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

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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

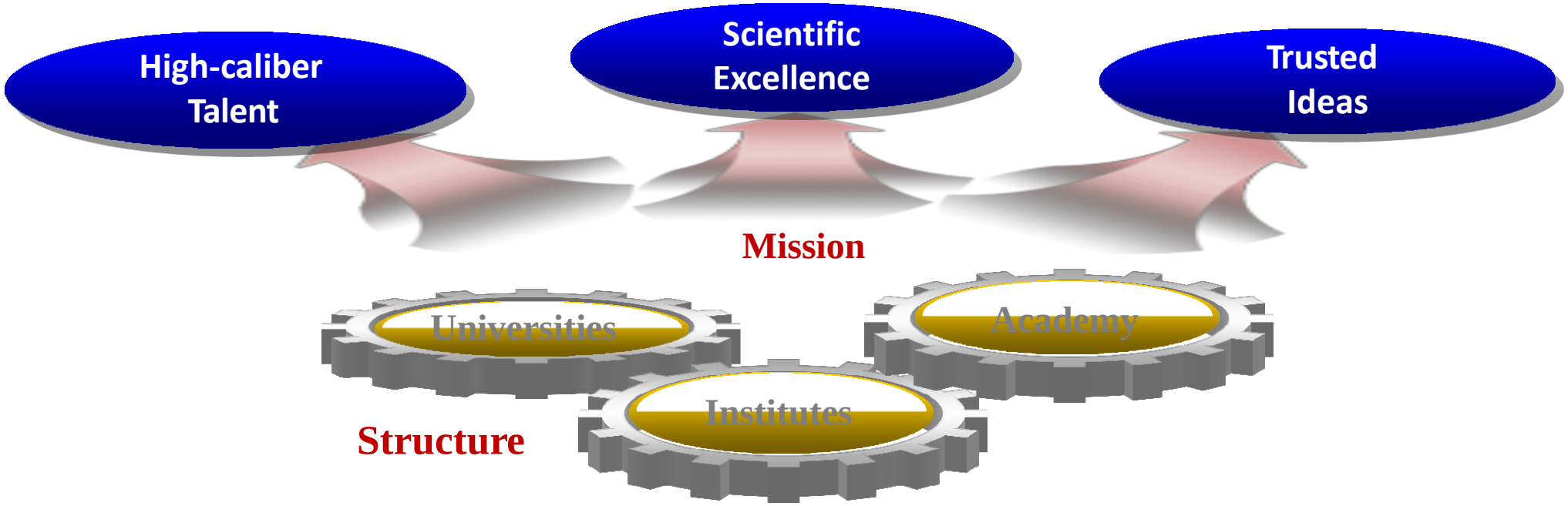
- Founded in November 1st, 1949
- Based on Academia Sinica and Beiping Academy
- Home to the largest number of best talents
- A powerhouse of knowledge and innovation

Academia Sinica (1928-1949)

CAS headquarters (1949-1979)

CAS headquarters (1979-)

Mission, Structure and Strategy



Structure

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

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

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National Planning and Layout

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).**

Energy Science	China Initiative Accelerator Driven System
	High-Efficiency and Low-Carbon Gas Turbine Research Facility
Material Science	High Energy Photon Source Test Facility
	Synergetic Extreme Condition User Facility
	SSRF Phase II Beam-line Project
Earth Systems & Environmental Sciences	Ocean Observation Initiative
	Earth System Numerical Simulation Facility
	National Precise Gravity Measurement Facility
Partical Physics & Nuclear Physics	Large High Altitude Air Shower Observatory
	High Intensity Heavy-ion Accelerator Facility
Space & Astroscience	Ground Simulator for Space Environment
	Antarctic Observatory at Chinese Kunlun Station
Engineering & Technology Science	China Environment for Network Innovations
	Large Low Speed Wind Tunnel
Life Science	National Infrastructures for Translational Medicine
	National Research Facility for Phenotypic and Genetic Analysis of Model Animals

National Planning and Layout

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).**

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

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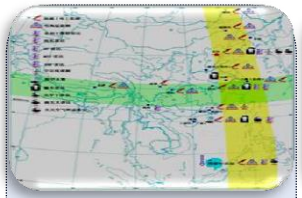
Overview to CAS's Infrastructure

- **CAS takes the major force in the construction and operation of China's major S&T infrastructure with a proportion of 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

BPL and BPM time service systems

Beijing Electron Positron Collider II



Meridian Space Weather Monitoring Project

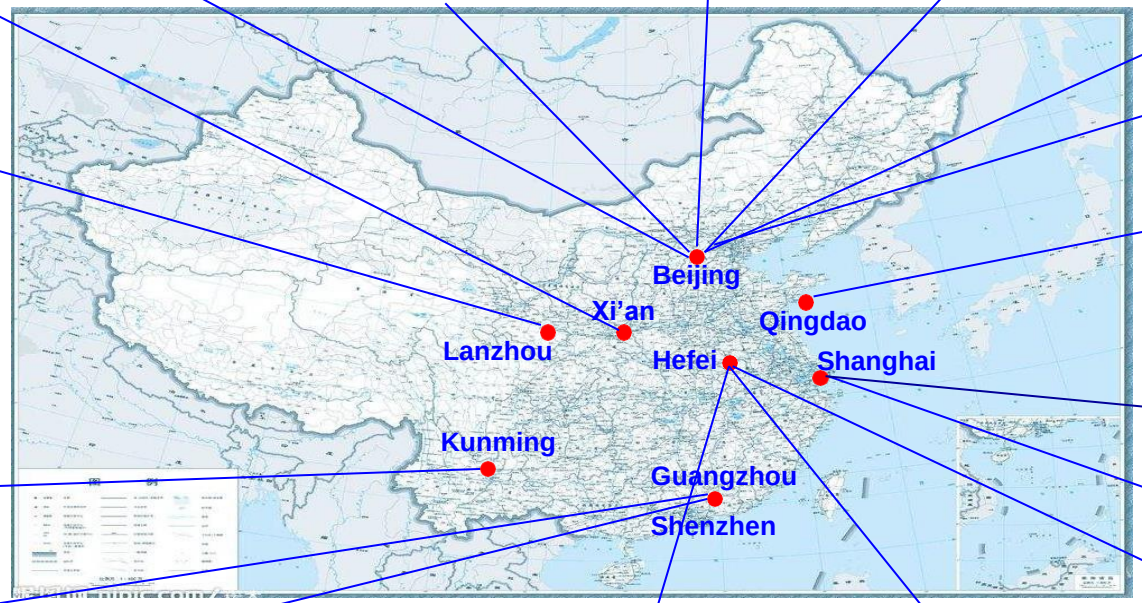
China Remote Sensing Ground Station Network

Large Sky Area Multi-Object Fiber Spectro-scopic Telescope

Remote Sensing Airplanes

China Remote Sensing Satellite Ground Station

Heavy Ion Research Facility at Lanzhou

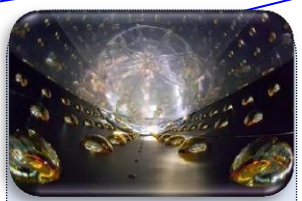


Research Vessel KEXUE

Germplasm Bank of Wild Species

Shenguang-Ⅱ: High Power Laser Facility

Science Research Vessel Shiyan1



Daya Bay Reactor Neutrino Experiment

Experimental Advanced Superconducting Tokamak

National Synchrotron Radiation Laboratory

Steady High Magnet Field Facility

Shanghai Synchrotron Radiation Facility

Facilities Under Construction of CAS

Airborne Remote Sensing System

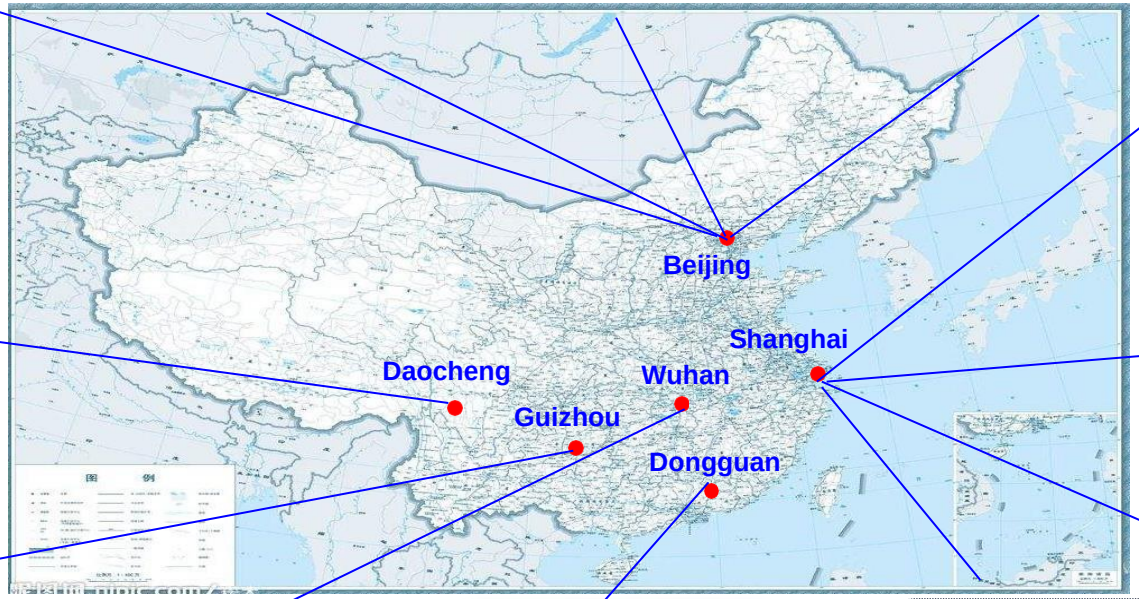
Synergetic Extreme Condition User Facility

High Energy Photon Source Test Facility

Earth System Numerical Simulation Facility

National Center for Protein Science Shanghai

Large High Altitude Air Shower Observatory

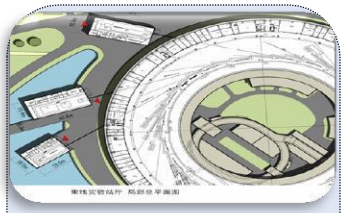


Hard X-ray Free Electron Laser

Five-hundred-meter Aperture Spherical Radio Telescope

Wuhan Biosafety Laboratory

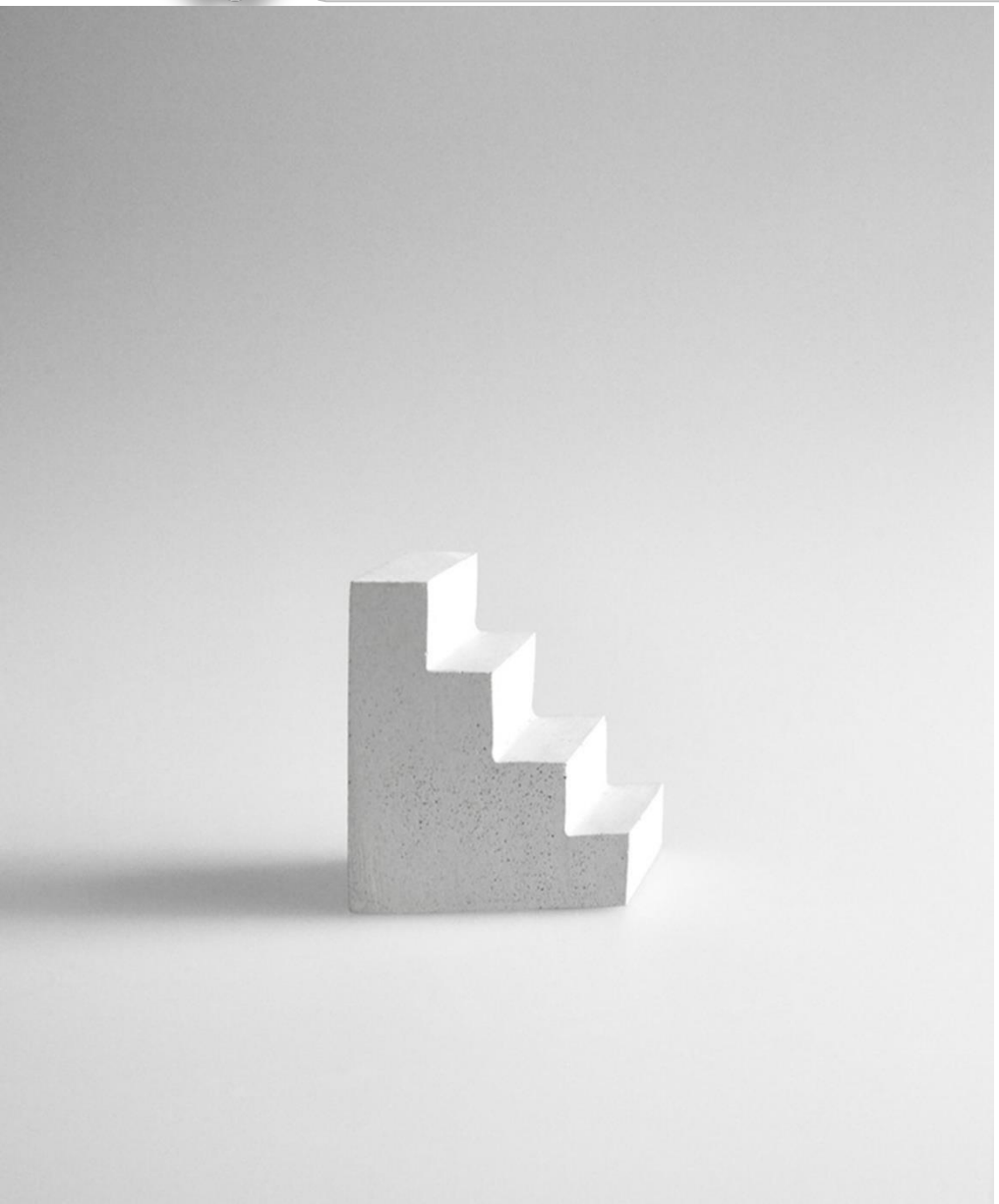
China Spallation Neutron Source



SSRF Phase II Beam-line Project

Soft X-ray Free Electron Laser

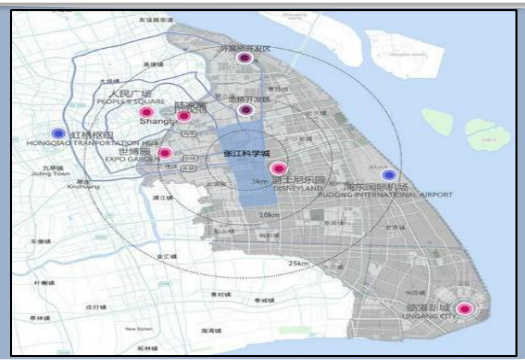
Comprehensive National Science Centers



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.

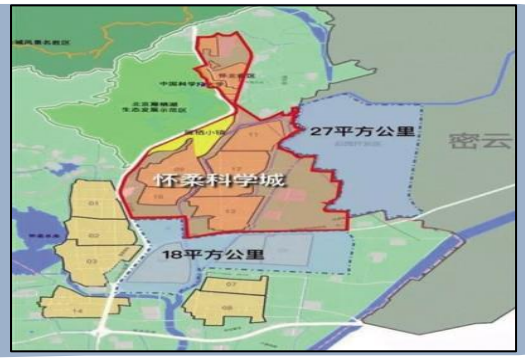
Comprehensive National Science Centers

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

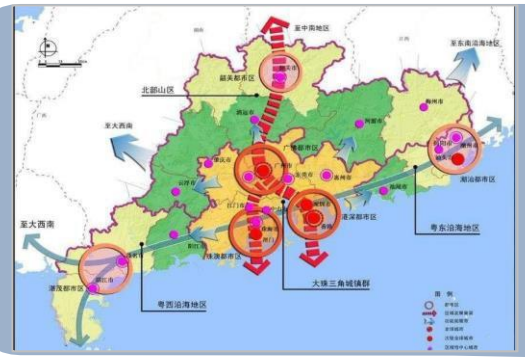


Comprehensive National Science Center in Hefei (Anhui) was approved in Jan., 2017.

Comprehensive National Science Centers



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



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

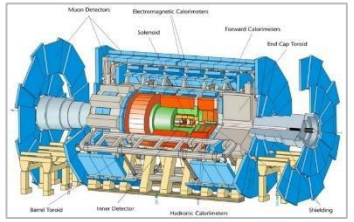
Conductor PF5, handed over to ITER

Feeder System, delivered to ITER

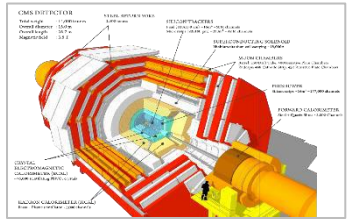
Cooperation with LHC

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

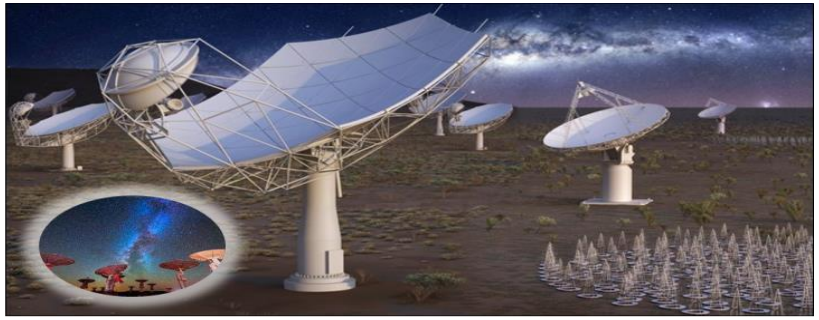


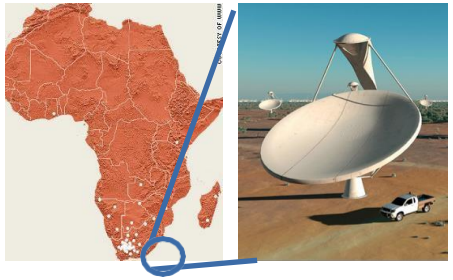
CMS Detector

International Cooperation

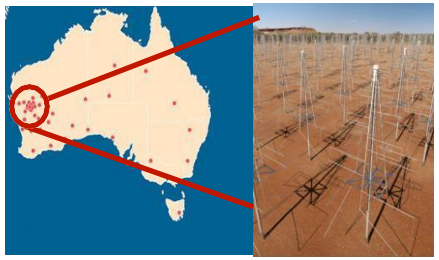
Cooperation with SKA

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





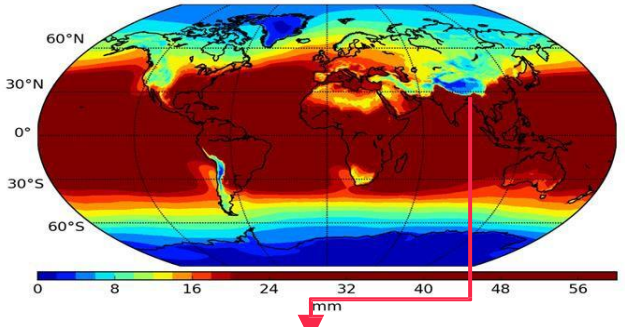
2500 dish antenna



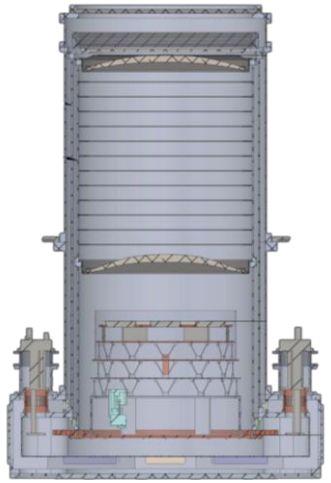
130,0000 helical antenna

Cooperation on Ali Primordial Gravitational Waves

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

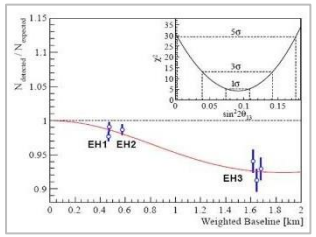


Observation Station for Ali Primordial Gravitational Waves

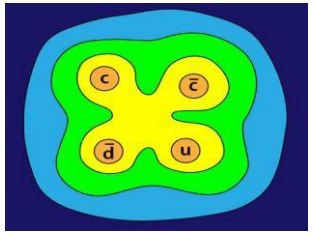


Preliminary design of AliCPT-1 receiver

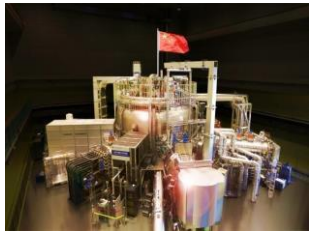
S&T Achievements

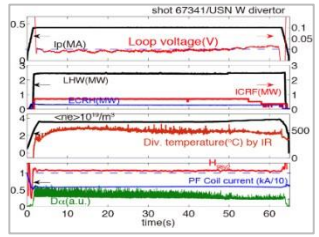


Precisely measuring of θ_{13} and finding of new pattern of neutrino oscillation in Daya Bay Reactor Neutrino Experiment, cooperating with the US partners.

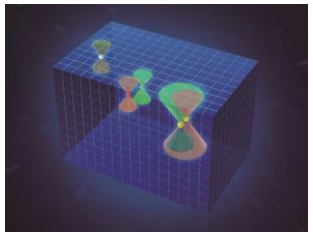


Discovering of Zc (3900) containing tetraquark with Beijing Electron Positron Collider II.

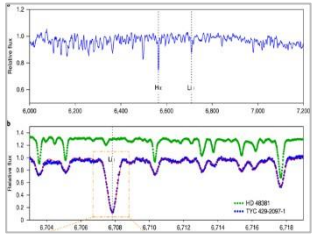




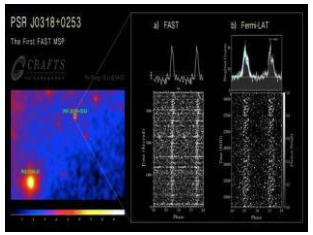
EAST, achieving the longest (>100s) fully non-inductive current driven steady state high confinement plasma discharge.



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 !