
Neil as Mentor: Swift and GRT

T. Sakamoto (Aoyama Gakuin U.)

My relationship to Neil

2004	March	Received Ph.D. (Tokyo Tech)
2004	October	NRC postdoc at GSFC/NASA (Supervisor: Neil)
2004	November	Swift launch
2004	December	Marriage
2007	October	Research associate at CRESST/UMBC/GSFC
2007	November	Mayuko's birth
2010	October	Yuiko's birth
2012	September	Assistant professor at Aoyama Gakuin U. (non tenure)
2017	April	Associate professor at Aoyama Gakuin U. (tenure)



2004-2012 (8 years at GSFC): Neil was my mentor during an initial post-doc period and a starting of my new family life.

The background of the slide features a faint, blue-tinted image of the Swift Burst Alert Telescope (BAT) satellite in space. The satellite is oriented vertically, showing its central body and four large, rectangular solar panel arrays extending outwards. The overall scene is set against a dark, starry background.

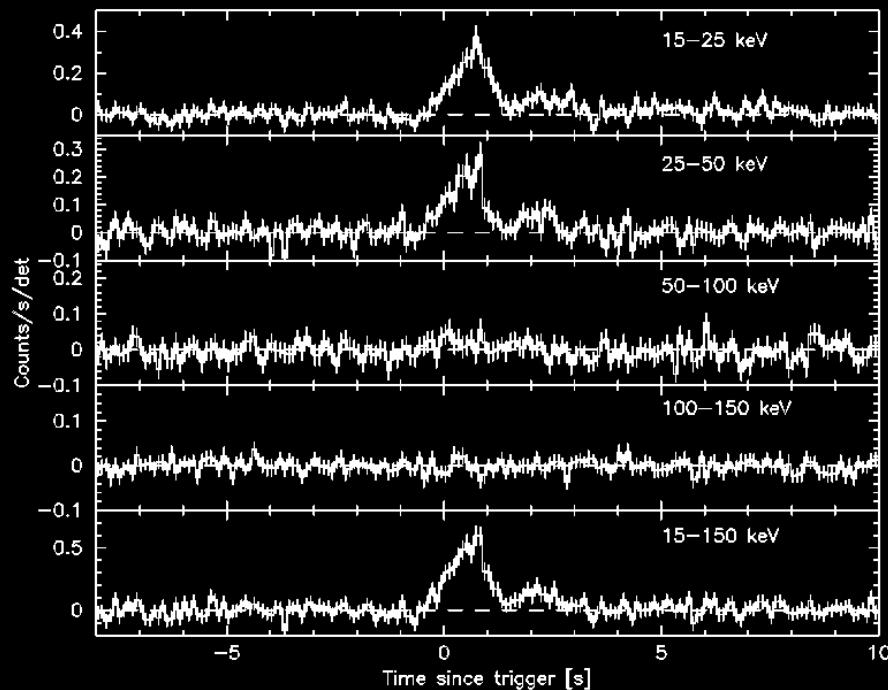
Swift Burst Alert Telescope (BAT)

XRF 050416A: $E_{\text{peak}} - E_{\text{iso}}$ relation

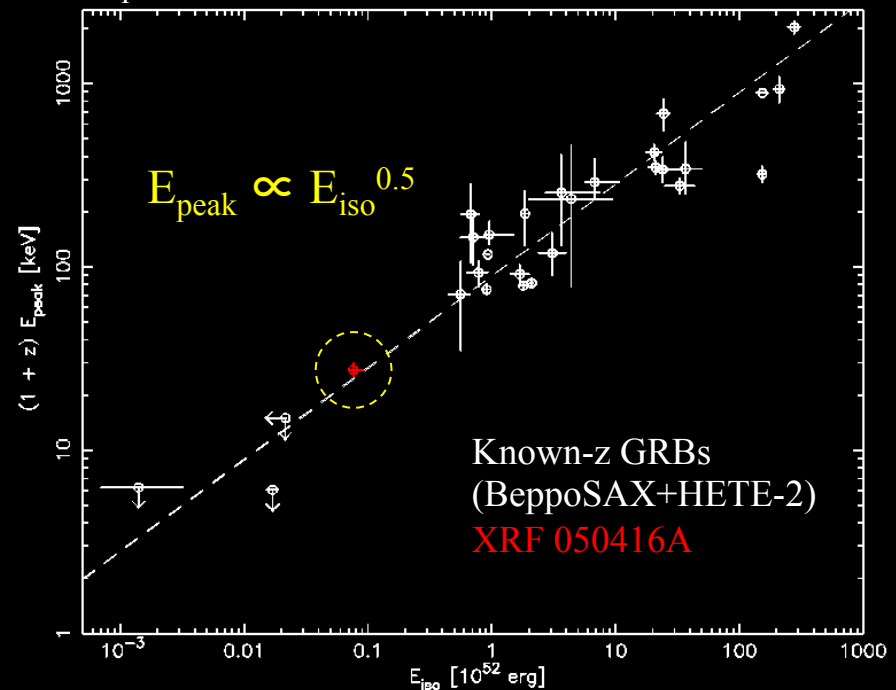
(Sakamoto et al. 2006)

- T_0 (BAT) : 11:04:44.5 UTC on April 16, 2005
- XRT and UVOT detections (Mangano et al. 2007, Holland et al. 2007)
- Optical, infrared and radio detections (e.g., Soderberg et al. 2007)
- Host galaxy $z = 0.6535 \pm 0.0002$ (Cenko et al. 2005)

BAT light curve



$E_{\text{peak}} - E_{\text{iso}}$ relation



Confirmation of $E_{\text{peak}} - E_{\text{iso}}$ relation using Swift/BAT data

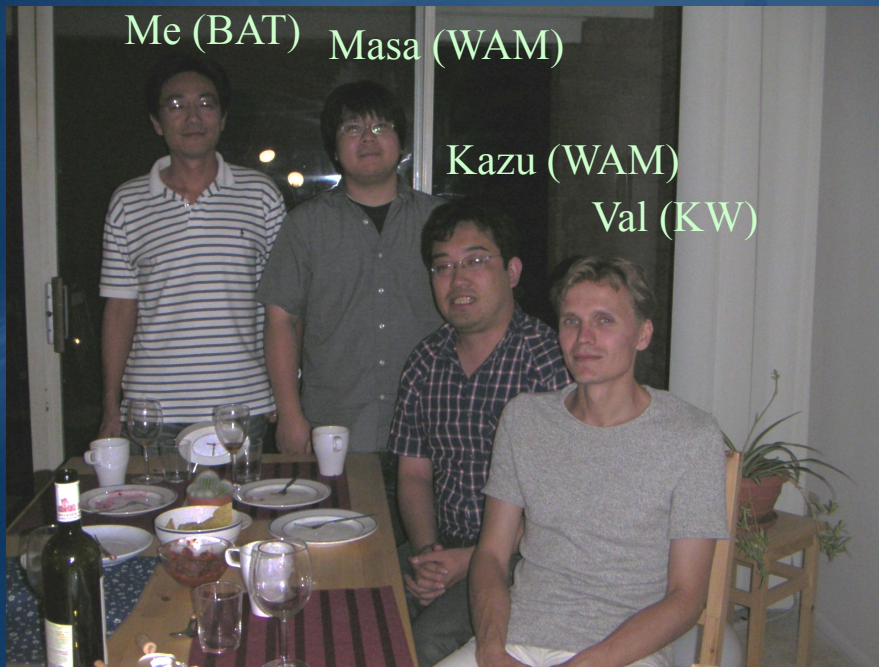
Spectral Cross-calibration: Swift/BAT-Konus/Wind-Suzaku/WAM

(Sakamoto et al. 2011)

Understanding a systematic error in BAT energy response function for hard spectral sources (like GRBs)

Required agreement among PIs to exchange data (Neil's arrangement)

Spectral cross-calibration work (8/1/06-8/22/06 @ NASA/GSFC)

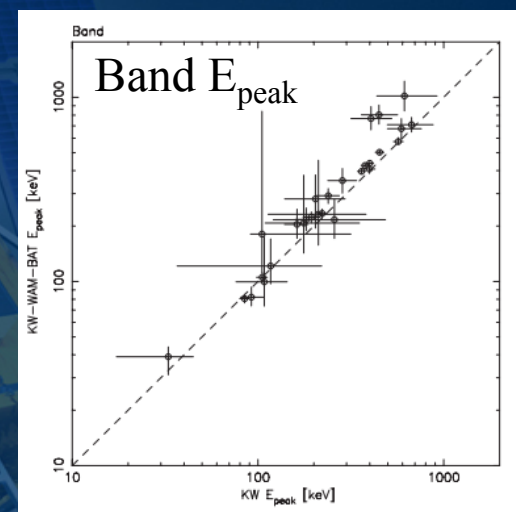
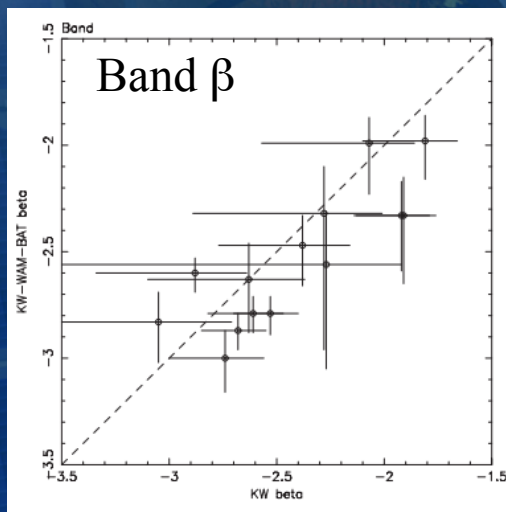
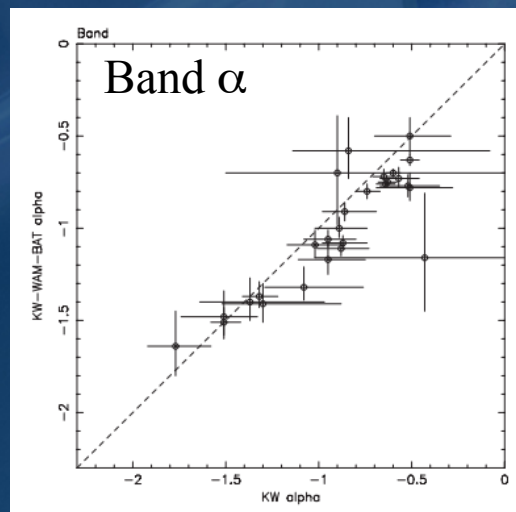
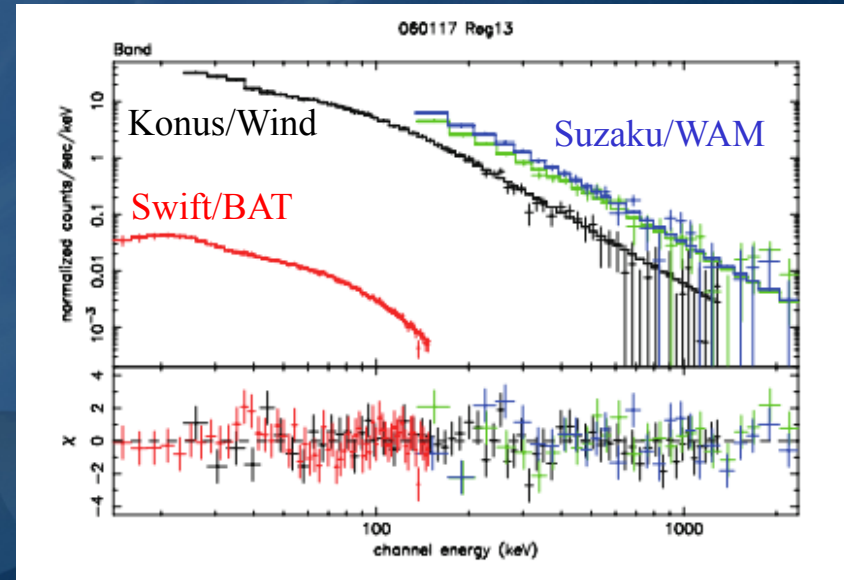
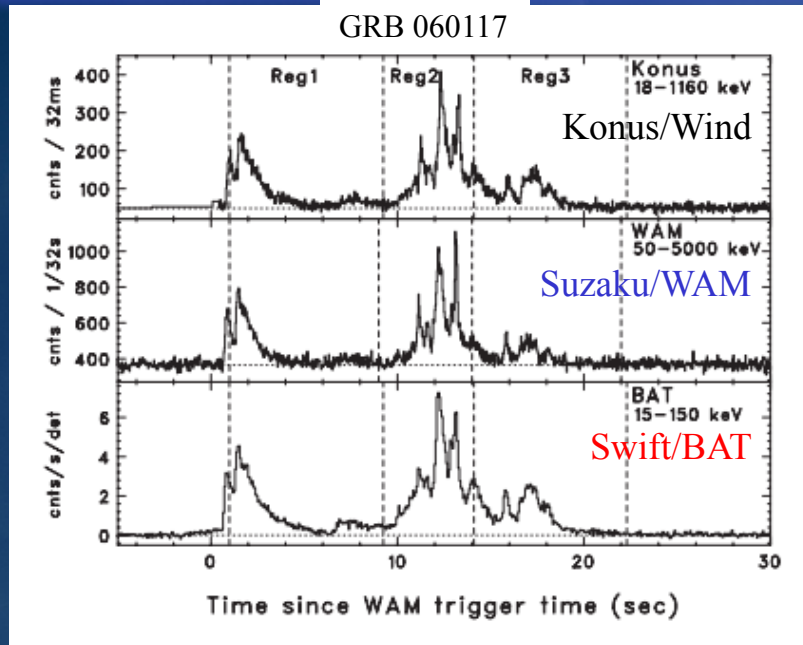


Konus-Wind: Valentin Pal'shin (Russia)
Suzaku/WAM: Kazu Yamaoka (Japan)
: Masa Ohno (Japan)

- Select 14 bright commonly detected GRBs as the samples
- Check the timing accuracy and the spectral consistency

Spectral Cross-calibration: Swift/BAT-Konus/Wind-Suzaku/WAM

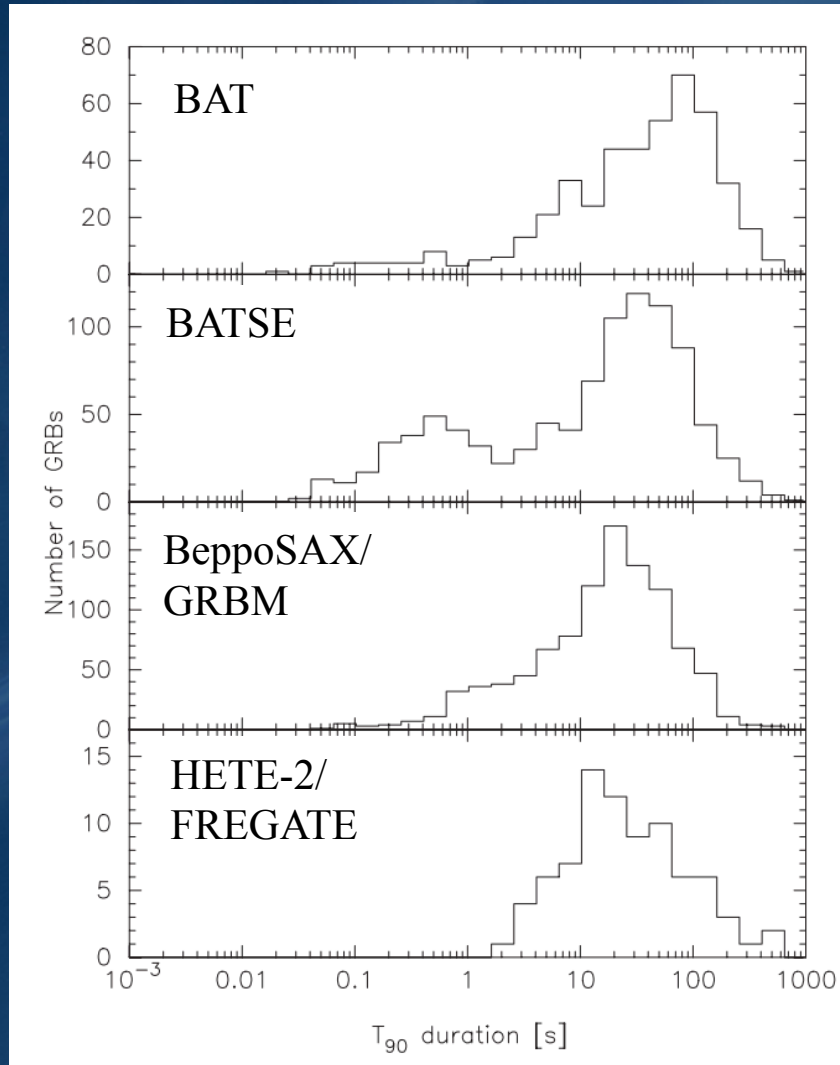
(Sakamoto et al. 2011)



BAT GRB Catalogs

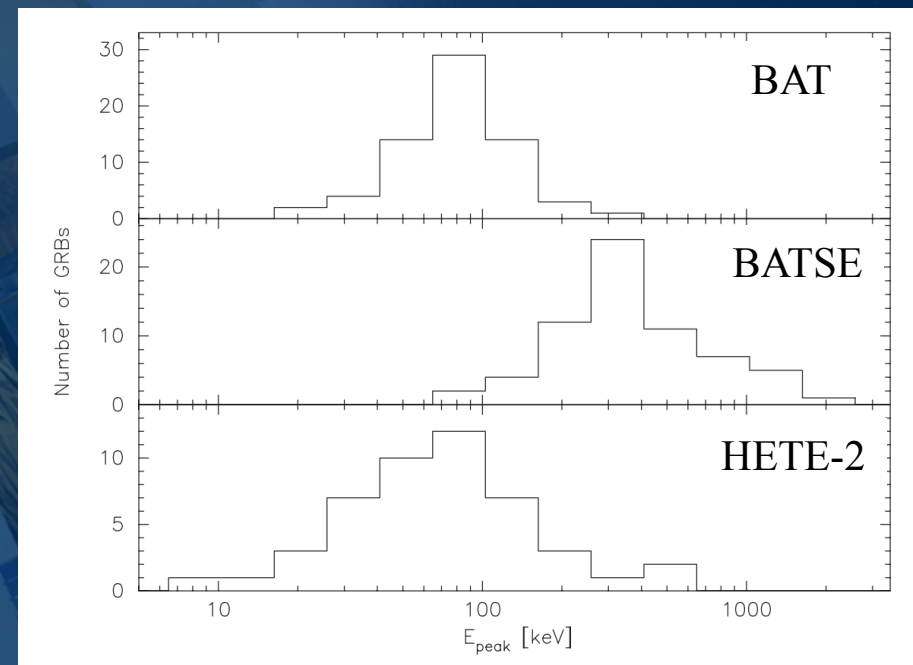
(Sakamoto et al. 2008; Sakamoto et al. 2011; Lien et al. 2016)

T_{90} duration distribution



- The First Swift BAT GRB Catalog (2008)
 - 237 GRBs (2004 – 2007)
- The Second Swift BAT GRB Catalog (2011)
 - 476 GRBs (2004 – 2010)
- The Third Swift BAT GRB Catalog (2016)
 - 1006 GRBs (2004 – 2015)

E_{peak} distribution



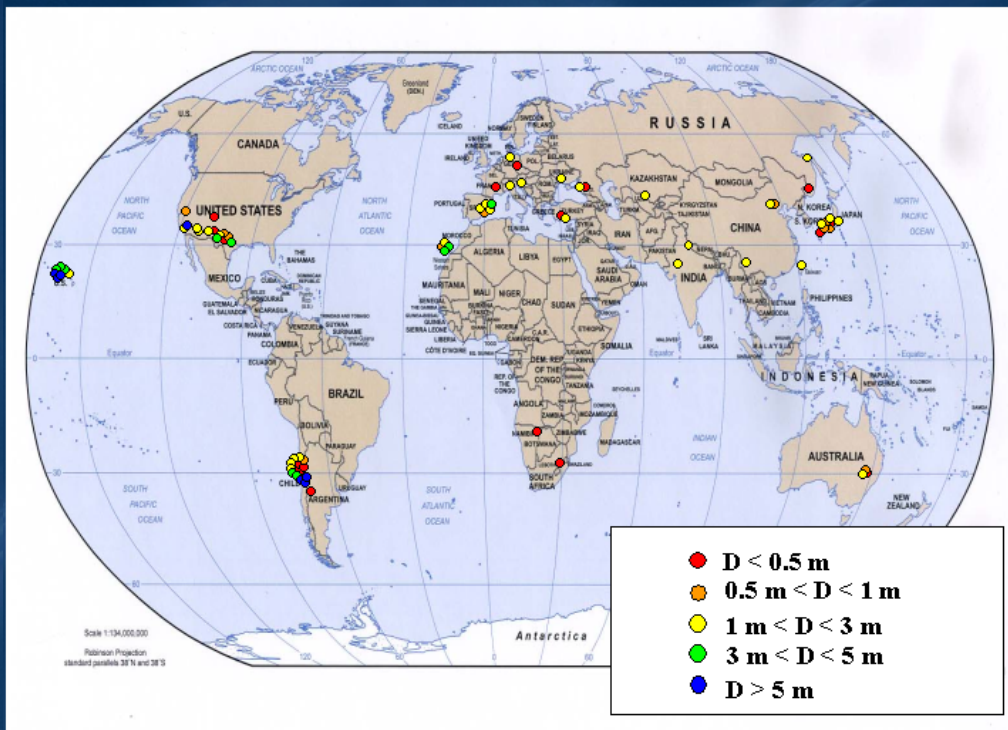
Goddard Robotic Telescope (GRT)

A satellite with solar panels is shown in space, positioned behind the main title text. The satellite is oriented vertically, with its solar panels extending outwards. The background is a dark blue gradient with some faint, wispy white clouds or nebulae.

GRT: Motivation

Understand the **jet physics** through the multi-wavelength observations of **GRBs** and **AGNs**.

GRB follow-up telescope locations (2006-2007)



Location: Goddard Geophysical and Astronomical Observatory (GGAO)



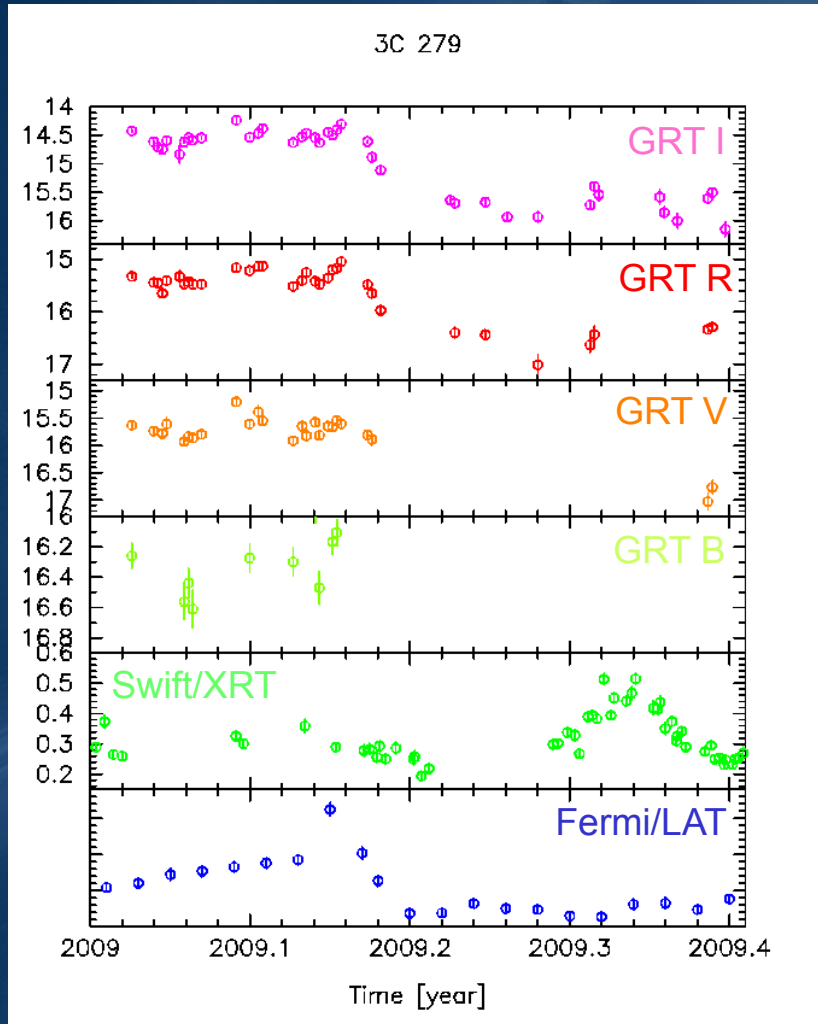
Great idea. How much do you need?

18/05/21

Neil Gehrels Memorial Symposium

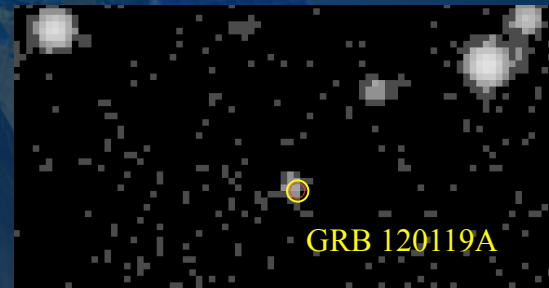
GRT: Observations

Blazar Monitoring



Prompt GRB Follow-up

GRB	Start time	R Magnitude	GCN Circ.
GRB 090530 (Swift)	T0+15 min	>18.1 mag	9466
GRB 090621A (Swift)	T0+37.3 min	>17.9 mag	9564
GRB 090621B (Swift)	T0+3.7 hr	>17.8 mag	9565
GRB 090726 (Swift)	T0+3.75 hr	>18.9 mag	9732
GRB 090727 (Swift)	T0+3.2 hr	>16.6 mag	9735
GRB 100213A (Swift)	T0+1.2 hr	>17.5 mag	10425
GRB 100213B (Swift)	T0+0.94 hr	>18.7 mag	10426
GRB 100420A (Swift)	T0+4.2 min	>18.9 mag	10666
GRB 100915A (Swift)	T0+146 s	>19.8 mag	11285
GRB 100915B (INT)	T0+76 s	>17.7 mag	11286
GRB 110212A (Swift)	T0+71 s	>18.9 mag	11704
GRB 110719A (Swift)	T0+137 s	>18.2 mag	12183
GRB 111225A (Swift)	T0+94 s	>18.5 mag	12729
GRB 120119A (Swift)	T0+132 s	17.2 ± 0.2	12894
GRB 120802A (Swift)	T0+36 min	>17.2 mag	13564



3C 454.3: Pacciani et al. 2010, Raiteri et al. 2011; Mrk 501: Abdo et al. 2011, Ahnen et al. 2017, Mrk 421: Abdo et al. 2011, Aleksic et al. 2015, ; 3C279: Hayashida et al. 2012; LO Peg: Karmaer et al. 2016

Neil as a mentor

E-mail from Neil on December 21, 2016:

差出人 Gehrels, Neil (GSFC-6610) <neil.gehrels@nasa.gov>★

件名 **Re: permanent position at AGU**

2016/12/21 午前6:28

宛先 (自分) <tsakamoto@phys.aoyama.ac.jp>★

Cc Kawai, Nobuyuki <nkawai@phys.titech.ac.jp>★

アドレス一括コピー

Dear Taka,

That is wonderful news! It was good that you were persistent. all these years. The AGU position sounds like a perfect match for what you were looking for.

Congratulations!

Neil

Neil:

- Always supported and encouraged my works.
- Always gave me the best environment to focus on the works.
- Never let me involved in a (dirty) political work.
- Always concerned about my family.