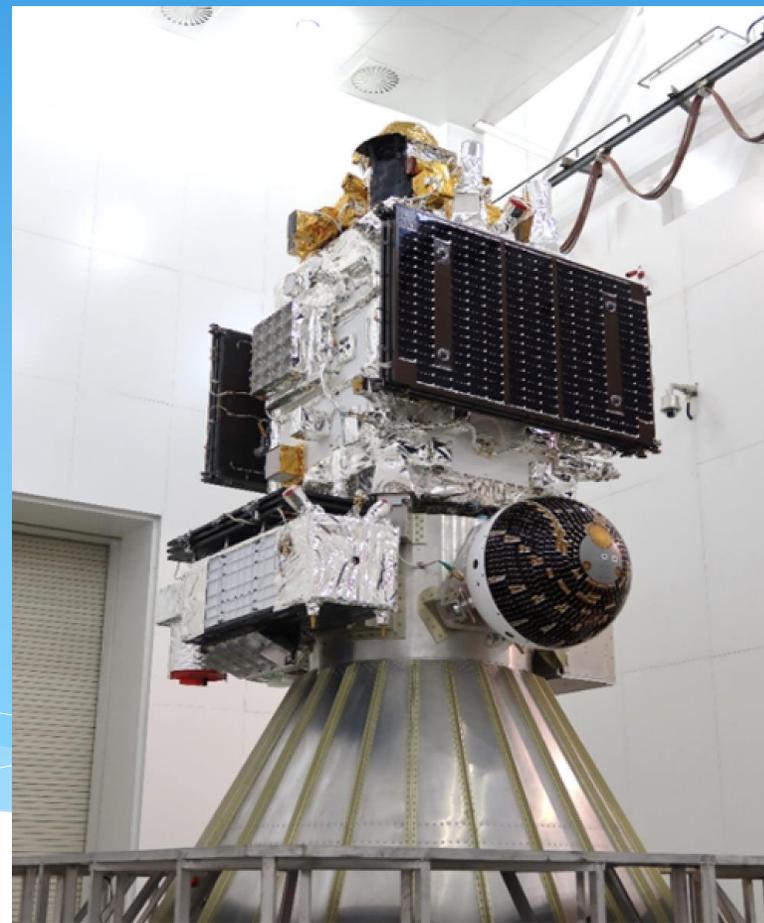


# EP-WXT探路者LEIA 在轨测试结果

凌志兴 LEIA载荷主任设计师  
代表LEIA团队

2023-6-6



LEIA

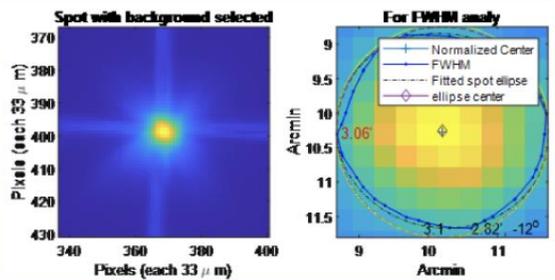
## EP-WXT pathfinder 探路者LEIA

- 2019年提出搭载计划。
- 2023年7月27日搭载中科院新技术实验卫星成功发射入轨。
  - ✓ 太阳同步轨道，高度500km。
  - ✓ 周期92分钟。
- 8月初开始观测至今工作10个月。
- 累积观测~3000轨，~1.8 Ms。

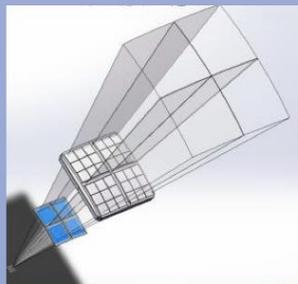


# LEIA在轨观测模式

地面标定



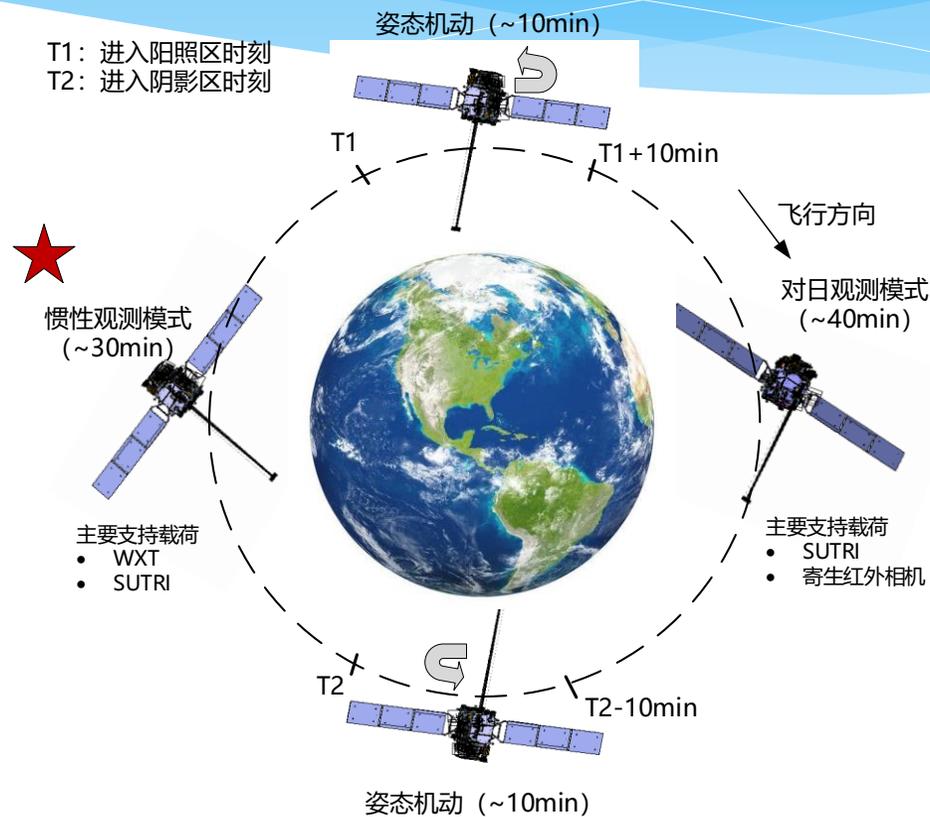
大视场



主要技术指标

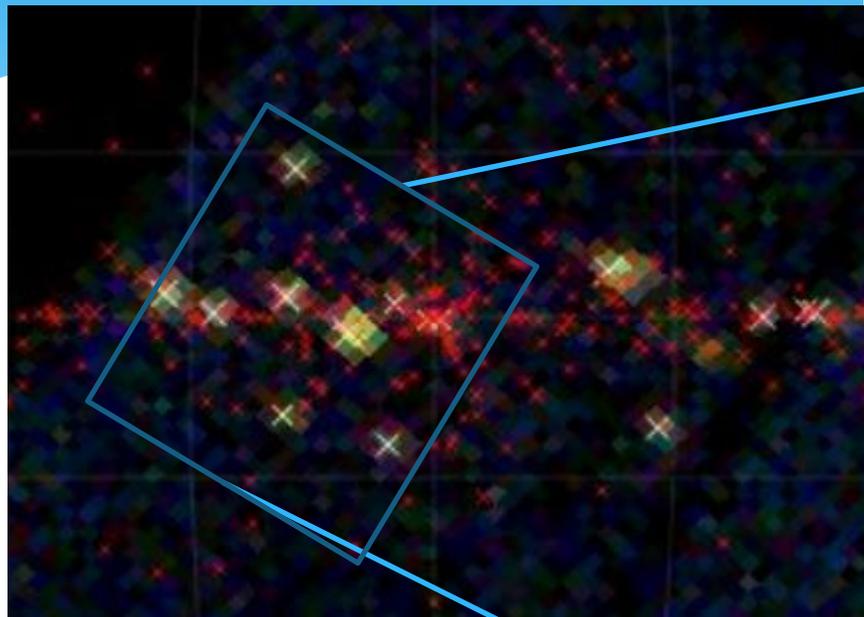
视场	346平方度
定位精度	优于1角分
角分辨率	优于5角分
分辨率	8K×8K
探测能段	0.5-4keV
能量分辨率	105eV@1.25keV

载荷单位：中国科学院国家天文台  
 合作单位：中国科学院上海技术物理研究所



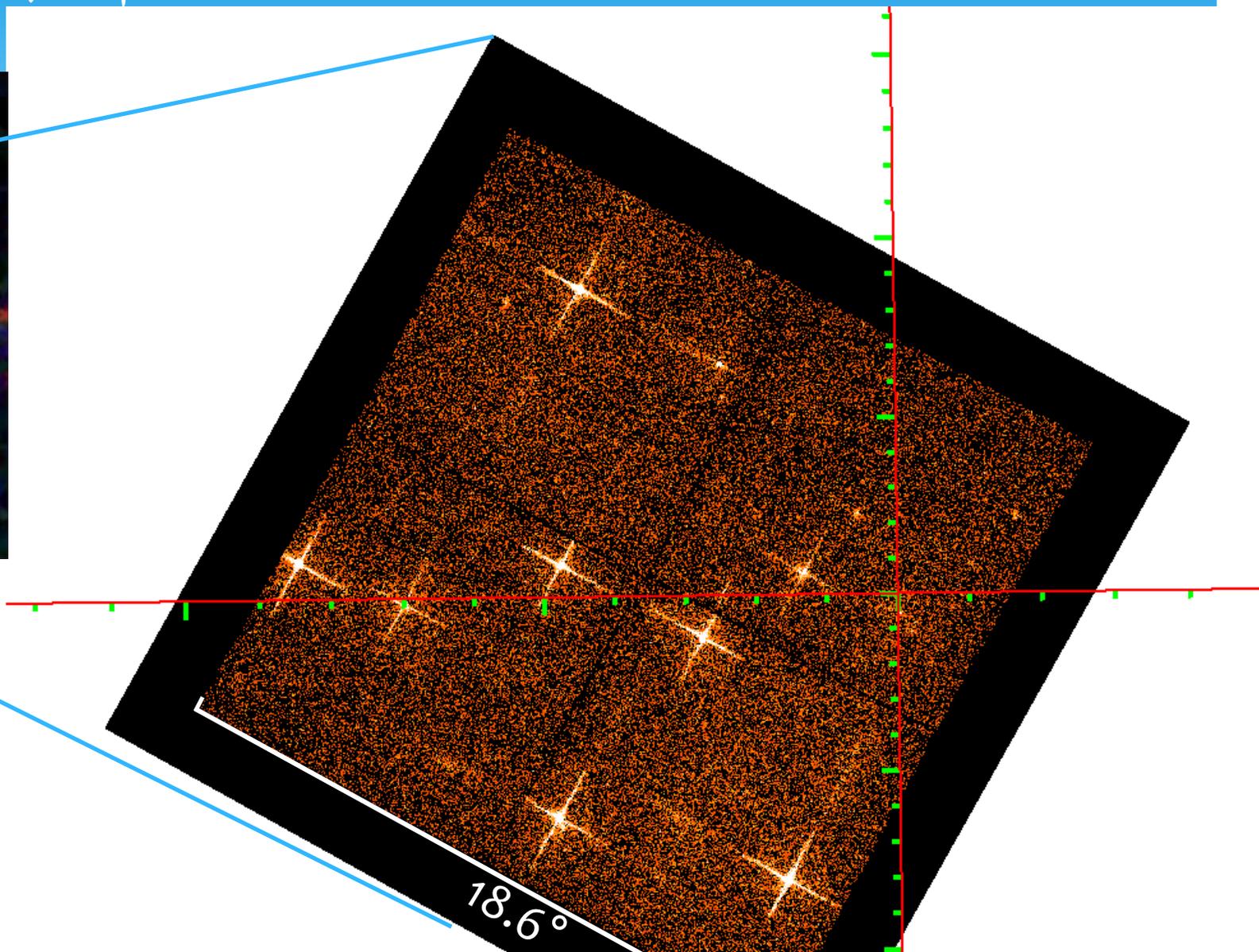
每轨 (92分钟) 观测~10分钟。  
 每天~10轨。

# 银河系中心天区



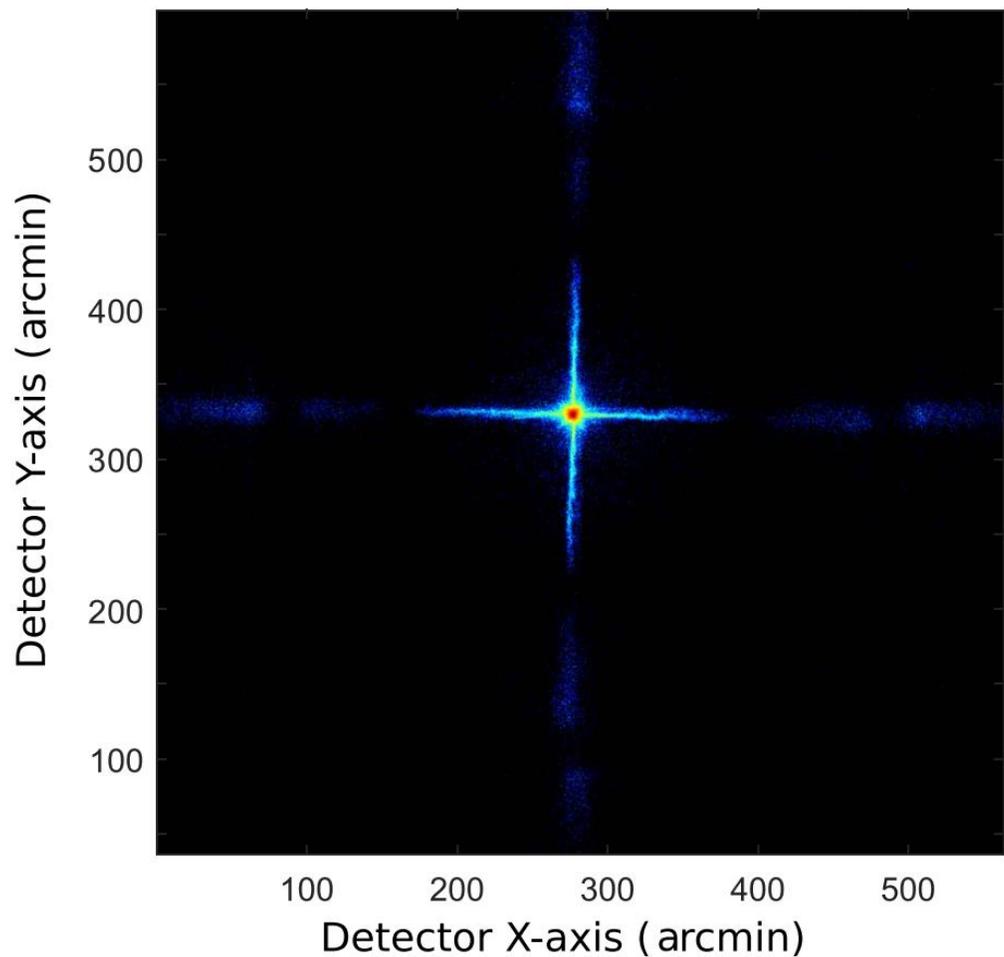
MAXI 1 orbit sky

MAXI (日本) : 目前在轨运行的  
X 射线全天监视器

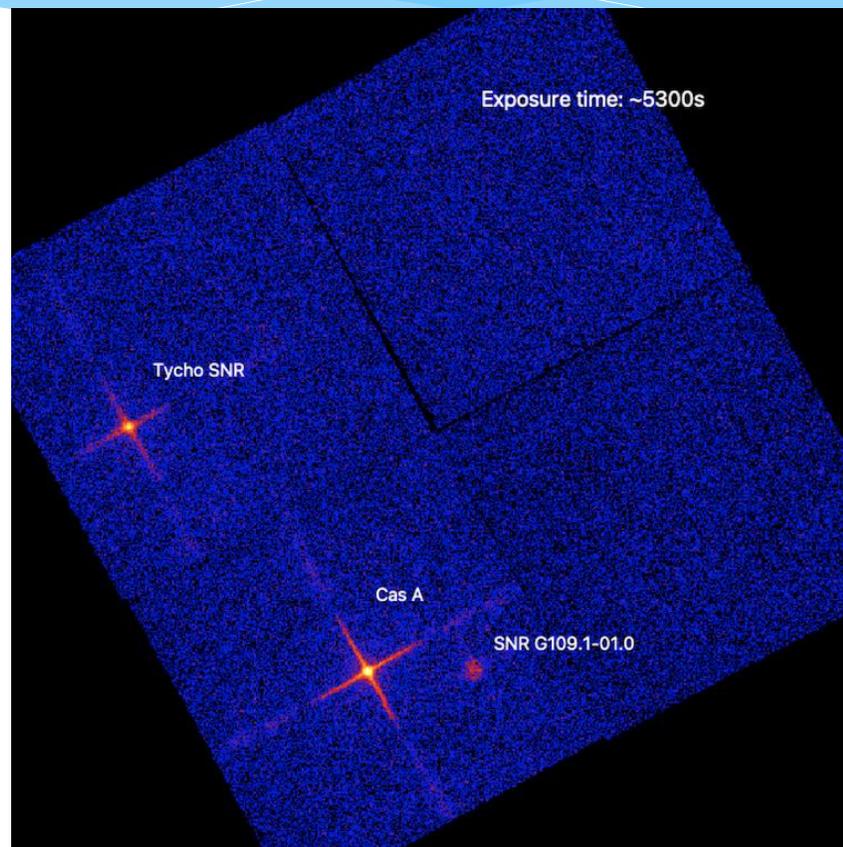


# LEIA观测图像

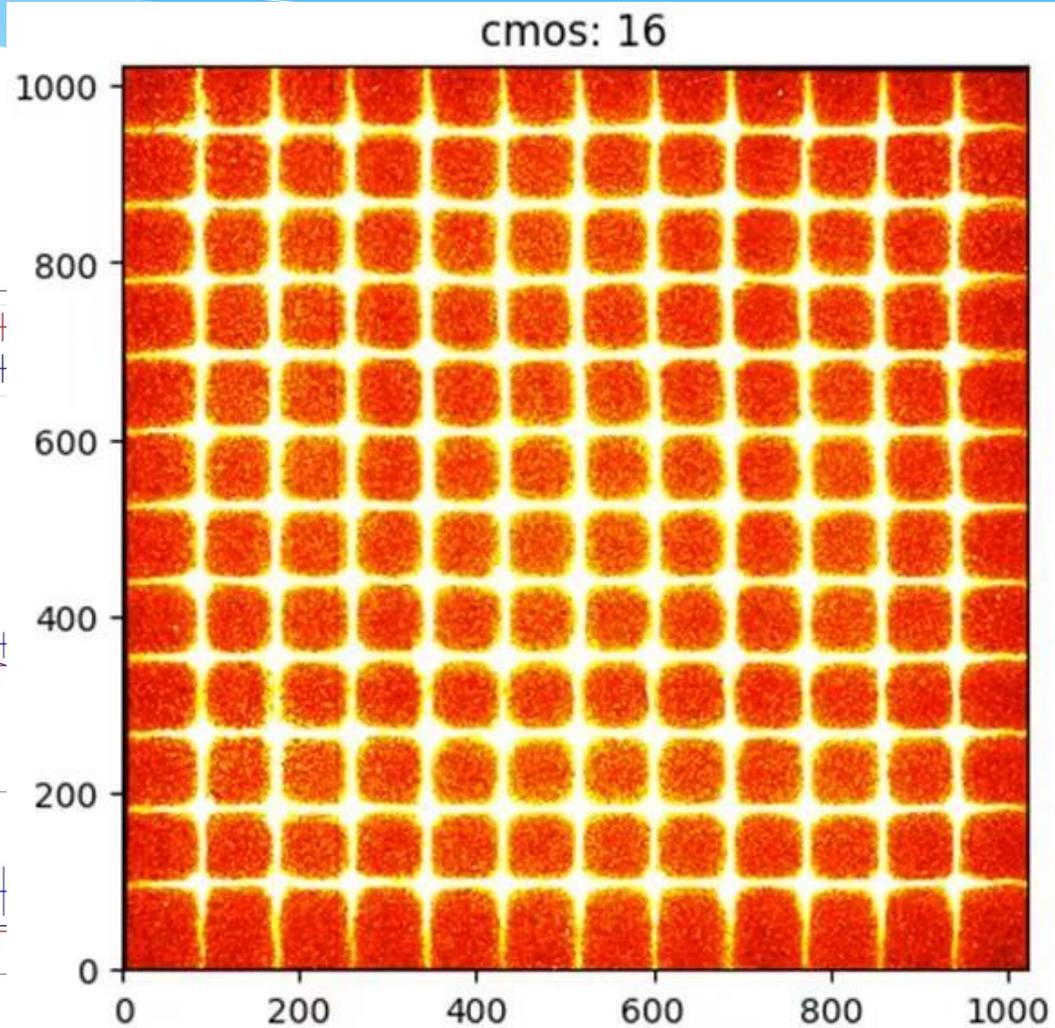
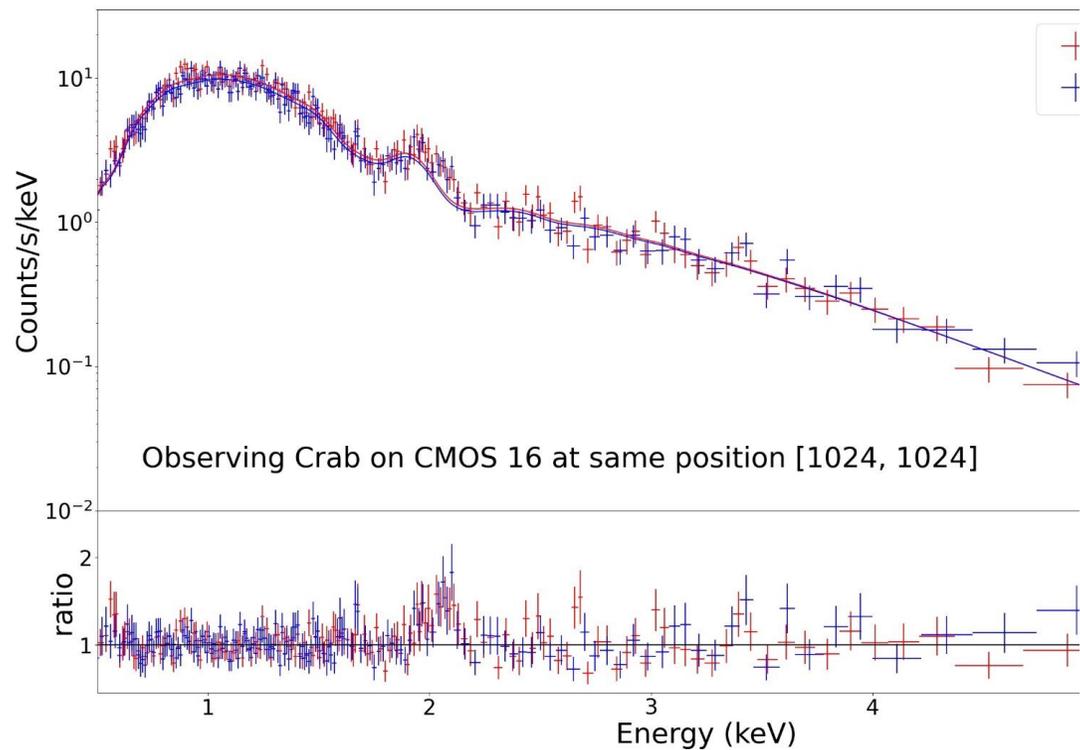
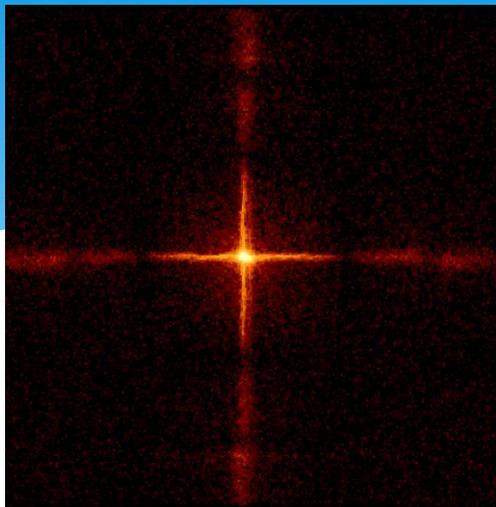
SCO X-1 观测图像 (无堆积)



一次观测覆盖3个超新星遗迹



# Crab 观测和定标



# 近邻星系大麦哲伦云 LMC

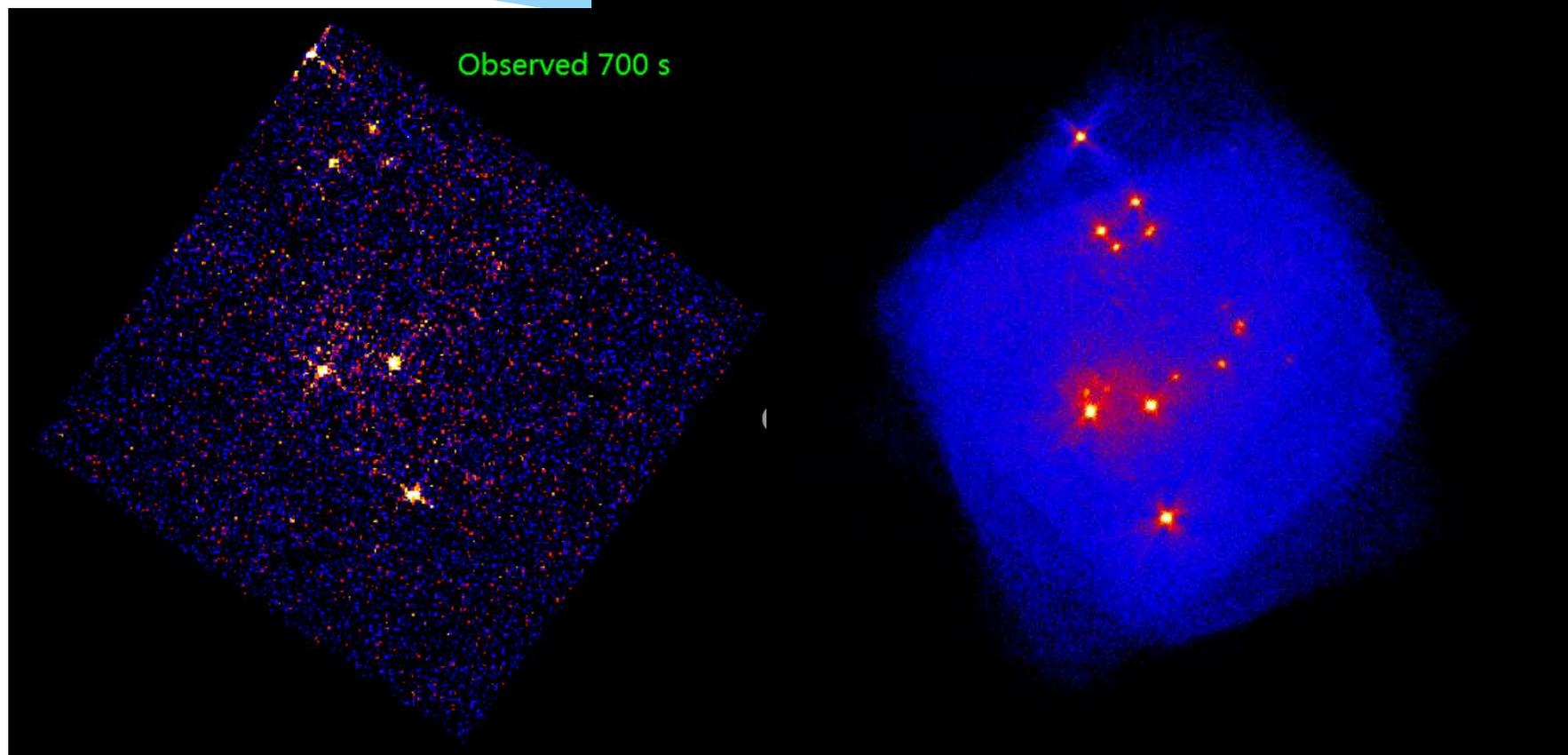
单次观测视场覆盖 LMC  
开展了长期监测。

LMC 光学图像



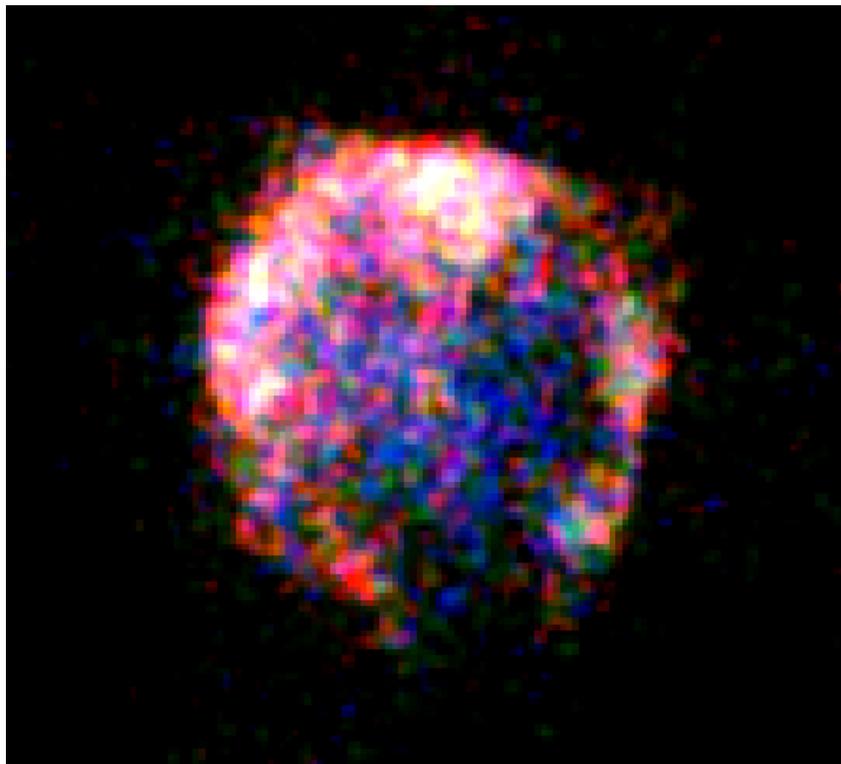
约 10 度

~100ks

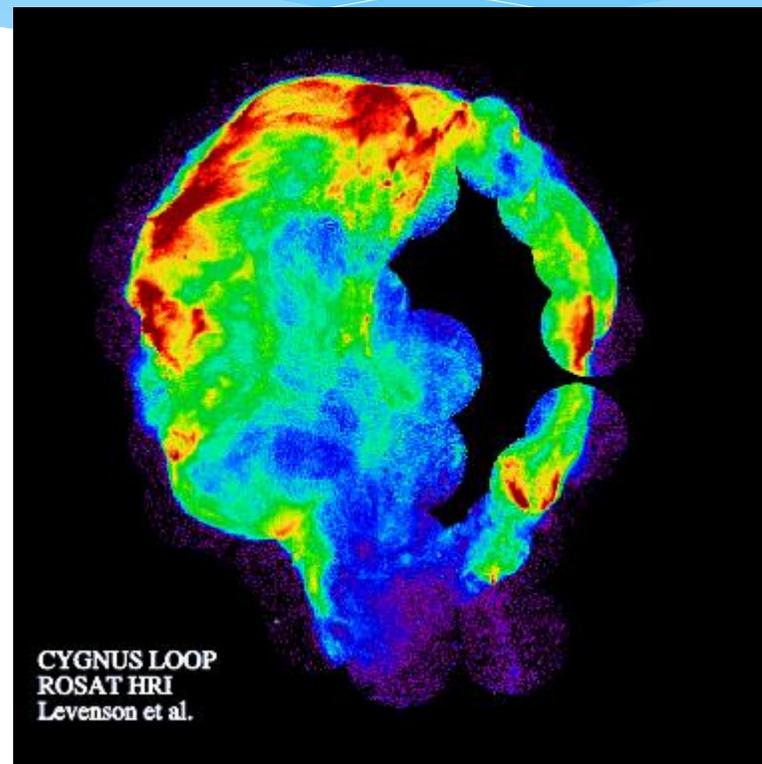


# 超新星遗迹 Cyg-Loop (弥散天体源)

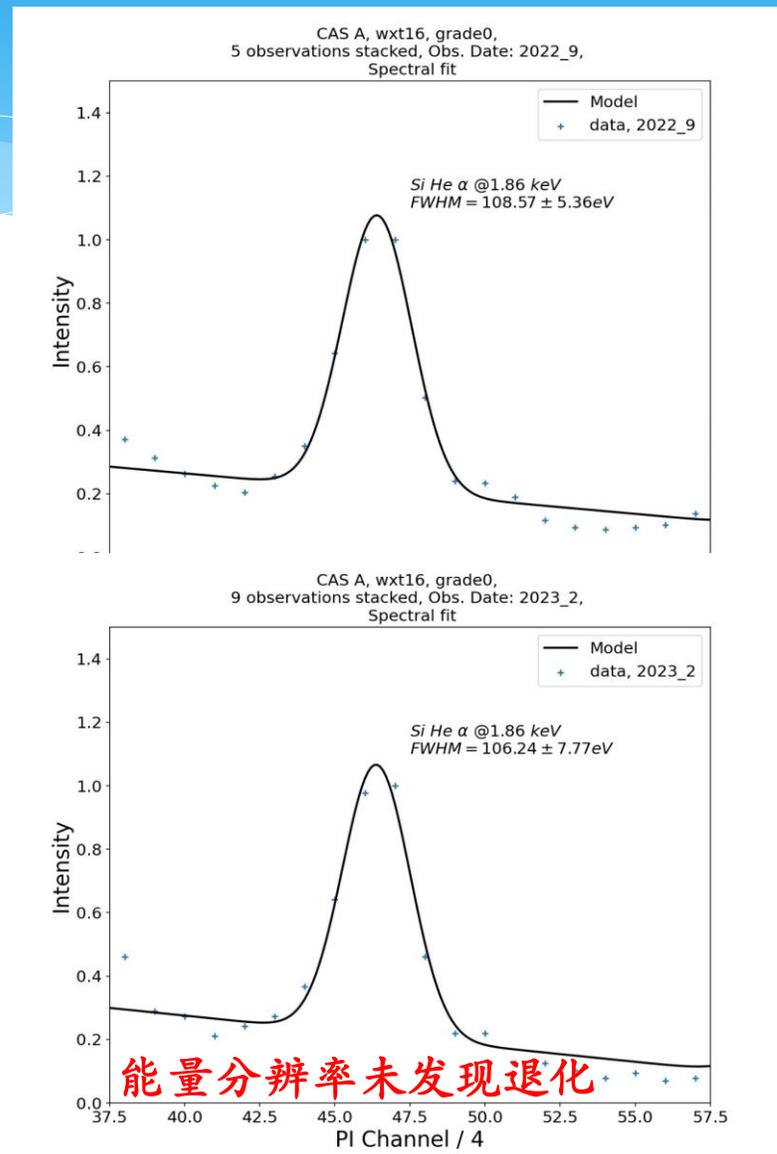
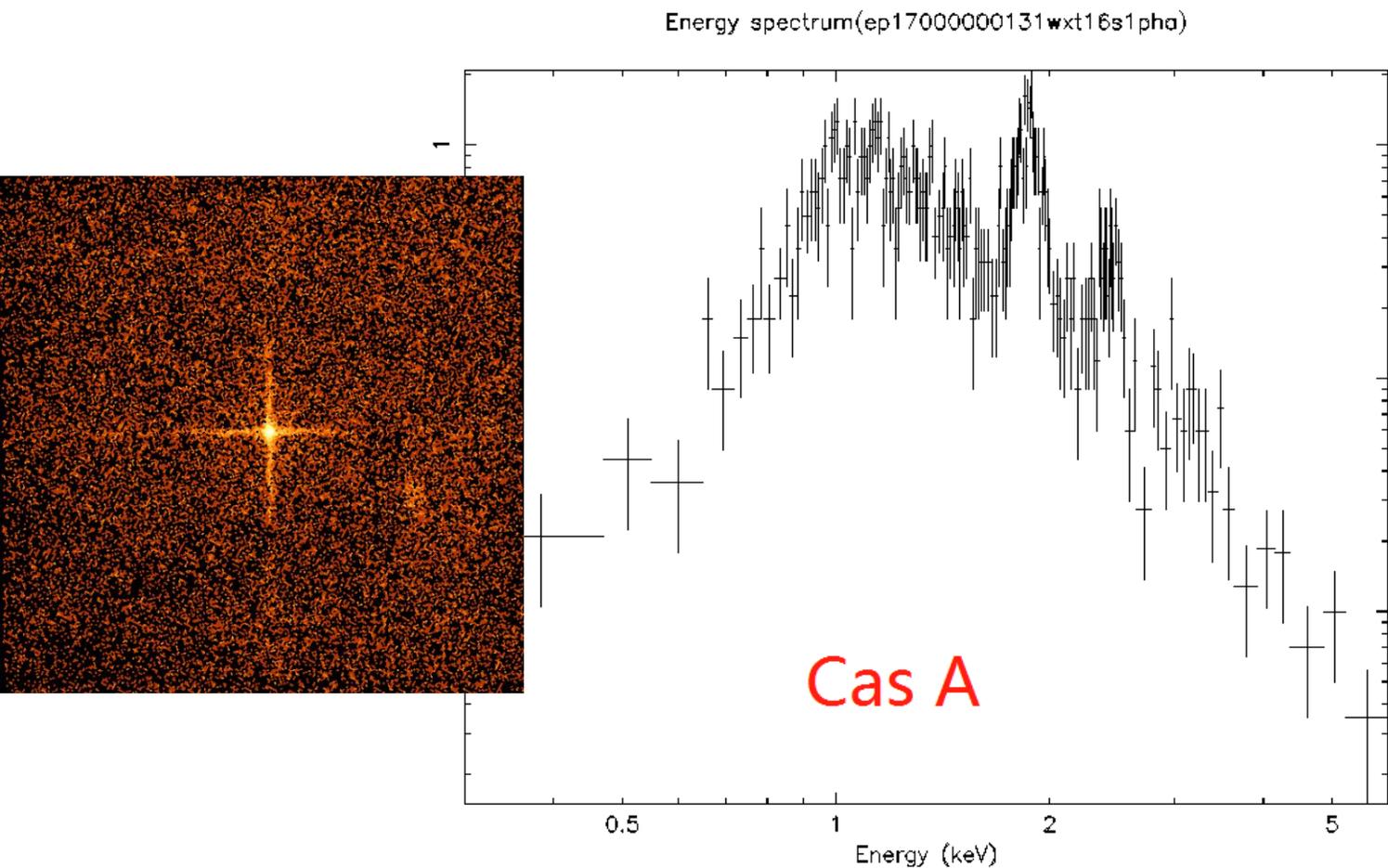
LEIA成像观测结果



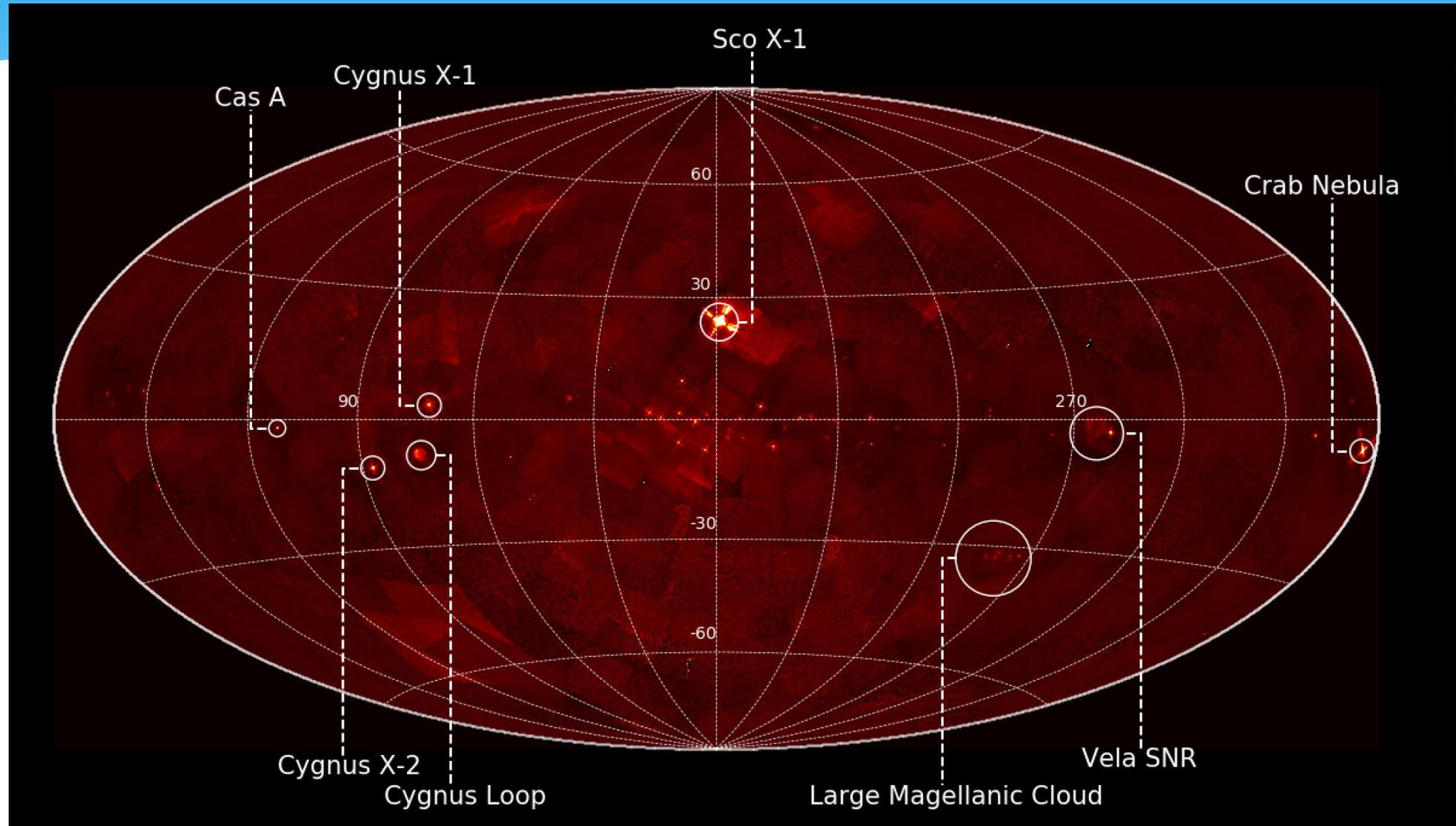
R 0.3-0.6 keV  
G 0.6-0.8 keV  
B 0.8-2.0 keV



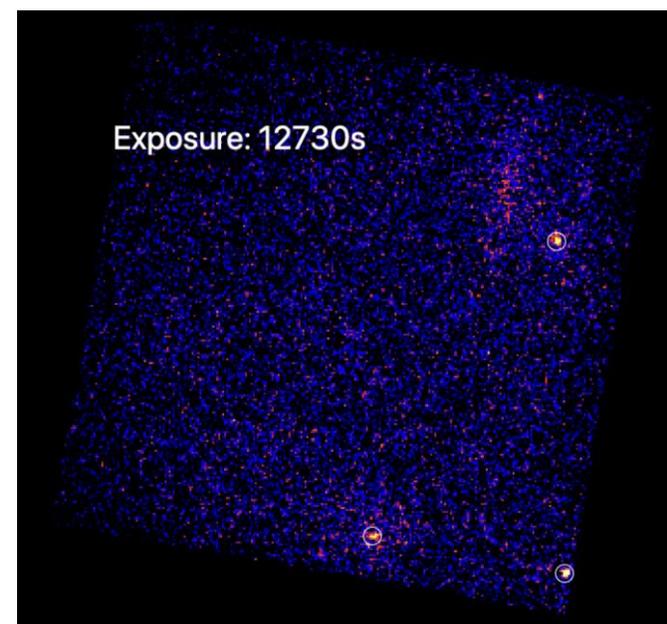
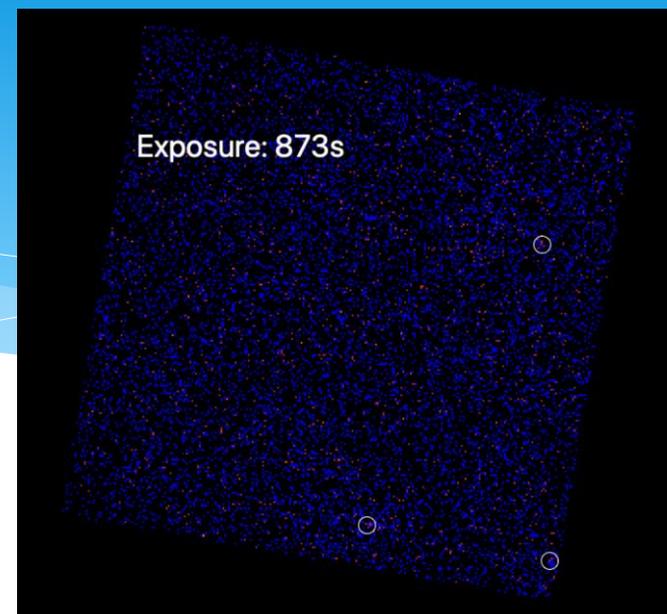
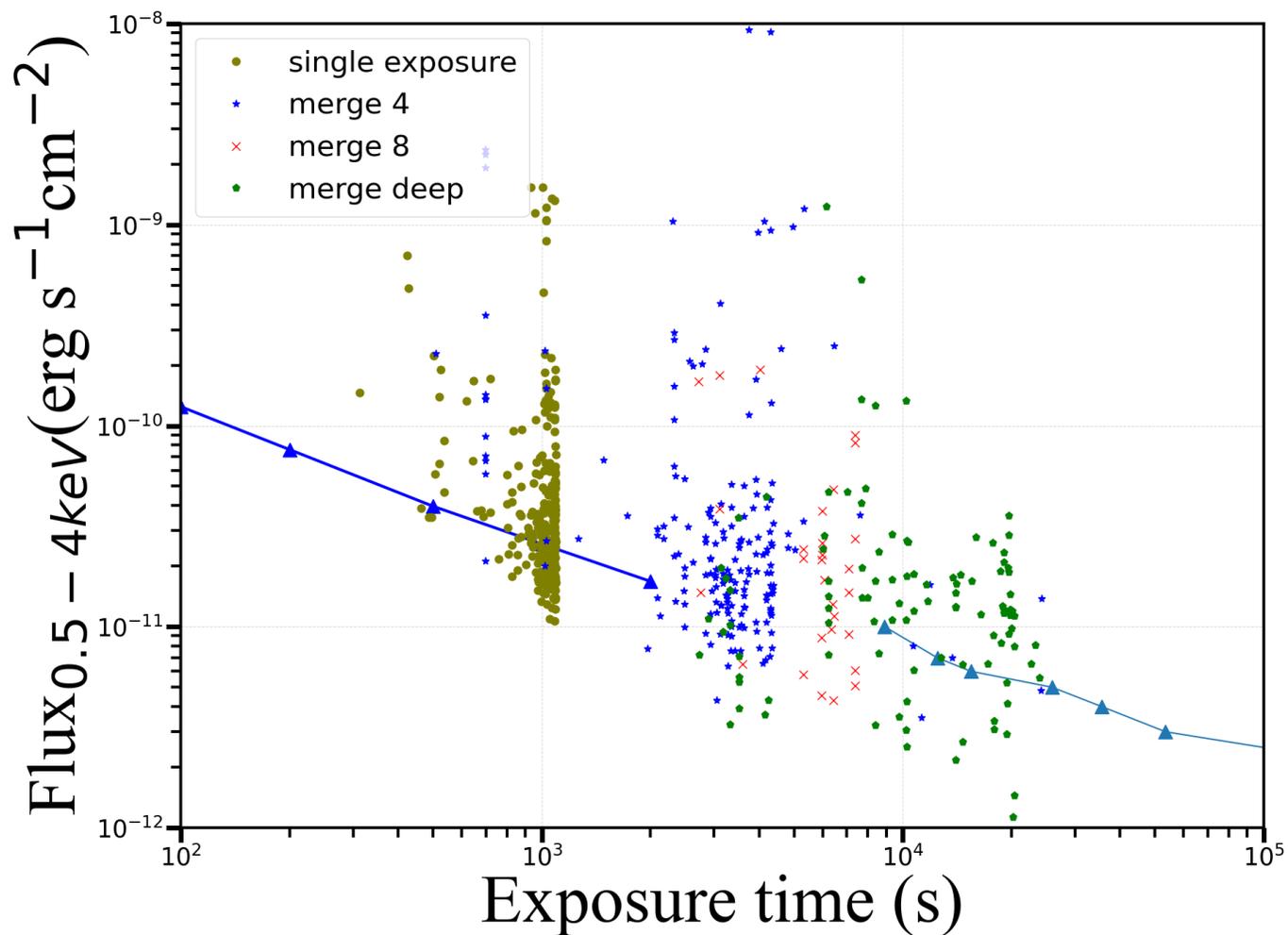
# 能谱测量：超新星遗迹 Cas-A



# 完成第一轮软X射线全天天图绘制



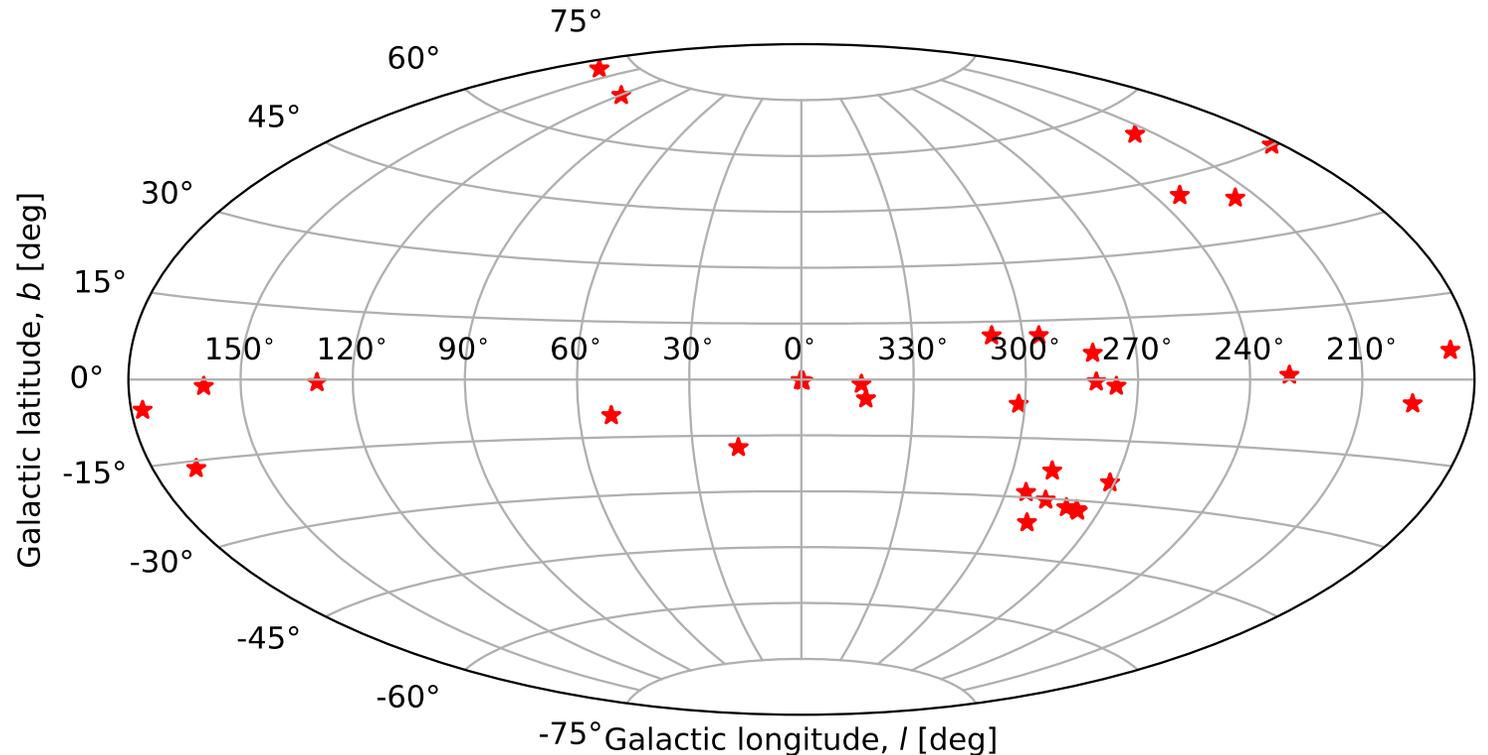
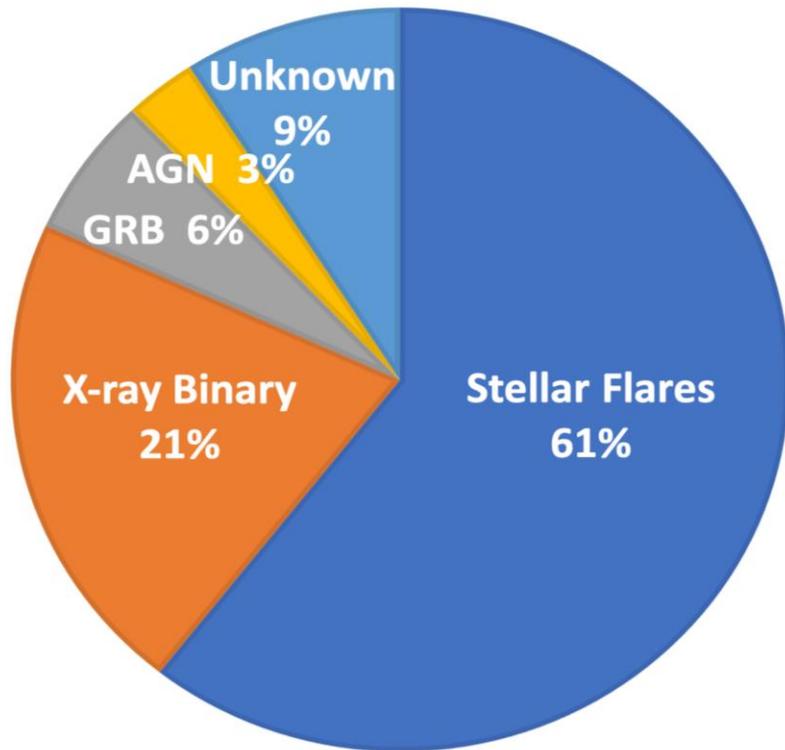
# 长曝光灵敏度



# 瞬变源/爆发源探测

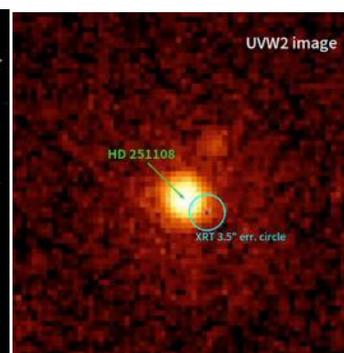
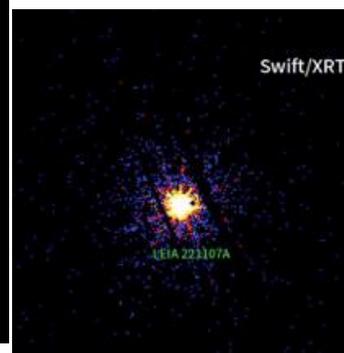
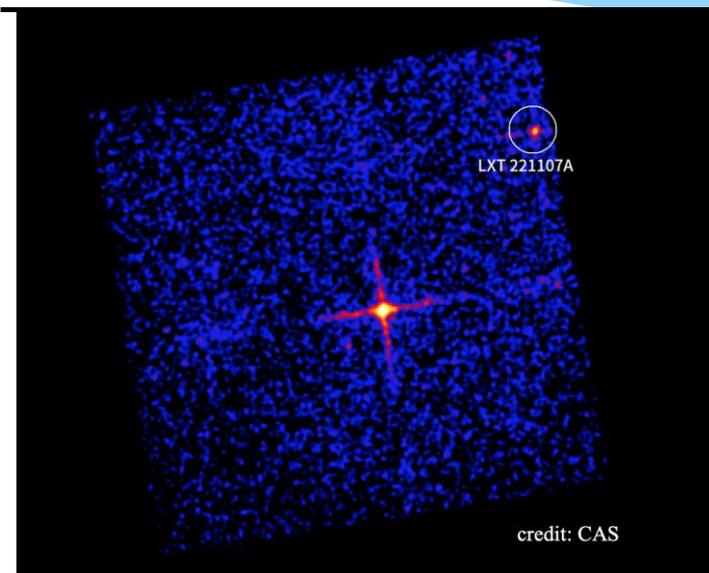
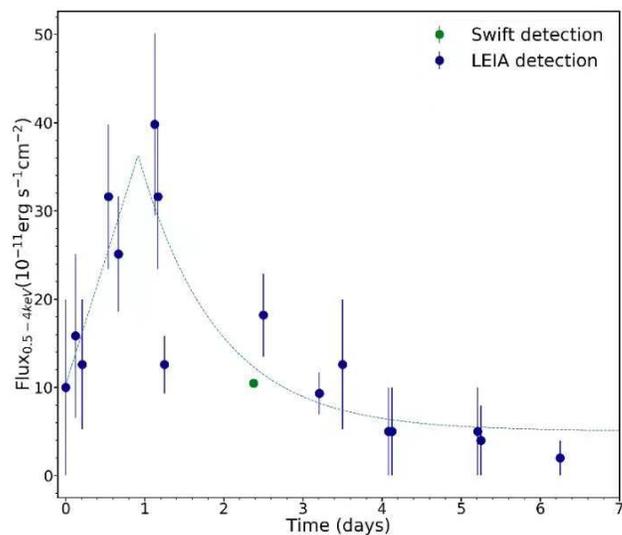
截止目前，共探测到33个暂现源/耀发源。  
发布了6次Atel，2次GCN。

■ Stellar Flares ■ X-ray Binary ■ GRB ■ AGN ■ Unknown

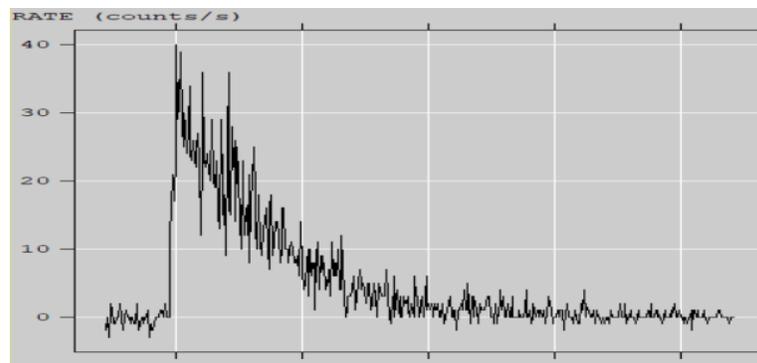


# 瞬变源/爆发源探测

## LXT 221107A 超级恒星耀发

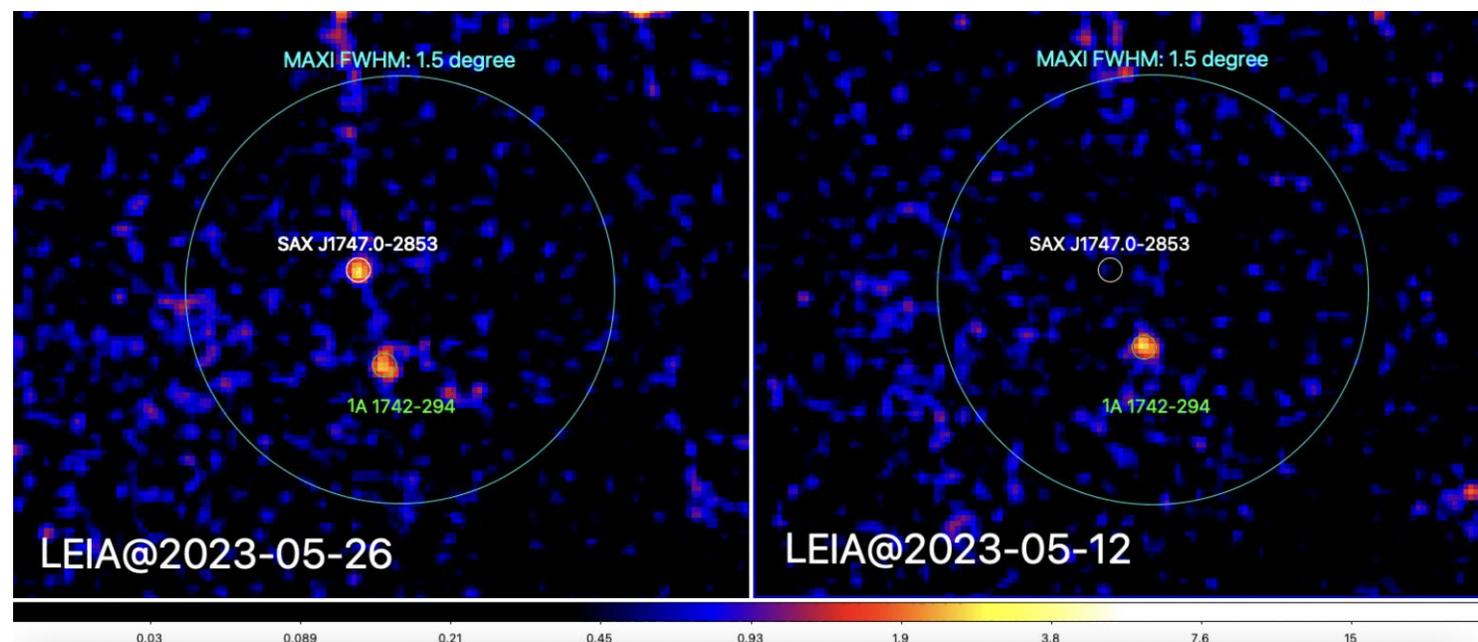
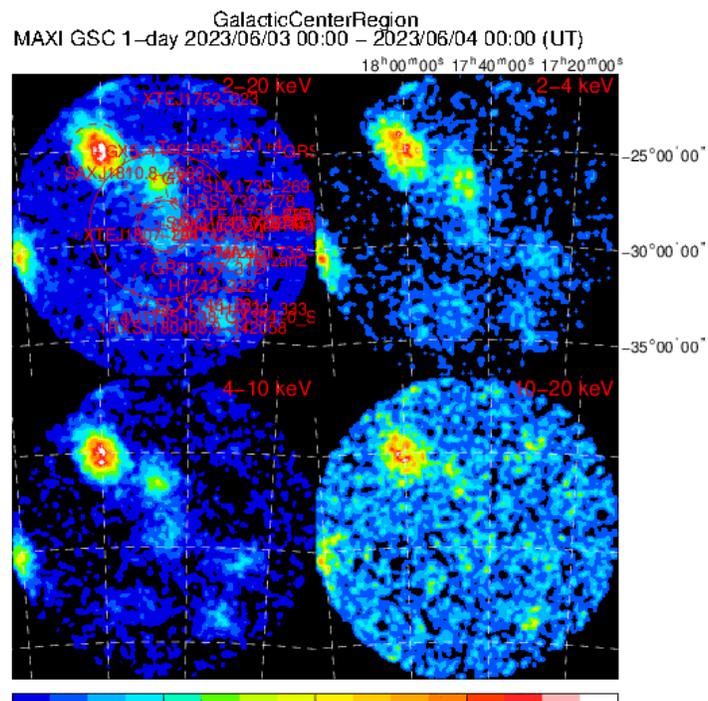


## GRB230307A 瞬时辐射



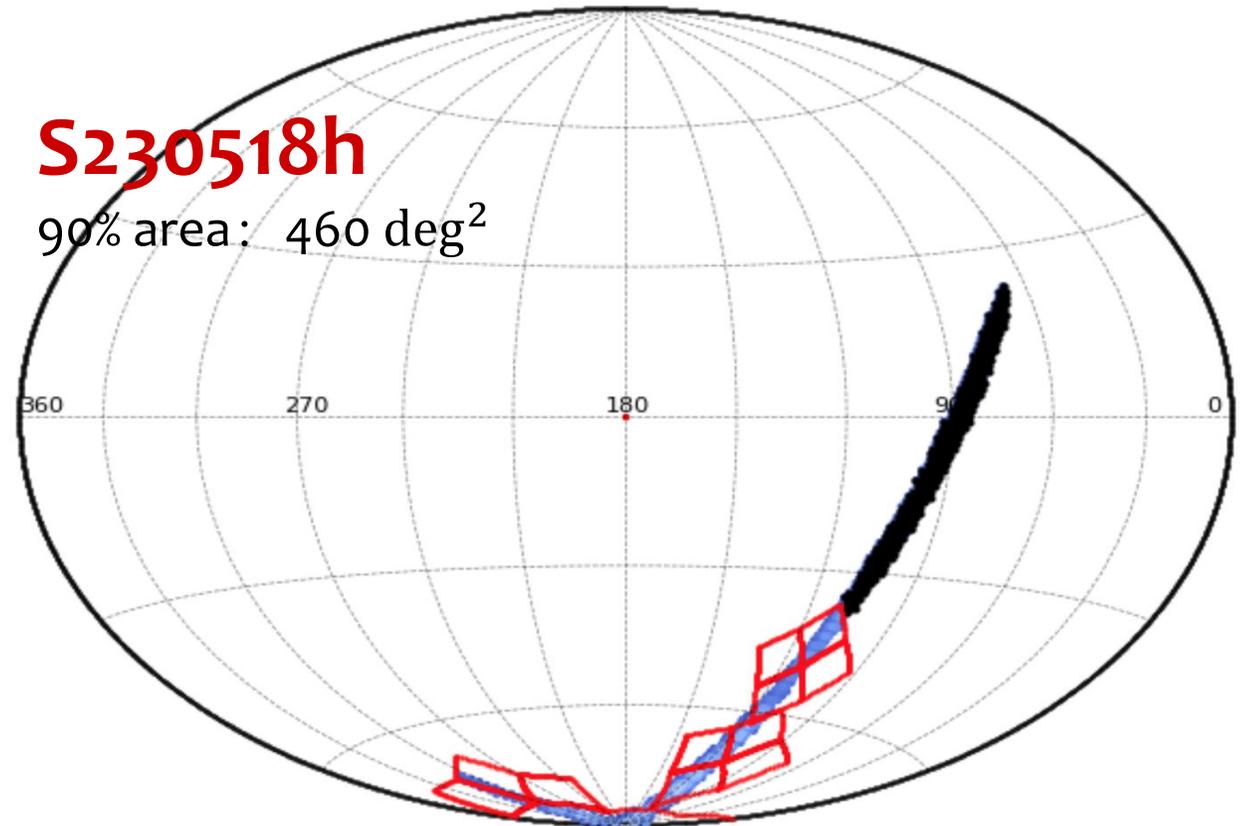
# SAX J1747.0-2853 爆发

- 5月24日MAXI在银心方向爆发，命名为J1743-291
- 观测延迟大约小时~半天。

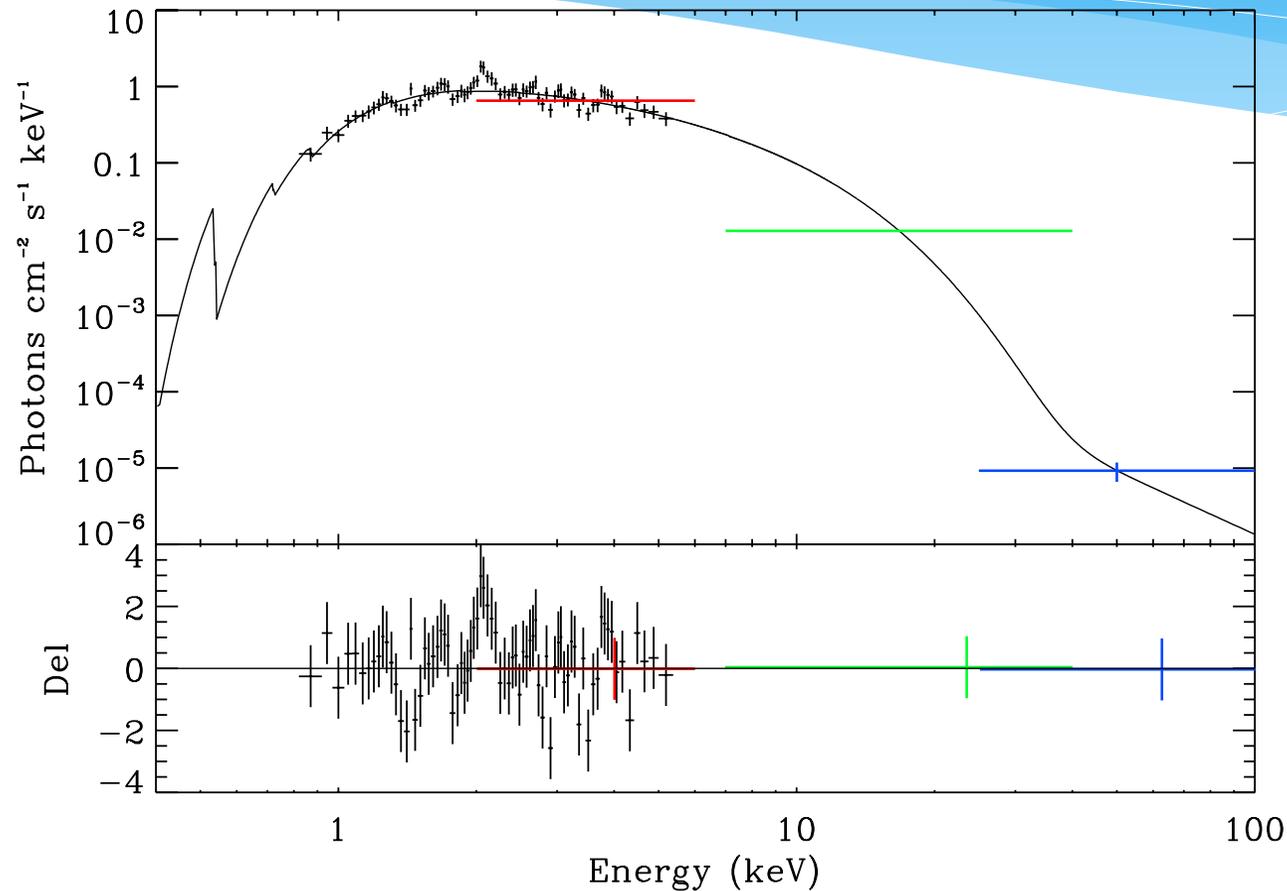


# 引力波对应体搜索

- 5月18日开始对引力波事件进行后随观测。
- 目前已进行3次follow-up。
- 观测延迟大约小时~半天。



# 慧眼HXMT和LEIA协同观测



GX 342+9

(diskbb+po)\*tbabs

Tin = 2.84 keV

PhoIndex = 2.8

LEIA:

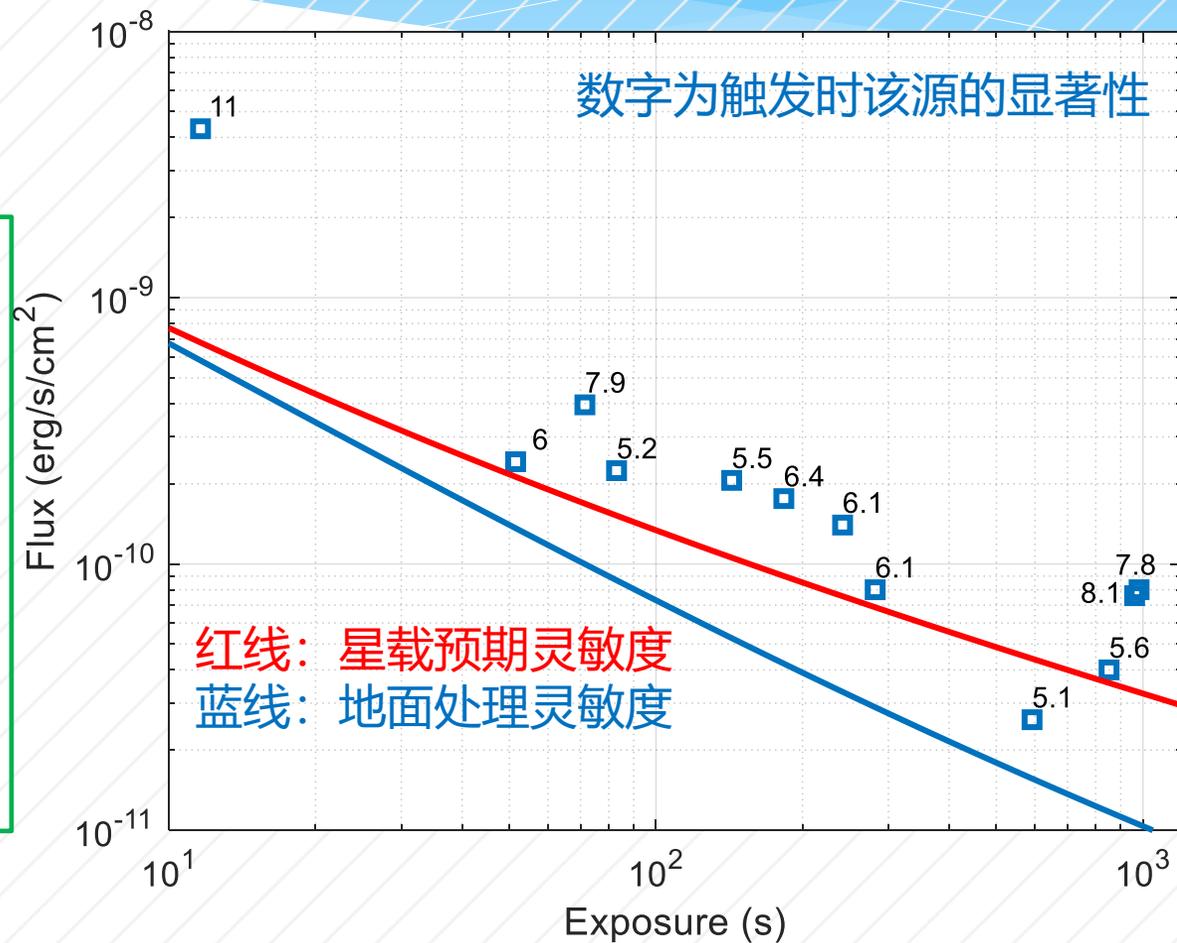
2023-03-29T05:34:55

HXMT: 2023-03-  
29T05:50:00

Black: LEIA; red, green, blue: Insight-HXMT LE, ME, HE

# 星载触发灵敏度

- 指标：10 mCrab (10分钟积分)
- 试验星实测北斗报文
- 配置对已知源发送警报
- 实测10分钟积分灵敏度约2 mCrab





## First Wide Field-of-view X-Ray Observations by a Lobster-eye Focusing Telescope in Orbit

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- First successful wide FoV obs. with a lobster-eye focusing X-ray telescope
- First application of CMOS for X-ray astronomical detectors in orbit (to our knowledge)

# 总结

- \* LEIA实现了EP-WXT的关键技术验证，目前在轨性能良好。

  - ✓ 完成了首轮软X射线全天天图绘制。

  - ✓ 发现了30余例瞬变源/爆发源。

  - ✓ 从5月份起，开展引力波后随观测。

- \* 未来将继续开展性能验证实验工作。

- \* 争取有所科学成果和发现。

  - 感谢各位支持。

  - 期待EP-WXT未来30X的能力！

