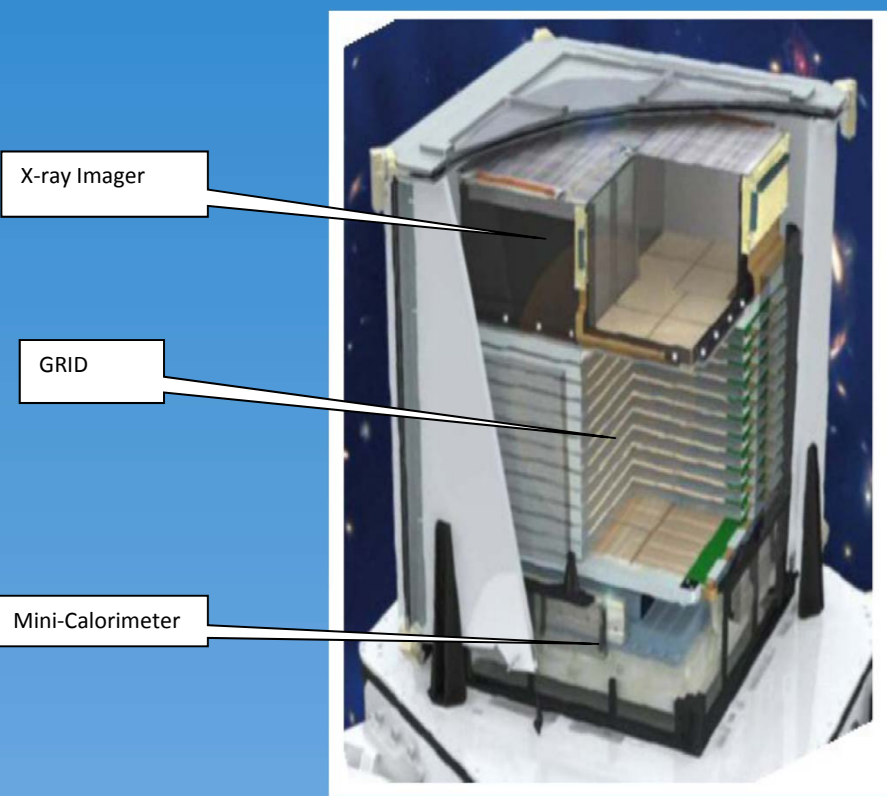


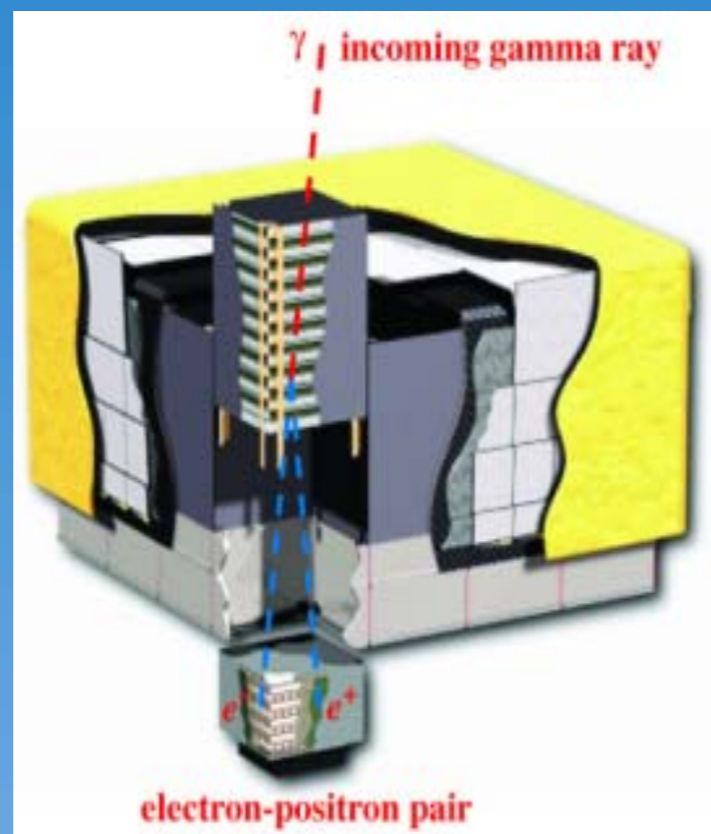
GAMMA-400 gamma-ray telescope construction features

S.I. Suchkov, A.M. Galper, M.D. Kheymits, A.A. Leonov, N.P. Topchiev, Yu.T. Yurkin et al.

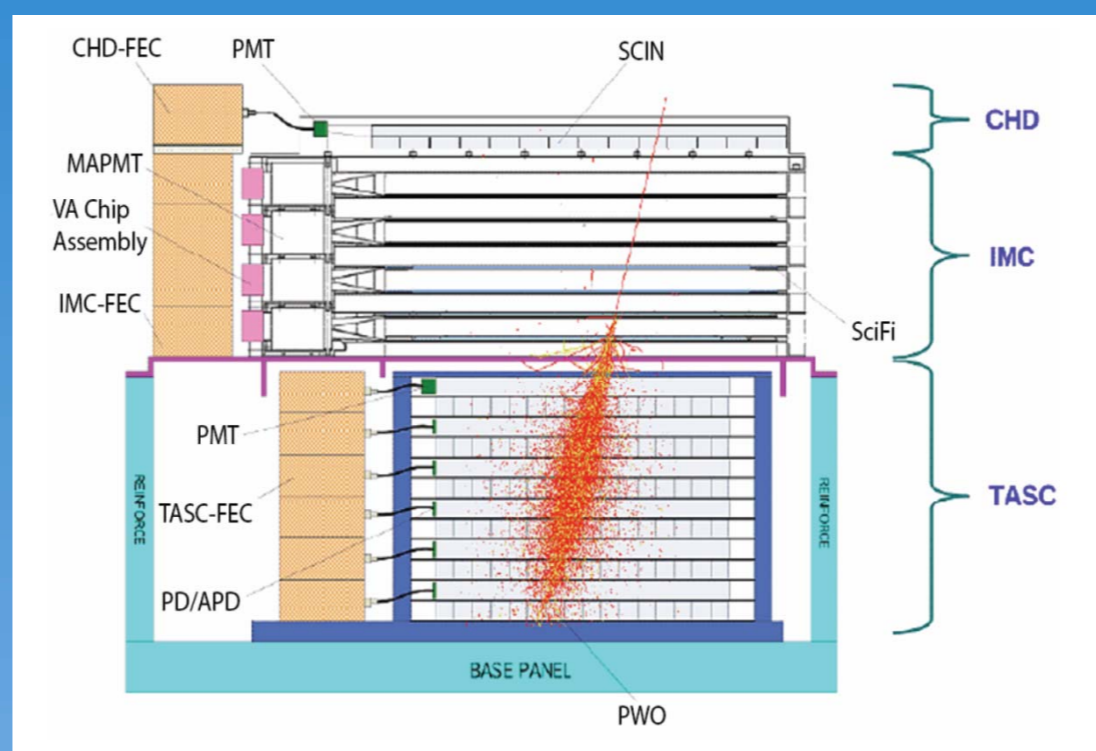
AGILE



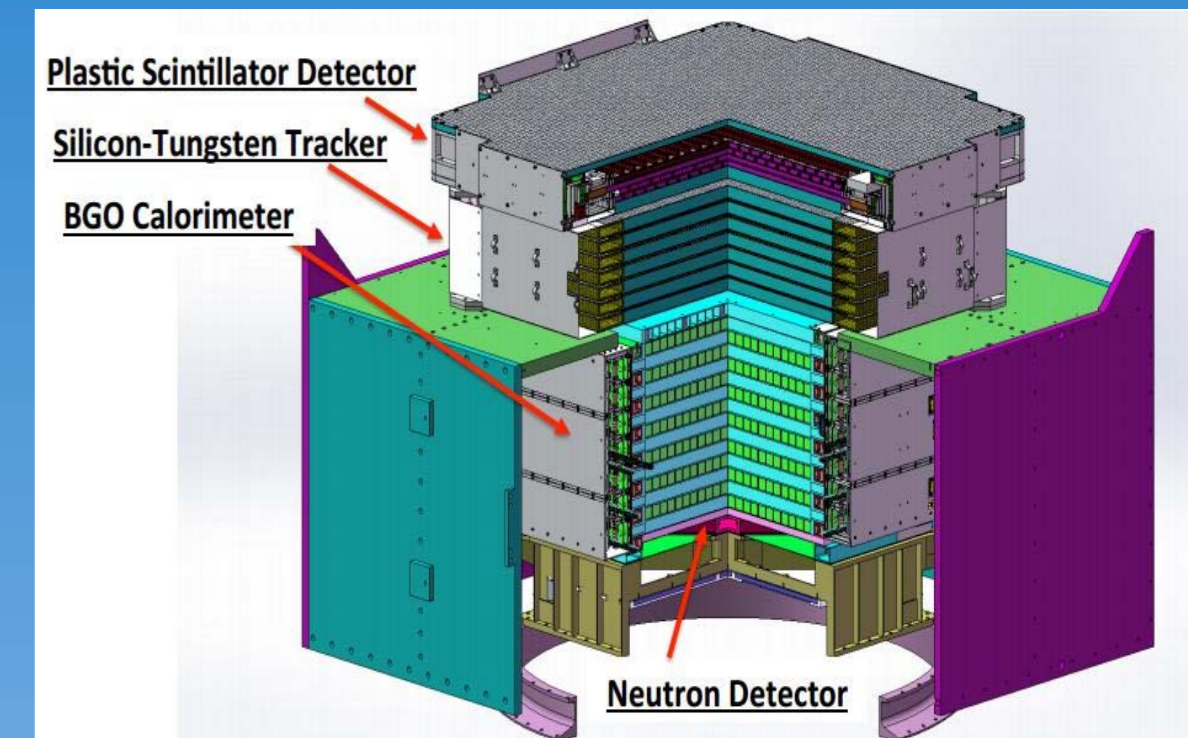
Fermi-LAT
main mode - sky survey



CALET



DAMPE



GAMMA-400 gamma-ray telescope main mode is point source (region of interest) observation

Main systems

AC

double layer thickness 10x2 mm, overlay 5-10mm
Efficiency of 0.999995

Converter-tracker

- The single-sided SSDs strips with 80 μm pitch,
- 13 pair SSD (X, Y)
- 7 paired layers (W 0.1 radiation lengths)
- 4 paired layers (W 0.02 radiation lengths)
- Last 2 paired layers no W.
- Analog readout**

TOF

- C1 upper counter - two layers of fast plastic scintillators
- C2 upper counter - two layers of fast plastic scintillators distance C1 - C2 500 mm

CC1 imaging calorimeter

- Two super layers
- CsI(Tl) 20 mm + Si strip detectors X,Y SSD pitch 80 μm
- 2 radiation lengths

C3 calorimeter trigger counter

two layers of fast plastic scintillators

CC2 electromagnetic calorimeter

- CsI(Tl) crystals 20 radiation lengths
- The total vertical depth of the calorimeter is **22 radiation lengths**
- e/p rejection $\sim 5 \times 10^5$

GAMMA-400 more deep calorimeter

allows more precisely determine the shower axis and, therefore, in the reconstruction of the track to reduce the number of hits strips (noise) - and thereby improve the angular resolution (0,01°)

- improve energy resolution (1%)
- improve proton rejection (10⁵)
- additional possibilities - observations lateral direction

GAMMA-400 trigger system (fast signal)

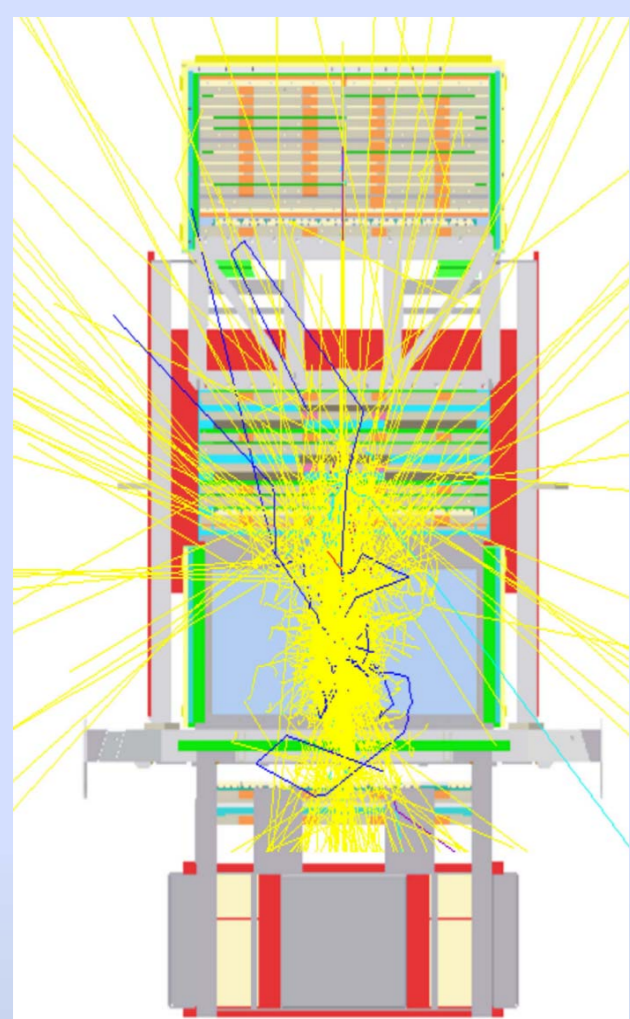
- TOF
- VETO ACD
- S3 (LO or HI)

The time between a particle interaction in the LAT that causes an event trigger and the latching ~ 50 ns)

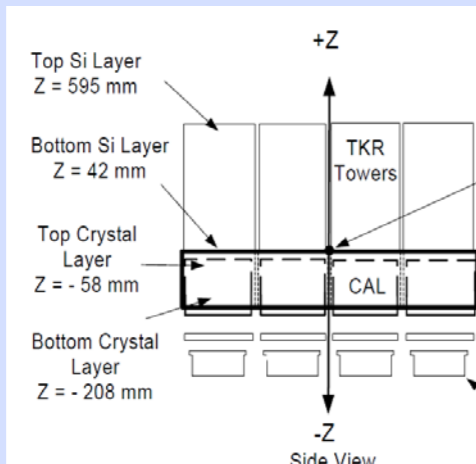
Fermi-LAT (slow signal)

The time between a particle interaction in the LAT that causes an event trigger and the latching ~ 2.5 μs)

Backsplash effect from gamma-quantum of 30 GeV



Backsplash influence in GAMMA-400 significantly reduced
Distance from calorimeter crystal CsI to bottom tracker SSD
Fermi-LAT 10 cm, GAMMA-400 110 cm.



- Gamma-400 - further development of gamma-ray telescopes after Fermi-LAT in energy range 20 MeV-10 TeV.
- allow to measure astrophysical objects with qualitatively new parameters in the field of high-energy, the angular resolution of 2 - 10 times better energy resolution of 5 - 10 times better
- In this range parameters GAMMA-400 is also superior being developed ground gamma telescopes CTA angular resolution 10 times, energy resolution 5 - 10 times.
- Allow a search for traces of decay and annihilation of particles of dark energy

