The First Insight-HXMT Gamma-Ray Burst Catalog: The First Four Years

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ABSTRACT

The Hard X-ray Modulation Telescope (Insight-HXMT), is China’s first X-ray astronomy satellite launched on June 15, 2017. The anti-coincidence CsI detectors of the High Energy X-ray telescope (HE) onboard Insight-HXMT could serve as an all-sky gamma-ray monitor in about 0.2-3 MeV. In its first four years of operation, Insight-HXMT has detected 322 Gamma-Ray Bursts (GRBs) by offline search pipeline including blind search and targeted search. For the GOLDEN sample of Insight-HXMT GRBs, joint analyses were performed with other GRB missions, including Fermi Gamma-ray Burst Monitor (Fermi/GBM), Swift Burst Alert Telescope (Swift/BAT) and Gravitational wave high-energy Electromagnetic Counterpart All-sky Monitor (GECAM). It shows that Insight-HXMT can provide better constraint on GRB spectrum at higher energy band. The properties of Insight-HXMT GRBs are reported in detail, including their trigger time, duration, spectral parameters, peak fluxes of different time scales and fluence. This catalog is an official product of the Insight-HXMT GRB team.

Keywords: catalogs – gamma-ray burst: general

1. INTRODUCTION

The Hard X-ray Modulation Telescope (HXMT), dubbed Insight-HXMT, launched on June 15, 2017, is China’s first X-ray astronomy satellite devoted to broad band observations in the 1-250 keV band. Insight-HXMT consists of three collimator-based telescopes: the High Energy X-ray Telescope (HE, Liu et al. 2020), the Medium Energy X-ray Telescope (ME, Cao et al. 2020) and the Low Energy X-ray Telescope (LE, Chen et al. 2020). Insight-HXMT/HE adopts an array of 18 NaI(Tl)/CsI(Na) phoswich detectors as the main detector, with a total geometric area of about 5100 cm² and a combined Field of View (FOV) of about 5.7°×5.7° (FWHM)(HE, Liu et al. 2020). The CsI(Na) (CsI for brevity) in the phoswich detector of HE can be also used as an all-sky gamma-ray monitor in 0.2-3 MeV, since gamma-rays in this energy range can penetrate the spacecraft and deposit energy in the CsI detector. Thus HE could play an important role in monitoring gamma-ray bursts (GRBs), MeV pulsars, Solar Flares (SFL), Terrestrial Gamma-ray Flashes (TGF) and other gamma-ray sources. The measured energy range (deposited energy) of CsI is about 40-800 keV in the normal gain (NG) mode and about 200 keV-3 MeV in low gain (LG) mode. The NG and LG modes are achieved by

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adjusting the high voltage of the PMTs which readout the NaI(Tl)/CsI(Na) phoswich detectors.

There is neither on-board GRB trigger system nor prompt data telemetry for Insight-HXMT, thus GRBs are unveiled on-ground using two pipelines: the blind search is performed on all data acquired by Insight-HXMT/HE CsI detector; in addition, for each GRB detected by other astronomical satellites or instruments (called external triggers hereafter, in contrast to the internal triggers produced by Insight-HXMT itself) reported through the Gamma-ray Coordinates Network (GCN), the targeted search pipeline would be launched to search CsI data around the trigger time of external triggers.

From June 26th in 2017 to June 30th 2021, GRBs and others bursts including terrestrial gamma-ray flash (TGF), solar flares (SFL, Zhang et al. 2021) have been detected by Insight-HXMT, the gamma-ray counterparts of Gravitational Wave (GW) events (Li et al. 2018a; Zhang et al. 2018; Li et al. 2017); Fast radio bursts (FRB, Guidorzi et al. 2020) and High Energy Neutrino (HEN, e.g. Zheng et al. 2020), have been monitored as well. During the first four years of observation data, 660 bursts are found, where 322 are classified as GRBs, 245 as TGFs, 4 as SFLs, 33 as charged particles and 56 as unclassified. Targeted search were implemented for external triggers of great importance, including 41 HENs, 48 GWs and 39 FRBs. For each GRB, the trigger time in Universal Time Coordinated (UTC) and Mission Elapsed Time (MET) are recorded and the event data is selected between $T_0 - 100s$ and $T_0 + 300s$ in most cases, where $T_0$ is trigger time from GCN or blind search. In addition, quick-analysis tools for GRBs and joint spectral fitting with other missions are developed for this catalog analysis, which are introduced in the following sections.

We start with a brief description of the HXMT/CsI detectors and calibration in Section 2 and refer Luo et al. (2020) for a more thorough and complete description of the instrument and calibration respectively. This is followed, in Section 3 the burst-searching algorithm and its up-to-date ability is introduced in details. In Section 4, a description of the methodology used in the production of this catalog is presented, including detector selection, data types used, energy selection and background fitting, and the source selection. In Section 5, catalog analysis and results are presented. In Section 6, the distribution of duration, hardness are discussed and all the GRBs catalog results are summarized.

2. INSTRUMENT

The High Energy X-ray Telescope (HE, Liu et al. 2020) consists of the main detector (HED), high energy collimator (HEC), auto-gain control detector (HGC), anti-coincidence shield detector (HVT), particle monitor (HPM), data processing and control box (HEB) and power box (HEA). As the main detector of HE, HED is responsible for the observation of celestial sources. It consists of 18 NaI(Tl)/CsI(Na) phoswich detectors (labelled as HED-0, 1 ... to 17), each with a diameter of 190 mm and a collimator made of lead and tantalum. The NaI detectors are sensitive to the hard X-rays in 20-250 keV, whereas the CsI acts as an anti-coincidence detector to reduce the background of NaI. The thickness of the NaI and CsI crystals are 3.5 mm and 40 mm, respectively. HGC provides the auto-gain control and energy calibration for HED. HVTs act as an active shielding system to reduce HED’s background caused by charged particles. HPMs monitor the flux of charged particles and send out an alert to switch off the high voltages of HEDs and HVTs in high flux regions to avoid potential damage to the PMTs of these detectors. The overview of all telescopes aboard Insight-HXMT is shown in Figure 1.

Insight-HXMT/HE can observe the high energy sky with two observation scenarios (Zhang et al. 2020) which can work simultaneously:

(1) Collimator-based (pointed or scan) observation: using NaI/CsI detectors, HE can detect hard X-ray emission in 20-250 keV from the celestial sources within the FOV defined by collimators. HE can do pointed observation to a specific source, or scan observation to a small sky area.

(2) Gamma-ray all-sky monitoring: Gamma-ray photons with energy higher than $\sim$200 keV from all directions can penetrate the spacecraft and be detected by the CsI detectors. CsI can monitor the gamma-ray all-sky with the only exception of the occulted region by the Earth. This gamma-ray all-sky monitoring is an extended capability for HE and inapplicable for ME or LE telescopes aboard Insight-HXMT.

The primary observation scenario of HE is the collimator-based observation consisting of pointed observation and scan observation, both of which use the NaI as the main detector and detect sources within the field of view (FOV) of collimator in 20-250 keV. The CsI detectors mainly act as the anti-coincidence and shielding to reduce the background of NaI. Due to the high thickness of the CsI(Na) crystals, high energy (greater than about 200 keV) gamma-ray photons can penetrate the spacecraft and be recorded by the CsI
detectors, thus the GRBs unocculted by the Earth can be detected. For each NaI/CsI phoswich detector of HE, the event-by-event data (called EVT data hereafter) is recorded and we can use the pulse width information in the EVT data to distinguish between NaI events and CsI events. For this paper, we only select these events recorded by CsI detectors by screening events with pulse width greater than 75. The response and calibration of the CsI detectors are mainly described in Section 4.1.

The gain of NaI/CsI detector is mainly controlled by the High Voltage of the PMT which converts the scintillation light produced by NaI/CsI crystals to the electric signals. To meet various observation requirements, two gain modes are designed for the HE NaI/CsI detectors: normal gain (NG) mode and low gain (LG) mode. The measured energy ranges for CsI detector are listed as bellow: the NG mode in 40−800 keV and the LG mode in 200−3000 keV (both refer to the deposited energies). NG mode is the main working mode that the auto-gain control system can keep the full-energy-peak of the 59.5 keV photons (emitted from a radioactive source $^{241}$Am) in a fixed channel of the NaI detector. In LG mode, the high voltage of the each Insight-HXMT/HE detector is reduced and the auto-gain control system is disabled to achieve a higher energy range detection. As derived from the two-year observations since Insight-HXMT has operated in-orbit, the E-C relationships of each Insight-HXMT/CsI detector for both NG and LG modes vary over time, so calibration of the instrumental response is of great importance.

3. SEARCH FOR BURSTS

A pipeline is developed to search for GRBs for blind search and the coherent search method for targeted search (Cai et al. 2021). The blind search software continually monitors each group (18 CsI detectors are divided into 6 groups, 3 in each group) of detectors count rates, for which the reason is to reduce statistical fluctuations of one or a few detectors, one of the main causes of false trigger. The pipeline is triggered when counts rates in the EVT data of three or more groups of CsI detectors exceed the background counts rates, by 3σ on five timescales: 0.06s, 0.1s, 0.2s, 0.5s and 1s by calculating an average of the counts rates of 10 s of the previous data as background.

If a GRB detected by other external missions, falls in the field of view of HE, but did not trigger the blind search, targeted search in HE/CsI data would be launched. The targeted coherent search method is applied to the EVT data of HE CsI detectors, which can recover true astrophysical bursts that are too weak to trigger through blind search. This coherent method was originally developed by Blackburn et al. (2015), improved by Goldstein et al. (2016), Goldstein et al. (2019), and verified by Kocevski et al. (2018). From the statistics of searched GRBs, we find the fluence (from GBM Burst Catalog) of HE targeted search could reach $\sim 10^{-7}$ erg cm$^{-2}$ (10 keV−1 MeV) in duration of 0.256 s. For this paper, 15 GRBs that are found from targeted search are included and labeled in Table 3, while the rest are from blind search. Details of burst search are presented in a separate paper (Cai et al. 2021).

4. CATALOG ANALYSIS

4.1. Instrument Analysis

There are two parts in the instrumental response of CsI detectors: the energy redistribution of the photons from incident energy to deposition energy that is determined by the property of the CsI crystal and the mass distribution of satellite; and the Energy-Channel (E-C) relationship that is determined by the detectors and electronic system of the instrument. For the photon energy redistribution, the reliability is mainly determined by the accuracy of the mass model of the satellite and the payloads (Agostinelli et al. 2003). Based on the initial mass model of the satellite platform (Xie et al. 2015), we calibrate the mass model with the Crab pulse radiation as a standard candle (Li et al. 2018b), to generate accurate instrumental response for the all sky gamma-ray monitoring.

The in-flight E-C relationship and energy resolution of the instrument can be obtained by analyzing the characteristic lines of the in-orbit observed and the on-ground simulated background spectra (Li et al. 2019). The E-C relationship varies over time, whereas the energy resolution remains stable (Li et al. 2020). Therefore, we update the E-C relationship every month, and take the average energy resolution of all calibration results to generate the instrumental response.

After the above calibration, a new response matrix library is established and a simulated spectral analysis is performed to test the HXMT/CsI spectroscopy capabilities. Calibration of the instrumental response to GRB is carried out with GRBs (Luo et al. 2020). In a GRB observation, the incident direction of the GRB photons is supposed to be arbitrary, however, only the instrumental response to several directions can be calibrated directly. A common method of the instrumental response testing is the cross-calibration with other instruments by comparing the energy spectrum of the simultaneously observed GRB (Sakamoto et al. 2011; Tsujimoto et al. 2011; Tierney et al. 2010; Ishida et al. 2014). The detection efficiency of HXMT/CsI is checked by the joint spectral analyses with Fermi/GBM, Swift/BAT.
Figure 1. The illustration of the satellite platform and the payloads of Insight-HXMT. The coordinate system used in this study is shown on the upper-left. It is adapted from Fig. 1 in Luo et al. (2020).

and Konus-Wind, in which we find that HXMT/CsI can provide better constraint on GRB spectrum at higher energy band (Luo et al. 2020). The instrumental responses are mainly obtained by Monte Carlo simulation with the Geant4 tool and the mass model of both the satellite and all the payloads, which is updated and tested with the Crab pulse emission in various incident directions. Both the Energy-Channel relationship and the energy resolution are calibrated in two working modes (NG mode and LG mode) with the different detection energy ranges. The simulated spectral analyses show that HXMT/CsI can constrain the spectral parameters much better in the high energy band than that in the low energy band. As introduced in (Luo et al. 2020), the joint spectral analyses are performed to ten bright GRBs observed simultaneously with HXMT/CsI and other instruments (Fermi/GBM, Swift/BAT, Konus-Wind), and the results show that the GRB flux given by HXMT/CsI is systematically higher by $7.0 \pm 8.8\%$ than those given by the other instruments. The HXMT/CsI-Fermi/GBM joint fittings also show that the high energy spectral parameter can be constrained much better as the HXMT/CsI data are used in the joint fittings.

In summary, the instrumental responses of the HXMT/CsI detectors of Insight-HXMT are well calibrated in aspects of mass model, E-C relationship and the energy resolutions for both the NG and LG modes. Thanks to the large effective area in the high-energy band, as shown in Figure 2, HXMT/CsI shows its advantages in constraining the GRB spectra in high energy band, together with other missions (such as Fermi/GBM) which provide observations at lower energies.

Note that the the deposited energy range is usually very different from incident energy bands due to the responses of HXMT/CsI detectors. Three types of spectra are listed in Table 1, where the soft and middle spectra are with BAND model, the hard spectra is with CPL model, and they are representative of GRBs of different hardness; details of BAND and CPL model are clarified in Section 4.7.1. They are simulated with the same amplitude in each type of spectra (use fakeit in Xspec 12.11.0, with all the model normalization factors equal to 1), and convoluted with the total response of 18 HXMT/CsI detectors. The deposited energy spectra of incident angle theta from $0^\circ$ to $180^\circ$ are shown in NG mode (Figure 3) and in LG mode (Figure 4) respectively, which shows the ranges of deposited energy. Considering the deposited spectra and effective area shown in Figure 2, the deposited energy range of HXMT/CsI data
Figure 2. Effective areas of HXMT/CsI, Fermi/LAT, Fermi/GBM, Konus-Wind, Swift/BAT, CALET/CGBM and AstroSat/CZTI. The effective area of Fermi/GBM (NaI) is the averaged over the unocculted sky. It is adapted from Fig. 13 in Luo et al. (2020).

Table 1. Three types of spectra and parameters. The soft and middle spectra are with BAND model, and the hard spectra is with CPL model.

| Types of spectra | $\alpha$  | $\beta$  | $E_{\text{peak}}$ (keV) |
|------------------|-----------|----------|-------------------------|
| SOFT             | -1.9      | -3.7     | 70                      |
| MIDDLE           | -1.0      | -2.0     | 230                     |
| HARD             | -0.5      | -        | 1500                    |

is determined to be about 150-800 keV for NG mode and about 200-3000 keV for LG mode in the following spectra analysis.

4.2. GRB Samples

In summary, we define three types of GRB samples as shown in Table 2. Only the ‘GOLDEN’ GRBs could be utilized in the joint analysis, which are required to be located well and detected without saturation in HXMT/CsI data. The ‘SILVER’ samples denote those which are detected by other external missions, but not located or lack of data for joint analysis. In this analysis, public data offered by Fermi/GBM, Swift/BAT or GECAM are utilized for joint analysis. The bursts which are only detected by HXMT are labeled as ‘BRONZE’. The HXMT/HE data files will not be used if there is saturation in electronics subsystem during the GRBs, or the data quality is not good (such as data loss). Saturation is defined when the two following criteria are matched simultaneously: firstly, total count rate of 18 CsI detectors exceeds 20000 counts/s, as evaluated over four different timescales: 0.1, 0.2, 0.5, and 1.0 s; secondly, in at least one of the three groups of 6 CsI detectors that share the same Analog-to-Digital Converter (ADC) (Liu et al. 2020), the total light curve has at least one 5-ms bin with zero counts. As shown in Table 2, this kind of GRB samples are labeled as ‘IRON’, which are not utilized in the following analysis.

4.3. Suppression of Background From Charged Particles

Among the main detectors of the HE telescope, HVTs act as an active shielding system to reduce HED background caused by charged particles (HE, Liu et al. 2020). In order to suppress the background from charged particles, events which are coincidence with signal in HVTs are removed since they are likely produced by charged particles rather than gamma-rays. Besides, those events which also have energy deposition in NaI (Tl) detectors are also eliminated, because the signals of NaI (Tl) are mainly from the target source when we perform pointed or scan observation. Response of 18 CsI detectors in HED according to Section 2 are different but the discrepancy between them are small (unlike the case
Figure 3. The deposited energy spectra of three types of BAND with incident angle $\theta$ of $0^\circ$ to $180^\circ$ are shown in NG mode. The azimuthal angle $\phi$ is $0^\circ$. Here the incident angle $\theta$ and the azimuthal angle $\phi$ denote the direction of gamma rays in spherical coordinates of HE/CsI detector.

Table 2. Classification of four kinds of Insight-HXMT GRB samples.

| Type   | Location and data for joint analysis | External detected | Saturation in HXMT data | Utilized or not | Number |
|--------|-------------------------------------|-------------------|-------------------------|-----------------|--------|
| GOLDEN | Yes                                 | Yes               | No                      | Yes             | 202    |
| SILVER | No                                  | Yes               | No                      | No              | 44     |
| BRONZE | No                                  | No                | No                      | No              | 50     |
| IRON   | Yes/No                              | Yes/No            | Yes                     | No              | 26     |
Figure 4. The deposited energy spectra of three types of BAND with incident angle \( \theta \) of 0° to 180° are shown in LG mode. The azimuthal angle \( \phi \) is 0°. Here the incident angle \( \theta \) and the azimuthal angle \( \phi \) denote the direction of gamma rays in spherical coordinates of HE/CsI detector.
in *Fermi*/GBM or GECAM where detectors have different orientations), therefore, all data events in 18 CsI detectors are utilized in this study.

### 4.4. Dead Time Correction

Dead time of HED detectors is complicated. According to Xiao et al. (2020), every 6 detectors in 18 NaI (Tl)/CsI (Na) detectors in HE share one ADC read-out electronics, thus a signal in any detector will cause dead time not only to the incident detector itself, but also to the other 5 detectors of the same ADC. The dead time of one event is normally about 4 ~ 8 µs, but it will be longer for the signals generated by high energy charged particles. There is a dead time counter in HEB for each HED, and the information is recorded in the form of proportion of dead time. The proportion of dead time in a time interval is determined with the method established in Xiao et al. (2020). The correction factors on the light curves are determined by \( \frac{1}{1-P_{dt}} \), where \( P_{dt} \) is the proportion of dead time in every time bin with bin width of 10 ms. The light curves of each CsI detector are corrected by multiplying with series of dead-time correction factors before background fitting is performed. As shown in Figure 5, the comparison between light curves with and without dead-time correction of a short GRB is present, which shows that the dead-time correction is necessary for refined analysis.

### 4.5. Background Fitting

After the data have been selected for a given GRB, a background model in the form of polynomial function with time, is computed separately for each detector, based on user-selected time intervals for background region. Here we use a pre-burst interval and a post-burst interval as user-selected background regions. The order of polynomial is determined by the best goodness of fits with polynomials of different orders, where the order could be 0, 1, 2 respectively. For each detector, background fitting is carried out for each energy channel, and the background fit determined from pre-burst and post-burst intervals are used to estimate the background counts in the signal region of the burst. The net counts number of GRB in each channel is obtained by subtracting the counts of background from the total counts number. Background fitting is performed in each detector channel by channel in deposited energy spectrum, until the net counts and background counts of all channels for the given GRB are determined. Statistical errors of net counts are determined by the root of the sum of squares of the statistical errors of background estimation and Poisson errors of total counts (i.e. classical error propagation). Note that all light curves for each energy channel in each detector have been corrected with dead-time correction factors. The source time intervals for all detectors are chosen to be same for the GRB data analysis, thus data of all detectors could be added up to reduce the statistical uncertainties.

### 4.6. Source Time Interval Selection

Source time interval selection may be different when we perform different analyses. For the computation of duration, peak fluxes and fluence, the source interval is loosely selected, by starting from several seconds before the burst begins and ending at several seconds after the burst ends, and may have overlaps with pre-burst and post-burst intervals for background selection. If there exists difference of start- and end-time of a GRB between HXMT/CsI and other missions due to the energy detection range, the loosest source interval is applied for the joint data analysis of these missions. For the analysis of time-average spectra, the source time interval is usually selected to be narrower. The events in \( T_{bo} \) or the whole duration in some cases based on deposited photon counts are selected for the time-averaged energy spectra.

In the case of joint analyses with other missions, the time delay due to the different arrival times of two spacecrafts is considered. The method mentioned in Hurley et al. (1999) is utilized to determine the time delay between HXMT and other missions. Figure 6 shows the time delays of other missions relative to HXMT for ‘GOLDEN’ GRB samples. The red histograms denote the time delays of *Fermi*/GBM, while the blue ones denote those of *Swift*/BAT and the green ones for those of GECAM. The negative values represent that GRBs arrived at other missions earlier than HXMT, while the positive numbers means that the GRB arrival time of HXMT is earlier. Some time delays reach up to tens of milliseconds and must be considered, because the time scale (64 ms) of deconvolved photon spectra is in the same order of magnitude.

### 4.7. Duration, Fluence and Peak Flux

In order to take advantages of different missions and to reduce uncertainties in determination of the parameters of GRBs, joint spectral analyses between HXMT and *Fermi*/GBM, *Swift*/BAT and GECAM are applied on all ‘GOLDEN’ GRBs. This paper reports various measures of the duration, peak fluxes and fluence of each burst. We take GRB 200125B (HEB200125863), GRB 210121A (HEB2101210779) and GRB 210112A (HEB210112068) as samples to show the procedures performed on all GRBs in Appendix A. The fits to time-averaged and time-resolved spectra are all performed with Xspec 12.11.0.
Figure 5. A comparison between light curves with and without dead-time correction of a short GRB triggered at 2019-11-05T06:11:08.65 UTC. The histogram of red lines and error bars denote the light curve without dead-time correction, while the black with dead-time correction. Here MET means the mission elapsed time of HXMT.

Figure 6. The distribution from ‘GOLDEN’ GRB samples of time delays of Fermi/GBM (dashed), Swift/BAT (dotted), and GECAM (dot-dashed) relative to HXMT are shown.

4.7.1. Time-Average Spectrum

The time-averaged energy spectra are obtained from HXMT/CsI together with other instruments. For example, from Fermi/GBM, the spectra from two NaI(Tl) scintillation detectors working at 8 keV - 1 MeV and one BGO scintillation detectors at ~ 200 keV to ~ 4 MeV are selected according to the statistics of GRB signal. A joint fit with time-averaged energy spectra from HXMT/CsI and three (two NaI and one BGO) spectra from Fermi/GBM are performed, where the parameters of GRB spectral shape are shared but the amplitudes are set to be float for these four sets of data, to compensate the possible lack information either in the adopted spectrum model or the understanding of the instruments response. In most cases, the amplitudes of fitted spectra are consistent well with each other within one standard deviation.

To perform the joint fit, 6 models are chosen including a single power law (PL), Band’s GRB function (BAND, Band et al. (1993)), an exponential cut-off power law (CPL, also called Comptonized Model) and plus a component of black body function (BB) of float amplitudes. The PL model is represented with Equation 1 with two free parameters, where A denotes amplitude and $\alpha$ is the spectral index.

$$N_{\text{PL}}(E) = AE^{\alpha}.$$  \hspace{1cm} (1)

The BAND function has four free parameters: low and high energy spectral indices, denoted as $\alpha$ and $\beta$ respectively, the peak energy of $\nu F_\nu$ spectrum, denoted as $E_{\text{peak}}$, and amplitude, as shown in Equation 2.

$$N_{\text{BAND}}(E) = \begin{cases} A \left( \frac{E}{100 \text{ keV}} \right)^\alpha \exp \left( -\frac{(\alpha+2)E}{E_{\text{peak}}} \right), & E \geq \frac{(\alpha-\beta)E_{\text{peak}}}{\alpha+2} \\ \left( \frac{E}{100 \text{ keV}} \right)^\beta \exp(\beta - \alpha) \left[ \frac{(\alpha-\beta)E_{\text{peak}}}{100 \text{ keV} (\alpha+2)} \right]^{\alpha-\beta}, & E < \frac{(\alpha-\beta)E_{\text{peak}}}{\alpha+2}. \end{cases}$$  \hspace{1cm} (2)

CPL model is a subset of BAND model if $\beta$ is very small and the part of $E < \frac{(\alpha-\beta)E_{\text{peak}}}{\alpha+2}$ of BAND model is ignored. There are three parameters in CPL model: the amplitude A, the lower energy index $\alpha$, and the $\nu F_\nu$.
peak energy, \( E_{\text{peak}} \), as shown in Equation 3.

\[
N_{\text{COMP}}(E) = A \left( \frac{E}{E_{\text{piv}}} \right)^\alpha \exp \left[ -\frac{(\alpha + 2) E}{E_{\text{peak}}} \right].
\] (3)

The Equation 4 for the photon spectrum of a black body usually used in the spectral fitting, where \( K = L_{39}/D_{10kpc}^2 \) is defined by the blackbody luminosity \( L \) in units of \( 10^{39} \) erg s\(^{-1}\) in the GRB host galaxy frame and the luminosity distance \( D_L \) in units of 10 kpc.

\[
N_{\text{BB}}(E) = \frac{K \times 8.0525 E^2}{(kT)^4 \exp(E/kT) - 1}. \] (4)

All models are formulated in units of photon flux with energy (E) in keV and multiplied by a normalization constant A (ph s\(^{-1}\) cm\(^{-2}\) keV\(^{-1}\)), and \( kT \) and \( E \) are measured in the observer’s frame. We determine the best spectral parameters by optimizing the Castor C statistic value. Castor Cstat (henceforth Cstat, Cash 1979) is a likelihood technique modified for a particular data set to converge to a \( \chi^2 \) with an increase of the signal. \( \chi^2 \) is evaluated for each spectral fit that is performed through minimizing C-Stat. Among these 6 models, the best model is determined when a single additional parameter changes in \( \chi^2 \) by at least 6 since the probability for achieving this difference is 0.01 as suggested by Goldstein et al. (2012), which is a conservative threshold to avoid the false positive rates of the extra component.

As shown in Figure 18 in Appendix A, for GRB 200125B (HEB200125863), joint spectra fit with BAND model is the best model, with a reduced \( \chi^2 \) of 1.14. A BAND model of low energy spectral index \( \alpha = -0.78 \pm 0.01 \), high energy spectral index \( \beta = -2.70 \pm 0.03 \), and the \( \nu F_\nu \) peak energy, \( E_{\text{peak}} = 200.8 \pm 7.7 \) keV, is determined. GRB 210121A is observed by HXMT/CsI, Fermi/GBM and GECAM, and joint analysis with the other two missions is shown in Figure 21. \( \alpha = -0.64 \pm 0.01 \), \( \beta = -2.49 \pm 0.03 \) and \( E_{\text{peak}} = 932.4 \pm 23.8 \) keV are determined with a BAND model. Figure 22 shows the spectrum of GRB 210112A detected by Swift/BAT and HXMT/CsI. The best model is determined to be CPL, with \( \alpha = -1.27 \pm 0.03 \), and \( E_{\text{peak}} = 347.7 \pm 49.7 \) keV for the CPL component. In the case of utilizing data of Swift/BAT only, PL model is determined and the \( E_{\text{peak}} \) is not measured due to lack of information from higher energy band.

The distribution of energy spectra parameter of ‘GOLDEN’ GRBs are shown in Figures 7, 8, 9. Up to 29% low energy spectral indices of the ‘GOLDEN’ samples violate -2/3 synchrotron “line-of-death” (Preece et al. 1998), while an additional 6% of the indices violate the -3/2 synchrotron cooling limit. The distribution of high-energy indices in Figure 9 peaks at a slope slightly steeper than -2 and have a extension toward steeper values. The \( E_{\text{peak}} \) distribution generally peaks around 200 keV, and spans over two orders of magnitude.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure7.png}
\caption{The distribution of low energy spectral index \( \alpha \) of ‘GOLDEN’ GRBs from time-averaged spectral fits are shown. The blue solid lines denote the total distribution of \( \alpha \) from BAND model (red dashed lines), CPL model (green dotted lines) and PL (orange dot-dashed lines).}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure8.png}
\caption{The distribution of \( \nu F_\nu \) peak energy \( E_{\text{peak}} \) of ‘GOLDEN’ GRBs from time-averaged spectral fits are shown. The blue solid lines denote the total distribution of \( E_{\text{peak}} \) from BAND model (red dashed lines), CPL model (green dotted lines).}
\end{figure}

4.7.2. Duration and Fluence

For ‘SILVER’ and ‘BRONZE’ samples, the burst durations are determined by integrating the signal counts
from GRBs with deposited energy in ranges of 40-800 keV in NG mode and 200-3000 keV in LG mode, respectively. The duration $T_{50}$ and $T_{90}$ are determined from the interval between the times where the burst has reached 25% (5%) and 75% (95%) of its maximum counts. The method developed for BATSE (Koshut et al. 1996) are used to determine the systematic error. Table 5 shows the values of durations of ‘SILVER’ and ‘BRONZE’ samples.

For ‘GOLDEN’ samples, the burst durations $T_{50}$ and $T_{90}$ are computed in the 10-2000 keV energy range. They are determined using a method similar to that developed for BATSE (Koshut et al. 1996), the counts spectra of HXMT/CsI and the other missions in each time bin 64 ms are deconvolved and the durations are computed from the time history of fitted photon spectra, as shown in Figure 19 and 20. Peak fluxes of different time scales are naturally obtained in the same analysis, and the fluence is obtained by integrating the deconvolved flux history.

It is worth noting that, to avoid the failure of fit to each time bin, the parameters of GRB shape are fixed to the best model determined in joint fit to the time-averaged spectrum, while the amplitudes are set to be float. Therefore, in addition to the systematic effects mentioned in Koshut et al. (1996), an extra systematic error is introduced by fixed parameters. To estimate the uncertainty from the fixed parameters, we simulate tens of sets of parameters of the best GRB model by smearing the mean values with covariance matrix within one standard deviation. Then the same procedures are applied to calculate tens of sets of duration values. The maximum changes from the duration values with the mean value are taken to be the systematic error from fixed GRB parameters. The systematic uncertainties of peak fluxes and fluences from the same source are also estimated in the same way. Note that in most cases of spectral parameters that are well determined, the system uncertainties of this kind are less than or numerically comparable with the the systematic effects, which could be ignored. As a sample of GRB 200125B, the total fluence (10-2000 keV) is $5.92\pm0.05\pm4.54\pm0.07$ erg cm$^{-2}$, the peak flux (ph cm$^{-2}$ s$^{-1}$) in 10-2000 keV of timescales of 64 ms, 256 ms, 1024 ms is $175.35\pm9.57$, $149.25\pm3.78$, $110.27\pm1.63$ respectively.

5. CATALOG RESULTS

Table 3 lists the 322 searched bursts that are classified as GRBs. In the last column of Table 3, abbreviation of GRBs types are given. Among 322 searched bursts files, 202 ‘GOLDEN’ samples are analyzed and collected in all. 44 ‘SILVER’, 50 ‘BRONZE’ and 26 ‘IRON’ samples are also listed in Table 2.

The results of the duration of GRBs are derived from joint analyses of HXMT with Fermi/GBM, Swift/BAT or GECAM discussed in 4.7, and shown in Table 4. The values of $T_{50}$ and $T_{90}$ in 10-2000 keV energy range are listed along with their respective statistical error estimates and start times relative to the trigger time of HXMT. As part of the duration analysis, peak fluxes and fluence are computed. Table 6 shows the total fluence and peak fluxes of different time scales in 10-2000 keV. Table 5 lists the durations of ‘SILVER’ and ‘GOLDEN’ samples, which obtained from HXMT/CsI GRBs signal counts.

6. DISCUSSION AND SUMMARY

Histograms of the $T_{50}$ and $T_{90}$ distributions are shown in 10-2000 keV energy range in Figure 10. Using the conventional division between the short and long GRB classes ($T_{90}=2$ s), we find 35 (17%) of the 202 ‘GOLDEN’ GRBs to be in the short regime. Within the quoted duration errors, the number of short GRB events ranges from 28 (14%) to 39 (19%). It is consistent with the results from Fermi/GBM GRB catalogs covering ten years (von Kienlin et al. 2020), which has 395 (17%) short GRBs from statistics in 10-1000 keV. Due to the limited statistic of GRB numbers, we do not perform lognormal fits to the distribution of durations.

Figure 16 shows the comparison of durations ($T_{90}$) from joint analyses with other missions and those from HXMT/CsI GRBs data, where the red line denotes the case of these two are equivalent to each other. Most GRBs are below the red line, because energy range of HXMT/CsI is higher than those of other

![Figure 9. The distribution of high energy spectral index $\beta$ of ‘GOLDEN’ GRBs from time-averaged spectral fits are shown.](image)
missions, such as *Fermi*/GBM and that GRBs tend to be shorter at higher energy. Therefore, joint analysis is necessary for the measurement of duration in 10-2000 keV.

Despite of the limited statistic of ‘GOLDEN’ GRBs, as shown in Figure 11, anti-correlation of spectral hardness with duration is confirmed by the relationship between the hardness and duration, where the hardness is calculated as the ratio of the flux density from spectral parameters determined from time-averaged spectral fits in 50-300 keV to that in 10-50 keV. We note that, here the durations are those from joint analyses in energy range of 10-2000 keV, which also illustrates the anti-correlation between the hardness of GRBs spectra and duration.

Distributions of GRBs fluence are shown in Figure 15. Peak fluxes on timescales of 64 ms, 256 ms, 1024 ms are shown in Figure 12, Figure 13 and Figure 14 respectively. These distributions are not consistent with those from von Kienlin et al. (2020). The contributions are very small both below $10^{-7}$ erg cm$^{-2}$ and 1 ph cm$^{-2}$ s$^{-1}$ in distributions of fluence and peak fluxes. It could be explained by the sharply fall of effective area below 100 keV. Weak short GRBs cannot cause enough statistics in HXMT/CsI, and thus cannot be detected significantly. Extremely bright GRBs would not be included in ‘GOLDEN’ samples because they are very likely to cause data saturation in HXMT and be labeled as ‘IRON’ samples.

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Figure 10. Distributions of ‘GOLDEN’ GRB durations in the 10-2000 keV energy range are shown. The upper plot shows $T_{50}$ and the lower plot shows $T_{90}$. 
Figure 11. Scatter plots of spectral hardness vs. duration are shown for the two duration measures $T_{50}$ (upper plot) and $T_{90}$ (lower plot) as shown in Figure 10. The hardness is calculated as the ratio of the flux density from spectral parameters determined from time-averaged spectral fits in 50-300 keV to that in 10-50 keV. For clarity, the estimated errors are not shown but can be quite large for the weak events. Nevertheless, the anti-correlation of spectral hardness with burst duration is evident.
**Figure 12.** Distribution of ‘GOLDEN’ GRBs peak flux on the 0.064 s timescale is shown in energy range of 10-2000 keV.

**Figure 13.** Distribution of ‘GOLDEN’ GRBs peak flux on the 0.256 s timescale is shown in energy range of 10-2000 keV.
Figure 14. Distribution of ‘GOLDEN’ GRBs peak flux on 1.024 s timescale is shown in energy range of 10-2000 keV.

Figure 15. Distribution of ‘GOLDEN’ GRBs fluence is shown in energy range of 10-2000 keV.
Figure 16. A comparison between the durations ($T_{90}$) of ‘GOLDEN’ GRBs from joint analysis and those obtained from HXMT/CsI GRBs counts are shown. The red line denotes the case of these two are equal to each other.
Table 3. GRB Triggers: Locations and Trigger Characteristics.

| Trigger ID\textsuperscript{a} | GRB Name   | Trigger Time (UTC) | Search Method\textsuperscript{b} | Gain Mode | RA(\textdegree) | DEC(\textdegree) | err(\textdegree) | location source | Kinds of GRB samples\textsuperscript{d} |
|-------------------------------|------------|--------------------|-----------------------------------|-----------|----------------|-----------------|----------------|----------------|----------------------------------|
| HEB170626040                  | GRB 170626B | 2017-06-26T00:55:50.80 | BLIND                             | NG        | 289.8          | -19.2           | 5.0            | IPN             | S                                |
| HEB170626400                  | GRB 170626A | 2017-06-26T09:37:23.32 | BLIND                             | NG        | 165.4          | 56.5            | 1.0            | Fermi/GBM       | G                                |
| HEB170705115                  | GRB 170705A | 2017-07-05T02:45:59.00 | BLIND                             | NG        | 191.7          | 18.3            | 0.1            | Swift           | G                                |
| HEB170708045                  | GRB 170708A | 2017-07-08T01:11:25.00 | BLIND                             | LG        | 335.8          | 19.8            | 4.6            | IPN             | S                                |
| HEB170712139                  | GRB 170712A | 2017-07-12T03:20:00.00 | BLIND                             | LG        | 18.2           | 29.5            | -              | Fermi/GBM       | G                                |
| HEB170714049                  | GRB 170714A | 2017-07-14T01:05:11.00 | BLIND                             | NG        | 10.2           | 13.5            | -              | -               | B                                |
| HEB170718152                  | -           | 2017-07-18T03:39:00.00 | TARGETED                          | NG        | 166.4          | -34.0           | 2.8            | Fermi/GBM       | G                                |
| HEB170726248                  | GRB 170726A | 2017-07-26T05:58:15.42 | BLIND                             | NG        | 297.8          | 6.6             | -              | Fermi/GBM       | G                                |
| HEB170726793                  | GRB 170726B | 2017-07-26T19:02:59.51 | BLIND                             | NG        | 238.0          | 70.1            | -              | Fermi/GBM       | G                                |
| HEB170728040                  | GRB 170728B | 2017-07-28T23:33:19.00 | BLIND                             | NG        | 245.2          | 64.3            | 6.3            | Fermi/GBM       | G                                |
| HEB170731751                  | -           | 2017-07-31T18:01:39.75 | BLIND                             | NG        | 83.0           | 50.1            | 3.7            | Fermi/GBM       | G                                |
| HEB170801208                  | GRB 170801A | 2017-08-01T04:59:55.25 | BLIND                             | NG        | 52.3           | -39.2           | 2.1            | Fermi/GBM       | G                                |
| HEB170802637                  | GRB 170802B | 2017-08-02T15:18:26.00 | BLIND                             | NG        | 327.7          | -31.8           | 1.0            | Fermi/GBM       | G                                |
| HEB170803917                  | GRB 170803B | 2017-08-03T22:00:31.00 | BLIND                             | NG        | 137.3          | 69.6            | 1.3            | IPN             | S                                |
| HEB170805596                  | GRB 170805B | 2017-08-05T14:18:49.50 | BLIND                             | NG        | 269.2          | -18.3           | 4.6            | IPN             | S                                |
| HEB170805610                  | GRB 170805A | 2017-08-05T14:33:34.00 | BLIND                             | NG        | 83.0           | 50.1            | 3.7            | Fermi/GBM       | G                                |
| HEB170817908                  | GRB 170817B | 2017-08-17T21:47:34.00 | BLIND                             | NG        | 52.3           | -39.2           | 2.1            | Fermi/GBM       | G                                |
| HEB170825306                  | -           | 2017-08-25T07:22:03.00 | BLIND                             | NG        | 327.7          | -31.8           | 1.0            | Fermi/GBM       | G                                |
| HEB170826818                  | GRB 170826B | 2017-08-26T19:38:05.00 | BLIND                             | NG        | 137.3          | 69.6            | 1.3            | IPN             | S                                |
| HEB170829270                  | GRB 170829A | 2017-08-29T06:29:39.90 | BLIND                             | NG        | 269.2          | -18.3           | 4.6            | IPN             | S                                |
| HEB170901499                  | GRB 170901B | 2017-09-01T15:59:56.50 | BLIND                             | NG        | 35.4           | -32.5           | 3.2            | IPN             | S                                |
| HEB170903534                  | GRB 170903B | 2017-09-03T14:41:11.00 | BLIND                             | NG        | 35.4           | -32.5           | 3.2            | IPN             | S                                |
| HEB170904406                  | GRB 170904B | 2017-09-04T09:46:00.62 | BLIND                             | NG        | 35.4           | -32.5           | 3.2            | IPN             | S                                |
| HEB170904884                  | GRB 170904B | 2017-09-04T13:07:10.00 | BLIND                             | NG        | 35.4           | -32.5           | 3.2            | IPN             | S                                |
| HEB170906029                  | GRB 170906B | 2017-09-06T03:40:06.00 | BLIND                             | LG        | 198.6          | -53.5           | 12.2           | Fermi/GBM       | G                                |
| HEB170912914                  | GRB 170912C | 2017-09-12T23:38:12.60 | BLIND                             | NG        | 83.6           | 7.2             | -              | Fermi/GBM       | G                                |
| HEB170918905                  | GRB 170918A | 2017-09-18T21:43:35.40 | BLIND                             | NG        | 221.5          | 81.2            | 5.0            | Fermi/GBM       | G                                |
| HEB170923818                  | GRB 170923A | 2017-09-23T04:31:05.44 | BLIND                             | NG        | 221.5          | 81.2            | 5.0            | Fermi/GBM       | G                                |
| HEB170926340                  | GRB 170926A | 2017-09-26T08:10:39.80 | BLIND                             | NG        | 135.6          | 42.8            | 0.1            | Swift           | I                                |
| HEB171007498                  | GRB 171007A | 2017-10-07T11:57:38.27 | BLIND                             | NG        | 232.6          | 24.0            | -              | Fermi/GBM       | G                                |
| HEB171080709                  | GRB 171008A | 2017-10-08T01:54:38.50 | BLIND                             | NG        | 158.9          | 1.6             | 8.1            | IPN             | I                                |

Table 3 continued
| Trigger ID\(^a\) | GRB Name | Trigger Time (UTC) | Search Method\(^b\) | Gain Mode | RA (°) | DEC (°) | err (°) | location source\(^c\) | Kinds of GRB samples\(^d\) |
|-----------------|-----------|-------------------|-------------------|-----------|---------|---------|---------|----------------|-----------------|
| HEB171013550    | GRB 171013B | 2017-10-13T08:24:42.11 | TARGETED          | NG        | 145.1   | -32.6   | 30.3    | Fermi/GBM      | G               |
| HEB17102063     | GRB 171020A | 2017-10-20T23:07:10.75 | BLIND             | NG        | 39.2    | 15.2    | 0.1     | Swift          | G               |
| HEB171103728    | GRB 171030A | 2017-10-30T17:29:45.00 | BLIND             | NG        | 74.1    | -19.5   | 23.4    | IPN            | G               |
| HEB171110216     | GRB 171102A | 2017-11-10T02:33:35.99 | BLIND             | NG        | 188.8   | 54.3    | 11.5    | IPN            | S               |
| HEB171110565     | GRB 171103A | 2017-11-03T23:10:30.04 | BLIND             | NG        | 249.5   | -10.2   | 3.0     | Fermi/GBM      | G               |
| HEB171108279     | GRB 171108B | 2017-11-08T06:42:24.00 | BLIND             | NG        | -       | -       | -       | -              | B               |
| HEB171115217     | GRB 171115B | 2017-11-15T05:13:14.70 | BLIND             | NG        | -       | -       | -       | -              | B               |
| HEB171120555     | GRB 17120A  | 2017-11-20T13:20:02.00 | BLIND             | NG        | 163.8   | 22.5    | 0.1     | Swift          | G               |
| HEB171121234     | GRB 171124A | 2017-11-24T08:38:03.00 | BLIND             | NG        | 333.9   | 35.1    | 1.6     | Fermi/GBM      | G               |
| HEB171207054     | -         | 2017-12-07T01:18:42.45 | TARGETED          | NG        | 314.4   | 51.7    | 9.5     | Fermi/GBM      | G               |
| HEB171209615     | GRB 171209A | 2017-12-09T14:46:16.22 | BLIND             | NG        | 139.4   | -30.5   | 0.1     | Swift          | G               |
| HEB171210492     | GRB 171210A | 2017-12-10T11:49:16.00 | BLIND             | NG        | 338.0   | 27.5    | 1.0     | Fermi/GBM      | G               |
| HEB171215705     | GRB 171215A | 2017-12-15T16:55:26.57 | BLIND             | NG        | 19.7    | 34.7    | 4.7     | Fermi/GBM      | G               |
| HEB171223818     | GRB 17123A  | 2017-12-23T19:38:15.00 | BLIND             | NG        | 115.8   | -33.5   | 6.6     | Fermi/GBM      | G               |
| HEB171230955     | GRB 171230B | 2017-12-30T22:55:34.00 | BLIND             | NG        | 89.5    | -27.8   | 1.1     | Fermi/GBM      | G               |
| HEB180103047     | GRB 180103A | 2018-01-03T01:08:40.00 | BLIND             | NG        | 159.6   | -53.5   | 0.1     | Swift          | S               |
| HEB180103949     | -         | 2018-01-03T22:47:12.00 | BLIND             | NG        | -       | -       | -       | -              | B               |
| HEB18010608     | -         | 2018-01-10T14:35:59.22 | BLIND             | NG        | 126.3   | 51.3    | 30.1    | Fermi/GBM      | G               |
| HEB180111695     | GRB 180111A | 2018-01-11T14:20:56.38 | BLIND             | LG        | 149.8   | 48.2    | 0.1     | Swift          | G               |
| HEB18012687     | GRB 180112A | 2018-01-12T16:30:38.00 | BLIND             | LG        | -       | -       | -       | -              | S               |
| HEB180113011     | GRB 180113B | 2018-01-13T01:16:00.00 | BLIND             | NG        | 354.0   | 13.5    | 1.2     | Fermi/GBM      | I               |
| HEB180113418     | GRB 180113C | 2018-01-13T10:02:57.50 | BLIND             | NG        | 174.6   | -64.7   | 1.0     | Fermi/GBM      | I               |
| HEB18011936     | -         | 2018-01-19T20:44:49.78 | BLIND             | NG        | 348.7   | -15.0   | 2.5     | Fermi/GBM      | G               |
| HEB180127049     | -         | 2018-01-27T01:11:12.91 | BLIND             | NG        | 20.5    | 25.8    | 5.0     | Fermi/GBM      | G               |
| HEB180130744     | -         | 2018-01-30T17:51:26.79 | TARGETED          | NG        | 136.8   | 52.7    | 68.1    | Fermi/GBM      | G               |
| HEB180202211     | GRB 180202A | 2018-02-02T05:04:28.00 | BLIND             | NG        | -       | -       | -       | -              | S               |
| HEB180206764     | -         | 2018-02-08T18:20:50.30 | TARGETED          | NG        | 196.6   | 8.2     | 5.1     | Fermi/GBM      | G               |
| HEB180210517     | GRB 180210A | 2018-02-10T12:24:44.00 | BLIND             | NG        | 3.3     | 21.0    | 1.5     | Fermi/GBM      | G               |
| HEB180210728     | -         | 2018-02-10T17:59:06.00 | BLIND             | NG        | -       | -       | -       | -              | B               |
| HEB180218634     | GRB 180218A | 2018-02-18T15:14:05.49 | BLIND             | NG        | 47.2    | 46.6    | 4.4     | Fermi/GBM      | I               |
| HEB180219482     | GRB 180219A | 2018-02-19T11:34:39.00 | BLIND             | NG        | 86.2    | 32.3    | 1.0     | Fermi/GBM      | I               |
| HEB180221520     | GRB 180221B | 2018-02-21T12:03:01.00 | BLIND             | NG        | -       | -       | -       | -              | S               |
| HEB180226392     | -         | 2018-02-26T09:24:58.73 | BLIND             | NG        | -       | -       | -       | -              | S               |
| HEB180305393     | GRB 180305A | 2018-03-05T09:26:08.66 | BLIND             | NG        | 45.9    | 31.2    | 1.6     | Fermi/GBM      | G               |
| HEB180306972     | -         | 2018-03-06T23:20:33.93 | TARGETED          | NG        | 196.8   | -32.2   | 14.8    | Fermi/GBM      | G               |

Table 3 continued
Table 3 (continued)

| Trigger ID   | Trigger Time (UTC) | Search Method | Gain Mode | RA(°) | DEC(°) | err(°) | location source | Kind of GRB samples |
|--------------|--------------------|---------------|-----------|--------|--------|--------|-----------------|---------------------|
| HEBS180300921 | 2018-03-07T07:43:10.62 | Targeted     | NG        | 34.5   | 21     | 17     | Fermi/GBM      | G                   |
| HEBS180300577 | 2018-03-07T07:43:10.62 | Targeted     | NG        | 26.5   | 5.7    | 13.5   | Fermi/GBM      | G                   |
| HEBS180300591 | 2018-03-07T07:43:10.62 | Targeted     | NG        | 13.5   | 3.1    | 8.9    | Fermi/GBM      | G                   |
| HEBS180300571 | 2018-03-07T07:43:10.62 | Targeted     | NG        | 5.7    | 3.7    | 3.7    | Fermi/GBM      | G                   |
| HEBS180300527 | 2018-03-07T07:43:10.62 | Targeted     | NG        | 1.6    | 0.1    | 1.6    | Swift           | G                   |

Table 3 continued
| Trigger ID     | GRB Name | Trigger Time (UTC) | Search Method | Gain Mode | RA(°) | DEC(°) | err(°) | location source | Kinds of GRB samples |
|---------------|----------|-------------------|---------------|-----------|--------|--------|--------|-----------------|---------------------|
| HEB180730017  | -        | 2018-07-30T00:25:40.00 | BLIND         | NG        | 98.0   | 44.5   | 8.3    | Fermi/GBM       | G                   |
| HEB180801275  | -        | 2018-08-01T06:37:03.51 | TARGETED      | NG        | 240.9  | -11.4  | 8.8    | Fermi/GBM       | G                   |
| HEB180803590  | -        | 2018-08-03T14:09:49.73 | BLIND         | LG        | 71.6   | 57.6   | 17.4   | Fermi/GBM       | G                   |
| HEB180804554  | -        | 2018-08-04T13:17:48.00 | BLIND         | NG        | -      | -      | -      | -               | B                   |
| HEB180804930  | -        | 2018-08-04T22:03:28.28 | BLIND         | NG        | 109.4  | -69.3  | 1.8    | Fermi/GBM       | G                   |
| HEB180816088  | -        | 2018-08-16T02:07:18.91 | TARGETED      | NG        | 126.2  | -36.7  | 1.9    | Fermi/GBM       | G                   |
| HEB180822561  | -        | 2018-08-22T13:38:34.05 | BLIND         | NG        | 185.2  | -61.5  | 2.2    | Fermi/GBM       | G                   |
| HEB180828789  | GRB 180828A | 2018-08-28T18:57:26.58 | BLIND         | NG        | 270.7  | -23.9  | 1.2    | Fermi/GBM       | G                   |
| HEB180912373  | -        | 2018-09-12T03:15:40 | BLIND         | NG        | 202.0  | -26.2  | 2.1    | Fermi/GBM       | I                   |
| HEB180914765  | GRB 180914B | 2018-09-14T18:22:48.00 | BLIND         | NG        | 332.4  | 24.9   | 0.3    | Fermi/LAT       | I                   |
| HEB180922461  | -        | 2018-09-22T11:03:52.02 | TARGETED      | NG        | 19.2   | -0.1   | 4.4    | Fermi/GBM       | I                   |
| HEB180925407  | -        | 2018-09-25T09:46:30.54 | TARGETED      | NG        | 181.9  | -25.4  | 9.3    | Fermi/GBM       | G                   |
| HEB180925609  | GRB 180925A | 2018-09-25T14:37:27.90 | BLIND         | NG        | 315.2  | -64.4  | 0.1    | Swift           | G                   |
| HEB180927992  | -        | 2018-09-27T23:49:20.19 | BLIND         | NG        | 236.0  | -1.7   | 5.7    | Fermi/GBM       | G                   |
| HEB180929453  | -        | 2018-09-29T10:53:33.02 | BLIND         | NG        | 244.7  | -8.9   | 8.4    | Fermi/GBM       | G                   |
| HEB181008269  | -        | 2018-10-08T06:28:13.50 | BLIND         | NG        | 57.5   | 7.2    | 14.4   | Fermi/GBM       | G                   |
| HEB181011181  | -        | 2018-10-11T04:21:12.00 | BLIND         | LG        | -      | -      | -      | -               | S                   |
| HEB181014479  | -        | 2018-10-14T13:30:23.00 | BLIND         | NG        | 228.9  | 16.5   | 1.3    | Fermi/GBM       | G                   |
| HEB181026590  | GRB 181028A | 2018-10-28T14:09:43.00 | BLIND         | LG        | 88.9   | -21.2  | 2.5    | IPN             | G                   |
| HEB181112582  | -        | 2018-11-12T13:58:51.00 | BLIND         | NG        | -      | -      | -      | -               | I                   |
| HEB181119605  | GRB 181119A | 2018-11-19T14:32:17.13 | BLIND         | NG        | 86.4   | 37.1   | 1.8    | Fermi/GBM       | G                   |
| HEB181121306  | -        | 2018-11-21T07:29:27.06 | BLIND         | NG        | 130.9  | 31.5   | 18.3   | Fermi/GBM       | G                   |
| HEB18112381   | -        | 2018-11-22T09:09:03.06 | BLIND         | LG        | 93.7   | 34.4   | 4.2    | Fermi/GBM       | G                   |
| HEB181123231  | GRB 18123B | 2018-11-23T05:33:03.09 | BLIND         | NG        | 184.3  | 14.6   | 0.1    | Swift           | G                   |
| HEB181201111  | GRB 18201A | 2018-12-01T23:53:03.00 | BLIND         | NG        | 319.3  | -12.6  | 0.1    | IBIS            | S                   |
| HEB181212692  | GRB 18212A | 2018-12-12T16:37:45.50 | BLIND         | NG        | 298.4  | -3.7   | 2.3    | Fermi/GBM       | G                   |
| HEB181213540  | GRB 18213A | 2018-12-13T12:57:38.00 | BLIND         | NG        | 248.3  | 78.5   | 0.1    | Swift           | G                   |
| HEB181217664  | GRB 18217A | 2018-12-17T15:56:57.00 | BLIND         | NG        | 332.2  | 29.9   | -      | Fermi/GBM       | G                   |
| HEB181222841  | GRB 18222B | 2018-12-22T20:11:37.00 | BLIND         | NG        | 311.1  | 22.9   | 1.6    | Fermi/GBM       | I                   |
| HEB181225489  | GRB 18225A | 2018-12-25T11:44:10.00 | BLIND         | LG        | 348.1  | -9.5   | -      | Fermi/GBM       | G                   |
| HEB190102652  | -        | 2019-01-02T15:40:17.27 | BLIND         | NG        | -      | -      | -      | -               | S                   |
| HEB190103695  | GRB 190103A | 2019-01-03T16:41:52.64 | BLIND         | NG        | 251.4  | 17.4   | 2.7    | IPN             | I                   |
| HEB190103877  | GRB 190103B | 2019-01-03T21:03:50.00 | BLIND         | NG        | 212.6  | 35.3   | 0.1    | Swift           | G                   |
| HEB19010725   | GRB 190110A | 2019-01-10T17:24:53.00 | BLIND         | NG        | 277.0  | -49.2  | 2.2    | Fermi/GBM       | G                   |
| HEB19014872   | GRB 190114C | 2019-01-14T20:57:02.00 | BLIND         | LG        | 56.2   | -31.8  | 3.3    | Fermi/GBM       | I                   |
| Trigger ID     | GRB Name | Trigger Time (UTC) | Search Method | Gain Mode | RA (°) | DEC (°) | err (°)   | location source | Kinds of GRB samples |
|---------------|----------|--------------------|---------------|-----------|--------|---------|-----------|-----------------|---------------------|
| HEB19017608   | GRB 190117A | 2019-01-17T14:36:47.00 | BLIND         | NG        | -      | -       | -         |                | S                   |
| HEB190131964  | GRB 190131A | 2019-01-31T23:08:35.00 | BLIND         | NG        | 42.3   | 35.5    | 2.2       | Fermi/GBM      | G                   |
| HEB19020655   |          |                   | BLIND         | NG        | -      | -       | -         |                | B                   |
| HEB190212129  | GRB 190212A | 2019-02-12T03:06:06.20 | BLIND         | NG        | -      | -       | -         |                | S                   |
| HEB190215771  | GRB 190215A | 2019-02-15T18:31:22.48 | BLIND         | NG        | 312.3  | 36.2    | 1.0       | Fermi/GBM      | G                   |
| HEB190218810  |          |                   | BLIND         | NG        | -      | -       | -         |                | B                   |
| HEB19022537   |          |                   | BLIND         | NG        | 147.3  | 60.9    | 1.5       | Fermi/GBM      | G                   |
| HEB190226515  | GRB 190226A | 2019-02-26T12:21:45.50 | BLIND         | NG        | 224.4  | -8.6    | -         | Fermi/GBM      | G                   |
| HEB190305545  | GRB 190305A | 2019-03-05T13:05:19.00 | BLIND         | NG        | -      | -       | -         |                | I                   |
| HEB190306467  | GRB 190306B | 2019-03-06T11:13:27.95 | BLIND         | NG        | -      | -       | -         |                | B                   |
| HEB190310398  | GRB 190310A | 2019-03-10T09:33:25.00 | BLIND         | NG        | 349.3  | 12.1    | 1.2       | Fermi/GBM      | G                   |
| HEB190321931  | GRB 190321A | 2019-03-21T22:21:21.00 | BLIND         | NG        | -      | -       | -         |                | S                   |
| HEB190323878  | GRB 190323D | 2019-03-23T21:05:24.00 | BLIND         | NG        | 34.7   | 10.3    | 1.1       | Fermi/GBM      | S                   |
| HEB190324488  | GRB 190324B | 2019-03-24T08:21:21.00 | BLIND         | NG        | 81.0   | 12.0    | 1.0       | Fermi/GBM      | G                   |
| HEB190324947  | GRB 190324A | 2019-03-24T21:24:20.50 | BLIND         | NG        | 49.6   | -47.2   | 0.1       | Swift          | G                   |
| HEB190326313  | GRB 190326B | 2019-03-26T07:31:47.00 | BLIND         | NG        | 264.2  | 68.3    | 1.3       | Fermi/GBM      | G                   |
| HEB190326316  | GRB 190326A | 2019-03-26T07:35:28.90 | BLIND         | NG        | 341.6  | 39.9    | 0.1       | Swift          | G                   |
| HEB190330207  |          |                   | BLIND         | NG        | -      | -       | -         |                | B                   |
| HEB190330964  | GRB 190330A | 2019-03-30T16:39:32.00 | BLIND         | LG        | 86.9   | 22.6    | 2.1       | Fermi/GBM      | G                   |
| HEB190331093  | GRB 190311A | 2019-03-31T02:14:38.00 | BLIND         | NG        | 28.6   | 27.6    | 0.1       | Swift          | G                   |
| HEB190331841  | GRB 190331C | 2019-03-31T20:12:00.10 | BLIND         | NG        | -      | -       | -         |                | S                   |
| HEB190340139  | GRB 190340A | 2019-03-04T03:20:21.00 | BLIND         | NG        | 280.0  | 39.0    | 5.7       | Fermi/GBM      | G                   |
| HEB190407671  | GRB 190407A | 2019-04-07T16:07:26.49 | TARGETED      | NG        | 181.8  | 40.6    | 4.5       | Fermi/GBM      | G                   |
| HEB190411406  | GRB 190411A | 2019-04-11T09:45:46.00 | BLIND         | NG        | 286.0  | -36.3   | 4.8       | Fermi/GBM      | I                   |
| HEB190415573  | GRB 190415A | 2019-04-15T04:09:49.90 | BLIND         | NG        | 26.9   | 13.9    | 6.6       | Fermi/GBM      | I                   |
| HEB190422283  |          |                   | BLIND         | NG        | 306.7  | -73.0   | 1.8       | Fermi/GBM      | G                   |
| HEB190424417  | GRB 190424A | 2019-04-24T16:00:42.00 | BLIND         | NG        | 48.7   | 20.2    | 0.1       | Swift          | G                   |
| HEB190507269  | GRB 190507A | 2019-05-07T06:28:23.00 | BLIND         | NG        | 156.0  | -12.8   | 4.8       | Fermi/GBM      | G                   |
| HEB190510119  | GRB 190510B | 2019-05-10T09:25:13.23 | BLIND         | NG        | 124.5  | -53.1   | 1.2       | Fermi/GBM      | S                   |
| HEB190515189  | GRB 190515A | 2019-05-15T04:33:03.00 | BLIND         | NG        | 137.2  | 39.3    | 5.0       | Fermi/GBM      | G                   |
| HEB190525301  | GRB 190525A | 2019-05-25T00:45:47.65 | TARGETED      | NG        | 338.0  | 5.4     | 4.0       | Fermi/GBM      | G                   |
| HEB190530429  | GRB 190530A | 2019-05-30T16:09:05.90 | BLIND         | NG        | 120.5  | 35.5    | 1.0       | Fermi/GBM      | I                   |
| HEB190531840  | GRB 190531B | 2019-05-31T01:10:12.00 | BLIND         | NG        | 24.3   | -42.0   | 1.0       | Fermi/GBM      | G                   |
| HEB190604446  | GRB 190604A | 2019-06-04T10:42:37.05 | BLIND         | NG        | 342.5  | 46.4    | 1.0       | Fermi/GBM      | G                   |
| HEB190605110  | GRB 190605B | 2019-06-05T02:39:08.00 | BLIND         | NG        | -      | -       | -         |                | B                   |
| Trigger ID   | GRB Name     | Trigger Time (UTC)     | Search Method | RA(°) | DEC(°) | err(°) | location source | Kinds of GRB samples |
|--------------|--------------|------------------------|---------------|-------|--------|--------|-----------------|----------------------|
| HEB190606079 | GRB 190606A  | 2019-06-06T01:55:07.78 | BLIND         | NG    | -0.6   | 6.0    | IPN             | I                    |
| HEB190610477 | GRB 190610A  | 2019-06-10T12:45:00.00 | BLIND         | NG    | -5.7   | 0.1    | Swift           | S                    |
| HEB190613449 | GRB 190613B  | 2019-06-13T10:47:00.00 | BLIND         | NG    | 30.5   | 0.1    | Swift           | G                    |
| HEB190615612 | GRB 190615B  | 2019-06-15T14:22:00.00 | BLIND         | NG    | -      | -      | -               | B                    |
| HEB190615636 | GRB 190615A  | 2019-06-15T15:16:27.00 | BLIND         | NG    | -      | -      | -               | B                    |
| HEB190619594 | GRB 190619B  | 2019-06-19T14:16:37.00 | BLIND         | NG    | -      | -      | -               | B                    |
| HEB190620507 | GRB 190620A  | 2019-06-20T12:19:50.00 | BLIND         | NG    | 16.6   | 2.1    | Fermi/GBM       | G                    |
| HEB190620511 | GRB 190620C  | 2019-06-20T14:12:25.95 | BLIND         | NG    | 35.1   | 2.6    | IPN             | I                    |
| HEB190706710 | GRB 190706D  | 2019-07-06T17:03:05.40 | BLIND         | NG    | 32.4   | 21.9   | IPN             | S                    |
| HEB190719113 | GRB 190719A  | 2019-07-19T02:44:08.00 | BLIND         | NG    | 12.3   | 30.8   | Fermi/GBM       | B                    |
| HEB190720964 | GRB 190720B  | 2019-07-20T23:08:39.50 | BLIND         | NG    | 13.9   | 55.6   | Fermi/GBM       | G                    |
| HEB190903721 | GRB 190903A  | 2019-09-03T17:19:36.26 | BLIND         | NG    | 70.5   | 49.0   | Fermi/GBM       | G                    |
| HEB191005645 | GRB 191006A  | 2019-10-05T01:45:09.00 | BLIND         | NG    | 26.7   | 11.9   | IPN             | S                    |
| HEB191005737 | GRB 191005B  | 2019-10-05T16:25:38.90 | BLIND         | NG    | 171.8  | 71.6   | Fermi/GBM       | G                    |
| HEB191015239 | GRB 191015A  | 2019-10-15T06:45:58.40 | BLIND         | NG    | 49.3   | 4.0    | Fermi/GBM       | G                    |
| HEB191021106 | GRB 191021B  | 2019-10-21T23:35:50.30 | BLIND         | NG    | -      | -      | -               | B                    |
| HEB191028550 | GRB 191028A  | 2019-10-28T13:14:00.00 | BLIND         | NG    | 36.6   | 29.5   | IPN             | S                    |
| HEB191028551 | GRB 191028B  | 2019-10-28T13:14:40.00 | BLIND         | NG    | 36.6   | 29.5   | IPN             | S                    |
| HEB191099927 | GRB 191099A  | 2019-10-09T07:06:56.77 | BLIND         | NG    | 29.4   | 63.4   | Fermi/GBM       | G                    |
| HEB191019970 | GRB 191019B  | 2019-10-19T23:17:33.35 | BLIND         | NG    | 216.3  | 40.6   | Fermi/GBM       | G                    |
| HEB191021831 | GRB 191021B  | 2019-10-21T19:57:29.00 | BLIND         | NG    | -      | -      | -               | B                    |
| HEB191025779 | GRB 191025B  | 2019-10-25T18:42:09.10 | BLIND         | NG    | 60.1   | 56.5   | IPN             | I                    |
| HEB191031182 | GRB 191031A  | 2019-10-31T04:23:11.36 | BLIND         | NG    | -      | -      | -               | S                    |
| HEB191031318 | GRB 191031E  | 2019-10-31T07:38:55.54 | BLIND         | NG    | -      | -      | -               | S                    |
Table 3 (continued)

| Trigger ID  | GRB Name | Trigger Time (UTC) | Search Method | Gain Mode | RA(°) | DEC(°) | err(°) | location source | Kinds of GRB samples |
|-------------|----------|--------------------|---------------|-----------|--------|--------|--------|----------------|---------------------|
| HEB191031C  | GRB 191031C | 2019-10-31T18:43:16.00 | BLIND         | NG        | 115.9  | -62.3  | 1.3    | Fermi/GBM       | G                   |
| HEB191105  | -        | 2019-11-05T06:11:08.65 | BLIND         | NG        | 297.3  | 24.6   | 3.3    | Fermi/GBM       | G                   |
| HEB191108A | GRB 191108A | 2019-11-08T00:04:37.60 | BLIND         | NG        | 232.9  | 10.8   | 17.3   | Fermi/GBM       | G                   |
| HEB191111A | GRB 191111A | 2019-11-11T08:44:29.95 | BLIND         | NG        | 197.2  | -23.2  | 13.4   | Fermi/GBM       | G                   |
| HEB191113A | GRB 191113A | 2019-11-13T13:52:44.52 | BLIND         | NG        | 298.1  | 20.9   | 5.8    | Fermi/GBM       | G                   |
| HEB191118A | GRB 191118A | 2019-11-18T22:12:01.82 | BLIND         | NG        | 219.8  | -58.7  | 26.8   | Fermi/GBM       | G                   |
| HEB1911445 | -        | 2019-11-19T10:41:07.00 | BLIND         | NG        | -      | -      | -      | -              | B                   |
| HEB191130A | -        | 2019-11-30T12:09:34.90 | BLIND         | NG        | 345.5  | -4.4   | 14.2   | Fermi/GBM       | G                   |
| HEB191203  | -        | 2019-12-02T09:05:40.50 | BLIND         | NG        | -      | -      | -      | -              | B                   |
| HEB191208  | GRB 191208 | 2019-12-02T20:48:59.55 | BLIND         | NG        | 246.4  | 17.1   | 1.8    | Fermi/GBM       | G                   |
| HEB191203  | GRB 191203 | 2019-12-03T06:57:19.08 | BLIND         | NG        | 332.4  | 51.8   | 34.3   | Fermi/GBM       | G                   |
| HEB191205  | GRB 191205 | 2019-12-05T17:42:40.44 | BLIND         | NG        | 14.0   | -34.1  | 21.4   | Fermi/GBM       | G                   |
| HEB191218  | GRB 191218 | 2019-12-18T02:42:43.20 | BLIND         | NG        | 301.1  | -40.3  | 0.1    | Fermi/GBM       | G                   |
| HEB191221  | GRB 191221 | 2019-12-21T03:49:10.70 | BLIND         | NG        | 154.8  | -38.1  | 0.1    | Swift           | G                   |
| HEB191224  | -        | 2019-12-24T19:55:07.00 | BLIND         | NG        | -      | -      | -      | -              | B                   |
| HEB191227  | GRB 191227 | 2019-12-27T01:39:34.40 | BLIND         | NG        | 319.2  | -16.7  | 0.1    | Swift           | G                   |
| HEB191227  | GRB 191227 | 2019-12-27T17:21:44.10 | BLIND         | NG        | 258.2  | -26.0  | 2.4    | Fermi/GBM       | I                   |
| HEB20009   | GRB 20009  | 2020-09T01:04:51:89 | BLIND         | NG        | 307.1  | 53.0   | 0.1    | Swift           | G                   |
| HEB200111  | GRB 20011A | 2020-01-11T15:10:17.61 | BLIND         | NG        | 104.5  | 31.7   | 3.5    | Fermi/GBM       | G                   |
| HEB200114  | GRB 200114 | 2020-01-14T03:40:45.50 | BLIND         | NG        | 199.4  | -0.3   | 2.6    | Fermi/GBM       | G                   |
| HEB200120  | GRB 200120 | 2020-01-20T02:42:45.60 | BLIND         | NG        | 139.4  | -70.7  | 1.0    | Fermi/GBM       | G                   |
| HEB200125  | GRB 200125 | 2020-01-25T20:43:31.90 | BLIND         | NG        | 7.5    | 64.7   | 1.0    | Fermi/GBM       | G                   |
| HEB200111  | -        | 2020-02-11T04:38:56.10 | BLIND         | NG        | -      | -      | -      | -              | B                   |
| HEB200219A | GRB 200219 | 2020-02-19T23:57:12.05 | BLIND         | NG        | 264.5  | 8.4    | 1.0    | Fermi/GBM       | G                   |
| HEB200221A | GRB 200221 | 2020-02-21T00:55:28.71 | BLIND         | NG        | 157.1  | 33.1   | 5.0    | Fermi/GBM       | G                   |
| HEB200227  | GRB 200227 | 2020-02-27T07:20:16.15 | BLIND         | NG        | 56.4   | 9.5    | 0.1    | Swift           | G                   |
| HEB200313  | GRB 200313 | 2020-03-13T24:05:58.00 | BLIND         | NG        | -      | -      | -      | -              | B                   |
| HEB200323  | GRB 200323 | 2020-03-23T18:46:32.80 | BLIND         | NG        | 156.5  | -55.5  | 1.5    | Fermi/GBM       | G                   |
| HEB200325  | GRB 200325 | 2020-03-25T03:18:31.70 | BLIND         | NG        | 22.1   | -29.1  | 4.2    | Fermi/GBM       | G                   |
| HEB200326  | GRB 200326 | 2020-03-26T00:07:36.86 | BLIND         | NG        | -      | -      | -      | -              | S                   |
| HEB200326A | GRB 200326A | 2020-03-26T12:24:47.90 | BLIND         | NG        | 245.3  | -21.1  | 6.9    | Fermi/GBM       | G                   |
| HEB200412  | GRB 200412 | 2020-04-12T09:08:45.80 | BLIND         | NG        | 279.8  | 64.1   | 1.0    | Fermi/GBM       | G                   |
| HEB200413  | GRB 200413 | 2020-04-13T17:06:38.00 | BLIND         | NG        | -      | -      | -      | -              | S                   |
| HEB200413  | GRB 200413 | 2020-04-13T17:50:06.00 | BLIND         | LG        | -      | -      | -      | -              | B                   |
| HEB200415  | GRB 200415 | 2020-04-15T08:48:05.55 | BLIND         | NG        | 6.1    | -32.0  | 2.0    | Fermi/GBM       | I                   |
## Table 3 (continued)

| Trigger ID<sup>a</sup> | GRB Name | Trigger Time (UTC) | Search Method<sup>b</sup> | Gain Mode | RA<sup>°</sup> | DEC<sup>°</sup> | err<sup>°</sup> | location source<sup>c</sup> | Kinds of GRB samples<sup>d</sup> |
|------------------------|----------|--------------------|--------------------------|-----------|-------------|-------------|----------|---------------------|-------------------------------|
| HEB200416295           | GRB 200416A | 2020-04-16T07:17:17 | BLIND                   | NG        | 335.7       | -7.5        | 0.1      | Swift               | G                             |
| HEB200418864           | -         | 2020-04-18T04:00:28 | BLIND                   | NG        | 72.6        | -1.0        | -        | Fermi/GBM           | G                             |
| HEB200519472           | GRB 200519A | 2020-05-19T11:20:23 | BLIND                   | NG        | 255.3       | -30.4       | 0.1      | Swift               | G                             |
| HEB200521511           | GRB 200521A | 2020-05-21T12:16:12 | BLIND                   | NG        | 169.5       | 7.2         | 4.3      | IPN                 | S                             |
| HEB200526628           | -         | 2020-05-26T15:00:18 | BLIND                   | NG        | -           | -           | -        | -                   | B                             |
| HEB200601097           | GRB 200601A | 2020-06-01T02:19:56 | BLIND                   | NG        | 36.7        | 33.5        | 1.7      | Fermi/GBM           | G                             |
| HEB200609379           | -         | 2020-06-09T09:06:48 | BLIND                   | LG        | 16.3        | 67.4        | 1.5      | Fermi/GBM           | G                             |
| HEB200617679           | GRB 200617A | 2020-06-17T16:05:50 | BLIND                   | NG        | 359.1       | -59.8       | -        | Fermi/GBM           | G                             |
| HEB200619108           | GRB 200619A | 2020-06-19T02:36:11 | BLIND                   | NG        | 101.3       | 56.7        | 4.0      | Fermi/GBM           | G                             |
| HEB200707072           | GRB 200707A | 2020-07-07T01:44:02 | BLIND                   | NG        | 80.8        | -14.9       | 3.1      | Fermi/GBM           | G                             |
| HEB200711461           | GRB 200711A | 2020-07-11T11:10:32 | BLIND                   | NG        | 292.1       | 1.2         | 5.6      | Fermi/GBM           | G                             |
| HEB200716315           | GRB 200716B | 2020-07-16T07:34:29 | BLIND                   | LG        | 350.7       | -21.8       | 13.8     | Fermi/GBM           | G                             |
| HEB200716956           | GRB 200716C | 2020-07-16T22:57:41 | BLIND                   | NG        | 195.6       | 25.1        | 3.5      | Fermi/GBM           | G                             |
| HEB200801352           | GRB 200801A | 2020-08-01T08:27:14 | BLIND                   | NG        | 321.1       | 85.3        | 11.3     | Fermi/GBM           | G                             |
| HEB200806645           | GRB 200806A | 2020-08-06T15:28:30 | BLIND                   | LG        | 52.9        | 37.1        | 0.1      | Swift               | G                             |
| HEB200806553           | GRB 200806B | 2020-08-09T15:42:27 | BLIND                   | LG        | 359.8       | -76.9       | 3.4      | Fermi/GBM           | G                             |
| HEB200824594           | GRB 200824A | 2020-08-24T14:15:38 | BLIND                   | NG        | 117.7       | 10.5        | 15.4     | Fermi/GBM           | G                             |
| HEB200903112           | GRB 200903B | 2020-09-03T02:42:08 | BLIND                   | NG        | 60.1        | -13.8       | 14.6     | Fermi/GBM           | G                             |
| HEB200919064           | GRB 200919C | 2020-09-19T23:08:22 | BLIND                   | LG        | 280.1       | -23.7       | 16.8     | Fermi/GBM           | G                             |
| HEB200925204           | GRB 200922A | 2020-09-22T12:06:46 | BLIND                   | NG        | 296.9       | -55.2       | 0.1      | Swift               | G                             |
| HEB200928551           | GRB 200928B | 2020-09-28T13:44:47 | BLIND                   | NG        | 85.7        | 2.3         | 17.8     | Fermi/GBM           | G                             |
| HEB201013157           | GRB 201013A | 2020-10-13T03:46:30 | BLIND                   | NG        | 107.4       | 57.0        | 0.1      | Swift               | G                             |
| HEB201016019           | GRB 201016A | 2020-10-16T00:27:49 | BLIND                   | NG        | 167.4       | 4.5         | 5.0      | Fermi/GBM           | I                             |
| HEB201105229           | GRB 201105A | 2020-11-05T05:31:07 | BLIND                   | LG        | 244.5       | 16.0        | 1.0      | Fermi/GBM           | G                             |
| HEB201122355           | GRB 201122A | 2020-11-22T03:20:01 | BLIND                   | NG        | -           | -           | -        | -                   | S                             |
| HEB201209239           | GRB 201209A | 2020-12-09T05:45:25 | BLIND                   | NG        | 23.1        | -1.7        | 0.1      | Swift               | G                             |
| HEB201221591           | GRB 201221B | 2020-12-21T14:11:43 | BLIND                   | NG        | 110.6       | 32.0        | 4.1      | Fermi/GBM           | G                             |
| HEB201226553           | GRB 201226A | 2020-12-26T13:16:26 | BLIND                   | NG        | 173.1       | -6.0        | -        | Fermi/GBM           | G                             |
| HEB201227634           | GRB 201227A | 2020-12-27T15:40:40 | BLIND                   | NG        | 170.1       | -73.6       | 1.5      | IPN                 | I                             |
| HEB21012068            | GRB 210120A | 2021-01-12T01:38:06 | BLIND                   | NG        | 219.0       | 33.1        | 0.1      | Swift               | G                             |
| HEB210119120           | GRB 210119A | 2021-01-19T02:54:09 | BLIND                   | NG        | 285.8       | -63.1       | 7.8      | Fermi/GBM           | G                             |
| HEB210121779           | GRB 210121A | 2021-01-21T18:41:47 | BLIND                   | LG        | 17.0        | -46.4       | 0.6      | IPN                 | G                             |
| HEB210123304           | GRB 210123A | 2021-01-23T07:19:33 | BLIND                   | LG        | 345.1       | -56.9       | 1.1      | Fermi/GBM           | G                             |
| HEB210124558           | GRB 210124B | 2021-01-24T13:23:48 | BLIND                   | LG        | 274.3       | -0.4        | 0.4      | IPN                 | S                             |
| HEB210129908           | -         | 2021-01-29T21:48:56 | BLIND                   | NG        | -           | -           | -        | -                   | B                             |

Table 3 continued
| Trigger ID\(^a\) | GRB Name | Trigger Time (UTC) | Search Method\(^b\) | Gain Mode | RA(\(^\circ\)) | DEC(\(^\circ\)) | err(\(^\circ\)) | location source\(^c\) | Kinds of GRB samples\(^d\) |
|-----------------|----------|--------------------|----------------------|-----------|--------------|--------------|----------|----------------|------------------|
| HEB210207911    | GRB 210207B | 2021-02-07T21:52:49.60 | BLIND               | LG        | 270.6        | 53.7         | 0.1      | Swift          | G                |
| HEB210208564    | GRB 210208A | 2021-02-08T13:32:25.63 | BLIND               | NG        | 260.2        | -12.7        | 0.1      | IBIS           | S                |
| HEB210213286    | GRB 210213B | 2021-02-13T06:52:27.18 | BLIND               | NG        | -            | -            | -        | -              | S                |
| HEB210225217    | GRB 210225A | 2021-02-25T05:13:36.00 | BLIND               | NG        | 333.4        | 28.4         | 3.4      | Fermi/GBM      | G                |
| HEB210227114    | -         | 2021-02-27T02:45:09.42 | BLIND               | NG        | 115.8        | 61.1         | -        | Fermi/GBM      | G                |
| HEB210228057    | GRB 210228B | 2021-02-28T01:22:53.90 | BLIND               | NG        | 283.5        | -43.1        | -        | Fermi/GBM      | G                |
| HEB210306320    | -         | 2021-03-06T07:41:07.50 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210306879    | -         | 2021-03-06T07:09:56   | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210307247    | GRB 210307B | 2021-03-07T05:56:37.94 | BLIND               | LG        | 125.6        | 17.5         | 7.3      | GECAM          | G                |
| HEB210323918    | GRB 210323A | 2021-03-23T22:02:18.40 | BLIND               | NG        | 317.9        | 25.4         | 0.1      | Swift          | G                |
| HEB210324468    | -         | 2021-03-24T11:14:28.21 | BLIND               | NG        | 148.5        | 37.2         | -        | Fermi/GBM      | G                |
| HEB210326557    | GRB 210326A | 2021-03-26T01:22:49.93 | BLIND               | NG        | 58.0         | 15.1         | 39.2     | Fermi/GBM      | G                |
| HEB210326890    | -         | 2021-03-26T21:22:49.37 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210328396    | -         | 2021-03-28T09:30:52.77 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210405507    | -         | 2021-04-05T12:11:26.68 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210406716    | GRB 210406A | 2021-04-06T17:11:28.92 | BLIND               | NG        | 132.5        | 76.5         | 0.1      | IBIS           | S                |
| HEB210409894    | GRB 210409A | 2021-04-09T21:28:26.86 | BLIND               | NG        | 70.9         | -58.3        | 2.9      | GECAM          | G                |
| HEB210411117    | GRB 210411A | 2021-04-11T00:31:41.10 | BLIND               | NG        | 259.4        | -27.4        | 3.0      | Fermi/GBM      | G                |
| HEB210412454    | GRB 210421B | 2021-04-21T05:44:48.1 | BLIND               | NG        | 272.3        | 57.2         | 2.1      | Fermi/GBM      | G                |
| HEB210422572    | GRB 210422B | 2021-04-22T14:37.13   | BLIND               | NG        | 116.6        | 24.7         | 2.1      | Fermi/GBM      | G                |
| HEB210427206    | GRB 210427A | 2021-04-27T04:57:12.99 | BLIND               | NG        | 177.3        | -53.4        | 1.1      | Fermi/GBM      | G                |
| HEB210429071    | -         | 2021-04-29T01:43:11.33 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210502295    | -         | 2021-05-02T07:05:16.38 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210504958    | -         | 2021-05-04T23:00:47.17 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210506027    | GRB 210506A | 2021-05-06T00:39:48.54 | BLIND               | LG        | 224.2        | -32.7        | 43.0     | IPN            | B                |
| HEB210511476    | GRB 210511B | 2021-05-11T1:26:39.26 | BLIND               | NG        | 316.2        | 61.7         | 1.0      | Fermi/GBM      | G                |
| HEB210511647    | -         | 2021-05-11T15:32:56.10 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210515546    | GRB 210515A | 2021-05-15T13:06:45.7 | BLIND               | NG        | 117.1        | 77.3         | 14.6     | Fermi/GBM      | G                |
| HEB210516982    | GRB 210516A | 2021-05-16T23:34:45.86 | BLIND               | NG        | 22.1         | 74.9         | 9.5      | Fermi/GBM      | G                |
| HEB210518544    | GRB 210518A | 2021-05-18T13:04:09.64 | BLIND               | NG        | 270.0        | 49.6         | 1.8      | Fermi/GBM      | G                |
| HEB210520796    | GRB 210520A | 2021-05-20T19:07:02.00 | BLIND               | NG        | 147.9        | -67.0        | 3.7      | Fermi/GBM      | G                |
| HEB210602502    | GRB 210602A | 2021-06-02T12:40:13.2 | BLIND               | LG        | 44.6         | -2.7         | 0.2      | MAXI/GSC       | S                |
| HEB210605214    | GRB 210605A | 2021-06-05T05:08:58.39 | BLIND               | NG        | 21.7         | -41.5        | 2.0      | Fermi/GBM      | G                |
| HEB210606120    | -         | 2021-06-06T02:53:02.89 | BLIND               | NG        | -            | -            | -        | -              | B                |
| HEB210606945    | GRB 210606B | 2021-06-06T22:41:05.24 | BLIND               | NG        | 87.5         | -18.4        | 1.2      | Fermi/GBM      | G                |

*Table 3 continued*
| Trigger ID\textsuperscript{a} | GRB Name | Trigger Time (UTC) | Search Method\textsuperscript{b} | Gain Mode | RA(\textdegree) | DEC(\textdegree) | err(\textdegree) | location source\textsuperscript{c} | Kinds of GRB samples\textsuperscript{d} |
|--------------------------------|----------|---------------------|---------------------------------|-----------|---------------|----------------|----------------|-------------------------------|-------------------------------|
| HEB210607775                  | GRB 210607B | 2021-06-07T18:37:17.80 | BLIND                           | NG        | -             | -              | -              | -                             | B                             |
| HEB210607902                  | GRB 210607C | 2021-06-07T21:39:20.72 | BLIND                           | NG        | -             | -              | -              | -                             | B                             |
| HEB210610827                  | GRB 210610B | 2021-06-10T19:51:05.05 | BLIND                           | NG        | 243.9         | 14.4           | 0.1             | Swift                         | G                             |
| HEB210615891                  | -         | 2021-06-15T21:23:51.50 | BLIND                           | NG        | -             | -              | -              | -                             | B                             |
| HEB210615981                  | GRB 210615A | 2021-06-15T23:33:53.60 | BLIND                           | NG        | 342.9         | 62.2           | 7.5             | Fermi/GBM                     | G                             |
| HEB210622064                  | GRB 210622A | 2021-06-22T01:32:35.94 | BLIND                           | NG        | 242.1         | -14.1          | 6.1             | Fermi/GBM                     | G                             |
| HEB210622339                  | -         | 2021-06-22T08:09:30.61 | BLIND                           | NG        | -             | -              | -              | -                             | B                             |
| HEB210627311                  | GRB 210627A | 2021-06-27T07:29:15.68 | BLIND                           | NG        | 148.3         | 44.5           | 10.7            | Fermi/GBM                     | G                             |
| HEB210627813                  | -         | 2021-06-27T19:31:37.68 | BLIND                           | NG        | -             | -              | -              | -                             | B                             |

\textsuperscript{a} The trigger ID starts with a ‘HEB’ label which means ‘HE-detected Burst’.

\textsuperscript{b} As clarified in Sec 3, BLIND: blind search, TARGETED: targeted search.

\textsuperscript{c} The uncertainties of the locations from \textit{Swift}/BAT are 90\% containment, including systematic uncertainty, while those from \textit{Fermi}/GBM and other detections are 1\sigma containment, statistical only. If the location source is from interplanetary network (IPN) triangulation, the error is determined to be the maximum dimension of error box area. Instrument detections are defined as: \textit{Fermi}/LAT: Large Area Telescope, IBIS: Imager on Board Integral Satellite in INTEGRAL.

\textsuperscript{d} As shown in Table 2, G: GOLDEN, S: SILVER, B: BRONZE, I: IRON.
Table 4. Durations (10-2000 keV) from joint analyses with ‘GOLDEN’ GRB samples.

| Trigger ID | Detectors | $T_{50}$ | $T_{50}$ start | $T_{90}$ | $T_{90}$ start | $T_{90}$ only with HXMT/CsI counts |
|------------|-----------|----------|----------------|---------|----------------|-----------------------------------|
| HEB170626400 | HXMT/CsI, Fermi-GBM (n0, n1, n2, b0) | 7.040±0.264 | 1.248 | 12.416±0.202 | 0.224 | 12.690±0.081 |
| HEB170705115 | HXMT/CsI, Fermi-GBM (n8, nb, b1) | 33.792±3.714 | 0.496 | 68.672±1.601 | -6.416 | 18.460±0.340 |
| HEB170714049 | HXMT/CsI, Fermi-GBM (n3, n7, b0, b1) | 0.128±0.064 | -0.156 | 0.448±0.143 | -0.412 | 0.835±0.220 |
| HEB170718152 | HXMT/CsI, Fermi-GBM (n3, n4, b0) | 10.624±1.943 | -7.144 | 24.768±3.562 | -13.352 | 24.160±3.322 |
| HEB170726248 | HXMT/CsI, Fermi-GBM (n9, n7) | 1.344±0.143 | -0.232 | 5.824±1.537 | -1.704 | 2.580±0.061 |
| HEB170726793 | HXMT/CsI, Fermi-GBM (n8, n7, b1) | 10.432±0.272 | 1.364 | 26.240±2.689 | -5.612 | 22.871±0.901 |
| HEB170728960 | HXMT/CsI, Fermi-GBM (n6, n9, b1) | 12.864±0.202 | 0.684 | 19.840±0.962 | 0.364 | 16.860±2.371 |
| HEB170731751 | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 41.664±1.604 | 4.336 | 59.584±3.623 | -2.768 | 28.141±6.360 |
| HEB170802637 | HXMT/CsI, Fermi-GBM (n6, n8, b0) | 0.192±0.091 | 0.696 | 2.176±1.793 | -1.288 | 0.820±0.014 |
| HEB170817008 | HXMT/CsI, Fermi-GBM (n0, n1, n2, n5, b0) | 1.472±0.143 | 0.544 | 2.688±0.202 | 0.288 | 2.620±0.081 |
| HEB170825306 | HXMT/CsI, Fermi-GBM (n3, n7, b0, b1) | 3.328±0.181 | -0.713 | 11.712±2.244 | -2.441 | 7.340±1.872 |
| HEB170826818 | HXMT/CsI, Fermi-GBM (na, nb, b1) | 5.952±0.091 | 1.424 | 11.392±0.264 | -0.432 | 9.537±0.161 |
| HEB170903534 | HXMT/CsI, Fermi-GBM (n4, n8, b0, b1) | 11.328±1.414 | -2.502 | 26.048±1.414 | -6.022 | 19.050±3.960 |
| HEB170906029 | HXMT/CsI, Fermi-GBM (n4, n3, b0) | 38.912±0.466 | 31.724 | 93.120±1.294 | 8.556 | 63.610±2.140 |
| HEB170912984 | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 1.728±1.154 | -1.680 | 2.880±0.834 | -2.256 | 4.005±0.708 |
| HEB170923188 | HXMT/CsI, Fermi-GBM (n4, n7, b0) | 12.672±2.636 | 9.533 | 32.960±2.561 | -0.451 | 25.660±1.310 |
| HEB171008079 | HXMT/CsI, Fermi-GBM (n4, n8, b0, b1) | 5.248±0.326 | 0.352 | 12.672±3.721 | -2.976 | 1.160±1.819 |
| HEB17103350 | HXMT/CsI, Fermi-GBM (n2, n3, b0) | 13.312±0.345 | 6.296 | 32.000±0.771 | -2.920 | 22.710±5.620 |
| HEB171020963 | HXMT/CsI, Swift/BAT | 6.400±1.231 | -2.416 | 10.176±0.091 | -5.040 | 9.620±2.070 |
| HEB171030728 | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 0.320±0.453 | 0.052 | 1.344±0.643 | -0.716 | 0.475±1.481 |
| HEB171103965 | HXMT/CsI, Swift/BAT | 0.064±0.091 | 2.032 | 0.192±0.091 | 1.968 | 0.197±0.022 |
| HEB171120555 | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 39.488±1.433 | 1.312 | 52.160±1.601 | 0.480 | 43.461±9.610 |
| HEB171124234 | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 5.312±0.362 | -3.608 | 18.112±0.653 | -6.424 | 6.197±0.490 |
| HEB171207054 | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 0.192±0.091 | -0.104 | 4.864±2.625 | -1.320 | 3.010±0.358 |
| HEB171209615 | HXMT/CsI, Swift/BAT | 61.376±1.358 | 11.792 | 93.696±2.567 | -0.944 | 84.781±10.092 |
| HEB171210492 | HXMT/CsI, Fermi-GBM (n9, n1, b0, b1) | 48.128±1.414 | 7.544 | 108.224±3.137 | 1.592 | 15.950±1.773 |
| HEB171215705 | HXMT/CsI, Fermi-GBM (n8, nb, b1) | 13.696±1.096 | 0.672 | 34.496±8.192 | -4.576 | 32.016±8.414 |

Table 4 continued
| Trigger ID       | Detectors                      | $T_{90}$ | $T_{90}$ start | $T_{90}$ start | $T_{90}$ only with HXMT/CsI counts |
|------------------|--------------------------------|----------|----------------|---------------|-------------------------------------|
| HEB17123818      | HXMT/CsI, Fermi-GBM (n7, n6, b1) | 1.088±0.219 | 0.632          | 1.216±0.219   | 0.632                               |
| HEB17123915      | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 24.768±1.105 | 6.056          | 77.440±4.636  | -1.368                              |
| HEB18011060      | HXMT/CsI, Fermi-GBM (n7, n9, b1) | 7.488±3.393  | -0.712         | 13.952±0.580  | -4.424                              |
| HEB18011169      | HXMT/CsI, Swift/BAT             | 9.920±0.091  | 2.604          | 27.008±3.073  | 0.108                               |
| HEB18011983      | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 2.112±0.202  | 2.800          | 6.144±1.802   | 0.176                               |
| HEB18012704      | HXMT/CsI, Fermi-GBM (n3, n7, b0, b1) | 7.744±0.345  | 2.400          | 21.312±1.541  | -2.400                              |
| HEB18013074      | HXMT/CsI, Fermi-GBM (n6, n8, b1) | 0.064±0.264  | -0.148         | 1.280±1.154   | -0.148                              |
| HEB18020876      | HXMT/CsI, Fermi-GBM (n0, n6, b1) | 4.544±0.547  | -1.896         | 27.328±1.856  | -15.976                             |
| HEB18021051      | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 16.704±0.181 | 6.104          | 40.448±0.707  | -1.384                              |
| HEB18030539      | HXMT/CsI, Fermi-GBM (n9, n1, b1) | 4.096±0.091  | 3.768          | 10.944±0.453  | 1.464                               |
| HEB18030697      | HXMT/CsI, Fermi-GBM (n3, n5, b0) | 9.984±1.431  | 0.928          | 33.856±9.605  | -3.232                              |
| HEB18030932      | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 16.832±1.694 | 5.344          | 44.608±2.248  | -1.504                              |
| HEB18031397      | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 0.064±0.389  | -0.008         | 0.832±0.453   | -0.008                              |
| HEB18030891      | HXMT/CsI, Fermi-GBM (n1, n3, b0) | 4.800±0.580  | 1.168          | 15.168±1.282  | 0.144                               |
| HEB18031177      | HXMT/CsI, Swift/BAT             | 16.320±1.350 | 1.232          | 29.568±2.499  | -4.272                              |
| HEB18040129      | HXMT/CsI, Fermi-GBM (n2, na, b0, b1) | 6.208±0.231  | 2.112          | 13.952±0.462  | -1.600                              |
| HEB18040206      | HXMT/CsI, Fermi-GBM (n6, n8, b1) | 0.128±0.091  | -0.048         | 0.384±0.326   | -0.304                              |
| HEB18040409      | HXMT/CsI, Fermi-GBM (n3, n4, b0) | 17.088±1.421 | 7.119          | 59.904±3.267  | 0.783                               |
| HEB18040936      | HXMT/CsI, Fermi-GBM (n9, b1)     | 6.912±0.091  | 4.616          | 12.864±0.264  | 1.288                               |
| HEB18041311      | HXMT/CsI, Fermi-GBM (n6, n7, b1) | 21.760±1.002 | 0.304          | 84.352±7.059  | -25.296                             |
| HEB18041692      | HXMT/CsI, Fermi-GBM (n4, n7, b0, b1) | 28.352±1.860 | 3.896          | 74.816±1.473  | 0.376                               |
| HEB18042744      | HXMT/CsI, Fermi-GBM (n6, n4, b0, b1) | 9.280±0.202  | 3.952          | 29.824±1.218  | 0.816                               |
| HEB18050539      | HXMT/CsI, Fermi-GBM (n8, n4, b0, b1) | 4.224±0.091  | -3.032         | 28.096±1.159  | -20.376                             |
| HEB18050602      | HXMT/CsI, Fermi-GBM (n2, n5, b0, b1) | 13.888±0.528 | 1.504          | 21.760±0.905  | -2.720                              |
| HEB18051080      | HXMT/CsI, Swift/BAT             | 2.752±0.091  | 0.688          | 39.744±4.224  | -9.296                              |
| HEB18052378      | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 1.728±0.547  | -0.968         | 7.936±1.118   | -3.720                              |
| HEB18052515      | HXMT/CsI, Fermi-GBM (n4, n5, b0, b1) | 0.064±0.091  | 0.012          | 0.320±0.264   | -0.052                              |
| HEB18060547      | HXMT/CsI, Fermi-GBM (n0, n2, b0) | 9.408±0.202  | 4.256          | 22.784±1.601  | 0.736                               |
| HEB18061803      | HXMT/CsI, Fermi-GBM (n4, n5, b0, b1) | 0.576±0.143  | -0.288         | 5.056±0.716   | -3.488                              |
| HEB18062309      | HXMT/CsI, Swift/BAT             | 18.624±2.057 | -6.976         | 64.768±0.453  | -24.960                             |
| Trigger ID | Detectors | $T_{50}$ | $T_{50}$ start | $T_{90}$ | $T_{90}$ start | $T_{90}$ only with HXMT/CsI counts |
|------------|-----------|---------|-------------|---------|---------------|----------------------------------|
| HEB180625040 | HXMT/CsI, Fermi-GBM (n4, n8, b0) | 0.256±0.091 | 0.120 | 2.048±0.962 | -0.776 | 0.310±0.071 |
| HEB180626391 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 0.320±0.091 | -0.340 | 0.768±0.453 | -0.340 | 0.770±0.070 |
| HEB180704233 | HXMT/CsI, Swift/BAT | 18.368±0.320 | -18.880 | 32.384±1.833 | -28.992 | 20.030±1.414 |
| HEB180715754 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 0.448±0.091 | -0.004 | 1.280±0.870 | -0.580 | 0.640±0.175 |
| HEB180718762 | HXMT/CsI, Fermi-GBM (n0, n2, b0) | 23.232±1.231 | 6.312 | 59.776±3.142 | 1.512 | 21.550±0.500 |
| HEB180722992 | HXMT/CsI, Fermi-GBM (n2, n1, b0) | 41.920±0.975 | 13.312 | 116.800±4.740 | 1.024 | 90.122±0.689 |
| HEB180724807 | HXMT/CsI, Fermi-GBM (na, nb, b1) | 17.792±0.590 | 6.584 | 52.224±1.921 | 1.400 | 53.066±14.026 |
| HEB180730017 | HXMT/CsI, Fermi-GBM (n4, n5, b0) | 0.000±0.092 | 0.312 | 1.664±1.601 | 0.248 | 0.100±1.561 |
| HEB180801275 | HXMT/CsI, Fermi-GBM (n6, n7, b1) | 0.192±0.091 | -0.008 | 0.704±0.264 | -0.456 | 0.550±0.114 |
| HEB180803590 | HXMT/CsI, Fermi-GBM (n3, n4, b0) | 0.128±0.091 | -0.240 | 0.256±0.516 | -0.304 | 0.350±0.071 |
| HEB180804930 | HXMT/CsI, Fermi-GBM (n8, nb, b1) | 5.824±0.771 | 0.496 | 23.040±1.802 | -3.472 | 4.620±0.240 |
| HEB180816088 | HXMT/CsI, Fermi-GBM (n2, n1, b0) | 15.040±0.320 | 9.015 | 39.168±2.180 | -0.137 | 59.074±5.031 |
| HEB180822561 | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 2.816±0.286 | -0.344 | 13.568±2.463 | -3.480 | 4.506±1.119 |
| HEB180828789 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 4.032±0.091 | 4.512 | 8.448±0.143 | 1.440 | 7.750±0.122 |
| HEB180925407 | HXMT/CsI, Fermi-GBM (n4, n5, b0) | 2.496±0.405 | -2.952 | 5.440±2.308 | -4.808 | 5.601±1.360 |
| HEB180925609 | HXMT/CsI, Swift/BAT | 13.312±0.286 | 3.304 | 33.664±1.484 | -5.080 | 10.640±0.940 |
| HEB180927992 | HXMT/CsI, Fermi-GBM (n1, n5, b0) | 3.392±0.590 | -0.264 | 11.584±2.753 | -2.568 | 3.380±0.256 |
| HEB180929453 | HXMT/CsI, Fermi-GBM (n1, n2, b0) | 2.368±0.091 | -0.008 | 3.008±0.143 | -0.264 | 2.850±0.190 |
| HEB18108269 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 11.264±0.362 | -3.384 | 49.920±3.014 | -24.312 | 31.039±1.583 |
| HEB18104479 | HXMT/CsI, Fermi-GBM (n1, n4, b0) | 8.128±0.405 | -4.248 | 25.728±2.755 | -9.432 | 23.507±3.042 |
| HEB181028590 | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 14.784±0.429 | 9.360 | 33.088±1.358 | 1.040 | 29.061±3.021 |
| HEB181119605 | HXMT/CsI, Fermi-GBM (n7, n9, b1) | 8.960±0.181 | 5.714 | 18.432±0.389 | 0.146 | 15.090±0.871 |
| HEB181121306 | HXMT/CsI, Fermi-GBM (n8, b1) | 0.384±0.326 | -0.240 | 0.576±0.143 | -0.304 | 0.621±0.022 |
| HEB181122381 | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 15.232±1.645 | 4.872 | 40.768±7.040 | 0.136 | 21.491±5.498 |
| HEB181123231 | HXMT/CsI, Swift/BAT | 0.128±0.090 | 0.090 | 0.256±0.090 | 0.024 | 0.370±0.030 |
| HEB181212692 | HXMT/CsI, Fermi-GBM (n2, n5, b0) | 8.768±1.218 | 2.512 | 58.752±3.585 | 0.848 | 47.059±7.509 |
| HEB181213540 | HXMT/CsI, Swift/BAT | 11.392±0.905 | 2.592 | 22.720±2.177 | 0.480 | 21.527±3.540 |
| HEB181217664 | HXMT/CsI, Fermi-GBM (n2, na, b0) | 8.256±0.389 | 11.440 | 33.088±4.100 | 2.736 | 25.630±2.580 |
| HEB181225489 | HXMT/CsI, Fermi-GBM (n3, n7, b0) | 9.344±0.264 | 1.312 | 35.776±2.817 | 0.672 | 10.110±0.440 |
| HEB190103877 | HXMT/CsI, Swift/BAT | 9.856±0.345 | 1.440 | 24.448±3.216 | -7.776 | 10.202±0.224 |

Table 4 (continued)
| Trigger ID | Detectors | $T_{50}$ (s) | $T_{50}$ start (s) | $T_{90}$ (s) | $T_{90}$ start (s) | $T_{30}$ only with HXMT/CsI counts (s) |
|------------|-----------|-------------|-------------------|-------------|-------------------|--------------------------------------|
| HEB190101125 | HXMT/CsI, Fermi-GBM (n3, n5, b0, b1) | 3.456±0.181 | -2.536 | 11.904±2.244 | -5.096 | 6.838±1.085 |
| HEB190131064 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 12.800±0.859 | 4.136 | 36.544±5.824 | 0.744 | 23.620±1.290 |
| HEB190215771 | HXMT/CsI, Fermi-GBM (n1, n3, b0) | 8.064±0.326 | 3.896 | 25.216±2.369 | 0.760 | 15.010±2.470 |
| HEB190222537 | HXMT/CsI, Fermi-GBM (n9, nb, b1) | 6.208±0.516 | 1.448 | 28.992±3.009 | -0.088 | 4.802±0.633 |
| HEB190226515 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 0.064±0.091 | 0.160 | 0.192±0.380 | 0.096 | 0.470±0.125 |
| HEB190310698 | HXMT/CsI, Fermi-GBM (n3, n5, b0, b1) | 6.672±0.143 | -1.696 | 75.072±1.537 | -51.680 | 64.080±27.038 |
| HEB190324348 | HXMT/CsI, Fermi-GBM (n1, na, b0, b1) | 16.896±1.541 | 3.456 | 51.136±1.569 | -1.152 | 49.562±4.036 |
| HEB190324947 | HXMT/CsI, Fermi-GBM (n6, n7, b1) | 5.056±0.202 | 1.664 | 12.736±0.580 | -0.256 | 6.700±0.501 |
| HEB190326313 | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 25.792±4.740 | 22.749 | 68.160±5.874 | -5.283 | 60.111±12.830 |
| HEB190326316 | HXMT/CsI, Swift/BAT | 0.064±0.389 | -0.040 | 0.576±0.429 | -0.232 | 0.325±0.011 |
| HEB190330694 | HXMT/CsI, Fermi-GBM (n1, n9, b0) | 23.808±1.409 | 1.648 | 45.760±2.113 | 0.432 | 8.080±0.860 |
| HEB190331093 | HXMT/CsI, Fermi-GBM (n0, n3) | 18.176±2.147 | -15.728 | 35.008±2.947 | -24.496 | 18.022±1.805 |
| HEB190401139 | HXMT/CsI, Fermi-GBM (n6, n7, b1) | 10.944±0.326 | 3.568 | 31.104±1.154 | 0.112 | 21.020±3.900 |
| HEB190407671 | HXMT/CsI, Fermi-GBM (n8, n9, b1) | 6.848±0.264 | 1.136 | 14.400±0.643 | -1.808 | 4.506±0.707 |
| HEB190422283 | HXMT/CsI, Fermi-GBM (n4, n8, b0) | 61.312±5.900 | 13.288 | 86.976±1.620 | -1.624 | 64.321±6.352 |
| HEB190424417 | HXMT/CsI, Swift/BAT | 12.928±0.405 | 1.000 | 31.040±2.180 | -2.904 | 23.410±4.840 |
| HEB190507269 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 7.488±0.716 | 0.761 | 18.560±1.282 | -1.159 | 12.180±3.861 |
| HEB190515189 | HXMT/CsI, Fermi-GBM (n6, n9, b1) | 0.192±0.091 | 0.160 | 0.448±0.091 | 0.032 | 0.400±0.087 |
| HEB190525031 | HXMT/CsI, Fermi-GBM (na, n9, b1) | 0.512±0.091 | 0.064 | 1.344±0.516 | -0.064 | 1.750±0.757 |
| HEB190531840 | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 13.632±0.091 | 18.360 | 37.248±4.224 | 7.544 | 29.390±1.400 |
| HEB190604446 | HXMT/CsI, Fermi-GBM (n4, n3, b0) | 4.480±0.143 | 3.052 | 13.184±0.834 | 0.044 | 9.902±2.721 |
| HEB190613449 | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 1.408±0.143 | 0.880 | 2.816±0.264 | 0.112 | 2.340±0.022 |
| HEB190615636 | HXMT/CsI, Fermi-GBM (nb, n8, b1) | 8.256±0.373 | 0.736 | 21.888±1.132 | -8.480 | 8.820±0.780 |
| HEB190619594 | HXMT/CsI, Fermi-GBM (nb, n7, b1) | 70.080±1.874 | 4.768 | 136.128±5.089 | -8.736 | 131.664±22.033 |
| HEB190620507 | HXMT/CsI, Fermi-GBM (n3, n4, b0) | 16.320±0.384 | 3.824 | 55.936±1.275 | -2.986 | 54.568±1.805 |
| HEB190720964 | HXMT/CsI, Fermi-GBM (n3, n4, b0) | 3.264±0.326 | 0.173 | 11.520±2.305 | -1.171 | 7.509±1.583 |
| HEB190723308 | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 16.640±0.643 | 0.848 | 27.136±3.841 | -4.144 | 18.022±2.064 |
| HEB190724030 | HXMT/CsI, Fermi-GBM (n0, n5, b1) | 0.064±0.091 | -0.004 | 0.192±0.143 | -0.132 | 0.430±0.032 |
| HEB190726642 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 4.096±0.202 | -1.576 | 17.472±1.958 | -7.144 | 4.570±0.530 |
| HEB190800675 | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 8.960±0.429 | 2.241 | 24.384±3.585 | -0.063 | 16.020±0.708 |

Table 4 (continued)
| Trigger ID | Detectors Used | $T_{50}$ | $T_{90}$ | $T_{50}$ start | $T_{90}$ only with HXMT/CsI counts |
|------------|----------------|---------|---------|--------------|----------------------------------|
| HEB190813520 | HXMT/CsI, Fermi-GBM (n2, n9, b0) | 0.064±0.143 | 0.640±0.771 | -0.072 | 1.200±0.022 |
| HEB190814837 | HXMT/CsI, Fermi-GBM (nb, n9, b1) | 4.928±0.653 | 13.184±3.009 | -3.035 | 5.910±0.430 |
| HEB190901890 | HXMT/CsI, Fermi-GBM (n3, n4, b0) | 7.872±0.202 | 23.360±1.096 | -5.808 | 16.620±3.221 |
| HEB190903721 | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 0.192±0.091 | 0.320±0.389 | -0.276 | 0.450±0.461 |
| HEB190906767 | HXMT/CsI, Fermi-GBM (n4, n8, b0) | 23.424±0.643 | 38.336±2.497 | -0.072 | 16.710±4.870 |
| HEB190915239 | HXMT/CsI, Fermi-GBM (nb, n8, b1) | 6.656±0.590 | 15.488±0.854 | -1.432 | 7.230±0.830 |
| HEB191009297 | HXMT/CsI, Fermi-GBM (n9, b1) | 48.192±6.977 | 88.128±3.992 | 0.424 | 53.566±18.050 |
| HEB191019970 | HXMT/CsI, Fermi-GBM (n0, n5, b0, b1) | 104.256±0.692 | 142.976±2.636 | 7.311 | 136.833±16.050 |
| HEB191031780 | HXMT/CsI, Fermi-GBM (n0, n6, b0, b1) | 21.952±0.516 | 75.264±6.849 | 0.623 | 49.951±4.510 |
| HEB191105257 | HXMT/CsI, Fermi-GBM (n4, n8) | 0.064±0.091 | 0.192±0.091 | -0.040 | 0.145±0.007 |
| HEB191108003 | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 94.784±2.273 | 164.736±7.700 | -3.572 | 116.579±16.204 |
| HEB191113364 | HXMT/CsI, Fermi-GBM (n4, b0) | 33.216±0.659 | 99.264±0.668 | -6.280 | 96.016±17.567 |
| HEB191113578 | HXMT/CsI, Fermi-GBM (n4, n8, b0) | 10.432±3.521 | 19.008±0.834 | 0.160 | 24.530±4.615 |
| HEB191118925 | HXMT/CsI, Fermi-GBM (n2, n5, b0) | 13.824±1.793 | 75.968±7.745 | 1.080 | 15.390±1.760 |
| HEB191130506 | HXMT/CsI, Fermi-GBM (n0, n9, b0, b1) | 17.024±0.854 | 46.720±5.422 | -0.664 | 46.057±10.025 |
| HEB191202867 | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 6.656±0.462 | 33.408±2.499 | -7.768 | 4.180±1.145 |
| HEB191203289 | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 0.192±0.091 | 0.448±0.516 | -0.466 | 0.695±0.276 |
| HEB191205740 | HXMT/CsI, Fermi-GBM (n3, n4, b0) | 2.496±0.466 | 3.840±0.962 | -4.084 | 3.920±0.581 |
| HEB191218112 | HXMT/CsI, Swift/BAT | 41.664±0.345 | 53.824±2.689 | -0.216 | 49.811±1.240 |
| HEB191221860 | HXMT/CsI, Swift/BAT | 4.096±0.091 | 13.632±0.962 | -1.960 | 13.016±1.119 |
| HEB191227069 | HXMT/CsI, Fermi-GBM (n2, n1, b0) | 8.256±0.202 | 28.032±1.562 | -6.872 | 24.030±1.583 |
| HEB200109073 | HXMT/CsI, Fermi-GBM (n5, n2, b0) | 24.704±1.489 | 40.256±1.860 | -4.512 | 25.540±5.260 |
| HEB200111632 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 5.184±0.091 | 10.240±1.665 | -3.528 | 11.500±2.501 |
| HEB200114153 | HXMT/CsI, Fermi-GBM (n2, na, b0, b1) | 26.048±0.590 | 42.496±6.529 | -2.512 | 28.035±5.105 |
| HEB200120961 | HXMT/CsI, Fermi-GBM (n6, na, b1) | 4.160±2.341 | 14.400±2.369 | -6.732 | 14.660±1.354 |
| HEB200125863 | HXMT/CsI, Fermi-GBM (n0, n1, b0, b1) | 2.624±0.091 | 6.400±0.202 | -0.072 | 4.240±0.330 |
| HEB200219998 | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 9.920±0.707 | 22.784±0.580 | -0.920 | 3.760±3.660 |
| HEB200221161 | HXMT/CsI, Fermi-GBM (n8, nb, b1) | 0.512±0.143 | 8.128±0.771 | -4.616 | 1.460±0.121 |
| HEB200227305 | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 7.936±0.286 | 23.488±2.627 | -7.536 | 19.450±2.240 |
| HEB200323782 | HXMT/CsI, Fermi-GBM (n7, n9, b1) | 0.768±0.091 | 1.664±0.264 | 0.056 | 1.601±0.141 |

**Table 4 continued**
| Trigger ID          | Detectors                  | ID Used                  | $T_{50}$       | $T_{50}$ start | $T_{90}$       | $T_{90}$ start | $T_{90}$ only with HXMT/CsI counts |
|---------------------|----------------------------|--------------------------|----------------|---------------|----------------|---------------|-----------------------------------|
| HEB200325137        | HXMT/CsI, Fermi-GBM (n3, n5, b0) | 0.576±0.143              | 0.120          | 1.728±1.154   | -0.008         | 1.210±0.014   |
| HEB200326517        | HXMT/CsI, Fermi-GBM (n9, nb, b1) | 1.728±0.405              | -0.636         | 2.816±1.032   | -1.020         | 2.410±1.131   |
| HEB200412381        | HXMT/CsI, Fermi-GBM (n6, n8, b1) | 1.920±0.091              | 2.820          | 7.616±0.389   | -0.444         | 6.360±0.139   |
| HEB200416295        | HXMT/CsI, Fermi-GBM (n2, n5)       | 3.328±0.264              | 0.160          | 7.616±1.473   | -1.888         | 6.310±2.181   |
| HEB200418864        | HXMT/CsI, Fermi-GBM (n3, n4, b0)   | 15.360±4.420             | 7.573          | 38.080±3.905  | 0.680          | 12.900±8.113  |
| HEB200519472        | HXMT/CsI, Swift/BAT            | 5.760±0.604              | 21.168         | 32.832±2.052  | 8.560          | 30.890±2.520  |
| HEB200601097        | HXMT/CsI, Fermi-GBM (n1, n5, b0) | 119.296±0.716            | 12.512         | 158.144±4.612 | -3.104         | 10.570±8.741  |
| HEB200607379        | HXMT/CsI, Fermi-GBM (n0, n4, b0) | 27.584±1.319             | 2.576          | 93.248±3.912  | -44.400        | 88.071±8.960  |
| HEB200617679        | HXMT/CsI, Fermi-GBM (n8, n4, b0) | 0.192±0.091              | -0.136         | 1.024±1.729   | -0.776         | 0.910±0.028   |
| HEB200618918        | HXMT/CsI, Fermi-GBM (n5, n4, b0) | 8.640±0.607              | 1.532          | 28.672±6.528  | 0.188          | 27.534±7.027  |
| HEB200707072        | HXMT/CsI, Fermi-GBM (n3, n1)     | 7.360±1.368              | 3.128          | 20.224±2.191  | -0.776         | 16.521±6.028  |
| HEB200711461        | HXMT/CsI, Fermi-GBM (n7, n9, b1) | 14.720±0.580             | 3.560          | 29.376±1.478  | 0.488          | 12.190±6.180  |
| HEB200716315        | HXMT/CsI, Fermi-GBM (n6, n7, b1) | 22.528±0.968             | 2.000          | 43.968±2.241  | -0.624         | 42.053±13.026 |
| HEB200716956        | HXMT/CsI, Fermi-GBM (n0, n1, b0) | 1.920±0.091              | 0.320          | 4.416±0.707   | 0.192          | 2.140±0.014   |
| HEB200801352        | HXMT/CsI, Fermi-GBM (n6, n8)     | 16.320±2.360             | -3.288         | 34.240±4.394  | -10.072        | 24.470±4.150  |
| HEB200806645        | HXMT/CsI, Swift/BAT            | 10.816±0.429             | 15.312         | 37.376±5.130  | 0.848          | 33.050±2.060  |
| HEB200809653        | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 5.120±0.707              | 0.280          | 14.656±3.334  | -1.000         | 17.522±2.553  |
| HEB200824594        | HXMT/CsI, Fermi-GBM (n0, n3)    | 0.320±0.834              | -0.456         | 1.664±0.707   | -0.840         | 0.850±0.112   |
| HEB200903112        | HXMT/CsI, Fermi-GBM (n7, b1)    | 38.528±2.589             | 4.056          | 89.152±3.917  | -16.424        | 40.026±2.809  |
| HEB200919964        | HXMT/CsI, Fermi-GBM (n7, n8, b1) | 36.224±0.716             | 11.152         | 57.280±4.144  | 1.680          | 58.261±7.300  |
| HEB200922504        | HXMT/CsI, Swift/BAT            | 7.552±0.196              | 0.504          | 16.512±1.118  | -2.760         | 4.440±1.192   |
| HEB200928551        | HXMT/CsI, Fermi-GBM (n9, na, b1) | 7.872±0.231              | -2.720         | 19.584±2.627  | -6.112         | 15.160±1.990  |
| HEB201031517        | HXMT/CsI, Swift/BAT            | 1.856±0.326              | -0.560         | 6.912±0.202   | 0.048          | 2.010±0.022   |
| HEB201105229        | HXMT/CsI, Fermi-GBM (n3, n5, b0) | 5.184±0.202              | 2.744          | 16.384±1.282  | 0.952          | 12.010±0.960  |
| HEB201209239        | HXMT/CsI, Swift/BAT            | 14.976±2.988             | -7.104         | 45.632±1.843  | -24.064        | 12.370±0.466  |
| HEB20121591         | HXMT/CsI, Fermi-GBM (na, nb)   | 0.010±0.014              | 0.048          | 0.050±0.045   | 0.038          | 0.035±0.007   |
| HEB201226553        | HXMT/CsI, Fermi-GBM (n2, na)   | 52.544±1.088             | 8.464          | 71.360±0.842  | -1.584         | 71.022±5.270  |
| HEB201121068        | HXMT/CsI, Swift/BAT            | 6.784±0.143              | 1.792          | 96.512±0.771  | -58.496        | 12.500±2.060  |
| HEB201119120        | HXMT/CsI, Fermi-GBM (n1, n3, b0) | 0.032±0.091              | -0.032         | 0.064±0.091   | -0.032         | 0.060±0.061   |
| HEB20121779         | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 7.040±0.453              | 1.528          | 15.424±0.643  | 0.312          | 13.980±0.170  |
| Trigger ID | Detectors | $T_{50}$ | $T_{50}$ start | $T_{90}$ | $T_{90}$ start | $T_{90}$ only with HXMT/CsI counts |
|------------|-----------|----------|----------------|----------|----------------|----------------------------------|
| HEB210123304 | HXMT/CsI, Fermi-GBM (n2, n5, b0) | 5.888±0.231 | -2.928 | 15.488±1.282 | -6.896 | 12.330±0.990 |
| HEB210123305 | HXMT/CsI, Swift/BAT | 27.968±0.202 | -26.192 | 43.584±0.389 | -40.400 | 42.501±0.631 |
| HEB210207911 | HXMT/CsI, Fermi-GBM (n3, n5, b0) | 6.720±0.286 | 1.432 | 19.392±4.615 | -1.000 | 10.100±3.340 |
| HEB210208057 | HXMT/CsI, Fermi-GBM (n4, n5, b0) | 8.640±0.091 | 0.056 | 1.408±0.516 | -0.200 | 1.620±0.370 |
| HEB210307247 | HXMT/CsI, GECAM | 0.896±0.091 | 0.216 | 1.216±0.771 | -0.040 | 0.190±0.014 |
| HEB210323918 | HXMT/CsI, Fermi-GBM (n0, n1, n2, n5, b0) | 16.768±0.362 | 4.448 | 34.432±1.282 | -3.808 | 33.109±10.330 |
| HEB210409894 | HXMT/CsI, Fermi-GBM (n0, n1, n2, n5, b0) | 0.128±0.091 | -0.008 | 0.832±0.453 | -0.392 | 1.240±0.990 |
| HEB210426057 | HXMT/CsI, Fermi-GBM (n4, n5, b0) | 1.792±0.091 | 3.176 | 32.000±3.019 | -5.032 | 10.017±4.480 |
| HEB210511476 | HXMT/CsI, Fermi-GBM (n3, n6, b0) | 6.528±1.180 | 3.040 | 38.464±6.728 | -14.944 | 32.053±4.789 |
| HEB210515546 | HXMT/CsI, Fermi-GBM (n9, na, b1) | 8.064±0.264 | 1.752 | 32.000±3.019 | -5.032 | 10.017±4.480 |
| HEB210516981 | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 3.968±0.143 | 1.844 | 9.856±0.604 | -2.264 | 12.521±5.394 |
| HEB210605214 | HXMT/CsI, Fermi-GBM (n0, n3, b0) | 19.616±2.561 | 8.888 | 246.848±1.601 | 3.896 | 22.537±3.046 |
| HEB210610827 | HXMT/CsI, Fermi-GBM (n6, nb, b1) | 17.344±0.202 | 5.264 | 67.392±3.917 | -6.512 | 33.556±3.541 |
| HEB210622064 | HXMT/CsI, Fermi-GBM (na, n8, b1) | 27.456±5.588 | 1.072 | 48.256±5.824 | -0.208 | 48.078±5.033 |
| HEB210627311 | HXMT/CsI, Fermi-GBM (n4, n5, b0) | 3.776±0.326 | -0.216 | 9.024±0.516 | -3.352 | 8.303±2.609 |
Table 5. Durations (40-800 keV for NG mode, 200-3000 keV for LG mode) of ‘SILVER’ and ‘BRONZE’ GRB samples

| Trigger ID | Detectors | $T_{50}$ | $T_{50}$ start | $T_{90}$ | $T_{90}$ start |
|------------|-----------|----------|----------------|----------|----------------|
| HEB170626040 | HXMT/CsI | 2.504 ± 0.707 | 3.840 | 6.511 ± 1.120 | 1.836 |
| HEB170708045 | HXMT/CsI | 0.050 ± 0.014 | -0.004 | 0.200 ± 0.022 | -0.034 |
| HEB170712139 | HXMT/CsI | 3.504 ± 0.708 | -2.628 | 8.511 ± 1.119 | -5.631 |
| HEB170801208 | HXMT/CsI | 0.020 ± 0.014 | 0.009 | 0.460 ± 0.750 | -0.421 |
| HEB170803917 | HXMT/CsI | 0.160 ± 0.014 | 0.837 | 0.260 ± 0.014 | 0.787 |
| HEB170805596 | HXMT/CsI | 0.040 ± 0.032 | 0.192 | 0.270 ± 0.487 | -0.028 |
| HEB170805610 | HXMT/CsI | 0.300 ± 0.141 | 0.476 | 2.000 ± 0.141 | -1.024 |
| HEB170829270 | HXMT/CsI | 2.002 ± 0.707 | 0.374 | 5.507 ± 2.696 | -0.627 |
| HEB170901499 | HXMT/CsI | 8.020 ± 2.832 | 3.274 | 46.118 ± 28.143 | -0.736 |
| HEB170904406 | HXMT/CsI | 5.901 ± 0.224 | 2.475 | 11.403 ± 0.608 | 0.175 |
| HEB170918905 | HXMT/CsI | 0.540 ± 0.033 | 0.312 | 1.929 ± 0.310 | 0.162 |
| HEB170921030 | HXMT/CsI | 0.500 ± 0.071 | -0.012 | 1.150 ± 0.112 | -0.312 |
| HEB171102106 | HXMT/CsI | 25.532 ± 3.540 | 7.277 | 50.563 ± 10.025 | 1.379 |
| HEB171108279 | HXMT/CsI | 1.000 ± 0.707 | 1.154 | 2.501 ± 0.707 | 0.154 |
| HEB171115217 | HXMT/CsI | 22.532 ± 16.030 | 0.891 | 47.066 ± 9.027 | -14.130 |
| HEB180103047 | HXMT/CsI | 43.310 ± 33.511 | -7.728 | 55.813 ± 3.516 | -16.630 |
| HEB180103949 | HXMT/CsI | 0.160 ± 0.014 | 0.928 | 0.430 ± 0.149 | 0.888 |
| HEB180112687 | HXMT/CsI | 138.168 ± 1.119 | 1.380 | 158.193 ± 26.537 | -4.127 |
| HEB180202211 | HXMT/CsI | 2.503 ± 0.708 | 2.378 | 8.511 ± 1.119 | -0.125 |
| HEB180210728 | HXMT/CsI | 4.005 ± 2.064 | 0.876 | 14.018 ± 4.036 | -0.125 |
| HEB180221520 | HXMT/CsI | 11.503 ± 2.802 | 7.277 | 32.208 ± 6.902 | 1.776 |
| HEB180226392 | HXMT/CsI | 0.200 ± 0.141 | 0.476 | 1.400 ± 0.412 | 0.376 |
| HEB180326143 | HXMT/CsI | 7.017 ± 2.242 | 3.759 | 14.035 ± 1.414 | 2.757 |
| HEB180405168 | HXMT/CsI | 9.011 ± 2.064 | 6.382 | 22.528 ± 3.540 | 0.875 |
| HEB180411359 | HXMT/CsI | 47.559 ± 2.239 | 39.928 | 94.617 ± 5.529 | 6.386 |
| HEB180603235 | HXMT/CsI | 0.200 ± 0.071 | 0.088 | 0.450 ± 0.461 | -0.012 |
| HEB180617871 | HXMT/CsI | 0.200 ± 0.141 | -0.131 | 1.200 ± 0.141 | -1.031 |
| HEB180626260 | HXMT/CsI | 19.048 ± 1.416 | 0.751 | 25.063 ± 8.267 | -2.256 |
| HEB180704525 | HXMT/CsI | 5.012 ± 1.416 | 1.752 | 13.032 ± 4.133 | -1.256 |
| HEB180804554 | HXMT/CsI | 10.025 ± 1.416 | 0.751 | 27.067 ± 3.169 | -9.273 |
| HEB181011181 | HXMT/CsI | 4.010 ± 1.416 | 1.753 | 8.020 ± 1.416 | 0.750 |
| HEB181201111 | HXMT/CsI | 5.401 ± 1.416 | 4.177 | 20.605 ± 1.118 | -1.324 |
| HEB190102652 | HXMT/CsI | 1.898 ± 0.122 | 4.059 | 2.918 ± 0.349 | 3.449 |
| HEB190117608 | HXMT/CsI | 15.704 ± 0.412 | 2.176 | 21.805 ± 1.504 | 0.375 |
| HEB190203655 | HXMT/CsI | 25.062 ± 2.241 | -22.307 | 60.149 ± 14.071 | 42.357 |

Table 5 continued
| Trigger ID  | Detectors | $T_{50}$ Used | $T_{50}$ start | $T_{90}$ Used | $T_{90}$ start |
|------------|-----------|--------------|---------------|--------------|---------------|
| HEB190212129 | HXMT/CsI | 0.045±0.090 | -0.007 | 0.180±0.335 | -0.027 |
| HEB190218810 | HXMT/CsI | 16.704±6.802 | 6.177 | 29.807±7.803 | 0.175 |
| HEB190306467 | HXMT/CsI | 19.048±2.241 | 0.751 | 29.073±7.635 | -4.261 |
| HEB190321931 | HXMT/CsI | 4.506±0.707 | 0.877 | 8.511±1.119 | 0.377 |
| HEB190328378 | HXMT/CsI | 14.017±0.708 | 1.878 | 25.03±3.206 | -3.629 |
| HEB190330207 | HXMT/CsI | 0.520±0.360 | -0.473 | 3.400±0.255 | -0.761 |
| HEB190331841 | HXMT/CsI | 0.050±0.071 | 0.039 | 0.850±0.255 | -0.761 |
| HEB19051119 | HXMT/CsI | 47.117±9.078 | 11.780 | 76.190±11.073 | 0.752 |
| HEB190605110 | HXMT/CsI | 6.402±0.707 | 2.676 | 15.704±2.702 | 0.275 |
| HEB190610477 | HXMT/CsI | 0.200±0.141 | 1.075 | 0.500±0.141 | 0.975 |
| HEB190615612 | HXMT/CsI | 20.050±1.416 | 1.753 | 29.072±4.133 | 0.751 |
| HEB190706710 | HXMT/CsI | 1.500±0.708 | -0.125 | 2.503±0.707 | -0.125 |
| HEB190719113 | HXMT/CsI | 6.007±3.645 | -6.131 | 10.513±2.239 | -7.132 |
| HEB190825878 | HXMT/CsI | 14.035±1.418 | 2.757 | 28.070±5.111 | -0.251 |
| HEB190906045 | HXMT/CsI | 0.400±0.141 | 1.077 | 2.601±0.141 | -1.024 |
| HEB190927106 | HXMT/CsI | 20.050±2.241 | 5.765 | 34.085±6.340 | 1.755 |
| HEB190928783 | HXMT/CsI | 3.004±0.707 | 0.375 | 5.006±0.708 | -0.125 |
| HEB190901182 | HXMT/CsI | 0.030±0.014 | 0.019 | 0.060±0.014 | -0.001 |
| HEB191021831 | HXMT/CsI | 2.503±0.707 | 0.375 | 9.011±0.708 | -5.131 |
| HEB191031182 | HXMT/CsI | 3.101±0.316 | 1.876 | 9.502±0.447 | 0.275 |
| HEB191031318 | HXMT/CsI | 3.007±1.418 | 4.761 | 9.022±1.416 | 0.751 |
| HEB191194445 | HXMT/CsI | 0.040±0.007 | 0.019 | 0.095±0.007 | 0.004 |
| HEB191203787 | HXMT/CsI | 3.008±1.414 | -3.259 | 3.008±1.414 | -3.259 |
| HEB191224829 | HXMT/CsI | 1.700±0.224 | 0.476 | 2.901±0.922 | -0.524 |
| HEB200211193 | HXMT/CsI | 0.000±2.242 | -0.249 | 3.007±1.416 | -2.254 |
| HEB200313878 | HXMT/CsI | 1.850±0.212 | 0.238 | 3.300±0.552 | -0.112 |
| HEB200326421 | HXMT/CsI | 77.628±9.070 | 9.350 | 97.160±16.034 | 1.838 |
| HEB200413712 | HXMT/CsI | 0.900±0.224 | 0.075 | 2.201±0.316 | -0.125 |
| HEB200413743 | HXMT/CsI | 2.501±0.825 | -0.124 | 8.702±0.721 | -2.224 |
| HEB200521511 | HXMT/CsI | 0.150±0.014 | -0.587 | 0.590±0.041 | -0.647 |
| HEB200526628 | HXMT/CsI | 7.017±1.418 | 62.907 | 73.182±12.072 | 3.759 |
| HEB201122355 | HXMT/CsI | 6.511±0.708 | 1.338 | 9.516±2.554 | 0.837 |
| HEB210124558 | HXMT/CsI | 0.020±0.014 | 3.069 | 0.500±0.114 | 2.769 |
| HEB210129908 | HXMT/CsI | 2.401±0.224 | 0.667 | 18.606±4.806 | -0.433 |
| HEB210208564 | HXMT/CsI | 24.216±1.020 | 0.738 | 25.216±1.078 | 0.337 |
| HEB210213286 | HXMT/CsI | 10.934±1.729 | 3.182 | 18.886±2.225 | 1.194 |
| HEB210306320 | HXMT/CsI | 8.027±2.242 | 5.685 | 29.097±1.417 | 1.671 |
| Trigger ID | Trigger Detectors | $T_{50}$ | $T_{50}$ start | $T_{90}$ | $T_{90}$ start |
|------------|------------------|---------|---------------|---------|-------------|
| HEB210306879 | HXMT/CsI | 3.010±1.414 | 1.673 | 8.027±1.417 | -0.334 |
| HEB210326890 | HXMT/CsI | 11.037±2.838 | -4.349 | 13.043±3.173 | -5.353 |
| HEB210328396 | HXMT/CsI | 3.101±2.885 | -1.934 | 5.002±0.671 | -2.235 |
| HEB210405507 | HXMT/CsI | 2.000±0.071 | -1.267 | 7.051±1.801 | -3.017 |
| HEB210406716 | HXMT/CsI | 8.504±1.119 | 3.776 | 17.008±5.337 | 0.774 |
| HEB210429071 | HXMT/CsI | 10.517±1.584 | 1.840 | 34.056±9.529 | -9.679 |
| HEB210502295 | HXMT/CsI | 2.003±1.120 | 1.838 | 8.013±0.708 | 1.337 |
| HEB210504958 | HXMT/CsI | 14.023±7.529 | 2.337 | 54.090±14.104 | -9.182 |
| HEB210506027 | HXMT/CsI | 0.400±0.453 | -0.415 | 1.200±0.255 | -1.215 |
| HEB210511647 | HXMT/CsI | 10.033±6.103 | 6.688 | 45.150±9.085 | 0.668 |
| HEB210602502 | HXMT/CsI | 0.501±0.707 | 1.335 | 2.003±0.707 | 0.834 |
| HEB210606120 | HXMT/CsI | 2.200±0.071 | 1.784 | 4.951±0.255 | 0.834 |
| HEB210607775 | HXMT/CsI | 9.030±3.172 | 0.667 | 15.050±5.676 | -0.336 |
| HEB210607902 | HXMT/CsI | 7.202±0.224 | 0.370 | 16.705±2.603 | -2.831 |
| HEB210615891 | HXMT/CsI | 13.043±6.103 | -0.335 | 24.080±6.731 | -1.338 |
| HEB210622339 | HXMT/CsI | 2.001±0.224 | 3.068 | 6.402±1.265 | 0.367 |
| HEB210627813 | HXMT/CsI | 79.264±26.106 | 3.678 | 104.347±11.218 | -8.362 |
Table 6. Fluence and Peak Flux (10–2000 keV) from joint analyses with ‘GOLDEN’ GRB samples.

| Trigger ID | Fluence (erg cm\(^{-2}\)) | PF64 (ph cm\(^{-2}\) s\(^{-1}\)) | PF256 (ph cm\(^{-2}\) s\(^{-1}\)) | PF1024 (ph cm\(^{-2}\) s\(^{-1}\)) |
|------------|-----------------------------|---------------------------------|---------------------------------|---------------------------------|
| HEB170626400 | 1.54e-05±1.43e-07 | 41.78±3.65 | 38.89±1.64 | 32.66±0.68 |
| HEB170705115 | 2.03e-05±6.04e-07 | 40.64±7.53 | 32.12±3.08 | 21.31±1.22 |
| HEB170714049 | 2.31e-07±2.72e-08 | 6.08±1.26 | 2.52±0.38 | 0.85±0.11 |
| HEB170713152 | 2.29e-04±6.64e-08 | 3.50±0.75 | 2.21±0.31 | 1.57±0.12 |
| HEB170726248 | 1.50e-06±1.01e-07 | 4.55±0.92 | 3.07±0.43 | 2.19±0.18 |
| HEB170726793 | 8.23e-06±1.08e-07 | 11.03±1.07 | 7.71±0.43 | 3.79±0.16 |
| HEB170728960 | 4.36e-06±9.99e-08 | 24.14±2.25 | 21.56±1.09 | 11.19±0.38 |
| HEB170731751 | 3.07e-06±9.91e-07 | 1.89±0.51 | 1.10±0.21 | 0.75±0.08 |
| HEB170802637 | 3.13e-06±1.78e-07 | 36.30±3.41 | 26.20±1.38 | 8.57±0.39 |
| HEB170817908 | 5.50e-06±9.30e-08 | 14.55±0.86 | 10.09±0.42 | 6.79±0.17 |
| HEB170825306 | 7.82e-06±1.68e-07 | 9.55±1.40 | 7.81±0.62 | 6.60±0.29 |
| HEB170826818 | 3.90e-05±3.48e-07 | 47.94±3.55 | 40.70±1.58 | 28.39±0.65 |
| HEB170903534 | 5.70e-06±9.44e-08 | 4.55±0.31 | 3.25±0.15 | 2.72±0.07 |
| HEB170906029 | 1.46e-04±7.09e-07 | 32.61±3.52 | 30.36±1.50 | 24.44±0.66 |
| HEB170912984 | 1.68e-06±2.14e-07 | 4.44±0.78 | 2.12±0.30 | 0.65±0.09 |
| HEB170923188 | 4.86e-06±1.20e-07 | 7.19±0.38 | 4.95±0.16 | 3.68±0.08 |
| HEB171008079 | 1.60e-06±9.14e-08 | 4.53±0.71 | 3.85±0.33 | 1.59±0.11 |
| HEB171013350 | 2.19e-05±2.65e-07 | 11.40±2.10 | 8.70±0.91 | 7.67±0.43 |
| HEB171020963 | 3.75e-06±1.39e-07 | 21.76±2.22 | 10.98±0.84 | 4.78±0.32 |
| HEB171030728 | 1.92e-07±7.14e-07 | 8.26±1.05 | 4.17±0.38 | 1.08±0.09 |
| HEB171103965 | 2.82e-06±8.49e-08 | 14.01±0.83 | 10.49±0.41 | 3.16±0.11 |
| HEB171120555 | 2.95e-05±3.04e-07 | 87.57±6.19 | 78.60±2.98 | 45.05±1.02 |
| HEB171124234 | 2.06e-05±4.72e-07 | 4.21±0.60 | 3.30±0.25 | 2.39±0.10 |
| HEB171207054 | 6.60e-07±5.57e-08 | 5.78±0.53 | 4.00±0.27 | 1.25±0.08 |
| HEB171209615 | 9.77e-06±2.53e-07 | 5.03±0.56 | 3.34±0.23 | 1.73±0.16 |
| HEB171210492 | 1.24e-04±6.12e-07 | 15.06±1.96 | 13.21±0.81 | 12.68±0.37 |
| HEB171215705 | 7.76e-06±1.35e-07 | 3.55±0.64 | 2.50±0.23 | 2.11±0.11 |
| HEB171223818 | 1.33e-08±7.50e-09 | 1.26±0.46 | 0.76±0.20 | 0.09±0.07 |
| HEB171230955 | 2.30e-05±2.82e-07 | 8.74±1.50 | 6.85±0.77 | 5.85±0.34 |
| HEB180116008 | 2.01e-06±1.16e-07 | 3.57±0.81 | 2.83±0.37 | 1.70±0.14 |
| HEB180116955 | 6.22e-05±1.10e-06 | 56.11±9.30 | 42.25±3.60 | 33.46±1.63 |
| HEB180119836 | 2.86e-06±8.67e-08 | 6.98±0.58 | 5.77±0.25 | 4.56±0.11 |
| HEB180127049 | 5.47e-06±1.60e-07 | 4.19±0.41 | 2.79±0.29 | 2.36±0.16 |
| HEB180130744 | 1.62e-07±2.19e-08 | 4.36±0.55 | 2.54±0.22 | 0.75±0.06 |
| HEB180208764 | 4.91e-06±3.92e-07 | 4.06±0.58 | 2.95±0.82 | 2.26±0.33 |
| HEB180210517 | 5.60e-05±4.09e-07 | 28.01±3.27 | 24.69±1.41 | 18.70±0.66 |
| HEB180305393 | 8.20e-05±8.81e-07 | 44.44±4.73 | 42.08±2.29 | 36.97±1.07 |

*Table 6 continued*
| Trigger ID      | Fluoence (erg cm$^{-2}$) | PF64 (ph cm$^{-2}$ s$^{-1}$) | PF256 (ph cm$^{-2}$ s$^{-1}$) | PF1024 (ph cm$^{-2}$ s$^{-1}$) |
|----------------|--------------------------|-------------------------------|-------------------------------|-------------------------------|
| HEB180306972   | 2.85e-06±8.88e-08        | 1.87±0.40                     | 1.18±0.15                     | 0.78±0.06                     |
| HEB180309321   | 9.51e-06±1.64e-07        | 5.73±1.66                     | 4.24±0.60                     | 3.43±0.27                     |
| HEB180313977   | 6.39e-07±1.10e-07        | 14.12±2.27                    | 4.34±0.66                     | 1.20±0.18                     |
| HEB180330891   | 8.47e-06±1.93e-07        | 11.90±1.31                    | 10.72±0.54                    | 9.88±0.26                     |
| HEB180331177   | 2.08e-06±7.76e-08        | 1.51±0.27                     | 0.76±0.10                     | 0.33±0.04                     |
| HEB180401279   | 8.81e-06±2.53e-07        | 7.06±1.31                     | 6.50±0.81                     | 4.07±0.32                     |
| HEB18042406    | 8.02e-07±5.41e-08        | 7.83±0.98                     | 4.43±0.33                     | 1.22±0.08                     |
| HEB180404091   | 2.11e-05±1.47e-07        | 5.83±0.64                     | 4.99±0.31                     | 4.24±0.14                     |
| HEB180409346   | 3.32e-05±4.14e-07        | 118.01±11.41                  | 91.04±4.74                    | 56.26±1.78                    |
| HEB180413117   | 7.18e-06±1.97e-06        | 4.29±0.92                     | 3.34±0.44                     | 2.70±0.19                     |
| HEB180416923   | 3.45e-05±4.21e-07        | 9.31±1.22                     | 8.26±0.57                     | 5.88±0.26                     |
| HEB180427442   | 5.67e-05±6.24e-07        | 41.34±6.21                    | 38.76±3.33                    | 35.75±1.50                    |
| HEB180505539   | 2.68e-05±1.76e-07        | 53.94±1.88                    | 49.43±1.14                    | 37.11±0.49                    |
| HEB180506902   | 3.38e-06±6.13e-08        | 4.08±0.68                     | 2.85±0.29                     | 2.52±0.13                     |
| HEB180510808   | 7.00e-06±4.98e-07        | 19.59±3.94                    | 18.01±2.18                    | 12.69±0.81                    |
| HEB180525752   | 2.28e-06±5.40e-08        | 7.06±0.80                     | 4.52±0.33                     | 2.55±0.13                     |
| HEB180525151   | 4.32e-07±3.67e-08        | 8.90±1.18                     | 4.10±0.39                     | 1.18±0.10                     |
| HEB180605457   | 2.37e-05±2.79e-07        | 16.99±1.36                    | 12.39±0.66                    | 6.48±0.25                     |
| HEB180618030   | 3.23e-06±9.93e-08        | 15.00±0.83                    | 12.74±0.33                    | 4.52±0.15                     |
| HEB180623606   | 2.28e-05±5.31e-07        | 10.11±1.79                    | 7.95±0.96                     | 6.53±0.43                     |
| HEB180625940   | 1.36e-06±1.66e-07        | 5.32±2.01                     | 4.31±0.79                     | 1.95±0.25                     |
| HEB180626391   | 6.60e-07±4.14e-08        | 16.39±1.84                    | 4.88±0.50                     | 2.67±0.19                     |
| HEB180704233   | 1.28e-05±1.88e-07        | 5.25±0.78                     | 4.14±0.36                     | 3.30±0.16                     |
| HEB180715754   | 1.49e-06±7.43e-08        | 5.00±0.86                     | 4.07±0.39                     | 2.18±0.13                     |
| HEB180718762   | 2.73e-05±1.82e-06        | 5.34±1.00                     | 4.31±0.54                     | 3.71±0.25                     |
| HEB180729992   | 2.93e-05±1.84e-07        | 10.41±1.43                    | 8.89±0.61                     | 8.26±0.30                     |
| HEB180724807   | 5.73e-05±4.46e-07        | 16.05±1.84                    | 13.90±0.87                    | 12.89±0.45                    |
| HEB180730017   | 2.32e-07±9.46e-08        | 11.60±1.08                    | 5.39±0.54                     | 1.19±0.19                     |
| HEB180801275   | 9.74e-07±6.16e-08        | 6.67±0.80                     | 4.36±0.34                     | 1.85±0.11                     |
| HEB180835900   | 1.42e-07±1.93e-08        | 3.25±0.57                     | 2.02±0.23                     | 0.61±0.06                     |
| HEB180804930   | 7.25e-06±1.19e-07        | 10.53±1.21                    | 9.99±0.61                     | 7.34±0.24                     |
| HEB180816088   | 2.21e-05±2.07e-07        | 21.94±2.73                    | 18.92±1.30                    | 15.40±0.57                    |
| HEB180822561   | 3.65e-06±9.97e-08        | 4.75±0.96                     | 3.98±0.42                     | 3.30±0.18                     |
| HEB180828789   | 3.41e-05±3.65e-07        | 48.57±4.57                    | 39.89±1.88                    | 34.42±0.84                    |
| HEB180925407   | 7.12e-07±3.94e-08        | 3.10±0.46                     | 1.91±0.17                     | 0.75±0.06                     |
| HEB180925609   | 1.42e-05±2.73e-07        | 27.34±3.14                    | 23.90±1.48                    | 12.13±0.55                    |
| HEB180927992   | 2.54e-06±9.05e-08        | 7.12±0.95                     | 5.84±0.38                     | 4.41±0.18                     |
| HEB180929453   | 1.57e-06±6.08e-08        | 6.47±0.90                     | 5.47±0.38                     | 3.14±0.15                     |
| HEB181008269   | 1.63e-05±1.30e-07        | 15.12±1.65                    | 13.21±0.86                    | 12.62±0.40                    |
| HEB181014479   | 1.65e-05±1.56e-07        | 6.50±0.68                     | 5.66±0.36                     | 5.05±0.18                     |
| Trigger ID | Fluence (erg cm$^{-2}$) | PF64 (ph cm$^{-2}$ s$^{-1}$) | PF256 (ph cm$^{-2}$ s$^{-1}$) | PF1024 (ph cm$^{-2}$ s$^{-1}$) |
|------------|-------------------------|-----------------------------|----------------------------|-------------------------------|
| HEB181028590 | 2.76e-05±1.98e-07 | 13.74±1.11 | 11.80±0.59 | 9.63±0.27 |
| HEB181119065 | 2.05e-05±2.16e-07 | 39.74±3.90 | 33.25±1.96 | 21.97±0.67 |
| HEB181121306 | 6.90e-07±1.17e-07 | 3.83±1.15 | 3.02±0.67 | 1.10±0.19 |
| HEB181122381 | 8.18e-06±2.08e-07 | 10.88±1.59 | 8.80±0.68 | 4.15±0.21 |
| HEB181123231 | 6.71e-07±4.43e-08 | 6.41±0.32 | 5.00±0.40 | 1.64±0.11 |
| HEB181212692 | 2.24e-05±1.82e-07 | 61.54±3.12 | 59.15±1.56 | 52.87±0.81 |
| HEB181213540 | 7.43e-06±2.70e-07 | 7.95±1.62 | 3.43±0.53 | 2.24±0.21 |
| HEB181217664 | 1.31e-05±2.38e-07 | 18.60±2.40 | 7.81±0.73 | 6.69±0.35 |
| HEB181225489 | 1.12e-05±3.06e-07 | 10.46±1.55 | 8.99±0.70 | 7.62±0.29 |
| HEB190103877 | 2.46e-05±3.88e-07 | 2.77±0.33 | 2.51±0.19 | 2.25±0.09 |
| HEB190110725 | 4.38e-06±7.96e-08 | 13.22±1.22 | 12.17±0.66 | 9.64±0.32 |
| HEB190131964 | 8.52e-06±1.14e-07 | 1.72±0.23 | 1.28±0.11 | 1.05±0.05 |
| HEB190215771 | 1.59e-05±3.30e-07 | 8.95±0.82 | 8.53±0.53 | 8.09±0.24 |
| HEB190222537 | 2.96e-05±7.61e-07 | 23.19±4.54 | 18.91±2.11 | 16.31±1.00 |
| HEB190226515 | 1.26e-06±1.09e-07 | 11.37±1.73 | 8.92±0.72 | 2.43±0.19 |
| HEB190351098 | 2.41e-05±2.51e-07 | 28.43±2.97 | 26.74±1.43 | 25.69±0.79 |
| HEB190324348 | 2.44e-05±1.78e-07 | 8.43±0.81 | 7.53±0.43 | 6.96±0.20 |
| HEB190424947 | 1.86e-05±2.39e-07 | 28.98±3.78 | 26.53±1.57 | 22.22±0.65 |
| HEB190325131 | 1.39e-05±1.35e-07 | 11.25±1.03 | 9.30±0.50 | 7.24±0.23 |
| HEB19032616 | 1.32e-07±1.57e-08 | 2.21±0.36 | 0.70±0.10 | 0.22±0.03 |
| HEB190330694 | 1.09e-05±1.63e-07 | 8.19±1.24 | 7.42±0.50 | 6.80±0.24 |
| HEB190331093 | 3.17e-06±1.07e-07 | 2.15±0.49 | 1.76±0.23 | 1.01±0.08 |
| HEB190401139 | 1.94e-05±1.73e-07 | 19.20±1.93 | 16.36±1.13 | 14.34±0.51 |
| HEB190407671 | 1.13e-05±2.70e-07 | 23.27±3.59 | 13.65±1.32 | 11.23±0.57 |
| HEB190422883 | 3.09e-05±1.94e-07 | 16.17±1.77 | 15.35±0.86 | 12.94±0.39 |
| HEB190424417 | 1.17e-05±4.28e-07 | 22.26±3.40 | 10.24±1.46 | 6.58±0.59 |
| HEB190507269 | 3.31e-06±6.19e-08 | 5.10±0.87 | 3.94±0.38 | 3.16±0.16 |
| HEB190515189 | 8.68e-07±5.15e-08 | 4.59±0.56 | 4.18±0.35 | 1.56±0.10 |
| HEB190525031 | 1.93e-06±8.58e-08 | 7.06±0.94 | 5.41±0.40 | 3.03±0.14 |
| HEB190531840 | 1.08e-04±4.73e-07 | 51.13±2.41 | 45.02±1.14 | 39.16±0.59 |
| HEB190604446 | 2.26e-05±2.77e-07 | 18.51±2.13 | 17.25±0.97 | 13.67±0.46 |
| HEB190613449 | 5.45e-06±1.52e-07 | 3.01±0.39 | 2.21±0.17 | 1.74±0.07 |
| HEB190615636 | 1.20e-05±3.67e-07 | 7.05±1.45 | 5.41±0.71 | 4.31±0.36 |
| HEB190619594 | 4.04e-05±3.76e-07 | 20.59±3.09 | 16.21±1.14 | 14.13±0.55 |
| HEB190620507 | 5.95e-05±2.93e-07 | 18.17±1.30 | 16.91±0.69 | 16.09±0.35 |
| HEB190720964 | 3.51e-06±7.89e-08 | 5.61±0.84 | 4.82±0.42 | 4.52±0.19 |
| HEB190723308 | 3.29e-06±9.60e-08 | 4.10±0.75 | 3.46±0.35 | 2.61±0.16 |
| HEB190724030 | 3.94e-07±2.15e-08 | 9.93±0.62 | 3.26±0.19 | 0.84±0.05 |
| HEB190726642 | 1.73e-05±2.36e-07 | 21.73±3.33 | 20.74±1.49 | 19.26±0.67 |
| HEB190806675 | 8.17e-06±1.16e-07 | 4.31±0.68 | 3.30±0.24 | 2.54±0.11 |

**Table 6 continued**
## Table 6 (continued)

| Trigger ID | Trigger | Fluence (erg cm\(^{-2}\)) | PF64 (ph cm\(^{-2}\) s\(^{-1}\)) | PF256 (ph cm\(^{-2}\) s\(^{-1}\)) | PF1024 (ph cm\(^{-2}\) s\(^{-1}\)) |
|------------|---------|----------------------------|-----------------------------|-----------------------------|-------------------------------|
| HEB190813520 | 3.99e-07±6.00e-08 | 9.41±2.10 | 3.58±0.60 | 1.03±0.16 |
| HEB190814837 | 1.85e-06±5.81e-08 | 1.62±0.32 | 1.16±0.13 | 0.97±0.06 |
| HEB190901890 | 4.38e-05±3.68e-07 | 19.34±1.86 | 16.48±0.93 | 15.77±0.45 |
| HEB190903721 | 4.43e-07±2.49e-08 | 2.99±0.35 | 1.82±0.13 | 0.67±0.04 |
| HEB190906767 | 4.91e-06±3.40e-07 | 10.55±1.01 | 8.50±0.43 | 5.48±0.20 |
| HEB190915239 | 7.11e-06±2.21e-07 | 6.74±1.77 | 5.29±0.67 | 4.46±0.31 |
| HEB191009297 | 1.90e-05±5.31e-07 | 2.84±0.74 | 2.05±0.31 | 1.72±0.15 |
| HEB191019970 | 3.80e-05±2.53e-07 | 7.56±1.02 | 6.71±0.50 | 6.15±0.23 |
| HEB191031780 | 1.14e-05±1.34e-07 | 6.46±1.03 | 4.64±0.40 | 3.78±0.18 |
| HEB191105257 | 6.39e-06±6.99e-08 | 60.97±0.94 | 45.59±0.38 | 11.92±0.12 |
| HEB191108003 | 2.28e-05±3.92e-07 | 7.96±2.45 | 5.64±0.93 | 3.85±0.40 |
| HEB19111364 | 2.29e-05±2.60e-07 | 28.32±4.07 | 17.58±1.57 | 12.28±0.64 |
| HEB191113578 | 1.06e-06±6.93e-08 | 10.79±1.97 | 6.66±0.78 | 4.94±0.33 |
| HEB191118925 | 6.14e-06±1.09e-07 | 4.39±0.79 | 3.28±0.31 | 2.94±0.15 |
| HEB191130506 | 9.57e-06±1.51e-07 | 3.47±0.56 | 2.34±0.22 | 1.91±0.10 |
| HEB191202867 | 2.86e-05±3.29e-07 | 42.80±4.69 | 38.55±2.02 | 28.30±0.89 |
| HEB191203289 | 3.68e-07±4.30e-08 | 2.62±0.74 | 1.99±0.33 | 0.88±0.10 |
| HEB191207540 | 9.49e-07±6.24e-08 | 4.73±0.79 | 3.31±0.34 | 1.59±0.13 |
| HEB191218112 | 2.70e-05±2.27e-07 | 7.06±0.92 | 6.30±0.41 | 5.81±0.20 |
| HEB191221860 | 6.98e-05±6.41e-07 | 48.23±4.60 | 45.41±2.25 | 35.96±0.95 |
| HEB191227069 | 6.11e-05±2.67e-07 | 42.03±1.88 | 37.79±0.99 | 31.34±0.46 |
| HEB200109073 | 5.49e-06±2.20e-07 | 2.50±1.04 | 1.46±0.36 | 1.09±0.14 |
| HEB200111632 | 6.22e-06±1.71e-07 | 20.45±2.09 | 17.01±0.96 | 10.95±0.39 |
| HEB200114153 | 6.83e-06±1.43e-07 | 2.43±0.63 | 2.19±0.28 | 1.84±0.12 |
| HEB200120961 | 1.24e-05±2.82e-07 | 38.90±6.14 | 25.40±1.85 | 18.08±0.83 |
| HEB200125863 | 5.92e-05±4.54e-07 | 175.35±5.97 | 149.25±3.78 | 110.27±1.63 |
| HEB200219998 | 3.21e-05±3.67e-07 | 32.78±2.79 | 29.51±1.56 | 25.39±0.73 |
| HEB200221161 | 2.50e-06±2.37e-07 | 6.13±2.10 | 5.09±0.93 | 2.78±0.30 |
| HEB200227305 | 1.26e-05±1.20e-07 | 10.07±1.10 | 7.57±0.53 | 6.81±0.24 |
| HEB200323782 | 4.06e-06±1.07e-07 | 37.44±3.94 | 33.41±1.97 | 26.08±0.91 |
| HEB200325137 | 2.92e-06±1.06e-07 | 9.81±1.00 | 7.43±0.43 | 4.91±0.17 |
| HEB200326517 | 7.86e-07±3.70e-08 | 0.98±0.16 | 0.77±0.08 | 0.46±0.03 |
| HEB200412381 | 8.70e-05±5.97e-07 | 157.21±8.23 | 155.41±3.77 | 115.72±1.58 |
| HEB200416295 | 1.36e-06±4.05e-08 | 5.44±0.48 | 4.37±0.22 | 3.28±0.09 |
| HEB200418864 | 1.85e-06±1.10e-07 | 5.33±1.44 | 3.39±0.59 | 2.02±0.23 |
| HEB200519472 | 1.06e-05±3.27e-07 | 9.88±1.77 | 8.16±0.90 | 7.09±0.41 |
| HEB200601097 | 5.41e-05±5.02e-07 | 7.88±1.82 | 5.44±0.72 | 4.80±0.31 |
| HEB200609379 | 3.13e-05±2.80e-07 | 4.49±0.76 | 4.07±0.32 | 3.28±0.14 |
| HEB200617679 | 1.81e-06±2.20e-07 | 5.09±1.10 | 4.06±0.50 | 1.98±0.20 |
| HEB200619108 | 9.97e-06±1.30e-07 | 4.48±0.43 | 4.09±0.23 | 3.62±0.11 |
| Trigger ID | Fluence (erg cm$^{-2}$) | PF64 (ph cm$^{-2}$ s$^{-1}$) | PF256 (ph cm$^{-2}$ s$^{-1}$) | PF1024 (ph cm$^{-2}$ s$^{-1}$) |
|------------|-------------------------|-------------------------------|-------------------------------|-------------------------------|
| HEB200707072 | 4.18±0.06±1.11±0-07 | 2.47±0.58 | 1.88±0.22 | 1.27±0.09 |
| HEB200711461 | 3.00±0.05±4.65±0-07 | 28.38±3.22 | 25.64±1.56 | 19.43±0.68 |
| HEB200716315 | 4.07±0.05±4.25±0-07 | 11.31±1.48 | 9.04±0.58 | 7.90±0.27 |
| HEB200716956 | 2.00±0.05±3.78±0-07 | 34.45±1.42 | 23.98±0.63 | 7.99±0.18 |
| HEB200801352 | 4.38±0.06±8.90±0-08 | 1.30±0.28 | 0.83±0.10 | 0.61±0.04 |
| HEB200806645 | 1.37±0.05±1.99±0-07 | 11.20±1.50 | 9.68±0.62 | 6.39±0.25 |
| HEB200809653 | 3.77±0.06±8.93±0-08 | 8.01±0.74 | 5.73±0.31 | 4.24±0.14 |
| HEB200825904 | 3.06±0.07±3.02±0-08 | 1.62±0.28 | 1.29±0.15 | 0.77±0.06 |
| HEB200903112 | 1.15±0.05±2.16±0-07 | 2.15±0.62 | 1.78±0.30 | 1.40±0.13 |
| HEB200919964 | 8.60±0.05±6.26±0-07 | 24.42±2.36 | 17.77±0.98 | 14.62±0.52 |
| HEB200925004 | 2.58±0.06±9.06±0-08 | 2.58±0.50 | 1.91±0.20 | 1.56±0.10 |
| HEB200928851 | 7.23±0.06±9.80±0-08 | 8.70±0.92 | 6.24±0.37 | 4.09±0.18 |
| HEB201013157 | 1.56±0.05±1.72±0-07 | 41.55±2.06 | 40.47±1.05 | 33.90±0.54 |
| HEB201105229 | 3.91±0.05±2.84±0-07 | 28.91±2.38 | 27.41±1.08 | 25.41±0.51 |
| HEB201209239 | 1.60±0.05±5.13±0-07 | 4.86±1.15 | 3.29±0.43 | 2.71±0.19 |
| HEB201221591 | 5.96±0.07±4.37±0-08 | 45.36±2.95 | 12.27±0.93 | 3.77±0.32 |
| HEB201226553 | 8.34±0.07±1.24±0-07 | 2.19±0.43 | 1.81±0.19 | 1.31±0.08 |
| HEB201106685 | 5.71±0.05±1.06±0-06 | 85.78±11.81 | 67.83±5.27 | 40.40±2.00 |
| HEB201109120 | 2.37±0.07±3.17±0-08 | 10.73±1.43 | 2.85±0.38 | 0.71±0.10 |
| HEB201121779 | 1.19±0.04±5.64±0-07 | 32.48±2.08 | 27.75±0.82 | 25.45±0.39 |
| HEB201203304 | 2.22±0.05±2.21±0-07 | 37.27±3.04 | 29.43±1.36 | 25.53±0.68 |
| HEB201207911 | 1.05±0.04±1.66±0-06 | 120.06±14.20 | 102.50±7.03 | 74.98±2.84 |
| HEB201225217 | 6.73±0.06±1.04±0-07 | 4.32±0.80 | 3.72±0.31 | 3.19±0.15 |
| HEB201227114 | 1.46±0.05±3.48±0-07 | 2.09±0.45 | 1.94±0.20 | 1.40±0.09 |
| HEB201228057 | 4.76±0.06±1.30±0-07 | 9.87±1.08 | 7.77±0.51 | 6.03±0.22 |
| HEB201307247 | 8.97±0.07±7.74±0-08 | 5.94±1.31 | 3.40±0.52 | 1.36±0.15 |
| HEB201329189 | 2.08±0.06±4.48±0-08 | 33.52±0.93 | 20.39±0.38 | 6.39±0.14 |
| HEB201324468 | 1.28±0.05±1.08±0-07 | 10.31±0.61 | 4.78±0.22 | 3.82±0.11 |
| HEB201326057 | 4.51±0.07±4.08±0-08 | 4.45±0.92 | 2.79±0.30 | 0.87±0.08 |
| HEB201408994 | 8.86±0.06±1.72±0-07 | 2.99±0.71 | 2.47±0.36 | 2.22±0.16 |
| HEB201411147 | 7.29±0.06±1.47±0-07 | 2.69±0.48 | 2.47±0.19 | 1.83±0.09 |
| HEB201421454 | 4.75±0.06±1.83±0-07 | 2.84±0.85 | 2.57±0.33 | 2.15±0.17 |
| HEB201422572 | 4.65±0.06±1.17±0-07 | 1.46±0.32 | 1.19±0.12 | 0.98±0.06 |
| HEB201427206 | 2.09±0.05±4.31±0-07 | 17.65±1.38 | 13.88±0.61 | 10.90±0.27 |
| HEB201511476 | 1.18±0.05±1.96±0-07 | 37.13±4.20 | 34.30±2.04 | 30.68±0.96 |
| HEB201515546 | 5.28±0.07±3.58±0-08 | 1.30±0.24 | 0.96±0.12 | 0.66±0.05 |
| HEB201516982 | 2.90±0.06±7.91±0-08 | 10.00±0.84 | 8.76±0.36 | 6.31±0.16 |
| HEB201518544 | 9.26±0.06±2.14±0-07 | 24.45±4.85 | 18.60±1.71 | 16.11±0.85 |
| HEB201520796 | 7.88±0.06±1.53±0-07 | 2.02±0.39 | 1.68±0.16 | 1.24±0.07 |
| HEB201605214 | 2.17±0.06±4.92±0-08 | 17.98±0.57 | 14.47±0.26 | 5.10±0.10 |
Table 6 (continued)

| Trigger ID         | Trigger Fluence (erg cm\(^{-2}\)) | PF64 (ph cm\(^{-2}\) s\(^{-1}\)) | PF256 (ph cm\(^{-2}\) s\(^{-1}\)) | PF1024 (ph cm\(^{-2}\) s\(^{-1}\)) |
|-------------------|----------------------------------|----------------------------------|----------------------------------|-----------------------------------|
| HEB210606945      | 5.53e-05±5.01e-07                | 63.48±1.48                       | 48.28±0.62                       | 37.22±0.27                       |
| HEB210610827      | 6.59e-05±3.26e-07                | 22.63±1.77                       | 21.94±0.84                       | 19.24±0.41                       |
| HEB210615981      | 9.91e-07±5.46e-08                | 2.20±0.44                        | 1.55±0.19                        | 1.21±0.08                        |
| HEB210622064      | 5.65e-06±1.42e-07                | 3.68±0.50                        | 2.94±0.23                        | 2.06±0.10                        |
| HEB210627311      | 1.28e-06±7.19e-08                | 4.11±1.32                        | 2.83±0.44                        | 2.27±0.20                        |
APPENDIX

A. LIGHT CURVES AND SPECTRA OF GRB 200125B AND GRB 210121A

Figure 17. Light curve of GRB 200125B (HEB200125863) of 18 CsI detectors. Vertical lines indicate the regions selected for the fit to the time-averaged spectra. Green regions defines the background region. Here MET means the mission elapsed time of HXMT.

Figure 18. Joint analysis of time-averaged spectrum of GRB 200125B (HEB200125863). Data from 18 HXMT/CsI detectors and Fermi/GBM NaI detector 0, 1, BGO detector 0 are utilized.
Figure 19. Photon flux light curve for GRB 200125B (HEB200125863) produced by the duration analysis. Data from 18 HE/CsI detectors and Fermi/GBM NaI detector 0, 1, BGO detector 0 are used. Here MET means the mission elapsed time of HXMT.

Figure 20. The duration plot for GRB 200125B (HEB200125863). Horizontal dashed lines in dark red are drawn at 5% and 95% of the total fluence, while those in dark blue at 25% and 75%. Vertical dotted lines are drawn at the times corresponding to those same fluences, thereby defining the $T_{90}$ and $T_{50}$ intervals. The green dotted horizontal lines are corresponding to the 0% and 100% of the total integration of the flux respectively. Here MET means the mission elapsed time of HXMT.
Figure 21. Joint analysis of time-averaged spectrum of GRB 210121A (HEB210121779). Data from 18 HE/CsI detectors and Fermi/GBM NaI detector 0, 3, BGO detector 0 are utilized.

Figure 22. Joint analysis of time-averaged spectrum of GRB 210112A (HEB210112068). Data from 18 HE/CsI detectors and Swift/BAT are utilized.
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