

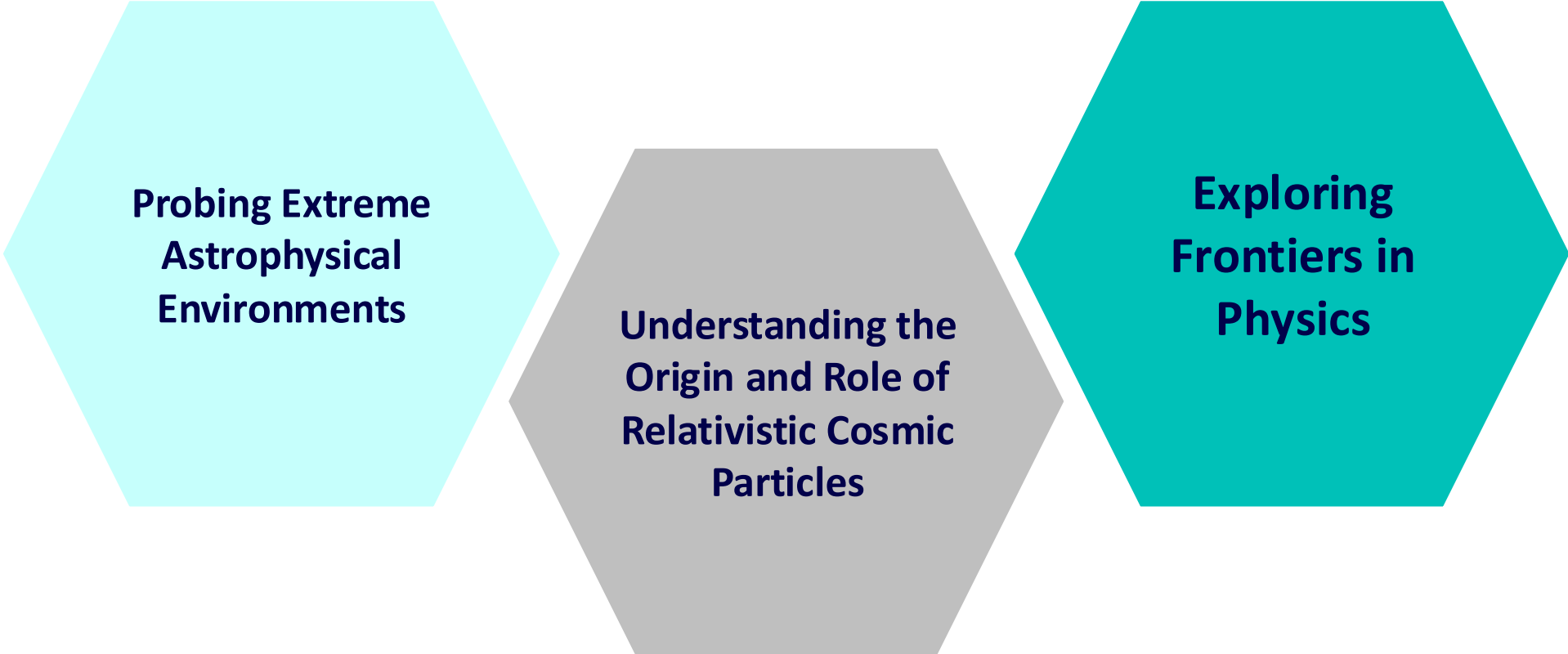
CTAO – A New Era for Astroparticle Physics at the Highest Energies

TeV Particle Astrophysics (TeVPA) conference September
1st 2026

Ivana Batković, Coordinator of the Gamma-Ray Joint Centre of Expertise on behalf of the CTAO Project Science Office
ivana.batkovic@cta-observatory.org

The CTAO science

3 PHYSICS THEMES:



**Probing Extreme
Astrophysical
Environments**

**Understanding the
Origin and Role of
Relativistic Cosmic
Particles**

**Exploring
Frontiers in
Physics**

The CTAO science

3 PHYSICS THEMES:

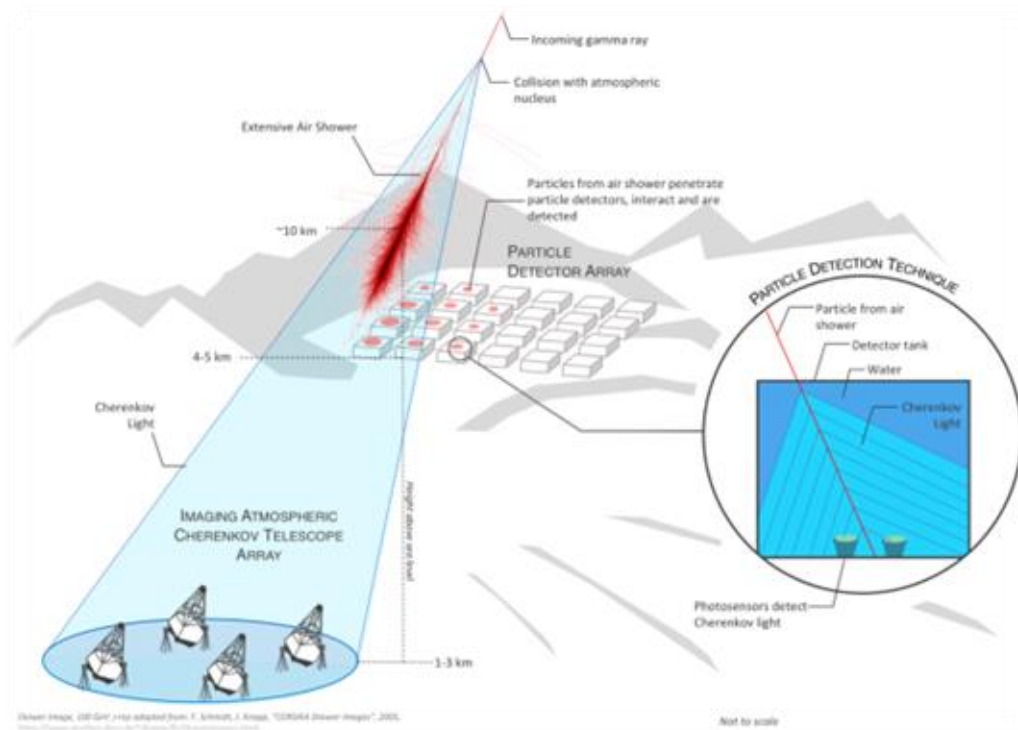
See talks by S. Abe, P. Bhattacharjee, M. Croissonier, Z. Curtis-Ginsberg L. Foffano, M. Hashizume, K. Hayashi,, M. Mizuno, A. Simongini, T. Terzić...

**Probing Extreme
Astrophysical
Environments**

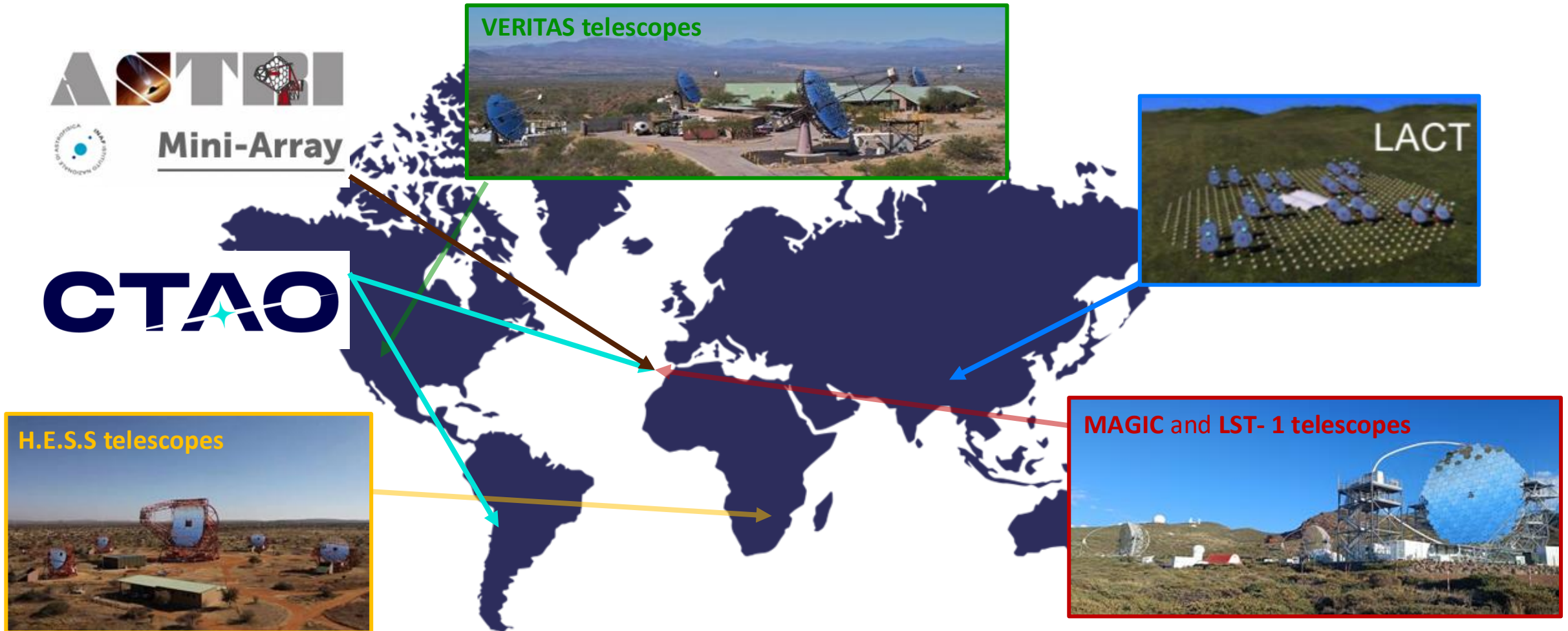
**Understanding the
Origin and Role of
Relativistic Cosmic
Particles**

**Exploring
Frontiers in
Physics**

Imaging Atmospheric Cherenkov Telescopes (IACTs)



Updates on the IACTs world map



The CTAO

The Cherenkov Telescope Array Observatory

- Cover a wide energy range through complementary designs

LSTs – 20 GeV to 3 TeV

MSTs – ~100 GeV – 50 TeV

SSTs – 2 TeV up to ~ 300 TeV

Alpha configuration

North (left):

4 LSTs and 9 MSTs

South (below):

14 MSTs and 37 SSTs



The CTAO

The Cherenkov Telescope Array Observatory

- Cover a wide energy range through complementary designs

LSTs – 20 GeV to 3 TeV

MSTs – ~100 GeV – 50 TeV

SSTs – 2 TeV up to ~ 300 TeV

Beta configuration

North (left):

4 LSTs and 9 MSTs

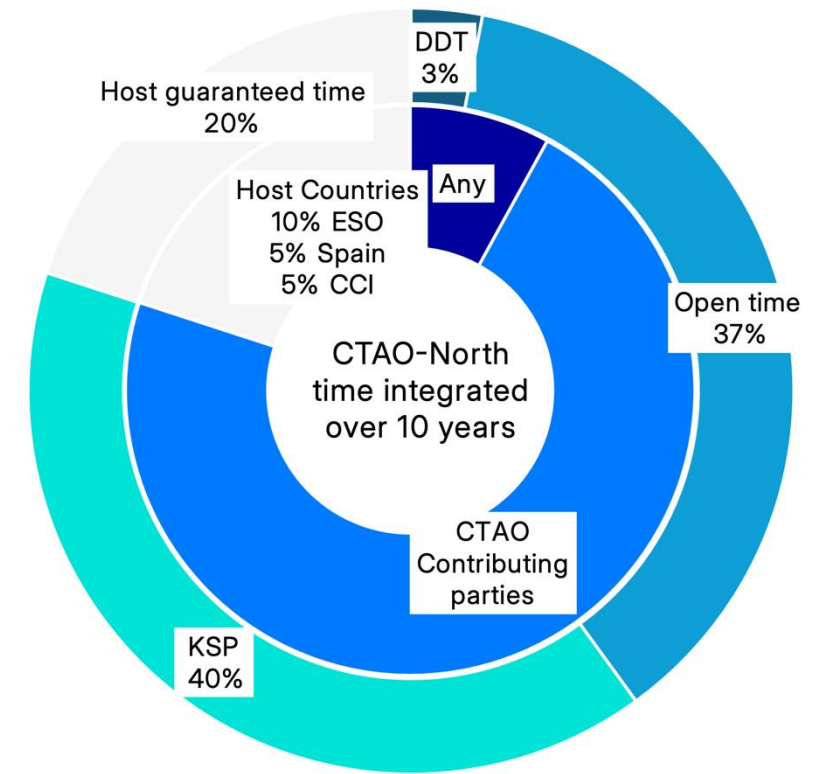
South (below):

2 LSTs, 14 MSTs and 37 SSTs



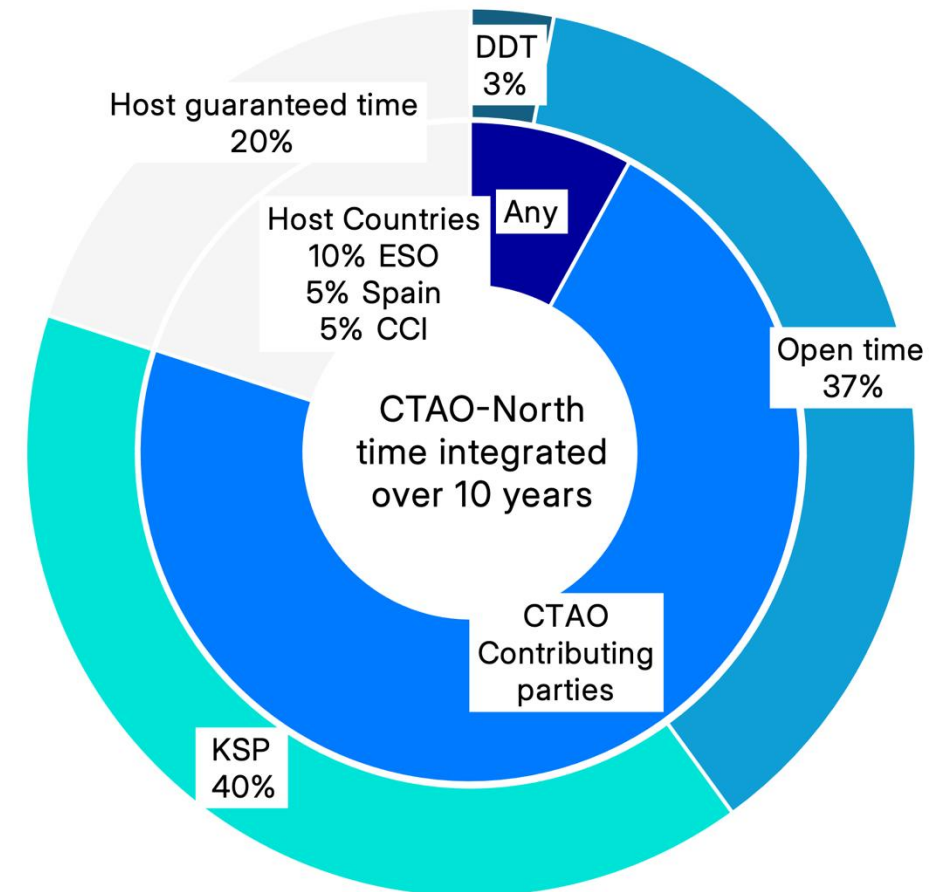
The CTAO

- CTAO is an **ERIC** (European Research Infrastructure Center) since 7th Jan 2025
- Funded by 9 European Member States, ESO and Japan. Australia, Brazil and possibly USA are on their way to join the project
- The first open, proposal-driven gamma-ray observatory in the world
- Unprecedented performance over the existing IACTs
- Cornerstone of Multi-Wavelength (MW) and Multi-Messenger (MM) Astrophysics

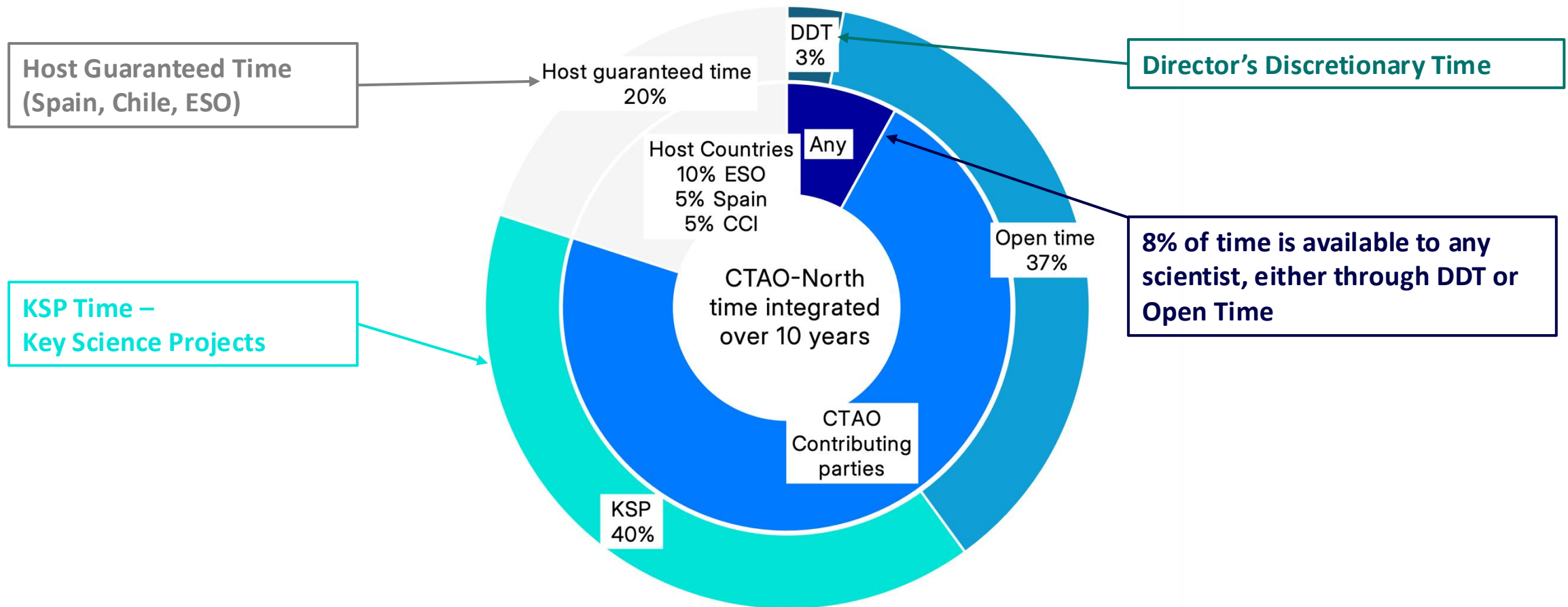


The CTAO

- CTAO is an **ERIC** (European Research Infrastructure Center) since 7th Jan 2025
- Funded by 9 European Member States, ESO and Japan. Australia, Brazil and possibly USA are on their way to join the project)
- **The first open, proposal-driven gamma-ray observatory in the world**
- Unprecedented performance
- Cornerstone of Multi-Wavelength (MW) and Multi-Messenger (MM) Astrophysics

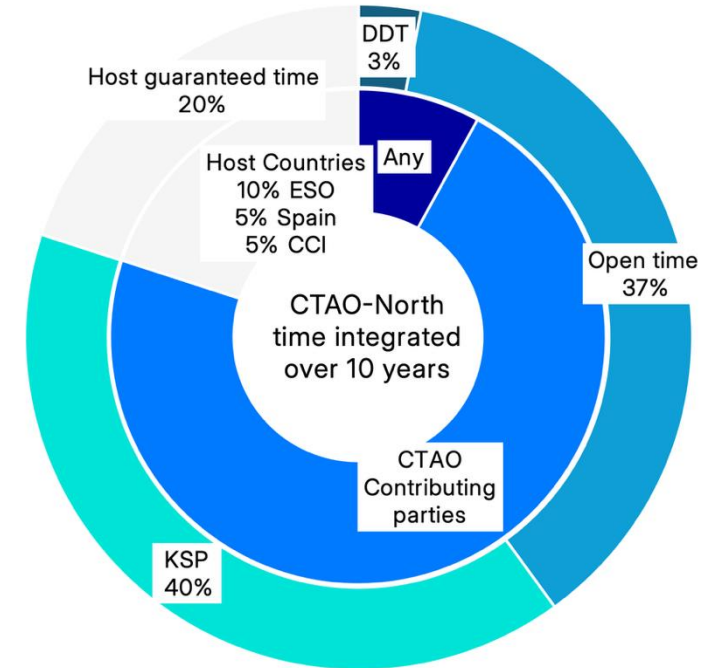


The CTAO



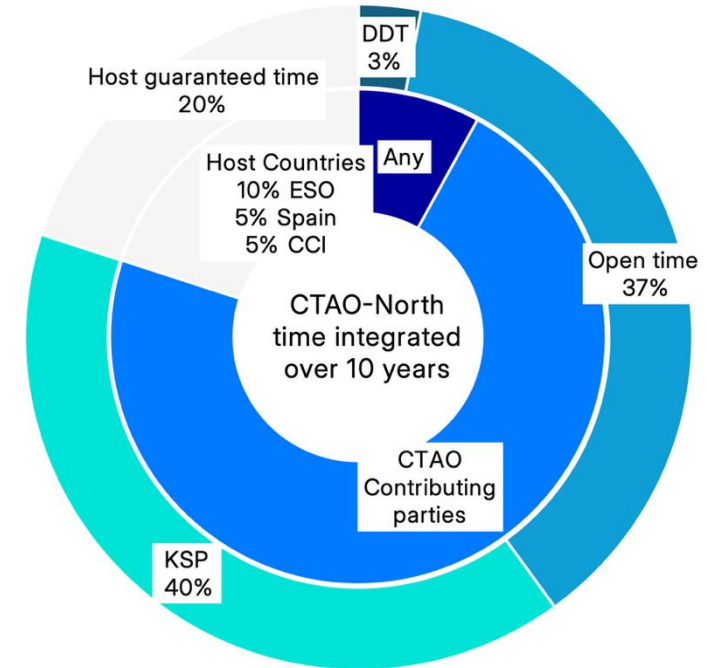
The CTAO

- Annual announcement of opportunity and call for proposals (every lunar cycle, ~ 13 months)
- All science proposals will be evaluated by the CTAO Time Allocation Committee (TAC) purely on scientific merit
- Data will have a proprietary 1 year period after which it will become public
- KSP time will be allocated upon the condition that the CTAO Science Collaboration requests for it through dedicated KSP call and carries over the corresponding analyses



The CTAO

- Annual announcement of opportunity and call for proposals (every lunar cycle, ~ 13 months)
- All science proposals will be evaluated by the CTAO Time Allocation Committee (TAC) purely on scientific merit
- Data will have a proprietary 1 year period after which it will become public
- KSP time will be allocated upon the condition that the CTAO Science Collaboration requests for it through dedicated KSP call and carries over the corresponding analyses



Proposals requesting **more than 300 hr** of observing time, and through **several observing periods**, delivering **legacy data sets**, science data products and source catalogues, which are produced in a **coherent fashion, on key science cases promising major breakthroughs**.

The CTAO timeline

IKC Construction

- Telescopes
- Array Common Elements
- Commissioning of array elements
- Preparation of the CTAO software

System Commissioning

- Integration, verification and validation of array ele.
- Science verification of system releases

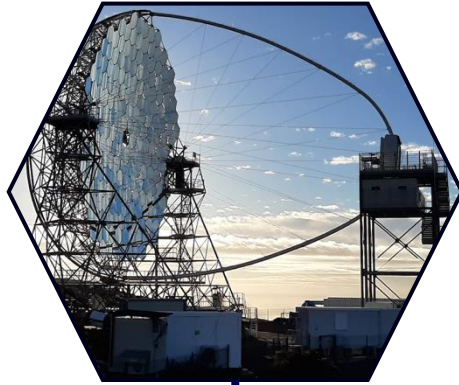
The CTAO timeline

IKC Construction

- Telescopes
- Array Common Elements
- Commissioning of array elements
- Preparation of the CTAO software

System Commissioning

- Integration, verification and validation of array ele.
- Science verification of system releases

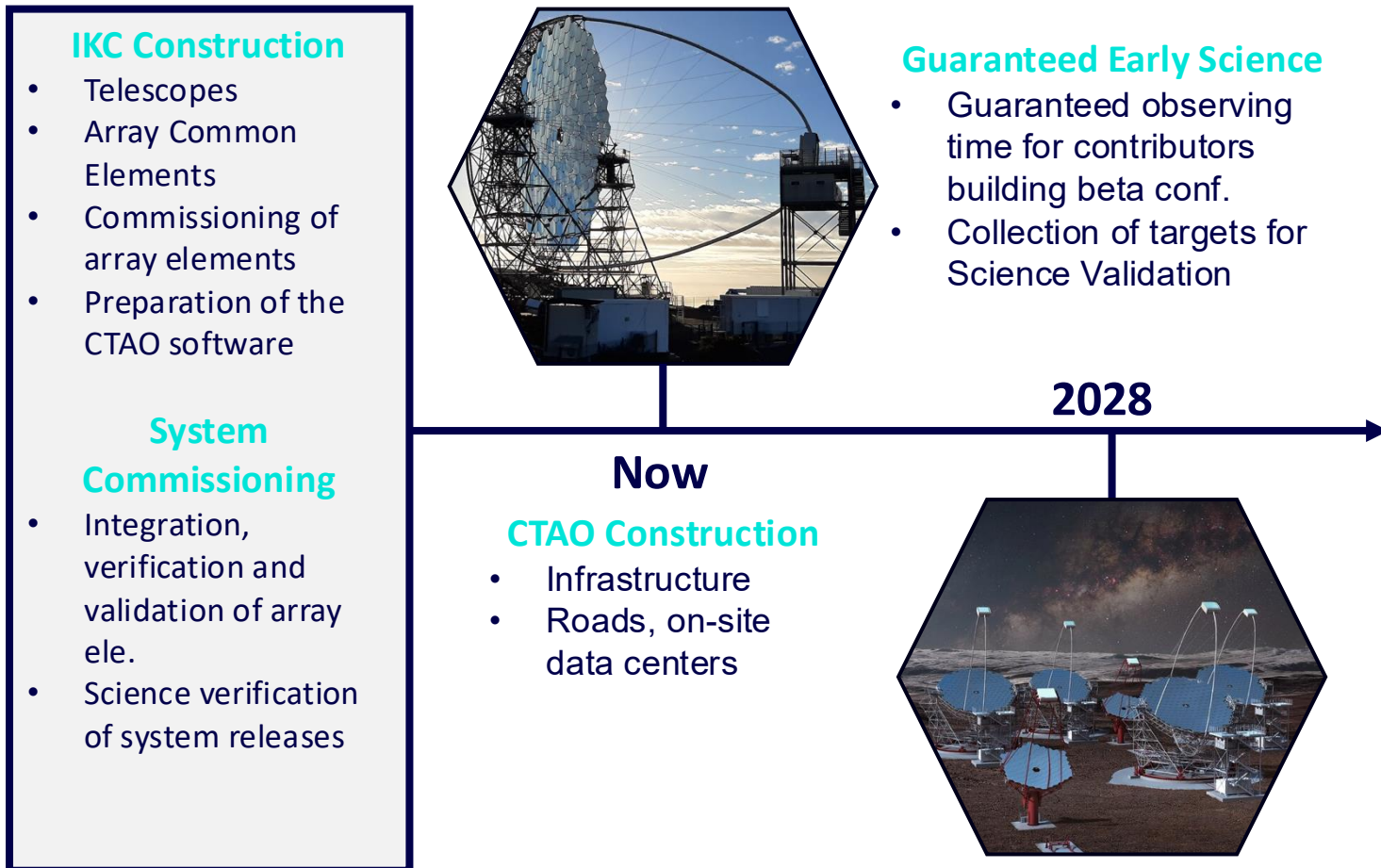


Now

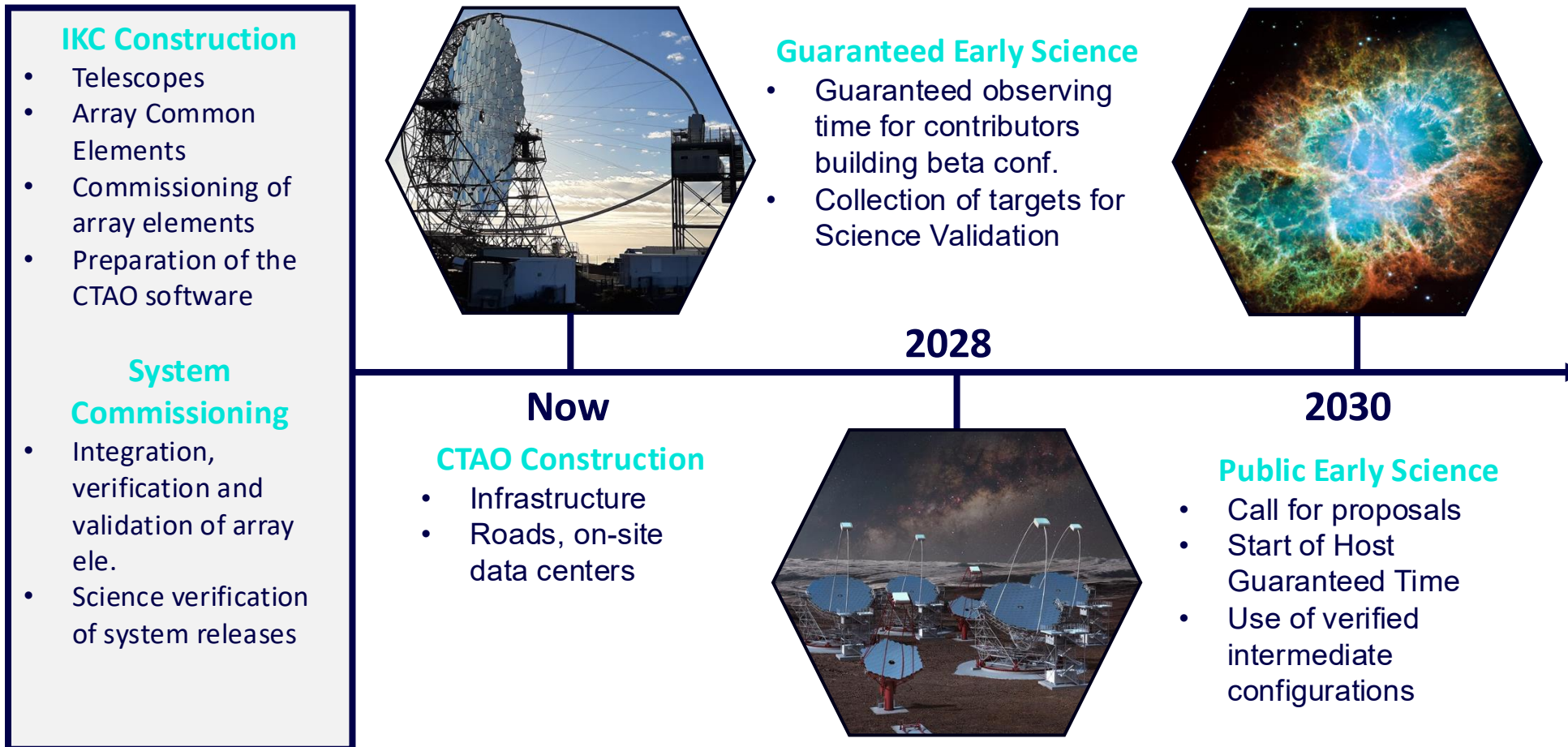
CTAO Construction

- Infrastructure
- Roads, on-site data centers

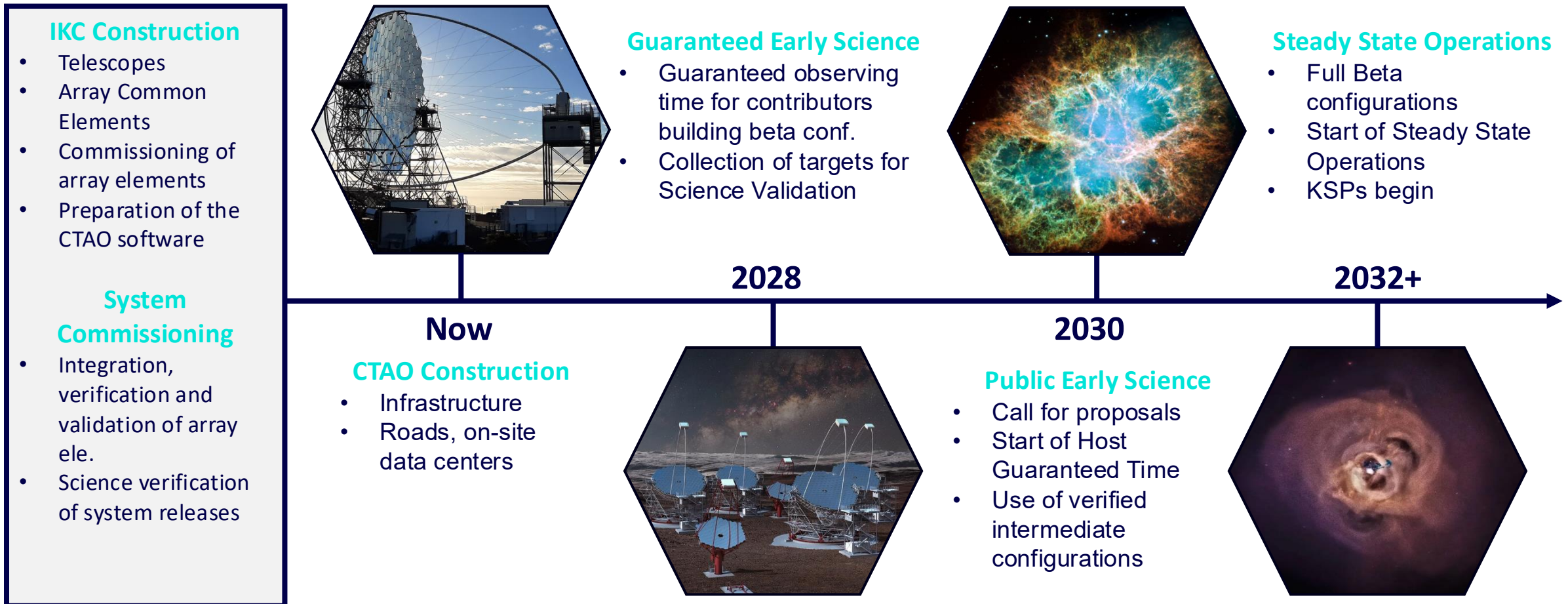
The CTAO timeline



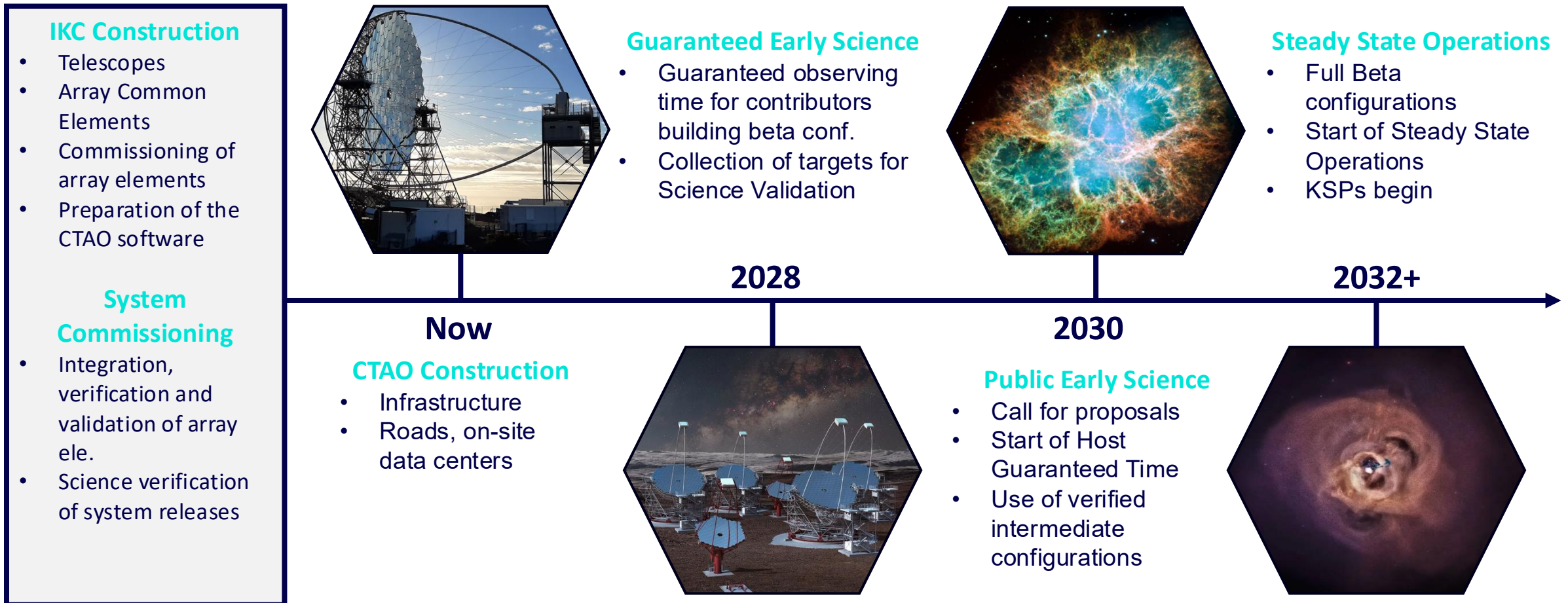
The CTAO timeline



The CTAO timeline



The CTAO timeline



The CTAO construction

CTAO-North

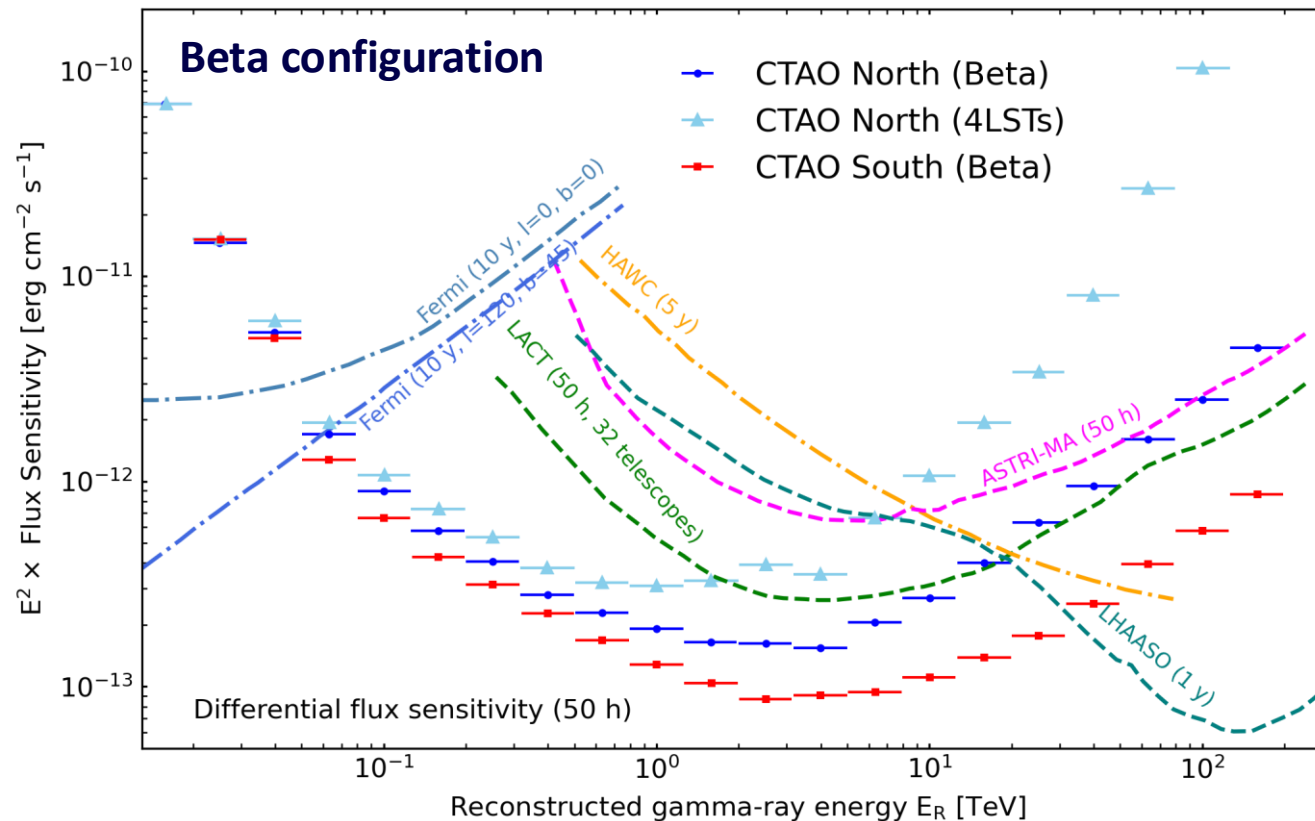


CTAO-South



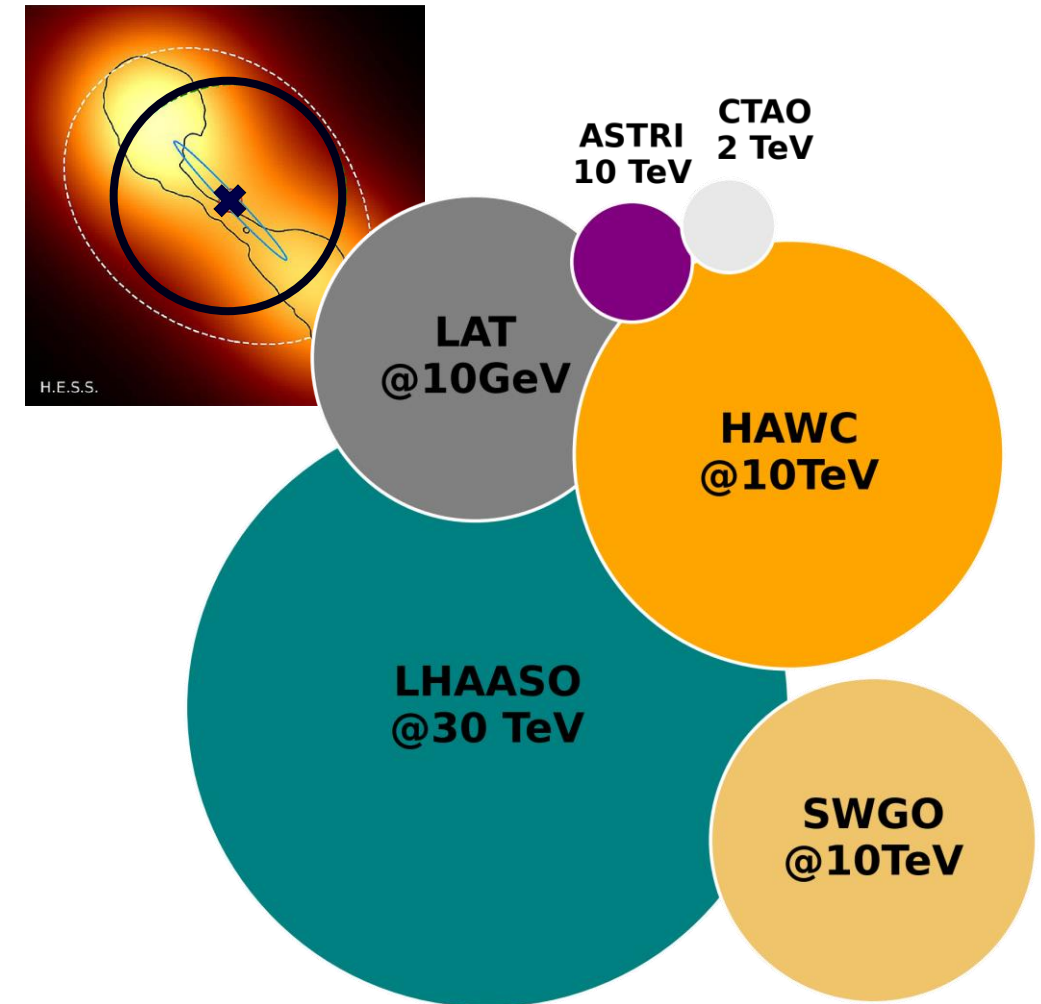
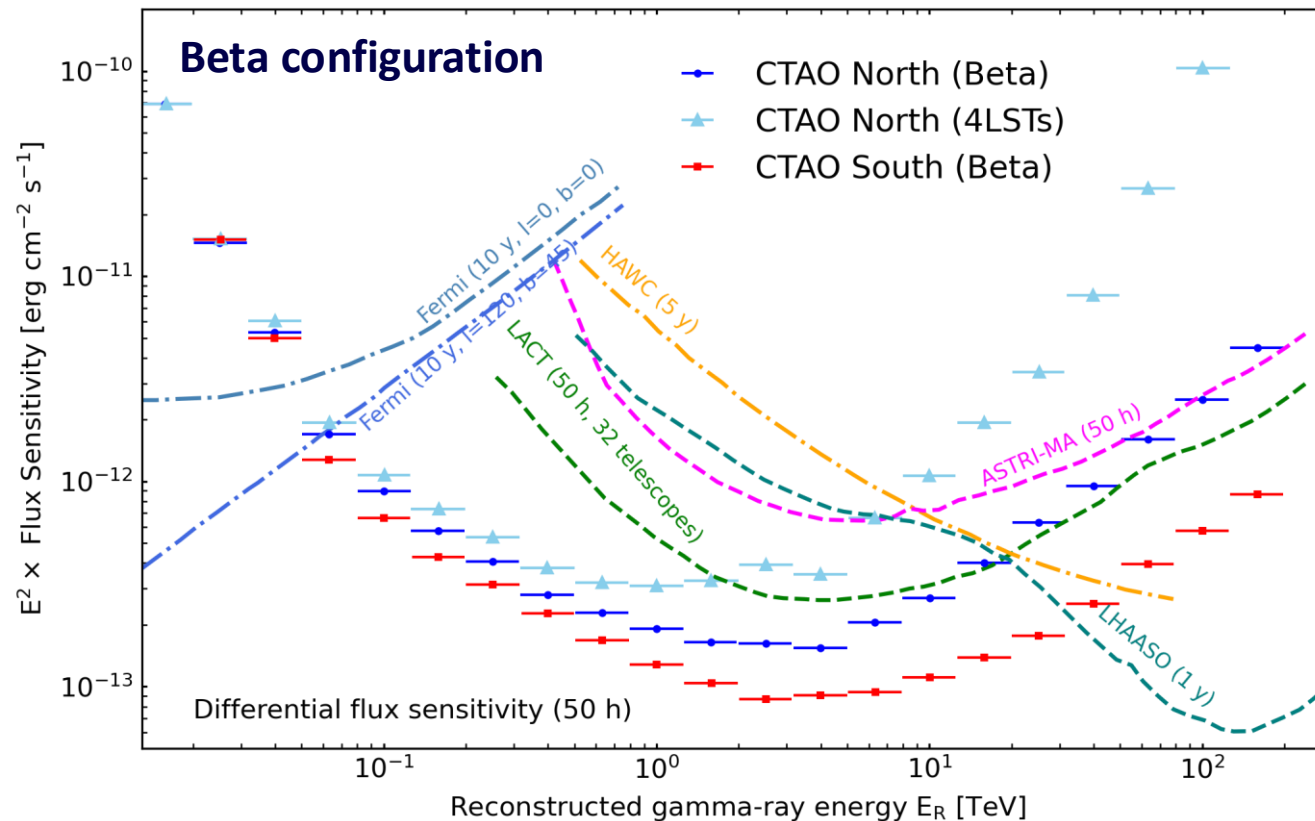
CTAO performance

Steady-source sensitivity



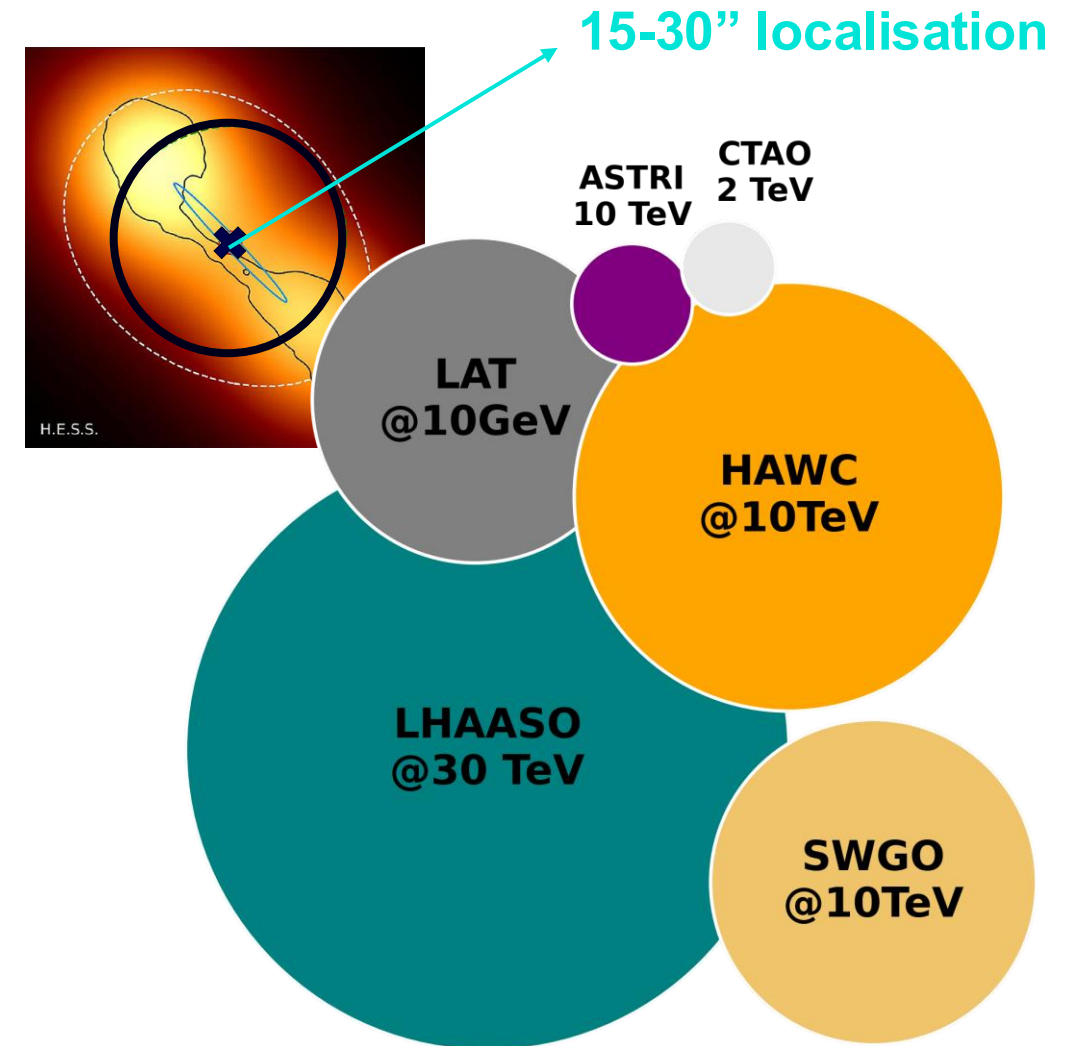
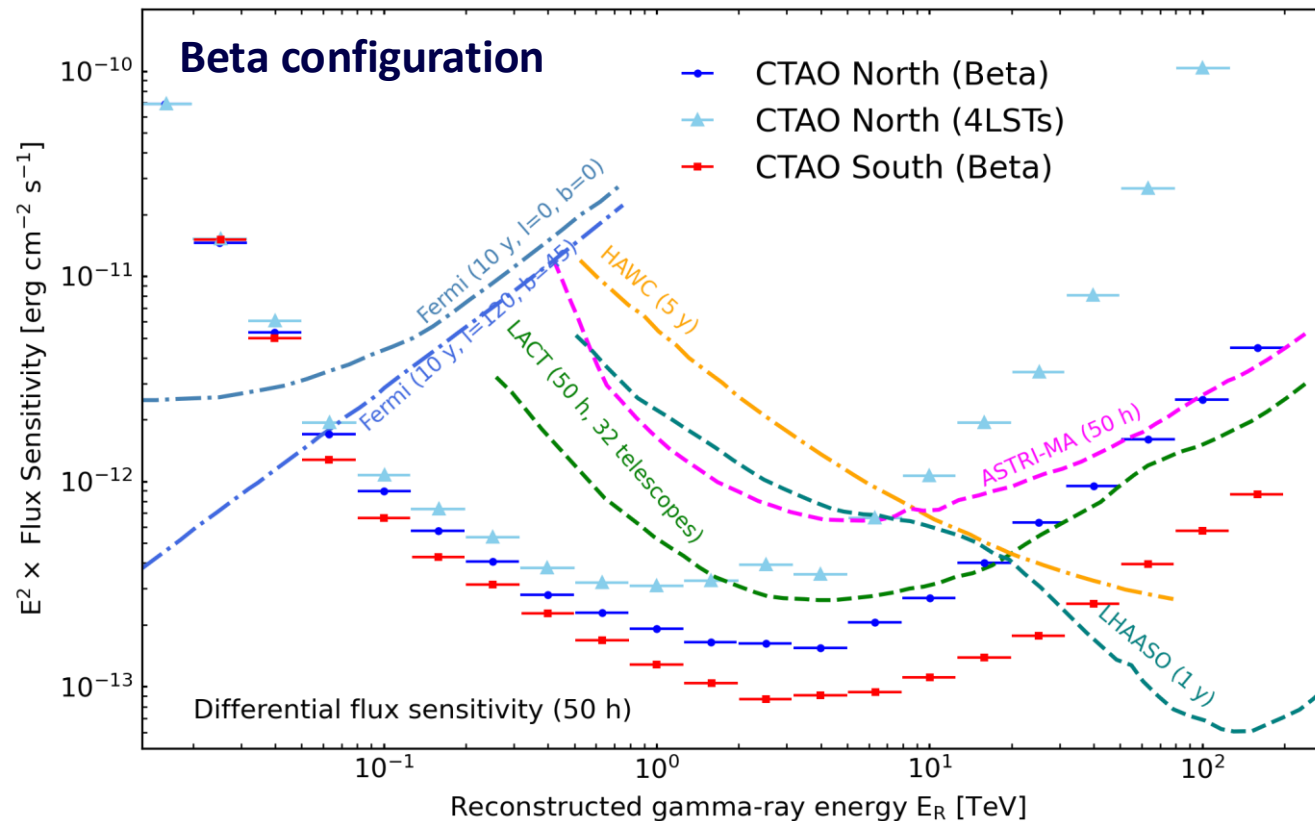
CTAO performance

Steady-source sensitivity



CTAO performance

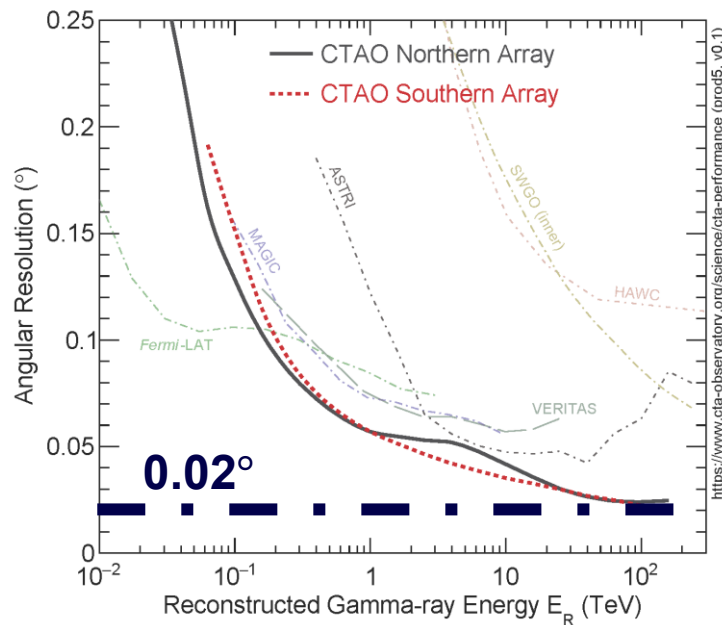
Steady-source sensitivity



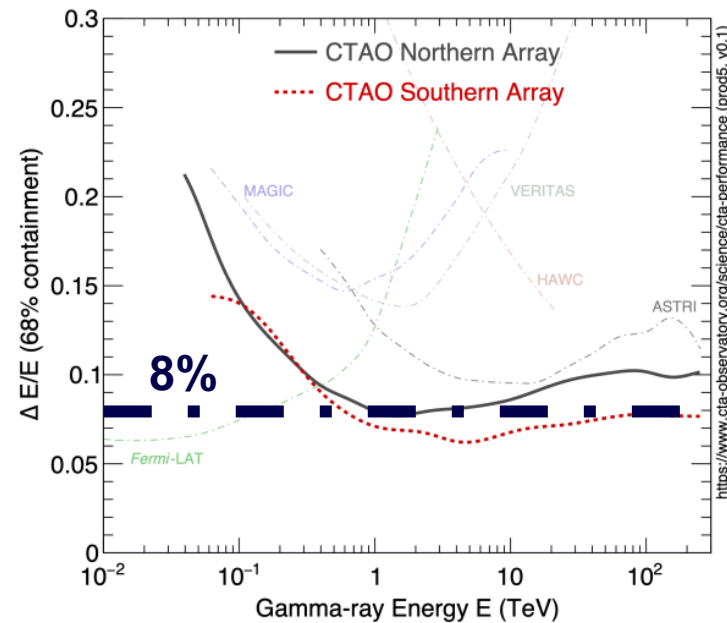
CTAO performance

Steady-source sensitivity

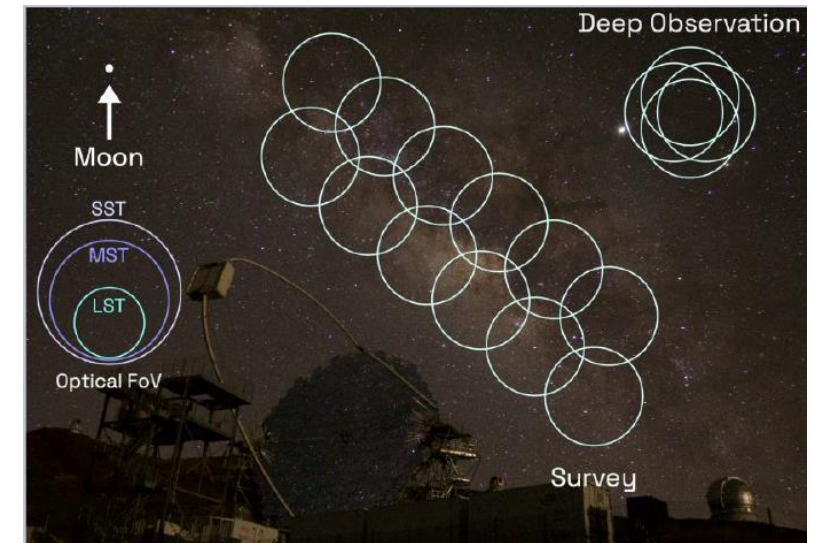
Angular resolution



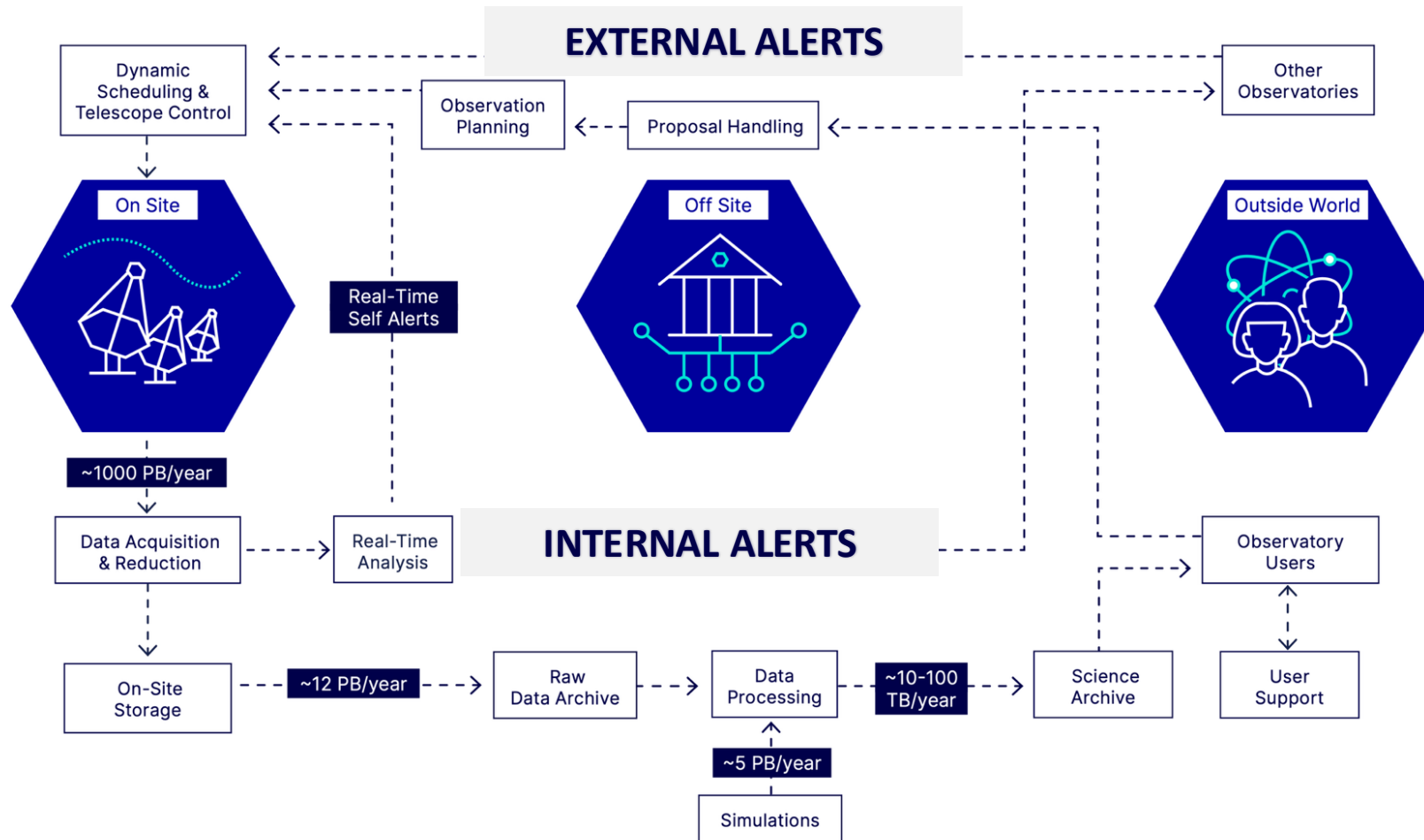
Energy resolution



Field of View & Obs. Modes

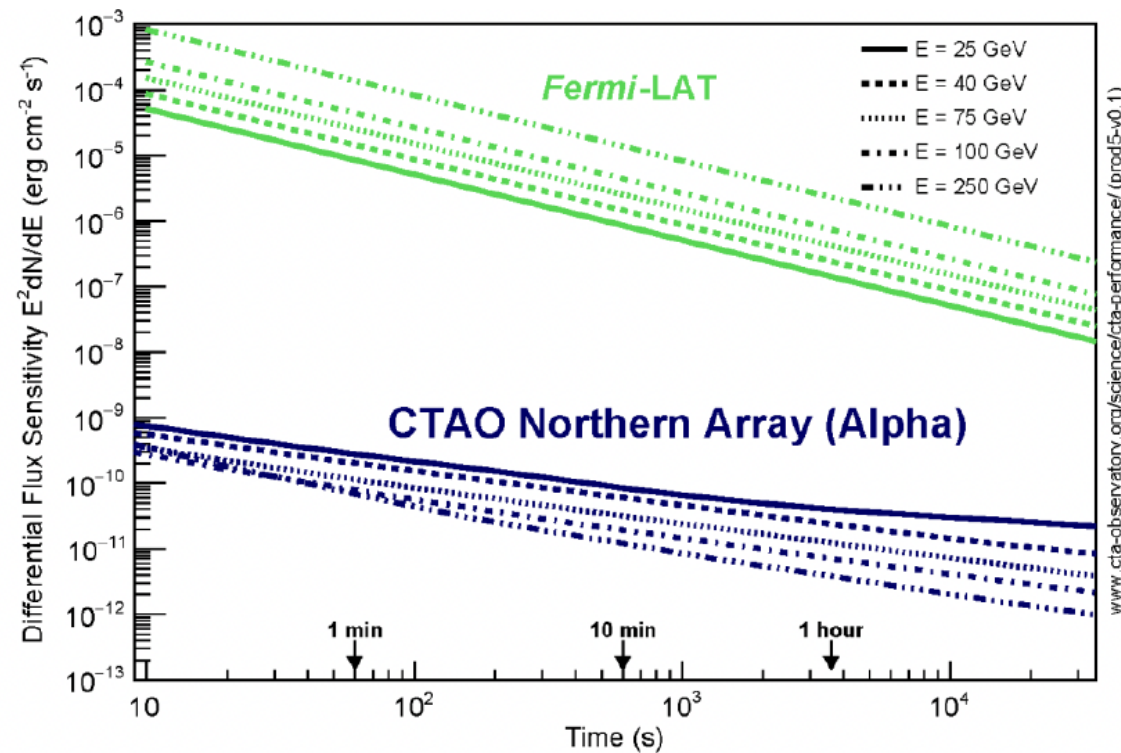


CTAO in MM and MWL astronomy



CTAO performance

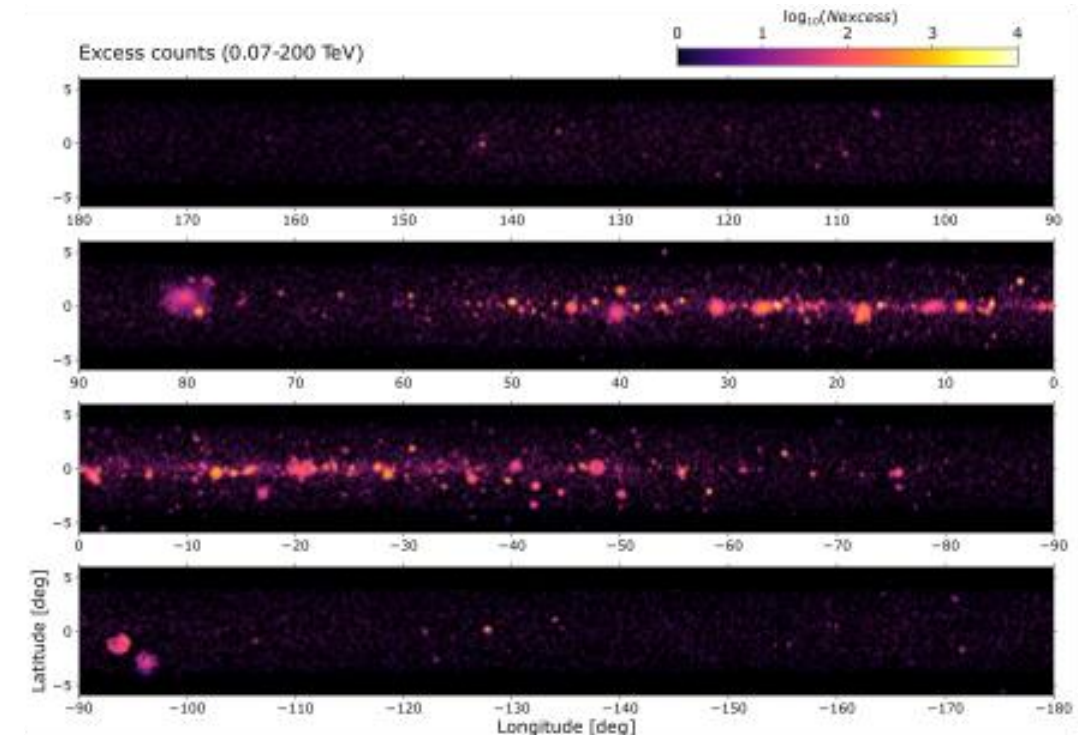
Transient sensitivity



- Once it receives an alert, LST can point any point in the sky in 20''
- CTAO will have unbeaten sensitivity to transients
- Orders of magnitude more sensitive for durations below 1 h
- New observation modes and strategies for transients follow-up

CTAO Open Science Data Challenge

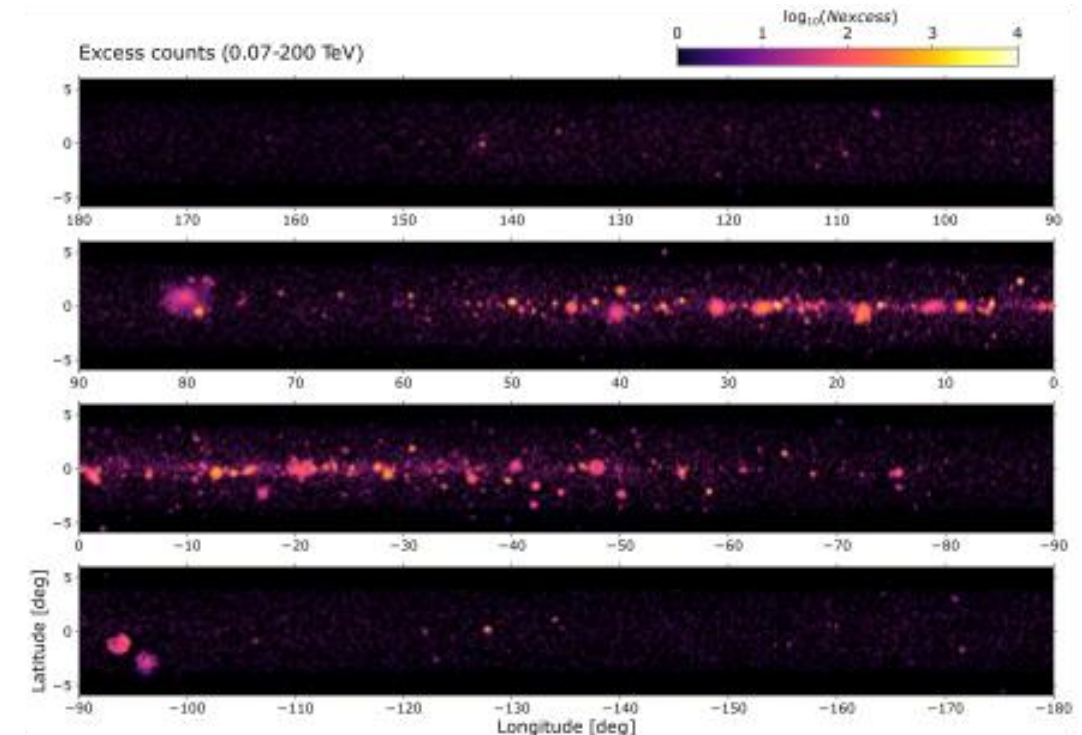
- Perfect moment to engage with the CTAO data, Science Analysis Tools and the CTAO in general
- **7 years of simulated, science-ready data**
- **User Support and support materials will be available** – reducing the entry barrier for all who are not familiar with VHE gamma-ray astronomy and IACTs
- Test-bench for early data access interfaces
- Validation of core CTAO software chain
- Early familiarisation with **Science Operations**



STAY TUNED, COMING SOON!

CTAO Open Science Data Challenge

- Perfect moment to engage with the CTAO data, Science Analysis Tools and the CTAO in general
- **7 years of simulated, science-ready data**
- **User Support and support materials will be available** – reducing the entry barrier for all who are not familiar with VHE gamma-ray astronomy and IACTs
- Test-bench for early data access interfaces
- Validation of core CTAO software chain
- Early familiarisation with **Science Operations**



We invite you to join us at:



[Symposium website](#)

[Gamma connection website](#)

The CTAO school

- After 3 successful editions – **we are continuing the tradition!**
- 10-day CTAO training school in La Palma for PhD students and postdoctoral researchers
- Lectures, data-analysis tutorials, proposal writing, and telescope operations.
- New 2027 focus on **multi-wavelength** and **multi-messenger astronomy** with the CTAO through collaborative student projects

**STAY TUNED, APPLICATIONS
SOON!**



Summary



- The CTAO will be the first **proposal-driven open observatory** for VHE gamma-ray astronomy, with **unprecedented sensitivity and performance**.
- **Extreme environments, cosmic particles, and fundamental physics** are the three key CTAO science themes.
- The CTAO Central Office and Consortium are preparing for future **operations** and **new science**.
- Through the Open Science Data Challenge, the community is already engaging with **science-ready data, analysis tools, and operational concepts**.
- Existing and upcoming initiatives are expanding the **community of future users** and awareness of **CTAO's scientific potential**.