

Possible PhD thesis topics in the High Energy Gamma-ray Astrophysics Group

1. Search for GRBs and Gravitational Wave Events EM counterparts with Gamma Ray instruments

The PhD candidate will work on the search for EM counterparts of GW events with [AGILE](#) and/or [Fermi/LAT](#) data. The PhD candidate will develop new algorithms for the fast identification and characterization of EM sources in the data collected by space experiments, participating to the activity of the transient group of the two experiments. In the analysis the PhD candidate will also search for un-triggered GRB in the archival data of AGILE and Fermi/LAT.

2. Study of the properties of the GRB population detectable by CTA

The PhD candidate will work on the GRB search by the upcoming [Cherenkov Telescope Array](#). A study of the GRB population that could be visible is currently ongoing. The PhD candidate will continue this search aiming to participate to the development of fast analysis tools for the characterization of detected events.

3. Characterization and Design of future Low Energy Gamma Ray Instruments

The PhD candidate will work on the development of current [Gamma Ray projects](#) in the Low energy energy range (~ 300 keV – 1 GeV). The PhD candidate will participate to the study of the instrument performance and the development of the analysis tools. The PhD candidate will particularly work on the development of the algorithms to perform Transient science topics for Low Energy Gamma Ray detectors (GRB, GW counterparts, AGN, PWN flares, etc).

4. Development of the synergy among THESEUS and CTA

The PhD candidate will work on the development of the [THESEUS](#) mission, concentrating in particular on the possible synergies among THESEUS and the upcoming CTA instrument. The THESEUS science topics will be of particular relevance for CTA in view of the need of a Fast Alert monitor for Flaring sources in the Very High Energy sky.

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