

A. BERRETTA, P. CRISTARELLA ORESTANO, S. CUTINI, STEFANO GERMANI, P. LUBRANO,
I. MEREU, G. TOSTI

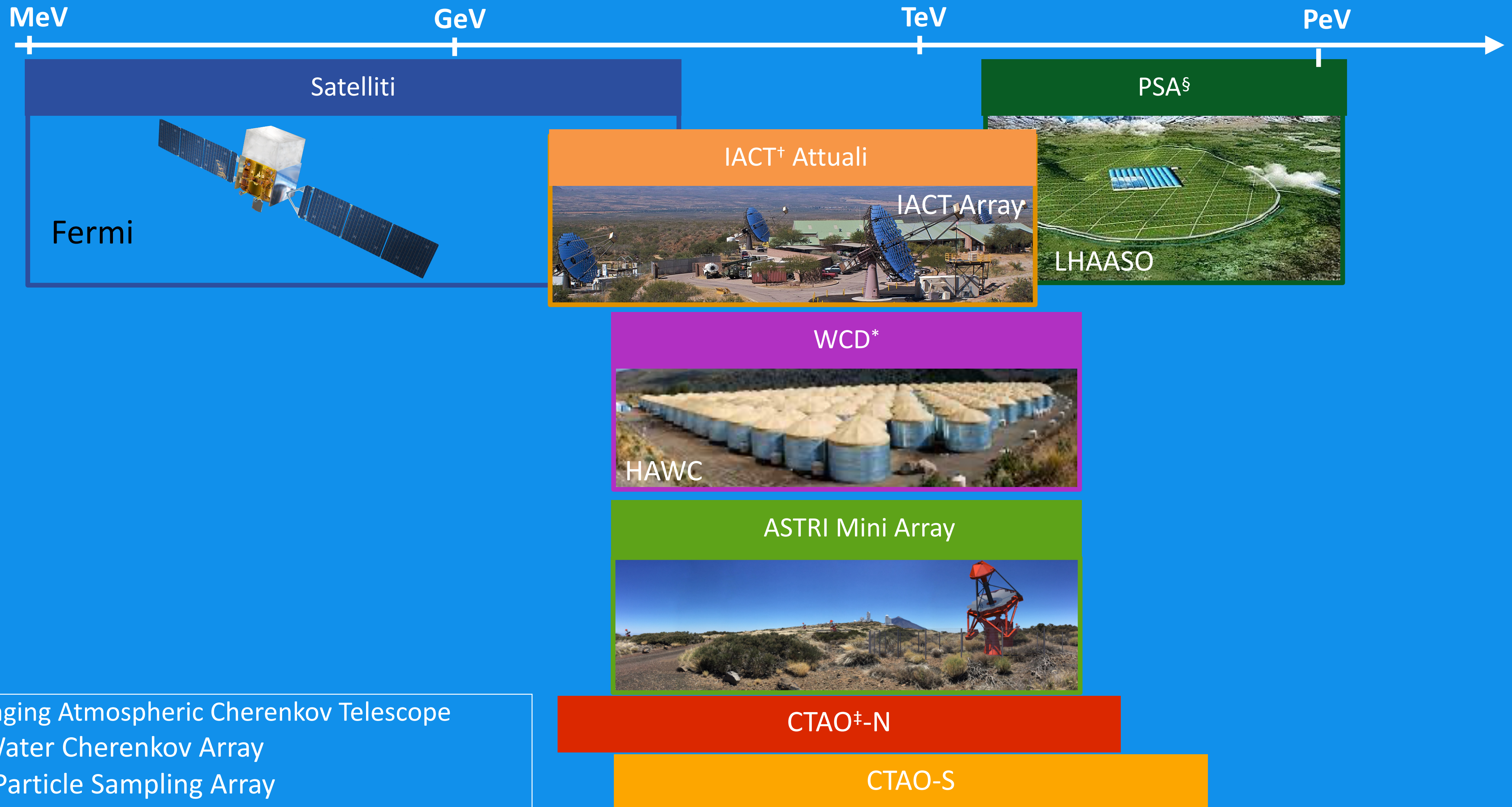
FERMI - ASTRI - CTA

PROGETTI PER L'ASTROFISICA DAL MEV AL TEV

PTSR

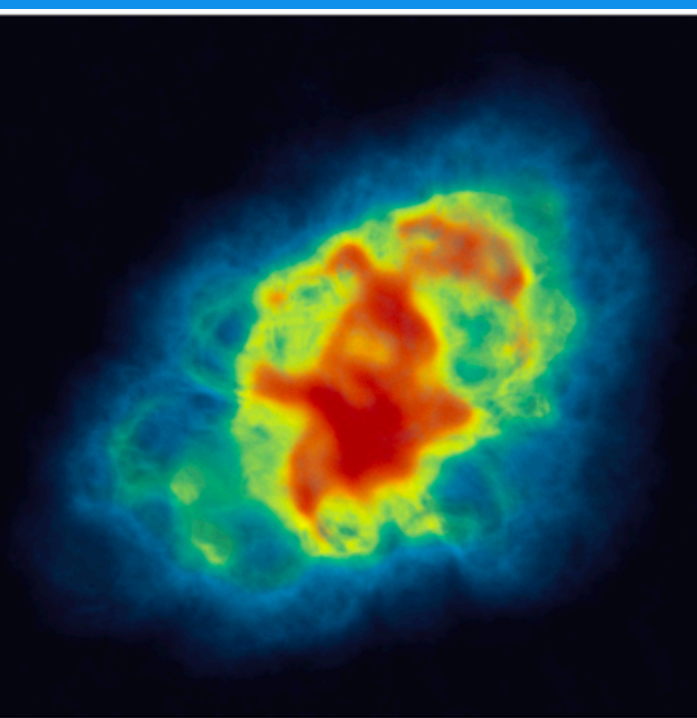
- *Ambito 2: Astrofisica delle alte energie e astroparticelle*
- *Ambito 6: Onde gravitazionali e astrofisica multimessenger, scienza e tecnologia*

ASTROFISICA GAMMA

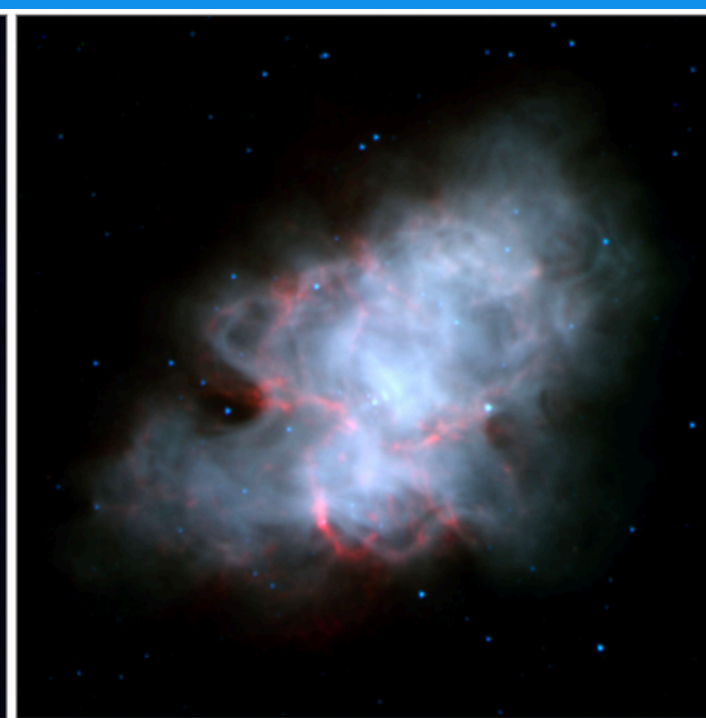


[†]IACT: Imaging Atmospheric Cherenkov Telescope
^{*}WCD: Water Cherenkov Array
[§] PSA: Particle Sampling Array
[‡] CTAO: Cherenkov Telescope Array Observatory

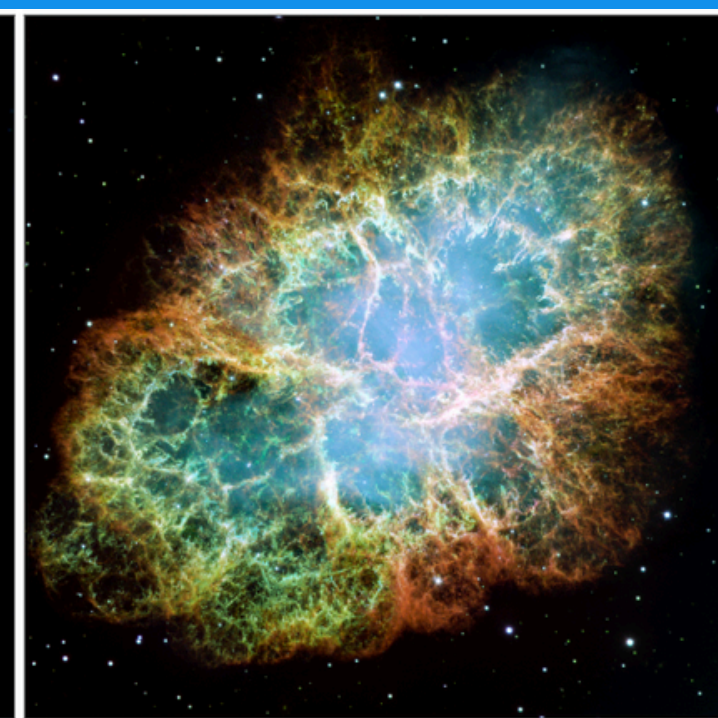
ASTROFISICA GAMMA



RADIO



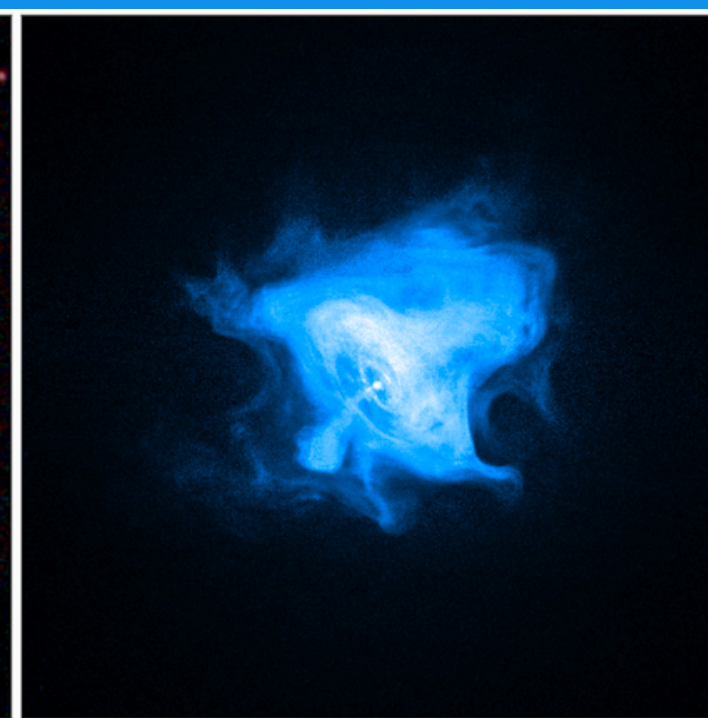
INFRARED



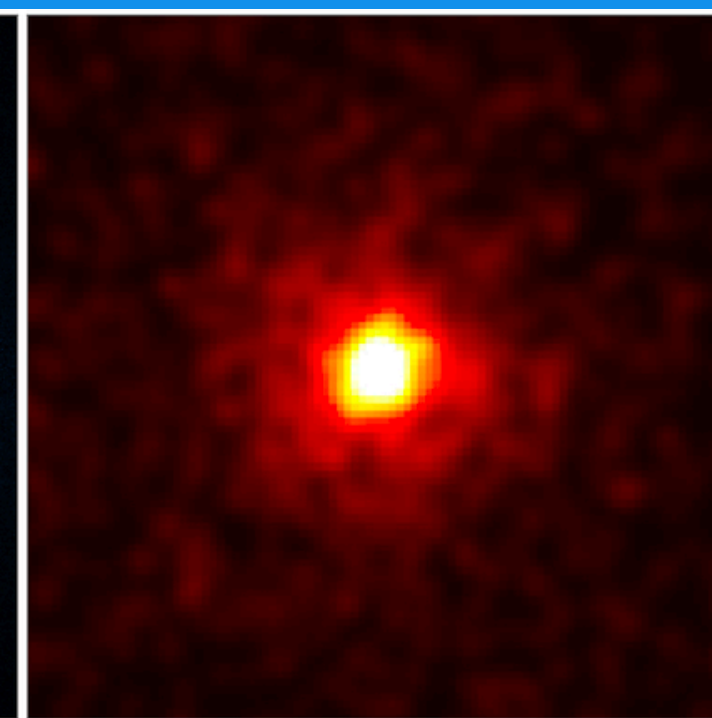
VISIBLE LIGHT



ULTRAVIOLET



X-RAYS

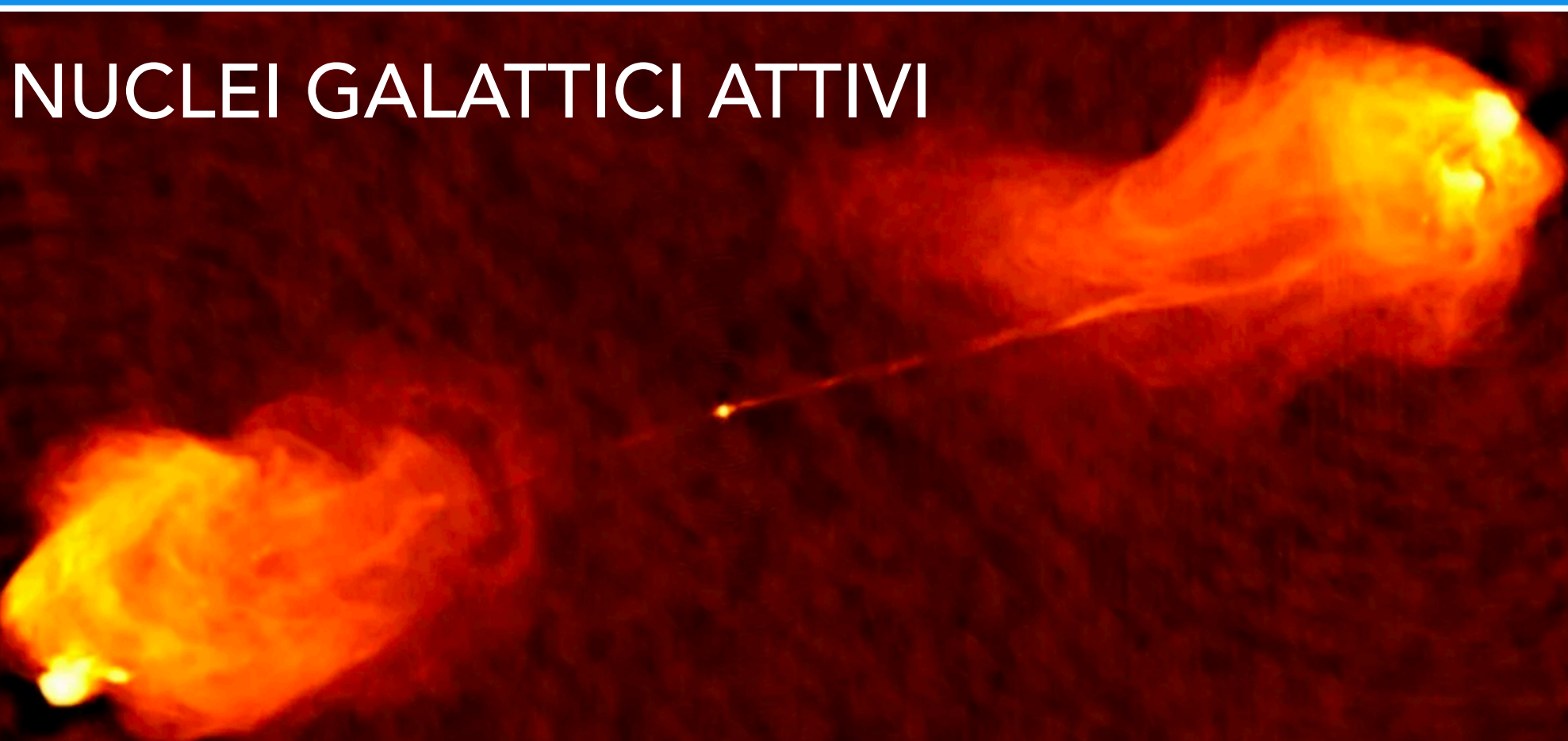


GAMMA RAYS

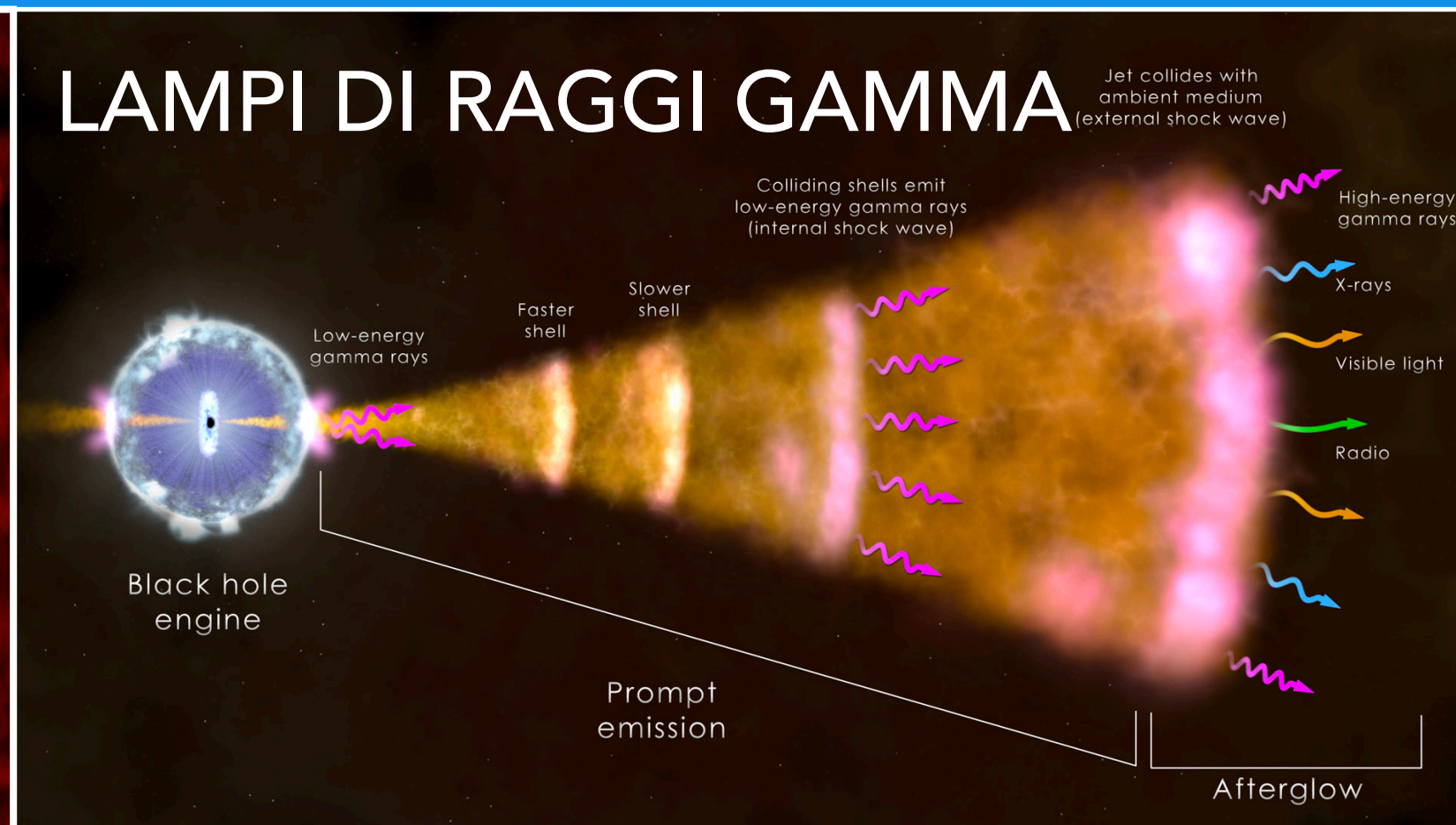
RESTI DI SUPERNOVA

PULSAR

PULSAR WIND NEBULA



NUCLEI GALATTICI ATTIVI



LAMPI DI RAGGI GAMMA



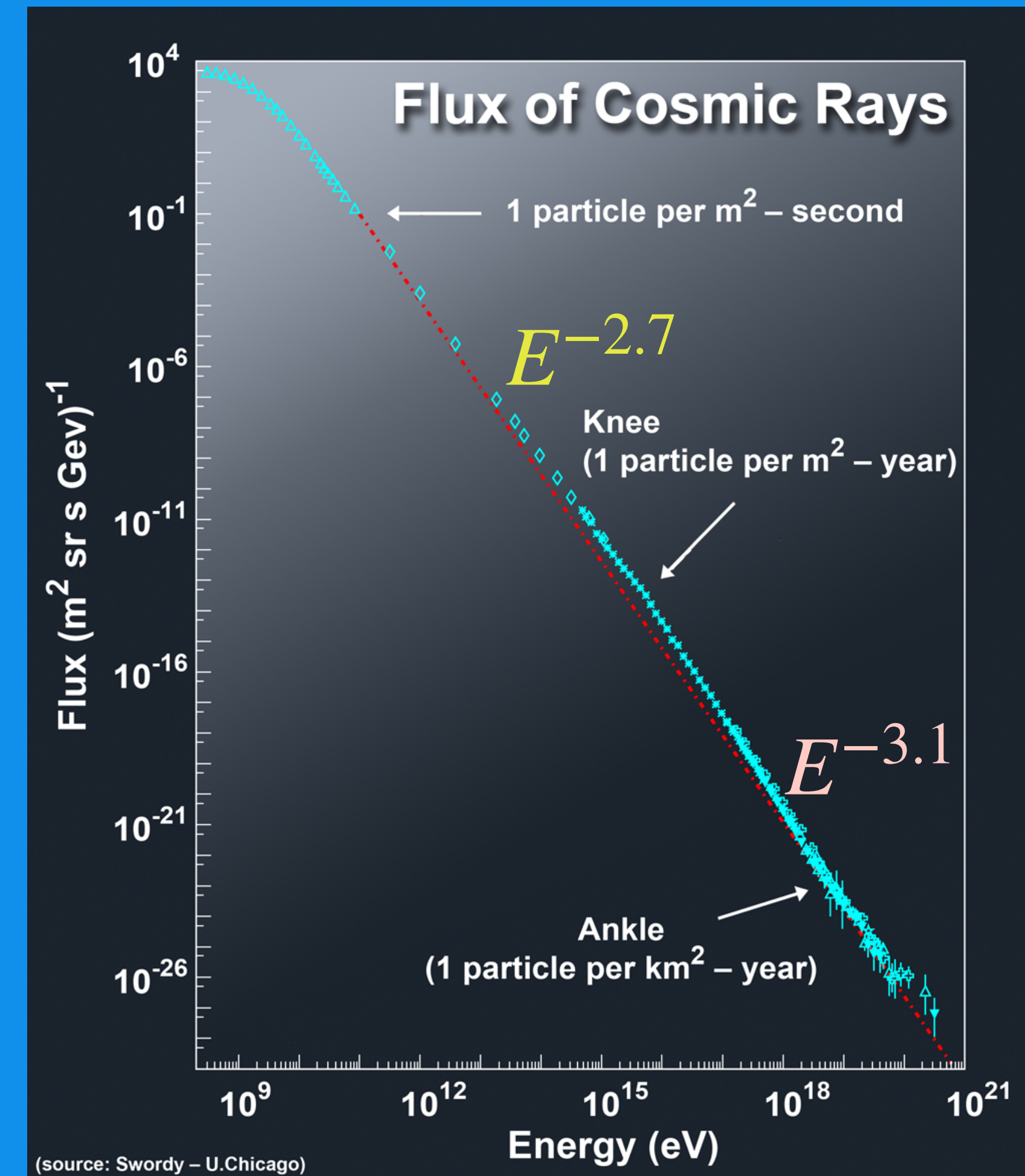
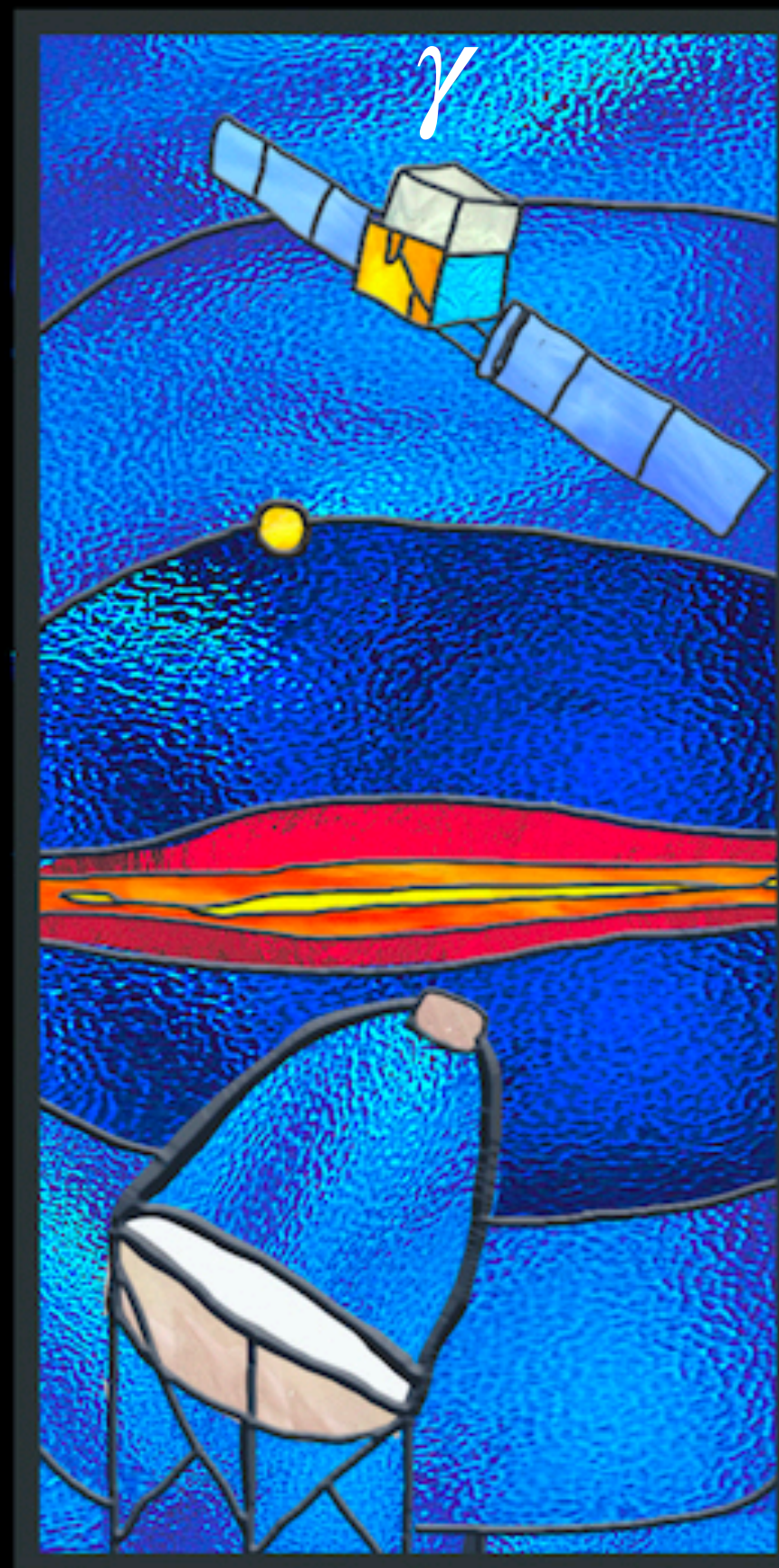
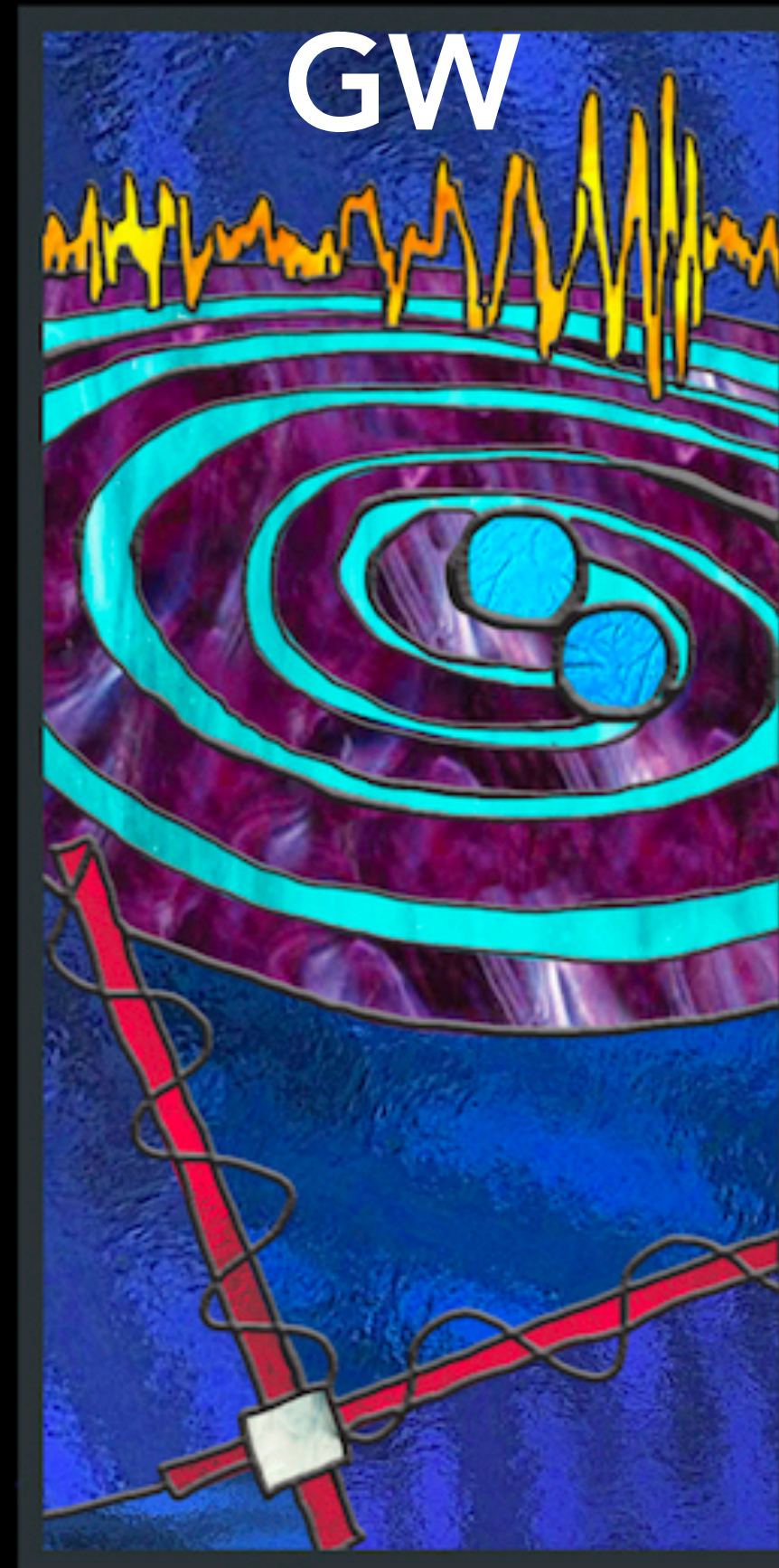
MATERIA OSCURA

ORIGINE RAGGI COSMICI

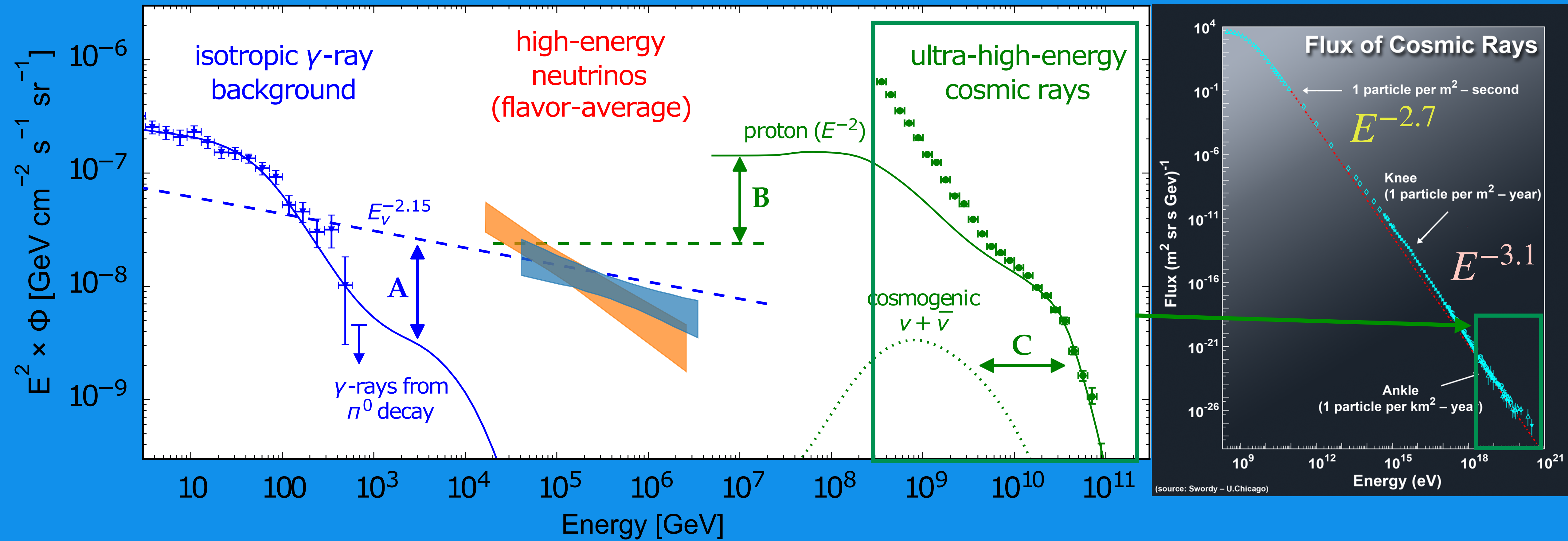
FISICA FONDAMENTALE

COSMOLOGIA

CONTESTO ASTROFISICA GAMMA



CONTESTO ASTROFISICA GAMMA

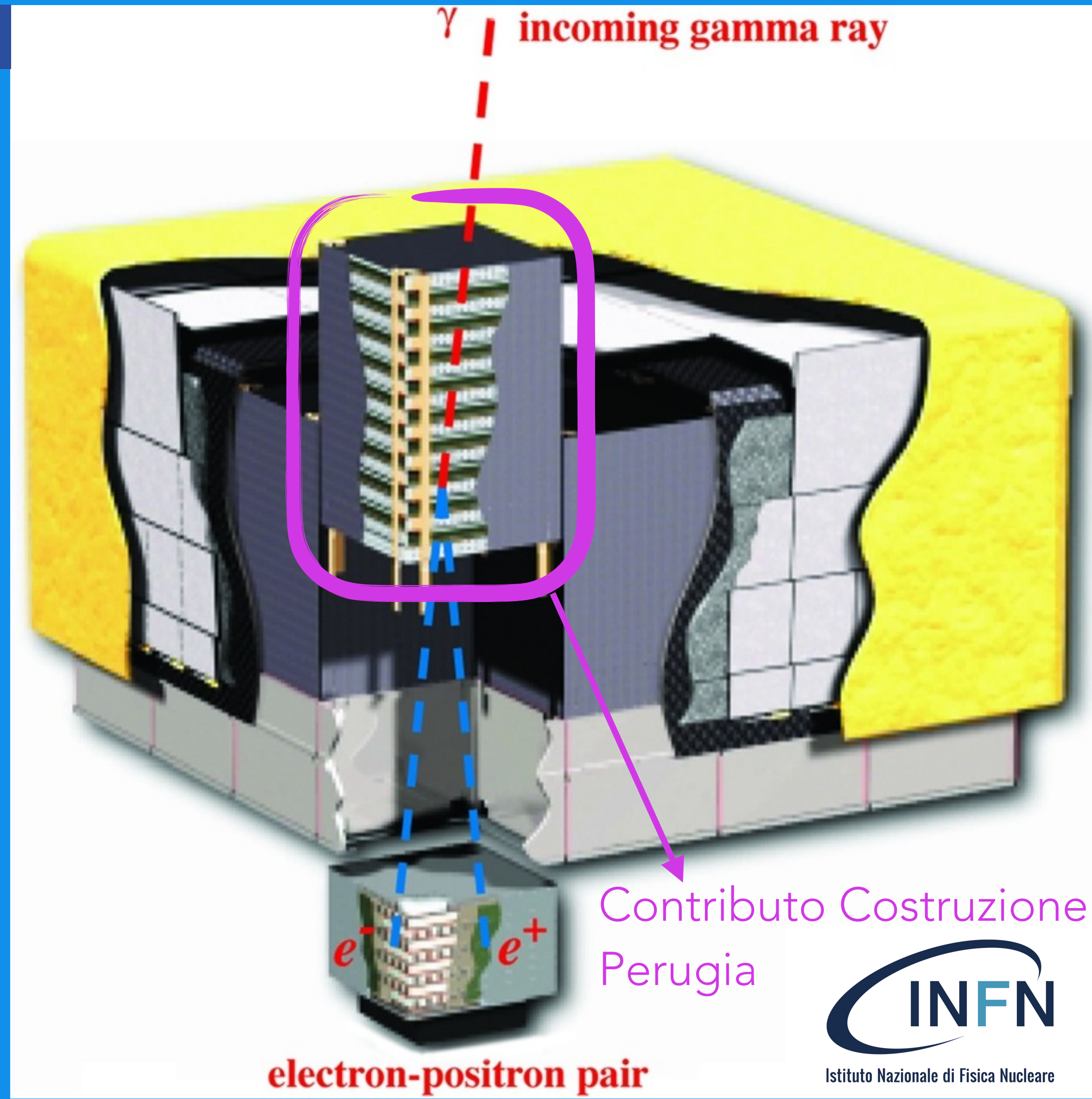
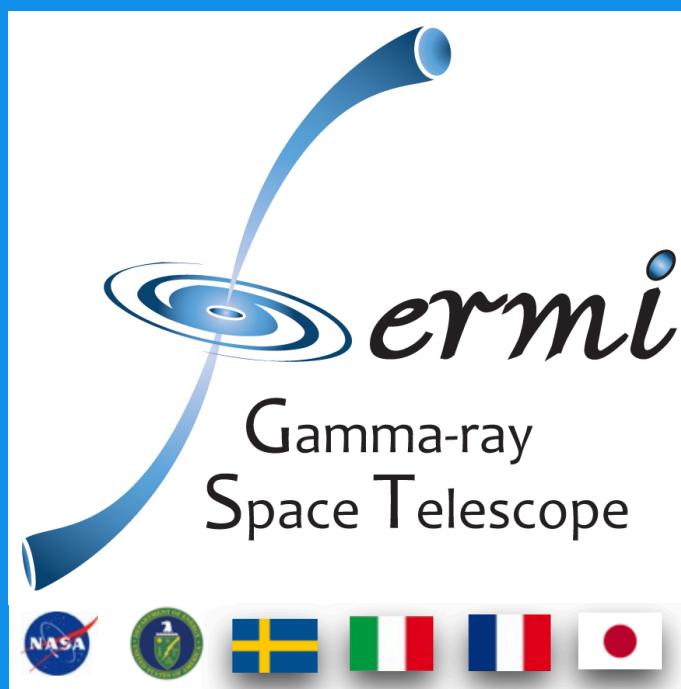


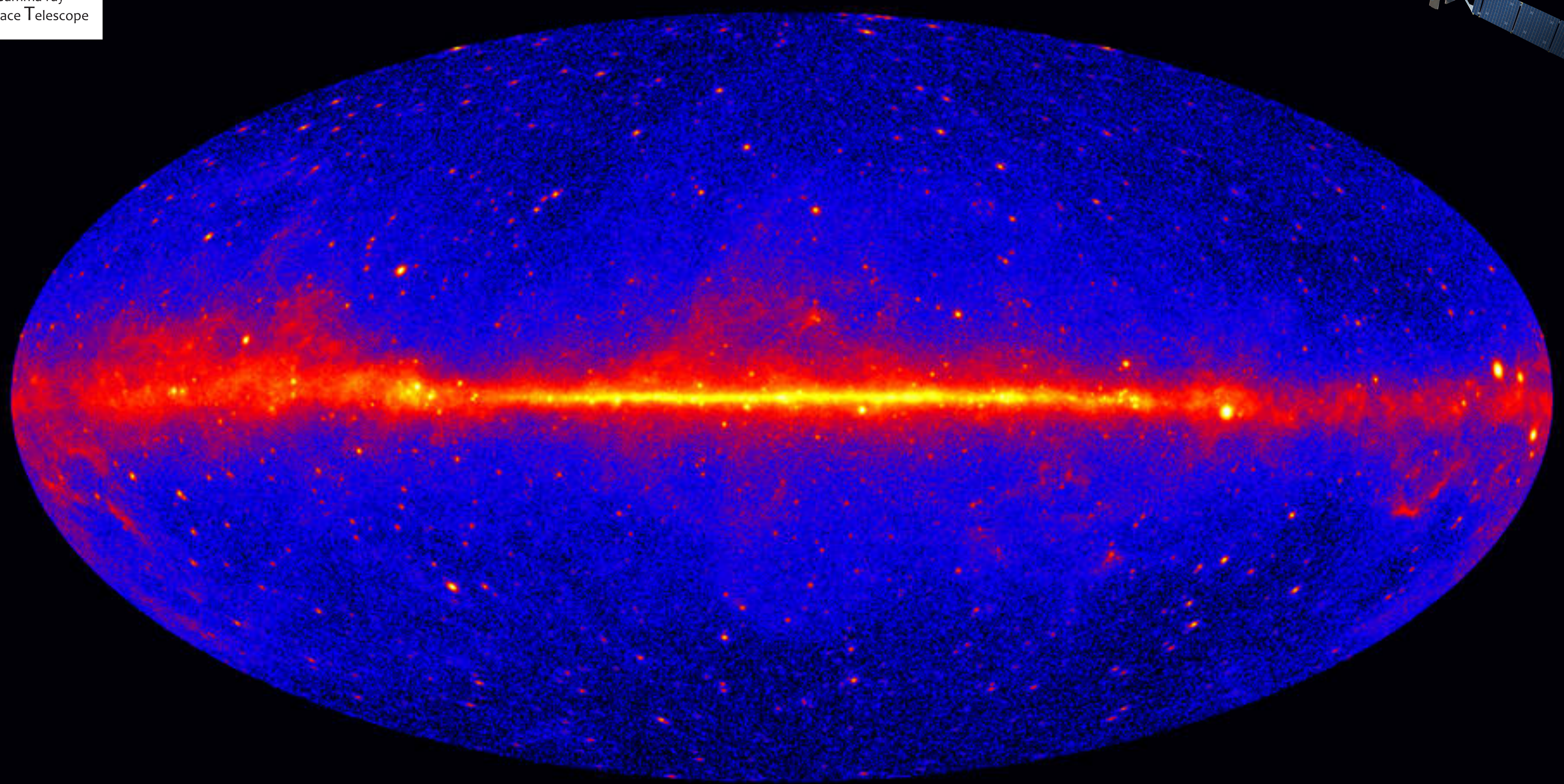
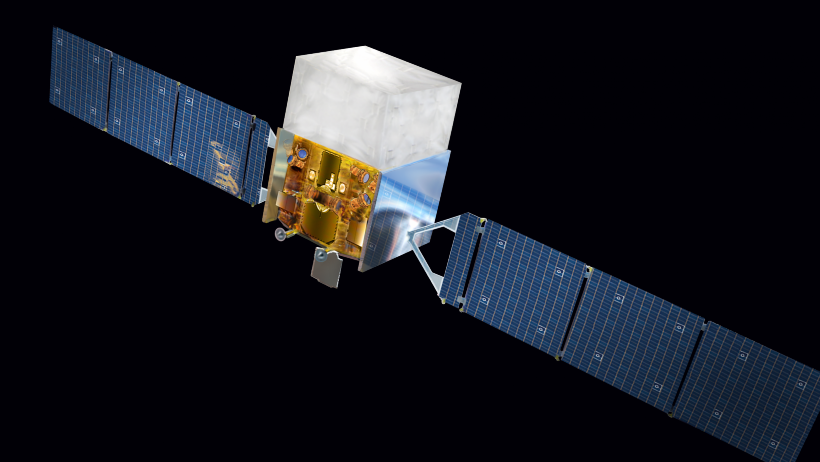
FERMI

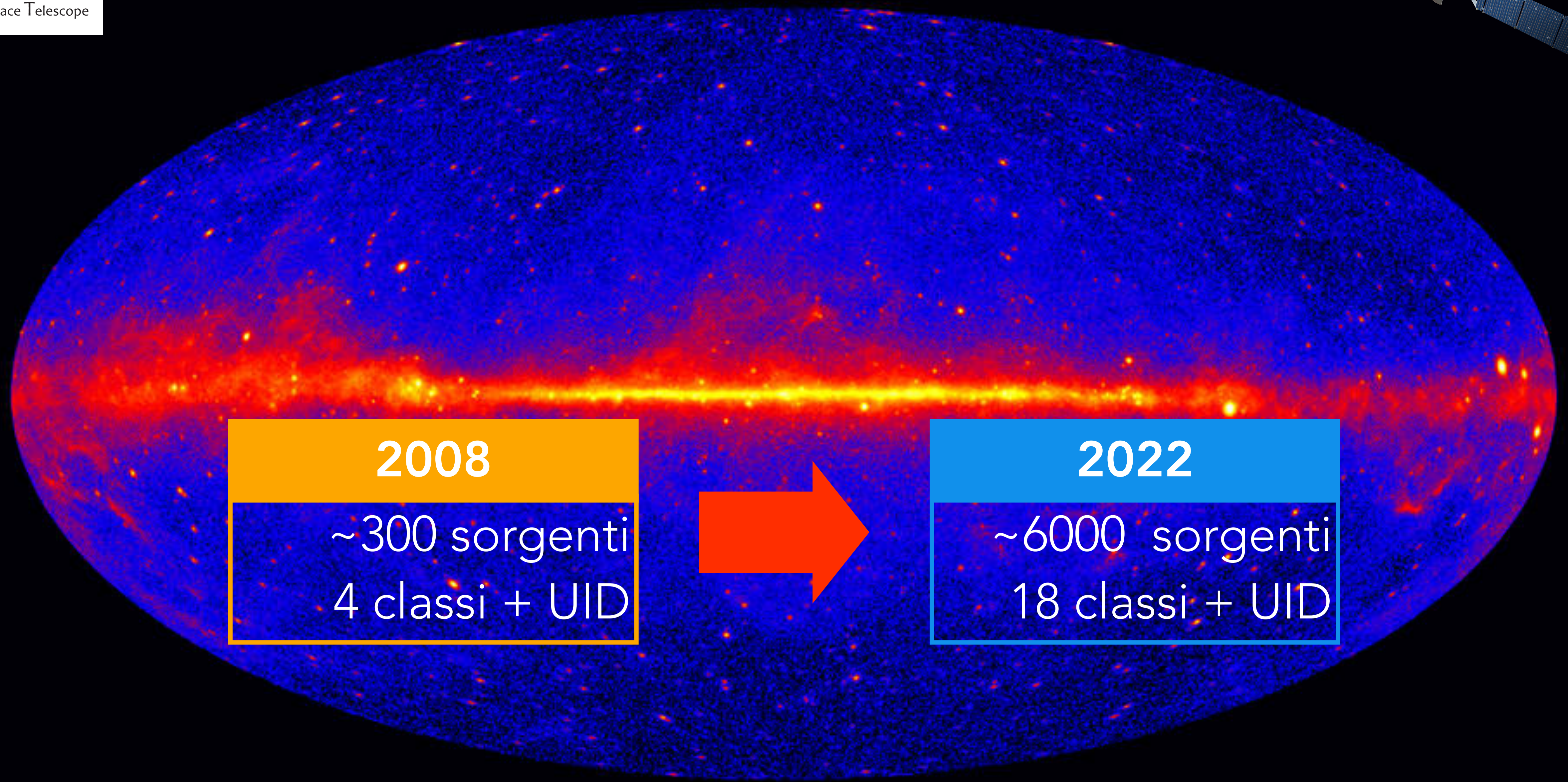
IN ORBITA DAL 2008

Large Area Telescope (LAT)

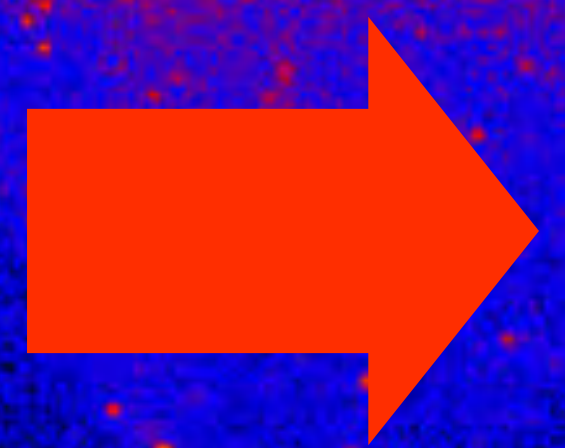
Gamma Burst Monitor (GBM)



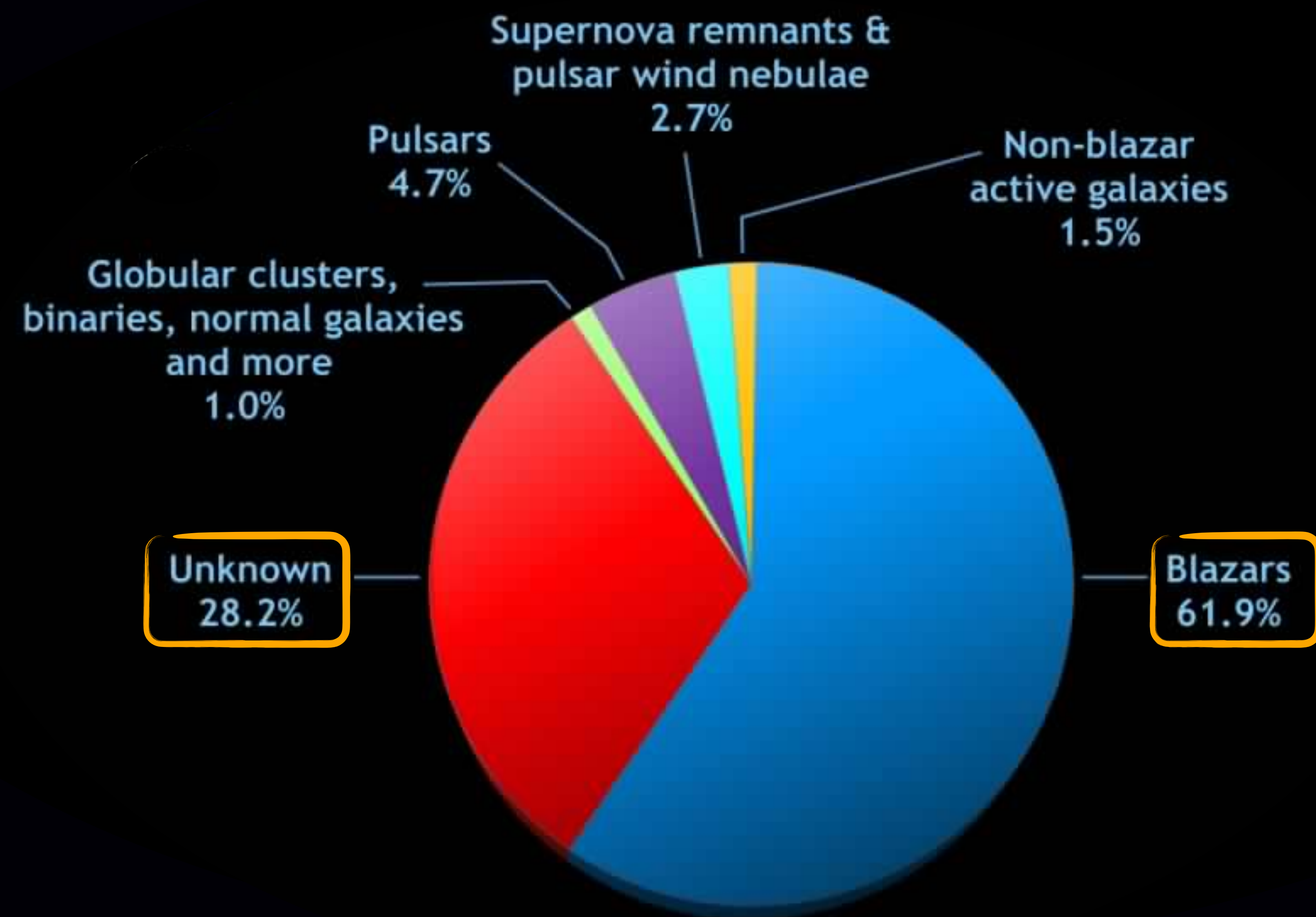
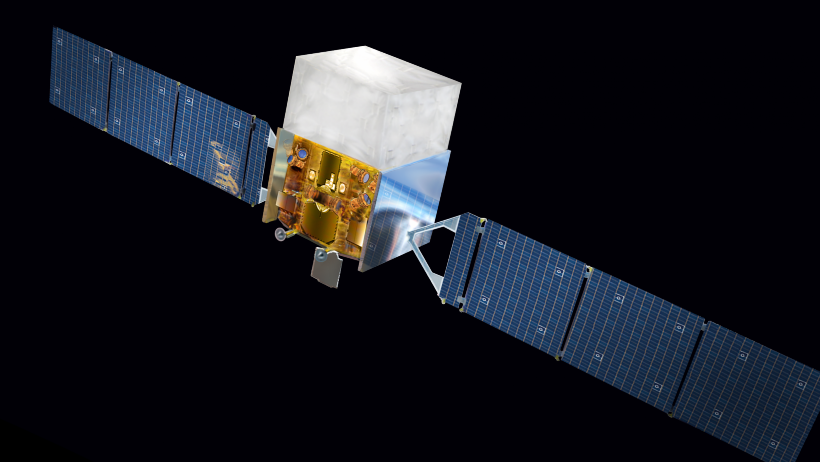




2008
~300 sorgenti
4 classi + UID



2022
~6000 sorgenti
18 classi + UID





Ruolo chiave per
sorgenti Transienti o Variabili



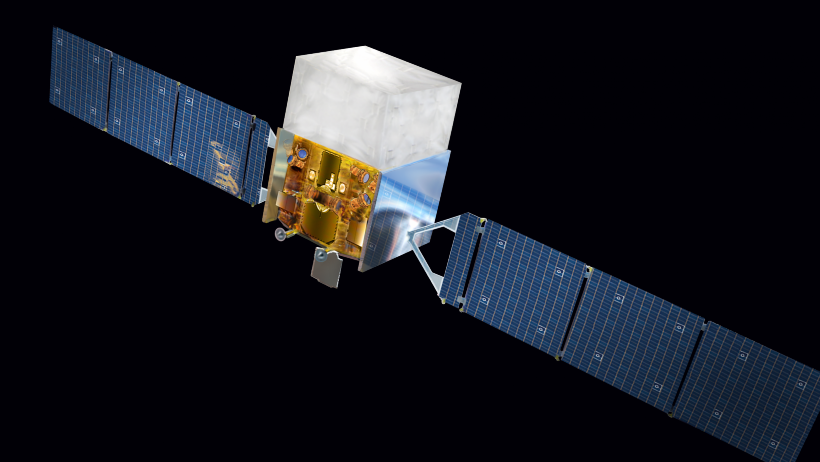
GRB

Burst Advocate

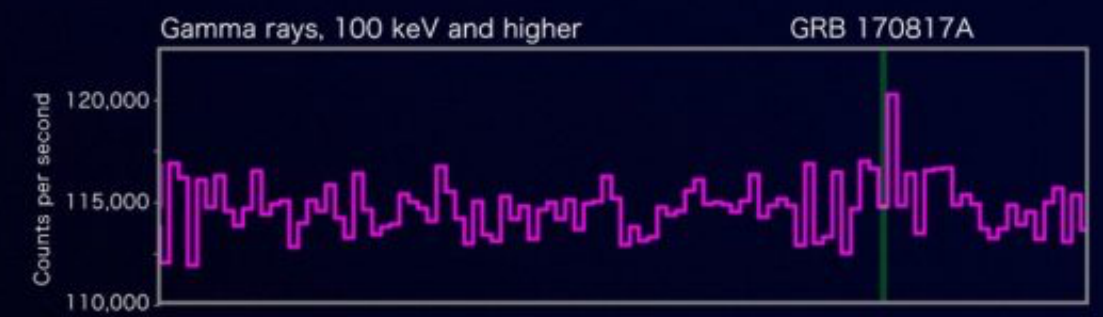
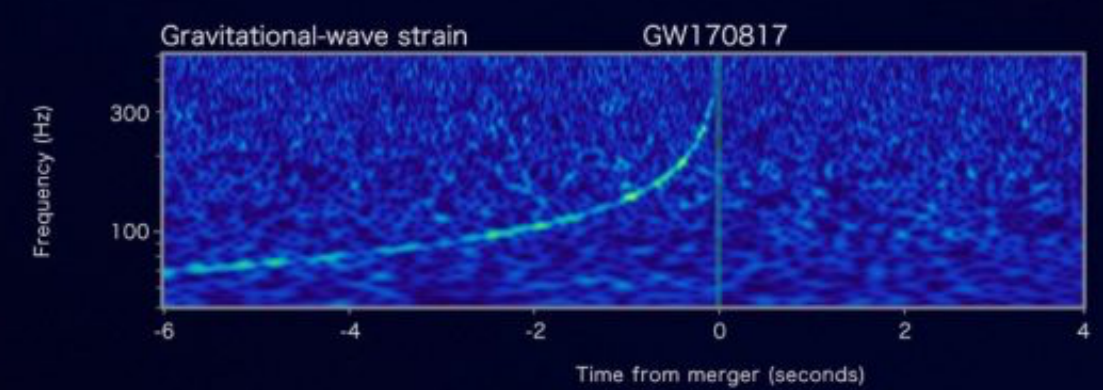
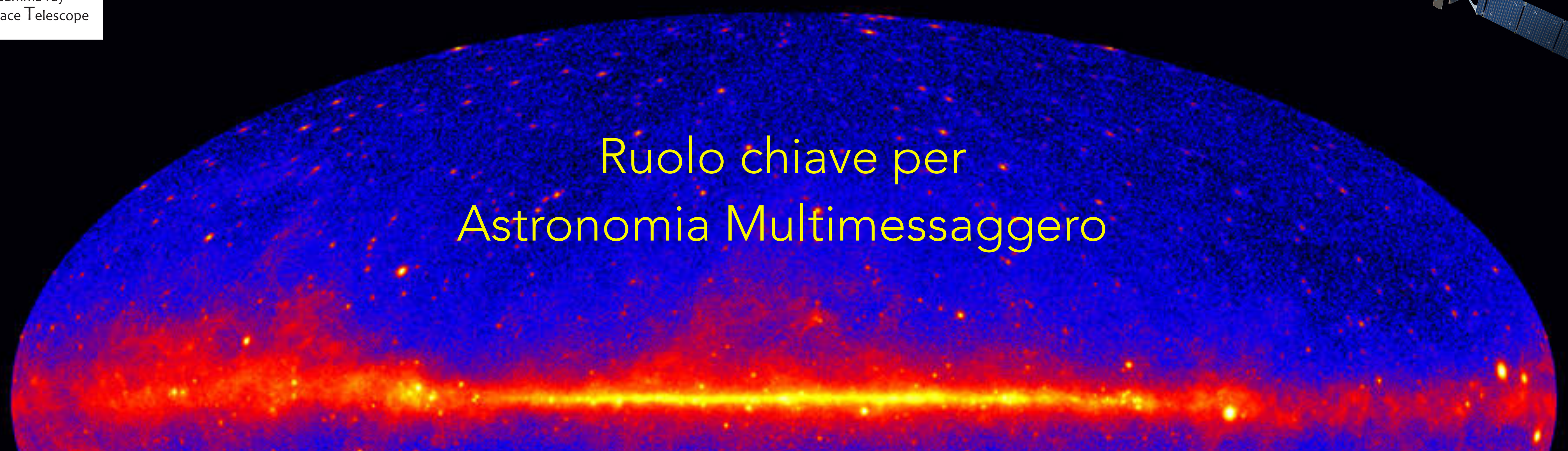


AGN

Flare Advocate

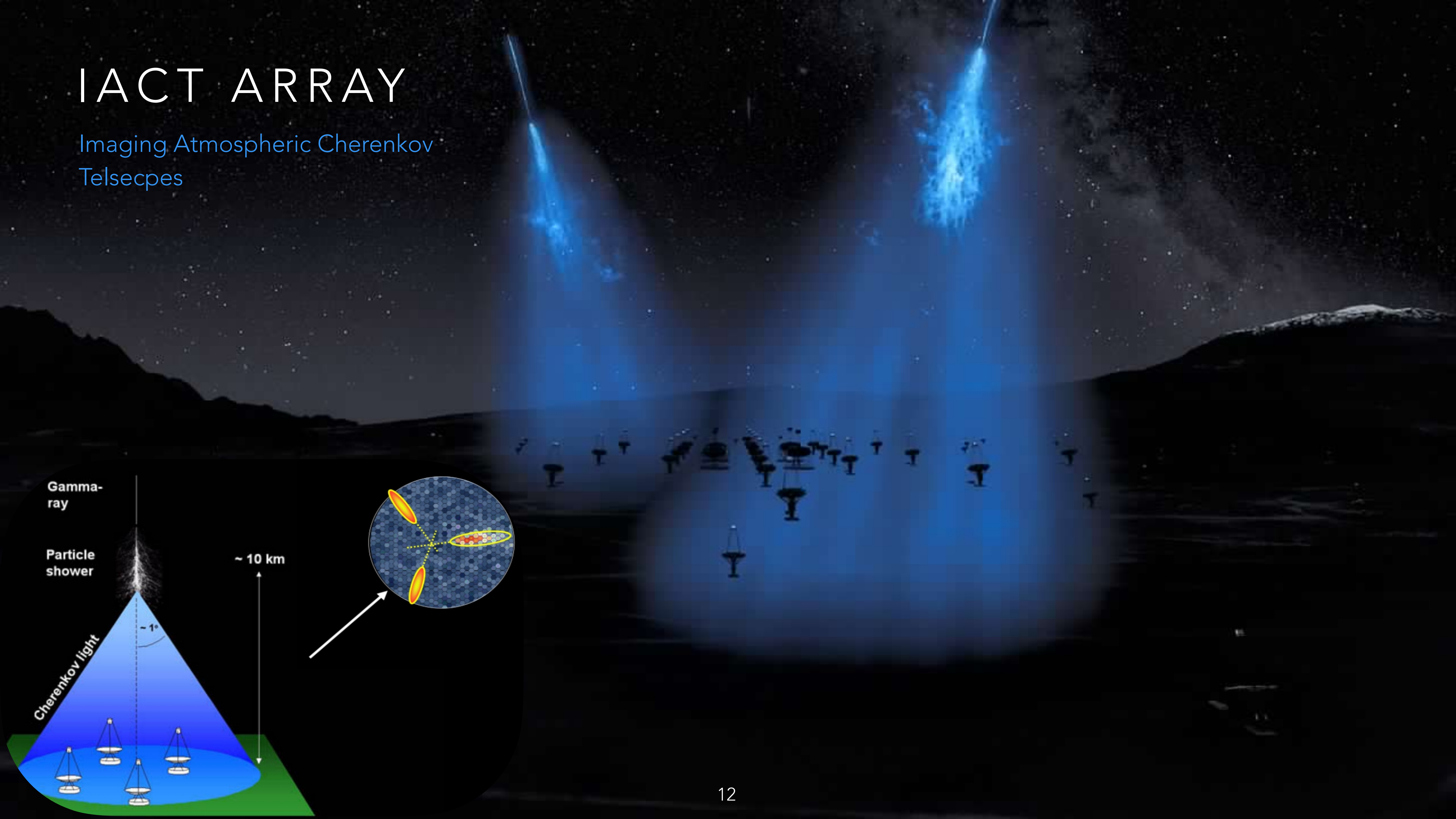


Ruolo chiave per Astronomia Multimessaggero



IACT ARRAY

Imaging Atmospheric Cherenkov
Telescopes



Gamma-ray

Particle shower

~ 10 km

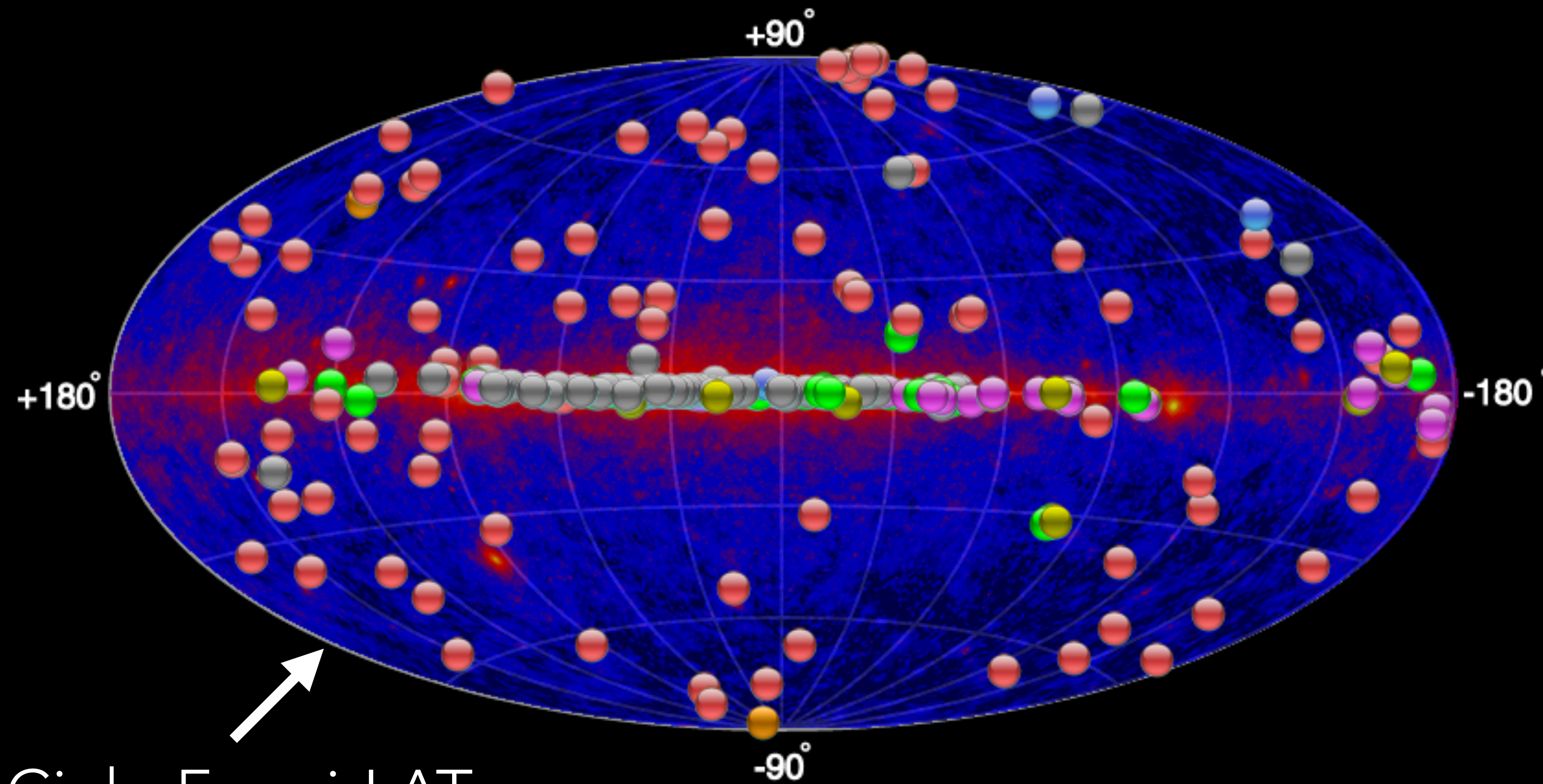
~ 1°

Cherenkov light

SORGENTI TEV

Source Types

- TeV Halo PWN/TeV Halo PWN
- Binary XRB PSR Gamma BIN
- HBL IBL GRB FRI FSRQ Blazar LBL AGN (unknown type)
- Shell SNR/Molec. Cloud Composite SNR Superbubble
- Starburst
- DARK UNID Other
- uQuasar Star Forming Region Globular Cluster Cat. Var. Massive Star Cluster BIN BL Lac (class unclear) WR



Cielo Fermi-LAT
(MeV-GeV)

~240 sorgenti
(non solo IACT)

ASTRI

ASTRI-Horn - M. Etna (1725 m)

Primario
(4.3 m)

Secondario
(1.8 m)

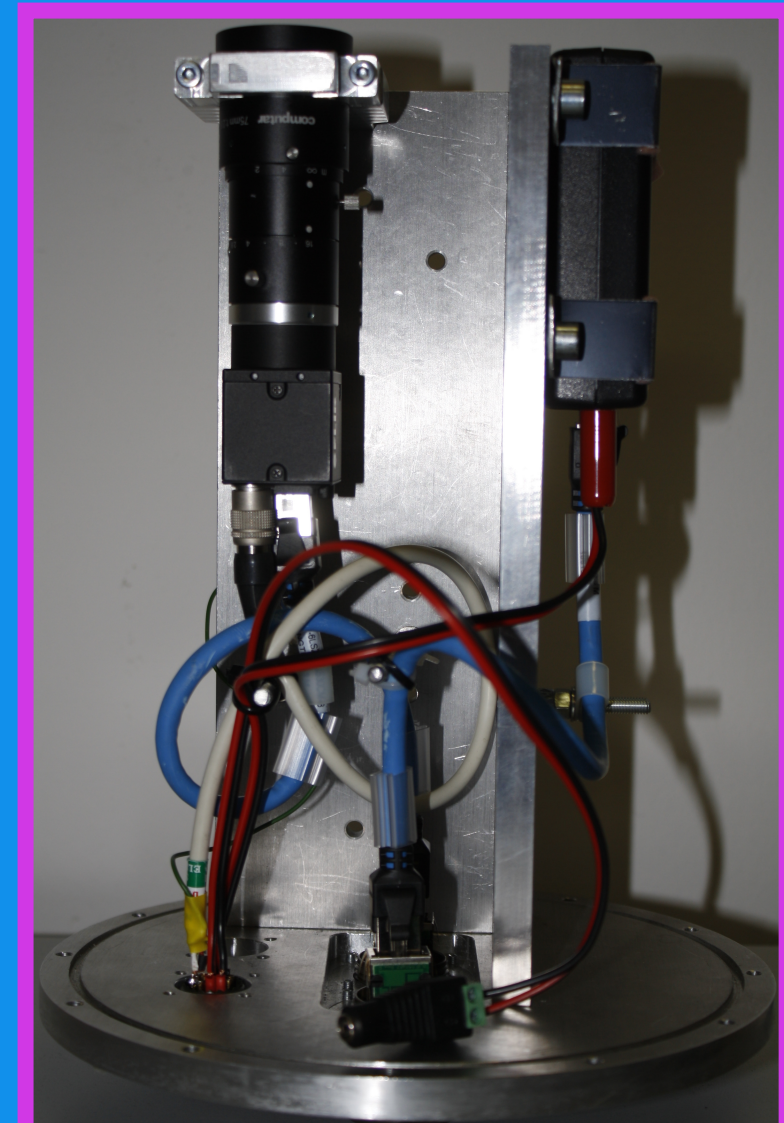
Pointing
Monitoring
Camera

Configurazione Schwarzschild-Couder a due specchi

Campo di vista 8.2°

Migliore sensibilità alla scala di energia multi-TeV

PMC Realizzata a Perugia



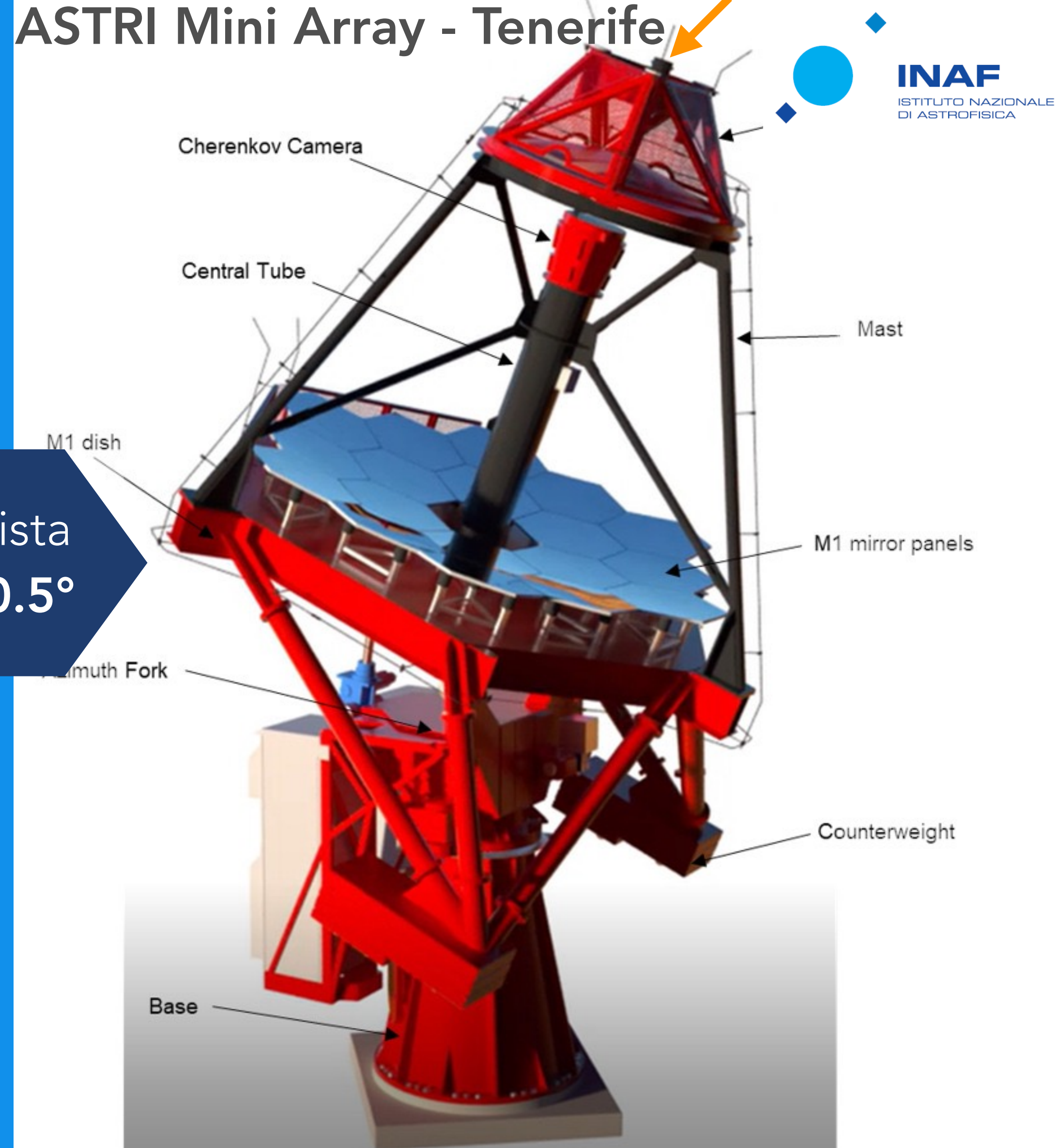
ASTRI

ASTRI-Horn - M. Etna (1725 m)



Campo di vista
da 8.2° a 10.5°

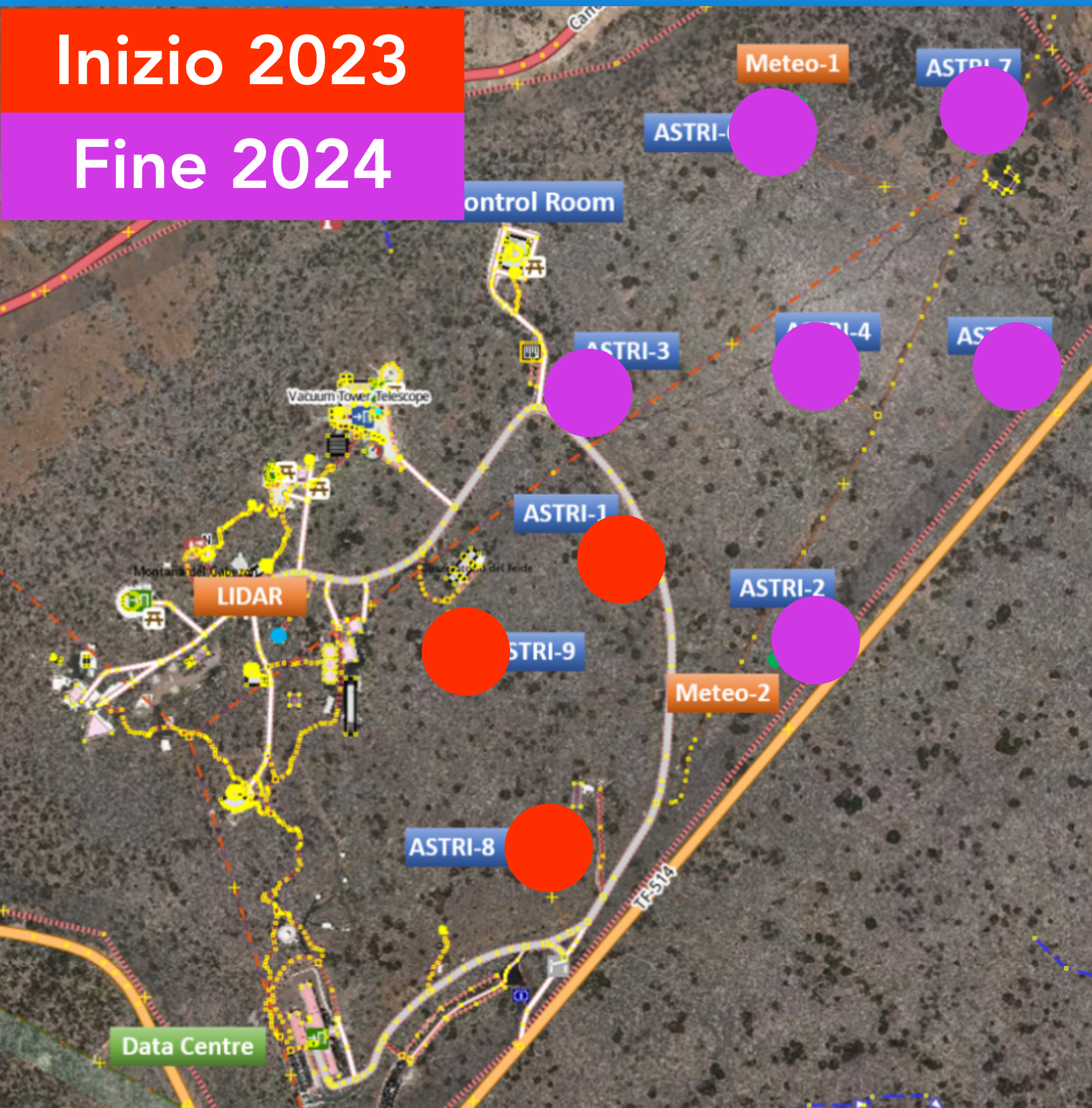
ASTRI Mini Array - Tenerife



ASTRI MINI-ARRAY

Inizio 2023

Fine 2024



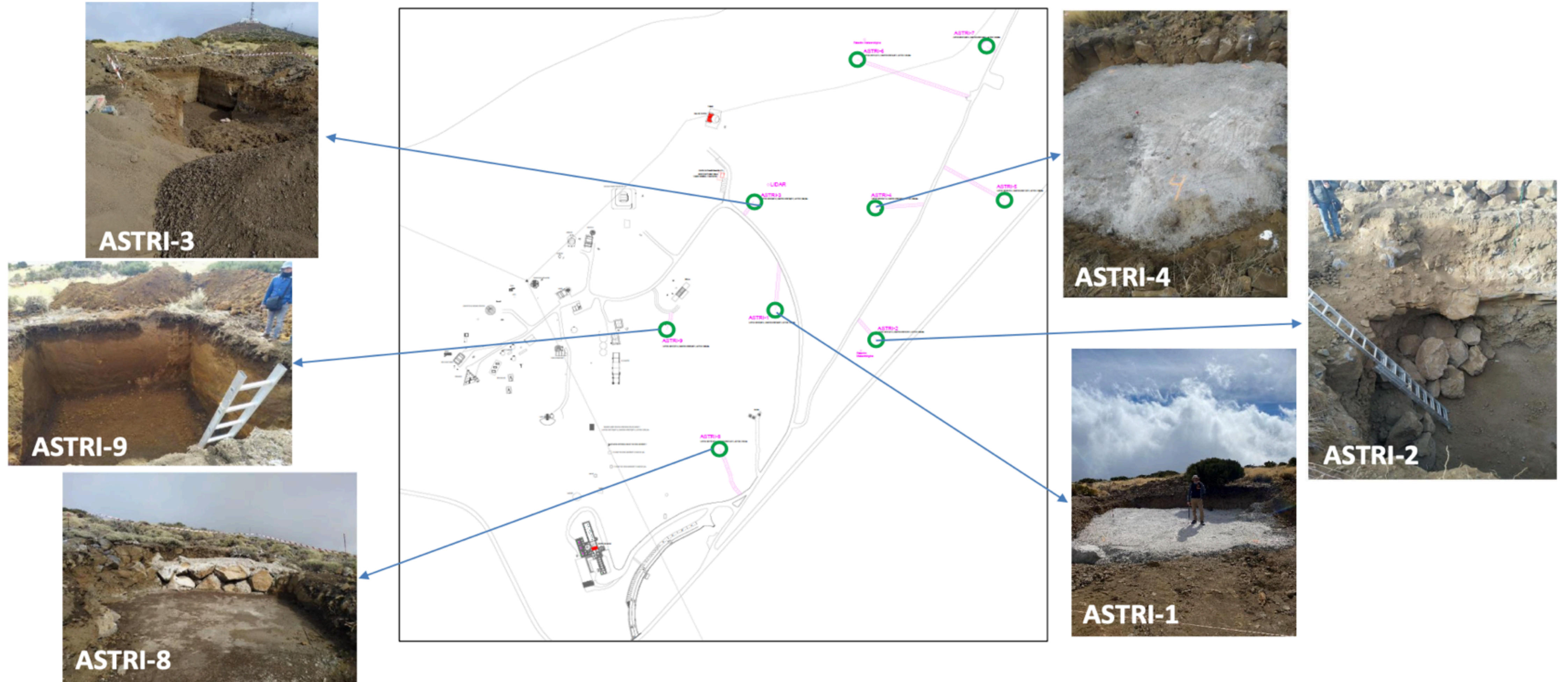
Observatorio del Teide (Tenerife)

Array di 9 Telescopi

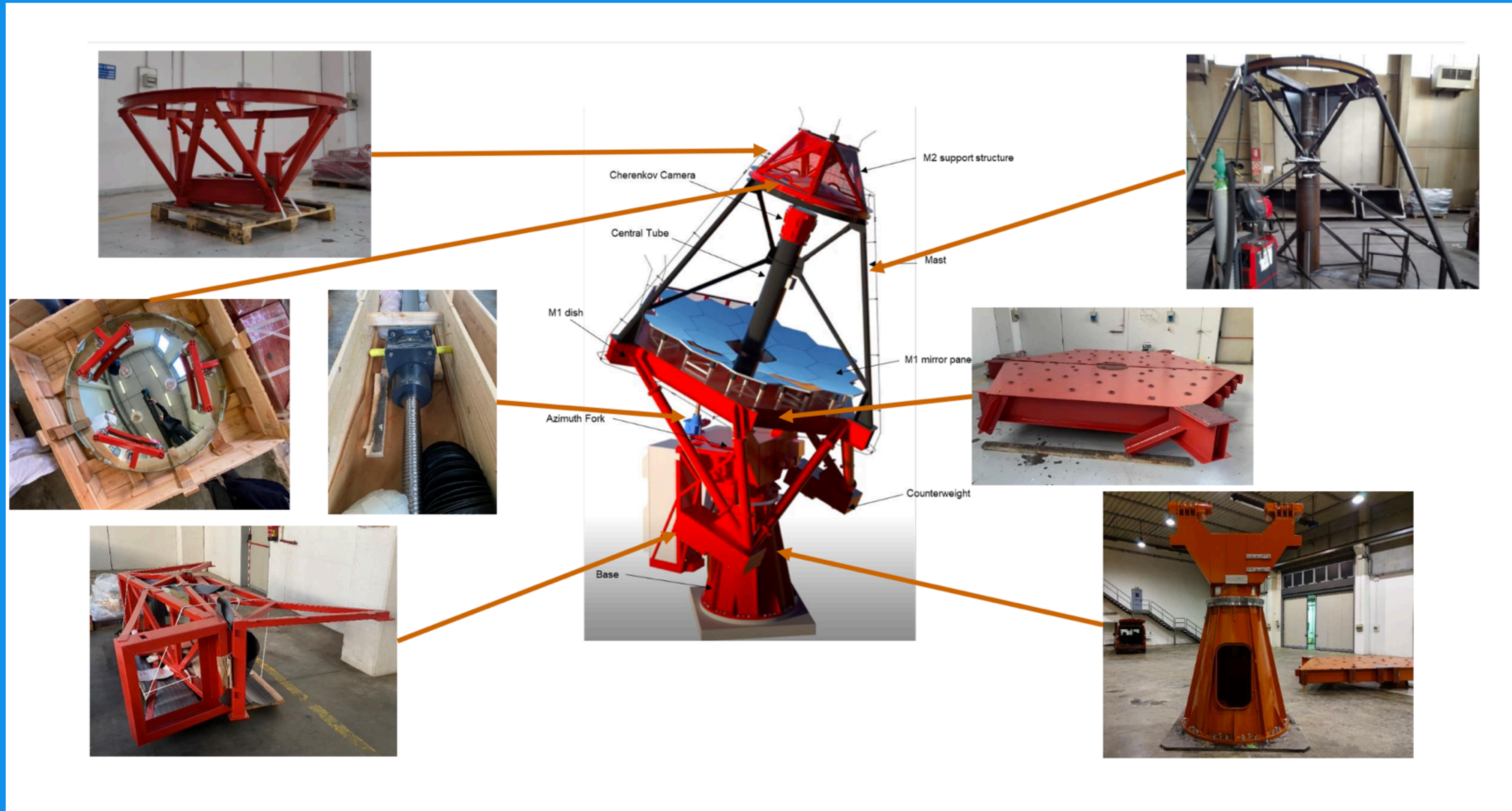


G. Tosti: System & Software Engineering Lead del Mini-Array

ASTRI MINI-ARRAY: SITO

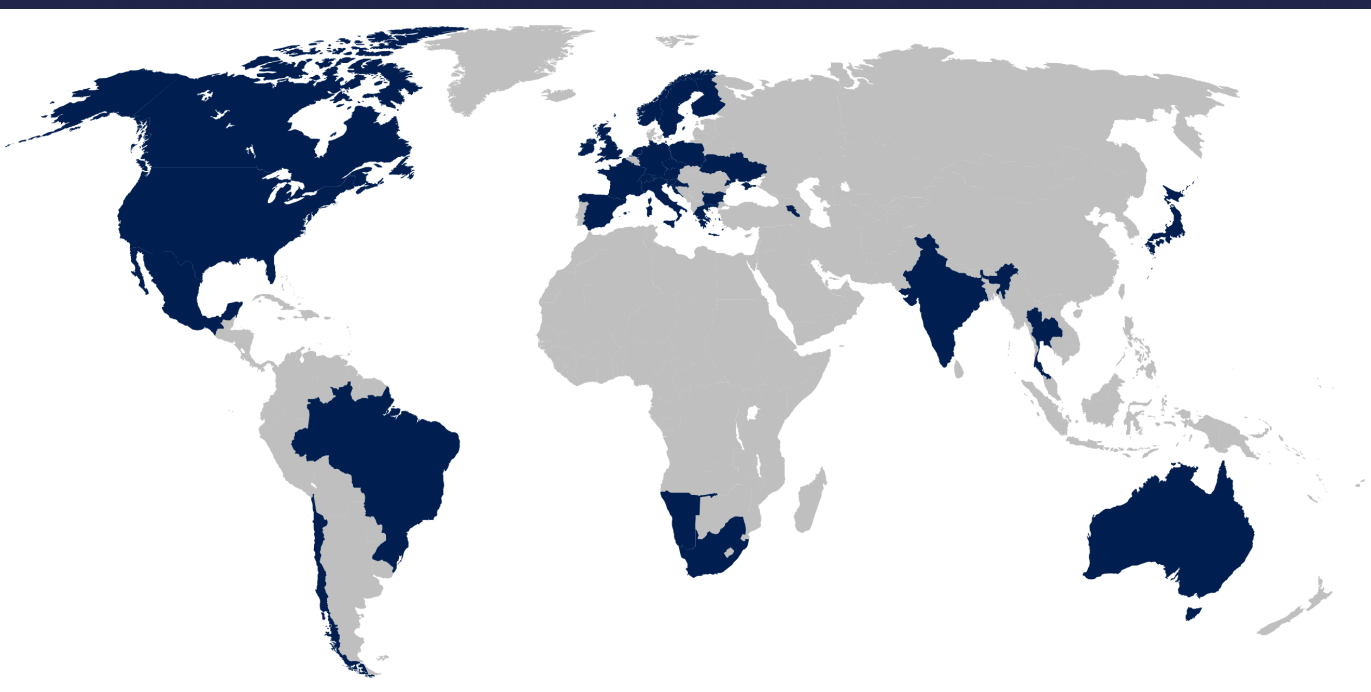
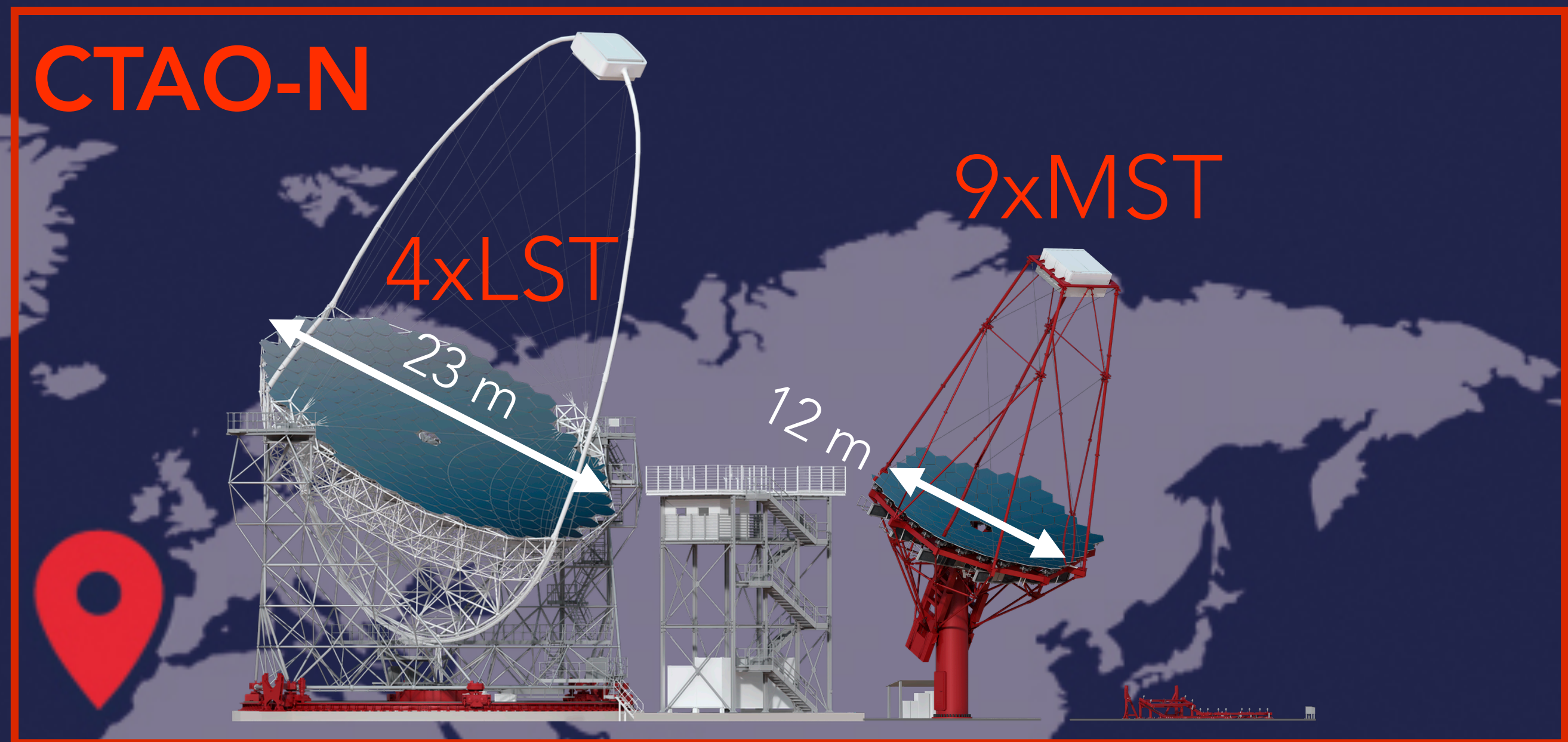


ASTRI MINI-ARRAY: TELESCOPIO 1

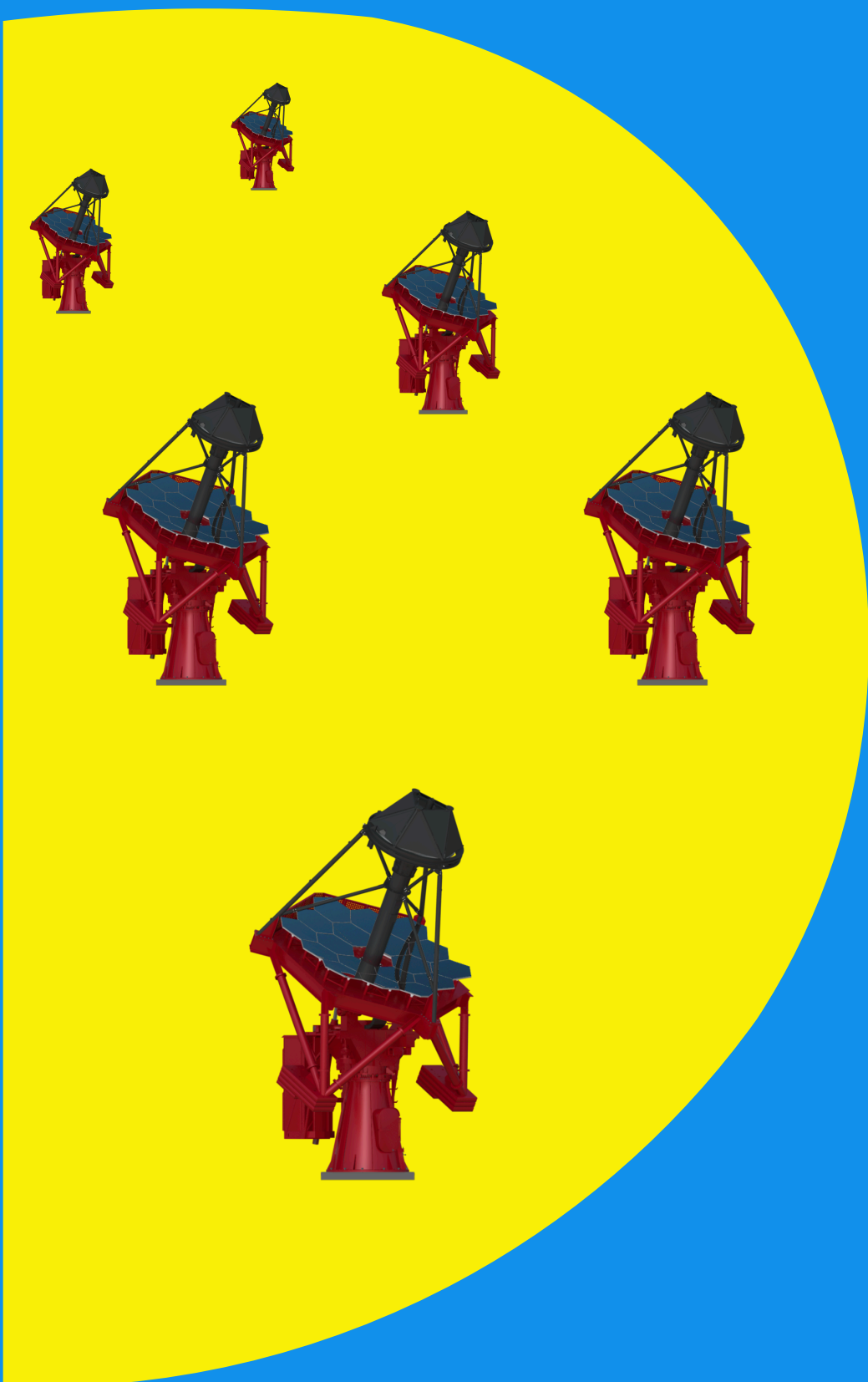


CHERENKOV TELESCOPE ARRAY (CTA)

G. Tosti: SST - System Engineering Lead della
Struttura e Controllo del Telescopio



CONTROLLO / COMPUTING



EDGE - REAL TIME COMPUTING

PMC Local Control System / Analysis

ON SITE COMPUTING - BIG DATA

Controllo Singolo Telescopio e Array
Sistema Monitoraggio e Allarme

OFF SITE COMPUTING

Stereo Event Builder / Ricostruzione Eventi

S. Germani: Responsabile WP PMC e SEB

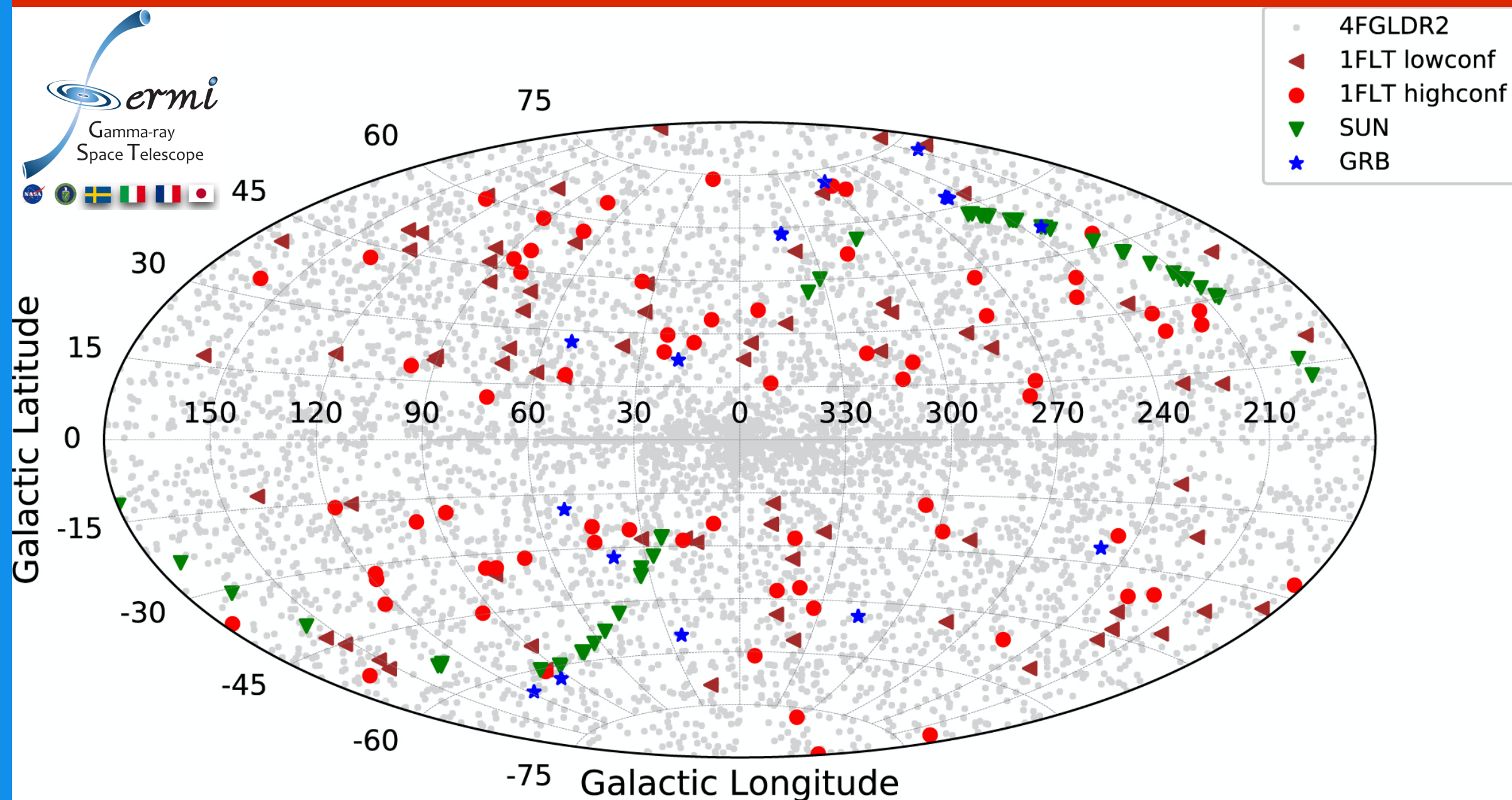
ANALISI DATI

GRB / AGN / UID

Sorgenti Transienti o Variabili

Identificazione o Classificazione Incerta

Catalogo 1FLT

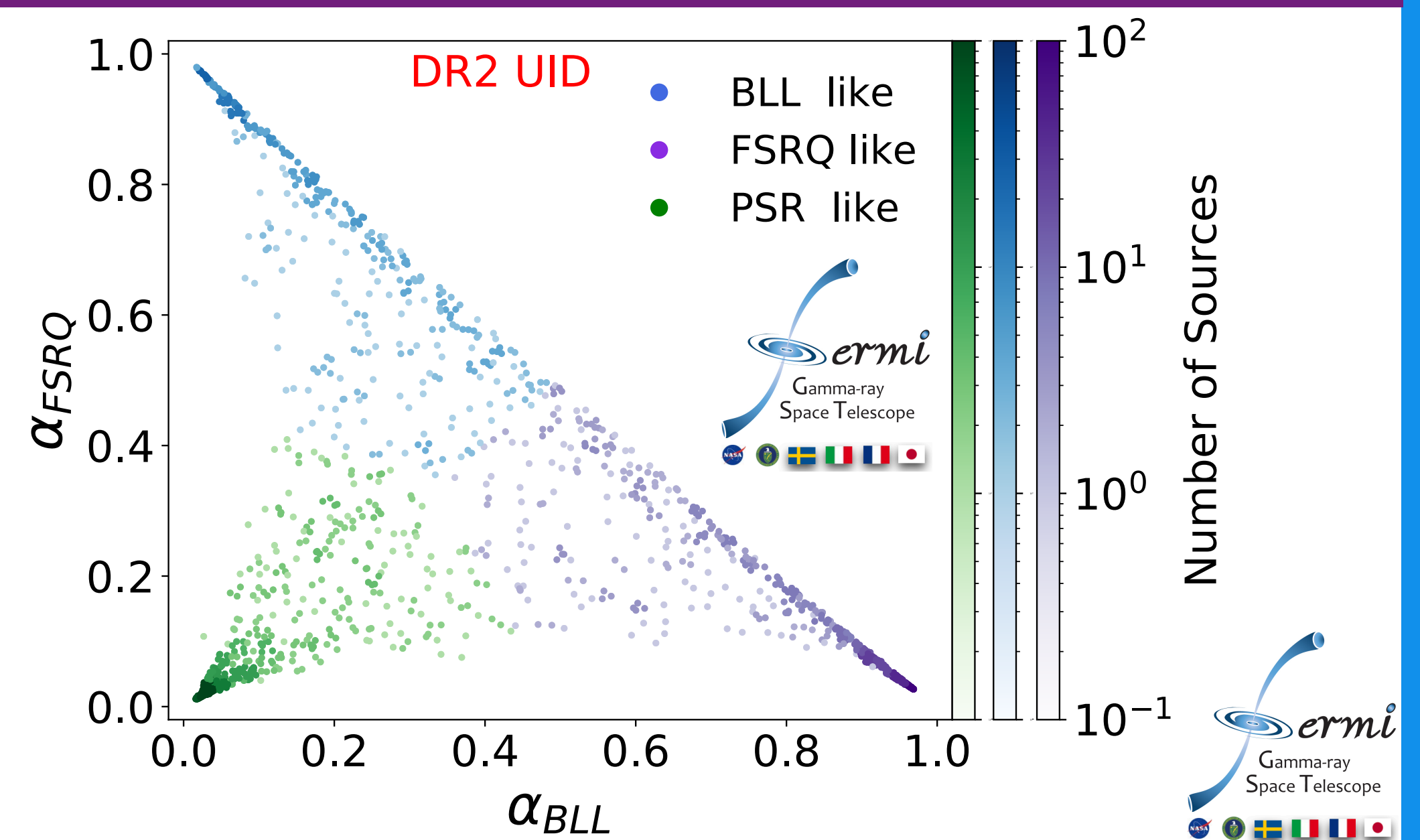


Time Domain
Astronomy

Classificazione

Machine Learning

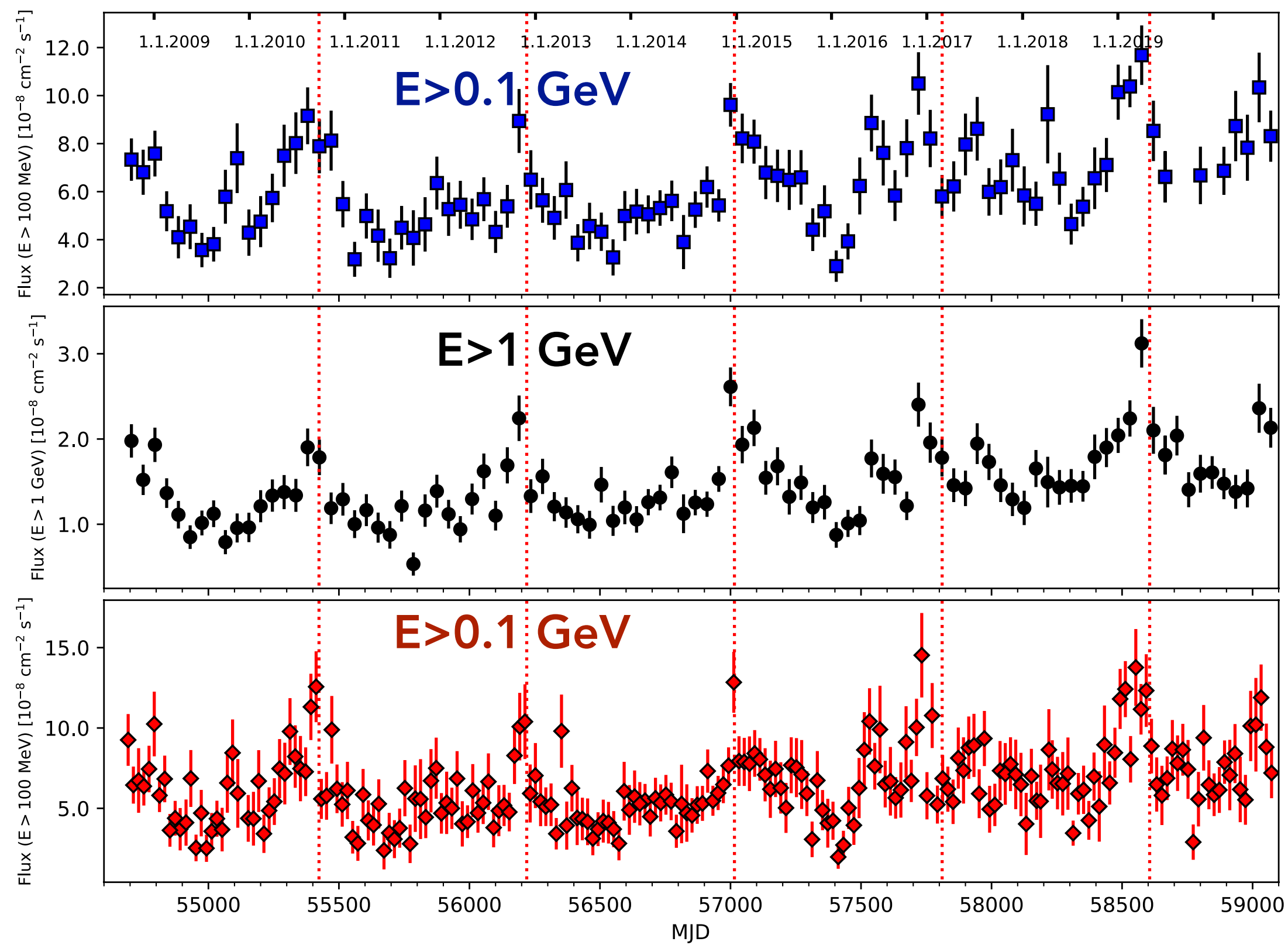
Sorgenti Non Identificate



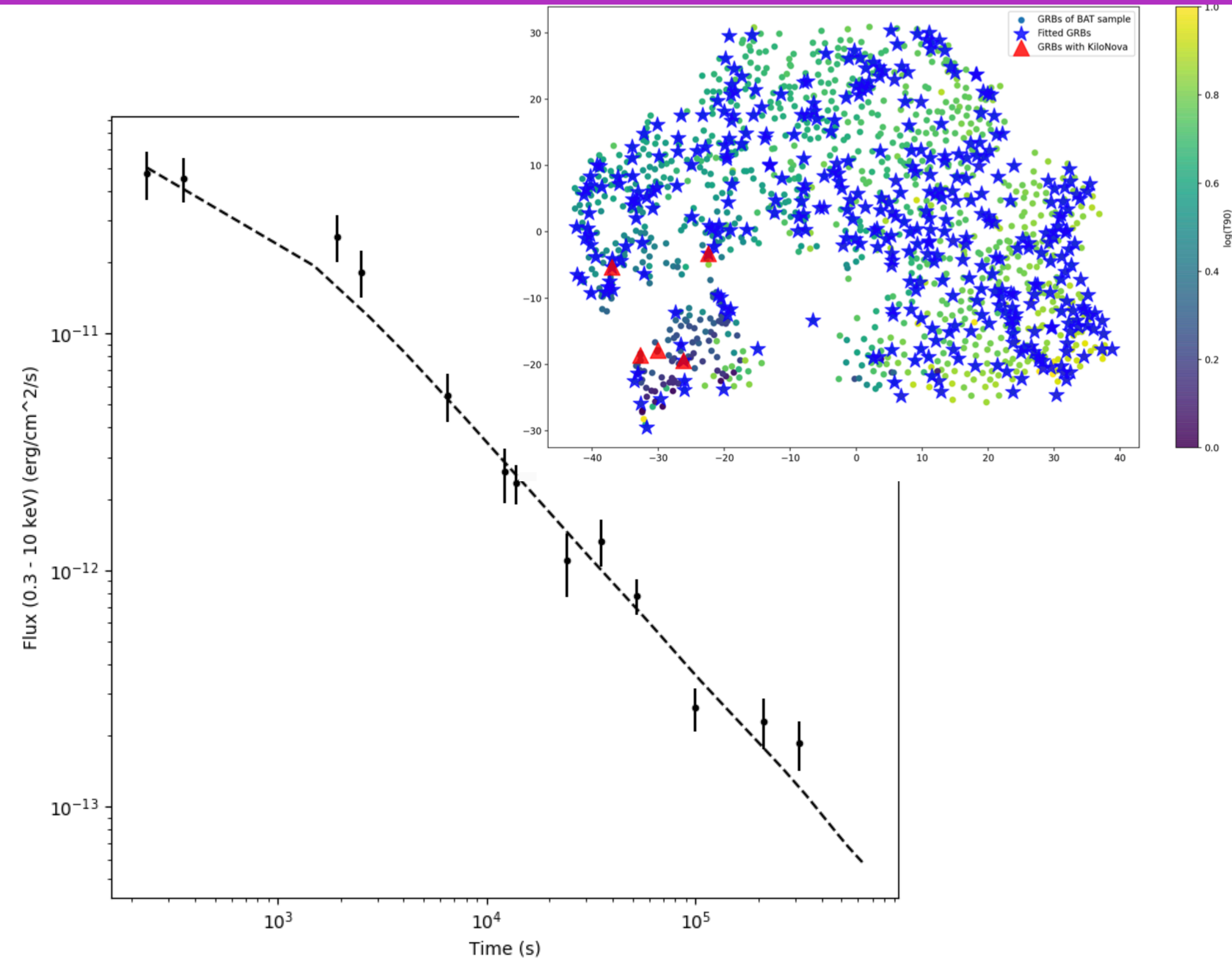
ANALISI DATI

Blazar Quasi-periodici

2008-2020



Kilonove in Contesto Multimessaggero



ASTROFISICA MEV - TEV



INFN



UNIPG



INFN



UNIPG



INFN



PHD



PHD

SERVIZIO MECCANICA

SERVIZIO ELETTRONICA

SERVIZIO CALCOLO



Ministero degli Affari Esteri
e della Cooperazione Internazionale

PRIN



*Agenzia per la
Coesione Territoriale*

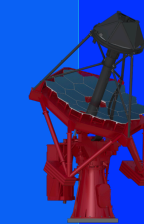
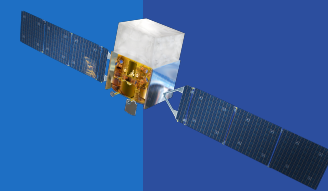
2000

2010

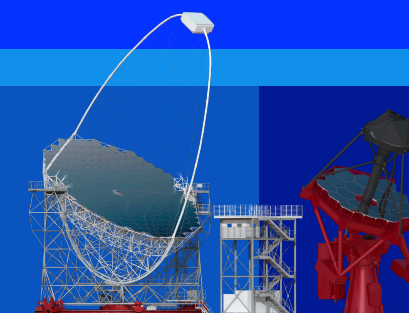
2020

2030

FERMI



ASTRI



CTA