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SPECIAL ISSUES

China's First Spallation Neutron Source

LU Yongxiang, President of the Chinese Academy of Sciences, and HUANG Huahua, Governor of Guangdong Province jointly inked on February 13, 2007 a memorandum to construct a spallation neutron source (SNS). Both sides will submit a joint application before the central government for establishing

China's first spallation neutron source in Dongguan City, Guangdong Province. Both sides also agree to work together to establish a national SNS lab, to ensure China's internationally advanced position in the area.

As a key project listed under the National Medium and Long Term S&T Development Planning (2006-2020), the spallation neutron source is a large scientific device to be built for multidisciplinary applications during the 11th Five-year plan period (2006-2010). The 7-year project will be mainly financed by the state treasury, and built on a site provided by Guangdong Province, with a fund offered by the same province for establishing a national SNS lab and associated support facilities. The device, upon completion, will be an open lab financed by Guangdong Province for its operation.

At present, there are four high performance X ray sources in China, respectively located in Beijing, Hefei, Taiwan Xinzhu, and Shanghai (under construction). Unfortunately, there is no same source for pulse neutron in the country.

According to the agreement, as a legal person of the project and the future national SNS lab, the Institute of High Energy Physics, part of the Chinese Academy of Sciences, will set up a branch in Dongguan to implement the project. The project has so far signed contracts with an array of users, including some 70 research teams under 9 CAS institutes, 22 universities, and more than 30 other research teams including China Institute of Atomic Energy. Along with the construction of the national SNS lab, the device will expect more collaborations with other research centers, and secure more users.

Outline for China's Sustainable Development

A national book for China's sustainable development was published on February 11, 2007 by the Science Press. With LU Yongxiang, Vice Chairman of the NPC's Standing Committee, and President of the Chinese Academy of Sciences, as editor-in-chief, the book is made up of 20 volumes in 13.5 million Chinese characters, covering diverse topics, including population, resources, environment, economy, society, S&T, education, culture, natural disasters, poverty eradication, and capacity building for the sustainable development. Writers have lined up six major challenges for China's sustainable development,

including three approaching peaks of Chinese population, excessive utilization of China's energy and resources, severe ecological degradation, finding basic solutions to addressing three major problems in the rural areas, realizing social fairness in all aspects, and deepening the knowledge of China's system and culture innovations. These issues, if poorly handled, may hamper the realization of sustainable development.

In the monograph, scholars worked out seven principles that China's sustainable development strategy shall follow: sustaining a rational economic growth; raising the quality of social development; meeting people's basic needs; placing the growth of population under control, and raising the quality of population; maintaining, expanding, and protecting the foundation of natural resources and ecological capability; paying more attention to breaking up the bottlenecks restricting the role of S&T advancement in the sustainable development; and always keeping a balance between efficiency and fairness.

Three-Fold Increase for Invention Patents

China State Intellectual Property Office handled 210,500 invention applications in 2006, or 21.4% up, compared with 173,300 applications in the preceding year. Of them, domestic invention applications reached 122,300 in number, or 30.8% more, compared with 93,500 applications in the preceding year, or 58.1% of the invention total. In the same year, invention grants amounted to 57,800, with a growth of 8.4%, compared with 53,300 in the preceding year, of which domestic grants were 25,100 in number.

During the 10th Five-year period (2001-2005), China's domestic invention applications have exceeded foreign applications in total, at 51.8%, or 29.8% for an annual average. Domestic invention application has registered a growth higher than the foreign one, both in terms of absolute quantity and speed since 2003. In 2006, domestic invention grants took 43.4% of the total grants for invention, which indicates a role played by China's strategy of patent on the one hand, and a steady and fast enhancement of China's proprietary technical innovation capacity and development level on the other.

As of December 31, 2006, China State Intellectual Property Office has handled 1.0895 million invention applications on a

combined basis, or 32.7% of the total patent applications. Of them, domestic invention applications reached 564,900 in number, or 51.9% of total applications for invention. At the same time, State Intellectual Property Office has issued 296,500 invention grants on a combined basis, or 17.1% of the total patents granted, of which domestic inventions took 112,400, or 37.9% of the total grants for invention.

During the 10th Five-year period, China also witnessed a large increase of both patent applications and grants derived from national S&T programs. For example, the National 863 Program has filed 22,000 patent applications, of which 17,000 are for invention. The program has been granted with some 6,000 patents, of which 3,700 are for invention. It enjoys a five-fold increase of patent grants, compared with the 9th Five-year period.

Software Copyrights Rise

China has recorded a historical high for software copyright registration in 2006, exceeding the threshold of 20,000, at 23,095 in number, with a growth of 26.45% compared with the same period of 2005.

Among the software copyright registrations made in 2006, most are filed for a preliminary certificate, though diverse in forms as defined by the Regulations for Protecting Computer Software and the Method for Software Copyright Registration.

The increase of software copyright registration reflects an augmentation of China's proprietary software on the one hand, and an improved legal environment for copyrights on the other.



New Thermofluid Sulfides Found

Ocean I, China's expedition boat found on February 13, 2007 a new thermofluid sulfides bed on the floor of the Indian Ocean,

disclosed by MAO Bin, Secretary-General of China Ocean Mineral Resources Research and Development Association. On their 19th oceanic expedition, researchers spotted abnormal massive activities of thermofluids over the mid-ridges of southwest Indian Ocean, with dark brown liquids continuously jetting out from the sea floor. Researchers are currently working on the size of the new thermofluid sulfides bed.

According to a briefing, the formation of thermofluid sulfides is a complex process, from seawater infiltration into the earth mantle, heating, dissolving the metals in surrounding rocks, including gold, silver, copper, iron, zinc, an lead, and to the final jetting out under a high pressure. The metals become sulfides through chemical reactions, depositing over the sea floor, and eventually forming a seafloor mineral bed weighing several thousand or even hundred million tons.

Thermofluid activities also produce a spectacular landscape of chimneys, surrounded by high temperature and pressure resistant biological colonies that fear no toxicant matters and need no oxygen. The biological colonies have bred out a biodiversity and density that can be compared with tropical rainforests. Researchers have so far found more than 500 species in 10 biological families. Thermofluids are mystified with scientific challenges, and their unique biological features may create broad application perspectives. The new discovery sets up a desirable ground for further research.

China Launch HXMT in 2010

China's HXMT will soon head for a deep cruise, expecting to discover thousands of huge black holes. This will eventually result in major basic research findings for the high display system, said Prof. ZHANG Shuangnan of Tsinghua University Astrophysics Center, at a meeting held on February 4, 2007 to prepare the payload and ground applications for HXMT.

LI Tabei, lead scientist for the project, told reporters that hard X-rays come from an area nearest to the black holes in sight, which makes a key window for exploring black holes and nearby physical processes. It is, however, difficult to image hard X-rays, and a dedicated waveband has to be developed.

As part of the civic space program for the 11th Five-year period,

China will launch its proprietary HXMT satellite in 2010. The satellite will be an HXMT system enjoying the highest sensitivity and best space resolution in the world, making high quality observation of high energy radiations such as black holes, neutron star, and supernova, at an extended wavelength.

China started upper-air balloon based HXMT observation from the end of 1970s. In the early 1990s, LI Tabei and WU Mei developed a direct process to reconstruct objects, which resulted in a new technique for the HXMT satellite with a powerful imaging and observing capability.

Digital Low Level RF Control System

Not long ago, China's first digital low level RF control system for accelerator, developed by a research team of the spallation neutron source project, has been successfully used at the RFQ accelerator to improve the performance of beam flows. The effort has produced a pulse current intensity of 43mA, duty ratio 6.25%, and transmission efficiency of 92%. The control system is mainly designed to confine the accelerating electric field amplitude and phase control within $\pm 1\%$ and $\pm 1^\circ$, and to realize a stable control of cavity resonance frequency.

According to a briefing, the rapid development of A/D converters and digital logic components in recent years has made digital low level RF control a new technology for accelerator operation. The technology cuts down the cost, while raising the stability, flexibility, and consistency of the system, through digitizing frequency signals of radar and telecommunication equipment, I/Q, and signal processing.

NEWS BRIEFS

Bioindustry Conference be Held in China

China Bioindustry Conference for 2007, co-sponsored by 11 associations, including Chinese Society of Biotechnology, Chinese Society of Agricultural Biotechnology, news media such as Science Time, and Hebei Provincial Government, will be held

June 16-18, 2007 in Shijiazhuang, the capital of Hebei Province. Participants from government, research institutes, industry, and business communities will attend the meeting to discuss the blueprint of China's bioindustry, in a move to spur up the sustainable, healthy, and fast development of the industry. Designed with a theme for innovation and development, and strategy and future, the meeting will be a platform for enhancing the investment in bioindustry, through the guidance of policies, and promoting exchanges and collaborations between industry, universities, and research institutes.

A range of accompanying events will be held during the meeting, including the forums for bioindustry policies and biotechnology, and new findings show. The forums will discuss an array of involving issues concerning industrial policies, market and fund raising, industrial development, intellectual property and standards, and cutting-edge biotechnology. Government officials will also be invited to issue and explain China's latest policies on bioindustry.

Selecting Site for New Observatory

According to the National Observatory affiliated to the Chinese Academy of Sciences, China plans to establish a world-class optical observatory in Xinjiang or Tibet, in an attempt to invite the most advanced observing instruments in the world to station in China through international collaborations.

It is reported that the site selection has been going for more than two years, with a preliminary preference for Kalasu in Xinjiang, and Wuma in Tibet. Scientists have installed some observing facilities on both sites, to determine which site is in a better position to accommodate a world-class observatory, using the collected data. Once the site is chosen, the most advanced observing instruments in the world will be invited to station there, through both proprietary development and international collaborations, in a move to raise China's astronomic research level.

Strategy for Advanced Materials

Sponsored by the Department of High Technology, part of the Ministry of Science and Technology, a seminar was held on February 7, 2007 to discuss the strategy for developing

advanced materials during the 11th Five-year period. Participants believe that the report on the strategy of developing advanced materials for the 11th Five-year period has reflected the nation's strategic goals, development trends of advanced materials, and major demands of involving sectors, closely in line with the National Outline for Medium and Long Term S&T Development Planning (2006-2020), and the National S&T Planning for the 11th Five-year Period. It takes into account the latest developments of material both domestically and internationally.

Participants believe that the Report has made right deployments for special and key projects, aiming at capacity building for proprietary innovations and core competitiveness, and sustained innovations for materials. While keeping a consistency with the 10th Five-year period, it highlights major innovation and development efforts, in line with the development trends of material technologies. The Report emphasizes the importance of proprietary intellectual property, an R&D system with industry as a key player, and the combination of industry-universities-research institutes. It advocates raising China's international competitiveness for advanced materials and associated technologies, through project based research, personnel training, and infrastructure construction, which agrees with the spirit of S&T system reform and the natural path of material development.

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