



Presentation of the GRM group in Nanning

Yun-Feng Liang Guangxi University





Gamma Ray Monitor (GRM) 15KeV-5M

Up to 35°: ECLAIRs detects and localizes the GRB ECLAIRs sends an and a slew request to the satellite GRM Up to 50°: GRM sends an alert (coarse location)

from Prof. Wei's slides

Members of GXU GRM group



Liang, En-Wei





Lu, Rui-Jing

and up to 10 graduate students



Lv, Lian-Zhong



Liang, Yun-Feng

Liu, Hong-Bang

Members of GXU GRM group

✓ Liang En-Wei, Professor

PI of GRM group, PI of GXU-astro laboratory, organize the whole group

✓ Lu Rui-Jing, Professor

Scientific data analysis of space-based high energy telescope, development of analysis software

✓ Liu Hong-Bang, Professor

Detector technology for astrophysics, analysis of raw data

✓ Lv Lian-Zhong, Associate Professor

Construction of VHF base station in Guangxi and management of the data transmission

- Liang Yun-Feng, Associate Professor
 Scientific data analysis, development of analysis software
- ✓ Many graduate students

Professor Liang, En-Wei

PI of GRM group, PI of GXU-astro laboratory, leading the whole group

Research area: astrophysics related to GRB, black hole and GW

Relativistic astrophysics

Radiation from relativistic jet

merger of compact binary

collapse of massive star





Compact object

Time-Domain Astronomy

Key Laboratory for Relativistic Astrophysics of Guangxi University

Professor Lu, Rui-Jing

expert in

data analysis of high energy telescope, programming

responsible for scientific analysis of SVOM GRM data, development of analysis software



Series of Comprehensive Analyses of Fermi-GBM Gamma-Ray Burst Data

Prof. Lu has rich experience in analyzing data of GRM-like detectors. THE ASTROPHYSICAL JOURNAL, 756:112 (13pp), 2012 September 10 © 2012. The American Astronomical Society. All rights reserved. Printed in the U.S.A.

A COMPREHENSIVE ANALYSIS OF *FERMI* GAMMA-RAY BURST DATA. II. E_p EVOLUTION PATTERNS AND IMPLICATIONS FOR THE OBSERVED SPECTRUM–LUMINOSITY RELATIONS

<u>Rui-Jing Lu¹</u>, Jun-Jie Wei¹, En-Wei Liang^{1,2,3}, Bin-Bin Zhang⁴, Hou-Jun Lü³, Lian-Zhong Lü¹, Wei-Hua Lei^{5,3}, and Bing Zhang³

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A COMPREHENSIVE ANALYSIS OF *FERMI* GAMMA-RAY BURST DATA. III. ENERGY-DEPENDENT T₉₀ DISTRIBUTIONS OF GBM GRBs AND INSTRUMENTAL SELECTION EFFECT ON DURATION CLASSIFICATION

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A Comprehensive Analysis of *Fermi* Gamma-Ray Burst Data. IV. Spectral Lag and its Relation to E_p Evolution

Rui-Jing Lu¹, Yun-Feng Liang²^(a), Da-Bin Lin¹^(b), Jing Lü¹, Xiang-Gao Wang¹^(b), Hou-Jun Lü¹, Hong-Bang Liu¹, En-Wei Liang¹^(b), and Bing Zhang^{1,3}^(c) ¹ Guangxi Key Laboratory for Relativistic Astrophysics, Department of Physics, Guangxi University, Nanning 530004, People's Republic of China lindabin@gxu.edu.cn, luruijin@gxu.edu.cn, lew@gxu.edu.cn ² Key Laboratory of Dark Matter and Space Astronomy, Purple Mountain Observatory, Chinese Academy of Sciences, Nanjing 210008, People's Republic of China

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Series of Comprehensive Analyses of Fermi-GBM Gamma-Ray Burst Data

Lu, R.J., Wei, J.J., Liang, E.W., et al. 2012, ApJ, 756, 112

Professor Lv, Lian-Zhong

research area GRB X-ray afterglow

expert in data analysis, building and maintenance of calculation platform/server

responsible for

the construction of the VHF communication base station of SVOM in Guangxi and management of the data transmission



Site of SVOM VHF base station in Guangxi



Professor Liu, Hong-Bang is mainly working on detector technology for astrophysics. He may analyze the raw data of the GRM detectors and his joining can help us better understanding and explore the GRM data.



beam test at CERN

Hongbang Liu

- BESIII Physics Analysis
- HERD (High Energy Cosmic Radiation Detection) facility onboard China's Space Station
 - TRD (Transition Radiation Detector) provides a feasible calibration for proton between 1- 10 TeV







TeV proton e/G/CR energy ISCMOS sub-system e/p discrimination calibration - SCAL & WALL - 50GeV e W/O Rad 3 2000 600 + SGeV & W/Rad 50GeV e' W/ Rad. + 78 TR + dE/dx500 400 1000 300 10⁵ ADC Num **Test Beam at CERN and DESY**

X-ray polarization detector

- eXTP (The enhanced X-ray Timing and Polarimetry mission) is a science mission designed to study the state of matter under extreme conditions of density
- Study on the X-ray Polarization Detector for eXTP





Event 3

baycenter

pixe



Laboratory



Liang Yun-Feng, Associate Professor Scientific data analysis, development of analysis software





Parameter Name	Value
Energy Range	<5GeV-10TeV
Field of View	~1 sr
Effective Area (Normal incidence)	~1200 cm ² @ 100 GeV
Energy Resolution (Normal incidence)	~1% @ 100 GeV
Angular Resolution (Normal incidence)	0.1°@100GeV
Time Resolution	~1 ms

DArk Matter Particle Explorer (DAMPE) -- a high energy cosmic-ray and gamma-ray detector.

previous works in DAMPE group

DAMPE gamma-ray data analysis





Duan K.K. et al., RAA, 2019

previous works in DAMPE group

Liang Y.F. et al., ICRC2017

DAMPE gamma-ray data analysis



Liang Y.F. et al., ICRC2017

previous works in DAMPE group

Search for EM conterpart of BNS GW event



https://gracedb.ligo.org/superevents/S190425z/

The orientation of 12 GBM detectors at the time of GW event.

Summed light curve of 12 GBM detectors.

We plan to perform instantaneous GW search with the GRM data in the future.

Summary

 The GRM group will collaborate with Prof. Wang Jing, Wang Xiang-Gao, Lv, Hou-Jun, Lin Da-Bin in GXU and other experts in NAO and French SVOM team to perform multiwavelength/multimessenger studies of transient astrophysical phenomenon related to GW, GRB, supernava, BH, et al.









GWAC

LCOGT network

60cm telescopes