

World's 1st Standard for AI-enabled BCI Released

Policy Express

By TANG Zhexiao

China's National Medical Products Administration (NMPA) has issued the country's third medical device standard for brain-computer interfaces (BCI).

It is the world's first product standard for BCI medical devices that adopts artificial intelligence to process electroencephalogram (EEG) data. The new standard will take effect on September 1, 2027.

The new standard regulates the technical requirements and testing methods across the entire process of data collection, processing, annotation, storage and access for BCI medical devices.

It applies to datasets used in the R&D, manufacturing and quality control of BCI medical devices in which AI algorithms are employed for the post-processing of EEG signals.

According to NMPA, a BCI medical device acts like an intelligent machine that can "read" brain signals. It needs to learn massive EEG data and train AI al-



A patient undergoes brain-computer interface rehabilitation training at Guizhou branch hospital of Beijing Jishuitan Hospital in Guiyang, southwest China's Guizhou province. (PHOTO: XINHUA)

gorithms to accurately interpret patients' intentions. This bears heavily on treatment outcomes and patient safety risks.

Li Shu, drafter of the standard and

deputy director of the medical device institute of the National Institutes for Food and Drug Control, explained that prior to the release of the new standard, research institutions and enterprises

used varying methods for EEG data collection. Some adopted 64 channels while others used 128 channels; sampling frequencies varied from 2 Hz to 1000 Hz, and annotation practices differed. Data collected in such ways resembled documents written in different "dialects," making cross-party comparison and reuse difficult.

The new standard provides a unified quality benchmark for EEG datasets used in R&D and manufacturing of BCI medical devices, reaching an internationally leading level.

In March, the BCI was incorporated into the 2026 Government Work Report and was listed as a key future industry in the 15th Five-Year Plan (2026-2030).

In August, the Ministry of Industry and Information Technology released the draft guidelines for the development of the national BCI industrial standard system. It targets the formulation and revision of over 40 BCI standards by 2028, as well as participation in developing more than 10 international standards.



Roadmap Unveiled to Promote E-information Manufacturing

By TANG Zhexiao

China has unveiled a comprehensive roadmap to upgrade its electronic information manufacturing sector, aiming for the operating revenue of enterprises above designated size to surpass 30 trillion RMB by 2030.

Jointly issued by the Ministry of Industry and Information Technology and the National Development and Reform Commission, the plan also targets the sector's research and development intensity to reach 3.5 percent.

Computing power supply capacity is set to grow substantially, while the uptake of new-generation intelligent terminals is expected to rise significantly.

By 2030, the plan envisions the emergence of a batch of technologies and products in integrated circuits (IC), advanced computing, consumer

electronics, basic electronics and energy electronics. It also targets coordinated progress in hardware, software, standards and patents, improved regional layout and international cooperation, and higher levels of intelligent, green and integrated development.

Seventeen key tasks have been outlined across four dimensions: foundation building, quality upgrading, nurturing new growth drivers, and governance.

Chips, components and smart sensors

The plan urges full-chain breakthroughs in the IC sector, calling for the development of high-end chips including high-performance processors, high-density memory, and high-reliability analog and mixed-signal chips.

It also promotes high-end development of electronic components and materials, accelerating the development

of mature, reliable and widely applicable "off-the-shelf" foundational industrial products — standardized products ready for direct use — to serve key sectors such as artificial intelligence, new-generation information and communications, aerospace, and new-generation intelligent terminals.

Manufacturing capabilities for intelligent sensors such as micro-electromechanical systems will be enhanced, with faster integration of smart sensors into key industries and application scenarios.

During the 2026-2030 period, China will pursue technological breakthroughs in the core segments of the photonics industry, build common-process platforms for micro-nano fabrication and optoelectronic integrated packaging, and strengthen R&D of photonic functional and process materials.

Intelligent terminals & advanced computing

The plan calls for sustained promotion and upgrading of AI smartphones, personal computers, smart glasses, audio-visual terminals, in-vehicle terminals, industrial terminals and commercial terminals, while accelerating deep integration of AI agents with such terminal products.

To build an advanced computing ecosystem, breakthroughs will be accelerated in computing architecture, data storage, high-speed interconnection,

software-hardware synergy and computing-energy synergy.

The layout of new computing paradigms including quantum computing, optical computing, neuromorphic computing and space computing will be advanced.

New growth points

To cultivate new growth drivers, the spatiotemporal information industry will be fostered and the AI hardware foundation consolidated.

This involves integrating the BeiDou Navigation Satellite System, satellite Internet, and space remote sensing to connect the full industry chain from chips to services. Additionally, the development of cloud training equipment and inference devices/chips for embodied AI and autonomous driving will be accelerated.

The plan emphasizes deep integration of electronic technologies with real-world demands including smart cities, smart agriculture, intelligent driving, smart healthcare, the low-altitude economy, commercial spaceflight, and deep-sea and polar exploration.

In addition, China will build a new pattern of open international cooperation in electronic information, participate in international standardization activities, and promote more Chinese standards going global.



Global Journal Observatory

Fundamental Research

Building High Ground for Basic Research Exchange

By GONG Qihuang

According to the 2025 Journal Citation Reports (JCR) released by Clarivate in June, *Fundamental Research*, sponsored by the National Natural Science Foundation of China (NSFC), boasts an impact factor of 7.0, ranking in the top 13.6 percent of global multidisciplinary journals and securing a place in the SCI Q1 category.

Launched in 2021, the journal is currently indexed by over 10 authoritative databases, including ESCI, Scopus, PubMed and CSCD, evolving into a mature international venue for interdisciplinary exchange.

Breaking down disciplinary barriers of single-field journals

Currently, most domestic journals are discipline-specific and struggle to accommodate interdisciplinary integration and collaborative efforts to tackle key research challenges.

NSFC funds many high-impact interdisciplinary basic research findings. Lacking suitable domestic publishing venues, China's vast original research results have long been published in overseas journals. As a result, the initial dissemination and academic influence of these achievements accumulate within international publishing systems, thereby constraining the academic discourse power of domestic publishing platforms.

Fundamental Research serves global researchers across nine fields: mathematics and physics, chemistry, life sciences, Earth sciences, engineering and materials, information science, management, medicine, and interdisciplinary sciences. It fosters cross-field exchange, generates original interdisciplinary results, and advances the "dual return" of funded research, bringing both high-quality publications and academic influence back to domestic platforms.

Weaving an interdisciplinary academic network

Future scientific breakthroughs will largely emerge at disciplinary intersections. Challenges including carbon neutrality, frontier information technology and life-health issues cannot be addressed by single-discipline research alone. *Fundamental Research* therefore prioritizes frontier interdisciplinary topics.

Instead of chasing hot topics or fixed themes, the journal plans around national strategic demands and global research gaps, and uses customized special topics to break down disciplinary barriers.

To date, it has launched over 40 frontier topics spanning quantum information, electronic materials, RNA diagnostics and therapeutics and smart transportation.

The Special Topic on Advanced Terahertz Sciences and Technologies published in 2025 exemplifies this approach. Terahertz research encompasses physics, electronic information, biomedicine and materials engineering, yet it has long been plagued by fragmentation



Front cover of *Fundamental Research*, Volume 6, Issue 5. (COURTESY PHOTO)

and application gaps that single-discipline journals are unable to bridge.

The journal pioneered this special topic, inviting academics from leading institutions, such as the Nanyang Technological University and the University of Shanghai for Science and Technology, and assembling landmark global findings. With coverage ranging from detection and communication security to intelligent devices and biosensing, it has built a comprehensive chain from basic mechanisms and device innovation to industrial application. Seven of its articles have received over 200 citations.

A diverse editorial board and a credible peer review system

The journal emphasizes the quality and balance of its academic lineup, assembling a global editorial and youth editorial board of over 540 leading scholars. Its review process is guided solely by scientific innovation, setting aside nationality, affiliation, title and seniority.

With over 7,000 experts worldwide evaluating submissions under unified, rigorous international standards, it has established a fair, globally trusted platform that fosters research collaboration.

Cultivating a borderless research community

The ultimate value of a top-tier journal does not lie in article volume, but in its ability to foster a sustainable global academic ecosystem.

Fundamental Research hosts interdisciplinary forums for researchers worldwide and adopts a diamond open-access model with no article-processing charges, serving as a key window for China's basic research and an inclusive global academic platform.

In the 15th Five-Year Plan's opening year, we will deepen collaboration in quantum technology, green transition, and biological interdisciplinary research to address humanity's shared scientific challenges.

The author is editor-in-chief of Fundamental Research, an academican of the Chinese Academy of Sciences, and a Boya Distinguished Professor at Peking University.

Journal Review

For a long time, China's high-quality research results flowed overseas, while high-end domestic multidisciplinary international journals were scarce, constraining the country's independence in fundamental research innovation and the enhancement of its academic discourse power.

As a multidisciplinary journal, *Fundamental Research* promotes innovation by planning frontier topics, ensures academic integrity by employing international editorial boards, and enables global academic sharing by adopting a public-interest diamond

open access model, which addresses the shortcomings in the development of the industry precisely.

Looking ahead, the journal should keep abreast of advances at the frontier of disciplinary development, pursue progressive innovation, and further explore strategic frontier areas. It should advance global research and innovation cooperation, and facilitate independent dissemination of China's basic research outcomes.

— Yang Wei, academican of the Chinese Academy of Sciences and professor at Zhejiang University

China-Mongolia Joint Lab a Model for Cross-border Mining Innovation

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It has also signed partnership agreements with five leading mining universities, including the Mongolian University of Science and Technology and Northeastern University, and built collaborative ties with the Mongolian Mineral Processing Association, the National Academy of Sciences of Belarus, and the China Certification & Inspection Group Mongolia.

Bian Zhiwei, a senior official at the joint lab, said the two sides hold regular dialogue, multi-sector technical collaboration and in-depth talent exchanges, giving momentum to bilateral cooperation.

Tangible results on the ground

Mongolia, endowed with more than 80 types of minerals across over 8,000 deposits, is listed by the International Monetary Fund among 29 resource-rich

developing countries. Yet much of its mining remains rudimentary. The operations are mostly small- and medium-scale, using outdated methods, with a below 60 percent resource utilization rate, low recovery rates at processing plants, and lagging environmental safeguards.

Targeting these pain points, the joint lab has developed a suite of solutions, including a beneficiation process for the Asgat mine in northwest Mongolia, a major undeveloped silver and multi-element ore resource, and a key technology for synergistic smelting and multi-metal cascading recovery from complex lead-zinc materials.

Liu Yongmao, deputy director of the Mining and Metallurgy Institute at IMAST, said these achievements have addressed the industry-wide challenge of low recovery rate for complex

polymetallic ores and heavy environmental pollution.

To tackle the absence of testing standards and the resulting blind extraction practices, the lab has co-established a joint inspection center with the China Certification & Inspection Group Mongolia. Six technical standards have already been adopted in Mongolia, with another 10 under development.

The lab has received four provincial, ministerial and national industry science and technology awards, and has secured key autonomous-region-level international cooperation projects, including research on beneficiation and efficient extraction of Mongolia's low-grade complex lithium-bearing ores.

Looking ahead

Qu Jingkui, director of the joint lab, said both sides will continue regular academic exchanges and joint research to

tackle key technical challenges, driving further breakthroughs in green beneficiation and smelting technologies.

The lab will focus on cross-border collaborative innovation, mineral resource security, green and low-carbon transformation, efficient results conversion, and diplomatic engagement, according to Yu Wei, president of the IMAST.

Yu said both sides will deepen practical cooperation in green mineral resource development, beneficiation and smelting technology, and talent cultivation, and continue to produce high-level research.

That will drive the demonstration and application of advanced technologies in Mongolian mining enterprises and build the lab into an internationally influential hub for mining science and technology cooperation.