



# Science and Technology Daily

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WEEKLY EDITION

## Better Environment, Better Life

By Staff Reporters

Respecting, adapting to, and protecting nature is essential for building China into a modern socialist country in all respects, Xi Jinping said at the opening session of the 20th National Congress of the Communist Party of China on October 16.

He called for advancing the Beautiful China Initiative and demanded a holistic and systematic approach to the conservation and improvement of mountains, waters, forests, farmlands, grasslands, and deserts.

Xi stressed that we must uphold and act on the principle that lucid waters and lush mountains are invaluable assets, and we must remember to maintain harmony between humanity and nature when planning our development.

He urged efforts to accelerate the transition to a model of green development, intensify pollution prevention and control, enhance diversity, stability, and sustainability in the ecosystems, and work actively and prudently toward the goals of reaching peak carbon emissions and carbon neutrality.

"We will carry out coordinated industrial restructuring, pollution control, ecological conservation, and climate response, and we will promote concerted efforts to cut carbon emissions, reduce pollution, expand green development, and pursue economic growth," he said. *See page 2*

## Ultrahigh Altitude PV Project Empowers Green Economy

By Staff Reporters

The world's first ultrahigh altitude photovoltaic project has seen its first unit connected to the grid and began generating electricity on October 14, which is expected to promote the green transformation of local energy consumption and economic development.

Generally, ultrahigh altitude refers to an area in excess of 3,500 meters above sea level. The Xingchuan photovoltaic demonstration base, with a total installed capacity of 600,000 kW, is located on the grasslands with an altitude of about 4,000 meters, in Ganzi Tibetan Autonomous Prefecture, Sichuan province.

After the full capacity is connected to the grid, the annual power generation will reach 1.268 billion kWh, saving about 390,000 tons of standard coal and reducing carbon dioxide emissions by about 1.07 million tons per year.

A multiple of innovative technologies, in terms of photovoltaic modules, inverters and energy storage devices, are applied and demonstrated in this project. Digital systems are applied to the construction and operation of the project.

Ecological protection is given equal importance. The project developers have created a system integrating the functions of power generation, water collection, water storage, irrigation and planting, at the same time planting high-quality grass suitable for high-altitude environment, so as to achieve a win-win result between ecological protection and project development.



The world's first ultrahigh altitude photovoltaic project is located on the grasslands with an altitude of about 4,000 meters, in Ganzi Tibetan Autonomous Prefecture, Sichuan province. (PHOTO: China State Power Investment Corporation)

## Ready for Launch



The combination of China's space station lab module Mengtian and its carrier rocket Long March-5B Y4 has been transported to the launch area, according to the China Manned Space Agency. The lab module will be sent into orbit at an appropriate time in the near future. (PHOTO: XINHUA)

## Editor's Pick

## Chasing the Sun: China's Solar Exploration Marks New Milestone

By LIN Yuchen

China's space exploration has reaped significant rewards over the past decade, furthering the country's scientific endeavors to unravel mysteries beyond the Earth.

In June, 2012, the Shenzhou-9 docked with China's first space lab Tian-gong-1, marking the country's first crewed spacecraft rendezvous and manual docking.

The Chang'e-3, launched in December, 2013, achieved China's first soft-landing and roving exploration on the Moon. Its successor Chang'e-4 achieved humanity's first soft landing on the far side of the Moon in 2019.

While the sun remains the only star accessible for our close investigation, China did not launch a solar observatory until recent times.

### Toward the Sun

The Chinese people's pursuit of the

secrets of the sun has been reflected in ancient mythologies, in which the two figures Xihe and Kuafu are the most famous.

In October, 2021, the Chinese H-alpha Solar Explorer, dubbed Xihe, was launched in China, marking the country's first solar observatory satellite sent into space.

Then the Advanced Space-based Solar Observatory (ASO-S), nicknamed Kuafu-1 after a mythological giant who relentlessly chases the sun, lifted off in northwest China on October 9, 2022.

Both satellites revolve around the 25th 11-year solar cycle, which would last from the latter half of 2020 to about 2031, with an expected peak in 2024 to 2025, similar to its last peak on Halloween in 2003, to obtain valuable data through more frequent solar eruptions.

They are representing the beginning of the vision of achieving the three-dimensional detection of the sun's global

and solar-terrestrial space by 2035, a proposal put forward by Chinese scientists at the Xiangshan Science Conference held in October, 2021.

"The solar three-dimensional exploration would be a systematic project which integrates space science and technology, and space applications," said Yang Mengfei, academician at Chinese Academy of Sciences (CAS), adding that this will drive the development of other related disciplines such as solar physics research and space weather forecasting applications, enhancing human research on solar eruptions that cripple global communication and positioning.

### Exploration objectives

Xihe, which serves as a scientific experimental satellite for constructing high precision and stability satellite platforms, could help formulate the Chinese strategies in tackling future negative impacts caused by the Sun.

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## Pan-genome Dataset Advances Silkworm Research

By LIN Yuchen

Chinese scientists have recently constructed the world's first silkworm pan-genome dataset and digital gene bank, which may invigorate global silkworm research and improve silkworm breeding, according to Southwest University.

With the dataset, silk yields could be improved and finer silk could be produced through more effective artificial selections. Scientists can now more conveniently determine which specific character genes of silkworms contribute economically, such as disease resistance and excellent feeding performance, and then design breeding blueprints accordingly,

according to the university.

"Studying a specific character gene used to take three to five years," said Tong Xiaoling, professor and leading researcher of the silkworm pan-genome dataset at Southwest University, adding that with the dataset, the time-span of character gene studies could be shortened to only a few months or even days.

Taking four years to complete, the pan-genome research re-sequenced 1,078 silkworms deeply, covering almost the entire genomic content in the species. Its results have been published in *Nature Communications* in September, bringing about the largest third-generation pan-genome dataset in the global realms of

plants and animals.

The construction of the silkworm pan-genome signifies a breakthrough in silkworm breeding by opening a new era of silkworm molecular breeding, said Xiang Zhonghui, academician at the Chinese Academy of Engineering, adding that this is the biggest achievement in silkworm research over the past century, digitizing silkworm research through the advent of sci-tech-backed silk industry.

There is now further evidence that the origins of silkworms date back to the middle or lower reaches of the Yellow River over 5,000 years ago, converting from wild silkworm, according to the research.

## Technology Provides Easier Access to Legal Services

By WANG Xiaoxia

Over the past decade, people's courts have utilized information technologies to facilitate the construction of smart courts, so as to satisfy the diversified judicial needs of the public, according to the Supreme People's Court of China (SPC).

To provide a round-the-clock service, the SPC has launched an online service platform that covers more than 3500 people's courts at four levels nationwide. With a smart phone, litigants can log in the Wechat mini-program called "People's Courts Online Services" to apply for case filing, online mediation and other judicial activities with detailed guidance provided.

By September 2022, the platform had more than 13 million real-name registrants, received more than 21 million online filing applications, and delivered more than 54 million documents online, according to the SPC.

With the online service, litigants only need to make at most two trips to the court to complete a lawsuit, down from about six in the past, said the SPC. Besides, e-courts create a more accessible judicial system for individuals in rural areas who would otherwise travel for hours or days.

Case information is digitalized once it is filed, and with application of big data, cloud computing, artificial intelligence and blockchain, the information systems of smart courts realize data interconnection and support coordination.

For judges and clerks, intelligent tools, such as automatic filling of information and automatic transcription of trial, have reduced the administrative work by more than 30 percent and increased trial efficiency by more than 20 percent.

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## WEEKLY REVIEW

### Chang'e-5 Reveals How Moon Volcanism Takes Place

Through the samples collected by Chang'e-5, researchers from the Chinese Academy of Sciences produced a new model explaining how young lunar volcanism is generated. The study, published in *Science Advances* on October 22, could help planetary scientists better understand the moon's thermal and magmatic evolution.

### Environmental-friendly Oil Tanker Unveils

The 300,000-ton oil tanker New Aden, equipped with the second-generation canvas control system, is delivered recently and estimated to reduce oil consumption by about 9.8 percent for one ocean route. The canvas system was developed by Chinese researchers and marks a milestone in the development of environmental-friendly oil tanker.

### New-gen Artificial Sun Makes Breakthrough

China National Nuclear Corporation announces on October 19 that China's new-generation artificial sun has set a new record domestically with plasma current exceeding one million amperes. The breakthrough marks an important step towards fusion ignition in China's nuclear fusion research and development.

### Test of Vacuum Liquid Oxygen-methane Rocket Engine Completes

The test of China's largest-thrust vacuum liquid oxygen-methane engine has been met with success, according to the Chinese private rocket company LandSpace on October 20. The engine will be used as the second-stage main engine for the second batch of the company's ZQ-2 rocket, which can carry a payload of at least 6 tons to low-Earth orbit.

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