An Introduction to CAS’s National Major Scientific and Technological Infrastructure

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representing Chunli BAI, President of CAS

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1. Introduction to CAS

2. Planning of National S&T Infrastructure

3. Introduction to CAS’s National Major S&T Infrastructure
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CAS: Cradle of Science and Innovation in China

- Founded in November 1st, 1949
- Based on Academia Sinica and Beiping Academy
- Home to the largest number of best talents
- A powerhouse of knowledge and innovation

Academia Sinica (1928-1949)

CAS headquarters (1949-1979)

CAS headquarters (1979-)

2011-
Bai Chunli

Academia Sinica (1949-1979)

1949-1978: Guo Moruo
1979-1981: Fang Yi
1981-1987: Lu Jiaxi
1987-1997: Zhou Guanghao
1997-2011: Lu Yongxiang
Mission, Structure and Strategy

High-caliber Talent

Scientific Excellence

Trusted Ideas

Mission

Three integrated elements: a large number of institutes, a merit-based academy and higher education institutions

Institutes

Universities

Academy

Structure

Strategy

Development Strategy: to run it with democracy, flourish it with openness and boost it with talent

Mission

Committed to excellent S&T, high-caliber talent and offering strategic advice to decision-makers
1. Introduction to CAS

2. Planning of National S&T Infrastructure

3. Introduction to CAS’s National Major S&T Infrastructure
The Medium- and Long-term Plan (2012-2030) for Construction of National Major S&T Infrastructure was issued in 2013. Priority was given to 16 projects in 7 fields for the “12th Five-year Plan” period (2011-2015).

<table>
<thead>
<tr>
<th>Energy Science</th>
<th>China Initiative Accelerator Driven System</th>
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<tr>
<td></td>
<td>High-Efficiency and Low-Carbon Gas Turbine Research Facility</td>
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<td>Material Science</td>
<td>High Energy Photon Source Test Facility</td>
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<td>Synergetic Extreme Condition User Facility</td>
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<td>SSRF Phase II Beam-line Project</td>
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<td>Earth Systems &amp; Environmental Sciences</td>
<td>Ocean Observation Initiative</td>
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<td>Earth System Numerical Simulation Facility</td>
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<td>National Precise Gravity Measurement Facility</td>
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<td>Partical Physics &amp; Nuclear Physics</td>
<td>Large High Altitude Air Shower Observatory</td>
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<td>High Intensity Heavy-ion Accelerator Facility</td>
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<td>Space &amp; Astroscience</td>
<td>Ground Simulator for Space Environment</td>
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<td>Antarctic Observatory at Chinese Kunlun Station</td>
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<td>Engineering &amp; Technology Science</td>
<td>China Environment for Network Innovations</td>
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<td>Large Low Speed Wind Tunnel</td>
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<td>Life Science</td>
<td>National Infrastructures for Translational Medicine</td>
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<td>National Research Facility for Phenotypic and Genetic Analysis of Model Animals</td>
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The 13th Five-year Plan for Construction of National Major S&T Infrastructure was issued in 2016. Priority was given to 10 projects in 6 fields for the "13th Five-year plan" period (2016-2020).

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<th>Energy Science</th>
<th>China Fusion Engineering Testing Reactor</th>
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<td>Material Science</td>
<td>High Energy Photon Source</td>
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<td>Hard X-ray Free Electron Laser Facility</td>
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<td>Life Science</td>
<td>National Multimode Trans-scale Biomedical Imaging Center</td>
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<td>Partical Physics &amp; Nuclear Physics</td>
<td>Deep Underground and Ultra Low Radiation Background Facility for Frontier Physics Experiments</td>
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<td>Space &amp; Astroscience</td>
<td>Large Optical/Infrared Telescope</td>
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<td>High Precision Ground-based Time Service System</td>
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<td>Network for Space Environment Research and Forecast</td>
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<tr>
<td>Engineering &amp; Technology Science</td>
<td>Large-scale Earthquake Engineering Simulation Research Facility</td>
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<td>Centrifugal Hypergravity and Interdisciplinary Experiment Facility</td>
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Overview to CAS’s Infrastructure

CAS takes the major force in the construction and operation of China’s major S&T infrastructure with a proportion of $\frac{2}{3}$.

Recently, CAS has built a batch of major S&T infrastructure.

- covering expanding fields
- providing strong support for S&T research
- forming a primary trend of cluster development of facilities
Operating Facilities of CAS
Facilities Under Construction of CAS

- Airborne Remote Sensing System
- Synergetic Extreme Condition User Facility
- High Energy Photon Source Test Facility
- Earth System Numerical Simulation Facility
- National Center for Protein Science Shanghai
- Large High Altitude Air Shower Observatory
- Hard X-ray Free Electron Laser
- Five-hundred-meter Aperture Spherical Radio Telescope
- Wuhan Biosafety Laboratory
- China Spallation Neutron Source
- SSRF Phase II Beam-line Project
- Soft X-ray Free Electron Laser
- Daocheng Large High Altitude Air Shower Observatory
- Hard X-ray Free Electron Laser
Comprehensive National Science Centers

According to the “13th Five-year Plan” for construction of national major S&T infrastructure, China will build comprehensive national science centers in cities with integrating superior resources, such as Beijing, Shanghai and Hefei and make them cradles for original achievements, platform for basic sciences and foundation for cultivating young generation of scientists.
Comprehensive National Science Centers

Comprehensive National Science Center in Hefei (Anhui) was approved in Jan., 2017.

Comprehensive National Science Center in Huairou (Beijing) was approved in May, 2017.

Comprehensive National Science Center in Zhangjiang (Shanghai) was approved in Feb., 2016.

Comprehensive National Science Center in Pearl River Delta is in process.
International Cooperation

Cooperation with ITER

China joined ITER in 2016 and CAS took a positive role in the work of ITER.

China's participation in signing ITER Joint Implementation Agreement

Conductor PF5, handed over to ITER

Feeder System, delivered to ITER

Cooperation with LHC

CAS cooperated with CERN since the 1970s and CAS has worked with ATLAS and CMS in High Energy Physics and so on.

Large Hardon Collider

ATLAS Detector

CMS Detector

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ATLAS Detector

CMS Detector
International Cooperation

Cooperation with SKA

China joined SKA and pursued for scientific goals including searching for the first light in the universe and gravitational waves detecting with pulsars.

CAS and its international partners are cooperating at an altitude of 5250m in Ali of Tibet, aiming at detecting the primordial gravitational waves.

2500 dish antenna 130,000 helical antenna

Observation Station for Ali Primordial Gravitational Waves

Preliminary design of AliCPT-1 receiver
Precisely measuring of $\theta_{13}$ and finding of new pattern of neutrino oscillation in Daya Bay Reactor Neutrino Experiment, cooperating with the US partners.

Discovering of Zc (3900) containing tetraquark with Beijing Electron Positron Collider II.

EAST, achieving the longest (>100s) fully non-inductive current driven steady state high confinement plasma discharge.

SSRF, providing strong support for the firstly observed three-component fermions.

Discovering of fixed star of the highest Li abundance in the universe with LAMOST.

Firstly discovering and verifying millisecond pulsar with FAST.
CAS will continue to develop major scientific and technological infrastructure, strengthen opening and sharing, actively participate in international cooperation and make contributions to scientific and technological exploration.

Thanks!