



# Nine Years of *Fermi* LAT Flare Advocate Monitoring Stefano Ciprini

ASI Space Science Data Center (SSDC), Roma, Italy - Istituto Nazionale di Fisica Nucleare (INFN) Sezione di Perugia, Italy (on behalf of the *Fermi* LAT collaboration; on behalf of the *Fermi* LAT Flare Advocates )

## Introduction

The *Fermi* Flare Advocate (also known as Gamma-ray Sky Watcher, FA-GSW) service provides for a quick look and review of the gamma-ray sky observed daily by the *Fermi* Large Area Telescope (LAT) through on-duty Flare Advocates and high level software like the LAT Automatic Science Processing (ASP) and *Fermi* All-sky Variability Analysis (FAVA). The FA-GSW on service provides alerts and communicates to the external scientific community for potential new gamma-ray sources, interesting transients, flares, particular hard-spectrum states, preliminary coincidence with PeV neutrinos or EeV CRs.

# The FA-GSW service

The role and activity of the FA-GSW is twofold. A Flare Advocate (FA) task (similar to burst-advocate for GRBs but looking at signals and flares on longer time scales), and a Gamma-ray Sky Watcher (GSW) task (6-hour, daily and weekly all-sky maps are inspected looking at all the detected sources and flares).

- News are posted through the Fermi multiwavelength (MW) mailing list, Astronomer's
   Telegrams (ATels), Gamma-ray Coordination Network
   notes (GCNs), other notes and dedicated discovery
   papers and MW follow-up papers .
- From July 2008 to Oct. 2017, 406 ATels and 126
  GCNs have been published by the *Fermi* LAT
  Collaboration.
- Some dozens of target of opportunity (ToO) observing programs have been triggered by the LAT Collaboration and performed though the Swift satellite, and individual observing alerts have been addressed to ground-based TeV Cherenkov, optical and radio telescopes.



 The FA-GSW service energy sky, increasin of international coop
 The dynamic/varial features). HE gamma continuous survey monitor.
 In addition the new era of multimessenger astronomy (neutrinos, EeV cosmic rays, gravitational wave bursts) is now very exciting also for the FA-GSW service.



## Conclusions

The FA-GSW service helps the LAT to catch opportunities offered by the variable HEenergy sky, increasing the rate of simultaneous multi-instrument observations and level of international cooperation in multifrequency/messenger time-domain astrophysics.

The dynamic/variable gamma-ray sky is continuing to be scientifically interesting, (new features). HE gamma-ray time domain astronomy benefits from the long-baseline



#### Acknowledgements

Author warmly express their gratitude to all the shifters of the Fermi LAT Flare Advocates (Gamma-ray Sky Watchers) service. Author acknowledge people who worked to build and work to maintain science analysis software and pipelines for this service, like the LAT Automatic Science Processing (ASP, Data Viewer task wavelet and DRP likelihood monitor), the FAVA tool at FSSC-GSFC, and the FAjobs swt in particular, and hosted at the LAT Instrument Science Operation Center (LISOC) in SLAC Stanford, USA.

The Fermi-LAT Collaboration acknowledges support for LAT development, operation and data analysis from NASA and DOE (United States), CEA/Irfu and IN2P3/CNRS (France), ASI and INFN (Italy), MEXT, KEK, and JAXA (Japan), and the K.A. Wallenberg Foundation, the Swedish Research Council and the National Space Board (Sweden). Science analysis support in the operations phase from INAF (Italy) and CNES (France) is also gratefully acknowledged.