Zhensheng and CHEN Yuao at the University of Science and Technology of China, realized for the first time in the world the entanglement exchanges featured with storing and read-out functions, using cold atom-quantum storing technology. They created the quantum entanglement between two cold atom systems connected by a 300m long optic-fiber. The designed quantum entanglement is able to be read out and converted into photon entanglement for further transmission and quantum manipulation. The experiment has perfectly realized quantum repeaters urgently needed by the long distance quantum communication, and created a solid foundation for the eventual realization of wide area quantum communications. The finding was published in the August 28 issue of journal *Nature*.

10) Pest resistant GM cotton



Journal *Science*, American Association for the Advancement of Science (AAAS), and the Chinese Academy of Agricultural Sciences jointly introduced the findings on a Bt resistant GM cotton species published in the September 19 issue of the journal of *Science*, at a news conference recently held in Beijing. This is the first time for AAAS to introduce the findings made by Chinese scientists in China. The five authors of the paper work at the Chinese Academy of Agricultural Sciences and National Agricultural Technology Development and Service Center. Bt is a biological pest killer. The cotton that has been genetically modified to express Bt is called Bt cotton. Chinese scientists found that the extensive growing of Bt cotton in north China in the past decade has not only dwindled the population of cotton pests, but also reduced the pest attacks to the crops without Bt improvement grown in the adjacent areas.

RESEARCH AND DEVELOPMENT

New Developments of HIRFL-CSR

Scientists of CAS Institute of Modern Physics measured the mass of ^{63}Ge , ^{65}As , and ^{67}Se using HIRFL-CSR, the first instance of measuring the mass of short-life nuclides near the proton drip line at the level of 100ms. Scientists developed a method to process the massive data in a real-time manner, which produced preliminary experimental results. They measured for the first time the mass of ^{63}Ge , ^{65}As , and ^{67}Se through ^{78}Kr fragmentation reaction, in the CSR experiment started at the end of 2008. It is important for scientists to understand the mass of these nuclides, as it will help scientists to estimate

the nuclear reactions of celestial bodies' rp process, and richness distribution of the elements in the cosmos. Scientists have also observed two 71kr events at two lower sections in the experiment, showing the high level sensitivity of CSRe.

Advanced Nuclear Data Study

According to a briefing recently made by ZHAO Zhixiang, President of China Institute of Nuclear Energy, researchers at the Institute have obtained a range of high quality data through establishing an advanced unconventional neutron time of flight spectrum on the terminal of an HI-13 accelerator built in the 1980s. Additionally, they independently developed needed equipment, including the vacuum ultraviolet spectrometer and anti-Compton γ -ray spectrometer, to measure atoms and molecules, along with effective solutions to addressing the interference of low energy neutrons and raising the accuracy of data. They also made innovations in the measurement evaluation and theoretical computation, through the improvement of theoretical models and UNF system.

China Institute of Nuclear Energy plans to build four platforms for experimental reactor, advanced research reactor, Tandem Accelerator Upgrade, and post processing experimental facilities. The Tandem Accelerator Upgrade, once completed, will become an effective means for stabilizing nuclear data, and for raising the level of nuclear data study. China will establish the platforms in Guangdong to provide advanced technical means for studying nuclear data, including spallation neutron source.

NEWS BRIEFS

China Kunlun Station Erected in the Antarctica



China's 25th Antarctic expedition team said on January 15, 2009 that it has completed the framing part of building a new station in the Antarctica, with 11 cabins in the place. Kunlun station will be built with pre-fabricated components and on-site installation. The steel frames have been erected on the selected site, and walled with insulation boards. To keep the temperature right for residence, even the container like cabins are walled with insulation boards.

Antarctic Station Enjoys Satellite Telecommunication

According to a briefing circulated on January 11, 2009 by China Polar Study Center, China has established a satellite based telecommunication network for its Great Wall Station in the Antarctica. With the help of Intelsat, the new telecommunication network is designed to send the signals from the Antarctica to Shanghai ground station, before being connected to China Polar Study Center through a dedicated line, making the station a distant user of the Center. The new system has basic functions for web surfing, voice communication, facsimile, and real-time data transmission. The establishment of the new communication system will greatly improve the quality of life of scientists working and living in the polar region, and shorten the psychological distance with the home country. The function of real-time data transmission will noticeably raise the output of polar studies, and enhance the communication capability of polar expedition.

Emergency Diesel Generator for Nuclear Power

Chinese made new generation emergency diesel generator for nuclear power applications passed an approval check on January 9, 2008. Shaan'xi Heavy Diesel, in collaboration with Shanghai Institute of Nuclear Engineering and other manufacturers, has independently completed the design and manufacture of the key components of the generator, including its protection, control, and mechanic support systems. It also mastered the key technologies of manufacturing an emergency diesel generator for nuclear power applications.

China's First UHV Pilot Project

China Grid announced on January 16, 2008 that its proprietary UHV AC pilot project for Jindongnan-Nanyang-Jingmen at the million voltage level was put into official operation. The new UHV AC system runs from the Jindongnan Transformer in the north, passing through the Nanyang Switch Station in Henan, and ends at the Jingmen Transformer in the south of Hubei. With a capacity of 2×3 million volt-amperes over a length of 640km, the pilot project has been connected to the power grids in the north and middle sections of China, traveling through three provinces, including Shanxi, Henan, and Hubei. Designed to tap up the coal resources in Shaanxi and the hydroelectric resources in Hubei, the new UHV AC will facilitate the coordinated economic development in both south and north. Up to date, the pilot project has smoothly passed a range of tests, including full voltage, large currents, and failures. The system has produced a top voltage reaching 1100 kilovolts, up to the design requirements. Its electromagnetic environment has met the major indicators defined by the national standards.

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