

CSET: China and US Lead in Scientific Research Publications Output

The Center for Security and Emerging Technology (CSET) recently released a report titled "Comparing the United States' and China's Leading Roles in the Landscape of Science", which makes a comparative analysis on the output of scientific research publications between China and the US, concluding that China and the US are leading the research publications output around the world.

China leads in hard science and the US in medicine and soft science

The report reveals that China leads research publications output in STEM (science, technology, engineering and mathematics) fields, whereas the US leads in medicine and social science. The two research regions that have the highest Chinese publication concentrations (30 percent and 25 percent) fall under materials science (mainly chemical engineering, composite materials, and inorganic chemistry) and computer science (represented by computer vision, pattern recognition and algorithms), respectively.

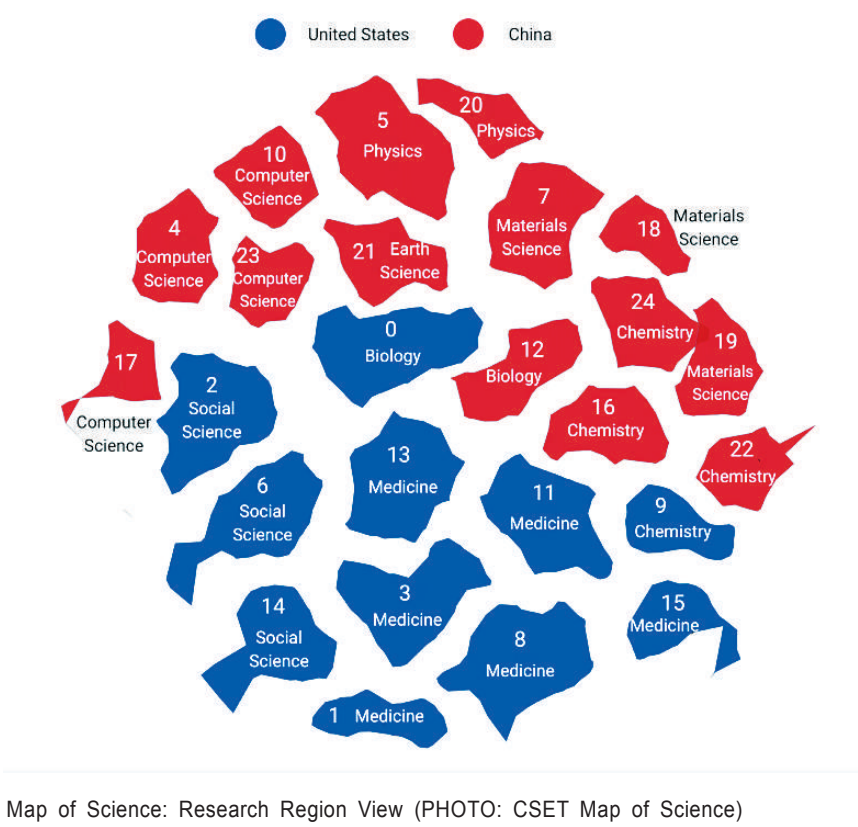
US publication concentrations range from 17 percent to 32 percent,

search publications into 126,915 research clusters (RCs), which are aggregated into 25 research regions according to citation links. The only two countries that lead at the research region level are China and the US, with China leading in 14 of the regions, and the US in 11.

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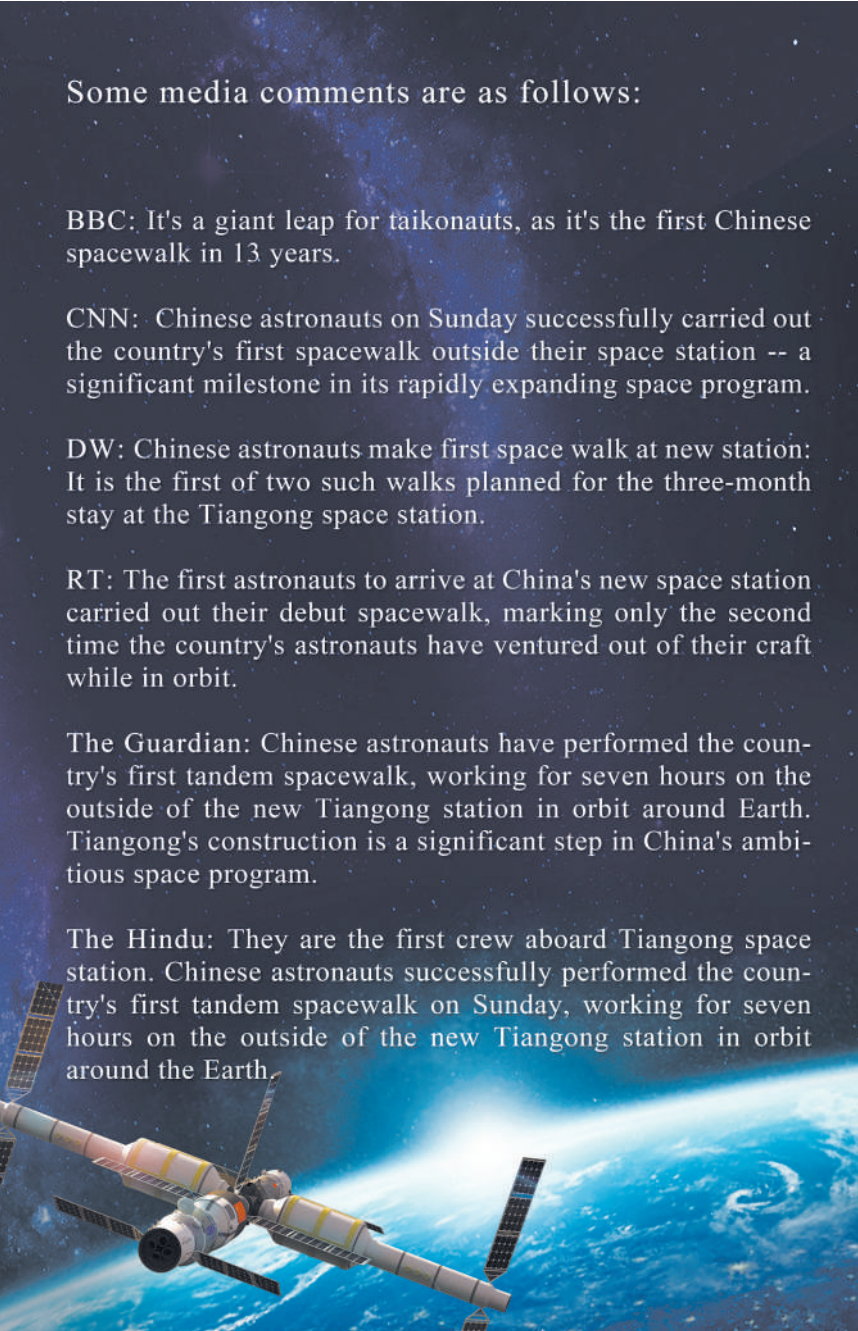


Comment

Shenzhou 12 Taikonauts' Space Walk Shows Full of Success

By Staff Reporters

Shenzhou 12 taikonauts carried out the first extravehicular activity on Ju-



ly 4. It was the first time taikonauts had made a space walk in this mission, which caused many repercussions in the international media world.

Some media comments are as follows:

BBC: It's a giant leap for taikonauts, as it's the first Chinese spacewalk in 13 years.

CNN: Chinese astronauts on Sunday successfully carried out the country's first spacewalk outside their space station -- a significant milestone in its rapidly expanding space program.

DW: Chinese astronauts make first space walk at new station: It is the first of two such walks planned for the three-month stay at the Tiangong space station.

RT: The first astronauts to arrive at China's new space station carried out their debut spacewalk, marking only the second time the country's astronauts have ventured out of their craft while in orbit.

The Guardian: Chinese astronauts have performed the country's first tandem spacewalk, working for seven hours on the outside of the new Tiangong station in orbit around Earth. Tiangong's construction is a significant step in China's ambitious space program.

The Hindu: They are the first crew aboard Tiangong space station. Chinese astronauts successfully performed the country's first tandem spacewalk on Sunday, working for seven hours on the outside of the new Tiangong station in orbit around the Earth.

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The declaration also calls on BRICS countries to share the experience and achievements of traditional medicine development, which can make traditional medicine better protect the health of local people.

At the symposium, Huang Luqi, academican of the Chinese Academy of Engineering and director of the China Academy of Chinese Medical Sciences, and Zhang Zhongde, vice president of Guangzhou University of Chinese Medicine, introduced how TCM was used in fighting against COVID19. They focused on how to deal with the "Delta" and "Delta + " variants of COVID19 with TCM. Traditional medicine experts from India, South Africa, Brazil, and Russia also conducted academic discussions and exchanges on the experience

Near Zero Energy Consumption Enters Smart Farm Houses

By HUA Ling and YU Haoyuan

Is there a building in the world that does not need air-conditioning during a hot summer or heating in cold winter, to keep its interior at a comfortable temperature? But can a building adjust to these changes on its own? Pushing open the door to the entrance of Banbian Village, Weishanzhuang Town, Daxing District, Beijing, the "Ling (Chinese for Zero) House" with its nearly 400-square-meter beautiful courtyard, is such an intuitive building.

According to *China's National Technical Standard for Nearly Zero Energy Building*, the Ling House was renovated based on a traditional farmhouse in 2019. It is the first Nearly Zero Energy Building (NZEB) that obtained an assessment logo in China, and won the Silver Award in the 2020 World Architecture News (WAN) Award for Sustainable Architecture.

Energy saving is the purpose of building NZEB

In recent years, against the background of the current global energy crisis and low-carbon emission reduction targets, countries worldwide have begun to find ways to carry out energy conservation and emission reduction initiatives, and the concept of NZEB arose spontaneously.

According to Zhang Shicong, a researcher at the Chinese Academy of Building Research, buildings account for about 30 percent of the world's total electricity consumption. With the aim of effectively reducing building energy consumption, developed countries have begun to research ways to improve building energy efficiency, and the development of NZEB has been significantly promoted.

Zhang said the term NZEB came

from the EU, which issued the Energy Performance of Building Directive (EPBD) in 2002, and updated it in 2010, proposing that Europe should enhance building standards and make NZEBs compulsory.

As a result of the economic imbalance of EU member states and the large span of climate zones, the EPBD defines NZEB as a building with "very high energy efficiency". Based on the actual situation of various countries and on the premise of fully considering the cost-benefit ratio of energy-saving technology, no unified and clear quantitative energy-saving target exists yet.

However, China defined NZEB with mandatory index requirements. In common circumstances, compared with previous standards implemented in 2016, the energy efficiency of NZEB is improved by 60-75 percent.

At present, NZEBs in China refer to the buildings that minimize heating, air conditioning, and lighting needs by passive building design and maximize energy equipment and system efficiency by innovative technical measures, providing a comfortable indoor environment by making the most of renewable energy sources and minimum energy consumption, and whose indoors environmental parameters and energy efficiency indicators comply with standard provisions.

Save energy actively: make full use of solar energy

Looking around Ling House from the outside, there is a red brick and tile-roof local style building under the shade of green trees. The interior is designed with bright and clean lines, featuring large windows and a well-arranged layout.

"The roof cover is composed of 14 colored photovoltaic film panels, with



China's first NZEB--Ling House won the Silver Award in the 2020 WAN Award for Sustainable Architecture. (PHOTO: Provided by REN Jun)

Fendouzhe: World-leading Deep-sea Manned Submersible

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Nearly 1,000 scientific researchers from 20 scientific research institutes, 13 universities, and more than 60 companies, including the CSSRC, the Institute of Deep-sea Science and Engineering of Chinese Academy of Sciences (CAS), have taken part in the research and development of Fendouzhe.

The manned cabin is the core component of the full-ocean-depth manned submersible. It not only provides a hardware guarantee and safety shield for humans to enter the 10,000-meter deep sea, but also marks the technical level of a country's manned submersible. Yang Rui, researcher at the Institute of Metal Research, CAS and the

person in charge of the manned cabin project, said that it is the largest pressure vessel in the entire submersible. Made with special materials, the manned cabin is directly related to whether the entire submersible can work successfully.

Under the extreme pressure conditions of 10,000-meter deep sea, the materials used in previous submersibles could not meet the requirements of Fendouzhe, in relation to target size and thickness. Independent innovation in technology was the last resort. "Our original new titanium alloy material has successfully solved problems regarding the strength, toughness and weldability encountered by the manned cabin in materials, and we finally manufactured a spacious and strong manned cabin made of new titanium alloy materials," said Yang.

The reporter learned that the continuous and repeated 10,000-meter-level sea trials of Fendouzhe have verified the stability of the overall performance and system reliability of the submersible, which meets the safety regulations of large-depth manned submersibles. Meanwhile, domestic watertight connectors were offered an opportunity to test at 10,000 meters as a key equipment, and technologies like domestic manned submersibles were adopted in the trials, proving the capability and practical value of the manned

submersible and laying the foundation for the following operations and maintenance applications.

At present, China has three deep-sea manned submersibles, as well as a series of unmanned submersibles such as Hailong. The country has established a preliminary full-depth deep submersible system, and has continuously achieved breakthroughs and major innovations in the development of deep-sea equipment technology.

In Ye Cong's view, China's self-developed 10,000-meter-deep manned submersible will help Chinese scientists explore freely in the deepest part of the world's oceans and realize their scientific dreams in the near future.