

Content

Science News from Chinese Media in November 2008
Collected and Compiled by the Helmholtz Beijing Office

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Dr. Weichselgartner from the LOICZ office in GKSS paid a visit to Shanghai, Yantai and Beijing. He and his CAS partner were greeted on the 03.11 by Mr. Tong Liu and briefed about the possibilities of cooperation.

Dr. Hong He paid a visit to Shanghai to support a four person FZJ group, led by Dr. Jaek from the TTB department, for a participation in the Shanghai International Fair for Industrial Automation. The goal was to understand the Chinese PV industry and the potential for licensing FZJ know-hows for the Chinese customers. It is well-known that Chinese PV industry is booming with an astonishing speed and its production capacity ranked already on the 3rd place in the world and has exceeded the annual installation of the whole world in 2006. A few of Chinese producers are already among the largest ones in the world. SUNTECH, which landed in Nasdaq in 2005, signed a 6 billion dollar deal for 10 years PV silicon supply and purchased in August a Japanese PV company for 300 million dollars. But because of the higher price, the Chinese PV market is still very small. Over 95% of the PV cells and modules would be exported. Prof. U. Rau, director of IEF5, took the opportunity and paid visit to two famous universities in Shanghai and Tianjin concerning this issue.

From 07.11-16.11, Dr. He and Mr. Tong Liu travelled to Guangzhou to participate in the DuC (Germany and China in together Move) event. Helmholtz has set a booth together with the other active German academic players in China, such as DAAD, DFG, FhG and Leibniz Institute for Marine Research. This was the third DuC event after the first one in Nanjing last year and the second one in Chongqing in May this year. That was the first BMBF presence in DuC. Dr. Stienen from BMBF and the representatives from China and Germany opened the BMBF pavilion at the morning of 08.11.

Also in November, Prof. H. von Storch and Prof. F. Coljin, directors of the Institute for Coastal Research, GKSS paid a visit to Shanghai, Qingdao and Yantai. They discussed further details concerning the future cooperation with their partners in YIC (Yantai Institute for Sustainable Coastal Development). On the 18.11, before his return to Germany, Prof. Coljin was accompanied by Dr. Hong HE paying a visit to the CAS headquarter. They discussed about several details with the heads of the department of international cooperation and department of environment and resources. Prof. Shi Ping and Dr. Tang from YIC were also presented in the discussion. It was agreed upon that YIC would like to invite Prof. Coljin to act as an academic director for YIC and support the YIC administration to coordinate the major research activities in YIC. A new agreement at the institute level was signed.

From 23 to 30.11 Dr. He paid a visit to Wuhan and then Yichang. In Wuhan, it was the POEM conference (Photonic and Optoelectronic Meeting) in the Chinese Optics Valley. Dr. He helped with the invitation for German speakers to attend the event and had also giving further advices on ways to strengthening the connection between Germany and China concerning academic exchanges and industrial cooperation. Under his initiation the Chinese Optical Valley would send next year a large delegation visiting several German optics networks and participating in the 2009 Munich Optonics Fair. Dr. He took also the opportunity visited two state-key laboratories in the hosting university, the Huazhong University of Science and Technology. He made comments and advices on how to build up cooperation partnership with Germany concerning ITER and Super-Magnetism. This university has attracted very talented young scientists from Europe and US for these two projects.

Helmholtz Beijing Representative Office

1 Science News

1.1 Energy

China, U.S. to collaborate on solar energy technology

(Xinhua Net, 2008-11-17)

China and the United States have agreed to work together on research into advanced solar energy technologies.

The Institute of Electrical Engineering (IEE) under the Chinese Academy of Sciences (CAS) and the U.S. National Renewable Energy Laboratory (NREL), which is affiliated with the Department of Energy, signed a memorandum of understanding over the weekend.

Under the pact, they'll share research on photovoltaic (PV) power generation technologies.

One facet of collaboration, IEE director Xiao Liye said, will be a sophisticated PV cell and module test center, probably in Beijing. The program also includes research data sharing, personnel exchanges and battery-related efforts, Xiao said.

Dan Arvizu, head of the NREL, said he hoped to extend cooperation in line with the common interests of both countries.

IEE is a national facility that carries out high-technology research and development.

NREL focuses on solar, wind, biomass, geothermal, hydrogen energy and fuel cell research.

A demo device for new approach of wave power generation

(CAS, 2008-11-21)

In cooperation with Chuanshiyu Machinery Co., Ltd., researchers with the CAS Institute of Electrical Engineering (IEE) have worked out a demonstration device that employs a novel approach to converting ocean wave energy into electricity.

Covering almost three-fourths of the earth's surface, oceans are rich in renewable energy sources, such as offshore wind energy, wave energy, ocean current energy, offshore solar energy. Among them, wave power receives top priority because of its high performance and enormous amount. However, the problem is that it's not easy to harness this energy and convert it into electricity in large magnitude. Thus, wave power station is facing several challenges. For instance, wave power is featured with low speed and powerful force, and the motion of forces is not in a single direction whereas most readily-available electric generators operate at higher speeds, and most readily-available turbines require a constant, steady flow. To solve the problem, a series of transformation steps are needed, which makes the whole system very complicated and drives its cost far beyond the acceptable market price.

Recently, an IEE group on magnetohydrodynamic (MHD) propulsion technology has come up with a new concept to deal with the problem. According to experts, MHD power technology supplies a new method to convert the thermal energy directly into electrical power. In a liquid metal MHD (LMMHD) power generation system, liquid metal with higher conductivity is used as the working fluid, and is driven to pass through an MHD channel in the presence of an intense magnetic field. An electromotive force (EMF) is induced between the channel walls.

Considering the slow-moving, high magnitude force of ocean waves and combining the characteristics

of LMMHD generator, the IEE researchers have been working on LMMHD wave energy direct conversion (LMMHDWEDC) for the past year or so. The system can provide an excellent match to the mechanical impedance of the ocean wave. It is highly efficient and can be employed as a very compact device with very high power density. Scientists expect the system could be one of the best ways to directly convert ocean wave energy into electricity. Now, the researchers are making efforts to develop a 25kW sampling machine at their laboratory.

1.2 Earth and Environment

XSSC session focuses on studies of west Pacific gyre and climate (CAS, 2008-11-04)

Under the theme of challenges and opportunities: studies of west Pacific gyre and climate, the 333rd Session of the Xiangshan Science Conferences (XSSC) convened from 29 to 31 October in Beijing.

The executive co-chairs of the session included Prof. HU Dunxin (the CAS Institute of Oceanography), Prof. SU Jilan (the Second Institute of Oceanography, the State Oceanic Administration), Prof. HUANG Ronghui (the CAS Institute of Atmospheric Physics), and Prof. WU Guoxiong (the CAS Institute of Atmospheric Physics). Prof. HU Dunxin gave a Key round-up report on opportunities and challenges for the research of Western Pacific gyre and climate.

As the largest warm pool with highest temperature in the world, according to experts, Western Pacific is a complex system of ocean current and a region with the strongest tropical convection and most massive water vapor content of the globe, playing a critical role in the global climate system. Via close coupling with the atmospheric Walker and Hadley circulations, the Western Pacific circulation brings into control the heat transportation and distribution of the ocean, playing a regulating role for the evolution of the Western Pacific warm pool, ENSO circulation and monsoon spell, and imposing a deep-going and far-reaching influence on the world's climate.

China has been making encouraging progress in international cooperative studies on the issue. This is considered as both an opportunity and a challenge. Under the auspices of the Xiangshan Science Conferences, the meeting held discussions on the following topics: The 3-D circulation's structure and changing mechanisms in Western Pacific; the interactive mechanism between air and seas in Western Pacific; Western Pacific's role in the global and eastern Asian climate change; and new strategic thoughts on the research into Western Pacific circulations and climate.

China's Antarctic expedition team enters Antarctica (People's daily, 2008-11-17)

China's 25th Antarctic expedition team has already entered Antarctica. On November 16, 4pm local time, the team held a rally aboard the Snow Dragon vessel that was navigating in the floating ice zone, pledging to complete construction of the Antarctic Kunlun Station.

Mi Wenming, assistant to the expedition team's leader and chief commander of cargo discharge operations, announced the plans of the first stage of missions for this expedition: the team will discharge five types of materials in the sea-ice zone near the Zhongshan Station, including materials for inland expedition and station-building, summer scientific research apparatus and logistics goods for the

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Zhongshan Station, capacity-building materials and oil products.

The materials include 1,557 barrels of aviation kerosene, 5 inland cabins and 10 containers of goods for the Zhongshan Station. Priority will be given to the discharge of materials and equipment used for building the inland Kunlun Station.

Kunlun Station, expected to be completed by the end of January 2009, will be China's first inland expedition station in Antarctica. It will be built 7.3 kilometers southwest of Dome Argus (Dome A), the highest icecap

on the South Pole at 4083 m above sea level.

Chinese scientific research ship anchors at Port Louis

(Xinhua Net, 2008-11-19)

An advanced scientific research ship from China has anchored at Port Louis, Mauritius for supply following its over 30,000-sea-miles (55,560 km) sailing since May.



Dayang Yihao, or Ocean No.1 anchors at Port Louis, Mauritius for supply following its over 30,000-sea-miles (55,560 km) sailing.

Dayang Yihao, or Ocean No.1, arrived here last Saturday from Auckland, a port city north of New Zealand, after a 39-day journey, during which it stopped several times for

research activities, Captain Cao Yezheng told Xinhua on Tuesday.

"We need supplies of diesel, drinking water, food and fruits in order to continue our research work southwest of the Indian Ocean," Cao said,

The ship, one of the most modern deep-sea research ships in the world, left Guangzhou, southern China, on May 22, having visited Micronesia, Ecuador and New Zealand before it reached Mauritius.

Cao said the journey from New Zealand to Mauritius was the most difficult one in the last 25 weeks, during which it experienced typhoons and big waves.

However, he said, the scientists on board the ship had managed to finish their tasks and research work as planned.

It is scheduled to leave here Wednesday evening.

Bulletin: Pollution worsens on Yellow River system

(Xinhua Net, 2008-11-24)

A Chinese water resources official on Sunday called on people to improve the awareness of water saving and protection in a bid to curb pollution of rivers from spreading and worsening.

Li Xiaoqiang, chief of publicity section with the Yellow River Conservancy Committee, made the remark over the phone while commenting on the fact that pollution had spread to one third of the

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Yellow River system.

With a mainstream of 5,464 km, the Yellow River, billed as the "mother river" of China, originates from Qinghai province, flows eastward through Sichuan and Gansu provinces, Ningxia Hui and Inner Mongolia autonomous regions, and Shaanxi, Shanxi and Henan provinces before emptying into the Bohai Sea from Shandong Province in east China. It has 35 main tributaries.

The Yellow River Conservancy Committee said in a bulletin released last Thursday that it monitored the mainstream of the Yellow River and its tributaries last year, with the combined length totaling 13,492.7 km, and found 4,557.6 km, or 33.8 percent of the waterways monitored, to have polluted water classified as type-five negative.

The Yellow River Conservancy Committee is an organization affiliated to the Ministry of Water Resources and has its headquarters in Zhengzhou, capital of central China's Henan Province. It is assigned with the mission to overseeing the welfare of the Yellow River system.

Only 2,174 km of the waterways, or 16.1 percent of the river sections monitored, were said to have water quality classified as types one and two, both standards suitable for drinking.

The bulletin also showed that the river system had an increase of 18.9 percent in rainfall last year in comparison with that of 2006, but received more pollution too: waste and sewage water discharged into the river system totaled 4.29 billion tonnes last year.

Industrial sector was blamed as the No.1 polluter, followed by living sewage contributed by urbanites living along the river system and the service trade.

In 2006, the organization monitored 12,510.8 km of the Yellow River system, of which, 31.1 percent were found to have type-five negative water. And 4.26 billion tonnes of waste and sewage water was discharged in the Yellow River system in that same year.

The Yellow River and its legions of tributaries flow through arid north China, making the river system hard to clean on its own, said Li.

The State Council, China's Cabinet, launched a nationwide campaign among industrial enterprises to save energy and reduce the discharge of pollutants enormously in the second half of last year.

"It is a good thing though it takes arduous efforts too," said Li. "I wish a harmony could be achieved between development, utilization, and protection of the river someday."

Experts advocate a carbon trading system in China

(CAS, 2008-11-25)

To give different provincial economic entities incentives to reduce their carbon emissions, a report released on 5 Nov. suggests building a carbon trading system based on the carbon balance between the domestic provinces, municipalities, and autonomous regions.

This report, titled Framework Report on Carbon Balance & Carbon Trading of China (later referred to as "the Report"), gives a ranking list of the provincial entities in terms of their total carbon emissions (source) and carbon absorption (sink) and meanwhile proposes a carbon trading mechanism based on the carbon balance between the entities. The expert panel led by the chief-scientist Prof. NIU Wenyuan, a Fellow of the Academy of Sciences for the Developing World (TWAS) and a researcher at the CAS Institute of Policy and Management (IPM), made a survey on the status quo of the carbon balance over the country and reported the statistics based on a set of calculations independently performed by them.

Based on the statistics, states the expert panel, a Carbon Fund and an Ecological Compensation Fund should be established in China. Essentially, entities whose carbon emissions go beyond their carbon

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absorption would need to pay to the Carbon Fund for their excessive emissions.

Thus raised, the Carbon Fund would serve for subsidizing the leading net carbon sinks, boosting the National Clean Development Mechanism (CDM), supporting innovations in energy-saving and emission-reducing technologies and so on. Provincial entities that contribute to the environment as net carbon sinks would receive ecological subsidies, so as to encourage efforts to preserve the ecology and increase carbon absorption.

Under the umbrella of this trading system, with the only exceptions of Yunnan, Qinghai provinces and Tibet autonomous region, all the other entities would have to pay for their excessive emissions in proportion to their carbon sinks.

As for the operation of the Ecological Compensation Fund of China, as designed in the Report, would be based on a baseline defined as the national net carbon emission. Starting from this baseline, different provinces, autonomous regions and municipalities each will get a quota of carbon emission credit in proportion to its economic scale. Any provincial entity that goes beyond its credit would have to pay for its extra emission, whereas an entity whose carbon emissions stay within the quota would be warranted to receive a sum of compensation, in proportion to its relative contribution to the overall carbon balance of the nation. The fund would be appropriated for ecological compensation in the same year as it is levied. It is anticipated to foster the ecological construction, modulation of economic structure and transformation of consumption in the entities.

If this designed system is introduced, the top three payers of carbon credit will be Shandong, Shanxi and Hebei provinces, according to the team's calculations. In light with a low-level compensation scheme given in the Report, Shandong will need to pay a sum as much as 0.11% of its GDP for its excessive emissions. If another scheme, which suggests a higher level of compensation is adopted and come into effect, this province will have to pay as much as 0.32% of its GDP to greener provinces.

The biggest beneficiaries of this suggested ecological compensation fund would be Tibet autonomous region, Qinghai and Yunnan provinces. Calculations show that mostly the credit buyers will come from eastern and middle part of this country, and sellers mostly from the west.

By this way, according to the panel, carbon emission quota will be turned into a scarce resource, and carbon sink capacity into a profitable treasure.

Also suggested in the report is a leadership group in charge of carbon trading over the country. This group would map out the strategies and layout for future carbon emission trading, deal with applications for low-carbon economic programs and manage their operation. It will also coordinate the organization, management, arbitration and supervision affairs of different entities relating to the carbon emission trading, so as to make sure the trading operates in order.

According to Mr. PAN Yue, vice Chinese Minister of Environmental Protection and president of the Association for Environment Culture Advancement of China, this suggested trading scheme is an important part of the environment-economy policies being studied by the government. He stresses that policy innovation is a guarantee for low-carbon development, and this framework would therefore play a great role. He addresses a symposium on the trading scheme: "The framework for carbon trading in China has positive implications to harmonizing the relationship between the economic development and energy/environment preservation of this country. It will play a great role in speeding up the development of low-carbon energy technologies, the transformation of the mode of economic development and the construction of resource-saving society in this country."

Over the past few years, Chinese government has sought to switch its economic locomotive onto a

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low-carbon track, seeing this as an important turning point on the path to ecological civilization. "High-carbon mode of economic development would badly restrict the future development of China." Remarks Pan.

Scientists study Yangtze delta monsoons to understand human impact on climate (Xinhua Net, 2008-11-29)

Chinese scientists are for the first time to start tracking monsoons in the eastern Yangtze River Delta in an attempt to reveal how human activities have impacted on climate change.

Fu Congbin, chairman of the Scientific Steering Committee (SSC) of Monsoon Asia Integrated Regional Study (MAIRS), told Xinhua Saturday, he and his colleagues had found out that the most serious dry area in China was the semi-arid area in the northwest, also the northern boundary of summer monsoons, indicating a correlation.

Scientists under MAIRS, the first project on climate change initiated by Chinese scientists, had been following monsoon activities in the semi-arid areas of northwestern China for about a year to find out how the Asian monsoon system copes with changes in land coverage, water resources and air quality resulted from industrialization.

Under guidance of the SSC, which consists of 15 leading scientists from different Asian countries, MAIRS would start tracking monsoons in the eastern Yangtze River Delta soon.

The exact date of start depends on when MAIRS could persuade existing observation stations to join the program, said Fu, also academician at the Chinese Academy of Sciences (CAS).

The overall project is studying changes in monsoons in Asia, the most active monsoon region in the world, to find out how human activity has affected climate change.

The project would also study monsoon activities on the Tibetan Plateau in cooperation with the Institute of Tibetan Plateau Research, CAS, he said.

Recent studies by the world's scientists show that increase in emissions of greenhouse gases, mostly carbon dioxide, and overuse of land and pastures are partly to blame for the decrease in crop output and abnormality in precipitation.

"We will study changes in human activities such as urbanization and industrialization, energy production and use, land use and coverage, as well as use of water resources like dam construction," Fu said.

The MAIRS program will interact with international and regional research bodies such as the Global Environmental Change and Food Systems (GECAPS), Global Water System Project (GWSP), Global Carbon Project (GCP), the Asian-Australian Monsoon Panel (AMMP) and so on.

1.3 Health

CAS researchers find a functional gene for rice's grain filling (CAS, 2008-11-05)

CAS scientists with the Institute of Plant Physiology and Ecology (IPPE) under the Shanghai Institutes for Biological Sciences have recently identified a functional gene capable of controlling the rice's grain-filling process

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Grain-filling is a trait that contributes greatly to rice yields. Due to technical difficulties, breeders are still unable to directly carry out an effective selection of the related characteristics and genes, which has become a bottleneck problem for cultivar-breeding.

As reported recently online by Nature Genetics, a research team headed by HE Zuhua with IPPE has isolated GIF1 (grain incomplete filling 1), a key functional gene responsible for controlling the transport and unloading of glucose in the grain-filling process via constructing genetic mapping population.

In collaboration with co-workers at home and abroad, the researchers show this gene plays an important role in the domestication of rice. "By making conscious efforts to select the lines with good grain-filling property and plump grains, our ancestors enabled the cultivars to accumulate beneficial genes and therefore cultivated modern rice species," say the experts .

The findings strongly suggest that such a domestication-selected gene can be used for further crop improvement. "By proper regulation of its gene expression, the economic characteristics of a cultivated crop might be further improved, providing a new approach for molecular design of high-yielding strains of rice," note the scientists.

Nature magazine publishes scientists' work on mapping Chinese genome

(Xinhua Net, 2008-11-07)

The latest edition of the journal Nature reports on scientists' progress in mapping the Han Chinese genome.

The scientific journal introduced the map of a Han Chinese individual, drawn up by about 120 scientists in the southern boomtown of Shenzhen, as part of its cover story on Thursday, said Wang Jian, head of the genome mapping project, on Friday.

Felix Cheung, a representative of the Nature Publishing Group, extended congratulations to the Chinese scientists and praised their achievements at a press conference in Shenzhen on Friday.

"The work is important because it demonstrates the utility of next-generation genome sequencing technology and illustrates the potential of personal genomics in disease diagnosis," said Cheung.

"It's a representative of an ethnic group that accounts for nearly 30 percent of the human population," he said. The sequencing is the first for a Han Chinese and the third for humans overall. The project is the Asian section of a comparative genomics project by Chinese and British scientists, which aims to create genome databases for various races from different continents.

"By comparing with the other individual genomes already available, the discovery of the Asian genome will also shed light on the genetic variation in individuals of different ethnic origins," said Cheung.

The publishing of "The Diploid genome sequence of an Asian Individual" in Nature was greatly encouraging for the Chinese scientists, who are seeking further funding for their study, said Wang.

According to Wang, the Yanhuang Project, named after two legendary ancient emperors who are considered to be the ancestors of the Han ethnic group, will map the genomes of 100 individual Chinese. "Our first donor is a researcher. We hope that the rest of the group will be volunteers who want to have their genomes sequenced for purely scientific purposes," he said. Wang said it was necessary to create the database to solve problems involving Chinese-specific genetic diseases.

"It will also give us a solid foundation for individual health care in terms of accurate and effective diagnosis, prediction and therapy," he said.

Scientists to advance fungal DNA barcoding in China**(CAS, 2008-11-14)**

A symposium on establishing China's system of fungal DNA barcodes was recently held in CAS Institute of Microbiology (IM), the key topic of which is how to advance China's fungal barcoding and join into the Consortium for the Barcode of Life (CBOL), an international initiative devoted to developing DNA barcoding as a global standard for the identification of biological species.

Hundred some scholars and graduate students in bioinformatics or microbiology participated in the discussion. ZHANG Yaping with the CAS Kunming Institute of Zoology made a report on "DNA barcoding technology and CBOL" and WEI Jiangchun with the IM on "fungal barcoding in CBOL and its research plan". Participants held an animated discussion on the topics.

China is now considered one of the four core players of the CBOL program. Our scientists feel the pressure and responsibility to fulfill the task of advancing fungal barcoding, which is an indispensable part in both domestic and international barcoding programs.

Neuronal circuitry and discharge patterns controlling eye movements revealed**(CAS, 2008-11-14)**

To search for an object of interest, our eyes frequently make quick movements (saccades) from here to there. Studies have shown that when observing a large field motion, the eyes alternately perform slow tracking and rapid resetting, i.e. optokinetic nystagmus (OKN). It is known that this OKN is necessary to keep the images on the retina clear and stable; nevertheless its underlying neural mechanism has long been elusive, and therefore been quite attractive to neuroscientists.

Encouragingly, a group of scientists at the CAS Institute of Biophysics (IBP) has recently made some progress in this field. Prof. WANG Shurong and Ph.D students YANG Yang and YANG Yan report in the 15 Oct. issue of *The Journal of Neuroscience* their discovery of the neuronal circuitry in the pigeon controlling its eye movements, and revealed in detail how the shift and oscillation components of a horizontal saccade are initiated.

In human and other vertebrates, the eye is driven by three pairs of antagonistic muscles. Different combinations of their contraction and relaxation activate various movements of eyes. These muscles are controlled by optokinetic neurons located in the abducens, oculomotor and trochlear nuclei. For example, horizontal eye movements are jointly actuated by the lateral and medial rectus muscles, which are controlled by the abducens and oculomotor nuclei in the brain. Birds have highly developed visual sense, and their saccades consist of shift and oscillation components, thus providing a good model for research on the neural mechanism of eye movements. Based on the understanding of the visual neural networks in model birds like the pigeon and the similarity between them and those of mammals, scientists can get some clues about the neural mechanism of eye movements of the latter.

Wang and his students record 297 neurons in the abducens nucleus in the pigeon, and discover that the neurons differ in discharge patterns, generating different electric signals to activate the shift and/or oscillation components of a horizontal saccade. The recorded neurons fall into at least three types,

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namely the shift-related neurons (ShNs) that make sustained firing around the saccadic shift, the oscillation-related neurons (OsNs) that produce bursts accompanying saccadic oscillations, and the saccade-related neurons (SaNs) that discharge both sustained firing and bursts around the saccades. The researchers find that the ShNs begin to discharge 20 ms before the saccade and generate continuous firing until the end of the saccadic movement. The OsNs give off five to six bursts, with each corresponding to one cycle of oscillations of the horizontal saccade. As for the SaNs, their bursts also correspond to the oscillation component of the saccade, and its sustained firing helps the eyes to stay at a new position.

As reported by the team, the OsNs and SaNs can be further divided into two subgroups, one of which make bursting activity before the onset of a nasotemporal saccade (a saccade away from the nose toward the temple) and the other after. The former, named the leading group, begins to discharge bursts 8.1 ms before the onset of the saccade, and the latter, named the lagging group, begins to discharge bursts 7.9 ms after the onset. The team finds that when a temporonasal saccade (a saccade away from the temple toward the nose) occurs, the two groups change their discharge time courses: the leading group discharges after, yet the lagging group before the saccade. When examining the responses of the neurons to antidromic activation of the contralateral oculomotor nucleus with electric current, the team finds that the leading group makes no response, and the lagging group responds by giving off antidromic spikes. This suggests that the latter projects to the contralateral brain to coordinate the activity of the medial rectus muscles of the contralateral eye; whereas the leading group of neurons directly projects to the lateral rectus muscles of the eye on the local side.

"Therefore, the two eyes are able to synchronize their movements, if the two groups coordinate with each other in terms of the timing of discharge." Explains Wang.

Further research by the team has demonstrated that the abducens nucleus is controlled by the oculomotor signals from certain areas in the brain. Chemical blockade of the nucleus lentiformis mesencephali and the nucleus of the basal optic root, both of which are involved in optokinetic nystagmus, can stop the sustained firing generated by abducens neurons, and as a consequence, the shift component of saccades and the slow-phase of optokinetic nystagmus also disappear. Chemical blockade of the brainstem raphe complex, on the other hand, can stop the bursting activity and the oscillation component of saccades, and meanwhile eliminate the quick-phase of optokinetic nystagmus.

"Based on the experiments we can say that the optokinetic nuclei and the saccade-related raphe complex respectively send signals to the abducens nucleus, and the signals travel through motoneurons and innervate the lateral and medial rectus muscles to contract or relax, hence triggering and controlling the saccades or optokinetic nystagmus of the eyes." Introduces Wang.

"It is traditionally believed that optokinetic nystagmus contains slow and quick phases. Our research clearly demonstrates that the quick phase is essentially a saccade that lasts for a shorter time, if judged from the velocity of movement and its neural origin." Continues Wang: "As we know that the nucleus lentiformis mesencephali and the nucleus of the basal optic root are respectively comparable to the nucleus of the optic tract and the terminal nuclei of the accessory optic tract in mammals, and the brainstem raphe complex in birds might be equivalent to the nucleus raphe interpositus in primates, this discovery might provide some insights into neuronal circuitry controlling eye movements in mammals."

The finding of the neuronal circuitry underlying eye movements is highly evaluated by reviewers of the Journal of Neuroscience, and it is just the latest one of the exciting advances made by the IBP team in

the field of neuronal circuitry controlling eye movements and its influence on visual perception. Five months ago, they reported their discovery of corollary discharge circuits for saccadic suppression in *Nature Neuroscience* and have since earned lots of acclaims in the neuroscience circle.

**Scientists call for enhancing studies on chromosome engineering in plants
(CAS, 2008-11-18)**

Botanists advocate more support to the studies of chromosomal engineering in plants at a recent session of the Xiangshan Science Conferences (XSSC). Under the theme of chromosome engineering of plants and molecular breeding of crops, the 330th session of XSSC convened from 14 to 16 October, 2008 in Beijing, bringing together senior researchers in chromosome engineering and young scientists in the fields of molecular biology and molecular breeding.

Distant hybridization and chromosomal engineering in plants have a unique role to play, Prof. WANG Daowen, a research professor at the CAS Institute of Genetics and Developmental Biology (IGDB) and one of the co-chairs of the meeting, was quoted as saying. "Their values in the fundamental and applied research into crop genetic improvement cannot be replaced by molecular biotechnology."

Over the past 15 years, however, there is a lack of systematic support to the studies of chromosome engineering in this country, leading to drastic decreases in the numbers of both research professionals and graduate students in this field. As a result, Chinese studies in this aspect have failed to make key achievements in recent years, according to experts.

Generally speaking, about 30% of the grain-yielding increase is contributed by genetic improvement, pointed out Prof. LI Zhensheng, a well-known Chinese geneticist and another co-chair of the meeting. During the latest decade, the increase of crop yields per unit area has seen a slower speed. Therefore, it is necessary to adopt measures to speed up the grain quality improvement, to keep on backup to the conventional cultivar-breeding studies. At the same time, the government should launch new research programs for the nurture of new cultivars of GM plants.

Of the wide scope of applications of the plant chromosomal engineering, the most significant one is gene mapping and gene transfer among species with closer relationships, stressed participants. Via chromosomal engineering, elite genes of wild species could be transferred to the related cultivated species, creating valuable germplasm resources. With the continuous development of the technology that produces germplasm resources for wheat breeding by combining distant hybridization and chromosomal engineering, theories, techniques and genetic materials have becomes available for improving the qualities of wheat through exogenous genes.

Along with the progress of science and technology, and in light of the demands for new crop cultivars through molecular design, new research breakthroughs are bound to make debut in chromosome engineering, predict scholars.

**Herb may play a potential role in fighting against HIV and neurodegenerative diseases
(CAS, 2008-11-19)**

A woody vine with clusters of tiny red berries: *wu-wei-zi* may look ordinary plant to you, but the Chinese people have used its fruits as medicine for over 2,000 years. It is believed to have many pharmacological effects: tranquilizer, concentration-booster, and even a beauty agent that helps hold moisture in your skin. Scientists now bring to light another two of its magic spells. Believe it or not, with anti-HIV bioactivity and control over the neural system, this herb may combat some of the most

elusive diseases of our modern society.

In the past decade, Prof. SUN Handong and colleagues have been exploring the kingdom of *wu-wei-zi* -- or Schisandraceae -- in southwest China where over half of its total 50 species are distributed. At the State Key Laboratory of Phytochemistry and Plant Resources in West China, CAS Kunming Institute of Botany, researchers carry out numerous experiments to analyze the chemical constituents and study their bioactivities.

For about a dozen species of Schisandraceae they have already examined, Prof. Sun and coworkers have separated and identified more than 700 compounds, one fourth of which were observed for the first time. A recent issue of Natural Products Report (NPR) recorded their original and diligent work on a class of organic chemicals from the Schisandraceae family called triterpenoids.

Sun's group analyzed these molecule structures and testified their bioactivities. To everyone's joy, several triterpenoid molecules were proved as effective inhibitors of the HIV-1 virus. For instance, back in 1996 the team isolated nigranoic acid, a triterpenoid from *S. sphaerandra* that showed activity in several anti-HIV reverse transcriptase and polymerase assays.

With support from the National Natural Science Foundation of China, the West Light Foundation of CAS and provincial grants, the team also uncovered over 80 highly-oxygenated triterpenoids endowed with different skeletons. The NPR review gave a detailed description and classification to these novel compounds. With unusual ring systems and rearranged structures, they may bring challenges to phytochemists, synthetic chemists, and pharmacologists, Prof. Sun says.

According to the professor, these newly-discovered triterpenoids can combine with some major pharmacological targets, such as β -secretase, to treat neurodegenerative diseases with the help of computer-aided drug screening. The research is a good example for natural chemists to reinvestigate some well-known medicinal herbs that were believed to be well studied, and to make breakthroughs with more admiring discoveries.

The laboratory is going to carry out similar studies on the rest of Schisandraceae species. It will also seek collaboration with other CAS institutes like the Shanghai Institute of Materia Medica and the Kunming Institute of Zoology for drug research and development, Sun notes.

Prof. Sun Handong, a CAS member and former director-general of the CAS Kunming Institute of Botany, got down to the study of the magic herb in the late 1990s. His decades-long studies on diterpenoids from *Isodon* species and their bioactivities, including the discovery of some 518 compounds, were reported by the NPR in 2006.

Chinese scientists use herbs to treat cows

(Xinhua Net, 2008-11-19)

Chinese scientists are attempting to keep milk free of chemical residues by using herbal medicines, rather than antibiotics or hormones, to treat bacterial infections in cows and increase their milk production.

Liang Jianping, a leading veterinary pharmacist with the Institute of Modern Physics under the Chinese Academy of Sciences, said on Wednesday that his research team produced zero-residue milk at an experimental dairy farm by using herbal medicines to treat mastitis (an inflammation of the udder) and endometritis (an infection of the uterus).

"The milk was supplied to yogurt manufacturers, and the yogurt produced was sold to restaurants and hotels at a price about twice that of regular yogurt," said Liang.

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Researchers used the anti-bacterial herbal medicine Liu Qian Su, which is extracted from the plant genus madder. It can be metabolized in a few hours and leaves no harmful residues in milk or other food, according to Liang.

Instead of using female hormones, they used puerarin extracted from the herb kudzu (a member of the pea family native to southeast China) to raise cows' milk production. Puerarin, usually used to treat coronary heart disease and angina, can achieve the desired effect by expanding the blood vessels of cows.

The next step was to provide the technique to dairy manufacturers in the northwestern Gansu Province, where the institute is based, said Liang, also member of a Ministry of Agriculture committee overseeing veterinary drug residues in food of animal origin.

"Overdoses of antibiotics in cows can leave chemical residues in milk, which pose a risk of drug resistance and allergic reactions in humans," said Liang.

Liang noted that overuse of antibiotics is common in China as dairy farmers flout dosage regulations.

Liang, who also led a state-level research program on commercializing safe veterinary drugs in 2002, said that China doesn't currently test for antibiotic or hormone residues in milk.

Stricter standards are urgently needed, according to Liang, who added that supervision over the production process is just as important as the product-testing process.

Peering into a disordered brain

(CAS, 2008-11-27)

A roommate who lived with him for years, and a group of mysterious spies who trailed him and gave him orders only he could hear: these are delusions that had haunted John Nash for most of his life. As depicted in the Oscar-nominated film *A Beautiful Mind*, Prof. Nash, a noted mathematician, economist and Nobel Prize winner, is known for his genius in game theory as well as his struggle with schizophrenia like many other sufferers of the severe brain disorder.

The word schizophrenia means "split-mind" in Greek origin. Scientists say it is a complex genetic disorder caused by multiple genetic and environmental factors. Repeated scientific studies have suggested that the disease has something to do with chromosome 5, one of the largest chromosomes in the human body. Researchers carried out investigations in European populations, and identified a so-called "5q22-33" linkage region of the chromosome as a probable cause of schizophrenia. But how is about patients of other populations? Would this conclusion possibly adapt to Han Chinese, the most populous people in the world?

A team led by Prof. SU Bing from the State Key Laboratory of Genetic Resources and Evolution, CAS Kunming Institute of Zoology (KIZ) has been working on the subject for some time. Their latest results, reported by a recent issue of *Journal of Medical Genetics*, confirm the previous observation and render new evidence to the etiology of the disease.

The researchers investigated 506 schizophrenia patients and 672 normal subjects from southwestern China, and examined eight single nucleotide polymorphisms (SNPs) located in his or her "5q23.3" region. The analyses ranged from marker association, haplotypic association and sex-specific association to molecular evolutionary analysis, Prof. Su said.

Previous discovery was observed in the present study. According to Su, single marker analysis indicated that SNP5 in LOC728637 is associated with schizophrenia. The study demonstrates that a haplotype block spanning PDZ-GEF2, LOC728637 and ACSL6 is highly associated with the disorder

of the brain, and that several haplotypes in this haploblock have about twofold to tenfold increase in the affected subjects. These data give strong evidence to the association of "5q22-33" with schizophrenia in Han Chinese.

Some interesting and new evidence was observed, too. When the scientists studied males and females separately, they found that SNP4 in PDZ-GEF2 is associated with schizophrenia in females but not in males, implying that PDZ-GEF2 might be under the regulation of female hormones.

Molecular evolutionary analysis also suggested that PDZ-GEF2 has undergone adaptive evolution due to Darwinian positive selection in the human lineage, Su noted.

The study was a joint effort between KIZ scientists and experts from Yunnan Mental Health Hospital and the Virginia Commonwealth University of the US.

According to the professor, the State Key Laboratory of Genetic Resources and Evolution focuses its research on such cutting-edge issues as the evolution of gene and genome, developmental genetics and evolution, the improvement and protection of genetic diversity, and so on.

Genetic modification of cassava for enhanced starch production successful (CAS, 2008-11-28)



A comparison between transgenic cassava species (left) and a regular one (right)

Recently, the field test of transgenic cassava (*Manihot esculenta* Crantz) for enhanced starch production by the Shanghai Institute of Plant Physiology & Ecology (SIPPE) of the CAS Shanghai Institutes for Biological Sciences proved successful. Through application of transgenic technologies in cassava, the starch quality of this tropical root crop was largely improved. The new cassava cultivars are believed to have a tremendous potential for industrial application in the future.

Cassava is an important root crop in the tropics and subtropics where it is traditionally processed for food, starch and alcoholic beverages. Due to the ever increasing demands by the industries of bioethanol,

modified starch, food, chemical engineering and textile, the improvement in production becomes a key issue. However, to enhance the starch quality by seed breeding, a traditional technique to evolve crops, has proved inefficient to meet the needs. Scientists were prompted to find a unique way by which the production could be increased with less labor and cost.

The ISPPE researchers, who are pioneers in China in genetic transformation study of the plant, obtained a series of cassava cultivars with diversified amylose and amylopectin content by using the RNA interference technology to generate the expression of the starch-synthesizing genes.

At present, the enlarged field experiment is under advancement in the south China's Hainan Province and more cassava cultivars are expected by the scientists, raising new solutions for industrial application.

1.4 Key Technologies

Symposium addresses polyacrylonitrile-based carbon fiber (CAS, 2008-11-18)

Under the sponsorship of the Xiangshan Science Conferences (XSSC), a symposium was held from 11 to 13 November in Beijing. Focusing on science fundamentals for the preparation of high-performance polyacrylonitrile-based carbon fiber, the meeting invited scholars from various disciplines to have discussions on such issues as the fiber formation controlled by polyreaction; organic/inorganic conversion process and composite materials of carbon fiber; analytic characterization, equipment and on-line control; and related progresses at home and abroad, operational systems & summary.

The high-performance polyacrylonitrile (PAN)-based carbon fiber is noted for its universal application in various sectors ranging from transport, energy, civil engineering, to sports goods. In 2007, China imported more than 80 million tons of such fiber, accounting for more than one fourth of the world total. After countless setbacks over the past three decades, Chinese chemists and technicians have finally realized that the low-level PAN precursor is a bottleneck for upgrading the quality of PAN-based carbon fiber. As related basic research is weak and backward in this country, several deep-seated issues remain unsolved in the regard, greatly impairing its development of top-performance PAN-based carbon fiber.

To meet the national strategic demands, this symposium made efforts to identify the key S&T issues in the preparation of carbon fiber and its precursor, and expounds the deep-rooted correlation between the formation of the high-quality precursor and the structure of carbon fiber. The discussions involved various academic disciplines, including the new polymerization theory and methods based on polymer chemistry and polymer physics, the design and control of poly-chain structures, new theories of macromolecular condensed state, polymer processing rheology and polymer structure rheology, and theories and methodology of materials' micro-physics and characterization of their chemical structures. Executive co-chairs of the meeting were SHI Changxu from the National Nature Science Foundation of China, DU Shanyi from Harbin University of Technology, YANG Yuliang from Fudan University, and XU Jian from the CAS Institute of Chemistry.

A novel laser beam in place at SGII (CAS, 2008-11-06)



Researchers with the State Key Laboratory of High Field Laser Physics, the CAS Shanghai Institute of Optics and Fine Mechanics, have been successful in developing a multifunctional and high-energy laser beam system (also known as the ninth laser beam) at the Shenguang-II Laser Facility (SGII).

Officially initiated in October 2002, the 92 million yuan (\$1.3 billion) project is to build an additional beam to the existing eight laser amplification chains at SGII, an important experimental platform for the short-term and mid-term studies of inertial confinement fusion in China. It has been completed recently and passed an

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acceptance check on 25 October by a panel of experts under the auspices of CAS, Chinese Academy of Engineering Physics and the national "863" Program for High-tech Research and Development on in Shanghai.

According to experts, the new facility, featuring several new technologies and advanced devices independently developed by the researchers, has fulfilled all technical requirements of the project. So far, it has conducted more than 1,000 shots of target-shooting alone or in cooperation with the other eight beams, with 80% of hits.

Its output laser light serves as a driving source for the optical probing system and shock wave induced by high-power laser, playing a substantial role in a variety of physical tests such as those in compression of infra-explosion compression, instability at the interface of two fluids, opacity, equations on a material's high-pressurized state, experimental astrophysics, X-ray laser devices and their application.

Constructed in 2001, SGII boasts the fourth among similar finalities in operation worldwide.

China's first low-temperature superconducting iron remover developed (CAS, 2008-11-07)



In cooperation with engineers from Shandong Huate Magnet Technology Co., Ltd, scientists and technicians from the CAS Institute of High Energy Physics (IHEP) have developed China's first low-temperature superconducting iron remover, a major piece of equipment for separating the ferromagnetic matter from coal and other raw materials.

The low-temperature superconducting magnet, the key component of the facility, is the brainchild of IHEP researchers, thanks to their two-year efforts to put into

practical application their know-how on superconducting technologies derived from the Beijing Spectrometer,

With a large diameter of 0.93 meter, the magnet has an energy storage capacity up to 3.4 megajoules and its highest magnetic field intensity could reach as much as 56,000 gauss. Under the superconducting state (at minus 269 degrees centigrade), its coil is resistance-free, which allows the passing through of a high current and the formation of a super intensified magnetic field. The iron separator produced with the technology is noted for a very strong iron absorption capacity, low weight, energy efficiency and environment friendliness. And it costs only 60% of the prices of similar facilities from US.

1.5 Structure of Matter

Premier hails development of electron-positron collider (CAS, 2008-11-05)

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Premier Wen Jiabao has hailed China's 20 years of effort in developing the Beijing Electron-Positron Collider (BEPC), and he urged the scientists involved to promote basic and emerging research and China's innovation capabilities.

The premier made the remarks on Tuesday during a visit to the upgraded project, known as BEPC II, at the Institute of High Energy Physics (IHEP) of the Chinese Academy of Sciences (CAS) in Beijing.

The premier attended a workshop and exchanged views with some leading scientists, including Lu Yongxiang, the CAS president and vice chairman of the Standing Committee of the National People's Congress; Chen Hesheng, IHEP director; Xiang Libin, director of the CAS Opto-Electronics Research Institute; Li Zhensheng, an academician with the Institute of Genetics and Developmental Biology, and Ding Zhongli, a vice president of the CAS. Tsung-Dao Lee, a Chinese-American and 1957 Nobel laureate in Physics, also attended the workshop. The BEPC project "has established China's international status in the sector of particle physics and generated the country's first group of scientists for large-scale research projects," said Wen, who is also a member of the Standing Committee of the CPC Central Committee Political Bureau.

The premier expressed his hope that the IHEP could be built into a world-class, multi-purpose and comprehensive state-level research base.

Wen highlighted the key role of science and technology in resolving major global challenges. Amid the global financial crisis, he said, it is of great importance "to promote a stable and relatively fast-growing economy, by relying on science and technological progress."

While at the IHEP, Wen met with U.S. delegates to the 29th meeting of the Sino-American Joint Commission on High Energy Physics.

The Chinese leader called the BEPC II a model project for Sino-American and multinational cooperation.

The BEPC is one of the world's eight largest high-energy accelerators. In 1988, the late leader Deng Xiaoping visited the domestically built facility, shortly after it achieved its first collisions between electrons and positrons. The upgrade started in 2004 and cost more than 640 million yuan (about 93 million U.S. dollars), according to CAS sources.

Among other improvements, BEPC II has a more powerful injection accelerator that produces the high-energy electrons and positrons and an extensive use of super conducting technology.

New discovery may change understanding of universe

(Xinhua Net, 2008-11-20)

Chinese and foreign experts on Thursday announced the discovery of an unexpected surplus of high-energy, cosmic ray electrons, which could change the current understanding of the universe.

Dr. Chang Jin, an astrophysicist at the Purple Mountain Observatory in China's eastern Jiangsu Province, along with his foreign counterparts, made the discovery using the Advanced Thin Ionization Calorimeter (ATIC).

That's an instrument sent on helium balloons to measure the composition and energy spectra of cosmic rays from 35 kilometers above Antarctica.

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The electrons, about 300 to 800 giga electron volts, were believed to be from a previously unidentified source close to the Earth's solar system.

According to Chang, the electron excess cannot be explained by the standard model of cosmic ray origin, in which electrons are accelerated in sources such as supernova remnants and then propagate through the galaxy.

Chang believed that the surplus possibly resulted from the annihilation of dark matters.

"One such predicted particle has annihilation characteristics that would produce a very good fit for the ATIC results," said Chang. "If true, this would be a major advance in our understanding of dark matter and its role in the universe."

His theory is shared by Lars Bergstrom, an expert in dark matter study with the Stockholm University in Sweden.

Other experts believed that even if the surplus didn't result from dark matter, the finding would be helpful in resolving the enigma of cosmic rays.

Chang said further research in dark matter would be continued.

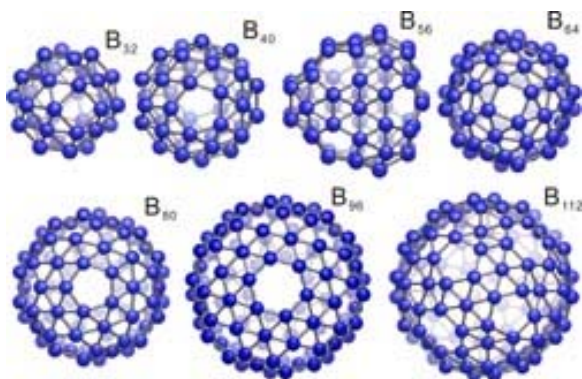
"The ATIC team plans to build a new instrument to further study this source," he said. "The research has just started. We have a long way to go for further data."

Chang worked on the project for seven years and flew to Antarctica three times to confirm the result.

Details of his finding are in the latest issue of the journal, Nature.

A possible recipe for building "football" with boron

(CAS, 2008-11-24)



If you look carefully at a football, you will notice that its surface is composed of hexagons and pentagons. Hexagons lie side by side while any pentagon is surrounded by five hexagons. How many corners and edges are there? Football players do not have to know that as long as they do pass and shots right; an architect or structural physicist, however, could readily give the answer. For decades, scientists have

Schematic structures of several boron S-fullerenes

tried to build molecular structures as symmetric, stable and useful as the football's spheric frame. A rapid communication published online in the Nov.

3 issue of Physical Review B reported a possible recipe for building a variety of nanoscale "footballs" with boron, an element just next to carbon in the periodic table, as proposed by researchers from the College of Physical Sciences, Graduate University of the Chinese Academy of Sciences.

According to Prof. SU Gang, principal investigator of the team, it is well-known that carbon can form nanostructures like fullerenes, nanotubes and graphenes. These structures are endowed with amazing physical and chemical properties: heat resistance, superconductivity, lubrication, even potential medicinal use. Fullerene, for example, is the name of a beautiful carbon-cage molecule found in 1985 by UK and US scientists, who won the Nobel prize in chemistry for the discovery in 1996. Composed entirely of carbon atoms, it may take the form of a hollow sphere, ellipsoid, tube or plane. People named spherical fullerenes "buckyballs" after the noted architectural modeler Buckminster Fuller.

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"So boron is just one atomic number from carbon, and they show many structural analogies. Thanks to this proximity, we believe it can also be grown into similar structures," Su noted.

Among the many scientists who have made remarkable research attempts in this regard, there is 1976 Nobel laureate Prof. William N. Lipscomb, who predicted the possibility of a molecule with 32 boron atoms and an icosahedral structure resembling a buckyball shape. In 2004, experts with Yale University synthesized the first pure boron single-wall nanotube in the world. By April 2007, Prof. Yakobson and coworkers at Rice University had envisioned the existence and stability of another buckyball, B₈₀, a hollow spheric cage consisting of 60 boron atoms at corner and an additional one in the center of each hexagon to increase the stability. Recent theoretical studies conducted respectively at Yale and Tsinghua brought about the prediction of new boron sheets and nanotubes.

Based on previous studies, Su's group was devoted to revealing a general scheme for building boron fullerenes. They finally worked out a formula that can derive a large family of new-type fullerenes with outstanding stability. According to the paper, the formula takes the form of "B_{32+8k}", where "k" can be zero or any counting number. That is to say, theoretically, scientists can develop an unlimited number of structures like B₃₂, B₄₀, and so on and so forth, well including the one envisioned by Yakobson. The newly predicted boron sheets, researchers analyzed, could be regarded as an extreme case of the scheme where "k" goes infinite. They call the series S-boron fullerenes, since these buckyballs contain basic building blocks that look like snowdrop motifs.

The researchers then studied the stabilities of these boron fullerenes. With intense ab initio calculations, they proposed an electron counting rule as well as an isolated hollow rule to readily explain high stability and electronic bonding property of the novel structures. Analyses showed that the electronic bonding property was also applicable to a number of newly predicted sheets and nanotubes.

The study by Prof. Su and his colleagues, experts believe, has set up a general framework for the construction and property study of novel boron nanostructures. Meanwhile, it might shed light on the possibility of similar structures built with elements other than carbon and boron.

Now, have you come up with the exact number of corners and edges of a football? Anyway, it has 60 corners and 90 edges.

1.6 Transport and Space

China expected to open tendering for 1st moon rover

(Xinhua Net, 2008-11-01)

An engineer who is in a UK-China space engineering exchange program said here Saturday that China is expected to open the tendering for the country's first moon rover.

Ju Hehua, associate professor at the Beijing University of Technology, said the tendering would be arranged by December before the National Space Agency (NSA) works out an overall development plan for the proposed lunar rover.

The NSA plans to send a robot moon vehicle to carry out a rover mission by 2012 in the second phase of its Chang'e moon exploration project.

At least 13 research institutes are interested in bidding for the contract, which is estimated to exceed one billion yuan (147 million U.S. dollars).

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Sponsored by the United Kingdom's Royal Academy of Engineering, Prof. Ju is cooperating with researchers from the Surrey Space Center in the UK to develop a prototype rover.

Ju's team has already completed research on onboard guidance, navigation and control systems, which are vital to such a sophisticated automatic vehicle.

Ju predicted that the contract might not go to just one source. "It'll be a concerted work by various participants," Ju said, citing that some bidders have strong leads over others on some particular fields.

Ju said they could keep the cost of a current lunar rover under three million yuan and the more advanced next-generation robot would spend as much as 30 million yuan.

One challenge is to develop a vehicle that is able to move on the rough surface of the moon, the gravity of which is only one sixth of that on the earth, Ju said.

One other major task for a successful rover is to make sure it could cope with the sharp temperature difference, as much as 300 Celsius degrees, on the moon due to its thin atmosphere, the engineer said.

"We are also considering building super powerful batteries which help the rover survive during long nights on the moon," Ju said.

The UK-China exchange program not only works for the Chinese moon exploration mission, but also paves the way for future moon shots of the UK's own, such as the Moonraker lander mission.

The NSA was not available for comment on the possible bidding for building.

CASC: Mars probe to be launched next year

(People's Daily, 2008-11-03)

Home-made satellite will start its first trip to the Mars next September, and the soft lander and moon rover will be launched during the second phase of China's moon exploration project. The news came on Nov. 1 as Wang Li, an official with China Aerospace Science and Technology Corporation (CASC) announced right before the opening of The 7th China International Aviation & Aerospace Exhibition in Zhuhai, south China's Guangdong province.

The orbital and re-entry capsules of Shenzhou-7 spaceship, "Long March V" Rocket, H-6U, J-10 Fighter Jet and so on are on display on the exhibition. It is reported that Zhuhai Airshow is the largest aerospace and aviation exhibition in history.

Live demonstration of moon rover

The exhibition of CASC is always the focus of the air show. "I think the soft lander and moon rover will draw most of the attention. The second phase of China's moon exploration has been approved, and the soft lander and moon rover will be launched in 2013 as scheduled," said Wang.

"During the air show, we are going to show how the moon rover works, including how it raises antenna, unfolds solar wings, gets camera ready, moves forward and backwards, and releases lander from orbit"

Home-made satellite to take on the mission of Mars exploration in 2009

Besides soft lander and moon rover, the air show also touches upon China's Mars exploration. According to Wang, home-made satellite will take on the mission of Mars exploration in 2009.

One Chinese satellite will travel to the Mars by a Russian spacecraft next September. It will reach the high-altitude orbit on Mars conducting series of explorations such as the probe of space environment, solar winds as well as magnetic fields on the planet.

According to calculation and estimation, it takes the shortest time for satellite to reach the Mars if launched in next September. "But it will still take 11 months to get to the Mars, much longer than that

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of the moon exploration. The move signifies China has made a solid leap forward in Mars exploration," noted Wang.

"Long March V" to be launched in 2013

The low-earth orbit carrying capacity of China's most advanced carrier rocket is 9.5 tons, however, that of latest "Long March V" is expected to be 25 tons. The module of soon-to-be-launched rocket has already stood in the airshow, and the rocket will be launched in 2013.

"Long March V" is powered by hydrogen-oxygen engine, and the booster uses liquid oxygen/kerosene fuel, which is different from the fuel of other rockets and will not produce any toxic substances.

It is difficult to transfer the 5-meter diameter rocket to Xichang, Jiuquan or Taiyuan launch centers by ways of railway or road. It will be carried by a specially-designed ship to Wenchang launch centre in Hainan province through waterway.

If the test launch is successful, the "Long March V" will be used to launch 20-tonne class permanent space station, large space telescope, recoverable lunar probe, deep space probe, as well as super-heavy satellites.

China plans second phase of moon probe mission

(People's Daily, 2008-11-03)

China's lunar rover is scheduled to conduct a nearly three-month moon probe mission in the second phase of the moon exploration project, Ju Hehua, associate professor of the Beijing University of Technology said in an interview with reporters on November 1, Beijing News reported.

Ju's research team is cooperating with the Surrey Space Center in the UK to carry out autonomous navigation and control technology research on the lunar rover.

On November 1, reporters saw the prototype lunar rover developed by the Deep Space Exploration Robot Research Center of the Beijing University of Technology. Measuring 1.1 meters long, 0.82 meters wide and 1.6 meters tall, the robot has a six-wheel drive with independent steering for each wheel.

Ju told reporters that the second-generation lunar rover developed by them, which weighs 75 kilograms, is mainly used for research on the lunar rover's certified solutions, as well as relevant critical technology on navigation and control. The center will start developing third-generation lunar rover next year, with an emphasis on boosting the vehicle's environment adaptability and reliability, as well as various technology indicators.

As for collecting samples on the moon, Ju told reporters that they are cooperating with Austria to conduct research on moon sampling technology. China is set to invite bids for the lunar rover by the end of December this year and to begin the project early next year.

Chinese jumbos cleared for takeoff

(People's Daily, 2008-11-04)

China has set a timetable for its large aircraft plan, and the first homemade jumbo jet will take to the skies by no later than the start of the 13th Five-Year Plan Period (2015-20), a senior official said yesterday.

This is the first time a timetable for the trunk liner project has been made public, since the Commercial Aircraft Corp of China Ltd was set up in May. The company is in charge of the large plane's assembly, marketing and after-sales service with an initial investment of 19 billion yuan (2.8 billion U.S. dollars).

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Miao Wei, vice-minister of industry and information technology, said at the China International Aviation & Aerospace Forum 2008 yesterday that China-made jumbo jets will be on the market between 2015 and 2020.

"We will finish the concept design and research on key technologies before 2010, and have the first plane roll off the production line before 2014," he said.

Even though the domestic passenger transport volume has been dropping recently amid the global economic slowdown, Miao said he had confidence in China's vast demand for new planes.

"In the next 10 years, China will need at least 1,000 new planes," he said.

The corporation is currently studying a feasibility plan for the large plane, Jin Zhuanglong, its general manager said yesterday. Some sub-projects have begun, and the large airplane's technology scheme and suppliers will be decided soon, he said.

The corporation, which is also responsible for marketing the homemade regional jet ARJ21, will sign its first overseas order, worth about \$750 million, with General Electric Co, at the seventh China International Aviation & Aerospace Exhibition, which opens today.

GE's leasing unit will sign a contract for 25 ARJ21-700s, which raises the company's backlog to 208, Chen Jin, general manager for marketing and sales, said. Miao said the ARJ21-700 will enter service next year, while work on a 100-seat version, a business-jet model and a freighter will start next year.

China has also received 136 orders for the MA 60, a propeller-driven commuter plane, Miao said.

Xi'an Aircraft Industry Group Co, the maker of the plane, has already delivered 34, he said.

"The next few years will be an important period for China's aviation industry," he said.

The ministry will draft a mid-and-long-term plan for the aviation industry soon in order to coordinate the development of large planes, regional jets and helicopters, he said.

China's space industry takes off

(Xinhua Net, 2008-11-05)

China put another two satellites into orbit on Wednesday, just weeks after its third successful manned space mission and the first space walk by Chinese astronauts in September.

The space industry is taking off, thanks to the 30-year-old Reform and Opening-up Drive, said Zhou Jianping, chief designer of the manned space program.

China established its space sector in the 1950s, an era of difficulty and hardship.

It wasn't until 1960 that China was able to launch its first domestic liquid-fuelled rocket from a primitive facility that resembled an ancient winch.

In the intervening years, the space sector developed slowly because of financial constraints and political turmoil, particularly the catastrophic Cultural Revolution (1966-76). During that period, there were five space launches.

In 1978, when China opened up to the outside world, Chinese scientists were surprised to learn how far they lagged other space-faring countries.

In 1986, the Political Bureau of the Communist Party of China (CPC) Central Committee held a special conference to approve a national scheme for high-tech development, known as the "863 Plan". A special fund of 4 billion yuan (worth about 584 million U.S. dollars at present exchange rates) was allocated to accelerate the development of the space industry.

In 1992, a manned space program was launched, along with a "three-step" strategy. The first phase of the manned space program will cost some 20 billion yuan.

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China's steady growth and expanding wealth provide a strong material foundation for the development of the country's space industry.

To date, China has achieved 112 launches of Long March rocket carriers, including 107 launches since 1978, according to Ma Xingrui, general manager of the China Aerospace Space and Technology Corp. (CASC).

Over the past 30 years, China has launched more than 110 satellites and sent seven spacecraft into outer space, developed 14 types of Long March rocket, made major breakthroughs in satellite technology and sent six astronauts into orbit on board three Shenzhou spacecraft.

China has also utilized many space technologies in its industrial, agricultural and tertiary sectors, and nearly 80 percent of new materials developed by Chinese scientists were first used in the space sector. So far, almost 2,000 space-related inventions have been used in other sectors.

Long March rockets have put 35 satellites from 13 countries or regions into orbit over 29 launches. Long March has become a renowned name in the international space market.

Sharpest telescope heralds China's ambition in deep space quest

(Xinhua Net, 2008-11-05)

A giant surrealistic tower, erratically skewed, points at the sky on top of a 960-meter hill 170 kilometers northeast of Beijing.

The white structure, with a wide dome at its lower end, looks more like a missile silo. Chinese scientists have built the world's most powerful optical telescope in a research base of the National Astronomical Observatories, Chinese Academy of Sciences (NAOC), expecting to unravel the mysteries of the universe.

The advanced astronomical facility, which cost 235 million yuan (34.4 million U.S. dollars) from the national research fund, has an effective aperture of over four meters, the biggest of its kind in the world, and 4,000 optical fibers that can simultaneously track space and decode starlight into enormous amounts of spectrographic data.

With its specifications, the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST), the official monicker of the mammoth device, sees at least twice as far into space and measure more spectral emissions than the previous No. 1 which inspired LAMOST, the Sloan Digital Sky Survey (SDSS).

Prof. Cui Xiangqun, lead engineer for the ambitious project, said in an interview Wednesday with Xinhua, LAMOST combines both large clear aperture and wide field of view into one single sky-monitoring instrument, which enables the highest spectrum acquiring rate in the world.

The team of engineers, which grouped the country's most talented telescope builders, mounted a four-meter segmented reflecting mirror at the lower end of the building. During observation nights, the upper parts of the dome would be removed, starlight would be reflected from the lower mirror up through the 20-meter tube to a 6-meter primary mirror. Then the light of space is fed into the front ends of optical fibers accurately positioned on a focal plane, before real-time data are recorded into spectrographs fixed in a room underneath.

"We need to change the shape of the reflecting mirror during tracking in order to eliminate the spherical aberration of the primary mirror for more precise recording of spectra," said 57-year-old Prof. Cui, who heads the Chinese Academy of Sciences (CAS) Nanjing Institute of Astronomical Optics and Technology.

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Cui's team innovatively designed 24 honeycomb-shaped flat thin plates to become the reflecting mirror. The bigger-sized primary mirror consists of 37 spherical hexagonal cells in a similar structure.

"A key innovation is an active optics system that deforms the correcting mirror's 24 plates individually, compensating for the spherical aberration of the primary mirror and bringing both mirrors into focus simultaneously," Prof. Cui said, calling it the active optics technique.

University of Chicago Prof. Donald York, who was the founding director of SDSS, said in an email interview with Xinhua, "LAMOST can do more than SDSS if they (Chinese astronomers) get high throughput for the entire system."

The game of scanning galaxies and stars is all about statistics, said Prof. York. "LAMOST has 4,000 fibers at a shot, 5.5 times that of SDSS and a bigger advantage over anything else."

SDSS, the 2.5-meter telescope, under multinational collaboration, which was installed in an astronomical station in New Mexico, the United States, images a sky area with the angular field of view of three degrees, equal to a size of 28 full moons. With five degrees in view, by comparison, LAMOST covers 80 full moons.

Prof. Richard Ellis, a California Institute of Technology (Caltech) astronomer who was invited by the CAS to advise on LAMOST, said in an email to Xinhua, "We still don't know exactly how deep LAMOST can probe but my guess is that it will outperform SDSS in both speed and depth."

LAMOST is dedicated to 100 percent spectroscopy whereas SDSS involves itself in both imaging and spectroscopy. "In the case of LAMOST which is a spectroscopic telescope, targets must be found from some imaging surveys," the Caltech astronomer said. "This provides an immediate opportunity for international collaboration which will be beneficial."

As Cui's team wrapped up the engineering job, Chu Yaoquan, the LAMOST project scientist who is an astrophysicist at the University of Science and Technology of China (USTC) in Hefei, Anhui Province, would lead his team in scientific missions.

"We have yet to shape a clear idea about our galaxy's structure," Prof. Chu said. "By parsing spectra of millions of stars in the Milky Way, we would have a chance to get the whole history of the galaxy."

In addition, the scientific goal of LAMOST is likely to expand to extragalactic observation and multi-wave identification. Based on the data collected in phase II of SDSS, LAMOST is expected to push large sample spectroscopic sky survey deeper and wider.

Prof. York guessed that LAMOST would start by following up on SDSS before defining its own new mission. "It is important that it develops a scientific planning process that takes the best ideas and works very hard on a few big things," the astronomer said.

Chinese scientists have long considered capitalizing on the country's big astronomical facilities to make research breakthroughs.

The network of virtual observatories might be a wise way to utilize the survey capability of not only LAMOST, but also an on-duty 2.4-meter aperture telescope in Lijiang, Yunnan Province, and several smaller ones. Data-mining technologies would substantially help astronomers onto the fast track for pinpointing new finds in deep space.

Prof. York said observational breakthroughs are now coming from "finding out what is actually out there" rather than "using theory to predict what is out there".

**China puts two satellites into orbit
(Xinhua Net, 2008-11-05)**

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China on Wednesday morning put two satellites into orbit after they were successfully launched from the Jiuquan Satellite Launch Center in northwest China.

Chuangxin 1-02 and Shiyao Satellite 3 were launched on a Long March 2D carrier rocket.

The smaller satellite, the Chuangxin 1-02, developed by the Chinese Academy of Sciences, will be used to collect and relay hydrological and meteorological data and data for disaster relief.

The Shiyao Satellite 3 will be used for experiments on new technologies in atmospheric exploration, according to its main developer, the Harbin Institute of Technology.

The launch was the 112th of China's Long March series of rockets.

Sinosat-5 and Sinosat-6 to be launched within three years

(People's Daily, 2008-11-05)

China Aerospace Science and Technology Corporation has signed a contract with China Satellite Communications Corporation and China Meteorological Administration for the research and launching of Sinosat-5, Sinosat-6, FengYun-2 satellites and five Long March 3A carrier rockets.

According to the contract, Sinosat-5 and Sinosat-6 are scheduled to be launched within three years, while three FengYun-2 (manufacturer code #03) satellites are set to be launched in 2010, 2012 and 2014 respectively.

Sinosat-5, Sinosat-6, FengYun-2 are the new generation of communication, broadcast and meteorological satellites. They are aimed at protecting China's registered orbital positions and frequency space, and ensuring the continuous business operation and use of China's meteorological satellites.

The ink of the contract also marks the primary transition of China's communication and meteorological satellites from experimental to applicable and service.

Chinese scientist calls for co-op between Asian space powers

(Xinhua Net, 2008-11-12)

A Chinese scientist on Wednesday called for moon probe program experts in China, India and Japan to step up cooperation to "deepen mankind's understanding of the moon."

Ouyang Ziyuan, chief scientist for China's moon exploration program, said the three countries shared goals on moon probe while each had its advantages.

Taking a full map of the moon's surface, detecting minerals and studying the space environment were the common goals, he said.

Each country had its unparalleled technological competitiveness, and he expected more cooperation and hoped to see more contributions made by the scientists in the three Asian countries.

Ouyang's comments came only hours after Chinese scientists revealed the country's first full map of the moon's surface, which was hailed as the most complete image of the moon surface yet published.

The picture was released more than a year after the launch of China's first lunar probe, Chang'e-1.

An official also announced on Wednesday that China would launch a second lunar probe, Chang'e-2,

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before 2012, as part of its three-stage moon mission.

The eventual goal is to bring lunar soil and stone samples back to earth for study in about 2017.

"Chang'e" is named after a legendary Chinese moon goddess.

In 1990, following the Soviet Union and the United States, Japan became the third country to orbit the moon after sending the Hiten spacecraft. India launched an unmanned lunar orbiter last month.

China to launch 2nd lunar probe before end of 2011

(CAS, 2008-11-12)

China will launch a second lunar probe, Chang'e-2, before the end of 2011, an official said on Wednesday, while announcing the start of the second stage of the country's moon mission.

Chang'e-2, part of the second phase of the Lunar Probe Project, will conduct experiments involving five core technologies such as orbital adjustments and soft landings, according to Chen Qiufa, director of the State Administration of Science, Technology and Industry for National Defense.

The probe will improve upon the design of Chang'e-1, the first lunar probe, Chen told reporters.

Also on Wednesday, China published its first full lunar map, based on data sent back by Chang'e-1, which blasted off last October from the Xichang Satellite Launch Center in the southwestern province of Sichuan.

Another lunar probe, the Chang'e-3, will be launched during the second phase of the project by a Long March 3B carrier rocket, Chen said. Chang'e-3 is designed to carry out missions including soft landings and inspection of the lunar surface, Chen said without elaborating.

The launch of Chang'e-1 was the first step in the country's three-stage moon mission, which will lead to a moon landing and launch of a moon rover in 2012 or thereabouts. In the third phase, another rover will land on the moon and return to Earth with lunar soil and stone samples for scientific research in about 2017. "Chang'e" is named after a legendary Chinese moon goddess.

CAS launches a new micro-satellite

(CAS, 2008-11-13)

On Nov. 5, a rocket launched the Chuangxin-1(02), a small satellite manufactured by the Shanghai Engineering Center for MicroSatellite under the CAS Shanghai Institute of Microsystem and Information Technology (SIMIT), into the preset orbit.

As an experimental micro-satellite for data collection and transmission, the Chuangxin-1(02) will be used to in the fields of water conservancy, hydrology, meteorology, electric power and disaster reduction.

The success marks the opening of a new horizon for the technological development of mini-satellites in China, according to experts.

China establishes a group of largest wind tunnels in Asia

(People's Daily, 2008-11-14)

China has established a group of the largest wind tunnels in Asia and the comprehensive competency of the experiment and research of the group of wind tunnels has reached world's advanced level, said a spokesman at the conference commemorating the 40th anniversary of the establishment of the aerodynamics research base on November 13.

The aerodynamics research base was honored with the title of "cradle of aeronautics and astronautics"

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in China.

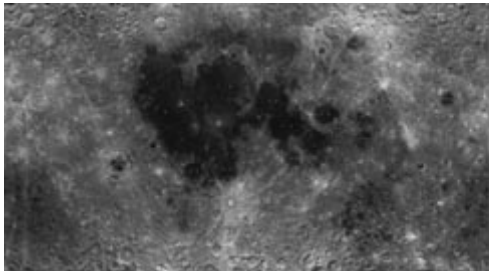
Through vigorous proposals by professors Qian Xuesen and Guo Yonghuai, famous experts of aerodynamics, the base was formally established in Mianyang, Sichuan in 1968.

Over the past 40 years, a large number of scientists, engineers and PLA officers and soldiers have built the group of the largest wind tunnels in Asia comprised of 52 wind tunnel equipment and special facilities in the desolate and uninhabited deep mountainous area.

In recent years, to meet the urgent needs of national economic development and the construction of key equipment, the research base has successfully completed the aerodynamic design and safety performance evaluation of a series of key projects including the Long March carrier rockets series, Shenzhou spacecrafts and J-10 fighter jets, filling the gap in over 100 key technologies in scientific research.

China unveils its first full image of moon

(CAS, 2008-11-17)



The country's first full map of the moon has recently been released by the State Administration of Science, Technology and Industry for National Defense. The image, which was produced on the basis of data obtained by the Chang'e-1, China's first lunar

probe, over the past one year or so, was presented to the National Museum of China on 12 November in Beijing.

About one year earlier, on 24 November, 2007, Chang'e-1 blasted off on its way toward the moon, making a new milestone in the country's space exploration history. Two days later, China unveiled its first lunar surface picture, which was taken by the CCD 3-D camera, a brainchild of scientists from the CAS Xi'an Institute of Optics and Precision Mechanics. Later on, in January 2008, China released images of the polar regions of the moon taken by this camera. Until 12 May, 2008, the camera had shot pictures of lunar terrain surface between 70 degrees of both North and South Latitudes of the moon. At the same time, a full image of the moon surface was produced on the basis of the data collected.

According to experts, the approaches by which the CCD camera aboard the lunar probe works are different distinctively from those of conventional ones: it makes images "track by track." During each orbit around the moon, the CCD camera scan one track of the lunar surface, covering an area of 60 km in width and about 10900 km in length. Using linear array push-broom imagery technology, the camera can simultaneously have forward, nadir and backward images of the track. The newly released the image is a reconstruction of the terrain surface of the moon on the basis of the information from nearly 560 such tracks after a series of rectifications in terms of radiation, geometry and optics. It covers an area of West Longitude 180 degrees to the East Longitude 180 degrees, between the North and South latitudes of 90 degrees.

It was the most complete image of the moon surface, and also the richest in detail, among similar pictures published so far. Its quality reached the world's advanced level and is spoken highly by experts at a meeting of its acceptance check.

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China's Feng Yun-3 A satellite starts trial business operation

(Xinhua Net, 2008-11-19)

China's new polar orbiting meteorological satellite, Feng Yun-3 A and its ground application system, started business runs on Tuesday, said China Meteorological Administration (CMA).

The CMA said it would actively sell data and services provided by the satellite to domestic and overseas users. It supplies a wide range of information in areas including meteorology, sea, water conservation, transportation, agriculture, forestry and aviation.

The satellite has been operating smoothly for four months after being sent into orbit on May 27, said CMA head Zheng Guoguang.

Being an important provider of meteorological information, the satellite played a key role during the 2008 Olympics, according to the CMA. It provided detailed mapping of the algae outbreak at the sailing competition site in Qingdao, and closely monitored typhoons during the flood season.

Feng Yun-3 A is listed by the World Meteorological Organization (WMO) as a global earth observation satellite, which provides 24-hour observation of air, sea and ground environment of the planet.

Construction of Wenchang launch center to begin

(People's Daily, 2008-11-19)

The launch center for new-generation carrier rockets in Wenchang, southernmost China's Hainan Province, has entered into the implementation stage after receiving project approval and verification from the State Council and the Central Military Commission.

Zhang Jianqi, deputy director general of the PLA General Armament Department, said on November 17 that at present construction command is on site and a project budget of almost 5 billion yuan has been formulated. Construction for water supply, electricity installation and road and ground leveling are expected to begin next month.

Zhang, once the deputy commander-in-chief of the 'Shenzhou VII' mission, said after a thorough site inspection, he realized that the launch site was situated in a world-class ecological environment. There are consequently huge obligations for environmental protection during construction. He promised that they will construct the Wenchang rocket launch site to be an open, ecologically-sound and environmentally-friendly world class one at all costs.

After completion, it will become a world leading nontoxic, pollution-free, dual military and civilian use launch site for carrier rockets, primarily used in launching earth synchronous orbit satellites, massive polar orbit satellites, large-tonnage space stations, deep-space detection satellites and other various spacecrafts.

The Wenchang Launch Site for new generation carrier rockets project was approved by the State Council last August. It has a total investment of about 5 billion yuan, and the construction is expected to last five years.

China to launch new remote sensing satellite

(Xinhua Net, 2008-11-30)

China will launch a new remote sensing satellite "Yaogan" on Monday at the northwestern Jiuquan Satellite Launch Center in the northwestern province of Gansu, an official with the center said on Sunday.

The satellite was to be aboard a Long March-2D carrier rocket into the space "at an appropriate time",

the official said.

At present, both the rocket and the satellite were in good condition and the preparation went on well. The satellite would be used for scientific research, land resources surveying, crop yield estimate and disaster prevention and relief. "It will play a positive role in the country's economic development," he said.

Its predecessor "Yaogan III" was launched from the Taiyuan Satellite Launch Center in north China's Shanxi Province on Nov. 12, 2007.

The "Yaogan I" satellite was launched from Taiyuan on April 27, 2006, and the "Yaogan II" was launched on May 25, 2007 from Jiuquan.

2 News from Universities

Number of Chinese students studying in the US keeps increasing

(People's daily, 2008-11-11)

According to the US Ming Pao Daily News, in 2007, the US Embassy in China issued 37,000 visas for students from the Chinese mainland, setting a new record.

Of the foreign students studying in the US, students from South Korean accounted for the largest number of them, followed by students from India and China.

Student and exchange visitor visas issued to Chinese nationals by the US surge 40%

(People's daily, 2008-11-21)

An officer from the US Embassy in Beijing said on November 20 that the student and exchange visitor visas issued to Chinese nationals in the 2008 fiscal year increased by about 40% year-on-year with the US Administration welcoming more Chinese students to study in the US.

The visa officer said that the US has no limit on the number of foreign students entering the country for study purposes, and it warmly welcomes all Chinese students who meet the relevant requirements to study in the US.

The Administration's visa policy on Chinese students studying in the US will neither be tightened nor loosened. The increase of student visas issued to Chinese nationals in recent years has been mainly due to the increase in numbers and better qualifications of Chinese applicants.

Referring to the impact of the global financial crisis on Chinese students to study in the US, Frank Mok, educational resource coordinator of the American Center for Educational Exchange (ACEE) at the US Embassy in Beijing, said that there will not be any big changes in the tuition fees for American universities in the short term. The scale of admission for international students is normally decided by the universities themselves.

According to the statistics of the US Institute of International Education (IIE), there were 81,127 students from the Chinese mainland studying in the US during the 2007/2008 academic year, second only to the number of students studying in the US from India, an increase of 20% year-on-year. In the meantime, there were 11,064 American students studying in China, an increase of 25.3% year-on-year.

3 Innovation Management

Science academy leaders meet to discuss innovation systems in Beijing

(CAS, 2008-11-17)



To mark the 30th anniversary of China's reform and opening-up and 10th anniversary of CAS Knowledge Innovation Program, a forum was held under the auspices of CAS from 11 to 14 November in Beijing. Leaders of State science institutions from 16 countries across the world were present at the meeting to address the role of their organizations in a national innovation system.

More than 70 participants from countries like US, Japan, Russia, Australia, ROK, India and China focused their attentions on various topics, including the positions of a

national science academy in the national system of innovation, its consulting and supportive roles in the national decision-making procedure; development of research teams and the sustainable development of a national academy; S&T innovations and a country's socio-economic development in coming years. CAS President LU Yongxiang and CAS Vice President LI Jinghai delivered speeches on the roles of CAS in the national innovation system and the driving force behind the development of a national innovation system, respectively.

In the course of the forum, the science administrators and scholars exchanged experience and ideas of common interest with the hosts on problems and issues concerning the national academy and innovation system, exploring possible routes and feasible methods for promoting a national innovation system and S&T development in the world via interactive and well-concerted efforts.

During the meeting, CAS leaders held talks with some foreign participants on the furtherance of S&T cooperation. Some foreign guests were invited to visit some CAS institutes.

Symposium on innovation management convenes in Kunming

(CAS, 2008-11-20)

The third Sino-German Symposium on innovation management was held recently in Kunming, capital of southwest China's Yunnan Province

The conference focused its discussions on the following five issues: innovation policies and sustainability; R&D management and innovative performance; innovation and management of intellectual properties; innovation management in enterprises; and technical acquisition and knowledge management. Its participation includes 17 Chinese experts and 13 German scholars. They delivered 29 speeches on monographic themes and then they held warm discussions.

Prof. Mu Rongping, IPM Director-general, Prof. Fan Chunliang, Song Hefa and Liu Huiwu took part in the symposium. They made presentations respectively on the following topics: China's national capacity for innovation and its developments, some key problems in basic research, innovation policies for China's technology-oriented small and medium sized firms, and intelligent property management for public R&D institutions.

In addition, the participants made discussions on the long-term cooperation between Chinese and German researchers, urging the enhancement of cooperation & exchange in medium & long-term

projects between the two sides.

The symposium was also supported by Bayreuth University, Kunming University of Science and Engineering and Beijing Institute of Technology. It was also funded by Sino-German Center for Research Promotion.

Int'l workshop on management innovation convenes in Beijing (CAS, 2008-11-25)



In order to strengthen communications between domestic research bodies and their overseas counterparts in the field of innovation management and evaluation, an international workshop was held in Beijing on November 13 and 14. Member of CAS Presidium Prof. FANG Xin was present at the meeting and Prof. BAI Chunli, CAS executive vice president, sent his congratulatory message.

Under the joint sponsorship of the CAS Bureau of Planning and Strategy and the CAS Center for Management Innovation and Evaluation affiliated to the CAS Institute of Policy and Management, the symposium was attended by some 30 S&T administrators or scholars of national research bodies from various countries, including the US Department of Energy, the US National Institutes of Health, the Environment Protection Agency and US National Science Foundation, the National Institute of Advanced Industrial Science and Technology from Japan, the Max Planck Society from Germany and Helmholtz Association from Germany.

At the conference, experts were invited to give talks on such topics as the fundamentals of innovation management, the strategic positioning and layout of a national research body, its developmental roadmap, organizational modes for their research work as well as concepts, modeling patterns and implements for appraising an R&D institution.

On 14 Nov. some participants were invited to visit the CAS Institute of High Energy Physics and held discussions on the management of mega-scientific facilities with administrators there.

4 China's International Science Cooperation

LIAMA Consortium signs cooperation agreement (CAS, 2008-11-05)



On the afternoon of 28 October, the Sino-French Lab in Computer Science, Automation and Applied Mathematics (LIAMA) announced a brand new agreement for international cooperation at the CAS Institute of Automation (CASIA), Beijing, which renews the name list of LIAMA partners and details ways in which the phase IV cooperation can take place.

CAS Vice President YIN Hejun, French Minister of

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Foreign Trade Anne-Marie Idrac and French Ambassador to China Herve Ladsous attended the signing ceremony, which witnessed the setup of LIAMA Consortium consisting of more than ten participating European and Chinese institutions.

LIAMA was jointly created by the French National Institute for Research in Computer Science and Control (INRIA) and CASIA in 1997. During the past three phases of international cooperation, LIAMA attracted the participation of more than 1,000 researchers from home and abroad in over 100 projects involving information, biology and natural environment. In the past 11 years, it also forged cooperative ties with numerous French and European research institutions, enterprises and universities. Now, LIAMA is entering a new phase of international cooperation. According to the agreement, LIAMA Consortium is created to replace the old collaboration fashion and assumes a membership system. With its membership open to universities, research institutions and enterprises in China and European Union member countries, LIAMA is expected to initiate more projects in research, training and industrialization based on mutual benefits.

The institutions that enlisted in the LIAMA Consortium membership include: CASIA, CAS Institute of Computing Technology, CAS Institute of Software, Tsinghua University, INRIA, National Center for Scientific Research of France, French Agricultural Research Centre for International Development, French National Institute for Agricultural Research, Ecoles Centrale Paris, Wageningen University, the Netherlands and the Chinese Department of Research and Development of France Telecom.

Center for human brain recording opens at the Institute of Biophysics (CAS, 2008-11-17)



The opening ceremony of the Center for Human Brain Recording was held during a symposium held on 27 and 28 October at the CAS Institute of Biophysics (IBP) in Beijing. CAS Vice President LI Jiayang was present at the ceremony and delivered a congratulatory message.

Also at the symposium, IPB Director-general XU Tao and Director of the McGovern Institute for Brain Research at MIT signed a Memorandum of Understanding for cooperation between the two sides.

CAS institute, US national lab ink MOU on renewable energy sources (CAS, 2008-11-21)



A memorandum of understanding (MOU) for cooperation on renewable energy sources was signed between the CAS Institute of Electrical Engineering (IEE) and the US National Renewable Energy Laboratory (NREL) on 11 November in Beijing.

Chaired by LV Yonglong, director-general of the CAS Bureau for International Cooperation, the signing

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ceremony was attended by CAS Vice President JIANG Mianheng, Vice Director-general of the CAS Bureau of High-tech R&D Development XIAO Yunhan, IEE Director-general XIAO, NREL Director Dan Arvizu and Director of US National Center for Photovoltaics Lawrence Kazmerski.

Prior to the ceremony, Prof. Jiang met with by Dr. Arvizu. The two sides came to a consensus, claiming this deal will greatly promote the cooperation between Chinese and American scientists and in particular push forwards collaboration in the field of test technologies of renewable energy sources. After the signing ceremony, the NREL guests visited the CAS Center for Photovoltaic Reliability.

Under the US Department of Energy, NREL is the only national Lab in US exclusively engaged in development of the renewable energy and related technology of application and popularization. Its research fields cover solar energy, wind energy, biomass energy, geothermal energy, hydrogen energy, batteries of fuel cells and other forms of reusable energy.

Scientists to further collaborate on climate change, water cycles

(Xinhua Net, 2008-11-24)

Around 70 scientists and scholars from China and Europe, mainly the United Kingdom, gathered in Beijing Monday to exchange opinions on climate change and its impacts on global and regional water resources.

Entitled "Climate Change and the Role of the Water Cycle", the seminar is co-organized by the Research Councils UK (RCUK), the Monsoon Asia Integrated Regional Study (MAIRS), and the EU funded integrated project Water and Global Change (WATCH) with an aim to enhance collaborations between Chinese and European scientists on climate change and water cycles.

Chris Godwin, director of the RCUK office in China said: "China is the UK's fastest-growing partner in science research, but there's much room for increasing impact of works co-authored by Chinese and UK scientists."

Fu Congbin, chairman of the scientific guidance committee of MAIRS, the first project on climate change initiated by Chinese scientists, said at the seminar that his colleagues had identified key environmental changes that affect the people and societies in the monsoon Asia region.

"But, further research needs full international collaboration," he said.

During the three-day seminar, speakers from the UK Meteorological Office, the Center for Ecology and Hydrology of UK, Reading University, the Chinese Academy of Sciences, Tsinghua University and so on will cover topic areas such as "Present and Future Water and Land Use", "Climate and Hydrological Cycle", and "Regional Trends: Floods and Droughts".

5 Miscellaneous

CAS physicist receives Richard Geller Prize

(CAS, 2008-11-03)

Dr. SUN Liangting from the CAS Institute of Modern Physics has been awarded the Richard Geller Prize for his outstanding contributions to the development of Electron Cyclotron Resonance (ECR) ion sources, especially an all-permanent magnetic one.



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The 4,000 Euro award, which was set up by PANTECHNIK, a world leader in commercial ECR ion sources, was presented at 18th International Workshop on ECR Ion Sources held recently in Chicago. This was the first time to award the prize, which is named after Richard Geller, founder of ECR ion sources.

An ECR ion source, the most effective device so far to produce intense beams of highly charged ions, has wide-range applications in such fields as accelerators, nuclear physics, atomic physics, surface physics and the semi-conducting industry.

Thanks to their three-year efforts, Sun and his colleagues have up with Lanzhou all permanent magnetic ECR ion source No.2 (LAPECR2). It is an all-permanent magnetic high charge state ECR ion source with the strongest magnetic field, largest plasma chamber, and most intense beams of highly charged ions in the world.

China air show concludes with deals of 102 aircraft inked (Xinhua Net, 2008-11-09)

The 7th China International Aviation and Aerospace Exhibition, also known as Airshow China, concluded here Sunday with deals of 102 aircraft inked, the organizer said.

Some 4 billion U.S. dollars worth of deals were signed at the six-day event held in the coastal city of Zhuhai in south China's Guangdong Province, a spokesman with Airshow China's Organizing Committee said.

Among the deals, the Commercial Aircraft Corp. of China (COMAC) will sell 25 ARJ21-700 regional jets to GE Commercial Aviation Services of the United States. The deal is valued at 5 billion yuan (733 million U.S. dollars). The first jet will be delivered in 2013, with one per month thereafter.

COMAC Board Chairman Zhang Qingwei said it was the first time Chinese-developed and manufactured regional jets have entered Western airline markets.

Some 600 aviation businesses from 35 countries and regions attended the largest show of its kind in China, with more than 60 aircraft being exhibited.

The event marked the maiden show of China's home-built J-10 fighter and FBC-1 fighter bomber.

The 8th China International Aviation and Aerospace Exhibition will be held in Zhuhai from Nov. 16 to 21 in 2010, the organizer said.

Nobel winners forum opens in Beijing (CAS, 2008-11-13)



The "2008 Nobel Winners Beijing Forum" opened on 11 November under the everlasting theme of "The Harmony and Development of the Human Kind", and with a focus on the annual topic of "Information & Innovation".

The four-day event is sponsored by CAS and the Beijing Municipal Government, with CAS President LU Yongxiang and Mayor of Beijing GUO Jinlong as co-chairpersons of the forum's organizing committee.

The forum have invited top scholars from all over the world, especially the Nobel winners, to give academic lectures and preside over forums on subject

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matters, to carry out multi-level discussions and exchanges on academic, social and industrial issues so as to provide a high-level platform for the Nobel winners, Chinese scholars, and Chinese government officials to exchange ideas, to have practical dialogues and to have international cooperation.

The forum will introduce to China's academia and industry the frontier theories and latest trends in natural sciences and social sciences in today's world so as to provide decision-making support in implementing the scientific outlook on development, enhancing self-innovation ability, constructing an innovative country, and building a harmonious society.

The Forum has invited 7 Nobel winners, and 4 Turing Award winners, to be present at the Forum in Beijing. During the Forum, the honored guests will deliver many speeches, the topics of which range from New Types of Materials for the Development of Modern Information Technologies, Research Directions Supporting the Information Age, A New Century of Particle Physics, to the Science Behind Information Technology, the Nobel Prizes, and the Future of Sciences, etc.

During the Forum, the honored guests will also pay a visit to CAS institutes and laboratories and give reports. In addition, some of them will go to five institutions of higher learning, including the Graduate University of CAS, Tsinghua University, and Peking University to have academic exchanges and accept their conferment as honorary professors. They will also go to high schools to communicate and interact with students.

Survey: Chinese basic scientific knowledge on rise (People's Daily, 2008-11-17)

Scientific and technological awareness has been increasing among the Chinese people, according to a survey released on Sunday.

The survey by the Chinese Association for Science and Technology (CAST) reveals that people with basic science and technology knowledge account for 2.25 percent of the total population of 1.3 billion, compared to 1.6 percent in 2005 when a similar survey was last conducted.

The survey covers 10,080 people, aged between 18 and 69, from 31 provinces, autonomous regions and municipalities on the Chinese mainland.

Carried out from December 2007 to February 2008, the survey indicates 18.4 percent of the Chinese people understood scientific terms, 33.5 percent understood scientific methods and 59.4 percent understood the relation between science and society.

The respondents held that teachers, scientists and doctors are the most respected professionals and 40.1 percent of the parents hoped their children would become scientists.

As to the relation between scientific development and human resources, 82.8 percent of the respondents agree that "stimulating children's interest in science and technology will be conducive to the development of China's talents."

The Chinese people also have high expectations on future development of science and technology. The survey says that 81.9 percent of the respondents believe modern science and technology will bring the offsprings more opportunities for development.

China's anti-SARS hero backs controversial school running campaign (People's daily, 2008-11-19)

A prominent Chinese medical expert voiced his support on Tuesday for a controversial government campaign to get kids running over the winter.

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Zhong Nanshan, the leading doctor in treating the Severe Acute Respiratory Syndrome (SARS) in 2002, said he was in favor of the Ministry of Education's recent health campaign.

It requires schools to organize daily runs for students from Oct. 26 until the end of next April. Primary schoolchildren must run 1 km per day, junior high school students 1.5 km, and senior high and college/university students 2 km.

"I've been jogging three or four times a week in the past decades. It has become sort of a habit. Look at me, I'm 72 and still in very good shape," Zhong said.

Debate over the campaign has been all over newspapers and websites, with opposition coming from students, parents as well as schools. Many argued schools don't have enough space for the exercise, running might take up study time and the campaign might not be very helpful for students' health.

Liu Dong, a high school student in Beijing, for example, said he was fond of playing basketball, but had little interest in running. He said the campaign might be a burden.

Xiong Bingqi, a specialist in education, said more exercise options should be provided to students instead of just running. "Some of the arguments are merely excuses," Zhong said.

The expert on respiratory diseases said running was one of the best ways to enhance young people's heart and lung functions as well as their endurance. Zhong added, it benefits not only the body but the mind and personality.

"Sports teach people to always try their best and never admit defeat. During the SARS outbreak, many people disagreed with me but I stuck to my own opinions that I believed were right," he said.

This is the first time the ministry has launched such a campaign. It was announced on Sept. 28.

A survey of Chinese students' health in 2005 showed that lack of physical stamina was a serious problem. The campaign was intended to improve children's endurance and team spirit, said a Ministry of Education official.

Six CAS scientists elected into TWAS in 2008 (CAS, 2008-11-19)

At the 19th General Meeting of the Academy of Sciences for the Developing World (TWAS) held from 10 to 13 November in Mexico City, Mexico, six CAS scientists were elected new TWAS Fellows.

MENG Anming, executive vice director-general of the CAS Institute of Zoology, is famous for identifying new mechanisms and new factors in vertebrate embryonic patterning, particularly in mesoderm induction, and for discovering a new approach for dissecting tissue-specific activities of a complex promoter in living embryos.

CHEN Xiaoya, director-general of the Institute of Plant Physiology and Ecology under the CAS Shanghai Institutes for Biological Sciences, is interested in plant molecular biology with the following major achievements: 1) elucidation of gossypol biosynthesis pathway at molecular level; 2) identification of the MYB gene involved in cotton fiber development; 3) development of a new phytoremediation method; 4) identification of transcription factors controlling root cap development.

YANG Huanming, a professor with the CAS Beijing Institute of Genomes, is well known for his outstanding achievements in genomics and bioinformatics. He is also the Coordinator-in-China, of the International Human Genome Sequencing Consortium, The International HapMap Consortium, and the International Chicken Genome Sequencing Consortium. He was elected a CAS Member in 2007.

DUAN Shumin, a professor with the Institute of Neurosciences under the CAS Shanghai Institutes for Biological Sciences, has discovered new roles for astrocytes in the brain, in neuron-glia interaction, and

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the critical role of astrocyte-derived D-serine in synaptic plasticity.

MU Mu, a professor with the State Key Laboratory of Atmospheric Sciences, and Geophysical Fluid Dynamics under the CAS Institute of Atmospheric Physics, has scored major accomplishments relate to stability problems in geophysical fluid dynamics, and in the predictability of weather and climate, in which he has proposed and applied a new method called CNOP to study the El Nino Southern Oscillation.

WANG Enge, a professor with the CAS Institute of Physics, has done pioneering work on the synthesis of tubular graphite cones and nanobells, and innovatively studied the formation and decay mechanisms of surface-based nanostructures. He has also been involved in the discovery of upward atomic diffusion and three dimensional Ehrlich-Schwobel barrier, and has predicted the two dimensional tessellation of ice.

Professors from China, Brazil, Japan win top medical awards of Thailand (Xinhua Net, 2008-11-21)

The International Award Committee of the Prince Mahidol Award Foundation of Thailand announced Friday three professors from China, Brazil and Japan, respectively, have won its 17th Prince Mahidol Award for 2008.

The Prince Mahidol Award 2008 in the field of medicine is conferred on Professor Sergio Henrique Ferreira from University of Sao Paulo, Brazil, and the Prince Mahidol Award 2008 award in the field of public health is jointly awarded to Professor Michiaki Takahashi from Osaka University, Japan and Professor Yu Yongxin from the Chinese National Institute for the Control of Pharmaceutical and Biological Products, announced Voradet Viravakin, chairman of the Sub-Committee on Public Relations of the Prince Mahidol Award Foundation.

According to the award committee, there were a total of 49 nominations from 19 countries contesting the awards in 2008. Thai Princess Maha Chakri Sirindhorn presided over the meeting of the Board of Trustees on Nov. 3, 2008 in which the final decision on the Prince Mahidol Award 2008 was made.

During the awardees introduction session, Professor Vicharn Panich, chairman of the award committee, explained the decision to select all the three to be this year's awardees.

Professor Ferreira from Brazil discovered the Bradykinin Potentiating Factor (BPF) which is a peptide found in the venom of a Brazilian snake.

Professor Takahashi from Japan developed a vaccine isolated from the vesicles of a typical case of chicken pox in a 3-year-old Japanese boy. Named Oka after the boy, the vaccine was developed to prevent chicken pox in a process which is strictly adhered to the standard of the World Health Organization. The vaccine was widely accepted and used extensively in Japan, South Korea, the United States, France, as well as Thailand. People who receive this vaccine will develop chicken pox with less fever and no scar, and they will recover in a quickly manner.

While Professor Yu from China had spent nearly three decades to derive an SA14-14-2 Japanese encephalitis (JE) vaccine from kidney cells of hamsters. Tested for immunogenicity and efficacy in experimental animals and then human subjects, the vaccine is widely regarded as the most efficacious and safest in preventing encephalitis in children. Since 1988, the vaccine has been distributed to over 200 million children in China and to millions more in India, South Korea, Sri Lanka, Nepal, as well as Thailand. It was proven to greatly help reduce the spread of encephalitis in Asia.

In the past 16 years, 48 individuals, groups of individuals, and institutions have received the Prince

Mahidol Award. Among them, two subsequently received the Nobel Prize in Physiology or Medicine.

CAS to start planning for coal chemical industry development in Xinjiang

(CAS, 2008-11-27)



CAS and the government of the Xinjiang Uygur Autonomous Region have decided to start a strategic development planning for the development of the local coal chemical industry.

On November 11, WANG Lequan, member of Political Bureau of the CPC Central Committee and Secretary of the Party's Committee in Xinjiang, held talks with Vice President of the CAS Li Jinghai on the research in Urumqi, capital of the region.

Although the proven reserves of coal in Xinjiang are about 2,000 billion tons, roughly accounting for 40% of the national total, its annual output of coal is only 80 million tons, or 5% of the national yield. To take advantage of the fecund natural resources, the Xinjiang government has put emphasis on the coal chemical industry in its development plan.

Last October, upon the invitation of the Xinjiang government, researchers with the CAS Dalian Institute of Chemical Physics and other institutes drew a blueprint for manufacturing the synthesized natural gas (SNG) via coal gasification and methanation.

To solicit ideas on the initiation of a project on strategic planning for the coal chemistry development in the region, the CAS delegation headed by Prof. Li Jinghai came to Urumqi to hold discussions with the regional leaders.

In order to promote the SNG industry in Xinjiang, Prof. Li made four suggestions. First, the CAS Academic Divisions would organize CAS Members to carry out a consulting project on the issue. Second, CAS will start research projects to tackle key issues in developing new catalysts and new techniques for industrial use. Third, efforts will be accelerated to build a pilot SNG facility with a production capacity up to 120,000 m³ per day. Finally, a technical planning will be implemented for the SNG manufacturing in the region.

Abbreviations

- CAS** - Chinese Academy of Sciences
MOST - Ministry of Science and Technology
CRI - China Radio International