Automatic search for GW counterparts with *Fermi*-LAT

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Follow-up of GW events

➢ **Fixed Time Interval analysis (FTI):**
  - Compute likelihood for each pixel of the LIGO probability map (with P > 0.9), including all the LAT sources as well as the Galactic and isotropic diffuse templates and providing a TS map, an UL flux map and a Bayesian UL for the entire map.

➢ **Adaptive Time Interval analysis (ATI):**
  - Similar to the FTI analysis but the likelihood is calculated only for the interval of time when the pixel is in the LAT field of view (for each pixel).

➢ **LAT Low Energy events (LLE):**
  - Extract LLE data (E < 100 MeV) around the time of the trigger for each pixel of the map (downgraded to NSIDE=32) producing light curve and estimating the significance.

As happened during O1 and O2 runs, every time we received a LIGO/Virgo alert:
  - Two independent analysis pipelines are automatically triggered (good for cross-checks and redundancy);
  - Within few hours, a GCN is sent with computed UL and TS for a possible gamma counterpart;
  - Flux ULs (0.1–1 GeV) ~ 1–5 x 10^{-10} erg cm^{-2} s^{-1}.