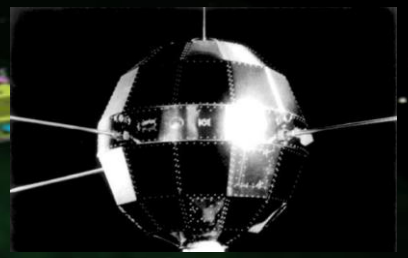

China Space Science Program

Chi Wang

National Space Science Center, CAS

May 26, 2021

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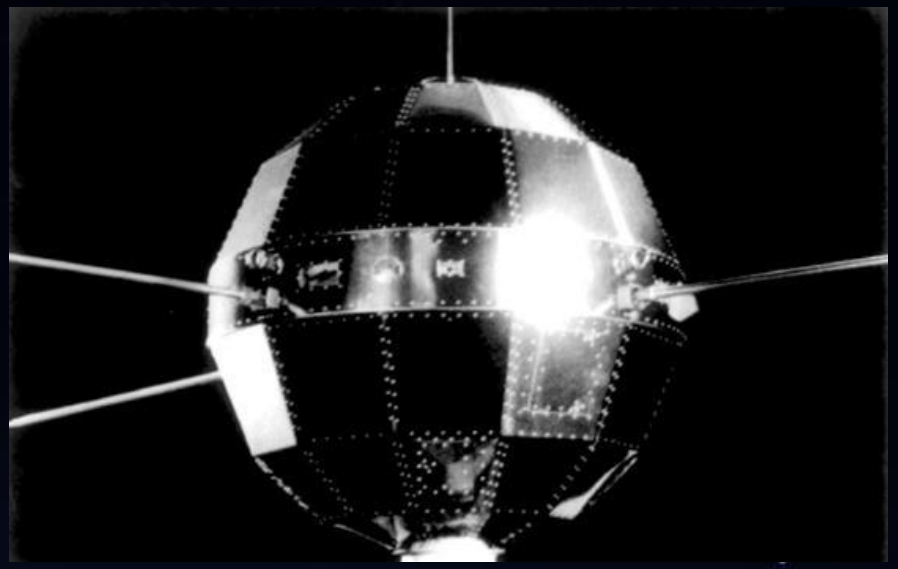
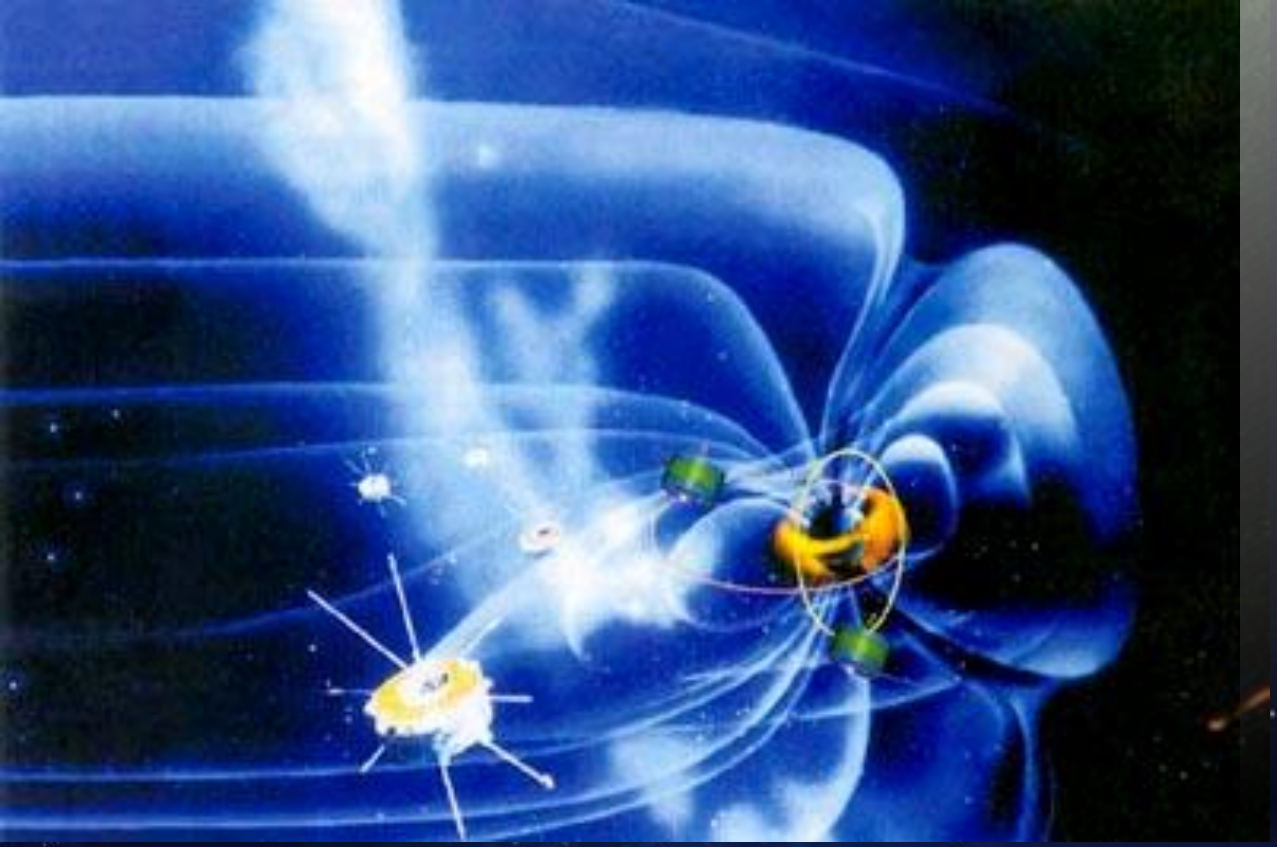


On April 24, 1970, the Dongfanghong One, China's first satellite, was successfully launched.

China became the 5th country to launch its own satellite.



Double Star Project is the first space science mission cooperation program between China and Europe, which was launched in 2003 and 2004, respectively.

In 2010,the International Academy of Astronautics (IAA) awarded the Laurels for Team Achievement Award to the Double Star/Cluster Team

Strategic Priority Program on Space Science (SPP)

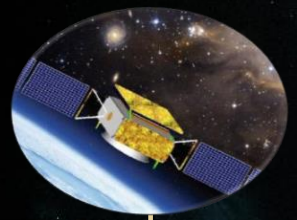
DAMPE

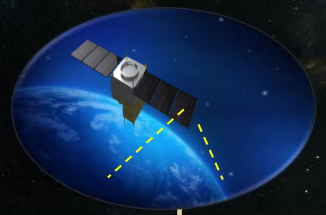
QUESS

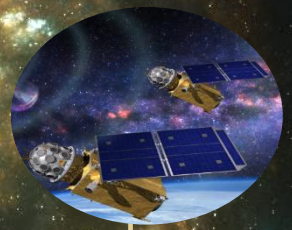
Taiji-1

GECAM

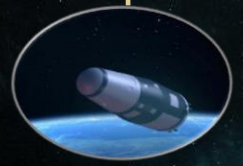
ASO-S







2011 — 2016 — 2017 — 2019 — 2020 — 2021 — 2022 — 2024



SJ-10

HXMT

SDGSAT

EP

SMILE

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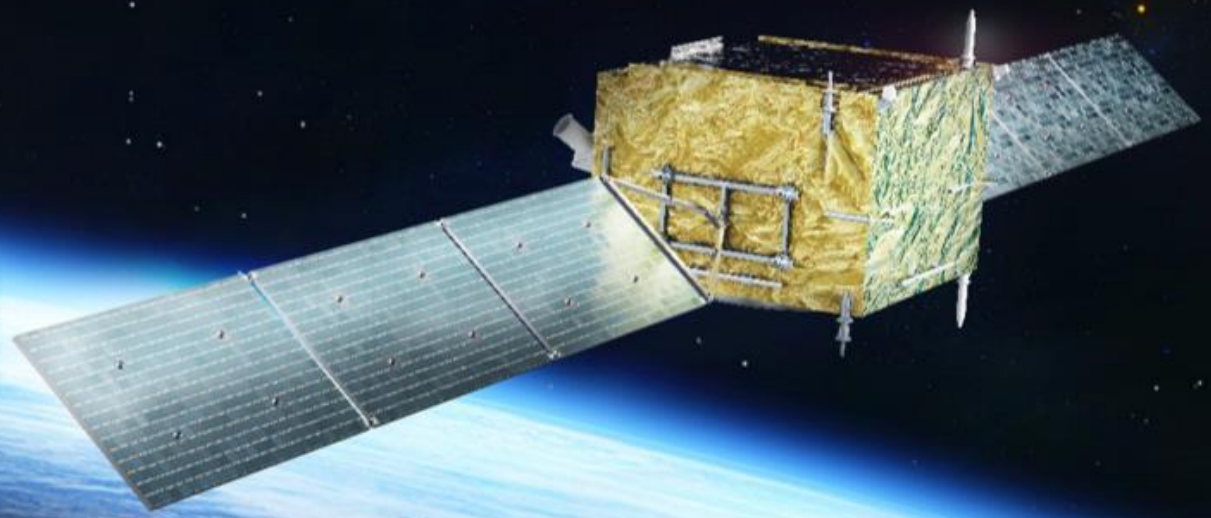
DArk Matter Particle Explorer (DAMPE)

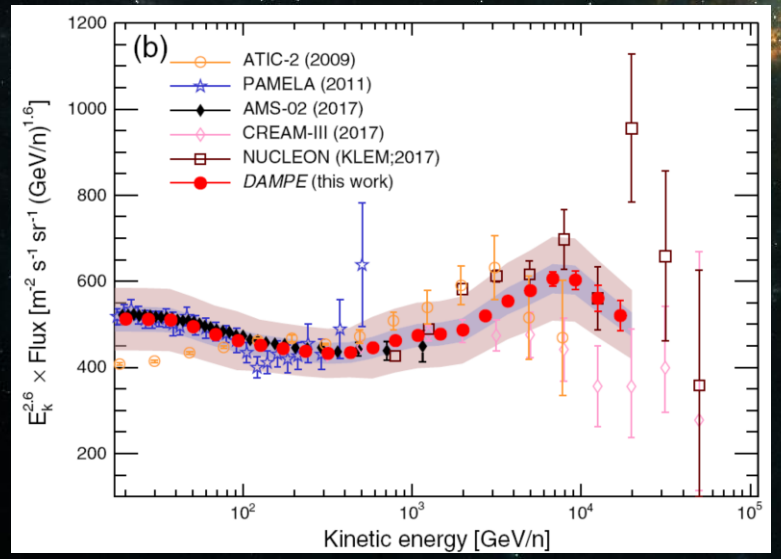
Launch: Dec. 17, 2015



A satellite-borne, high-energy particle and γ-ray detector, dedicated to indirectly detecting dark matter particle and the study of high-energy astrophysics

DArk Matter Particle Explorer (DAMPE)

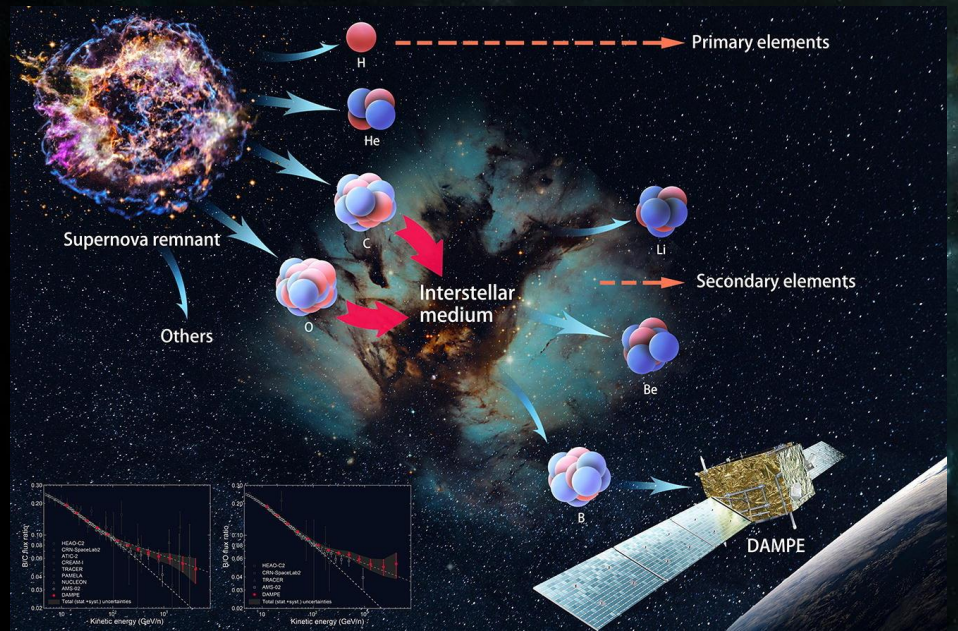
The DAMPE spectral measurements of both cosmic protons and helium nuclei suggest a particle charge dependent softening energy.

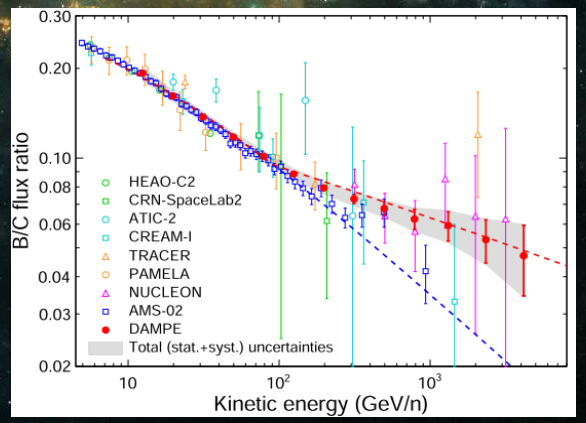


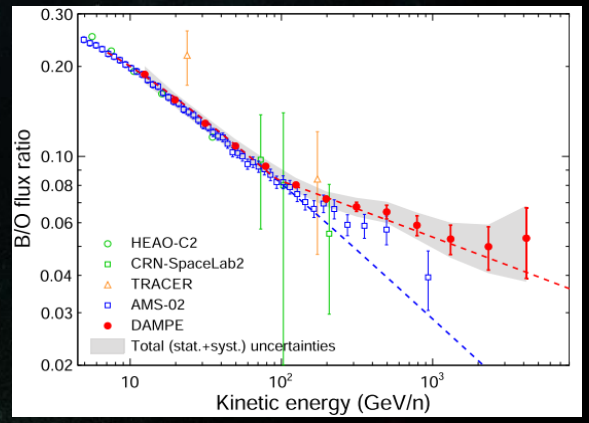
Phys. Rev. Lett. 126, 201102, 2021

DArk Matter Particle Explorer (DAMPE)

Secondary-to-primary ratios (e.g., B/C and B/O) are important probe of cosmic ray propagation. DAMPE measurements reveal spectral breaks of B/C and B/O with high significance, indicating cosmic rays propagate more slowly than expected.

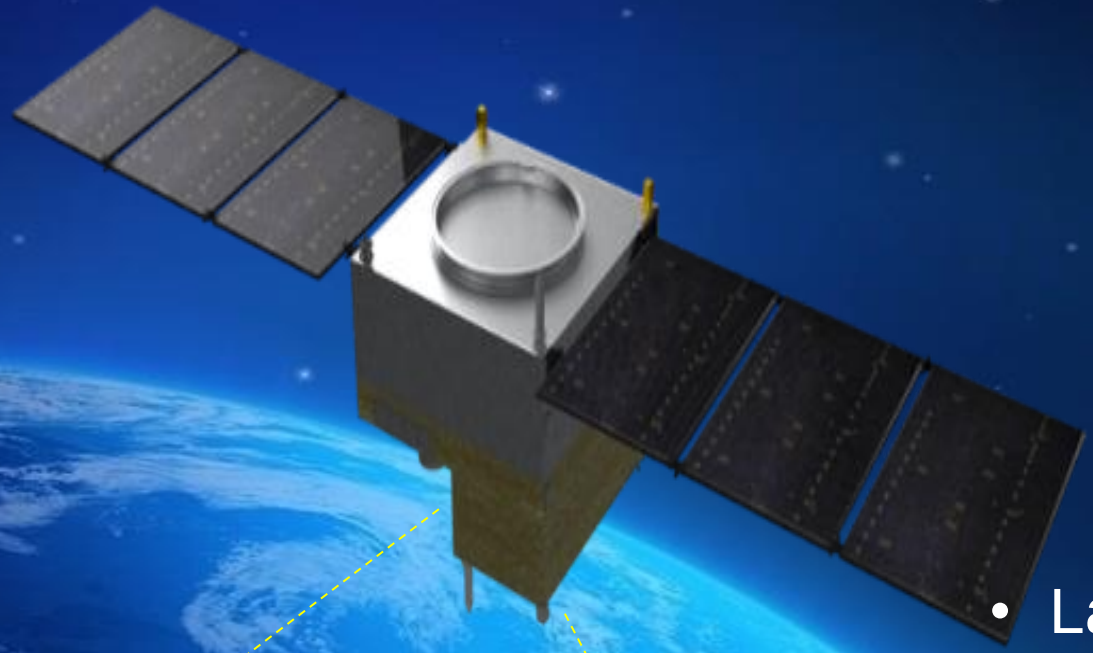






Sci. Bull. 2022

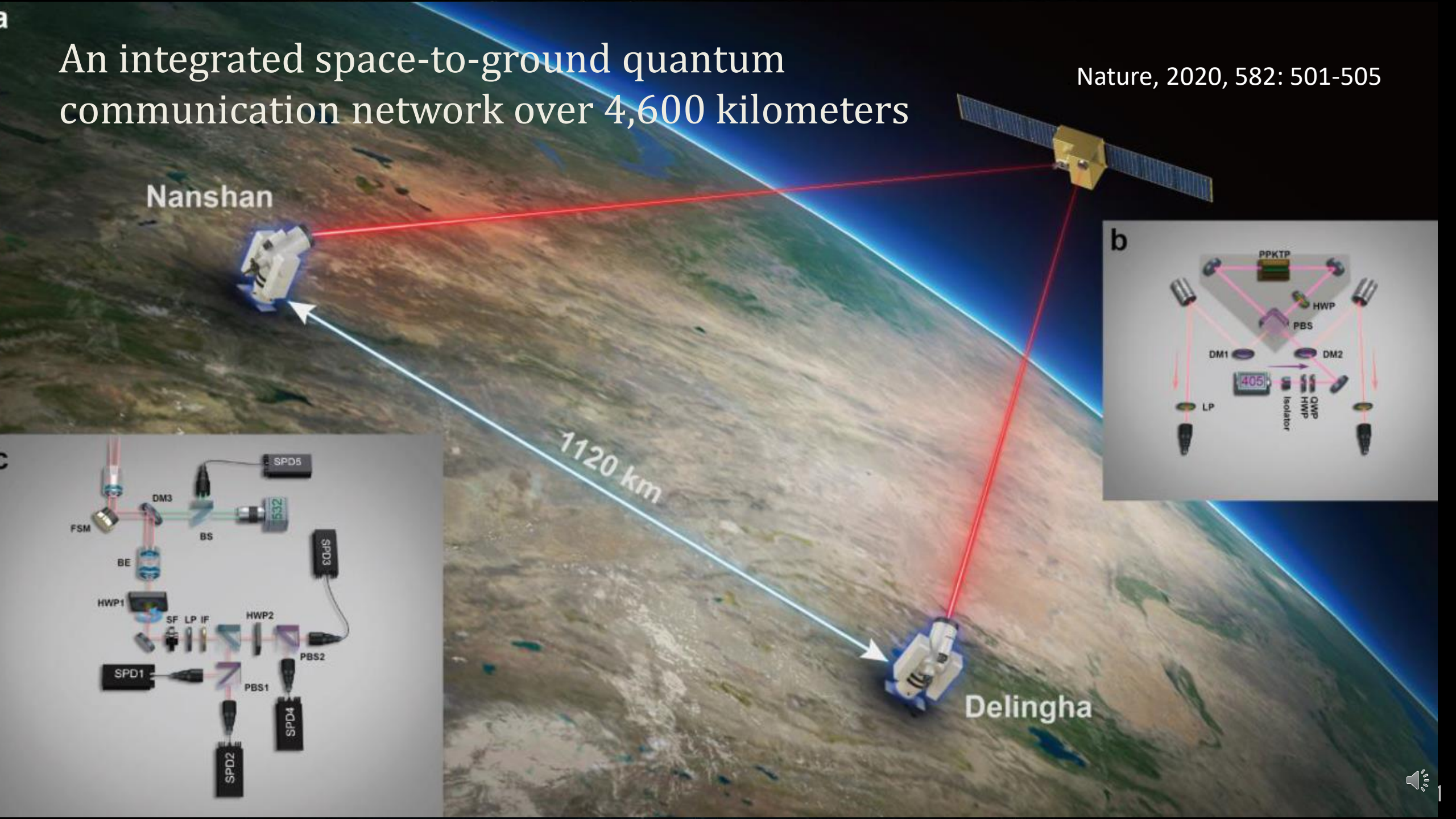
QUESS（QUantum Experiments at Space Scale）



- Launch: Aug. 16, 2016
- Orbit：500km, sun-synchronous
- Status：in extended operation

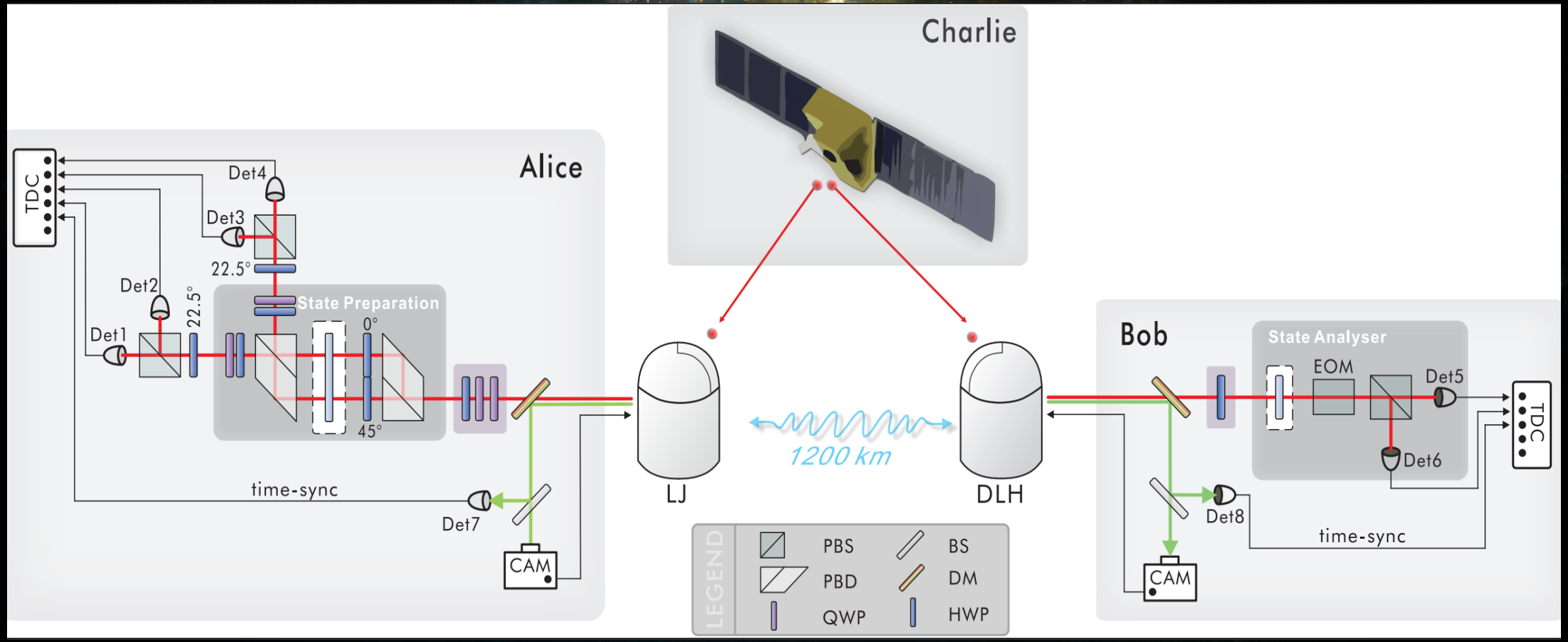
An integrated space-to-ground quantum communication network over 4,600 kilometers

Nature, 2020, 582: 501-505



Experiment demonstrates that it is possible to transfer quantum state via prior entanglement distribution, which can aid in the construction of a global quantum network

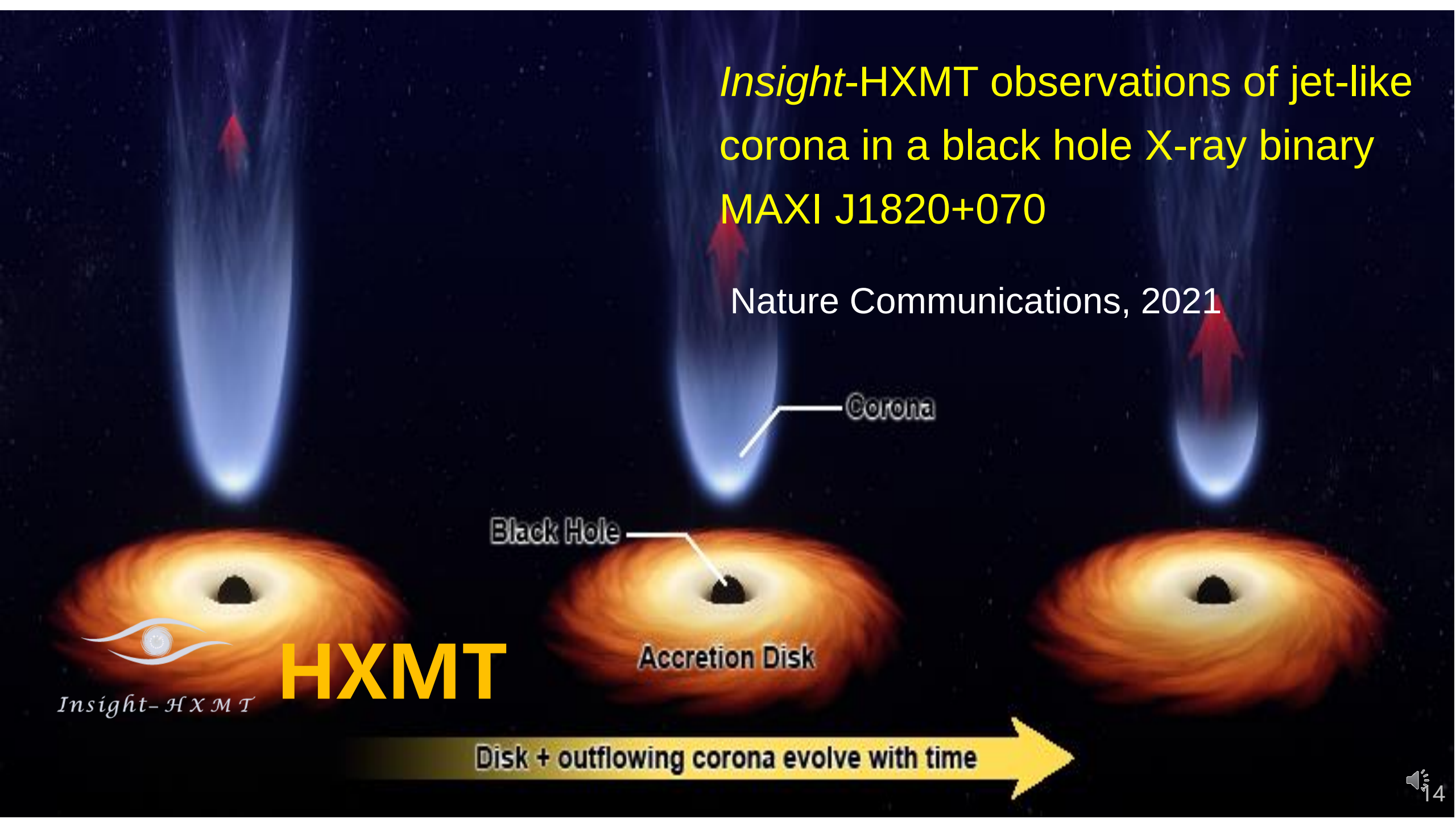
Physical Review Letters 128, 2022




Hard X-ray Modulation Telescope
(*Insight* - HXMT)
Launch：Jun. 15, 2017
慧眼 - HXMT

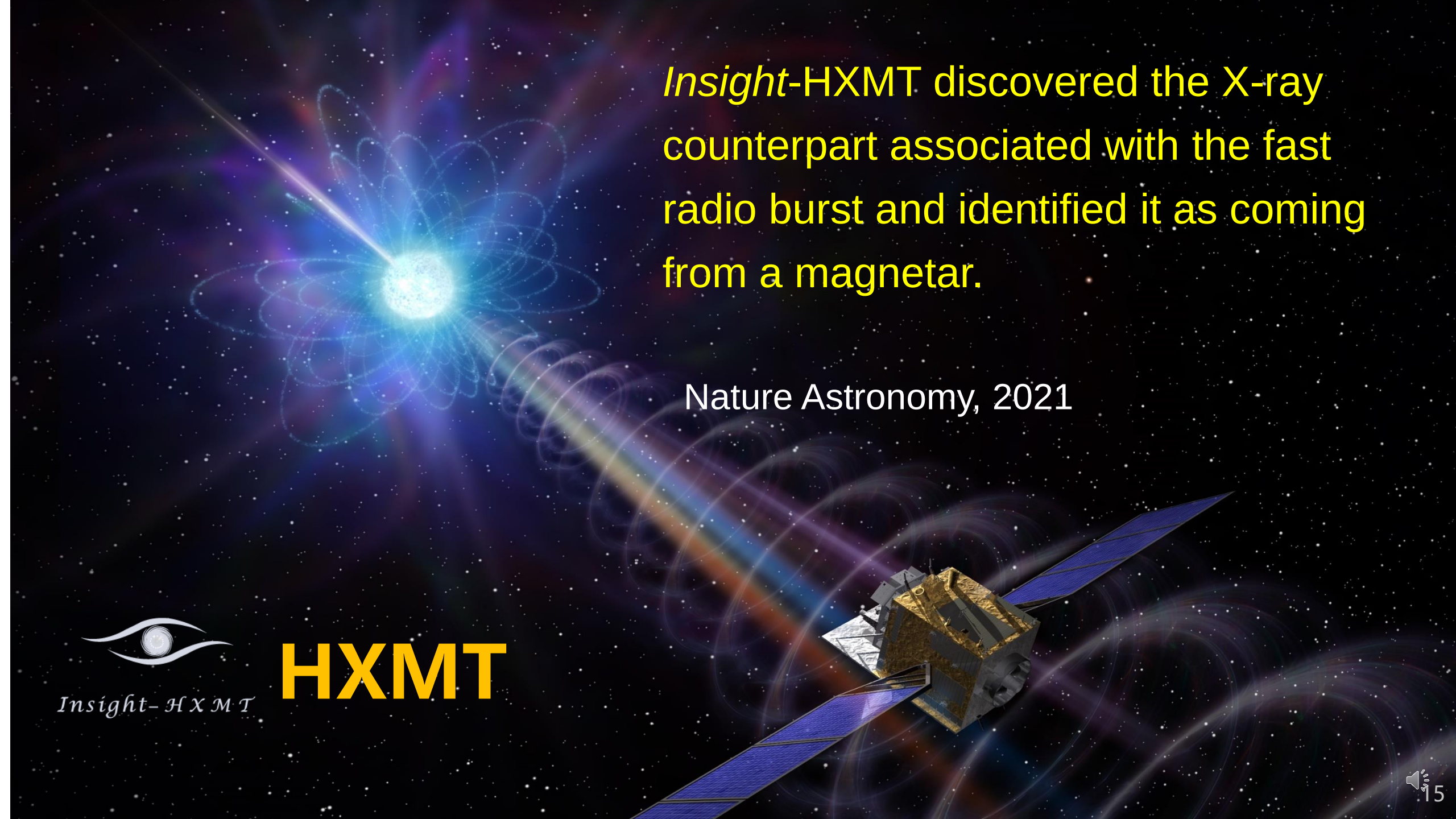
Insight-HXMT observations of jet-like corona in a black hole X-ray binary MAXI J1820+070

Nature Communications, 2021



Insight-HXMT discovered the X-ray counterpart associated with the fast radio burst and identified it as coming from a magnetar.

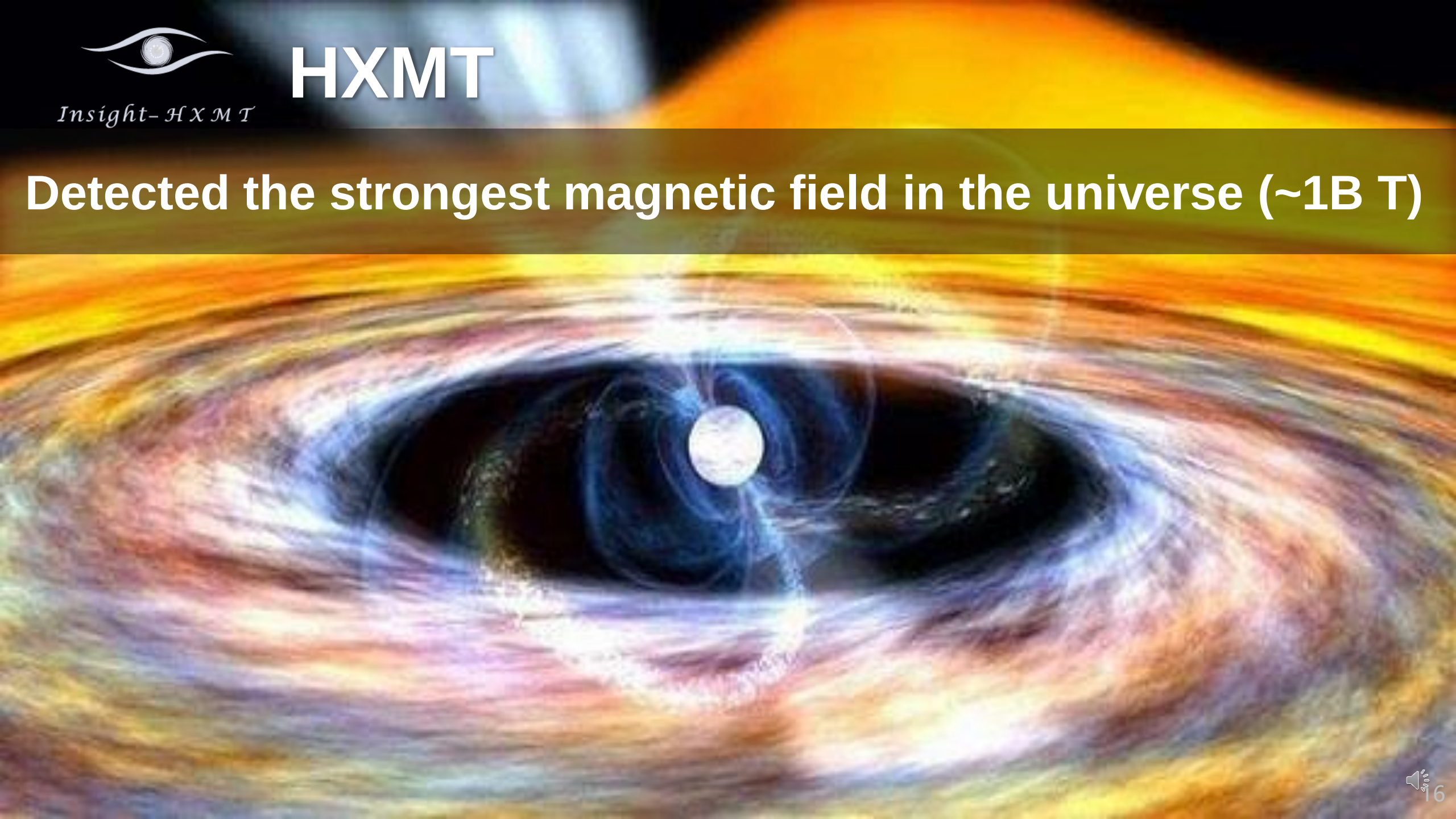
Nature Astronomy, 2021



Insight-HXMT

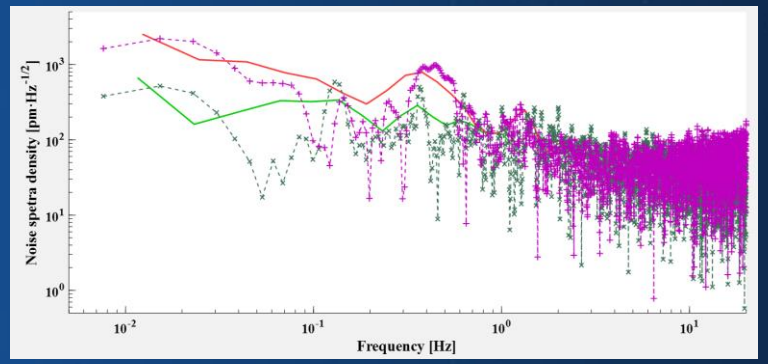
HXMT

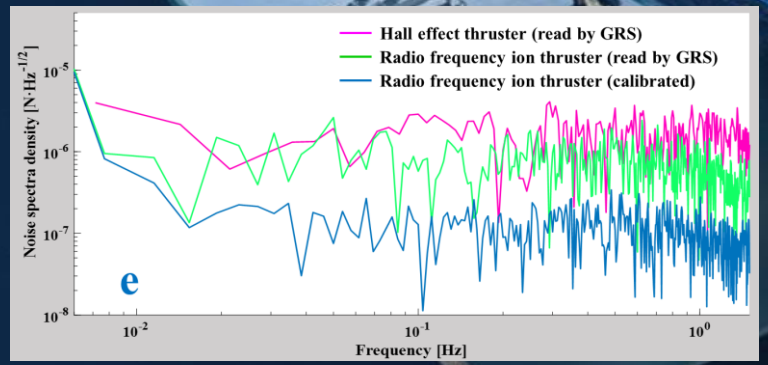
Detected the strongest magnetic field in the universe (~1B T)



Taiji

- **First technology demonstration mission of space-borne GW detection**
- **Payloads: Laser interferometer** μ-Newton Thruster
- Drag-free control experiments





Laser interferometer

μ-Newton Thruster

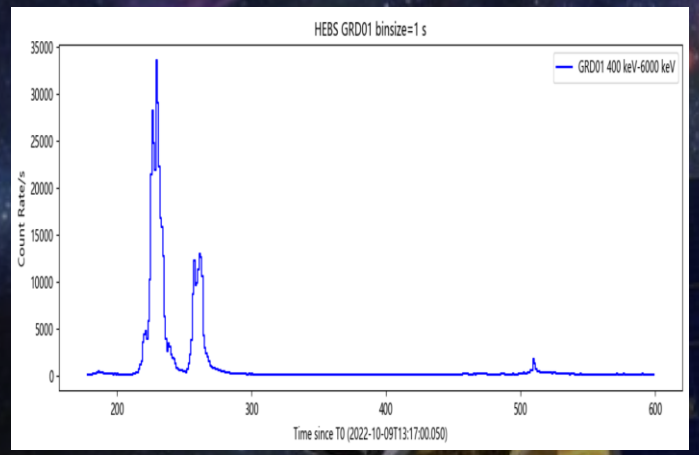
Launch: 31 Aug, 2019

Gravitational wave high-energy Electromagnetic Counterpart All-sky Monitor (GECAM)

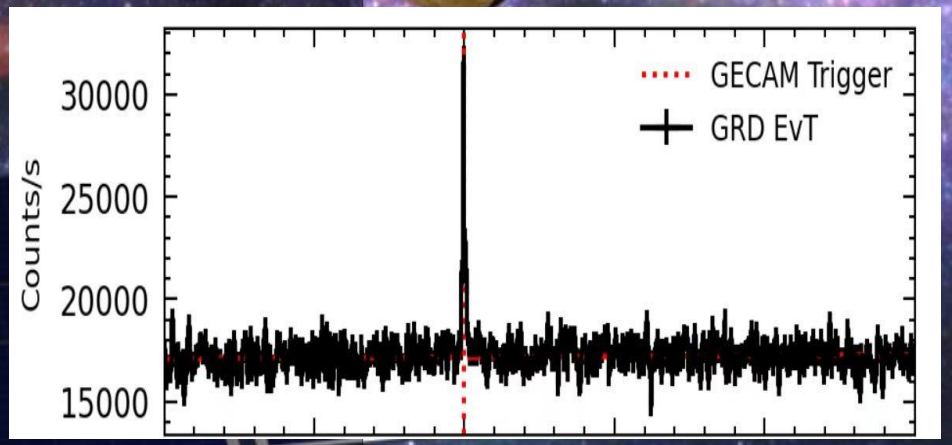
Launch: Dec. 10, 2020

GECAM has discovered 127GRBs and hundreds of SGR and Solar flares, and released 1657 real-time alerts (till Oct. 31)

2022/07/27: GECAM-C (HEBS) launched onboard SATech-01 satellite of CAS



2022/10/09: GECAM-C detected GRB 221009A，the most energetic GRB ever found



2022/10/14: GECAM-B/C discovered an X-ray burst associated with FRB from SGR1935-2154

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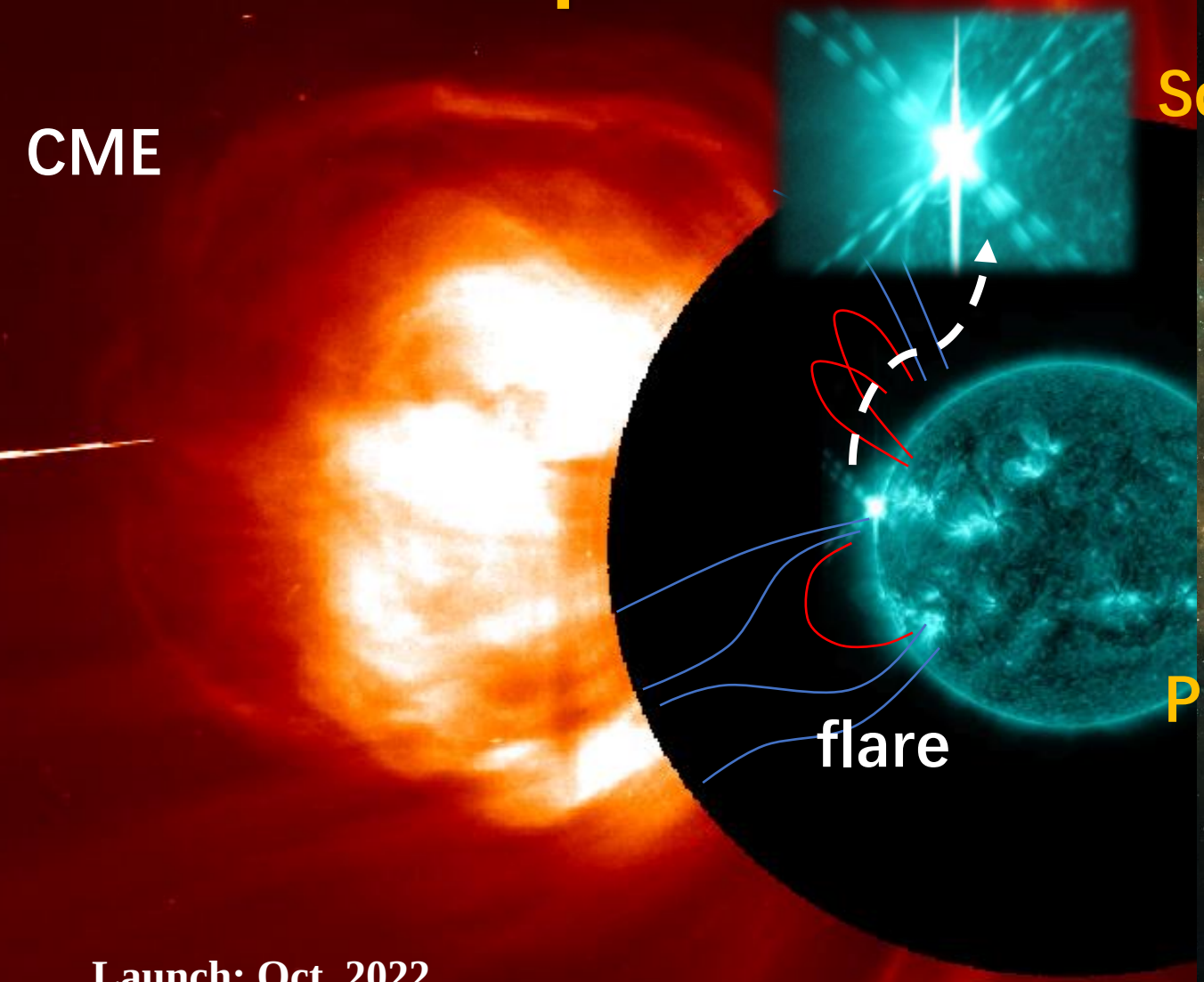
Advanced Space-borne Solar Observatory (ASO-S)



Launch: Oct. 2022

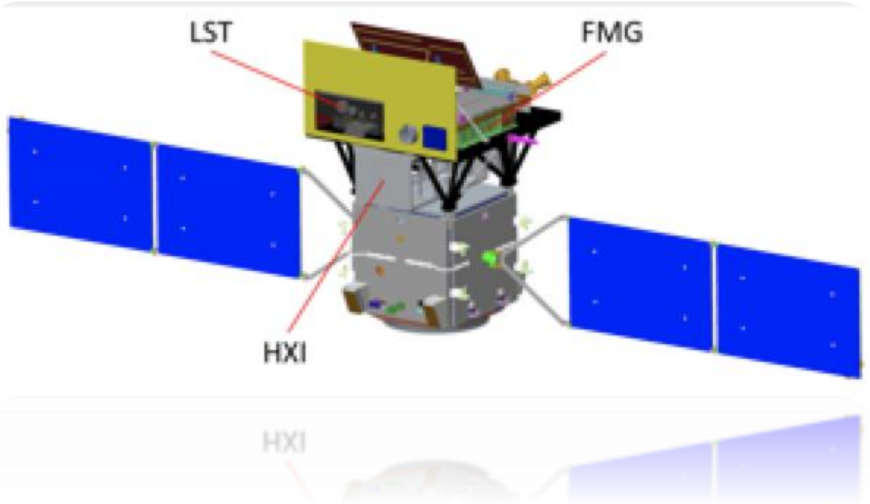
Science Objectives

- Relationship between solar magnetic field and solar flares
- Relationship between solar magnetic field and CMEs
- Relationship between solar flares and CMEs

Payloads

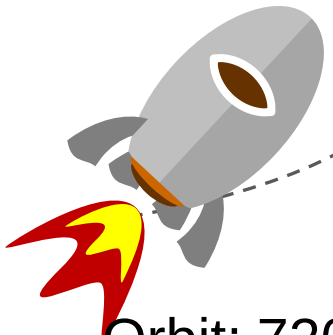
- Full-Disc Vector Magnetograph (FMG): solar magnetic field
- Hard X-ray Imager (HXI): solar flare
- Lyman-alpha Solar Telescope(LST): CME

ASO-S



Now
Completed
satellite platform test

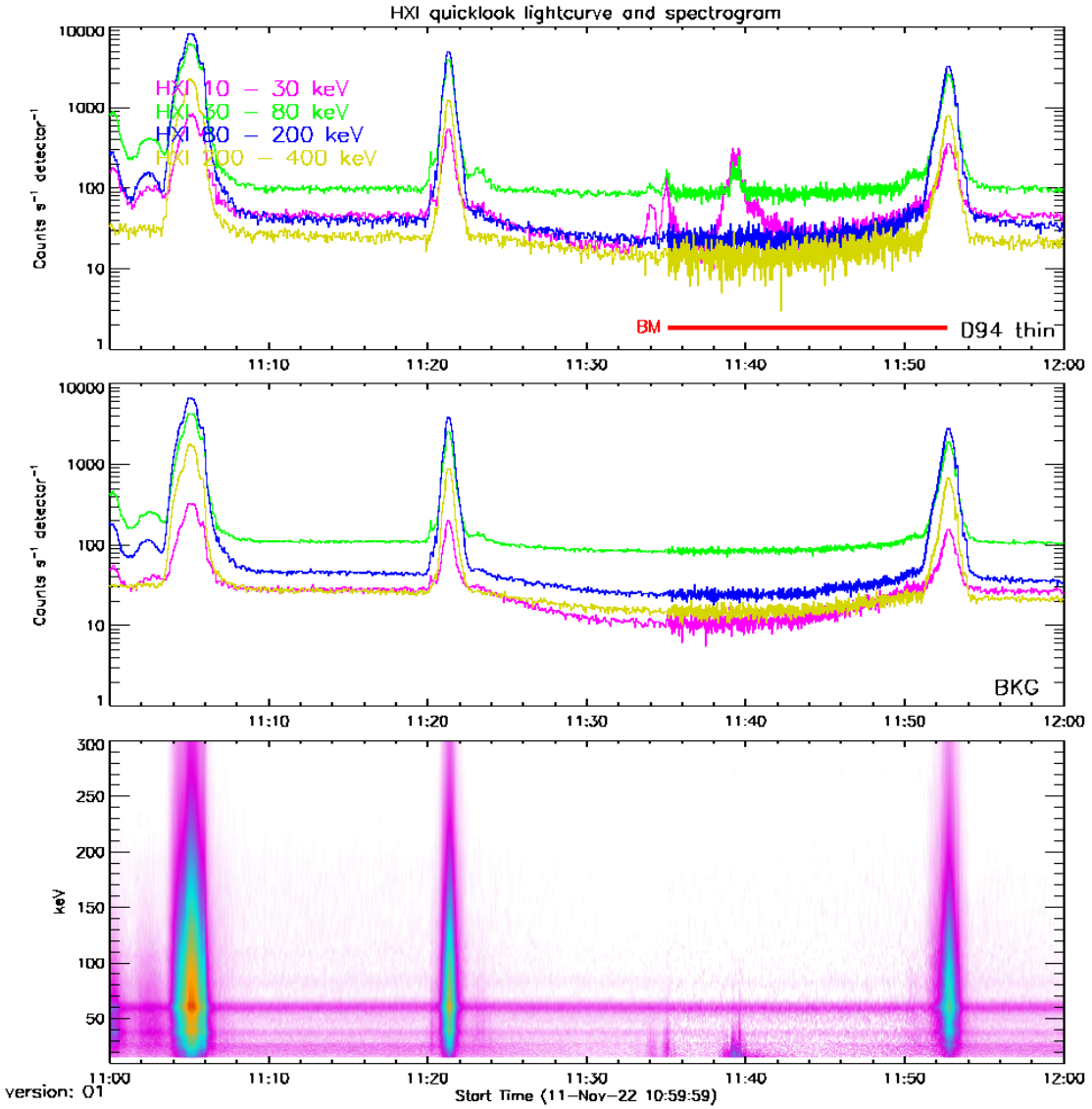
- Testing showed the satellite platform's functions & performances meet the design requirements.
- The scientific payloads are in commissioning phase.
- The scientific data will be released soon.



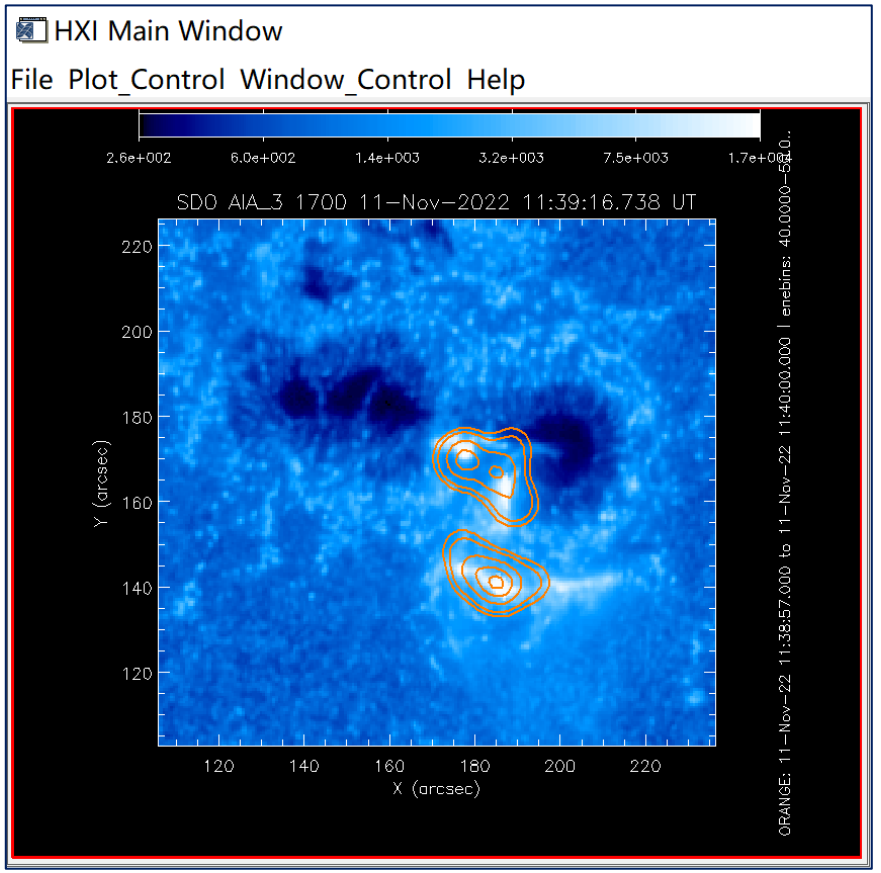
9 Oct. 2022
Launched

Orbit: 720km, Sun-synchronous orbit

HXI initial results

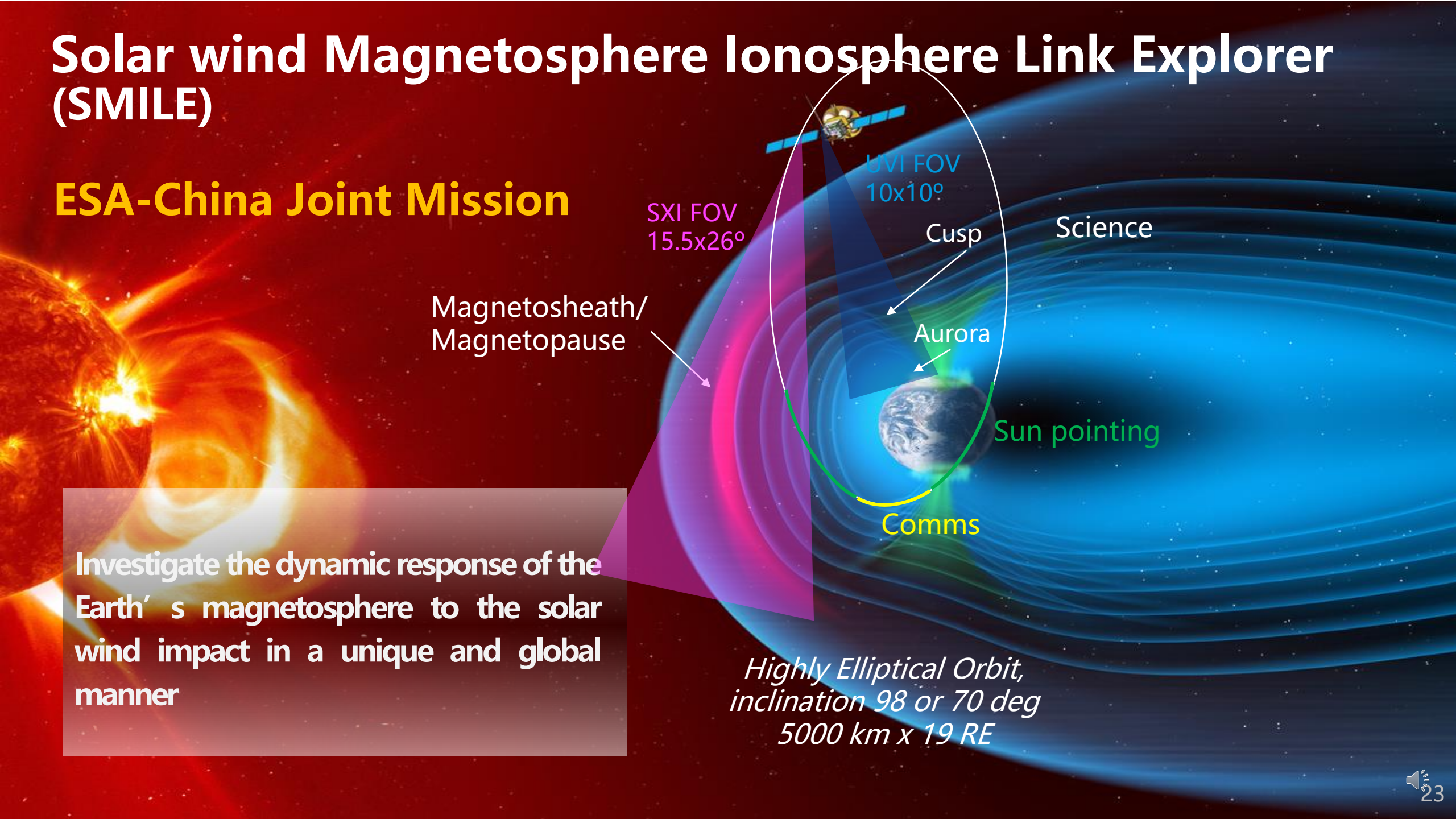


- **2022-11-11,11:32 UT**



Solar wind Magnetosphere Ionosphere Link Explorer (SMILE)

ESA-China Joint Mission



Investigate the dynamic response of the Earth's magnetosphere to the solar wind impact in a unique and global manner

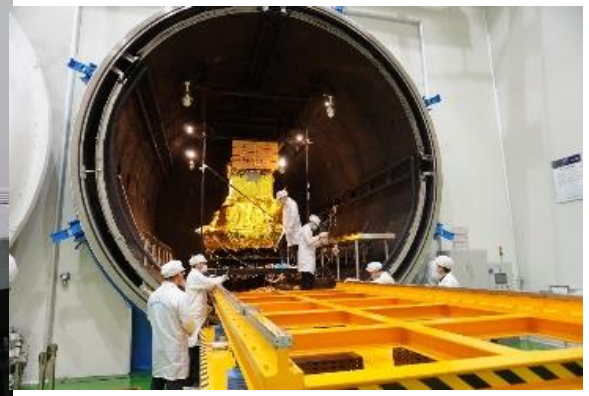
Highly Elliptical Orbit, inclination 98 or 70 deg 5000 km x 19 RE

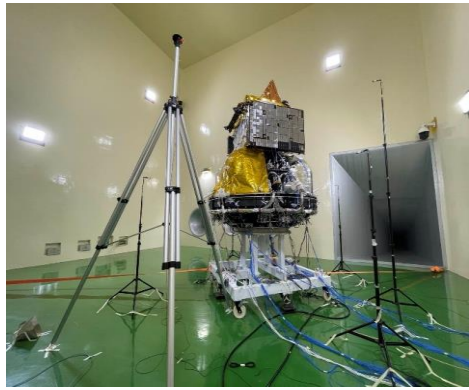
SMILE

Aug - Oct. 2022
Satellite’s Mechanical and Thermal test

May. 2023
M-CDR

May. 2025
Launch

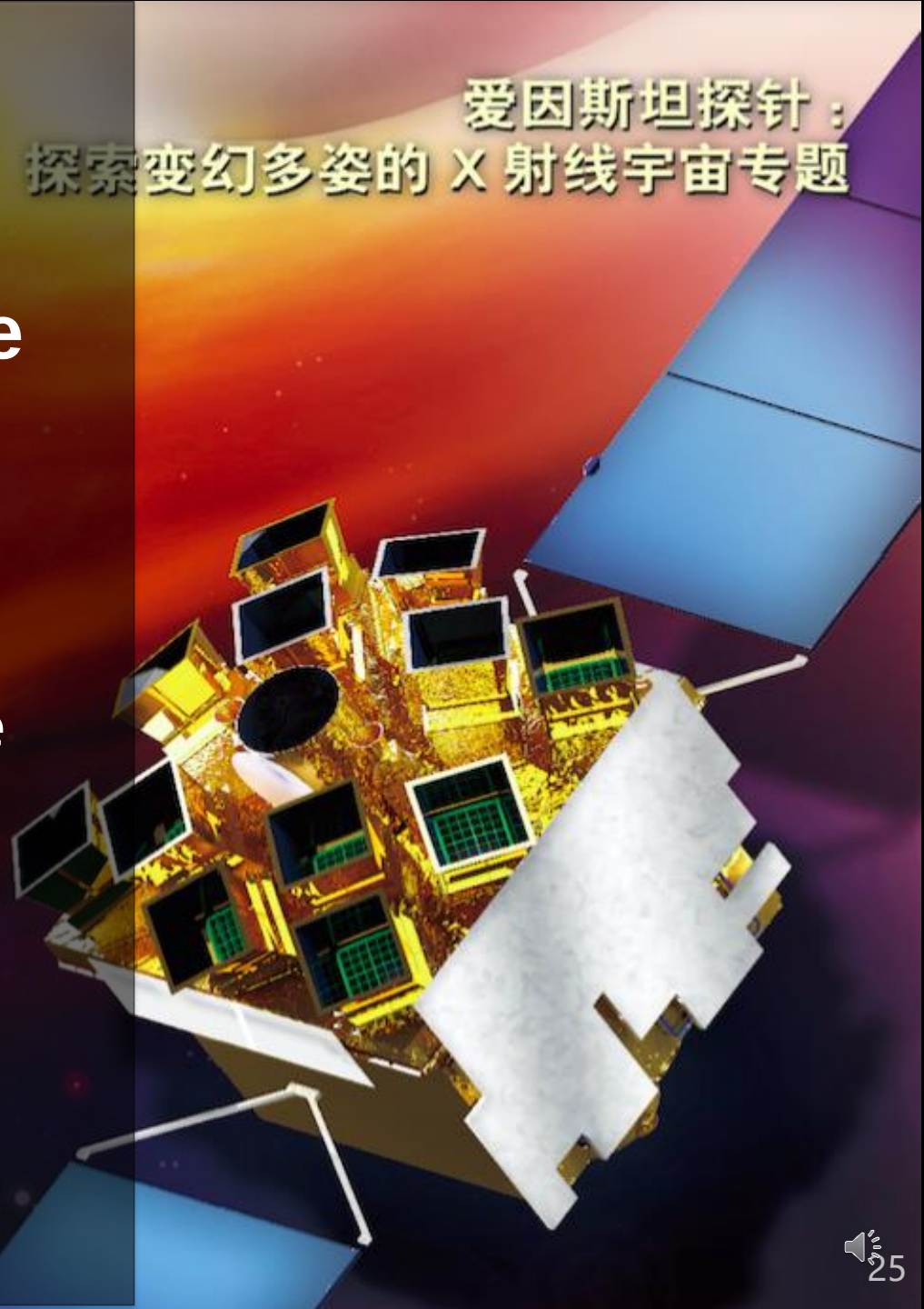




Einstein Probe (EP)

exploring the dynamic X-ray universe

- Carry out systematic survey of soft X-ray transients and variability of X-ray sources at unprecedented sensitivity and high cadence



- **Phase-C: January 2020**
- **Expected Launch date: Oct, 2023**

EP

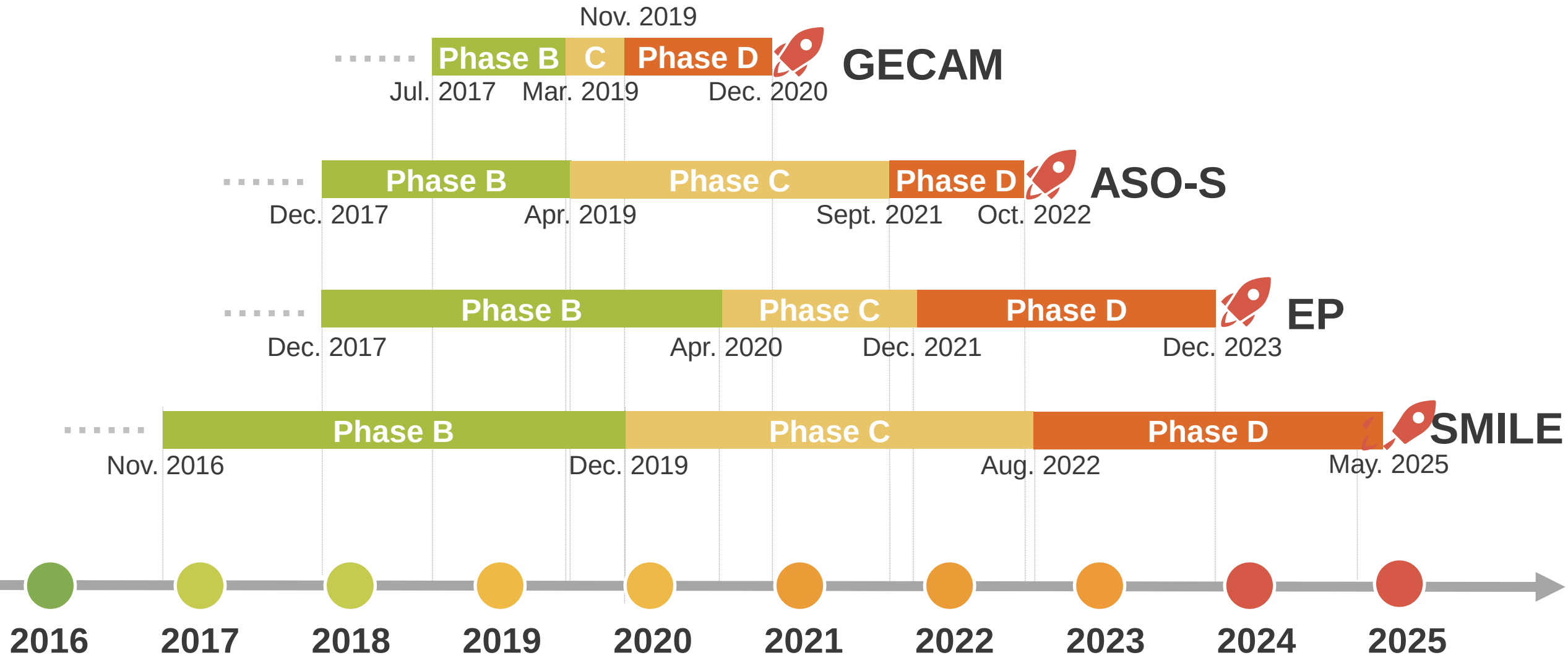
- Mar.2022,EP SC CDR
- Jul.2022,FXT MA calibration
- Aug.2022,WXT E2E calibration
- Oct.2022,FM units interface test

Dec. 2022
FM interface test

May. 2023
Satellite AIT

Dec. 2023
Launch

Implementation Plan



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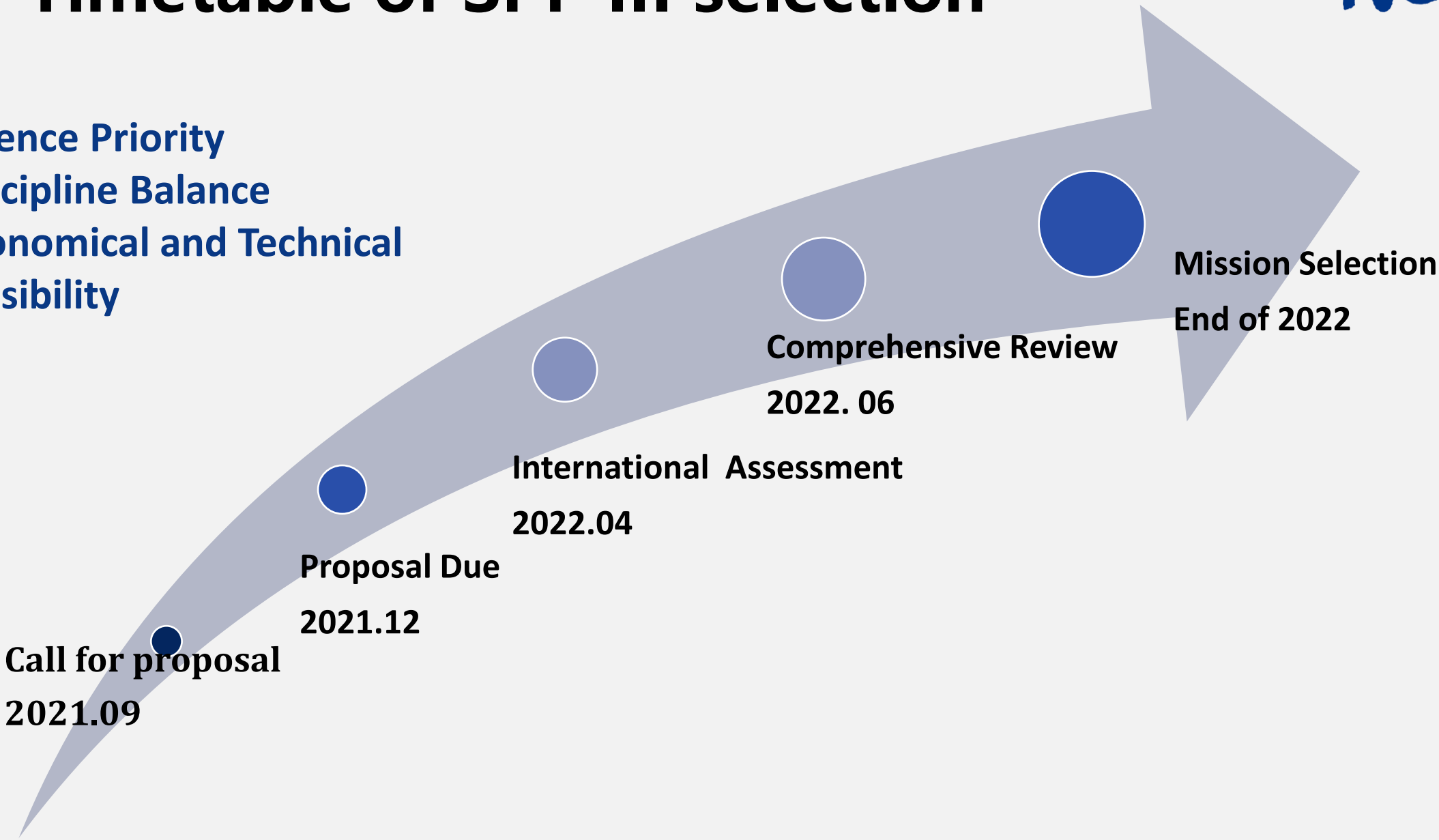
Timetable of SPP III selection

- Science Priority
- Discipline Balance
- Economical and Technical feasibility

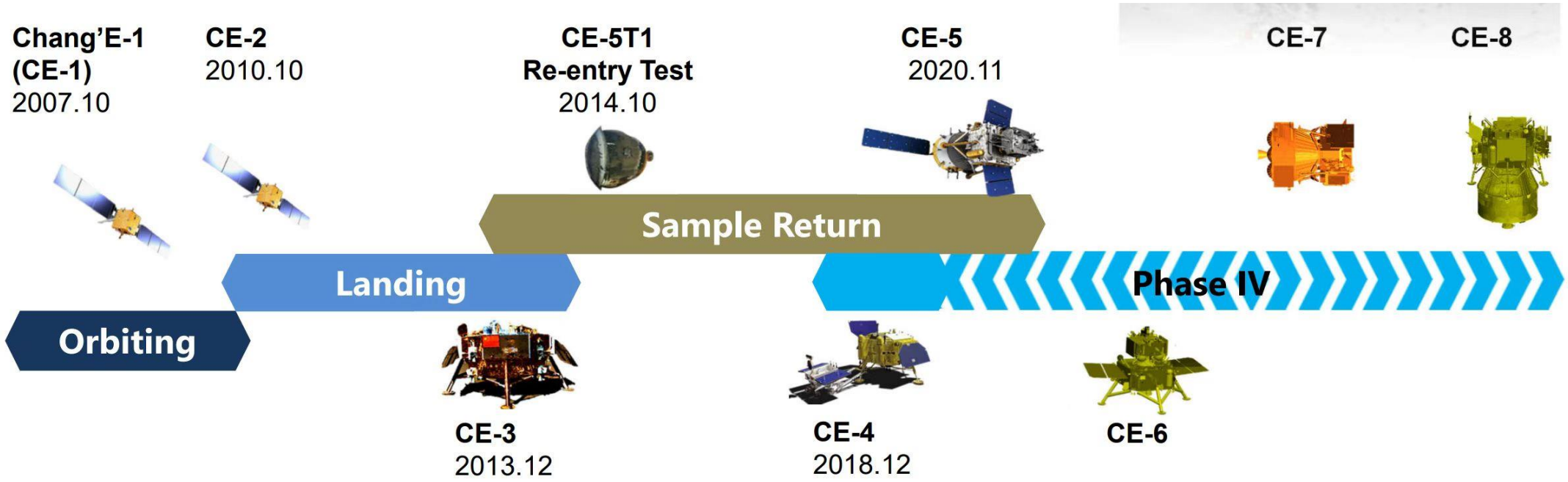


Nationwide Call for SPP3 Missions

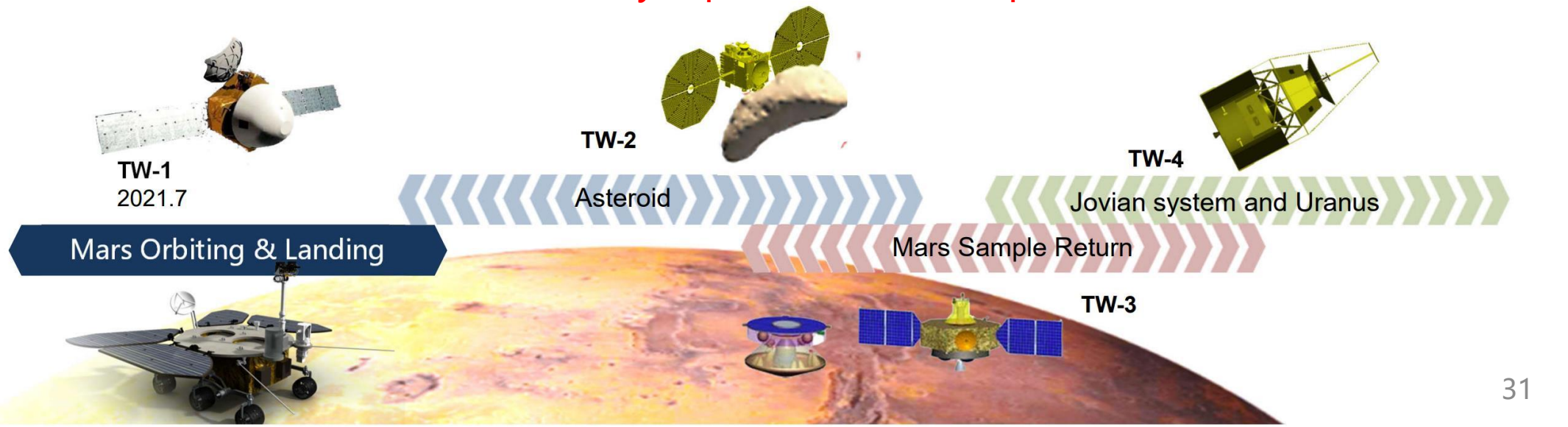
- To be implemented in 2023-2028.
- Call for mission concept at Aug. 2021: 20 applications on 4 science areas

Astrophysics	enhanced X-ray Timing and Polarimetry mission,eXTP	8
	Dark Matter Particle Explorer 2, DAMPE 2	
	Very Large Area gamma-ray Space Telescope, VLAST	
	Census of WHIM, Accretion, Feedback Explorer, CAFÉ	
	Ultra-long Wavelength Astronomical Observation Array	
	Closeby Habitable Exoplanet Survey, CHES	
	Earth II, ET	
	Stellar Activity and Planetary Habitability Explorer, ZITONG	
Heliophysics	Solar Ring	6
	Solar Polar Explorer	
	Solar Terrestrial Environment Monitor， STEM	
	Self-Adaptive Magnetic reconnection Explorer, AME	
	Wide Field Heliospheric Marginal Neutral Atom Imager	
	Earth Occulted Solar Eclipse at L2	
Planetary Science	E-type Asteroid Sample Return Mission	2
	Venus Volcano and Climate Explorer mission,VOCE	
Earth Science	Ocean Surface Current multiscale Observation Mission,OSCOM	4
	Global Climate and Atmospheric Composition Monitor	
	GUANLAN Ocean Explorer	
	Solar Spectral Irradiance Observatory	

China Lunar Exploration Roadmap



China Planetary Exploration Roadmap




What we expect in New Horizon:
Science and Cooperation