

The Fermi GBM gamma-ray burst and the Fermi LAT follow up of the GW event

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“On behalf of the Fermi-GBM Collaboration”

Since its launch in 2008, the Fermi Gamma-ray Burst Monitor (GBM) has triggered and located on average approximately two gamma-ray bursts (GRBs) every three days. Here we present the main results from the latest two catalogs provided by the Fermi GBM science team, namely the third GBM GRB catalog and the first GBM time-resolved spectral catalog.

The intention of the GBM GRB catalog is to provide information to the community on the most important observables of the GBM detected bursts. It comprises 1405 triggers identified as GRBs. For each one, location and main characteristics of the prompt emission, the duration, peak flux and fluence are derived.

The GBM time-resolved spectral catalog presents high-quality time-resolved spectral analysis with high temporal and spectral resolution of the brightest bursts observed by Fermi GBM in a shorter period than the former catalog, namely four years. It comprises 1491 spectra from 81 bursts. Distributions of parameters, statistics of the parameter populations, parameter-parameter and parameter-uncertainty correlations, and their exact values are obtained.

With its broad field-of-view and excellent sensitivity to short Gamma-Ray Bursts (GRBs), the Fermi Gamma-ray Burst Monitor (GBM) is an ideal partner for LIGO/Virgo in the search for electromagnetic counterparts to the gravitational waves detected from the merger of compact objects in binary systems.

Here we present Fermi-GBM observations of the LIGO Gravitational Wave event GW150914, which has been associated to the merger of two stellar-mass black holes, and report the presence of a weak transient event, close in time to the LIGO one. We discuss the characteristics of the GBM transient, which are consistent with a weak short GRB arriving at a large angle to the direction in which Fermi was pointing.

Future joint observations of GW events by LIGO/Virgo and Fermi GBM could reveal whether the weak transient reported here is a plausible counterpart to GW150914 or a chance coincidence, and will further probe the connection between compact binary mergers and short GRBs.

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