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INTERNATIONAL COOPERATION

China-France Joint Research Center

A national joint research center was inaugurated on July 2, 2008 at LIAMA, a Sino-French Lab in Computer Science, Automation and Applied Mathematics. SHANG Yong, Chinese Vice-Minister of Science and Technology, Herve Ladsous, Ambassadeur de France en Chine, and some 70 guests from China, France, and the EU were present at the event.

SHANG sent his congratulations to the establishment of the joint research center, and to the achievements made by LIAMA in the area of information, automation, and merging disciplines in the past 11 years. He pointed out that LIAMA, as an international cooperation institution established earlier in China for basic research, has a solid ground for enhanced

international S&T cooperation, deserving being upgraded to an international joint research center at the national level. The new center will create more opportunities for the collaborations between scientists in China, France, and Europe. MOST and other Chinese government agencies will secure a steady support for the joint research center, making it a key project supported by the China-France intergovernmental S&T cooperation framework.

Since its establishment in January 1997, LIAMA has attracted the participation of some 1,000 researchers in more than 100 projects involving information, biology, and natural environment. It has also forged cooperative ties with numerous French enterprises and universities, including French Telecom, Alcatel Space Center, and polytechnique schools. LIAMA is entering a new phase for international cooperation, at which expanded research fields and disciplines, and increased involvement will be a new focus.

China-Germany Time Comparison

Chinese National Time Service Center (NTSC) and Physikalisch-Technische Bundesanstalt (PTB) have recently launched a satellite based time comparison project. The established NTSC—PTB data links will further raise the precision of comparison between China's standard time and international standard time.

TWSTFT, or two-way satellite time and frequency transfer (TWSTFT), is a most precise technique applied in time transfer and comparison. It asks the two labs in comparison to send local time signals to the other side, and receive and measure the time signals sent from the other side in a simultaneous manner. One can calculate the time difference between the two points based on comparison data. Thanks to the identical transfer links, the possible delays in the course of transfer have been minimized for an enhanced precision of comparison. NTSC has so far established TWSTFT with five national labs, including NICT.

PTB is a key link in the international time comparison framework (TAI). The time comparison with PTB will result in a comparison result that can be part of the calculation of international atomic time in line with BIPM. To realize the TWSTFT linkage with PTB, NTSC has established experimental links with VSL in the Netherlands and OP in France. In the mid-June, it successfully made an uplink test as required by IS, and fine tuned the links with PTB. At present, NTSC-PTB link has become a regular TWSTFT operation, with a comparison precision at 0,3 nanoseconds, a precision level matching with other two way link comparisons. Thanks to its two way comparison links with Japan and Europe, China has become an important link in the global time comparison.

More Universities in 4G Study

Chinese Ministry of Science and Technology undersigned on July 2007 an accord with the

Swedish government to jointly work on 4G mobile telecommunication technology. The accord was put into effect on January 1st, 2008. In the past three years, scientists from both countries have worked on a range of studies concerning the next generation mobile telecommunication technologies. Up to date, some 10 Chinese and Swedish universities have become part of the project. According to the accord, Chinese Ministry of Science and Technology and Swedish government will put in RMB 30 million respectively, though the final contribution sits at 27 million Swedish Krona from the Swedish side, and 18 million from the Chinese side. The key R&D players include Datang Corporation and Datang Mobile supported by the Chinese Ministry of Industry and Information Technology, Huawei and ZTE from the private sector, and a forum for future mobile telecommunication led by universities. So far an experimental 4G network has been established in Shanghai. Not long ago, some 10 universities have reached an accord with Datang for joint R&D of a next generation mobile telecommunication system.

RESEARCH AND DEVELOPMENT

All Sub-Mirrors in Place for LAMOST

The Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST), a national large science project, has recently seen the completed installation of 24 sub-mirrors for MA (correction mirror), and 37 sub-mirrors for MB (primary mirror) at the Xinglong Observing Station, part of the CAS National Astronomic Observatories. Consisting of an MB (6.67m x 6.05m), and an MA (5.72m x 4.4m), the Schmidt telescope is able to observe the spectra of some 4000 celestial bodies over a 5-degree vision field, a system enjoying the largest vision field and highest spectrum acquisition rate in the world.

The entire system is designed with three major components, namely MA, MB, and a focal plane. The Schmidt MA (5.72m x 4.4m) is made up of 24 sub-mirrors in 1.1m. This is the first instance in the world applying active optical and sub-mirror assemble techniques. The 24 sub-mirrors would create a high precision non-spherical reflection, correcting the possible errors in the primary mirror. The MB (6.67m x 6.05m), or the primary mirror, is built with 37 sub-mirrors in 1.1m, also using active optical and sub-mirror assemble techniques, to maintain a common focus in the course of celestial bodies observation.

BEPCII Upgraded

Not long ago, the Chinese Academy of Science's Institute of High Energy Physics in Beijing produced for the first time collisions in the upgraded BEPCII electron positron collider, indicating that all three super-conducting magnets have reached the design indicators. BEPCII has two sets of low temperature super-conducting units, namely super-conducting

high frequency chamber and super-conducting magnets. The former was put into operation last year, and has been working smoothly since, with all indicators up to the design target.

The three super-conducting magnets have the following features. 4.91m long, and 3.4m across, with an exciting current at 3370 amperes, the spiral magnet has a field intensity worth 10,000GS, or 20,000 times stronger than the earth's magnetic field, and a maximum energy storage reaching 10 million joules. It is the largest single unit super-conducting magnet produced in the country. Two inserting super-conducting magnets are designed with a sophisticated structure that allow different functions to be performed by seven super-conducting coils, which makes it a most sophisticated inserting super-conducting magnet in the world. Limited by space, the magnets have imposed extremely high requirements for both design and preparation. One of the super-conducting coils has reached an exciting current as large as 1300 amperes, with a magnetic field reaching 28,000 GS. When the collider is in work, the two super-conducting magnets sitting in the inner part of the spiral super-conducting magnet would produce an electric magnetism larger than 1 ton. The successful operation of the three super-conducting magnets marks China's a major breakthrough in mastering low temperature superconducting technology, indicating Chinese scientists' capability in designing and manufacturing large low temperature super-conducting magnets.

Instruments Precision Tuning for New Spacecraft

An ocean-going measuring boat, the second of its kind designed and manufactured by Chinese scientists, has recently completed the precision verification of its onboard instruments, allowing the boat ready for the launch of Shenzhou 7 manned spacecraft in the near future. During the period from the end of April to the early July, the boat was working on cruising and running through a shallow route training, verifying the precision of instruments in eight directions. It also completed the verification of the performance of two flights and the precision of seven flights, and obtained effective data on the instruments under different combinations. The boat, started to build in April 2006, is equipped with the state-of-the-art technologies in the area of space, marine meteorology, electronics, machinery, optics, telecommunication, and computer. With a full load displacement capacity for 25,000 tons, the boat is able to resist strong winds up to 12 magnitude, and cruise in any sea areas within 60 degrees of south and north latitudes.

Submarine Robot Made Debut in North Pole

North Pole ARV, a submarine robot jointly developed by CAS Shenyang Institute of Automation and a number of domestic research institutes, is a system able to work on its own, or in a controlled manner in a submarine environment. With a weight of 350kg, and donned in a 'wooden overcoat' for a floating capacity, the robot is able to suspend in the

water 100m under the ice of the North Pole, or run in an area 3,000m within its reach. Made up of a control system, navigation system, and propelling system, the submarine robot will be employed by Chinese scientists in China's third North Pole expedition to collect information on sea ice bottom, sea ice thickness, and salinity/temperature at different depths, through the onboard instruments.

The new system carries its own power system, connecting to a support system above the sea surface via mini optic fiber cables. Designed in a shape like a framed torpedo, it can work freely in a given range of area, while making precision observation in a suspension manner in the sea, desirable for obtaining a whole picture of the target spot in a real-time manner.

NEWS BRIEFS

More Internationalized Suzhou High Tech Park

Suzhou High Tech Park was named an international S&T cooperation center on July 14, 2008. Senior officials from Dept. of International Cooperation, part of Ministry of Science and Technology, Dept. of Science and Technology of Jiangsu Province, S&T Bureau under the Suzhou People's Government, and Suzhou High Tech Park, were part of the ceremony. JIN Xiaoming, Director of MOST International Cooperation, thought highly of the innovations introduced in international S&T cooperation and importing high caliber personnel in the park. Since its establishment, Suzhou High Tech Park has signed cooperation agreements with universities, S&T parks, and technology associations in North America, Europe, and Australia, and stationed more than 100 R&D institutes and engineering centers in the park. Firmly sticking to the combined process of importation, digestion, and re-innovation, it has established a service center for start-ups, industrial incubators, and a start-ups park for returned overseas Chinese students. Up to date, it has introduced and incubated some 1,000 innovative enterprises, and become a rendezvous for domestic and overseas R&D institutes, high tech businesses, and high caliber personnel.

World's First Laser Movie Theater

Thanks to the support of Department of High and New Technology Development and Industrialization, part of Chinese Ministry of Science and Technology, and the Administration Committee of Zhongguancun Science and Technology Park, the world's first laser movie theater made its debut recently under the joint sponsorship of Chitec, CAS Academy of Opto-Electronics, and UME. The theater is equipped with the digital laser projector manufactured by Chitec.

CAS Academy of Opto-Electronics and Chitec have landed major breakthroughs in developing key laser display technologies, and have rolled out series laser display products that can be used by Chinese laser display industry, which made China an international leader in the area. The novel mini laser unit enjoys numerous merits, including a greatly reduced size and cost, and a noticeably raised efficiency and reliability. Meanwhile, Chitec has developed patented array illumination sources, digital driving system, and key components for handling color and optic information. So far Chitec has filed some 80 domestic patent applications, and 2 PCT, or 10% of the world's patents filed in the area of laser display. Thanks to the collaborations between industry and research institutes, Chitec has worked out the world's first digital laser movie projector in line with DCI.

Shanghai Builds Quake Test Platform

Not long ago, Shanghai set off to build a largest quake test platform in the country. Scheduled to wrap up in 2010, the platform will provide quake resistance test for large structure models, including bridges. Sitting in Jiading, a county in the city, the project will be financed with an investment worth RMB 100 million.

According to a briefing, the platform, surrounded by an array of oil pumps, would shake and vibrate along with the vibration of oil pumps, allowing people to measure the resistance a structure model has to 'earthquake". The shake and vibration of oil pumps can be varied by feeding in different data of seismic waves. The initiative, a phase II project sponsored by the Chinese Ministry of Education, will spend some RMB 50 million building the platform, though the construction of entire lab will cost RMB 100 million. People can read out the resistance a bridge has to earthquake simply by placing the two mimic major pillars and two mimic support pillars on the four vibrating platforms, and feeding in different seismological data.

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