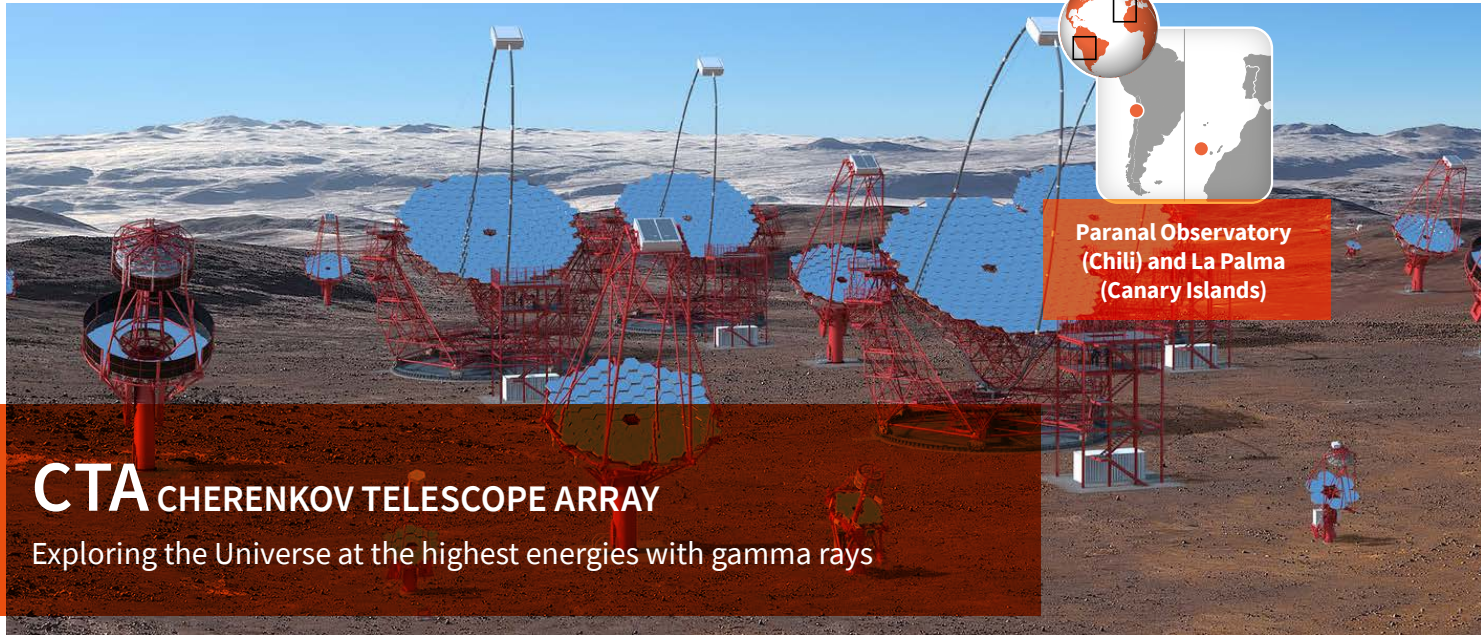


## Very high energy gamma rays



# CTA CHERENKOV TELESCOPE ARRAY

Exploring the Universe at the highest energies with gamma rays

Paranal Observatory (Chili) and La Palma (Canary Islands)

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- **Scientific leader:** Stephen Fegan (LLR) \*
- **Laboratories involved:** APC (Paris), CPPM (Marseille), IJCLab (Orsay), LAPP (Annecy), LLR (Palaiseau), LP2I (Bordeaux), LPNHE (Paris), LUPM (Montpellier)
- **Nature:** research infrastructure
- **Status:** project under construction, involving mainly France, Germany, Italy, Japan, Spain
- **Website:** <https://www.cta-observatory.org/>

### SCIENTIFIC OBJECTIVES

CTA will study very high energy gamma-ray photons from the most violent phenomena in the Universe. Two sites are planned to observe the entire sky. The first, in the south of the globe at the Paranal Observatory in Chile, will be dedicated to the multiple sources in the central regions of our Galaxy. The second, in the north on the island of La Palma in the Canary Islands, will be dedicated to the study of extragalactic sources such as active galactic nuclei. CTA will consist of a network of Cherenkov telescopes of various sizes, observing the bursts of light emitted by particle cascades as very high-energy gamma-ray photons collide with the upper atmosphere.

### RESOURCES DEPLOYED

- More than 60 telescopes from 4 to 23 m in diameter, dispatched over an area of several square kilometres. The telescope structures are approximately 8 to 45 metres high and weigh 8 to 100 tonnes.
- More than 3 000 high reflection mirror facets (90 cm to 2 m in diameter) to focus the light on the telescopes' cameras.
- Three classes of telescopes to provide broad energy coverage from 1 to 1 000 billion times the energy of visible light (20 GeV to 300 TeV).
- 100 Petabytes of data generated in the first five years of operation.

**100%** of the sky is observable

**200** institutes worldwide

**33** participating countries

**30** years of operation

**330** million euros (construction cost)

**1 400** collaboration members

### IN2P3 CONTRIBUTIONS

- Design of fast electronic cameras (NectarCAM) for medium-sized telescopes.
- Design of the arches, camera frames, camera controllers, and motorisation of the 4 large telescopes.
- Simulations and optimisation of the array, starting with the CTA concept study in 2006.
- Development of computational methods for data analysis, formats, archiving and dissemination.

### OTHER FRENCH LABORATORIES INVOLVED

Irfu (CEA Saclay), IPAG (Grenoble), IRAP (Toulouse), LUTH (Meudon), OCA (Nice)

**2008**

Creation of the CTA consortium, 200 laboratories in 33 countries

**2010-2013**

Study to identify sites capable of hosting the observatory

**2014**

Creation of the legal entity CTA Observatory

**2015**

Selection of sites in La Palma (Canary Islands) and Mount Paranal (Chile)

**2016**

Construction begins on the northern site

**2019**

Validation of the qualification models for the proposed cameras and telescopes

**2027**

Planned start of CTA