



Erratum: “Search for 10–1000 GeV Neutrinos from Gamma-Ray Bursts with IceCube” (2024, ApJ, 964, 126)

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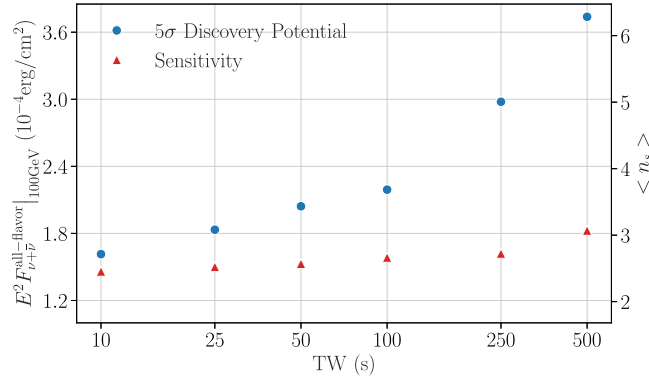


Figure 2. Sensitivity and 5σ discovery potential for (Fermi-GBM detected) GRB bn 140807500 for the six time windows considered in this work. This is the most significant GRB–neutrino correlation identified in this work. The left ordinate axis is the all-flavor time-integrated neutrino number flux, $F_{\nu+\bar{\nu}}(E)$ times E^2 assuming an $E^{-2.5}$ spectrum and evaluated at 100 GeV. The right ordinate axis is the average number of signal events $\langle n_s \rangle$ that result in the left ordinate axis. Here, TW is the duration of each time window. The sensitivity and 5σ discovery potential for GRECO-Astronomy are only weakly dependent on decl. or GRB localization uncertainty, therefore GRB bn 140807500 is representative of all GRBs studied here.

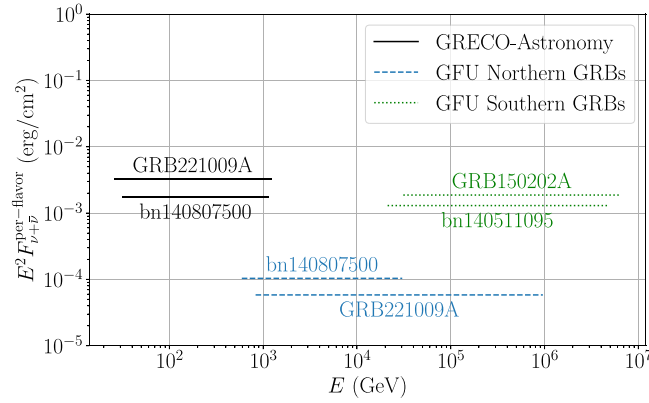


Figure 6. Limits on per-flavor time-integrated neutrino number flux, $F_{\nu+\bar{\nu}}(E)$, times E^2 for six GRBs. Black lines show two GRBs studied with GRECO-Astronomy. One GRB is bn 140807500 (TW = 100 s), the most significant GRB identified in this work, and the other is GRB 221009A (TW = $T_{90, \text{GBM}}$; Abbasi et al. 2023). Blue lines are for two northern sky GRBs, studied with TeV–PeV, using the gamma-ray follow-up (GFU) data set. These are, again, bn 140807500 (for TW = 100 s) (Abbasi et al. 2022) and GRB 221009A (TW = $T_{90, \text{GBM}}$; Abbasi et al. 2023). Green lines are for two southern sky bursts: GRB 150202A (TW=2 days) and Fermi GRB bn 140511095 (TW = 2 days; Abbasi et al. 2022). The energy ranges shown correspond to the central 90% of neutrino energies that would contribute to an E^{-2} signal. The sensitivity of GRECO-Astronomy varies by a factor of ~ 2 as a function of decl. On the other hand, the sensitivity of TeV–PeV studies changes significantly from the northern hemisphere to the southern hemisphere. To derive the per-flavor GRECO-Astronomy limits a 1:1 flavor flux ratio has been assumed.

Table 1
Top Three Most Significant GRBs in the Individual Search Analysis

GRB Name	Start Time	R.A.	Decl.	Loc. Unc.	Loc. Satellite	TW	$\hat{n}_s$	$E^2 F_{\nu+\bar{\nu}}(E)$ Upper Limit		Synth. Prior	Pretrial p -value	Posttrial p -value
	(UTC)	(deg)	(deg)	(deg)		(s)		$\gamma = 2.5$ $(10^{-5} \text{ erg cm}^{-2} \text{ s}^{-1})$	$\gamma = 2.0$			
bn 140807500	2014-08-07 11:59:33	198.3	31.7	4.4	GBM	100	1.08	12.84	5.24	No	4.6×10^{-6}	0.097
bn 160804968	2016-08-04 23:13:34	82.3	−23.0	9.1	GBM	100	2.81	23.04	11.94	No	9.6×10^{-4}	...
GRB 160802A	2016-08-02 06:13:30	28.1	71.4	1.0	IPN	50	2.74	16.92	8.26	Yes	1.3×10^{-3}	...

Note. The table shows the GRB name; start time of T_{prompt} ; R.A.; decl.; circularized localization uncertainty; most significant time window duration; best-fit $\hat{n}_s$ number of neutrino events in coincidence with the GRB; all-flavor neutrino number flux $F_{\nu+\bar{\nu}}(E)$ upper limit times E^2 for the most significant time window TW for two spectral indices; whether or not a synthetic prior was used; the GRB pretrial p -value, corrected for the six time windows used in this analysis; and the posttrial p -value for the most significant burst. The R.A. and decl. for bn 140708500 and bn 160804968 are for P_{max} of the GBM map.

The power-law-flux upper limits initially reported in this publication are underestimated by a factor of 2. Non-power-law-flux upper limits are unaffected. Event weights, calculated from a simulated neutrino signal, are used to convert the best-fit number of signal events, $\hat{n}_s$, to the time-integrated flux for the combination of neutrinos and antineutrinos, $F_{\nu+\bar{\nu}}$, assuming equal flux of ν and $\bar{\nu}$. Initially, the event weights incorrectly assumed the summed flux of ν and $\bar{\nu}$ instead of the average flux. Using event weights for the summed flux of ν and $\bar{\nu}$ double counts the factor of 2, which is already included in the conversion from $\hat{n}_s$ to $F_{\nu+\bar{\nu}}$. The corrected Figures 2 and 6 and Table 1 are shown here.

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