NO. 174 • April 2021

CASNewsletter

中國科學院
CHINESE ACADEMY OF SCIENCES

SCIENCE OUT OF THE EARTH

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Edited by Bureau of International Co-operation, Chinese Academy of Sciences

CAS Newsletter – Monthly – Editorial Board: 52, Sanlihe Road, Beijing, 100864, China

Image: China National Space Administration

China releases new images of Mars from Tianwen-1 probe

The China National Space Administration (CNSA) on March 26 released two new images of Mars captured by the country's Tianwen-1 probe.

In the images, Mars is crescent-shaped with a clear surface texture.

When the Tianwen-1 probe was 11,000 km away from Mars on the far side of the planet to the sun, it took panoramic photos with an onboard medium-resolution camera.

The Tianwen-1 probe has been operating in a parking orbit around Mars for a month. The high-resolution camera, medium-resolution camera, mineral spectrometer and other payloads onboard were switched on successively to carry out exploration of Mars and obtain scientific data, according to the CNSA.

Source: Xinhua


AN OPEN
FAST
GLOBAL,
POWERFUL,
SENSITIVE

China's FAST telescope officially opens to global astronomers

China's Five-hundred-meter Aperture Spherical radio Telescope (FAST), the world's largest single-dish and most sensitive radio telescope, officially opened to global researchers on March 31.

According to a statement from the National Astronomical Observatories under the Chinese Academy of Sciences, astronomers worldwide can visit http://fast.bao.ac.cn/proposal_submit to submit their applications for observations.

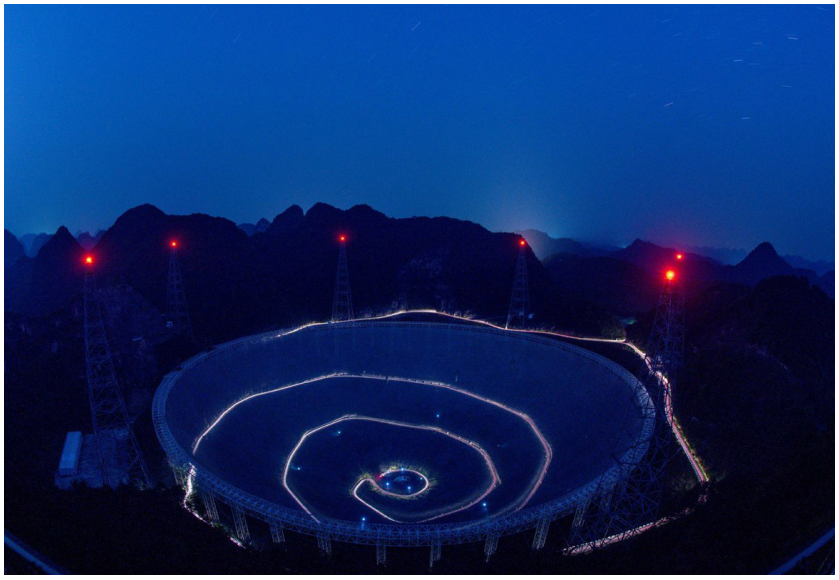
All foreign applications will be evaluated, and the selected proposals will be announced on July 20. Observations by international users will begin in August.

The statement noted that FAST will provide its research facilities to the world with a more open attitude, offering more observation options for the international astronomical community.

The project will contribute Chinese wisdom to the construction of a shared future for humanity, and strive to promote international sci-tech development and the progress of human civilization, said the statement.

Since it started operations, FAST has provided stable and reliable services. It has found 300 pulsars and made breakthroughs in fields like fast radio bursts, a type of powerful radio wave in deep space.

Source: Xinhua



A night view of China's FAST on March 30, 2021 [IMAGE: XINHUA]

A bird's-eye view of China's FAST on March 28, 2021 [IMAGE: XINHUA]

China's FAST Telescope identifies more than 300 pulsars

China's Five-hundred-meter Aperture Spherical radio Telescope (FAST), which is currently undergoing maintenance, has identified more than 300 pulsars so far. Located in a deep and round natural karst depression in Southwest China's Guizhou Province, it officially began operating on January 11, 2020. *Source: Xinhua*

Staff carry out regular maintenance operation on FAST in Guizhou

Starting formal operations in January 11, 2020, the Five-hundred-meter Aperture Spherical radio Telescope (FAST) in Pingtang County, Southwest China's Guizhou Province, is believed to be the largest and most sensitive radio telescope in the world, which has a huge potential for verifying and exploring the mysteries of the universe.

Source: Xinhua

Photo taken with a fisheye lens on March 28, 2021 shows a staff member entering the feed cabin during a regular maintenance operation on FAST. [IMAGE: XINHUA/OU DONGQU]

Staff members work on the feed cabin during a regular maintenance operation on FAST. [IMAGE: XINHUA/OU DONGQU]

A staff member checks reflector panels during a regular maintenance operation on FAST. [IMAGE: XINHUA/OU DONGQU]

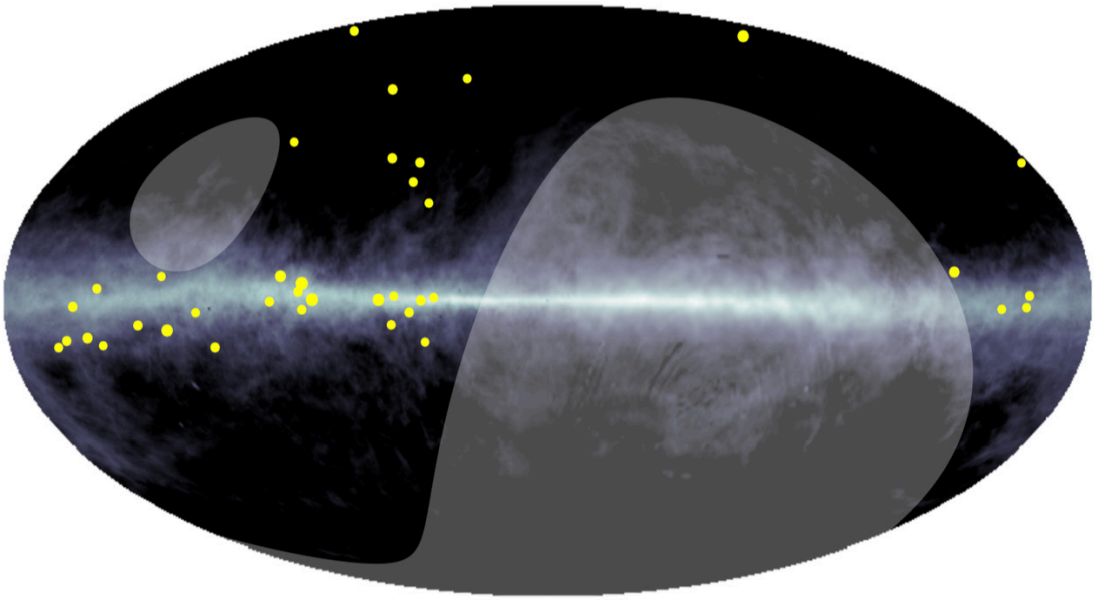


Fig. 1. Distribution of the ultra-high-energy gamma rays (yellow points) detected by the Tibet ASγ experiment in the galactic coordinate system. They are obviously concentrated along the galactic disk. The gray shaded area indicates what is outside of the field of view. The background color shows atomic hydrogen distribution in the galactic coordinates
[IMAGE: HTTPS://LAMBDA.GSFC.NASA.GOV/PRODUCT/FOREGROUND/FG_HI4PI_GET.CFM].

Evidence for PeVatrons — the Milky Way's most powerful particle accelerators

The Tibet ASγ experiment, a China-Japan joint research project on cosmic-ray observation, has discovered ultra-high-energy diffuse gamma rays from the Milky Way galaxy. The highest energy detected is estimated to be unprecedentedly high, nearly 1 Peta electronvolts (PeV, or one million billion eV). Surprisingly, these gamma rays do not point back to known high-energy gamma-ray sources, but are spread out across the Milky Way (see Fig. 1). Scientists believe these gamma rays are produced by the nuclear interaction between cosmic rays escaping from the most powerful galactic sources ("PeVatrons") and interstellar gas in the Milky Way galaxy. This observational evidence marks an important milestone in revealing the origin of cosmic rays, which has puzzled mankind for more than a century.

Cosmic rays are high-energy particles from outer space that are mainly composed of protons and nuclei, as well as small numbers of electrons/positrons and gamma rays. Cosmic rays below a few PeV are believed to be produced in our Milky Way galaxy, and a source that can accelerate cosmic rays up to PeV energy is called a PeVatron. Although supernova remnants, star-forming regions and the supermassive black hole at the galactic center are suggested as candidate PeVatrons, none have yet been identified observationally, mainly because the majority of cosmic rays have an electric charge and lose their original direction when propagating in the Milky Way; they are also bent by the magnetic field.

However, cosmic rays can interact with the interstellar medium near their acceleration place and produce gamma rays with roughly 10 percent of the energy of their parent cosmic rays. As the direction of electrically neutral gamma rays cannot be changed by the magnetic field, ultra-high-energy gamma rays (0.1-1 PeV) may tell us where the PeVatrons are in the Milky Way.

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The Tibet ASγ experiment was started in 1990. After several expansions, the current air shower array consists of more than 500 radiation detectors distributed across about 65,000 square meters. In order to improve its sensitivity to gamma rays observations, new water Cherenkov-type muon detectors with a total effective area of 3,400 m^2 were added under the existing surface cosmic-ray detectors in 2014 (see Fig. 2).

Since gamma-rays events are muon-poor and the dominant proton/nucleus events are muon-rich, this feature can be used to suppress the background induced by the proton/nucleus events. Using this technique, the Tibet ASγ experiment successfully reduced proton/nucleus background events to one millionth, the most efficient reduction ever realized in this kind of experiment. We can therefore detect ultra-high-energy gamma rays almost free of cosmic-ray background events.

Scientists from the Tibet ASγ experiment observed gamma rays with energies between about 0.1 and 1 PeV coming from the galactic disk regions. Specifically, they found 23 ultra-high-energy cosmic gamma rays with energies above 398 TeV along the Milky Way. Of these, the highest energy observed was nearly 1 PeV, which is a new world record for gamma ray photons detected anywhere.

Surprisingly, these gamma rays do not point back to the most powerful known high-energy gamma-ray sources, but are spread out along the Milky Way! Scientists soon noticed that these gamma rays probably originated from the interaction of PeV cosmic rays and the interstellar medium after they escaped from the acceleration sources (PeVatrons). This process, known as "hadronic origin," produces gamma rays with energies roughly one-tenth that of their parent cosmic rays via the production and subsequent decay of neutral pions.

Fig. 2. The China-Japan collaboration placed new water Cherenkov-type muon detectors under the existing air-shower array in 2014.
[IMAGE: INSTITUTE OF HIGH ENERGY PHYSICS, CHINESE ACADEMY OF SCIENCES]

These diffuse gamma rays hint at the ubiquitous existence of powerful cosmic particle accelerators (PeVatrons) within the Milky Way. In other words, if PeVatrons exist, the cosmic rays they emit would permeate the galaxy, producing a diffuse glow of gamma rays of extreme energies. That's just what scientists with the Tibet ASγ experiment have found. This has been a long-awaited discovery for decades, and provides unequivocal evidence for the existence of PeVatrons in the past and/or now in our Milky Way galaxy.

Two years ago, scientists of the Tibet ASγ experiment found extremely energetic gamma rays from the Crab Nebula, a pulsar wind nebula in the Milky Way. Those gamma rays were probably produced in a different manner, such as by high energy electrons/positrons in the nebula, a process called "leptonic origin."

Publication details

Author: M. Amenomori et al. (The Tibet AS Collaboration)

Title: First Detection of sub-PeV Diffuse Gamma Rays from the Galactic Disk: Evidence for Ubiquitous Galactic Cosmic Rays beyond PeV Energies

Journal: *Physical Review Letters*

Online URL (Abstract page, not full text):
https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.126.141101

Keywords: Gamma Ray, Cosmic Ray, Astronomy, PeVatron

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Source: Institute of High Energy Physics, Chinese Academy of Sciences

How lipids and water molecules regulate 5-HT receptors revealed

Serotonin, or 5-hydroxytryptamine (5-HT), is a kind of neurotransmitter. 5-HT can regulate multifaceted physiological functions such as mood, cognition, learning, memory, and emotions through 5-HT receptors. 5-HT receptors are a type of G protein-coupled receptor and can be divided into 12 subtypes in humans. As drug targets, they play a vital role in the treatment of schizophrenia, depression, and migraine.

However, the structural and functional mechanisms of 5-HT receptors have been largely unknown.

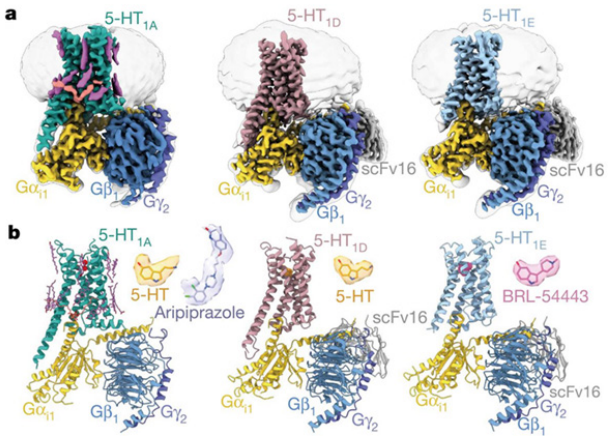
In a study published in *Nature* on March 24, Professor H. Eric Xu and Professor Jiang Yi from the Shanghai Institute of Materia Medica (SIMM) of the Chinese Academy of Sciences, together with Professor Zhang Yan from Zhejiang University, and their collaborators, have clarified the critical role of PtdIns4P and cholesterol in G-protein coupling and ligand recognition, as well as the molecular basis of basal activity and the drug recognition mode of 5-HT receptors, by resolving the cryo-electron microscopy (cryo-EM) structures of five 5-HT receptor-G_i complexes.

These five 5-HT receptor-G_i complexes include three with 5-HT_{1A} structures (one in the apo state, one bound to 5-HT, and one bound to aripiprazole, an antipsychotic drug), one with 5-HT_{1D} bound to 5-HT, and one with 5-HT_{1E} bound to the 5-HT_{1E}- and 5-HT_{1F}-selective agonist BRL-54443.

PtdIns4P is one of the major classes of phosphoinositides. In this study, the researchers first identified PtdIns4P as a major phospholipid at the 5-HT_{1A}-G protein interface, which stabilizes the 5-HT_{1A}-G protein complex.

They found that PtdIns4P is sandwiched between two cholesterol molecules surrounding the 5-HT_{1A} receptor, therefore providing a structural basis for the modulation of 5-HT_{1A} signaling by cholesterol and phospholipids.

Researchers also found several structured water molecules that form hydrogen bonds with the apo receptor within the orthosteric binding pocket. Water molecules mimic the polar functionalities of 5-HT in the active apo-5-HT_{1A}-G_i complex, thus revealing the key role of water molecules in sustaining the basal activity of 5-HT receptors.



Cryo-EM structures of the 5-HT_{1A}-G_i, 5-HT_{1D}-G_i, and 5-HT_{1E}-G_i complexes [IMAGE: H. ERIC XU'S GROUP]

In addition, the researchers revealed the basis of ligand selectivity and drug recognition in 5-HT receptors. They identified residue at position 6×55 as a key determinant for the BRL-54443 and 5-CT selectivity of 5-HT receptors.

An outward shift of the extracellular end of TM7 in 5-HT_{1A} stabilizes the quinolinone group of aripiprazole, resulting in 5-HT_{1A}'s high selectivity for aripiprazole.

A cholesterol molecule was further found to be involved in the stabilization of the aripiprazole pocket and to cause aripiprazole to have a higher binding affinity for 5-HT_{1A}.

The observations in this study have wide implications for a mechanistic understanding of 5-HT signaling and for drug discovery targeting the 5-HT receptor family.

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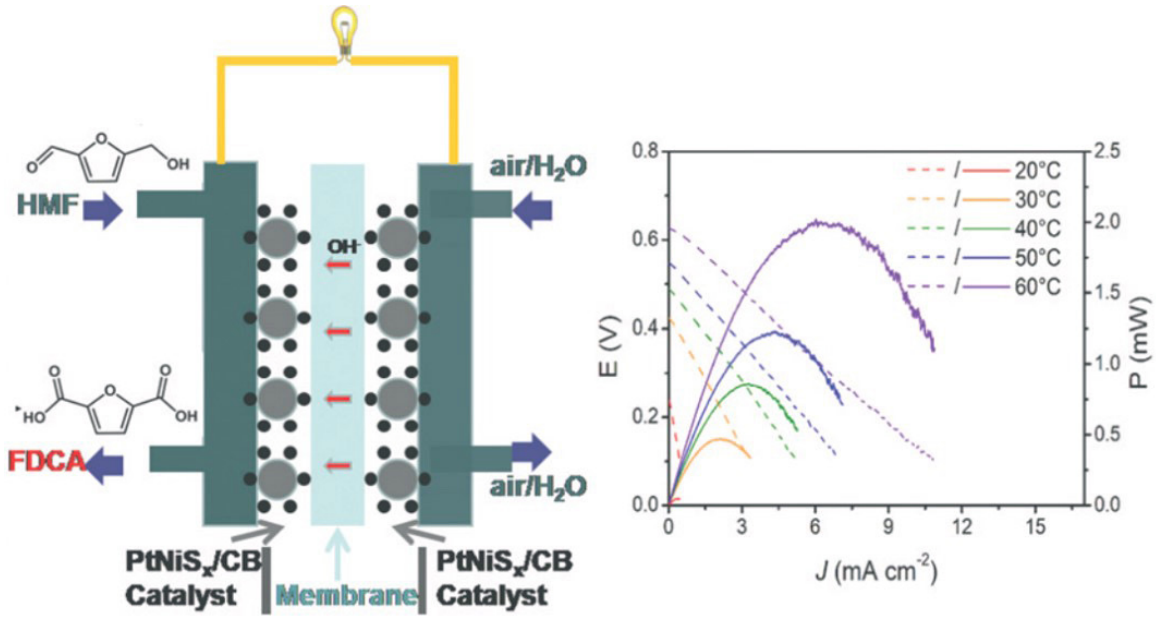
Shanghai Institute of Materia Medica,
Chinese Academy of Sciences

Source: Shanghai Institute of Materia Medica, Chinese Academy of Sciences



A direct 5-hydroxymethylfurfural (HMF) oxidation fuel cell based on a bifunctional PtNiSx/CB catalyst not only transformed chemical energy into electric energy but also converted HMF into value-added 2,5-furandicarboxylic. [IMAGE: ZHANG XIAN AND WANG JIALU]

New fuel cell catalyst lays a solid base for future development

2,5-Furandicarboxylic acid (FDCA) has received increasing attention as a near-market platform chemical that can potentially replace terephthalic acid in the production of commercial and high-performance polymers.

Currently, FDCA is mainly obtained from oxidation of 5-hydroxymethylfurfural (HMF). However, these strategies, including thermochemical and electrochemical oxidation, are all processes of energy consumption, so how to design and develop a more sustainable conversion process of HMF to FDCA is worth investigating in depth.

Researchers at the Institute of Solid State Physics, Hefei Institutes of Physical Science, Chinese Academy of Sciences, developed a new type of direct 5-hydroxymethylfurfural (HMF) fuel cell using bifunctional nanocatalyst — PtNiSx composite material — with an interface between platinum and nickel sulfide supported on carbon black.

This material is both the cathode and anode catalysts of the cell. Its ORR catalytic activity is enhanced by the close interaction and interface effect between Pt and NiSx nanoparticles.

"The catalyst demonstrates oxidization of HMF to the prospective platform chemical FDCA, efficiently and selectively, with a low over-potential," said Wang Jialu, member of the team, "which is enough to drive the oxygen reduction reaction (ORR) to build the fuel cell."

When they assembled the catalyst into an HMF-driven fuel cell, the discharge efficiency was as high as 2.12 mW cm^{-2} at a current density of 6.8 mA cm^{-2} and a temperature of 60°C.

"HMF is efficiently converted into FDCA with high selectivity." said Wang excitedly. "With this strategy, HMF can be continuously converted to value-added product FDCA at the anode, and simultaneously drive ORR in the cathode."

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Source: Hefei Institutes of Physical Science, Chinese Academy of Sciences

Peeping the Milky Way's merging history: reconstructing the Cetus stream

Around the Milky Way, there are many river-like structures made up of stars. They are called stellar streams. How these stellar streams formed remains unclear.

Researchers led by Professor Zhao Gang and Dr. Chang Jiang from the National Astronomical Observatories (NAOC) of the Chinese Academy of Sciences reproduced the formation process of the newly discovered Cetus stream using a computer.

The study was recently published in *The Astrophysical Journal*.

"Stellar streams are the remnants of dwarf satellite galaxies that were swallowed by the Milky Way, but have not been fully digested," said Dr. Chang, the study's first author. "During the accretion process, the Milky Way does not swallow a dwarf galaxy in one bite, instead peeling the dwarf galaxy layer by layer from outside to inside through tidal stripping. It's just like peeling an onion. The stripped stars distribute in their original orbits, and they form a river-like structure, that is, a stellar stream."

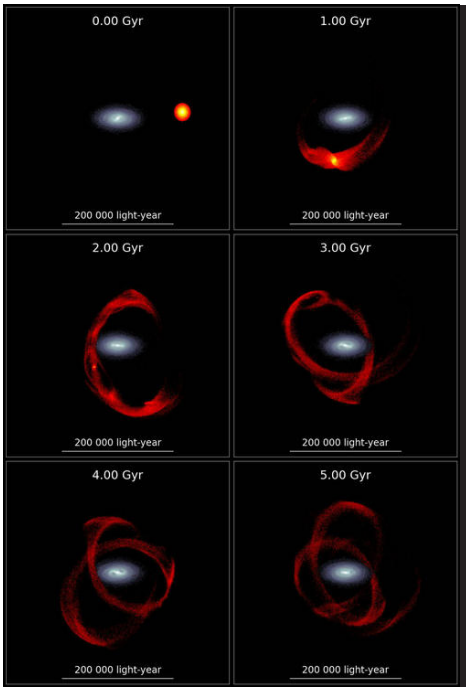
The Milky Way galaxy grows by constantly devouring dwarf satellite galaxies, a process that is called galaxy merging. By studying the Milky Way's history of mergers, we can learn how the Milky Way formed and evolved.

In their previous study, the researchers discovered the Cetus stream based on observational data from the Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST, also known as the Guoshoujing Telescope) Survey and the Sloan Digital Sky Survey.

Now, they have used a supercomputer to reconstruct the formation history of this stellar stream, relying on a series of high-resolution dynamics numerical simulations. The simulation provided a simple portrait of the Cetus stream progenitor before it was swallowed by the Milky Way.

"Our work shows how the Milky Way slowly peeled apart and swallowed a dwarf galaxy with a mass about 20 million times that of the sun over a period of 5 billion years," said Professor Zhao, the co-corresponding author of the study.

In satellite galaxies, there always remains a core structure composed of relatively dense stars. Some researchers have previously put forward the hypothesis that the globular star cluster NGC 5824 is a core structure associated with the Cetus stream. But during the recent progress achieved, the scientists overturned this hypothesis through detailed numerical simulations.



The simulated process of the Cetus stream progenitor merging with the Milky Way [IMAGE: CHANG JIANG]

"The globular cluster NGC 5824 is not the remnant core structure corresponding to the Cetus stream, because the dynamic feature is not correct," Dr. Chang said. "But we found that there is a strong correlation between the two. NGC 5824 should be a globular cluster in the Cetus stream progenitor galaxy."

Stellar streams are distributed throughout the sky. While LAMOST helped to discover the Cetus stream in the northern sky, the researchers also found a candidate counterpart of the Cetus stream in the southern sky — the Palca stream.

"There are a large number of merging relics in the Milky Way similar to the Cetus stream," said Professor Zhao. "They provide a treasure trove of information for those studying the structure and formation history of the Milky Way and help us to better understand how galaxies in the universe have formed and evolved."

Source: National Astronomical Observatories, Chinese Academy of Sciences

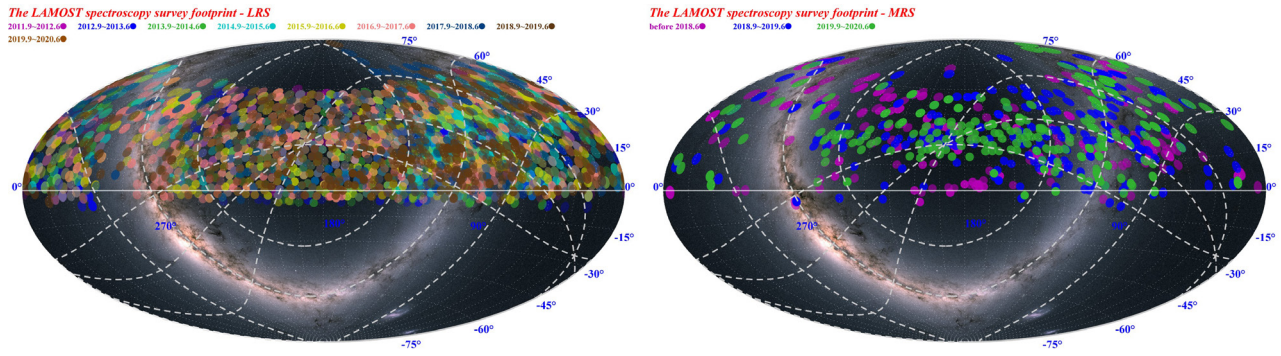


Fig. 1. Left: Footprint of the LAMOST pilot survey and the eight-year regular low-resolution survey; Right: Footprint of the LAMOST medium-resolution commissioning and the first two-year regular medium-resolution survey. [IMAGE: LAMOST TEAM]

LAMOST releases its DR8 data

The LAMOST DR8 dataset, including the spectra obtained from the pilot survey through to the eighth-year regular survey, was officially released to domestic astronomers and international partners on March 31, according to the National Astronomical Observatories of the Chinese Academy of Sciences.

Scientific users can log on the website at http://www.lamost.org/dr8/ to query and download the DR8 data.

The DR8 dataset includes the spectra obtained from both the low- and medium-resolution surveys. A total of 17.23 million spectra have been released, consisting of 11.21 million low-resolution spectra from the observation of 5,207 plates, and 1.47 million non-time-domain and 4.55 million time-domain medium-resolution spectra from 1,089 plates. High-quality spectra, with a signal to noise ratio (S/N) over 10, reached the number of 13.28 million.

Moreover, the stellar spectral parameters of 7.75 million stars were released in DR8, which also include the abundances in the stars of 12 elements, such as carbon, magnesium, and calcium. It is currently the largest stellar spectral parameter catalogue in the world.

Fig. 2. LAMOST and the Milky Way [IMAGE: CHEN YINGWEI]

It is estimated that by 2022, the number of spectra released by LAMOST will exceed 20 million. Such a huge spectroscopic dataset is the result of the LAMOST design concept, which is to conduct large-scale spectroscopic sky survey.

Before LAMOST was built, the number of objects observed by humans had already reached tens of billions, but only one in ten thousand of them had undergone spectroscopic observation. At that time, only a few hundred spectra could be obtained in a single exposure using the largest spectroscopic survey telescope.

To realize a large-scale spectroscopic sky survey, the designers of LAMOST increased the number of fibers to 4,000, which increased the maximum number of fibers equipped on a telescope by an order of magnitude. In 2008, LAMOST carried out its first light observation, opening a new era of large-scale spectroscopic sky surveys.

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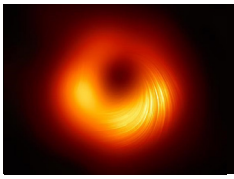
Group picture of the workshop which triggered the imaging of the magnetic fields at the Max-Planck-Institut für Radioastronomie in Bonn, Germany, on July 15-19, 2019 [IMAGE: E. TRAIANOU/MPIFR]

Astronomers image magnetic fields at the edge of M87's black hole

The Event Horizon Telescope (EHT) collaboration, which produced the first ever image of a black hole, revealed a new view of the massive object at the centre of the M87 galaxy on March 24, 2021: how it looks in polarized light. This is the first time astronomers have been able to measure polarization, a signature of magnetic fields, this close to the edge of a black hole. The observations are key to explaining how the M87 galaxy, located 55 million light-years away, is able to launch energetic jets from its core.

With the new EHT image of the black hole and its shadow in polarized light, astronomers managed for the first time to look into the region just outside the black hole where this interplay between matter flowing in and being ejected out is happening.



A view of the M87 supermassive black hole in polarized light: This image shows the polarized view of the black hole in M87. The lines mark the orientation of polarization, which is related to the magnetic field around the shadow of the black hole. [IMAGE: EHT COLLABORATION]

The observations provide new information about the structure of the magnetic fields just outside the black hole. The team found that only theoretical models featuring strongly magnetized gas can explain what they are seeing at the event horizon.

More than 300 scientists from various organizations and universities around the globe, including researchers from the Shanghai Astronomical Observatory (SHAO) of the Chinese Academy of Sciences, are participating in this research.

Source: EHT Collaboration

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Moreover, the fast robotic fiber arrangement technology, which was first applied to large-scale multi-fiber equipment successfully by LAMOST, also plays an important role in the high spectral acquisition rate. To reconfigure for a new sky map only takes 10 minutes, improving observation efficiency.

"Having operated for 10 years, the huge amount of released data and the increasing study results have manifested the success of LAMOST, for both of its design concept and its technology," said Professor Zhao Yongheng, Executive Deputy Director of the Center for Operation and Development of LAMOST.

The spectral data and related LAMOST products provide valuable insights for studying the structure, origin and evolution of the Milky Way. With the continuous efforts of the LAMOST team and the mining and use of LAMOST data by astronomers all over the world, LAMOST will continue to yield more exciting finds.

Source: National Astronomical Observatories, Chinese Academy of Sciences

PIFI grant as a tool for fruitful Chinese-Russian scientific cooperation

Science has an international nature and, in many problems, significant progress can be achieved through close cooperation between scientists from different countries. Solar physics, which is becoming more and more practically important (e.g. in the context of space weather issues) is not an exception. Many international scientific groups have been working on the different topics, trying to understand the active processes at work in our nearest star. Since the main sources of solar instability are different manifestations of solar magnetic fields, many efforts of the solar physics community have been devoted to the observation and analysis of such fields.

As a part of long-term scientific cooperation between Russia and China, the joint projects between the Institute of Solar-Terrestrial Physics (Irkutsk) and the Key Laboratory of Solar Activity of the Chinese Academy of Sciences (CAS) (Beijing) have received powerful support in terms of Russian-Chinese conferences on space weather. After one of such conference which was held in Russia, all participants were invited to the Chinese Consulate-General in Irkutsk. Among other partners from the Chinese side, some solar physicists attended this meeting.

The other reason for fruitful Chinese-Russian cooperation, besides the close geographical positions of Irkutsk and Beijing, is a common scientific interest in exploration of global solar magnetism. Only in Irkutsk in Russia and at the Huairou Solar Observing Station (HSOS) in China are there instrumental facilities for the observation of full-disk solar magnetograms. This is the STOP (Solar Telescope for Operative Predictions) telescope at Sayan observatory and SMAT (Solar Magnetism and Activity Telescope) at HSOS. This fact provides a good basis for the organization of coordinated measurements using the two instruments and for their joint analysis.

As a logical result of this motivation, a joint Chinese-Russian proposal for the CAS President's International Fellowship Initiative (PIFI) was suggested at the end of 2016 and approved at the beginning of 2017. The title of the proposal is "Cross-Comparison of Full-Disk Solar Magnetic Fields Measurements Obtained with Chinese, Russian and Other Observatories: Instrumental and Solar Physics Issues".

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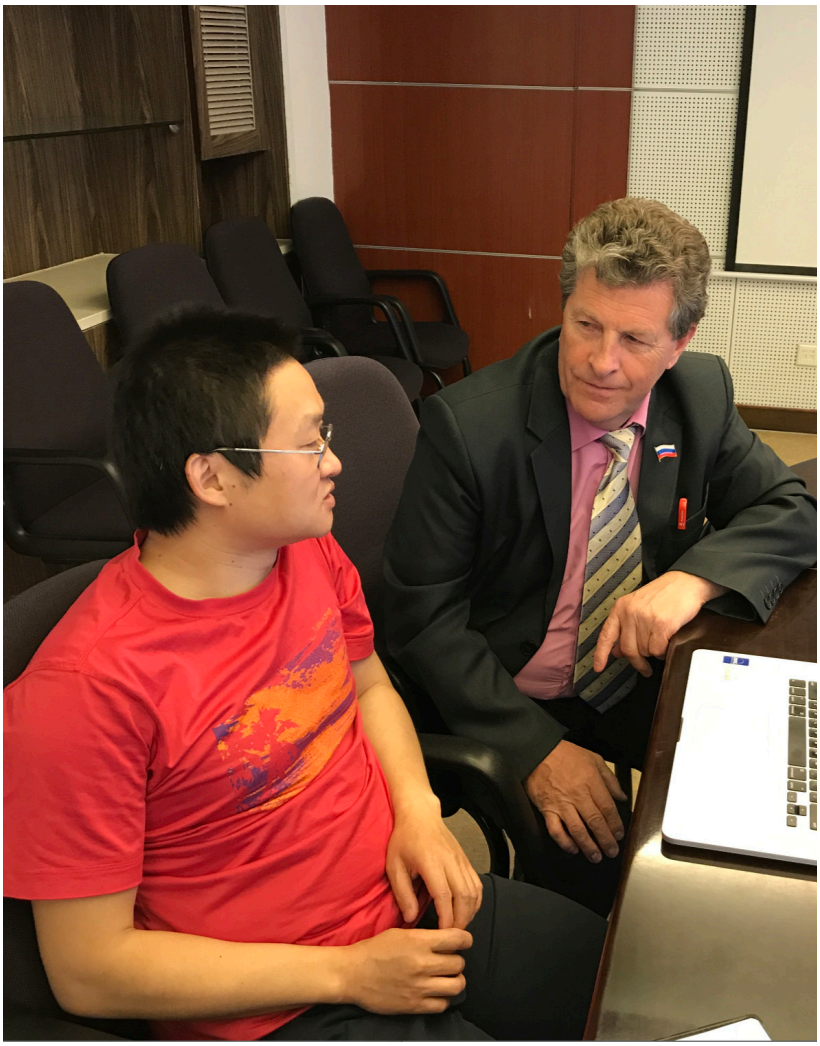

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In the context of this PIFI project, Demidov M.L. has made three very useful and interesting visits to China. Most of the time he has spent at HSOS, participating in routine observations run together with HSOS staff, making some original experiments, etc. The main partner of all experiments on the SMAT telescope, which were devoted to the study of its numerous polarization effects, was Professor Wang Xiaofan. Due to help from Professor Wang it was possible to undertake many experiments which finally helped us to understand the main reasons of SMAT problems in observations of magnetic fields distributions across the solar disk. In this case a special optical element (half-wave phase plate) was installed in front of the telescope's objective.

Many efforts have been made in the processing of SMAT observations, and comparison of them with STOP and other instruments' [mainly with SDO/HMI and IRmag (NAOJ, Mitaka, Japan) magnetograms] data sets. A conclusion about the necessity of observations at SMAT in two wings of spectral line was made. Observations only in one wing can provide more or less reliable data only in the case of observations with a small entrance aperture.

There is no doubt that cooperation between the Russian Institute of Solar-Terrestrial Physics SB RAS and the Chinese Key Laboratory of Solar Activity, National Astronomical Observatories, Chinese Academy of Sciences, has been very fruitful in the past and there are good prospects for future collaboration as well.

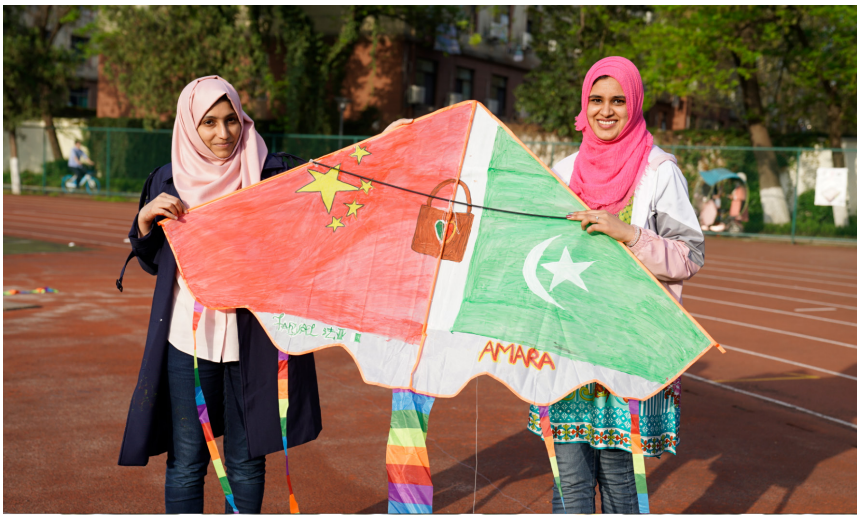
Source: National Astronomical Observatories, Chinese Academy of Sciences

Spring: a time for reaching out

Embracing spring by designing and flying a kite

On March 28, the International College at the University of Science and Technology of China organized a kite drawing and flying activity, which saw international students enjoying flying kites with their friends on a sunny afternoon. Everyone showed off their talents, using their creativity to design their own kites. After drawing the kites, students went to the playground to fly them.

Source: University of Science and Technology of China, Chinese Academy of Sciences



Stage production featuring moon spotlights Chinese culture

Four international students, together with 11 Chinese students from the University of Chinese Academy of Sciences, experienced Chinese culture and history by combining poems about the moon with stage performances.

Source: University of Chinese Academy of Sciences

USTC eyes more exchange with Japanese universities

The 2021 USTC Global Vista-Japan Weekend was held on April 10 at the University of Science and Technology of China (USTC).

In total more than 800 teachers and students took part. A group of 12 universities and two research institutes from Japan, as well as USTC Alumni in Japan, were invited to the event, which offered a face-to-face communication channel for universities from both sides.

The universities and institutes were introduced, and several activities such as keynote lectures and cultural experiences were held in order to deepen communication and allow the participants to learn and get to know one another.

The event not only expanded the university's partnerships with Japanese educational institutions and research institutes but also helped USTC faculty members and students get more information about cooperating with them and studying in Japan.

Source: University of Science and Technology of China, Chinese Academy of Sciences