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NEWSLETTER

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INTERNATIONAL COOPERATION

China-Japan-Korean Forum on New and Renewable Energy



A China-Japan-Korean forum on new and renewable energy was held on July 17, 2008 in Beijing. Sponsored by the Chinese Ministry of Science and Technology, and organized by the Chinese Academy of Science and Technology for Development, the forum has attracted the participation of some 150 representatives from government agencies, research institutes, universities, and industry of three nations.

Participants discussed the policy and management issues in the area of new and renewable energy, S&T exchanges and cooperation, and associated industrialization. An initiative was adopted at the meeting to strengthen S&T cooperation among three nations in the area of new and renewable energy, aiming at practical and high level collaborations. The initiative has embraced the following common consensus: 1) cooperation shall observe the principle of reciprocal advantages and mutual convenience, protecting intellectual property rights, sharing resources, and technological innovation; 2) make new and renewable energy a priority area for S&T cooperation among three countries, and appeal government to create infrastructures for the collaborations in the area; 3) dish out favorable policies for S&T cooperation in the area of solar energy, wind energy, biomass energy, and geothermal energy, encouraging the efforts to establish joint labs and industrial centers; 4) promote the combined efforts of industry, universities and research institutes in the area of new and renewable energy; 5) maintain exchanges and cooperation in diverse forms, including forum, in the area of energy; 6) promote the visit and exchange of scientists, engineers, industrial people, and government officials.

RESEARCH AND DEVELOPMENT

Ovarian Cancer Stem Cells

Dr. ZHANG Shu, a research fellow at Shanghai Jiaotong University Renji Hospital, has successfully separated and identified ovarian cancer stem cells from human ovarian cancer tissues. The finding, published in the recent issue of journal *Cancer Research*, will make the inhibition of both the genesis and development of ovarian cancers possible.

During his stay in the United States, ZHANG and her coworkers have successfully separated and identified ovarian cancer stem cells from human ovarian cancer tissues, and found both CD44 and CD117, a specific marker of ovarian cancer stem cells. The cells are of strong self-reproduction and multi-directional division potentials. Study results show that it takes 100 ovarian cancer stem cells to build a human ovarian cancer tissue in a rat model. ZHANG believe that the discovery will lead to new drug targets, and to an integrated therapy that may greatly reduce the recurrence and raise the survival rate of ovarian cancer.

Heavy Ion Ring Approved

On July 30, 2008, CSR, a cooling storage ring for HIRFL, passed the approval check at the national level. As a system with the largest scale and highest energy, HIRFL- CSR has produced numerous innovations, including the type of ions accelerated, the highest energy, and beam strength, all up to an internationally leading level. The new system has greatly enhanced the cumulative efficiency, energy, intensity, and quality, making high precision measurement under an extreme condition possible. The development has also made HIRFL the second world class experimental unit, after GSI.

CAS Institute of Modern Physics has since 2006 worked on radio physics and biology, in an attempt to treat malignant tumors using heavy ion beams. Heavy ion beams have been used to treat malignant tumors, without operation, pain, and damage to healthy tissues, though with a strong power to kill cancerous cells. As of March 2008, researchers have performed heavy ion therapy on 66 cancer patients, with noticeable results. The development has made China the fourth country in the world able to treat malignant tumors using heavy ion beams.

Longteng Chip Approved

Longteng, a high performance built-in chip developed by a team headed by Prof. GAO Deyuan of Northwest Polytechnic University, has recently passed an approval check. The system is made up of three chips with different functions. Of them, R2 is a latest model designed for PowerPC 750, T2 a QCIF mobile phone display chip, the first of its kind in the

country, and S2 chip an SOC system built for PC104, also the first of its kind in the country.

R2 chip has made a range of technological innovations, including mirror storage structure, distributed test module, and floating point exception handling approach, which enhanced the performance of the processor. It has resulted in one national invention grant, and one national invention application.

T2 is featured with low power consumption and high quality images. Researchers have worked out techniques to control the access violation commonly seen in a high resolution and large size system. They also found a solution to accommodate high speed transmission and load drive, using an innovative charge-pump circuit. The effort has produced two national invention grants, and one national invention patent application.

S2 has led to the birth of a core IP unit and an SOC design platform. Researchers developed a structure allowing the parallel operation of a number of components with multiple accesses, and a calculating unit structure up to IEEE 754 standard and X86 floating point. This part of efforts has resulted in two national invention patent applications.

Key Repressor of Alpha-Fetoprotein Gene Transcription Found

A study team, led by Prof. ZHANG Weiping at the Second Military Medical University, has unveiled zinc finger protein ZBTB20, a key repressor of alpha-fetoprotein gene transcription. In collaboration with CAO Xuetao, a CAS academician at the Second Military Medical University Institute of Immunology, Prof. ZHANG cloned in 1998 a proprietary ZBTB20 from human dendritic cells, and reported the preliminary finding in 2001. Under the further support of the Chinese National Natural Science Foundation, and the National 863 and 973 Programs initiated by the Chinese Ministry of Science and Technology, ZHANG and his coworkers worked together with overseas experts, to establish a generated hepatocyte-specific ZBTB20 knockout mice by the Cre/loxP approach, and demonstrated that ZBTB20 ablation in liver led to dramatic depression of the AFP gene in the entire liver throughout an adult life, although the hepatocytes were normally under a nonproliferating status. Researchers also found that ZBTB20 was a transcriptional repressor capable of specifically inhibiting AFP promoter- driven transcriptional activity. Liver chromatin immunoprecipitation and mobility shift assays showed that ZBTB20 bound to AFP promoter directly. ZBTB20 was developmentally activated in liver after birth, and inversely correlated with its AFP gene expression, suggesting that the activated ZBTB20 expression in liver mediated AFP gene repression. The finding was published in the August 5 issue of *the Proceedings of the National Academy of Sciences*.

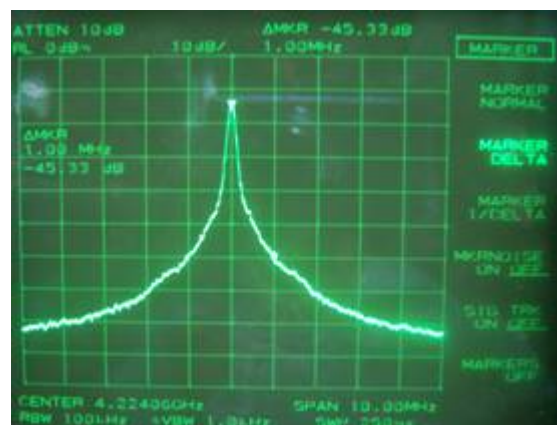
New Progresses for Lightning Test

A study, led by YAO Xueling, an associate professor working for Xi'an Jiaotong University

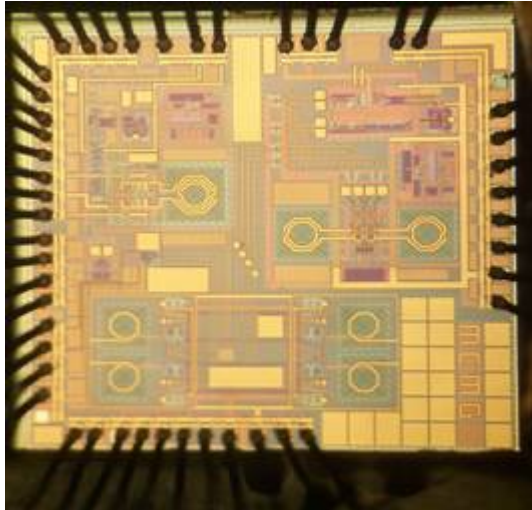
Institute of Electric Engineering, has recently had its lightning test theory and associated technologies and products approved. Derived from the project are a range of innovative designs, technologies, and components, including over-voltage protection, accurate lightning current test loop, discharge switch, current wave resistance, and current wave sensing. Researchers rolled out an automatic voltage monitoring system, a high precision digital phase tracking and control circuit, a control unit based on optic transmission/reception technology, and digital devices able to detect lightning current for over-voltage protection. Meanwhile, they have developed control and application software for diverse current tests. So far the project has produced some 200 sets of test equipment that have found extensive applications in the area of electricity transmission and distribution, and telecommunication, harvesting noticeable economic and social benefits.

Improved RFCMOS Technology

The Institute of Microelectronics, part of the Chinese Academy of Sciences, has worked out a range of key circuits that makes 0.18um RFCMOS foundry process in the range between 6~9GHz possible: 1) a 3.9~4.9GHz phase lock loop chip allowing a VCO between 3.9~4.9GHz, with a reduced phase noise at 95dBc/Hz@1MHz offset, and a reference spur less than -40dBc; 2) a 6.5~7.2GHz voltage-controlled oscillator chip, with a VCO range reaching 700MHz, and phase noise less than -90dBc/Hz@1MHz offset; 3) a 6~9GHz low noise amplification chip, allowing a gain larger than 18dB for the LNA within the range of 6~9GHz, and an S11 and an S22 less than -10dB; and 4) a 6~9GHz down conversion chip able to convert radio signals within the range of 6~9GHz into analog base signals, with a conversion gain larger than 5dB.



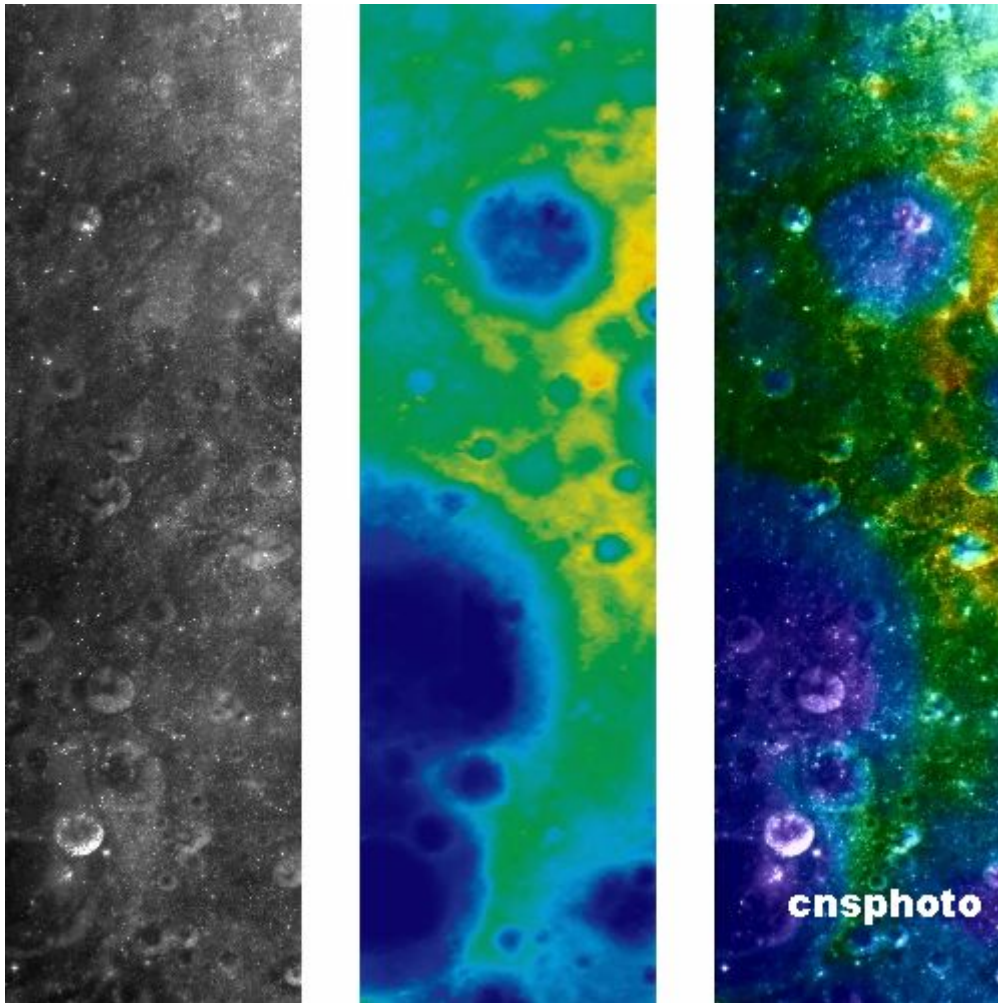
Spectrum of 3.9 ~ 4.9GHz phase lock loop chip



6 ~ 9GHz DDS chip

NEWS BRIEFS

[More Images from Chang'e I Satellite](#)



China National Space Administration released on December 11, 2007 some lunar images derived from the data collected by Chinese made Chang'e I satellite. The images show an impact pit named after an ancient Chinese. The left image is a front view. The middle presents a digitized contour model. The right shows a coded color terrain image. The pit that cannot be seen from the earth sits in 9.8 degree south latitude and 138.8 degree west longitude on the other side of the moon, covering an area of 52 km. In the 1970s, the impact pit was named Wanhua after a Chinese figure living in the Ming Dynasty by the International Astronomy Association.

As of 1400 August 1, 2008 (Beijing time), Chang'e I satellite has worked smoothly in orbit for nine months and nine days, circling the moon for 3042 times. The probe has produced a huge amount of scientific data, including 1.11TB data collected by the ground stations in Miyun and Kunming. The onboard CCD camera has collected the data for the entire moon surface, and other payloads have also collected massive data. Researchers are currently working on these data. According to a by-law to manage the data derived from the moon satellite, and an accord signed between the China National Space Administration and the European Space Agency, the data collected by Chang'e I satellite will soon be released to the authorized domestic users and the European Space Agency.

3mm InGaAs/InP Tube

A study team, led by JIN Zhi, with Chinese Academy of Sciences Institute of Microelectronics, has rolled out a 3mm InGaAs/InP tube. Researchers made an innovative design to address possible breakdown voltage, using an enhanced collecting electrode layer. A tailored design combining both InGaAs and InGaAsP has greatly improved the high frequency performance of DHBT components. They also developed the technologies for sharpening and flattening HBT, in an attempt to raise the performance of components. The project has resulted in a complete set of InGaAs/InP DHBT making technologies, allowing a breakdown voltage larger than 6V for DHBT components, a maximum current-gain cut-off frequency of 176GHz, and the maximum oscillation frequency as high as 253GHz, all making the domestic record. All these breakthroughs have made the design of a 3mm MMIC possible.

High Purity Carbon Nanotubes

Thanks to the 7-year efforts, a high purity flexible carbon nanotube with an enhanced strength and associated manufacturing equipment, jointly developed by Zhejiang University and Hangzhou Xuanaij Corp., were recently put into mass production. As a proprietary product, it has obtained 12 national invention grants.

The simple and unique technology is able to turn one gram of catalyst material into more than 40 grams of carbon nanotubes, a laudable efficiency 4 times that of the similar technologies developed overseas. Meanwhile, the technology produces a product with a purity as high as 95%, and a length reaching the micron level. The inexpensive nature of the materials and technology has also brought down the price.

S&T Strategy Website

www.casted.org.cn, a website sponsored by the Chinese Academy of Science and Technology for Development, has recently opened to the public. The website is made up of a range of utilities, including news, academic study, blog/forum, information/video, data, and a brief introduction of the Academy. It will report the current and hot issues concerning S&T development strategy in China, introducing the latest findings in the area, and providing needed basic data. The website has also opened blogs and forums for academic exchanges, in an attempt to reflect the latest views in the area.