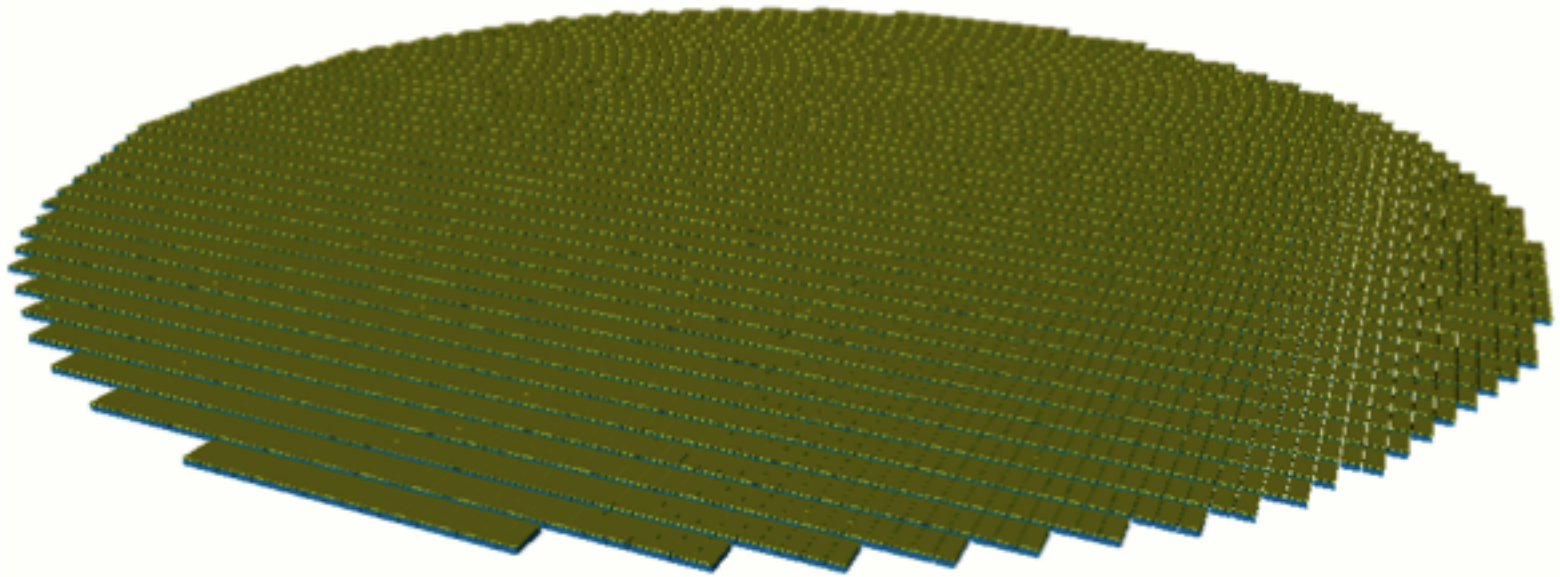
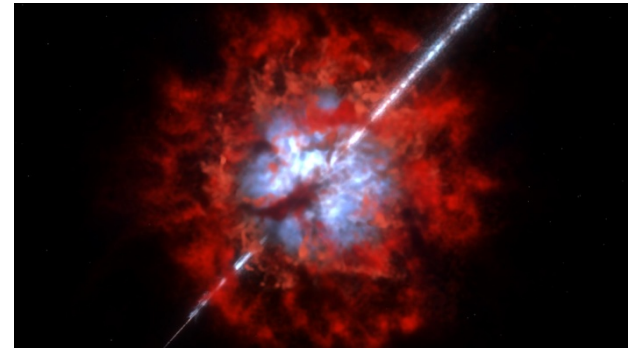


LATTES

Large Array Telescope for
Tracking Energetic Sources



Mário Pimenta
May 2018

Key Words

Physics - white book or something similar

- Sensitivity to transients
- Multi-messenger GW : BH-NS
- Multi-messenger neutrinos : Galactic center
- Multi-messenger UHECRs : Pevatrons
- Cosmic-rays : Pulsars
- Multi-messenger workshop (Sep/Oct 2019)

Detector and Performance - several detectors concepts

R&D - production and test of prototypes

Site - evaluation of sites (Chile, Argentina) and of the local support.

Towards a single collaboration - Heidelberg 8/10

Key Words

Physics - white book or something similar

Detector and Performance - several detectors concepts

- Sparse array
- Accidentals
- Explore RPC patterns
- Angular dependence
- MARTA/LATTES as a baseline ?

R&D - production and test of prototypes

Site - evaluation of sites (Chile, Argentina) and of the local support.

Towards a single collaboration - Heidelberg 8/10

Key Words

Physics - white book or something similar

Detector and Performance - several detectors concepts

R&D - production and test of prototype

- **RPCs**
 - Test of MARTA RPC at low pressure
 - Small prototypes optimized at 5000 meters
 - Cost review
 - RPC dedicated workshop
- **Silicon PMTs**
 - Layout design

Site - evaluation of sites (Chile, Argentina) and of the local support.

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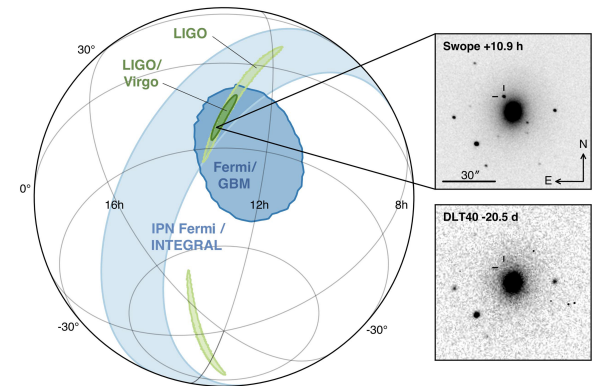
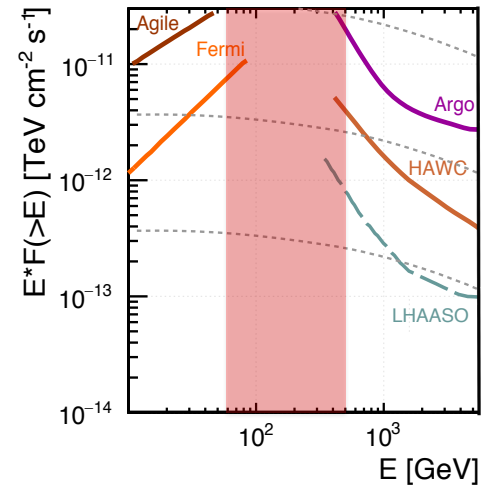
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Towards a single collaboration - Heidelberg 8/10

- Joint SGSO (June?)
- Contributions to Heidelberg meeting

Wide field of view gamma-ray observatory in South America

- **A broad energy range** : From satellites to the highest energies (Core + sparse array at 5000 m a.s.l.)
- **Complementarity to**: CTA, IceCube, KM3NET, GW observatories (transients, sources variability, ...)
- **Build on the experience of successful observatories**: Argo, HAWC, Auger, ...
- **Low maintenance / reasonable cost**



Science

Gamma-ray physics

- Study of flares and transient sources.
- Identification and study of extended photon sources (Fermi bubbles, ...)
- Assessment of the sensitivity of LATTES to indirect dark matter (DM) searches.

Cosmic-ray physics

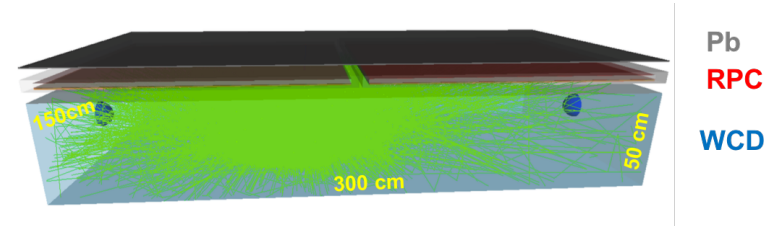
- Study the nature of cosmic rays up to the first “knee” energy region.
- Study charged cosmic rays and their connection with accelerator measurements.

Multi-Messenger (astro)physics

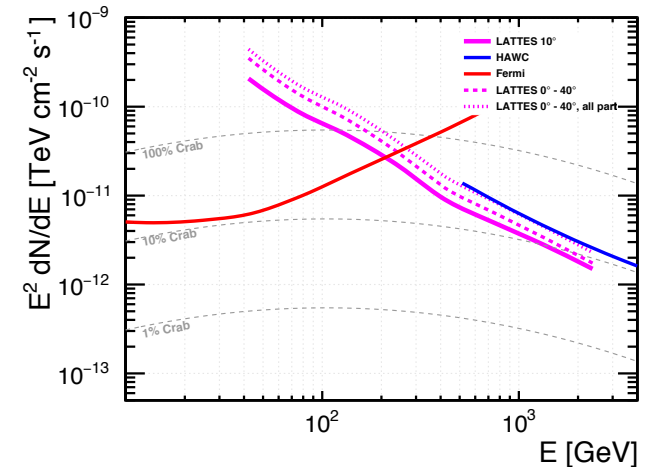
- Search for electromagnetic counterparts of extreme energy phenomena such as the Gravitational Waves and neutrino bursts.

Detector concept and performance

- An hybrid detector : 1 ns time resolution (angular resolution), calorimetric energy measurement (trigger)



- Results from LATTES concept are quite encouraging! (end-to-end simulation)



(*Astropart.Phys.* 99 (2018) 34-42)

How to go ?

- Built an enlarged LATTES collaboration
- Establish links with CTA/HAWC/LHASSO
- Science opportunities (50 GeV - 100 TeV)
- Site procurement
- General design – baseline and alternatives
- Sparse array
- Simulations data sets
- Better reconstruction algorithms
- Better gamma/hadron algorithms
- Detector detailed design and prototypes
 - RPCs
 - WCDs
 - Trigger and data readout
 - Auxiliary systems: Power, gas, sensors and slow controls
 - Thermal simulation (freezing?)
- Funding opportunities