

Content

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

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Helmholtz News Concerning China

Helmholtz-CSC programme for the junior scientists exchange has been kicked off for the third round. The information and application procedure has been released on the Helmholtz Chinese website: http://www.helmholtz.cn/Helmholtz_China/positions/Helmholtz_CSC2009en.htm

In the previous two rounds of the programme, over 60 Chinese postdocs, PhD students and exchange students have got a scholarship to Helmholtz research centres. Under the agreement, CSC (China Scholarship Council) overtakes the first year scholarship and the international flight costs, and Helmholtz Berlin Office pays off the first half of the remain time and the research groups the second half (PhD students at 1200 euro and postdocs at 1800 euro/month). We have noticed, several Helmholtz Centres, such as DESY, IPP, have not yet been involved strongly in this programme, although they have had many cooperation and contacts with China. So far we have announced about 50 position calls since December for the third round of the programme. We may still have the opportunity to add some new positions if some more Helmholtz scientists have the willingness to support the applicants from China. Actually CSC is willing to sponsor 6000 selected students studying abroad, including 500 to Germany following an agreement with DAAD. We wish our scientists not to get surprised if they are approached by students from China claiming of being able to come over with a full CSC-scholarship.

Prof. Mlynek received a Chinese CAS delegation (Chinese Academy of Sciences) led by its president Prof. Dr. LU Yongxiang on 15.12.2008. Both parties briefed their major development and expressed wished for strengthening future cooperation. A framework agreement between both organizations was signed, and four research fields, energy, environment, health and large research facilities were given priorities for collaboration. For the first stage, aside from joint workshops and summer schools, Twin-Junior research groups, joint laboratories would also be seen as possible models. Dr. Dannenberg and Dr. Hong HE on the Helmholtz side and three director generals and two CAS institute directors witnessed the signing ceremony. The CAS guests were also invited for a lunch together. Before their visit to Berlin, this delegation also [visited GKSS and met the scientific director Prof. Keysser](#).



Dr. Hong He paid a visit to Germany in December. He visited Juelich at first participating the Helmholtz Panel Meeting for international strategy. He had also the opportunity to visit several laboratories and talk to several colleagues in FZJ, such as Prof. Stroehler from IKP, Prof. Bott from IBT and Dr Robert Steinberger-Wilckens from IEF-PBZ. Dr. Wilckes confirmed that two Chinese fuel cell research groups in Dalian and Shanghai had jointly got EU FP 6 programme for their own excellence.

During Dr. He's stay in Berlin, he also has had the opportunity to speak to the colleagues in the Helmholtz Berlin Office and in MDC and Helmholtz Berlin Centre for Energy and Materials. Dr. Liangping Li from MDC wished to have more cooperation with partners in Shanghai and Beijing.

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1 Science News

1.1 Energy

China's domestic-made biomass gasification power system

(People's Daily, 2008-12-01)

China's research and application of biomass gasification power technology at present has achieved breakthroughs in numerous areas, according to news from Guangzhou Institute of Energy Conversion (GIEC) and the Chinese Academy of Sciences (CAS).

This important technological research project uses gasification as the core technology, and is complemented by independently-developed, low calorific value, gaseous fuel, and internal-combustion motor generators.

The technology indicators and equipment scale have both achieved breakthroughs, and formed an agricultural waste gasification power generation system which is well-suited for China's current condition.

Overall technology has reached an advanced international level.

Currently, the equipment for this new type of power-generating system is already all domestic-made.

Grid-connected photovoltaic power plant built in Hubei

(People's daily, 2008-12-02)

Hubei's first grid-connected photovoltaic power plant, currently under construction in Optics Valley in Wuhan, Hubei Province, has recently been approved by experts and is expected to be operational next May.

Different from common energy-efficient buildings, the four buildings located in the Wuhan Rixin Technology Company's Photovoltaic Industrial Park all have their screen walls, ceilings, doors and windows built with photovoltaic structuring.

They will be able to produce 1.8 million kilowatt-hours of electricity upon completion. The project, with an installed capacity of 1.2 megawatts, involves a total investment of 66.05 million yuan. The annual electricity-generating capacity will reach 1.6-1.8 million kilowatt-hours.

The grid-connected photovoltaic power plant, currently China's largest grid-connected BIPV (Building Integrated Photovoltaic) power project, has been classified as a project financed by the Ministry of Science and Technology, the Ministry of Housing and Urban-Rural Development and the Ministry of Finance.

The grid-connected BIPV electricity-generating technology can be applied in public buildings such as industrial factories, urban residences and new buildings in rural areas. An official from the energy section of the Hubei Development and Reform Commission disclosed that Hubei will spearhead the testing of grid-connected photovoltaic electricity generation after the project is completed.

China Experimental Fast Reactor to connect to grid in 2010

(People's Daily, 2008-12-21)

The China Experimental Fast Reactor (CEFR) has entered the final stage of installation and trial runs,

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and is set to be connected to the grid and start generating electricity in 2010, according to news released during a meeting marking the 50th anniversary of China's first heavy water reactor and first cyclotron hosted by the China Institute of Atomic Energy on December 11.

In 2015, a demonstration fast reactor will be built and put into commercial use. The China Advanced Research Reactor (CARR) has completed construction of all its sub-projects and started a trial run of all its systems and is expected to reach its critical period in the first half of 2009.

The fast reactors, i.e. the fast breeder reactors, can raise the 1% utilization rate of natural uranium resources in pressurized water reactors to between 60% and 70%.

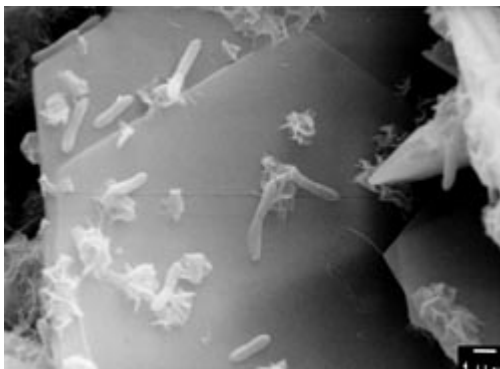
This feature has major strategic significance regarding issues such as making the best use of uranium resources, maintaining a sustainable and stable development of nuclear power and solving future energy supply problems.

The soon to be completed CARR is an advanced reactor that will replace the heavy water reactor. It will be able to meet China's demands for future nuclear technologies in the 21st century.

1.2 Earth and Environment

Working with miraculous microbes

(CAS, 2008-12-01)



SEM micrograph of inner layer of rust from steel immersed in seawater for 2 years. Sulfate-reducing bacteria and/or iron-reducing bacteria attached on large and small green rust platelets. (From J. Duan et al. / *Electrochimica Acta* 54 (2008) 22-28)

Microorganisms, despite of their simple structure and tiny size, are often vital to humans and the environment. You might know about their contributions to the Earth's carbon cycle and amazing ability of decomposing waste products. But have you ever heard of microbes that eat away undersea metal, or those who protect iron from corrosion? Some may even wow you with the feat to generate electricity and clean up polluted water!

As the first forms of life to develop on Earth, these small creatures shall never be underestimated, according to marine chemist DUAN Jizhou with the Research and Development Center for Marine Corrosion and Protection, the CAS Institute of Oceanology. With strong supports from the National Natural Science Foundation of China, Duan, HOU Baorong and other co-workers have been working at the vast frontier of microbiologically influenced corrosion and their

inhibition technologies for over a decade.

Microbial community dwelling in rust

In the oceanic environment which covers more than two thirds of the Earth's surface, iron is widely used for building bridges, ships and pipelines. Corroded steelwork under the sea not only brings about extra cost of construction materials, but may lead to disasters and loss of lives.

For a long time, people simply took the destruction process as the oxidation whereby iron reacts with

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oxygen. Later, scientists revealed the existence of microbes in rust samples, and came to realize a major role these tiny creatures have played.

"The rust presents an ideal habitat for some microbes," Duan notes.

In 2004, German experts obtained a novel species of bacteria which live on electrons provided by iron. Later on, Duan and collaborators discovered several species of anaerobic bacteria and archaea from different rust layers. Through biological analyses, they even identified a microbial "community" there. Among the massive microorganisms living in the ocean, a considerable number of them tend to attach themselves on the surface of steelwork and thus form "biofilm" as scientists call it. At first, the biofilm is mainly composed of aerobic bacteria. Gradually, aerobic bacteria disperse and are largely replaced by anaerobic ones.

According to Duan, many experiments and observations have demonstrated anaerobic bacteria's power in iron corrosion, particularly for a group named sulfate-reducing bacteria (SRB). In seawater, SRB can use their enzymes to accelerate the reduction of sulfate compounds to hydrogen sulfide, which is highly corrosive to iron.

With stainless steel, Duan's group carried out on-the-spot experiments as well as laboratory simulations to study how SRB form biofilm on the metal's surface and eat away parts of it. They also investigated the transformation of the rusted steel from metallic oxide to metallic sulfide.

Bugs that breathe ion?

Rust layers are microbes' palace. At the same time, the little creatures need to find something to eat and breathe like we human beings do.

"There are plenty of nutrient substances in ocean for their growth. So the question is what they respire." A recent analysis by Duan's group shows there are at least two kinds of relevant microbes in their rust samples: SRB and iron-reducing bacteria (IRB). While SRB take in sulfate and releases corrosive hydrogen sulfide, IRB pass electrons onto iron during breathing.

"We speculate the respiration mechanism of these microorganisms is closely related to electron transfer. They give electrons to ferric ions, and reduce them to ferrous ones. It's just a way these bacteria live, and they don't have to know they've completed the mineralization of rust by just breathing in and out electrons," Duan so explains his new discovery.

This peculiar characteristic may be applied to the protection of iron. In industrial practices, people often coat less active metal with more active metal to protect the former from losing electrons and being eroded. In this sense, the ion-respiring bacteria, by passing electrons onto steel, just serves a barrier to prevent the oxidation of iron. Maybe scientists will be able to develop various bioactive film in the presence of such bacteria for cathodic protection in the near future.

Bacteria to clean water and generate power

State-of-the-art studies show that the interactions between microorganisms and undersea metals involve a very complex process of electron transfer. The interactions, experts say, might boost the development of technologies concerning corrosion prevention, water remediation and microbial fuel cells.

For example, a new species of SRB named *Desulfovibrio dechloracetivorans*, which was reported by Duan's group in 2008, can effectively degrade organic chlorine and similar pollutants in the ocean in the presence of iron.

Other bacteria (iron-reducing bacteria, D. R. Lovley) are able of decomposing compounds containing heavy metals like uranium in contaminated underground water.

"In the electron transfer process, the microorganism changes the metal from its dissolved form to a

solid form," Duan says.

Scientists find that the biofilm on stainless steel is capable of accelerating oxygen reduction rate, which is now being applied to the research and development of marine sediment-related microbial fuel cells. As designed, the cell will have a bio-anode, where anaerobic microbes oxidize organic compounds and transport electrons to its bio-cathode, where electrons pick up reducing speed with the help of aerobic bugs. Once external load is added, the cell will be able to transform the organic compounds in the sediment and generate power. Researchers in the US, Belgium, France, Germany and Korea have carried out pioneering bio-anode studies, with an aim to develop bio-cathode aspect.

"However, we still need to overcome the limitations of current technologies, and to look for simpler and cheaper methods," the scientist adds.

In Duan's eye, there are still large areas of controversy for microbiologically influenced corrosion. For instance, its fundamental mechanism is not properly understood by far. Nevertheless, this is a very sophisticated but equally promising subject to work on.

Project to study carbon cycle in an arid region

(CAS, 2008-12-02)

According to a recently-approved national basic research program, scientists from the CAS Xinjiang Institute of Ecology and Geography (XIEG) will join efforts with domestic and overseas colleagues to investigate carbon cycle in salt-alkali soil in arid regions and some issues concerning global change.

The project will focus on the evolution of salt-alkali soils in the desert-oasis complex of Asia and Europe's inland arid regions, the soil-surface and underground carbon cycle processes, the exchange of carbon dioxide between land surface and atmosphere, and carbon assimilation as well as the interactions between these effects.

Combing field investigation with system simulation, XIEG scholars will carry out research from localities, belt transects, observation stations and laboratories with the help of remote sensing inversion technology, ground and under-ground monitoring, quadrat sampling, and the screening, sequencing and positioning of functional genes.

Set against the global trend of climate change, this study may shed light on the "missing carbon mystery" and contribute to a much comprehensive theory about carbon cycling in drought areas. It also aims at rendering S&T support to China's participation in international negotiations on carbon balance and mitigation. Still, the research shall lay a theoretical foundation to the nation's energy saving and emission reduction strategy.

The XIEG is going to work as principal participant of the project. Their collaborative scientists include those from Shihezi University, the CAS Institute of Botany, China Agricultural University, the University of Kassel, the University of Trier, the Catholic University of Leuven and the Martin Luther University of Halle-Wittenberg. Therefore, the major program also gives strong impetus to Sino-EU cooperation, and boost China's role within the Shanghai Cooperation Organization.

Environmentalists seek to improve public awareness of climate change in Poznan

(Xinhua Net, 2008-12-02)

Standing at the entrance to the venue of the UN Poznan meeting on climate change, Su Xiaowei was handing out walnut and nutcracker to every participant, highlighting the key to fighting climate change lies in one's hands and is achievable.

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"I came here from my Beijing office ... to tell people that it's time for the world to crack the climate nut," Su, a Chinese American, told Xinhua.

As a program officer of the World Wild Fund for Nature (WWF), Su was here to hold a series of side events of the UN climate talks to enlighten people with the significance of fighting the catastrophe of climate change.

"Personally, I am extremely interested in environmental protection and feel delighted to help people improve environmental awareness in China and in the world," she said.

Su's organization is only one of the 400 non-governmental organizations showing up at this year's UN climate conference, which involves some 10,000 participants. The registered participants from those organizations reached 5,413, a number much higher than the 3,700 government delegates who came here to negotiate.

Some members of the Greenpeace, another environmental organization, marked the opening of the talks by unveiling a 3-meter sculpture depicting the earth on the brink of destruction from a "tidal war of CO2."

The sculpture, Planet Earth, shows the fragile planet cowering beneath a giant wave made of wood and coal, serving as a daily reminder to delegates that the stake of climate change could not be higher.

The enormous efforts of the non-governmental organizations were also encouraged by the UNFCCC (United Nations Framework Convention on Climate Change) with its spokesman John Hay saying that the conference provides them with an opportunity. "Their function is far more than negotiations," Hay told Xinhua.

Despite the endeavor of those organizations to push for an agreement on the reduction of greenhouse gas emissions, the marathon Poznan talks kicked off with not much outcome expected.

Experts say that countries may not be willing to commit themselves to any promise regarding emission curbs until they have seen how the U.S. President-elect Barack Obama is likely to act on climate change. Insiders say it means that little substantial progress on new carbon cuts can be expected.

However, the British Guardian newspaper said some progress is still possible at Poznan as countries could reach agreement on how to free hundreds of millions of pounds of funding to help the poor nations cope with the adverse effects of climate change. There could also be some advancement on a possible scheme to provide fund for tropical countries to protect forests, it added.

Researchers to start a project to monitor sensitive factors in global change

(CAS, 2008-12-03)

With the support from the National Basic Research Program (also known as the "973" Program), CAS researchers will soon start a project to explore the mechanisms and methodology of Earth observation for sensitive factors in global change.

Coordinated by the CAS Center for Earth Observation and Digital Earth, the project will involve researchers from six other institutions including the CAS Institute for Tibetan Plateau Research. It will probe such issues as spatial-temporal characteristics and remote sensing model of the global change-sensitive factors, remote sensing information mechanisms of the sensitive factors, and technologies for information extraction and data assimilation.

At the same time, studies will also be conducted on the blueprint for the space Earth observation satellite program, the information simulation of global warming effects, multi-platform remote sensing and other fields.

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The implementation of this project is expected to lead to the inauguration of a unique remote-sensing system for monitoring global change in China, raising its theoretical buildup and technological level in this aspect, and enabling this country to carve a niche in the research of global change and global remote-sensing observation.

Project to address disasters at underground energy storage groups (CAS, 2008-12-03)

Presented by the CAS Institute for Rock and Soil Mechanics (IRSM) and other research institutions, a research proposal to address disasters of underground energy storage groups has received the go-ahead from the Ministry of Science and Technology (MOST).

Funded by the National Basic Research Program (dubbed "973" Program), the three-year project is designed to focus on key issues concerning the safety of the underground energy storage groups constructed on layered rock deposits, according to Prof. YANG Chunhe, principal investigator of the project and geological engineering expert from IRSM.

Its research efforts will be concentrated on contriving solutions to various scientific problems and issues in this aspect through addressing the formative mechanisms of the depots' deformation and rupture, patterns of their interactions and long-term security. The research priorities include the breeding, formation, development, risk assessment and prevention of such disasters, resulting in the development of related systems for assessment & prevention. By adopting various approaches such as engineering investigation and physical simulation, theoretical exploration, numerical emulation and multi-disciplinary fusion, the project will explore the constitutive relations, mechanism underlying the deformation-caused breakdown of the surrounding rock mass, the depots' disaster-proliferating mechanism, their time-space evolution, risk assessment & prevention under the reaction imposed by the crude oil, water and gas.

Coordinated by IRSM, the research project will be conducted by researchers from seven other institutions, including China University of Mining and Technology (Beijing), Tsinghua University, the CAS Institute of Geology and Geophysics, Chongqing University, Shandong University, the PLA University for Science and Technology, the Langfang Branch under the Research Institute of Petroleum and Development.

Shanghai to build 'live studio' for earthquake early-warning (People's daily, 2008-12-09)

A station to monitor and broadcast live sea floor conditions in Shanghai waters will start construction in the beginning of next year.

In future, the network of the station, which costs 2 million yuan per kilometer, will cover the peripheral waters of Shanghai and will play many important roles, including forecasting earthquakes seven seconds before they occur.

The live studio, featured with multiple high-tech elements, will be connected with optic-fiber cables laid 30-meters deep undersea. The cable can transmit energy and information accurately and reliably.

On December 7, the deep sea aquarium of Tongji University, showcasing cutting-edge deep sea technology opened in Shanghai. At the opening ceremony, Wang Pingxian, academician of China Academy of Sciences, disclosed the above information.

Picture caption: Visitors observing the 7000-meter deep manned submersible vehicle model in the

Tongji University Aquarium on December 7.

Project launched to handle eco-environment of Qinghai Lake

(CAS, 2008-12-11)



CAS researchers have launched a 48.16-million-yuan project to address the eco-environmental setting of Qinghai Lake. Its kick-off meeting was held on 29 and 30 November in Xining, capital of northwest China's Qinghai Province.

Supported by the National Key Technology R&D Program, the project, entitled "technological integration and experimental demonstration of eco-environmental rehabilitation in Qinghai Lake valley, is jointly organized by CAS and Qinghai Province, and jointly

conducted by CAS Institute of the Earth Environment (IEE), the CAS Northwest Institute for Plateau Biology and Beijing Normal University.

Qinghai Lake is a vast water body sprawling at the northeastern fringe of the Qinghai-Tibet Plateau. With a fragile eco-environment system sensitive to global change, the area is a key link in maintaining ecological safety of the northwest China, according to experts. Because of its unique geographical position and ecological characteristics, the lake is of a special significance and in the spotlight of public attention, and become a research focus in the international community.

Over the decades, the lake and its periphery have seen a deteriorating trend in local environment due to global change and human encroachment. The ominous developments include the dropping water table, vegetation degeneration on the natural pasturelands, mounting stance of desertification, wetland shrinkage, severe ravage on valleys and further depletion of native biodiversity.

Led by Prof. AN Zhisheng, an expert on loess and environment from IEE, the project will make an overall monitoring and assessment of the current eco-environmental situation, develop the know-how and conduct technical experiments and demonstration in protection and rational exploitation of the reaches and wetlands, high-elevation meadows and controlling desertified land, In addition, researchers will develop a management model for the Lake's ecosystem and multi-channel rehabilitation via technical integration, promoting a well-concerted and harmonious pattern for the area's socio-economic development.

A universal explanation for morphological diversity

(CAS, 2008-12-16)

Pumpkins, melons, bell peppers, gourds, cantaloupes and many other fruit and vegetables have skins with ribs and ridges, of which the complexity in the formation could "drive the sanest man mad" according to Charles Darwin. Prof. CAO Zexian at Beijing National Laboratory of Condensed Matter Physics, CAS Institute of Physics (IoP), in cooperation with Prof. LI Chaorong at Zhejiang Sci-Tech University and a research group headed by Prof. CHEN Xi from the Columbia University, US, have taken these fruit and vegetables from the kitchen to the laboratory for a thoughtful experimental and numerical simulation. As a result, a simple, universal reason for these patterns has been established.

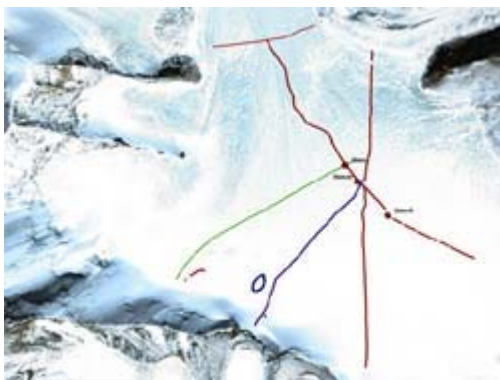
Since 2004, Cao and Li (also with IoP at that time) have been devoted to the study of stress-driven

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self-assembly on nonplanar surfaces, revealing that stress-driven buckling modes are closely related with the geometric properties of the supporting surfaces. They successfully coaxed, via stress engineering, the stressed points on the Ag Core/SiO₂ shell microstructures to self-assemble into the triangular tessellation and Fibonacci parastichous spirals in 2005, and reproduced a few groups of Fibonacci spirals (3 by 5 through 13 by 21, and in both sinister and dexter forms) in laboratory in 2007. For a long time Prof. Cao and Prof. Li realized that the fruit with their navels and ends as the two antipodes can be simulated by a spheroid. And recently, the simulation performed by Prof. Chen Xi's group, by using the finite element method with software ABAQUS, has justified their conception that various fruit patterns have been reproduced as the buckling modes of the stressed spheroidal surface. The results showed that the diversified pattern deformations like ribs, ridges, reticula and dimples appear on the spheroid models and they are mainly governed by three dimensionless parameters: the effective thickness of the shell (ratio of the shell thickness to the size), the level of overstress, and the shape factor of the spheroids -- whether it is elongated (like a cucumber) or flattened (like a pumpkin). It is found that a particular pattern appears in a definite domain in the parameter space. This adds more evidence to the conjecture -- it can be dated back to 1904 or even earlier to some British scientists -- that the appearance of some natural fruit and vegetables may be merely a result of stress-driven buckling, a mechanical principle, rather than genetic force.

Their research paper entitled "Stress-driven buckling patterns in spheroidal core/shell structures" was published in the 17 November issue of the Proceedings of National Academy of Sciences. The research, which received support from the National Natural Sciences Foundation of China and China's civil space projects, provided the first explanation of how the appearances of the natural plants and fruit are affected by mechanical principles, raising a new perspective for understanding the morphological diversity in the living world.

Sino-German team finishes field investigation into Tibetan lakes (CAS, 2008-12-17)



Teaming up with six German researchers, scientists with the CAS Institute of Tibetan Plateau Research recently carried out a survey on Namco and Puma Yumco, two saltwater lakes on the Qinghai-Tibetan Plateau, and their peripheries.

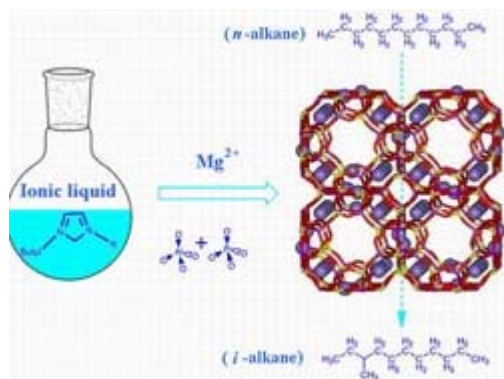
In order to make clear the spatial distribution of the lake sediments of Puma Yumco and their reflections on the deposition process, the researchers made measurements of 10 sections across the lake's sedimentation by using an advanced echo sounder system. An initial analysis

indicates a rich deposit of organic materials.

To probe the depositing ratio in contemporary time and related eco-environmental conditions, the investigators collected six short rock cores, ranging from 20cm to 80cm in length.

To obtain continuous samples of the sediments dating back to the last glaciation in the lake of Namco, they put in use of the state-of-the-art technologies and obtained a rock core 1,100 cm in length at the lake bottom 93m below the water surface.

Furthermore, the survey acquired 42 samples from surface sediments of the Namco.

Novel progress in zeolite synthesis
(CAS, 2008-12-24)


A research team headed by Prof. TIAN Zhijian with the CAS Dalian Institute of Chemical Physics has made remarkable progress in the synthesis of zeolites, the aluminosilicate members of the family of microporous solids known as "molecular sieves." The result was published in a recent issue of Chemistry-A European Journal .

Zeolites are widely used as ion-exchange beds in domestic and commercial water purification, softening, and other applications. In chemistry, zeolites are used to

separate molecules (only molecules of certain sizes and shapes can pass through), as traps for molecules so they can be analyzed. Zeolites have the potential of providing precise and specific separation of gases including the removal of H₂O, CO₂ and SO₂ from low-grade natural gas streams. Other separations include noble gases, N₂, O₂, freon and formaldehyde. However, at present, the true potential to improve the handling of such gases in this manner remains unknown.

Recently, WANG Lei, XU Yunpeng and co-workers successfully introduced magnesium into the framework of the aluminophosphate zeolite via an ionothermal procedure, thus creating a new type of pure crystalline zeolite, MAPO-11.

Moreover, by supporting platinum onto this newly synthesized molecular sieve, the resulting catalyst showed excellent reactivities in the hydroisomerization of hydrocarbons, exhibiting a very promising commercial prospect.

This research project was supported by the National Natural Science Foundation of China.

Bacteria in ice may record climate change
(CAS, 2008-12-26)

To many people, bacteria and climate change are like chalk and cheese: the smallest creature versus one of the biggest phenomena on earth. Not really. Scientists with the Institute of Tibetan Plateau Research (ITP), Chinese Academy of Sciences and coworkers recently reported that small bugs deposited in ice and snow might tell how our climate has been changing.

The discovery might bring about a new indicator for climate change, which is by nature different from all previous physical or chemical benchmarks.

According to Prof. YAO Tandong, chief scientist of the research, bacterial abundances in ice cores vary in response to climatic conditions. With ice and snow samples taken from the Guoqu glacier on Mount Geladaindong, Yao and collaborators from ITP and Xiamen University measured the annual abundances of bacteria trapped in ice over the past seven decades. Analysis showed that bacterial levels rose with higher temperatures and dust concentrations.

The experts found that the bacterial abundance, lowest in 1938 and highest in 1997, increased in accordance with levels of oxygen-18, a natural, stable isotope of oxygen known to be well correlated with temperature. Usually, oxygen-18 concentration in ice will go up in warmer years.

The bacteria also increased with levels of dust in the core, scientists discovered when measuring

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calcium levels in visible dirty layers. The dust was likely transported onto the glacier during the spring dust storm season and trapped in ice through subsequent melting of the snow and ice.

Further analysis showed that seasonal factor plays a part in bacterial diversity. During the annual monsoon season, the microbes originated from very diverse environments including animal and human sources, while in non-monsoon seasons they mainly came from closer and cold environments.

The study is the first of its kind to connect bacteria with climate change for ecological studies. For a long time, world scientists kept their eye on how bacteria survive in thousand-year-old cold and dark ice cores in polar regions.

Since 2002, Prof. Yao and his colleagues have turned to exploring the microbial community in Malan and Puruogangri Ice Cores on central Tibetan Plateau. The present study on Geladaindong Ice Core is also the first high-resolution restoration of annual abundances of trapped bacteria.

Researchers will have to do more to quantify the above correlations, notes Yao, also director-general of ITP and a CAS Member.

Leading Chinese academy says Lop Nur disappeared in 1962

(Xinhua Net, 2008-12-26)

A leading Chinese academy says Lop Nur, the former lake believed to nurture the ancient Loulan (Kroraina) civilization along the Silk Road, evaporated in 1962.

The announcement, made by scientists from the Xinjiang Institute of Ecology and Geography under the Chinese Academy of Sciences on Thursday, sets the date 10 years earlier than previously thought.

Lop Nur is located between the Taklamakan and Kuruktag deserts in China's northwest Xinjiang Uygur Autonomous Region. The lake, once the largest in northwest China, was believed to have evaporated in 1972 as a result of desert erosion and the loss of trees cut for firewood.

Scientists from Xinjiang reported the lake dried up because it lacked a water source in the desert.

Xia Xuncheng, a researcher with the institute, said "evaporation was irreversible and human activities only sped up the process."

Thursday's announcement was made after a more than 4,000 km long scientific expedition by scientists in the lake area and satellite picture analysis. The research, which started from mid-November and lasted nearly a month, indicated a large flood hit the area in 1958. A lake emerged afterwards once covering more than 3,000 square km in the Tarim Basin.

"The lake was only three meters deep and as much as one third of its water evaporated as there was no water supply", said Xia.

Lop Nur, or Lake Lop, also known as "the sea of death", is now a 20,000-square-km seasonal marsh which is rich in oil, gas, coal and mineral resources

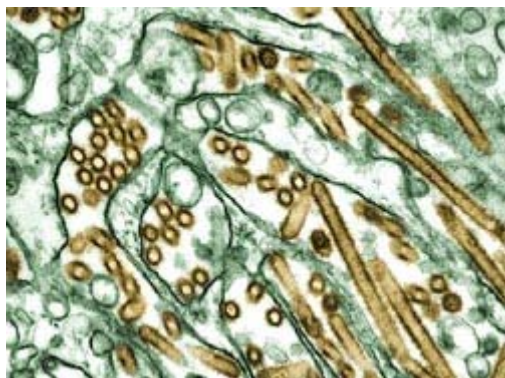
The area is also known for being the test site for the first Chinese nuclear bomb.

In 1980, Peng Jiamu, a noted Chinese scientist, went missing in his fourth expedition to the Lop Nur and was never found.

1.3 Health

New strategy against killer virus H5N1

(CAS, 2008-12-10)



Colorized transmission electron micrograph of Avian influenza A H5N1 viruses.

H5N1 is a subtype of the Influenza A virus that has caused widespread infections in poultry and wild birds. It can also produce illness in humans. However, current vaccines are still of limited effect. Recently, a research group headed by HE Hongxuan with the CAS Institute of Zoology, in cooperation with their co-workers from Tsinghua University, revealed that short interfering RNA (siRNA) specific for conserved regions of the H5N1 AIV genome can effectively inhibit its replication in both cell lines and embryonated chicken eggs. Their work was published in a recent issue of Journal of Biotechnology.

Actually, scientists had already made attempts to suppress H5N1 AIV production by using siRNA solutions, but their approaches were unsuccessful. Through extensive study and experiments, Prof. He and his colleagues found that the "vehicle" adopted to transduce siRNA into the animal cells was adenovirus vector rather than DNA circle and the immune system could then eliminate the adenovirus, which caused the inefficacy of the method.

The siRNA expression plasmid, which is suitable for mass production, is a type of DNA circle and was used in He's study. Previous studies showed that a portion of the genome of a number of AVI mutants developed to have strong conservation, so the research group specified the design of the siRNA expression plasmid for the conserved regions of the AIV genome, which then showed potent inhibition effect on the AVI replication. The scientists hope that this kind of siRNA expression plasmid can make the same effect on other AVI mutants.

Although the work is still preliminary, it provides a basis for the development of siRNA as prophylaxis and therapy for AIV infection in birds and humans. This approach is of large potential value though there are still challenges to be overcome, says Prof. Herman Eisen, a virologist from the Massachusetts Institute of Technology.

The research was under the joint auspices of the National Natural Science Foundation of China, the National Hi-Tech Research and Development Program of China (dubbed the "863 Program") and a Sino-US cooperative project.

Project launched to study structure of proteins

(CAS, 2008-12-26)

As one class of the most important materials supporting life phenomena, proteins have complicated and exquisite 3D structures which play a key role in the expression of its function. To gain a better understanding of the biological macromolecules, a key research project on protein structure measurement and preparation technology was launched recently at the CAS Wuhan Institute of Physics and Mathematics (WIPM).

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Entitled "High-resolution structure measurement and high-efficiency preparation technology of Protein", this project is part of a major S&T program on protein studies prescribed by the National Guideline on Medium- and Long-Term Program for Science and Technology Development (2006-2020).

With WIPM director-general Liu Maili as its chief scientist, the project is going to be a collaborative effort of outstanding scholars from WIPM, the CAS Institute of High Energy Physics, the CAS Shanghai Institute of Organic Chemistry and Fudan University, attracting National Outstanding Young Scientist awardees, Bairen-Program awardees as well as two CAS members on the expert board.

With a budget of 12.7 million yuan for its first two years, the five-year research will combine nuclear magnetic resonance spectroscopy, synchrotron radiation-based X-ray crystallography and related technologies to develop new techniques and methods to detect the architecture of proteins, and come up with corresponding design and synthesis innovations.

According to Prof. Liu, a protein is basically a linear heteropolymer. On one hand, it remains unsolved as to how the chain-like molecules fold into a specific 3D structure, dubbed "the folding problem". On the other hand, the chemical evolution of protein, or the process through which complicated and exquisite 3D structures of protein as we see today have been constructed, constitutes an appealing issue. Since these studies are related not only to basic research, but to technological foundation for identifying proteins and creating new ones, they are drawing wide attentions from industrial sectors such as pharmacy and agriculture.

While both problems are far from total clarification, studies are in steady progress, Prof. Liu says. For the moment, the lack of effective protein structure measurement has become the bottleneck for the development of the entire protein science. And the structure measurement lags far behind genome studies. In 2005, scientists decoded about 1.5% of all discovered protein sequences, but the percentage had dropped by half to only 0.75% by June, 2008.

Chinese scientists successfully detected and synthesized the 3-D crystal structures of pig insulin in 1974. Their work on SARS-related proteins also won world acclaims.

1.4 Key Technologies

Symposium addresses nano- and molecular materials (CAS, 2008-12-05)

Under the theme of nano- and molecular materials and devices, the 337th session of the Xiangshan Science Conferences convened from 2 to 4 December in Beijing. This symposium was chaired by Prof. ZHU Daoben from the CAS Institute of Chemistry, Prof. TONG Zhenhe from the CAS Technical Institute of Physics and Chemistry, Prof. GAO Song from School of Chemistry and Molecular Engineering, Peking University and Prof. ZHANG Xi from Department of Chemistry, Tsinghua University.

The nano- and molecular materials and devices are featured with small dimension and large interface, as well as a series of new effects (namely, the effects of small size, interface, and quantum). In addition, their structures are easy to determine. Therefore, they demonstrate many unique physical characteristics and performance that do not exist in bulk materials, which provide promising prospects for their

application to a wide range of fields, including micro-electronics, bio-medicine and the military. As a result, they have become a major subject of many researchers.

While enjoying dynamic development, however, the research in this field is facing significant challenges in searching for approaches for their controllable preparation (in terms of size, length, and dimension; methods for developing such materials and devices with novel properties via structure design and control; ways to reveal their molecular and structural properties and the process of their self-assembly; and the strategy for developing technologies that could promote the application of nano- and molecular materials in devices; and research into the structure properties of single molecules and molecular devices. their strong points to be used in developing new elements and devices.

With an objective of promoting the development of nano-molecular materials and devices in China and strengthening the cooperation in the fields, the conference invited experts from across the country to have discussions on the following issues: design and synthesis of nano-materials and devices; physical and chemical properties of nano-materials and their controllable assemblage; and nano-materials and devices.

A central roundup report on nano-molecular materials and devices was delivered by Prof. ZHU Daoben. Other topics of reports included fundamentals of molecular spintronics by Prof. XUE Qikun; molecular magnetism and molecular spintronics by Prof. GAO song; and interface study & engineering for molecular electronics by Prof. Li Shutang.

China's first ultracold atoms on a chip

(CAS, 2008-12-15)



Scientists with the CAS Shanghai Institute of Optics and Fine Mechanics (SIOM) announced on Nov. 26 the successful development of China's first atom-chip system for achieving Bose-Einstein condensation (BEC), a milestone progress in ultracold atom research and quantum information storage technologies.

Although scientists from countries like the United States, France and Germany have already realized atom-chip BEC, Chinese researchers are second to achieve the feat in Asia, only after Japan.

With support from the National Basic Research Program, the work was chaired by Prof. WANG Yuzhu, a CAS Member, and carried out by the atom-chip group under the Laboratory for

Quantum Optics, SIOM.

According to Prof. Wang, a BEC is a state of matter in which atoms are cooled to temperatures very near to absolute zero (0 K, about -273°C or -459°F). Under such conditions, a large fraction of the atoms will collapse into their lowest quantum state, and quantum effects become apparent on a macroscopic scale. Predicted in the 1920s by Indian physicist S. Bose and Albert Einstein, this exotic phenomenon was not observed until 1995 in dilute atomic gases for the first time. Now, BEC is a subject of intense theoretical and experimental studies with wide application in atom frequency standards, atom interferometer as well as the storage and process of quantum information.

As traditional apparatuses for the preparation of BEC are often expensive and huge in size, world

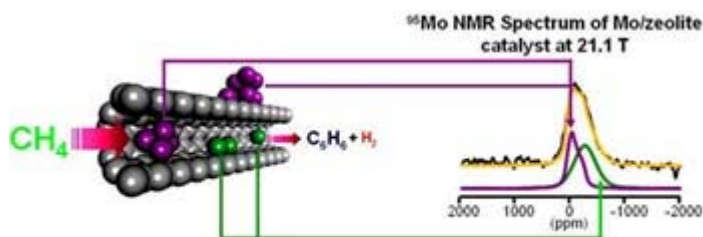
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scientists turn to cheaper and smaller experimental instruments. With the help of modern technologies of semiconductor manufacturing and micro-electro-mechanical system, some of them are now able to integrate the magnetic and optical systems into a silicon-based chip. When a surface electric current induces gradient magnetic fields on the chip, the atoms will be trapped and gradually frozen to extremely low temperatures. The BEC-on-a-chip not only is more stable and easier to carry, but can perform functions that traditional equipment could not.

Since it was established in the year 2003, the CAS group has installed China's first atom-chip optical electro-mechanical experimental setup including a ultrahigh vacuum system, an optical system, a frequency-stabilized laser device, an external magnetic field, along with high-resolution imaging and computer control systems for ultra cold atom research. Their original design also involved an atom-chip capable of combining a magnetostatic trap with a high-frequency one.

Later they joined efforts with scientists from Zhejiang University to successfully prepare first such atom-chip in China. With these chips researchers were able to carry out a series of cutting-edge experiments, such as laser cooling and chip-surface evaporative cooling of atomic gases, magneto-optical trapping, atomic waveguides, and the splitting of ultra cold atom clouds. They finally managed to cool down the atoms -- 3,000 of them in all -- to some 300 nK (nano Kelvin), at which point the phase transition of BEC was obtained.

New progress in basic research of methane direct activation (CAS, 2008-12-18)



After the successful realization of selective oxidation of methane to methanol at a low temperature (800C) via the construction of a circulation system of multi-pair electrons, a research team headed by Prof. BAO Xinhe with the CAS Dalian Institute of Chemical Physics (DICP) has attained new progress in basic studies of methane direct activation.

In cooperation with the US National West Pacific Laboratory, they obtained information on the intact structures of active centers of solid catalysts. This accomplishment was achieved by applying a technique called the high field solid nuclear magnetic resonance for the investigation of practical catalyst systems. Their results were published in a recent issue of J. Am. Chem. Soc.. An abstract of the paper also appeared in the recently published Chemical & Engineering News (C&E News).

In this work, the molybdenum (Mo) species on the surface of the catalyst were observed directly with the ^{95}Mo NMR technique. The DICP researchers found that during the preparation processes of the Mo/ZSM-5 catalysts, strong interaction would occur between the Mo species and the acidic sites of the ZSM-5 support, forming a kind of Mo-O-Al moiety. Moreover, this strongly interacting moiety was in equilibrium with the molybdenum oxide crystallites which were existing under a weak interaction state. It was revealed that the surface Mo-O-Al species were predominant if the Mo loading on the catalyst was high, while the molybdenum oxide crystallites were prevailing when the Mo concentration was low.

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By correlating with catalytic reaction results, it was concluded that those Mo-O-Al species located on the exchangeable sites were the active centers for reactions of methane direct conversions.

This was the first successful attempt in utilizing the High Field ^{95}Mo NMR technique for the investigation of practical catalysts, manifesting the great potentiality of utilizing the High Field NMR technique in solving chemical problems concerning atomic nuclei like molybdenum, silver and titanium, which are difficult to tackle by traditional means.

China's first multi-functional experiment system for space tribology (CAS, 2008-12-18)

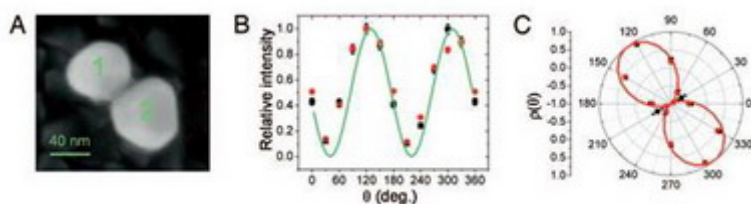


A multi-functional experiment system for space tribology, developed by the CAS Lanzhou Institute of Chemical Physics (LICP), has passed its acceptance check. The feat, the first of its kind in China, is of special significance for the development of high-performance, space lubricants in this country.

The system is capable of carrying out various experiments on a material's performance of friction and abrasion in various circumstances, ranging from atomic oxygen, ultra-purple light, proton/electronic beams, high vacuum or high/low temperatures, according to Prof. LIU Weimin, director of the State Laboratory for Solid Lubrication at LICP. More importantly, it could implement tests in an emulated space environment.

The working reliability of a tribology system is a critical factor affecting the life-span and reliable operation of a spacecraft. So, it is of special significance in systematically deepening the understanding of the influence of the space environment on a lubricant's frictional characteristics and in development of new long-service lubricants and related techniques applicable to the space environment.

Light polarization research sees new light (CAS, 2008-12-19)



Polarization response of a nanoparticle dimmer

Manipulating light on the nanometer scale is a challenging endeavor worldwide not only for the fundamental study, but also for applications aiming at the design of miniature optical devices. In recent years, the plasmonics becomes a rapidly emerging field of photonics that offers solutions to manipulate light by using surface plasmon excitations on metal nanostructures.

As we may learn, direction, intensity, spectrum and polarization are some primary properties of light. And through plasmonics, scientists managed to manipulate the first three properties on the nano-scale. While a less explored yet particularly important property of light to control is its polarization.

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Breakthroughs in the latter can largely renovate the study in the areas like the single molecule spectroscopy, supersensitive detection, integrated optic chips and quantum communication.

A research group headed by Prof. XU Hongxing with the Beijing National Lab of Condensed Matter Physics, CAS Institute of Physics, has been engaged in this study for years and recently succeeded in managing the polarization of the Raman-scattered (RS) light from a single molecule on the nanoscale. Their research paper entitled "Managing light polarization via Plasmon-molecule interactions within an asymmetric metal nanoparticle trimer" was published in a recent issue of the Proceedings of the National Academy of Sciences.

The scientists employed RS light from individual molecules to probe the response of asymmetric nanoparticle aggregates (which are asymmetric silver nanocrystal trimers they used in the experiment) over a range of wavelengths and to show that these aggregates can dramatically modulate the polarization of the emitted light.

The results showed that the RS light could be elliptically polarized because of strong plasmonic coupling between all the trimer nanoparticles and its intensity pattern was actually rotated. Then the scientists made further research to find that this coupling depends crucially on the wavelength of the light, the relative sizes of the nanoparticles and their relative distances.

Novel progress in the development of chemical sensors

(CAS, 2008-12-19)



A research team led by Prof. NIU Li with the CAS Changchun Institute of Applied Chemistry has made a series of progress in its research into chemical sensor elements based on nano-structured composite materials and their analytical instrumentalization. Recently, the group received a Second Award of Science and Technology of Jilin Province.

A high-tech device integrating expertise from such academic fields as electronics, chemistry and materials science, the chemical sensor is capable of transferring physical and chemical qualities into electronic signals to be analyzed and processed by integrated instrument. It plays a unique role in basic research and finds applications in various sectors, ranging from environment protection, medicine, public security and industrial process control.

Experts predict that novel chemical sensors and its miniature and integration studies will be one of the key areas in scientific research over the next 5 to 10 years. The application of technologies for new nano-structured composite materials and their micro-fabrication and micro-chips will play a leading role in the development of such sensors.

Prof. Niu and colleagues have been conducting research in the field since 2004. Focusing on nano-structured composite materials, they made a systematic study of their design, integration, performance and micro-structure. They also explore the chemical and electro-chemical approaches for preparing new nano-structure composite materials on the basis of conducting polymers, carbon nano-materials, metal nano-materials and ionic liquids. Their efforts have led to a number of new materials in the field.

These new materials exhibit new properties, such as high conductivity, high bio-compatibility,

enhanced surface activity and electro-catalytic activity, and provide powerful support for the development of new chemical sensors.

On the basis of these studies, Prof. Niu and his team have been successful in preparing many kinds of chemical materials for sensors and related analytical and monitoring instruments by using nano-processing and assembly techniques, and solving many bottleneck issues in the studies of analytic sensors of complicated components.

Experts say their work makes prohibitive contributions not only to the scientific instrument sector in China but also to the integrated preparation of nano-structured composite materials, and the development of sensing chips.

Xiangshan symposium addresses molecular imaging (CAS, 2008-12-22)

Under the auspices of the Xiangshan Science Conferences (XSSC), a symposium was held from 18 to 20 December in Beijing to deal with the key S&T issues in molecular imaging and related application.

The meeting was co-chaired by TIAN Jie from the CAS Institute of Automation, TANG Xiaowei from Zhejiang University, WANG Weiqi from Fudan University, BAI Jing from Tsinghua University, and BAO Shanglian from Peking University.

Molecular imaging is a newly emerging field of study that involves many academic disciplines, such as informatics, molecular biology, chemistry, physics, radiological medicine, nuclear medicine and clinics. The technology is able to obtain three-dimensional images about the physiological and pathological changes of an organism at the molecular level in an in-vivo, real-time, dynamic and no-invasive way. In addition, it is also expected to offer effective approaches for data acquisition, analysis and processing in research into specific functions of genomes, growth of organisms, disease development and drug efficacy assessment.

At present, molecular imaging has become an interdisciplinary "hot spot", among which radionuclide-based molecular imaging has been used for the human body and found primary applications in clinics. However, there still exist many science fundamentals to be solved. As a new research focus for the whole area, optical molecular imaging labeled with fluorescence in particular, is still in its fledgling development stage and needs strengthened efforts.

Molecular imaging will eventually provide new and revolutionary methods for life sciences and clinical medicine, according to experts. As the in-vivo studies of activities of genes, bio-macromolecules, and cells are a major research target for the 21st century life sciences, it will be beneficial for developing brand-new methods for the alert, diagnosis, and treatment of diseases, and is vital for upgrading people's health and living standards.

The participants of the XSSC symposium focused their discussions on such topics as studies of optical molecular imaging and application; radionuclide-based molecular imaging studies and application; multimodal molecular imaging and application; key issues in molecular probes; molecular diagnosis and its clinical application; important roles of molecular imaging in the development of anti-cancer drugs.

At the meeting, Prof. TIAN Jie and LIANG Wei from the CAS Institute of Automation delivered keynote roundup reports on multimodal diagnosis and its clinical application, and status and demands for the application of molecular imaging in life sciences, respectively.

Preparing an anticancer drug carrier via crystallization of nano-particles

(CAS, 2008-12-24)

A research team led by Prof. MA Guanghui with the CAS Institute of Processing Engineering has developed a one-pot approach to couple the crystallization of CaCO₃ nanoparticles and the in-situ symmetry-breaking assembly of these crystallites into hollow spherical shells under the templating effect of a soluble starch. Their work was published in a recent issue of Journal of American Chemical Society.

Their further functional studies using HP-a as an anticancer drug carrier demonstrated its advantages for localizing drug release by the pH value-sensitive structure and enhancing cytotoxicity by increasing cellular uptake, perinuclear accumulation, and nuclear entry.

The work was supported by the National Natural Science Foundation of China, CAS, and Ministry of Science and Technology, respectively.

1.5 Structure of Matter

Black hole preying on a star probably responsible for a weird long GRB

(CAS, 2008-12-9)



A computer animation of the supernova-free progenitor for GRB 060614: an intermediate mass black hole gulping a solar-type star triggers an intense blast of γ rays.

lasted for 102 seconds. "This suggests that the current classification and fuel model for GRBs need to be revised." Remarks Prof. LU Ye from the National Astronomical Observatories, CAS (NAOC), who proposed a new model in issue 684, volume 1330 of The Astrophysical Journal together with Prof. HUANG Yongfeng from Nanjing University and Prof. ZHANG Shuangnan from Tsinghua University. GRBs are intense and short blasts of γ rays billions of light years away from the Earth. Before they were first spotted by US military satellites as a byproduct of their efforts to detect possible nuclear tests in violation of the atmospheric nuclear test ban treaty, these spooky light emissions were totally unknown to astronomers, though they actually visit the planet about once a day. More surprisingly, recent

A recent study by Chinese astronomers suggests that the weird behavior of a γ -ray burst (GRB) detected in 2006 might have been fueled by an intermediate mass black hole (IMBH) gulping a star, rather than a massive star collapsing to form a black hole. This provides an alternative model explaining the origin of some long GRBs and has stirred a new wave of controversy on the source of such intense electromagnetic radiations from

extremely distant universe, which for a long time constituted the biggest mystery in high-energy astronomy.

The GRB of interest, named GRB 060614, caught the eye of the astronomers because it showed no link to any supernova, which is unusual for a long GRB that

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developments in related research indicate that GRBs occur about 500 times a day. We can only see one out of every 500 such events just because our planet is often unfavorably aligned with their trajectories and therefore miss their waves.

The origin of GRBs has been confusing astronomers since their discovery. Where do they come from? What have triggered the powerful radiations? In the early days of GRB research, it was so controversial that hypotheses about their origins even outnumbered the observed GRBs themselves!!

Accumulated evidence later helped astronomers focus on two hypotheses for GRB progenitors. For a long GRB that lasts more than 2 seconds, the collapse of the core of a massive star is believed to be the cause; and for a short one that lasts less than 2 seconds, the merger of a binary system of neutron stars or black holes would be the source. The former model, for which a new term the "collapsar" has been coined, argues that when the collapsing star core forms a black hole, a big explosion is triggered inside the core, sending a blast wave transmitting through the outer layers of the star. This blast wave bombards the stellar material in the outer layers, producing γ rays. Moreover, when bursting into the space, it collides with vicinal matter like gases and dust, and produces another kind of radiations that are less powerful as γ rays, which form the "afterglow" of a GRB.

The "collapsar" model has gained widespread support among astronomers since the optical spectrum of an afterglow detected in March 2003 was found to be almost identical to that of a supernova, and later more "signatures" of supernovae were found in GRB afterglows. Because the collapse, on which the model is built, is hypothesized to be caused by the explosion of the outer layers of a massive star—the burst of a supernova, the clear proof of supernova link greatly boosts this model.

With the discovery of GRB 060614, however, astronomers might need to reconsider the classification and fuel model of them. "GRB 060614 cannot be grouped into any conventional type of GRBs." The authors say.

Obviously, GRB 060614 represents a maverick long GRB event, because it showed no link to any supernova. The three Chinese astronomers therefore jointly fix a new model to explain this abnormality, suggesting that GRB 060614 might have been fueled by the energy released by an IMBH gulping a star. The IMBH is estimated to be at least as big as 1×10^4 solar masses, and the star it was devouring had about the same mass and size as the Sun. The prey star, which happened to be close enough to the black hole, was distorted and quashed into a pancake by the strong tidal forces of the black hole and dropped into its heart.

The tremendous damage, described as "tidal disruption" in the paper, resulted from the great difference between the gravity forces exerted by the IMBH on different parts of the poor prey. This unbearable imbalance of tension destructively twisted and wrested the star. Similar effects are ubiquitous in our cosmos, though what we generally see tends to be much milder, like the tides caused by the imbalanced gravity forces exerted by the Moon on different parts of our planet. It could be cruel and violent, however, when it involves a mighty predator, like a black hole.

While dropping into the unfathomable black hole, the wreckage of the prey star or the "blobs" formed a transient accretion disk, which in turn threaded the black hole and extracted a large amount of rotational energy, creating two counter-moving jets along the rotation axis of the black hole. The powerful jets could have been an ideal energy reservoir for a GRB, according to the authors' calculation.

The new model can reasonably explain all the observed basic features of this unusual GRB, including the duration, pulse energy, periodicity of the pulses, and most importantly, the absence of supernova

link.

Besides, the model estimates that the blobs might fall into the black hole in an interesting way. The blobs, according to the authors, fall neither uniformly nor completely unsystematically. "They seemed to fall in group," suggest the authors, meanwhile stress that the detailed modulation of the falling mechanism remains largely uncertain and needs further investigations.

Such maverick GRBs, as predicted by the authors, might not be rare in our cosmos. Evidence suggests that about 6% GRBs could be of GRB 060614-type.

Naturally, the new fuel model stirred a new wave of discussion about IMBHs, whose existence is still hotly disputed and for which astronomers are still searching for direct evidence. Recent theoretical work, however, has given their possible density and occurring rate in the Milky Way. If these predictions are confirmed by observations, there could be 1,000 to 10,000 IMBHs in our native galaxy. Given all the uncertain factors, the team agrees that still many parameters need to be settled for more accurate and detailed a description of the producing mechanism of these weird long GRBs without any link to supernovae. Nevertheless, their work has provided a viable model, and it might have opened up a new window to IMBH studies.

CAS to set up a free electron laser facility in Shanghai

(CAS, 2008-12-23)



A scheme map of SXFEL at the campus of the Shanghai Synchrotron Radiation Facility.

CAS has decided to establish, as pre-research engineering projects for a hard X-ray free-electron laser (FEL) facility in the future, a soft X-ray FEL (SXFEL) experiment facility and an RF superconducting accelerator unit, according to a presentation made by Prof. ZHAO Zhentang, vice director-general of the CAS Shanghai Institute of Applied Physics (SINAP), at the 122nd session of the Eastern Forum of Science and Technology held on 11 and 12 December in Shanghai.

Using a relativistic electron beam as its working medium, FEL is a new kind of laser source that amplifies electromagnetic radiation via stimulated emissions in a periodic magnetic field. It is considered as an operational technical approach to the fourth-generation

light sources as it has the widest frequency range of any laser type with high brightness and short pulses, and can be widely tunable.

Key technologies concerning the development of hard X-ray FEL facilities are highly challenging and very expensive. Therefore, all of the three such facilities now under construction in the world (LCLS in US, EURO-XFEL in Europe, and SCSS in Japan), were started with soft X-ray FEL.

A study on FEL test facility was initiated by a group of the CAS Institute of High Energy Physics (IHEP) in 2005, and such a kind of FEL R&D had been proposed by Prof. C. N. Yang, 1957 Nobel laureate in physics, in 1997, according to Prof. ZHAO, who is vice principal investigator of a research project on FEL with support from the National Basic Research Program.

After long discussions within the experts in Chinese physics community, CAS decided in 2007 to choose the Shanghai Synchrotron Radiation Facility campus as the facility site of SXFEL test facility

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and SINAP as its host institute. Its design and construction will be implemented under the close collaborations among IHEP, Tsinghua University and SINAP. Right now, a proposal for SXFEL is under the government's review.

The future SXFEL will be a 10nm two-stage cascading high gain and harmonic generation (HG) FEL demonstrator for performing the "proof of principle" of the cascading HG FEL and prototyping the key FEL technologies toward the HG based X-ray FEL, notes Prof. Zhao.

Construction of largest aperture radio telescope starts in southwest China (CAS, 2008-12-30)

While observing the world around us via an optical telescope with information carried by visible light, which constitutes only a small portion of the electromagnetic spectrum, astronomers use the remainder of the spectrum to reveal extensive data about celestial objects. For instance, they use telescopes operating in the radio spectrum to explore the Universe.

At present, the world's largest single-aperture radio telescope is the Arecibo telescope located in Arecibo, Puerto Rico, whose 305-meter dish is fixed in the ground and steerable within about 20° of the zenith.

To further promote studies in this field, CAS has started the construction of a five-hundred-meter aperture spherical telescope (FAST) at a Karst valley in Pingtang County, Guizhou Province, in southwest China. With a total collecting area about 30 football fields, FAST will be the most powerful single dish radio telescope with the largest aperture in the world.

When completed, its overall capacity will be 10 times larger than Arecibo telescope, and its observation sensitivity 10 times more powerful than the 100-m aperture steerable radio telescope in Germany, Prof. NAN Rendong, chief scientist of the project and a researcher from the National Astronomical Observatories at CAS (NAOC), was quoted as saying by China Daily.

As a major project supported by the National S&T Infrastructure Program in the 11th Five-year Plan Period (2006-2010), FAST embraces three major innovative concepts developed independently by CAS researchers, noted CAS Vice President ZHAN Wenlong at the foundation-laying ceremony held on 26 December at its construction site.

These outstanding ideas include: the unique Karst depression as the site; the active main reflector which corrects spherical aberration on the ground to achieve full polarization and wide band without involving complex feed system; and the light focus cabin driven by cables and servomechanism plus a parallel robot as its secondary adjustable system to carry the most precise parts of the receivers.

Preparation and research for the project took some 13 years. This October, a proposal for FAST, a brainchild of over 20 research institutions and universities under the coordination of NAOC, received the green light from the central government. The 70-million-yuan telescope is expected to be operational in five and half years.

This telescope will be a platform for basic research in various fields, ranging from large scale structure of the universe to in-depth structures and patterns of matter, according to Prof. Nan.

1.6 Transport and Space

China launches remote sensing satellite (Xinhua Net, 2008-12-01)

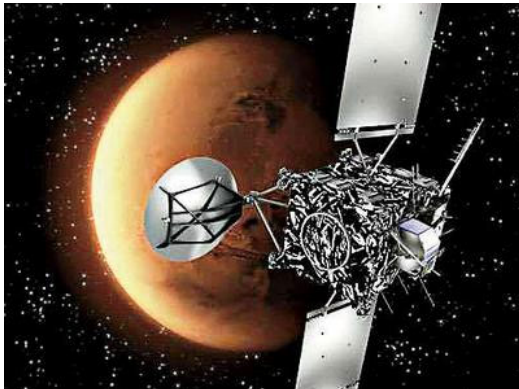
China launched a new remote sensing satellite "Yaogan IV" on Monday at the Jiuquan Satellite Launch Center in northwestern Gansu Province.

The satellite will be used for scientific research, land resources surveying, crop yield estimate and disaster prevention and relief, according to its chief developer, China Academy of Space Technology.

The satellite was launched on a Long March-2D carrier rocket. This was the 113th launch of China's Long March series of rockets.



China to Launch 1st Mars Exploration Rover in 2009 (CRI, 2008-12-05)



China will send its first Mars Rover, Yinhuo-1, into space in October next year by a Russian space rocket under a bilateral Mars exploration initiative reached between Russia and China in March this year.

Chen Changya, a Shanghai Space Administration official, also deputy designer-in-chief of China's first Mars rover, disclosed this Wednesday at an ongoing aerospace exhibition held in Shanghai.

According to the deep space exploration plan, Yinhuo-1, a small 110 kilogram spacecraft with an estimated one year life span, is expected to be put in orbit by August 2010, after an 11 month long and 350 million kilometers distant space journey. It will then begin its mission of exploring the surface of the red planet.

Chen says that rather than landing on Mars, China's Yinhuo-1 will collect scientific data while in orbit. It will constantly transmit data back to space headquarters on Earth via a long-distance transmission system. However, the spacecraft will never return to Earth.

With the bilateral Mars exploration initiative in place, Chen adds that China is awaiting cooperative experiments with Russia.

To date, China has already developed 4 Mars exploration program related sample crafts, among which two have already been transported to Russia. Following close test experiments in Russia, Yinhuo-1 will finally stand out from the two sample crafts, which, of course, will need improvements while in tests. Meanwhile, Russia's Mars spacecraft, which will be launched together with the Yinhuo-1, is targeted to land on the red planet.

Back in 1962, former Soviet Union started the history of Mars exploration. In 1964, the American

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Mariner 4 became the first spacecraft ever to visit the red planet. During the following decades, Mars exploration has developed still further.

China conducts first successful test of hybrid rocket

(Xinhua Net, 2008-12-06)

China successfully launched and retrieved a hybrid rocket on Friday for the first time.

The rocket, "Beihang-2", was launched at 3:05 p.m. from the Jiuquan Satellite Launch Center in northwestern Gansu Province. The head of the rocket was parachuted to the ground 1.2 km south of the launch site 15 minutes later. The rocket reached an altitude of 3,000 m.

The rocket was 3.417 m long and 0.22 m in diameter. It was designed primarily by 15 undergraduates and postgraduates of the School of Astronautics of Beijing University of Aeronautics and Astronautics. Researchers said this kind of rocket would not explode and had a low cost. The launch was mainly intended to test the performance of the rocket's hybrid engine.

China strives for completion of manned space station by 2020

(People's Daily, 2008-12-08)

China plans to launch a target vessel named "Tiangong I" at the end of 2010, and will strive for basic completion of a manned space station by early 2020, revealed Zhang Jianqi, delegation head of the Shenzhou VII manned space mission to Hong Kong and Deputy Commander-in-Chief of China's Manned Space Engineering Program, in Hong Kong on December 6.

Before 2012, China will complete the launch missions of Shenzhou VIII, Shenzhou IX and Shenzhou X, and will resolve the rendezvous and docking issues of the manned spacecraft and space vessel. Afterwards, Tiangong II and Tiangong III will be launched and a variety of applications will be carried out, Zhang said.

According to Zhang, China's manned space flight program features a three-stage development strategy. The first step is to complete spacecraft tests for Shenzhou I to Shenzhou VI, make breakthroughs in manned space technology and carry out some space experiments.

The second step is to establish China's own space laboratory and the third step is to build China's own space station, developing large-scale space applications and realizing long-term space residence for taikonauts.

China's first moon probe lowers orbit for further exploration

(Xinhua Net, 2008-12-10)

China's first moon probe, Chang'e-1, has successfully lowered its orbit from 200 kilometers away from the moon's surface to 100-kilometers.

Scientists did this to conduct more specific observation, according to the China National Space Administration (CNSA) here on Tuesday.

The satellite will remain at the new height before scientists lower its orbit again to gather information for a future moon landing, said CNSA without giving further details.

Chang'e-1 was launched into space on Oct. 24 last year. This was the first step of China's three-stage moon mission. The probe sent the first full map of the moon's surface back to China in November 2008.

A moon landing and launch of a moon rover is planned for 2012.

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During the third phase of the plan, scheduled for 2017, another rover will land on the moon and return to earth with lunar soil and stone samples for scientific research.

China launches Yaogan V remote-sensing satellite

(Xinhua Net, 2008-12-15)

China on Monday launched a remote-sensing satellite, "Yaogan V," from the Taiyuan Satellite Launch Center in north Shanxi Province.

The satellite was launched with a Long March-4B carrier rocket at 11:22 a.m., the center said.

The satellite will be used for data collection and transmission involving land resources surveys, environmental surveillance and protection, urban planning, crop yield estimates, disaster prevention and reduction, and space science experiments.

Xu Hongliang, director of the center, said the flight had been carried out under extreme low temperature, with the lowest reaching minus 29 degrees celsius in the past few days.

However, its success showed that the designing of the launcher, which was put into use in September, was up to standard and capable of working in low temperature.

The center's staff had also drawn on successful domestic and foreign experience of low-temperature launching and made much effort for its success, he said.

The satellite's predecessor, "Yaogan IV," was launched from the Jiuquan Satellite Launch Center in northwestern Gansu Province earlier this month. "Yaogan III" was launched from Taiyuan on Nov.12, 2007.

The "Yaogan I" and "Yaogan II" satellites were launched in April 2006 and May 2007, respectively.

The satellite was developed by the China Aerospace Science and Technology Corp., while the rocket was designed by the Shanghai Academy of Space flight Technology, which is under the corporation.

The flight was the 114th of the Long March series of carrier rockets.



China launches new geostationary weather satellite

(Xinhua Net, 2008-11-23)

China launched its third geo-stationary meteorological satellite, the Fengyun-2-06, Tuesday morning.

The satellite was launched on a Long March-3A carrier rocket from the Xichang Satellite Launch Center in southwestern Sichuan Province at 8:54 a.m. (Beijing Time).

It entered the preset orbit 24 minutes later.

The 1,390-kilogram satellite, developed by the Shanghai Academy of Spaceflight Technology affiliated to the China Aerospace Science and Technology Corporation, was able to acquire data from the ground, the ocean and space for the China Meteorological Administration (CMA).

Its predecessors, Fengyun-2-04 and -05, was launched in 2004 and 2006 respectively. The Fengyun-2-06 was to become a successor to boost the stability of the satellite series and would play an important role in weather forecast for China and neighboring countries and in disaster reduction, said the CMA.

It would also help enhance China's cooperation with international meteorological organizations.

The launch was the 115th mission of China's Long March series of rockets since April 24, 1970, when

a Long March-1 rocket successfully sent China's first satellite Dongfanghong-1 into the space.

Lunar exploration program introduces competition mechanism**(People's Daily, 2008-12-26)**

The State Administration of Science Technology and Industry for National Defense recently issued the Decision on Introducing Competition Mechanism in the Lunar Exploration Program, which puts forward establishing an evaluation system for the lunar exploration program and setting up a platform for cooperation and competition.

According to the Decision, from now on, projects that are qualified for competition and selection should be open to bids to determine which research and manufacturing contractors are used.

For the system integration projects whose responsible units have already been confirmed, they should, in accordance to their characteristics, carry out multilevel technological cooperation in the form of collecting design proposals, selecting the best from various plans or optimizing plans by taking the best aspects of each, and joining research and development, to take full advantage of the whole society's strengths in science and technology.

Beidou navigation system users exceed 40,000**(People's Daily, 2008-12-31)**

Since China's independently-developed Beidou satellite navigation and positioning system started five years ago, the number of users has surpassed 40,000. The system has brought about noticeable social and economic benefits.

So far the Beidou-1 satellite has provided positioning services 250 million times, communication services 120 million times and timing services 25 million times. The system operation is 99.98% reliable.

Reporters learned that research and development of China's second-generation Beidou system have now entered a critical stage.

In 2009, several satellites will be launched into space and the networking system will be completed in 2011, so the second-generation system will be basically equipped with operational capabilities.

At the same time, initiation and verification of constructing a global Beidou system have also begun. As planned, the construction of the system will be completed by 2020.

2 News from Universities

Number of Chinese students studying in the US increases by 19.8% in 2008**(People's Daily, 2008-12-12)**

The US is the leading destination for Chinese students pursuing overseas studies. In the 2007-2008 academic years, there were 81,127 students from China enrolled in higher education institutions in the US, up 19.8% from last year. The rise is mainly attributed to the relaxing of US visa policies.

According to the US Institute of International Education's latest statistics released in November 2008, the number of Chinese students studying in the US this year increased by 13,404 compared to last year. Overseas students for the 2007-2008 academic years brought the US huge economic benefits through tuition fees and living expenses. Enrollment of overseas students has already become an important

supplement to the US economy.

Therefore, insiders are saying that in the face of the ongoing financial crisis, the US government is certain to continue to encourage students from foreign countries to study in the US. US universities will continue to welcome students from China, so the stable and relaxed visa policies for overseas students will remain in place.

It has been learned that officials from the consulates of countries such as Bulgaria and Poland located in Shanghai said recently that they will create more favorable policies for Chinese students in terms of visas and scholarships.

Enrollment of graduate students for master's degrees to see a year-on-year increase of 5%

(People's Daily, 2008-12-15)

The Ministry of Education and the National Development and Reform Commission jointly issued a circular calling for a year-on-year increase of around 5% in the enrollment of graduate students for master's degrees in 2009 and a year-on-year increase of 1.7% in the enrollment of doctoral candidates.

It was pointed out in the circular that, with regard to graduate education in 2009, the rate of doctoral candidate enrollment should remain basically stable while the rate of enrollment of graduate students for master's degrees should increase at a moderate pace. The enrollment structure should be readjusted and its quality improved. The circular also requires all units to make active efforts to promote reforms of the graduate education system to improve the quality of graduate education.

China produced 240,000 PhDs in last 30 years

(People's Daily, 2008-12-30)

Universities have conferred doctoral degrees on 240,000 people in China over the past 30 years, officials said on Monday.

The Academic Degrees Committee of the State Council (cabinet) also told a conference that 1.87 million master's degrees have been awarded, as well as 14.15 million bachelor's degrees.

State Councilor Liu Yandong said the post-graduate students nurtured by China have become a leading force in different sectors. She urged the improvement of the academic degree system to improve the country's base of human resources.

3 Innovation Management

CAS to make nine changes in science administration

(CAS, 2008-12-05)

CAS has to realize the following nine transitions under the guidance of the scientific outlook on development, stresses CAS President LU Yongxiang. He made the remarks at a symposium held on 21 November in Beijing

First of all, a change should be made in the research mode, from isolated, free exploration to innovation activities focusing on goal-oriented fundamental and cutting-edge research, key high-tech development, major systems integration, and systematic and basic studies concerning sustainable development. These activities should be performed in light of key S&T issues in the world and the major strategic demands of the country.

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Second, a transition should be made in science evaluation, from the conventional practice laying stress only on research papers and awards to new approaches also giving importance to innovative contributions and innovation levels, qualities and development trends. On the basis of peer review, evaluation should be more concerned with the contributions of research work to practice and whether it can withstand the test of time.

Third, a transition should be made from a one-sided emphasis on S&T innovation to an equal stress on both innovation and technology transfer.

Furthermore, in order to optimize personnel structure and upgrade the S&T contingent, a change should be made in human resource management, from paying attention to individual talent recruitment to laying emphasis on the selective introduction and cultivation of professionals according to development requirements.

Fifth, the way that basic research units are organized should be transformed from the traditional ones led by principal investigators to novel ones adaptable to various research activities, ranging from free exploration, large science projects, high-tech frontier research, key technology development, major systems integration and innovation to the long-term systematic buildup of data and their testing, and technology transfer.

Sixth, conversion should be made in organizational management from a system that is mainly composed of research institutes established according to academic disciplines to a new one featuring a matrix grid and composed of both research institutes and innovation clusters formed in light of major strategic objectives of innovation.

Seventh, expectations of scientific research should change from the idea of stressing S&T outputs only to a new concept giving equal importance to human resource development and education reform, plus innovation environment upgrading and management innovation so as to produce first-class research, management, academic environment and personnel.

Eighth, the existing distribution of CAS institutes across the country has to be reshaped according to the needs of national socioeconomic growth and regional development, as well as to native natural resources and environment.

Finally, the financial resources of CAS should be diversified. In addition to stable support from the central government, efforts should be made to explore other sources from various sectors, including local authorities, business enterprises and overseas organizations.

China's input into science and technology hits new high (People's Daily, 2008-12-19)

China's input into science and technology has hit a record high in 2008. The total investment stood at 371 billion yuan, accounting for 1.49% of China's GDP.

The central government has injected about 100 billion yuan, while local governments have invested about 80 billion yuan. The remaining investments were from enterprises and other sectors of society.

It has been learned that national major science and technology projects have already entered the comprehensive organization and implementation stages.

The total investment into the nine major science and technology projects for civil use will reach 690 billion yuan by 2020 with over 200 billion yuan from the central government and over 100 billion yuan from local governments. The remaining investment will be injected by related enterprises as supplementary funds.

4 China's International Science Cooperation

China-Germany Pure EV Technology Workshop Held

(MOST, 2008-12-05)

On December 5th of 2008, China-Germany Pure Electric Vehicle (EV) Technology Workshop was held in Shanghai, which was jointly sponsored by MOST and Federal Ministry of Transport, Building and Urban Affairs of Germany (referred to as German Ministry of Transport) and organized by China Automotive Technology & Research Center and Shanghai Clean Energy Research & Industry Promotion Center. Representatives from MOST, Science and Technology Commission of Shanghai Municipality, German Ministry of Transport, German Consulate General in Shanghai addressed the Workshop. Scholars and researchers from more than 40 enterprises, research institutes and universities attended the Workshop, including Volkswagon, BMW, Bosch, FAW Group, Tianjin Qingyuan, Shanghai DAJUN Technologies, Shanghai Maple, Shanghai Power Grid, CNGC China North Vehicle Research Institute, China Electric Power Research Institute, Tongji University, Beijing Institute of Technology.

Discussions and communications revolved around national EV strategy, EV technological R&D, and infrastructure construction. Both sides expressed their willingness to expand cooperation in R&D of key spare parts for pure EV, infrastructure construction, government funding methods, the public response, etc..

CAS, CNRS extend cooperation on joint lab for catalysis

(CAS, 2008-12-09)



CAS and National Research Center of France (CNRS) renewed the cooperative protocol for the Laboratory of France-China for Catalysis (LFCC) on 1 December in Beijing. Presided over by Prof. LI Can, Chinese director of LFCC, the signing ceremony was attended by high-level officials from the two sides.

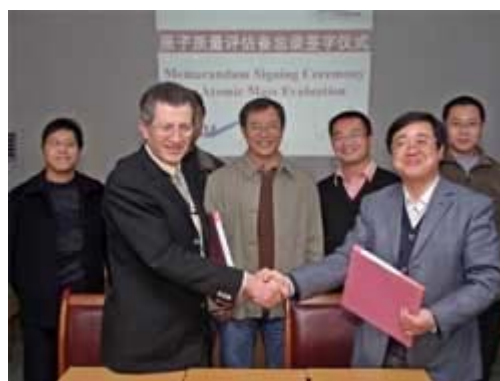
Established in 2000, the joint lab is coordinated by the CAS Dalian Institute of Chemical Physics and the Lyon Institute of Catalysis with

the participation of 13 research bodies from the two countries. Over the eight years, the lab has scored encouraging progress in the fields of energy sources, environment and fine chemicals. In the future four years, it will dedicate to the studies of clean energy sources and environmental friendly catalysis.

CAS institute to take over world atomic mass evaluation

(CAS, 2008-12-12)

The French Center for Nuclear Mass Spectrometry signed a memorandum of understanding (MOU) with the CAS Institute



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of Modern Physics (IMP) recently in Lanzhou to transfer the task of atomic mass evaluation to the latter. The document was signed by IMP director XIAO Guoqing, and Director of the Atomic Mass Data Center (AMDC) Georges Audi.

According to the MOU, the CAS institute will take over the task of AMDC for the world's determination of the atomic masses in the future.

Mass is the primary physical quantity of fundamental significance for an atomic nucleus. Almost all of the studies and application in the field of atomic physics are closely related to the atomic mass. So it is of vital importance for scientists to make a top-quality evaluation of the atomic mass. Since 1955, there have been six editions of bulletins published to catalogue various nuclide masses. The latest edition was published in 2003.

Equipped with the largest research facility for heavy ions in this country, IPM boasts one of the most important hubs of nuclear research in the world today.

China, Russia jointly plot transportation routes on sea ice (People's Daily, 2008-12-12)

On December 10, the joint Sino-Russian ice detection team studied the key issues of the unloading and transportation of materials for China's 25th Antarctic expedition team. After scientific verification and onsite observation and measurement of the sea ice conditions of Prydz Bay, they set the transportation routes on the sea ice.

Due to the complex ice situation, the R/V Xuelong polar research ice-breaker got stuck on route and failed to arrive at the safe unloading place on schedule.

On December 10, at the invitation of the Chinese team leader Yang Huigen, Sergey, the captain of the Russian Antarctic Station, Progress 2, and two of his team members visited the R/V Xuelong, and held friendly discussions with the Chinese contingent on Sino-Russian cooperation in sea ice detection and on-the-ice transportation using the PB300 snowmobiles.

The Russians provided the Chinese team with observation and measurement data on sea ice obtained from the three sea ice continuous monitoring spots in the peripheries of the Progress 2 Station.

Then the two sides jointly drew up a comprehensive information chart on sea ice in Prydz Bay including information on unpredictable ice belts, icebergs, ice cracks as well as safe routes and locations of the observation points. On the same day, the two teams started an investigation of the depth and structure of the sea ice, and finalized the on-the-ice unloading and transportation routes for the PB300 snowmobiles.

Sino-German winter school on innovation opens in Beijing (CAS, 2008-12-16)

Jointly organized by the CAS Institute of Policy and Management (IPM) and the Fraunhofer Institute for System and Innovation Research (ISI), a winter school on innovation policy and sustainable development was inaugurated on 15 December in Beijing.

This one-week training session will be dedicated mainly to the PhD students and young scientists at IPM. Its topics will include the conceptual background of innovation policy and sustainable development, their policy measures and driving forces, and critical issues and limitations in this context.

In addition, the trainees will learn about the international view on these topics, as teachers are not only

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from China, but also from IPM's scientific co-operation partner ISI from Germany. This will help students to open their minds and broaden their knowledge about sustainable development and innovation policy.

The lecturers of the training course will from both IPM and ISI, namely, Prof. MU Rongping and Prof. WANG Yi from IPM; and Prof. Rainer Frietsch and Prof. Rainer Walz from ISI.

Students will get practically involved, as they have to prepare their own research questions, which will lead to an even broader exchange of different views during the discussions.

China, France to jointly set up a astrophysical lab in Beijing (CAS, 2008-12-19)



The signing ceremony for co-establishing a China-France internationally associated laboratory (Laboratoire International Associé, or LIA, in French) in astrophysics was held on 22 October in Beijing. Among the prestigious participants witnessing the event were French Ambassador H.E. Herve Ladsous and Vice Director-general of the CAS Bureau of International Cooperation QU Juliang.

Named "Origin," LIA will be engaged in research into extragalactic astrophysics and cosmology, focusing on such topics as the formation and evolution of galaxies, dark matter and dark energy, and the nature of sources of high energies including gamma-ray bursts.

The new lab will be made up of astronomers from 11 Chinese institutions, including the National Astronomical Observatories at CAS (NAOC), Beijing University, Nanjing University and the University of Science and Technology of China ; and research groups from 10 French laboratories, such as the National Center for Scientific Research (CNRS) in France, the Paris Observatory, the Pierre & Marie Curie University and Université Paris-Diderot. It will be co-managed by NAOC and CNRS.

The objective of LIA is to build a strong and jointly managed Franco-Chinese scientific community, with a joint steering committee, leading to regular academic conferences. While many Chinese students and researchers have already worked in French laboratories, the new lab will also enable French researchers to work in China.

LIA will also strengthen other partnerships in the fields of extrasolar planets and instrumentation, particularly space experiments, of radio astronomy, and of future giant telescopes with diameters of 40 m (Extremely Large Telescope).

CAS inks collaboration agreements with French partners (CAS, 2008-12-23)

Upon the invitation of Prof. Catherine Bréchnac, president of the French National Center for Scientific Research (CNRS), CAS President LU Yongxiang, who is also vice chairman of the Standing Committee of China's top legislature NPC, led a delegation to pay a visit to France from 7 to 10 December.

During his trip, Prof. Lu visited a lab for coastal environment jointly established by La Rochelle

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University and CNRS, the CNRS headquarters, the French Academy of Sciences, and the French Research Institute for Exploitation of the Sea.

The CAS delegation signed several protocols with its French partners, including a CAS-CNRS agreement on international cooperative research into absorption spectroscopy of important elements in atmospheres of the Earth and planets among China, France and Russia; and a CAS-CNRS agreement on Sino-French joint lab on clean energy sources.

CAS to further cooperation with German academia in ocean studies (CAS, 2008-12-30)

President. Lu Yongxiang (left) meets with Scientific Chairman of GKSS Research Centre Wolfgang Kaysser during the visit.

At the invitation of the Max Planck Society and the Helmholtz Association of German Research Centres, a delegation led by CAS President LU Yongxiang paid a visit to Germany from 11 to 15 December.

With an objective of promoting cooperative studies in the fields of ocean and coastal studies, the CAS delegation visited, from 11 to 14 December, the

Helmholtz GKSS Research Centre in Geesthacht and the Max Planck Institute for Meteorology in Hamburg, the Max Planck Institute for Marine Microbiology in Bremen, and the University of Heidelberg.

On 15 December in Berlin, Prof. Lu, who is also vice chairman of the Standing Committee of China's top legislature NPC, met with Prof. Dr. Jürgen Mlynek, president of Helmholtz Association, and signed an agreement on cooperation framework between the two organizations.



5 Miscellaneous

Japanese Expert Lauds China's Efforts to Promote Scientific Research (CRI, 2008-12-06)

China's remarkable achievements in science and technology are inseparable from the positive environment Chinese policy-makers have created over the past decades, a Japanese expert said.

"When China rolled out a plan for reforming the science and technology sector in 1985, virtually no one outside the country heard of it, because at that time nobody would associate China with high-tech," said Atsushi Sunami, an expert at Japan's Science and Technology Agency.

"But now, nobody would laugh on mentioning China's science and technology," he said in a recent interview with Xinhua.

Sunami has long been engaged in the comparative study on China's national innovation policies. He has witnessed the number of scientific researchers grow steadily in the past few decades. Among them, some are returnees from the United States, Europe and Japan, and some are young people inspired by the older generations.

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"I believe this would not have happened without the reform and opening-up policy," he said.

"In the late 1980s and 1990s, the Chinese government tried its best to create a conducive atmosphere for scientists and researchers to return from developed countries and work for China," said Sunami.

"This effort is unprecedented and has paid off," he said.

Looking into the future, the Japanese expert said he was optimistic about the prospects of China's scientific advances.

"If scientific research continues to win enough support from the fiscal and financial departments, China's science and technology are expected to keep developing rapidly in the next 20 years," he said.

"A large number of young people are involved in researches such as the mapping of the rice genome or human genome. They are doing the same things as we do in the developed countries," Sunami said.

He was even more amazed that wherever he went during his stay in China, he would encounter people who were thinking and approaching things from a global perspective.

"As long as these people play an important role in the development of China's science and technology, I wouldn't doubt the progress the country will make in the next 20 years."

According to Sunami, China's rich human resources give it an unrivaled edge.

China should make full use of its talented people and try to make progress in areas with Chinese characteristics, for example, the pharmaceutical industry and clinical medicine, he said.

"China has a long tradition of scientific research. If China can combine its tradition with the world's most cutting-edge technologies and find a development mode suitable to itself, China can be even stronger in this sector," he said.

"China will have a lot of opportunities in the next 20 years. Let's wait and see," said Sunami.

China publishes most scientific theses in 2007: Engineering index

(Xinhua Net, 2008-12-09)

China published 78,200 Ei-indexed theses in 2007, overtaking the United States for the first time to be the world's number one, the Institute of Scientific and Technical Information of China (ISTIC) said here Tuesday.

The Ei theses are scientific and technical ones indexed by the U.S. based Engineering Index.

ISTIC statistics also showed, the number of Chinese theses indexed by the Science Citation Index (SCI) topped 94,800 in 2007, 7.5 percent of the world's total, ranking third after the United States and Britain.

China's theses indexed by the Index to Scientific and Technical Proceedings (ISTP) were 45,300, 10.1 percent of the world's total and the second among all countries.

Most of the theses were on disciplines such as chemistry, computer science, physics, materials science, telecommunication, automatic control, biology, dynamics and electronics, mathematics, architecture and geography.

CAS academician honored with prestigious French award

(CAS, 2008-12-15)

Prof. LI Daqian (Li Tatsien), a CAS Member and mathematician of Fudan University, was present the Knight of National Order of the Legion of Honor (Chevalier de la Légion d'Honneur) at the Consulate-General of France in Shanghai on



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14 November. The honor is to recognize Prof. Li's outstanding contributions to Sino-French cooperation in applied mathematics.

Established by by Napoléon Bonaparte, First Consul of the First Republic in 1802, the Order is one of the most prestigious French awards and the country's highest civilian honor.

With the support of the leaders of the two countries, a Chinese-French Institute for Applied Mathematics was jointly set up by Fudan University and Ecole Polytechnique in 1998. Under the leadership of Prof. Li, the institute has made encouraging progress over the past 10 years in strengthening cooperation and exchanges between mathematicians of the two countries.

Abbreviations

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