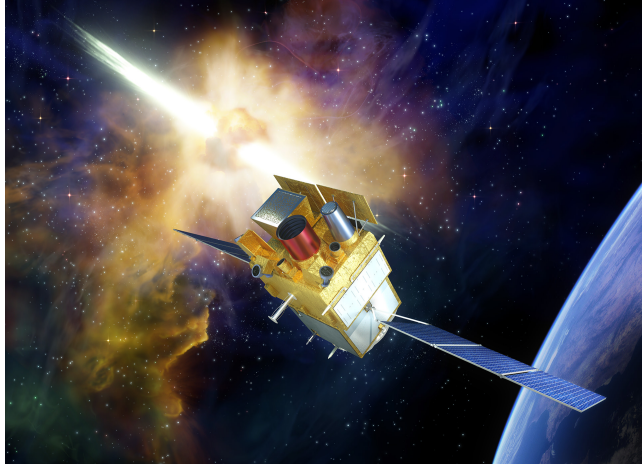


SVOM General Program Catalog @ First Year from CSC (V1.2)

**Prepared by Wang Jing, Bai Jianying, Xu Dawei, Li
Guangwei, Li Huali, Han, Xuhui, Qiu Yulei, Wei Jianyan
on behalf of CSC GP Science Working Group**

Xichang, China
2024/06/23



Outline

- ❖ **Scientific topics**
- ❖ **Organization of GP scientific teams**
- ❖ **Definition of GP catalog of the first year**
- ❖ **Summary**

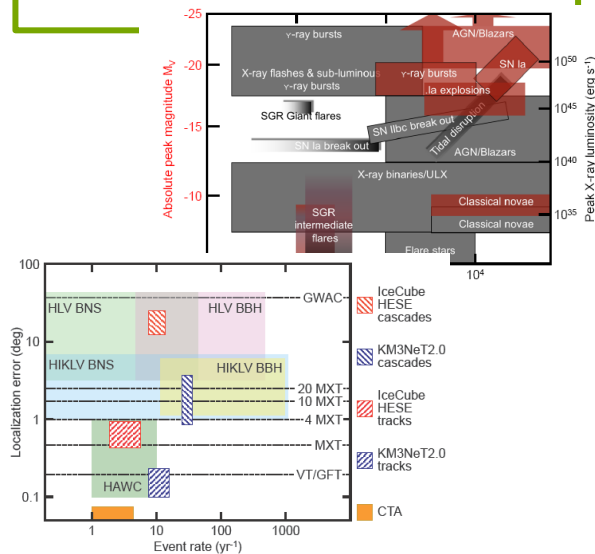
Scientific topics of GP

GRBs: Core Program

- **All types**
- **Fast, reliable positions**
- **Prompt emission: Visible to MeV**
- **Afterglows: Infrard to X-rays**
- **Early universe: highly redshifted ($z > 5$)**

Rapid Follow-Up: ToO Program

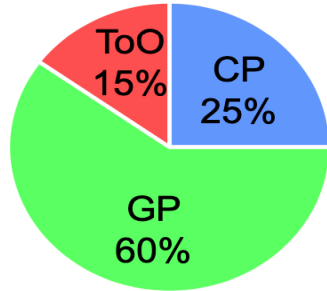
- **Multi-wavelength**
- **Multi-messenger**



Observatory Science (General Program)

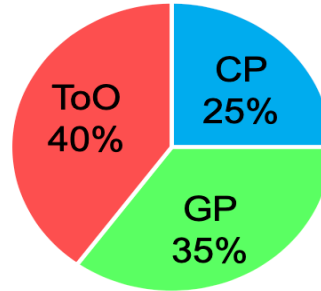
- **AGNs**
- **Ultra Luminous X-ray Sources**
- **Tidal Disruption Events**
- **Galactic sources**
 - **Accreting systems**
 - **Pulsars & magnetars**
 - **Flaring stars**
- **Exoplanets & Solar System bodies**
- ...

Nominal mission



3 years

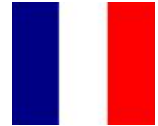
Extended mission



2 years



60%



40%

- **Nov 2022: Internal call in SVOM community for participation to GP working group**
- **Goal: define a list of sources (scientifically driven) for the 1st year of SVOM observation plan related to the main science cases (GP + GP-ToO)**

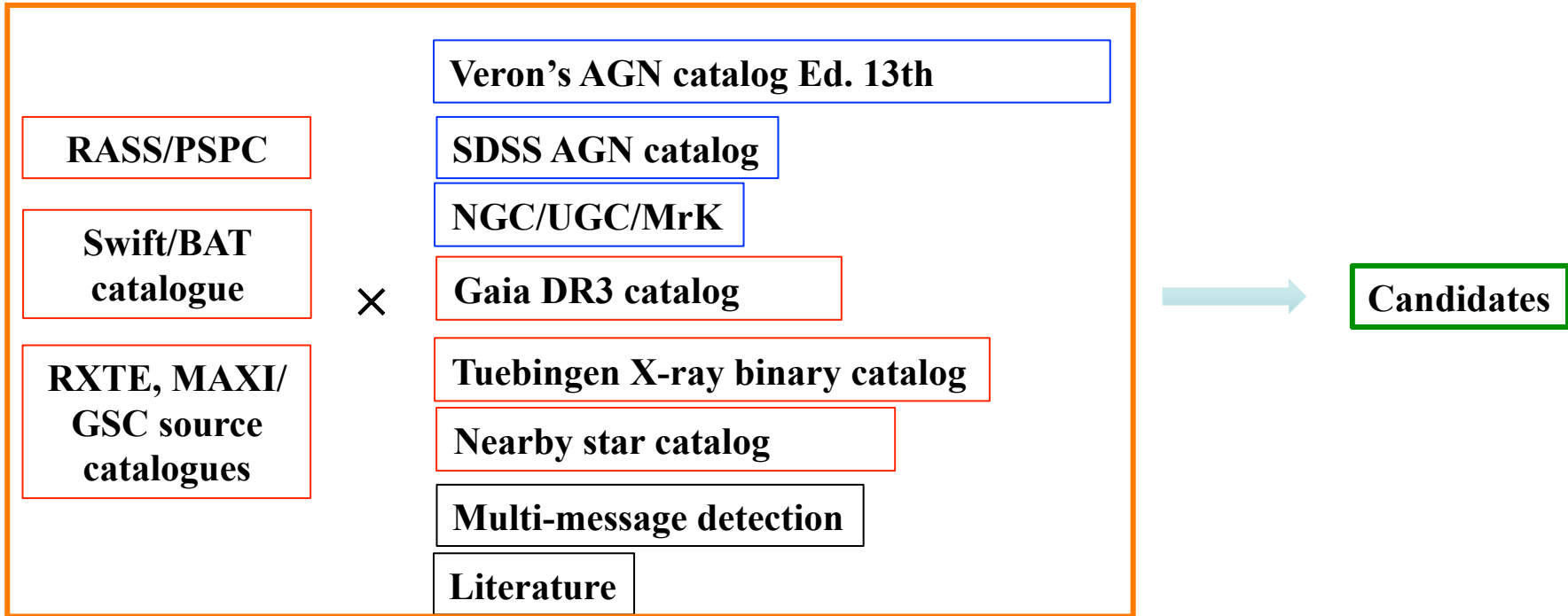
Scientific objectives and requirements of GP catalog

	Celestial object		Science	Obs cadence	MXT/VT requirements	B1-law
Extragalactic	AGN	QPE-AGN	SMBH accretion	Intra day/Week/month	Y/Y	Not all
		CL-AGN				Y
		AGN/NLS1				Y
		Blazar and VHE AGNs	Jet physics	Intra day		Y
	SN		Compact obj	GP-ToO	N/Y	Not all
	TDE		SMBH accretion		N/Y	Not all
	FRB		Compact obj	GP-ToO/~Minutes/FAST	N/N	Not all
Galactic	Flaring star		Magnetic activity	~Minutes	N/Y	Y
	LMXRB		Compact obj	Week/Month	N/N	N
	microquasars		Compact obj	Week	Y/Y	N

GP working groups & proposals from CSC

	Celestial Objects		WGs (CN)
Extragalactic	AGN	QPE-AGN	J. Wang(GXU/NAOC)
		Blazar	J. H. Wu (BNU)
		CL-AGN	D. W. Xu (NAOC)
		AGN/NLS1	T. G. Wang(USTC)/J. X. Wang(USTC)/D. W. Xu(NAOC)
	Nearby galaxy		G. W. Li(NAOC)
	SN		W. K. Zheng/A. V. Filippenko(UCB)
	TDE		N. Jiang(USTC)
	FRB		W. W. Zhu(NAOC)/L. P. Xin(NAOC)
Galactic	X-ray binary		W. F. Yu(SHAO)/J. R. Mao(YNAO)
	Flare		J. Wang (GXU/NAOC)
	CV/Nova		J. R. Mao(YNAO)

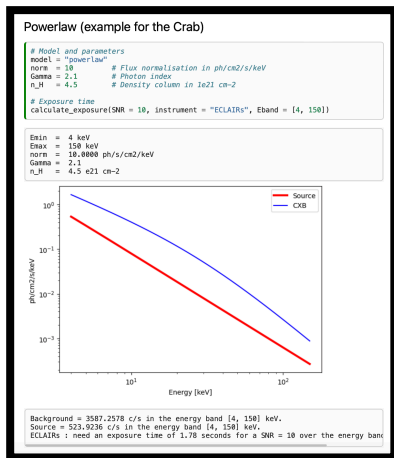
Catalog selection and filtering from CSC



Catalog selection and filtering from CSC & FSC

Candidates

G>8mag for unsat



MXT & Eclairs calculators

MXT/Eclairs CR

Pointing

Physics

Magnitude converter and SNR calculator for Visible Telescope

Input magnitudes in Johnson(Vega) system(-0.6<B-R<3.5)

B mag R mag
 Bvt Rvt
 Exposure(seconds in Integer)
 SNR in Blue band SNR in Red band

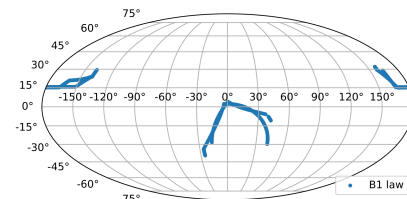
Input magnitudes in sloan system(-0.64<g-r<2.07)

g mag r mag
 Bvt Rvt
 Exposure(seconds in Integer)
 SNR in Blue band SNR in Red band

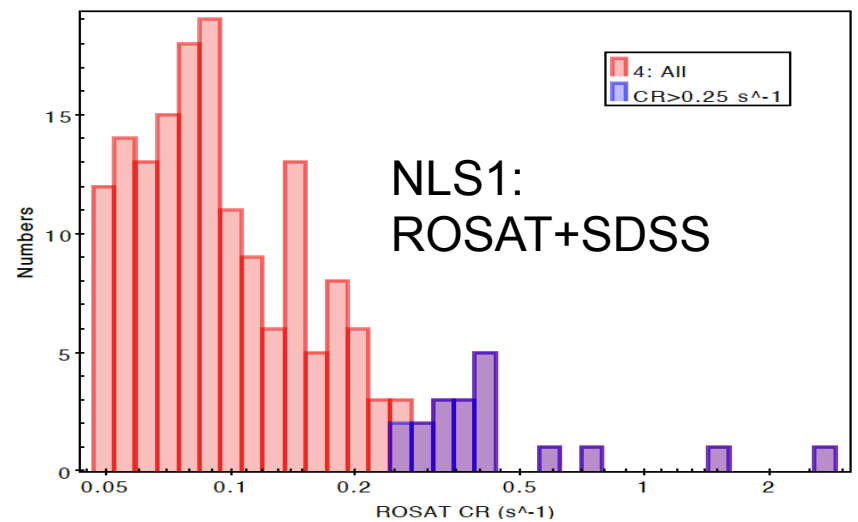
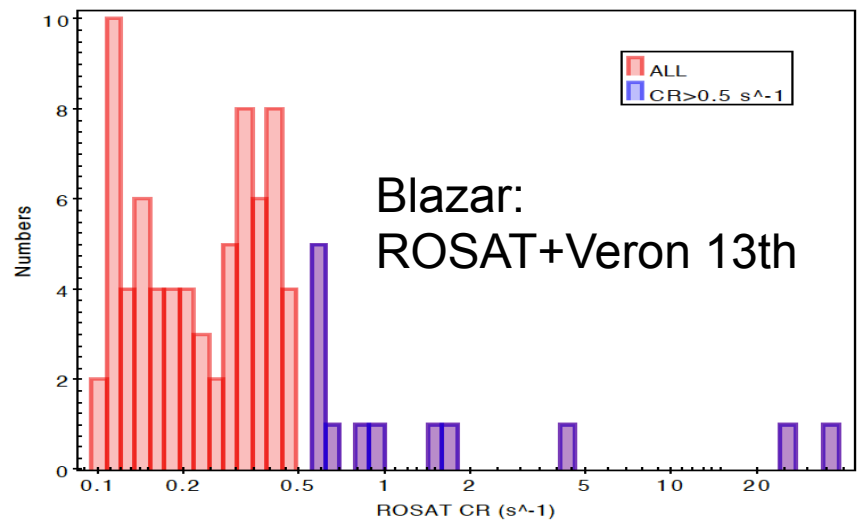
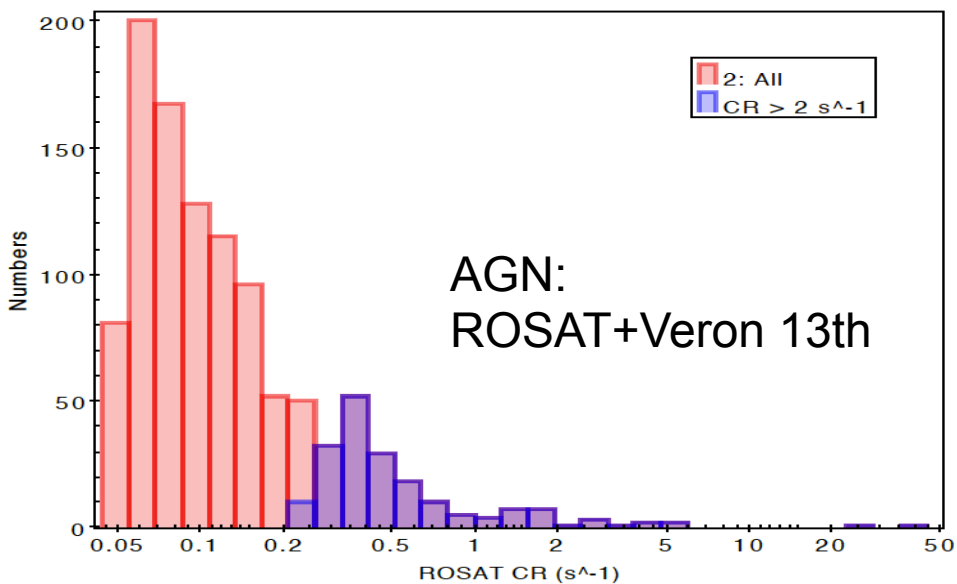
Estimate the total data volume for the observation

Exposure(seconds in Integer) Effective Duration(min)
 Interval(0,1,2) Window size(arcmin)
 Data volume(Mbit)

VT calculator



B1 law



➤ Freund et al. (2022) perform crossmatch between RASS sources and Gaia Early Data Release 3 ($G < 19$ mag & parallax significance $> 3\sigma$).

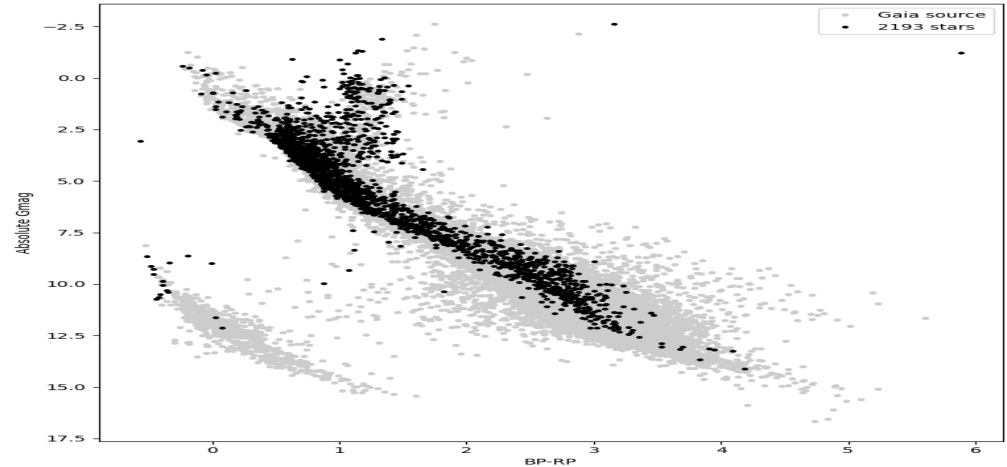
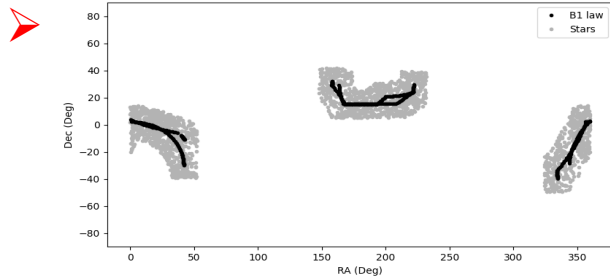
➤ Clearing for the 28111 ‘stars’

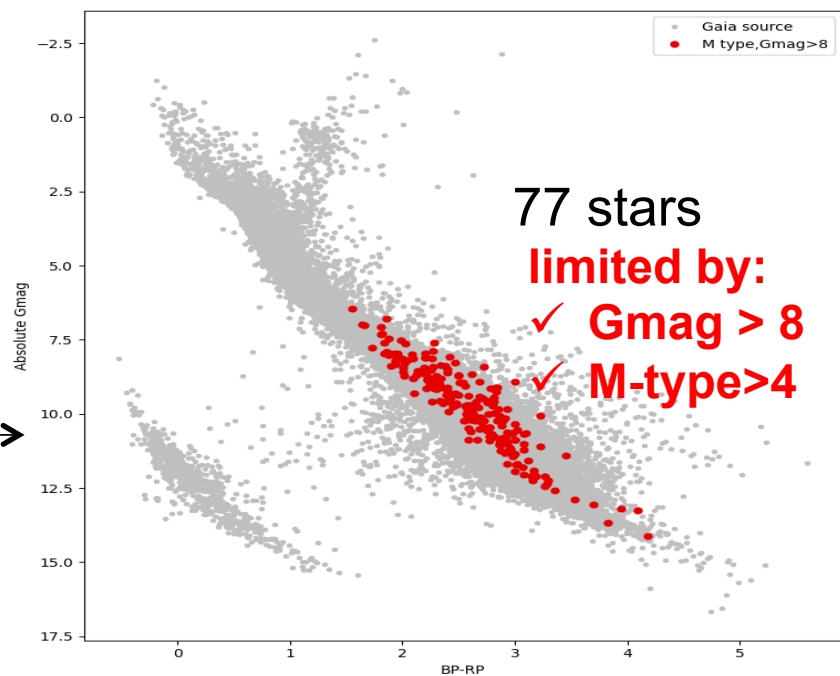
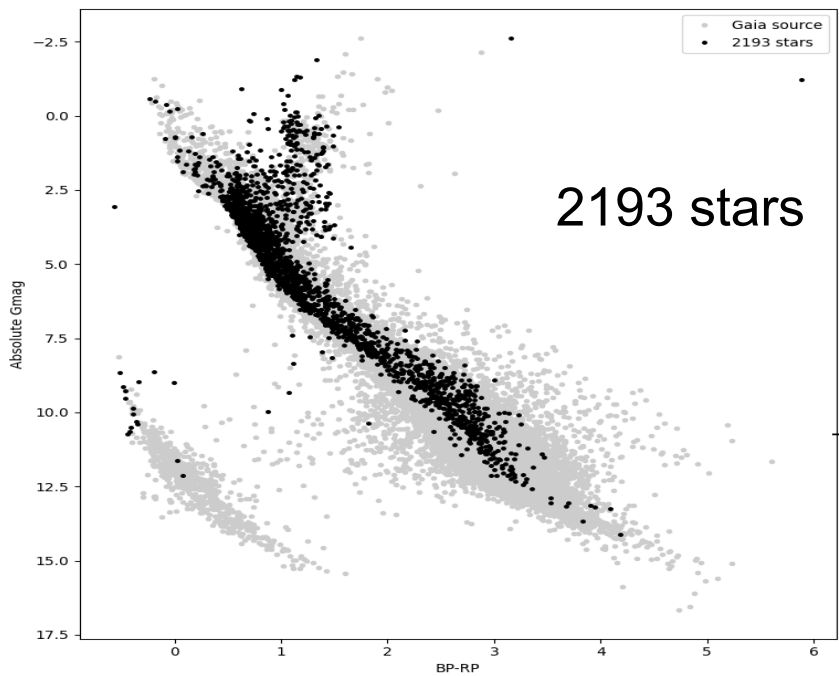
➤ AGN (54), SDSS DR12 QSO catalog, Veron AGN catalog

➤ Galaxy(19), ROSAT-BSC galaxy identifications

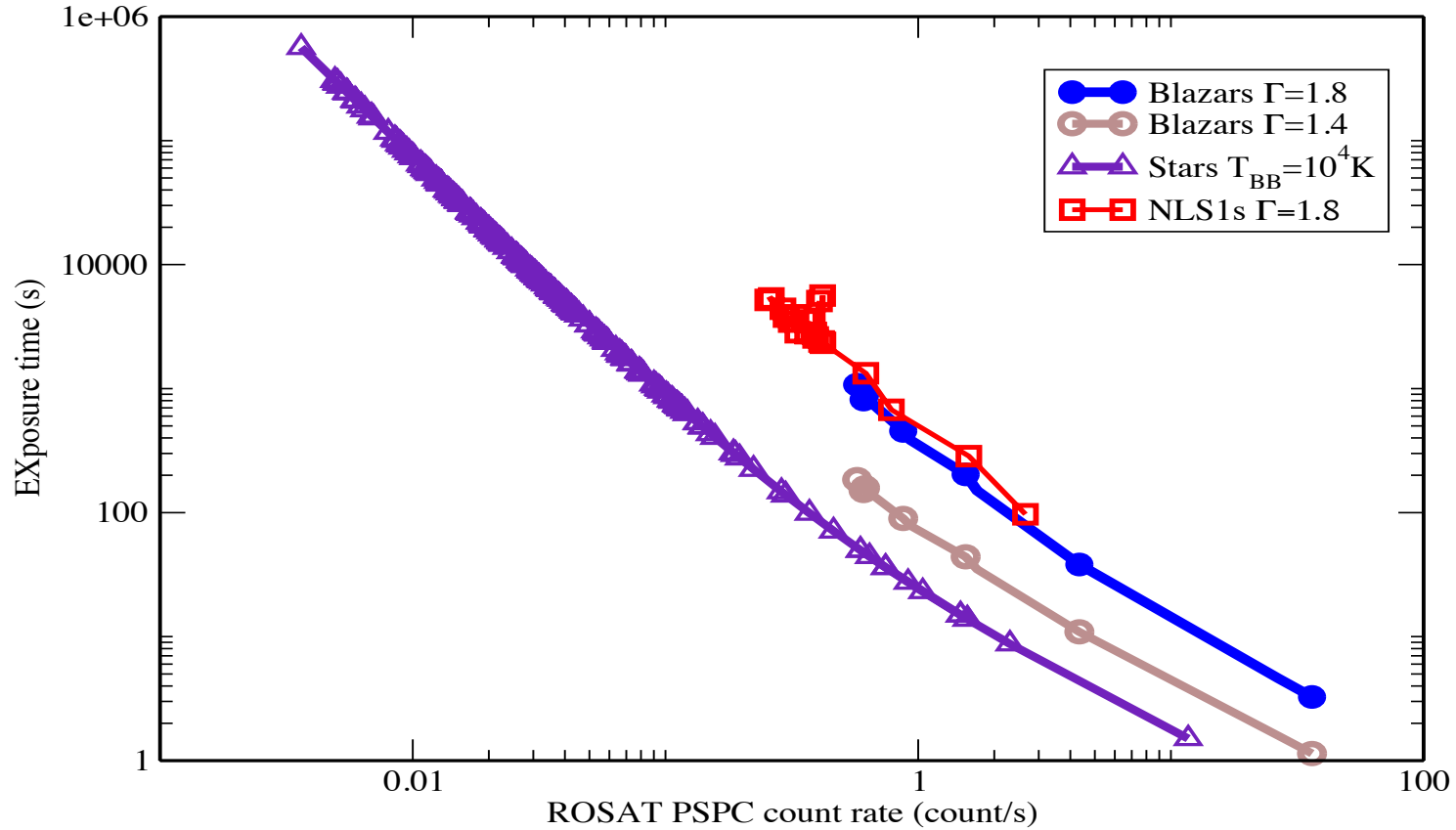
➤ Cluster of galaxies(0), ROSAT Brightest Cluster catalog, RASS/SDSS Clusters catalog

➤ Non B1-law stars (25845)





MXT exposure time calculation



Catalog from CSC

13 Veron Blazars (ROSAT CR > 0.5 counts/s)

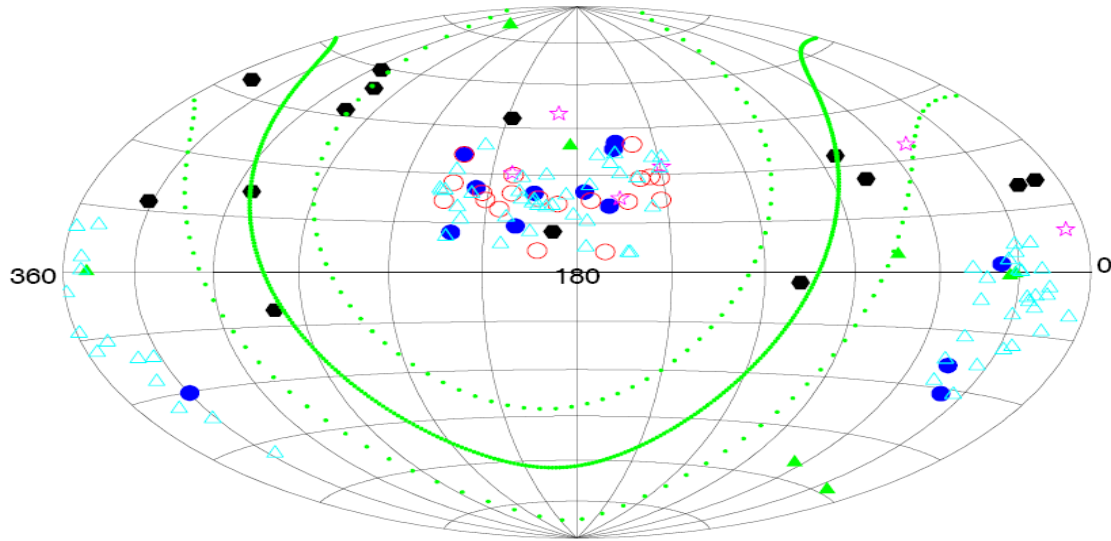
19 SDSS NLS1 (ROSAT CR > 0.25 counts/s)

6 γ -ray NLS1s

8 Repeating CL-AGNs

14 FRBs

77 M-dwarfs



Objects	Source #
Blazars	13
NLS1s	19
γ -NLS1s	6
RCL-AGNs	8
FRBs	14
M-dwarfs	77

App. time (ks)	Max. available time (ks)
7956	3879

Summary

1. A GP working group in CSC has been established on multiple science
2. A GP catalog for **the first year** has been built after taking into account of science, instrumental capability and platform capability.