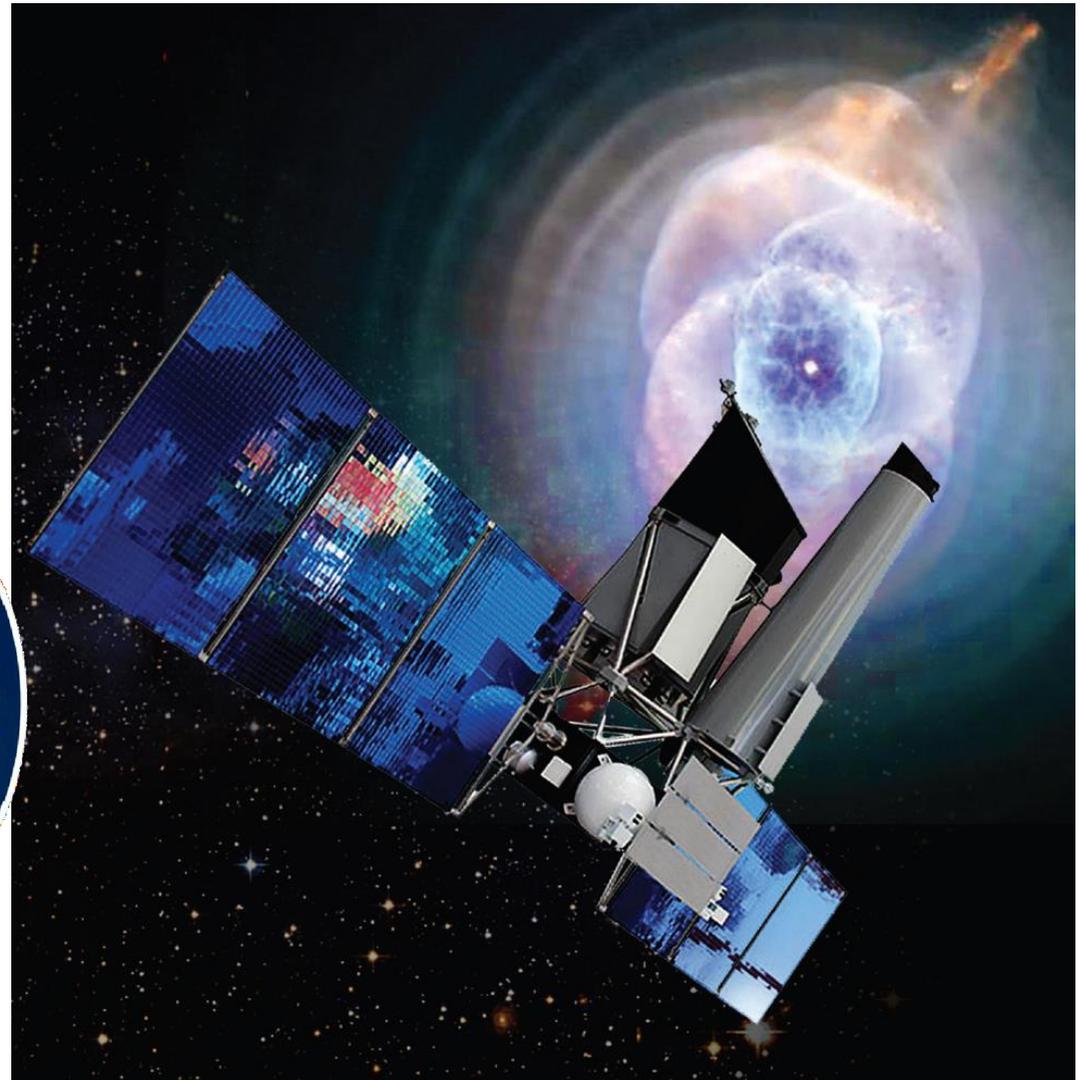
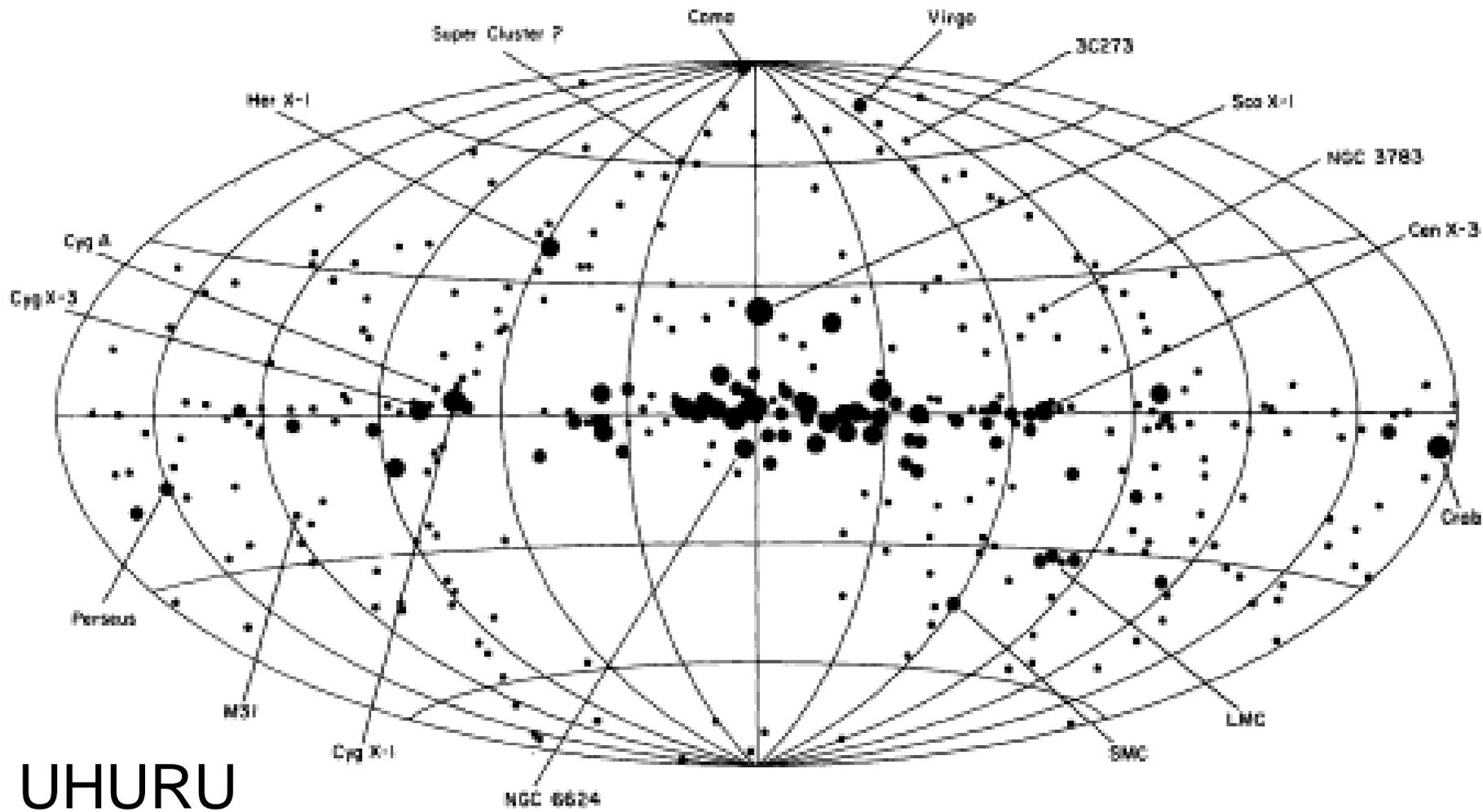


Александр Лутовинов,
Вадим Арефьев
ИКИ РАН



Александр Лутовинов,
Вадим Арефьев
ИКИ РАН





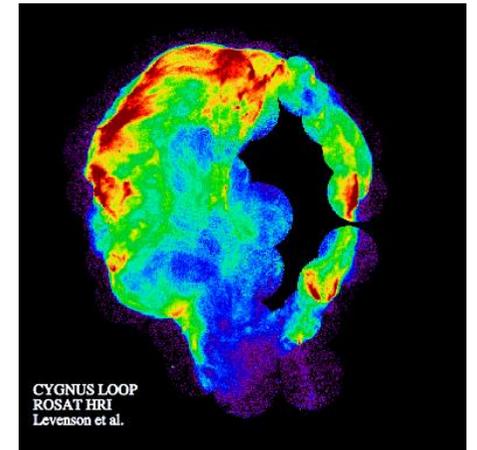
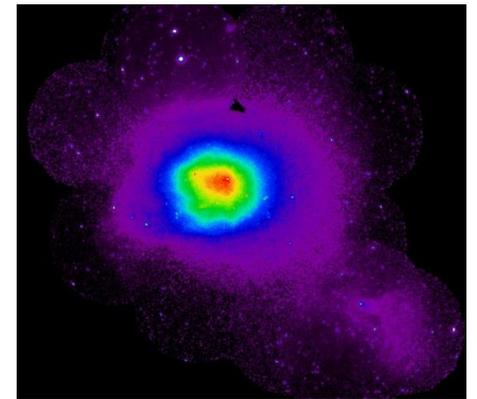
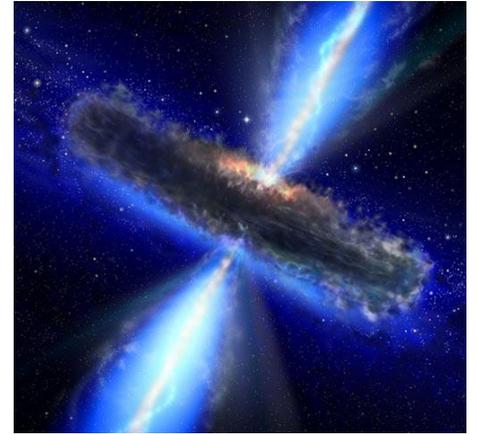
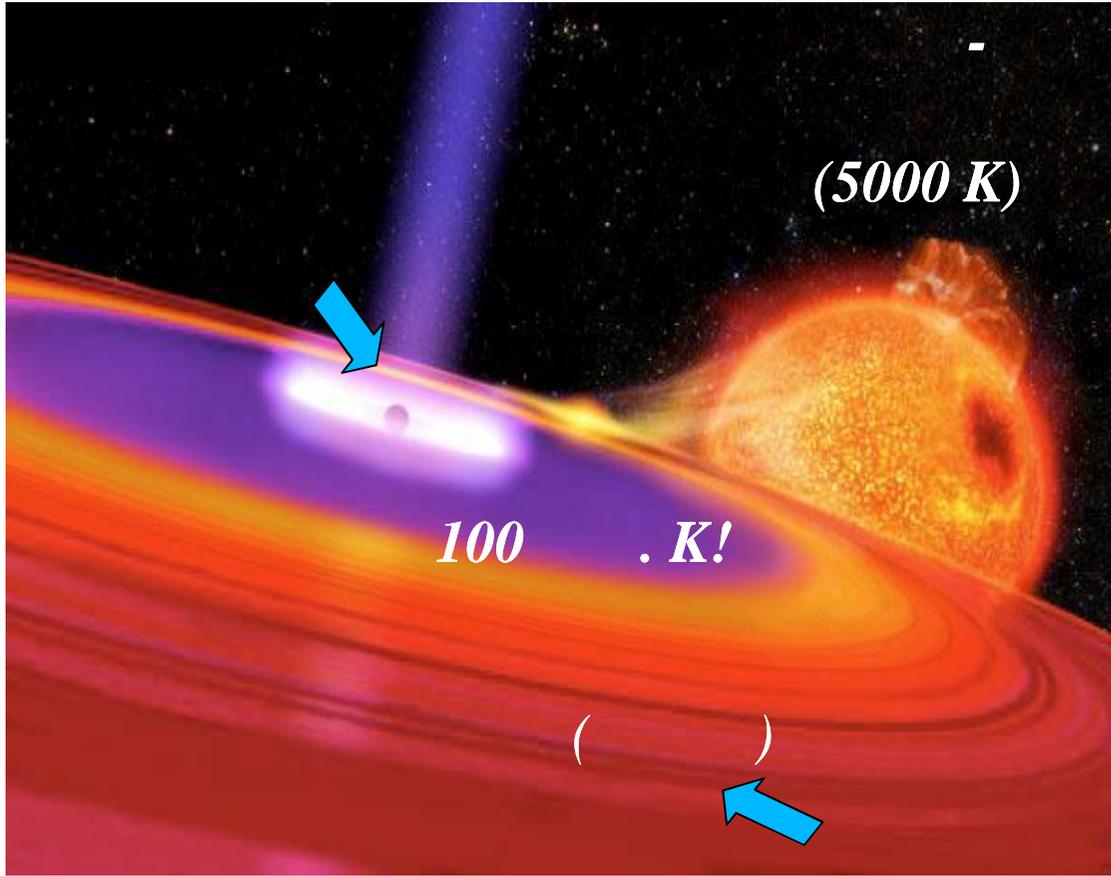
UHURU

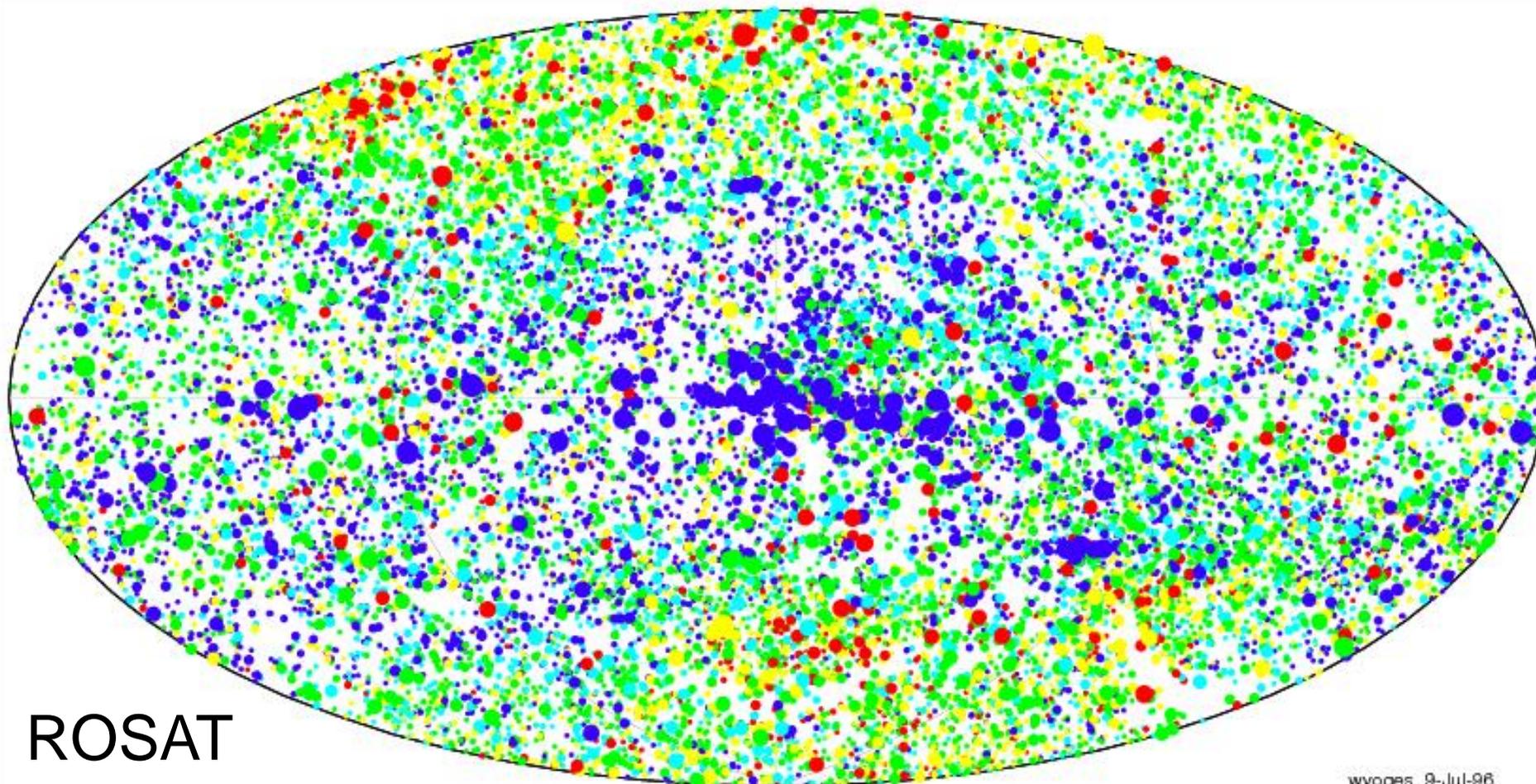
1970-1973

339

$L \sim 10^5 - 10^6 L_{\text{Sun}}$







ROSAT

wvoges 9-Jul-96

~200000

1990-1991 (0.1-2.4)



18 **2009,**
DLR (**)**
« **-** **»**

MAKS2009



. . .

- ,

MSFC/NASA

Max-Planck-Institute for Astrophysics

Istitut fur Astronomie und Astrophysik, Univ. Tubingen

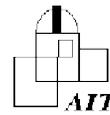
Astrophysikalishes Institut Potsdam

University Erlangen-Nuernberg

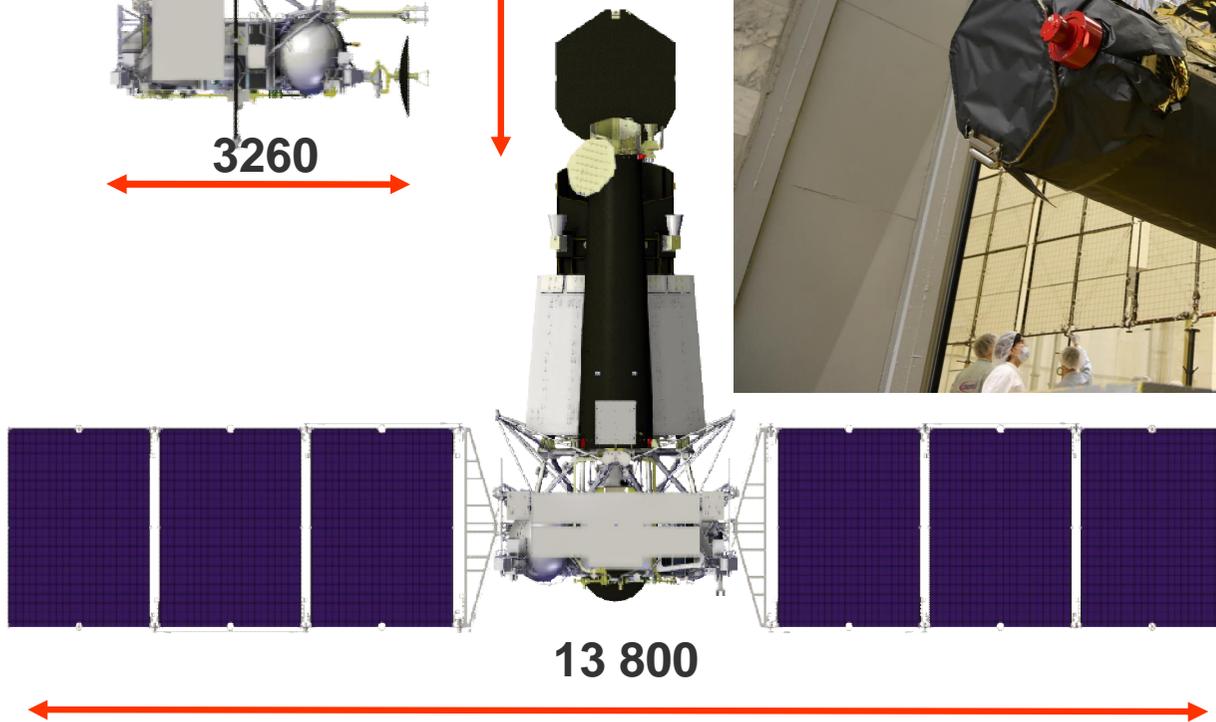
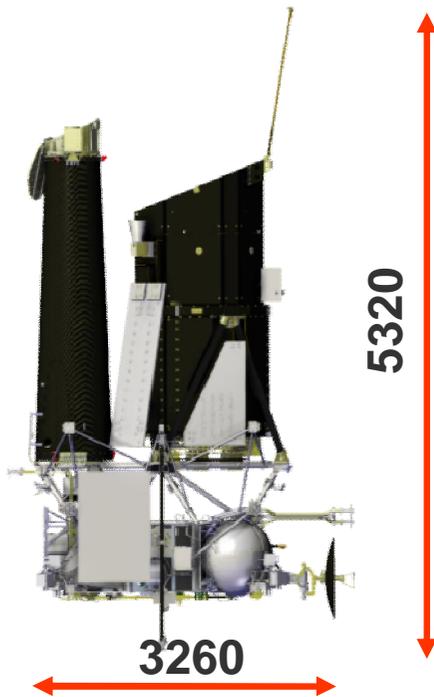
Hamburg University

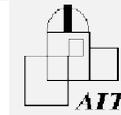
Max-Planck-Institute for Extraterrestrial Physics

DLR



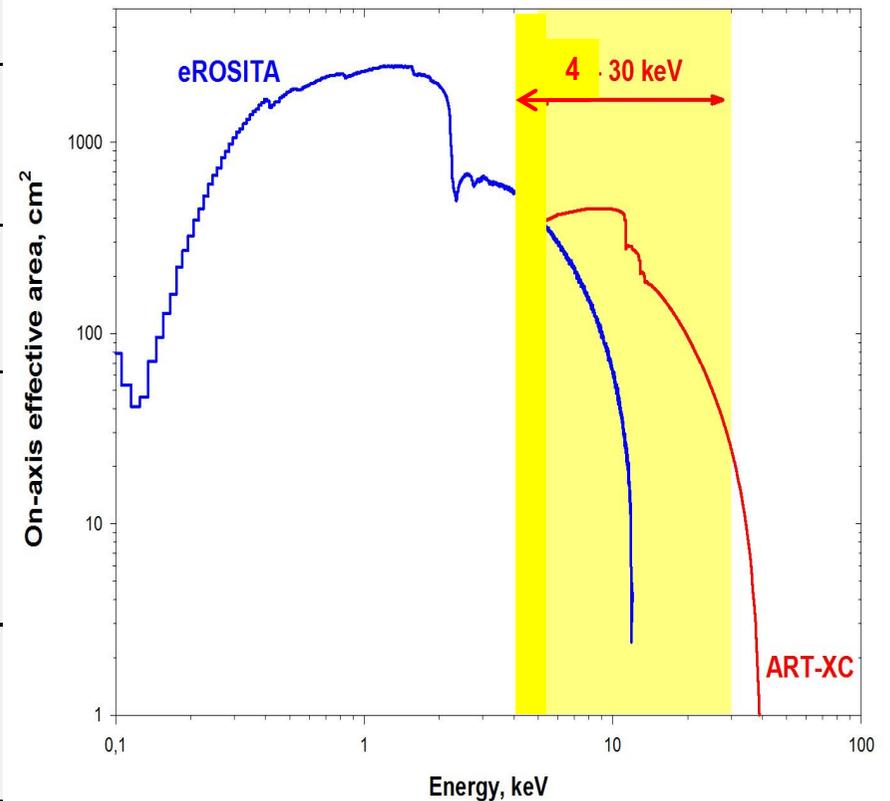
- (eRosita + ART-XC)





	eRosita	ART-XC
Диапазон энергий	0.3-10 keV	4-30 keV
FoV	1°	30'
Угловое разрешение	15"	45"
Площадь	2400 cm ² @ 1 keV	450 cm ² @ 8 keV

On-axis effective area of eROSITA and ART-XC

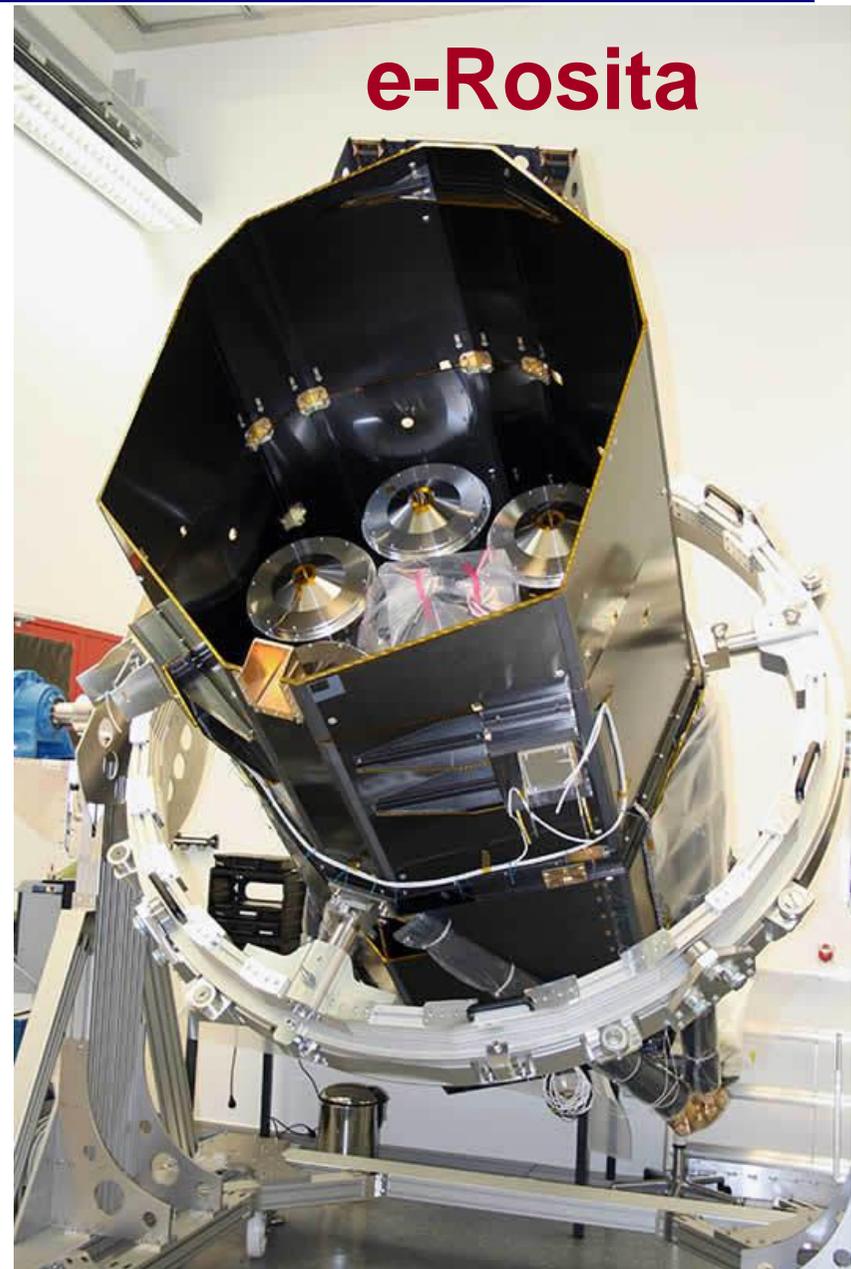
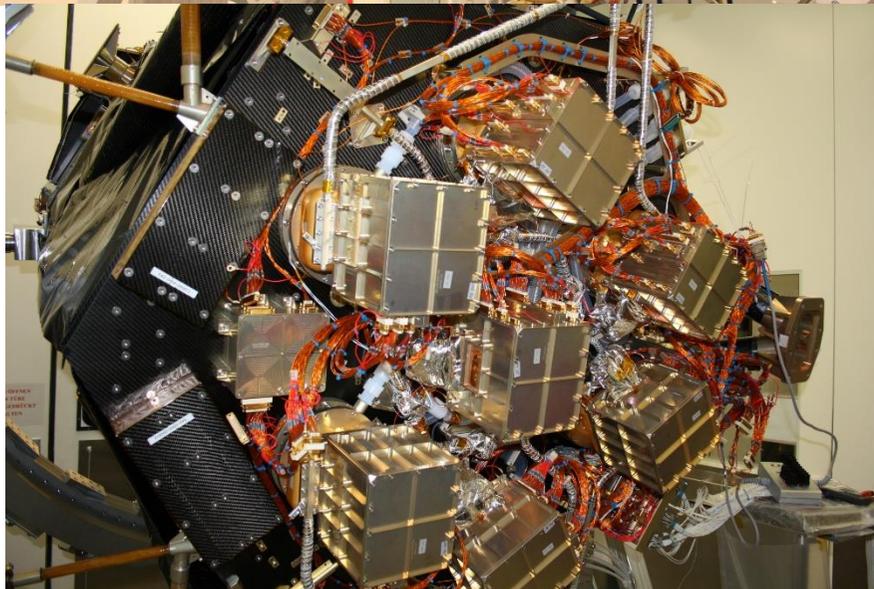
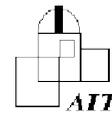


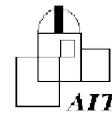
К

х

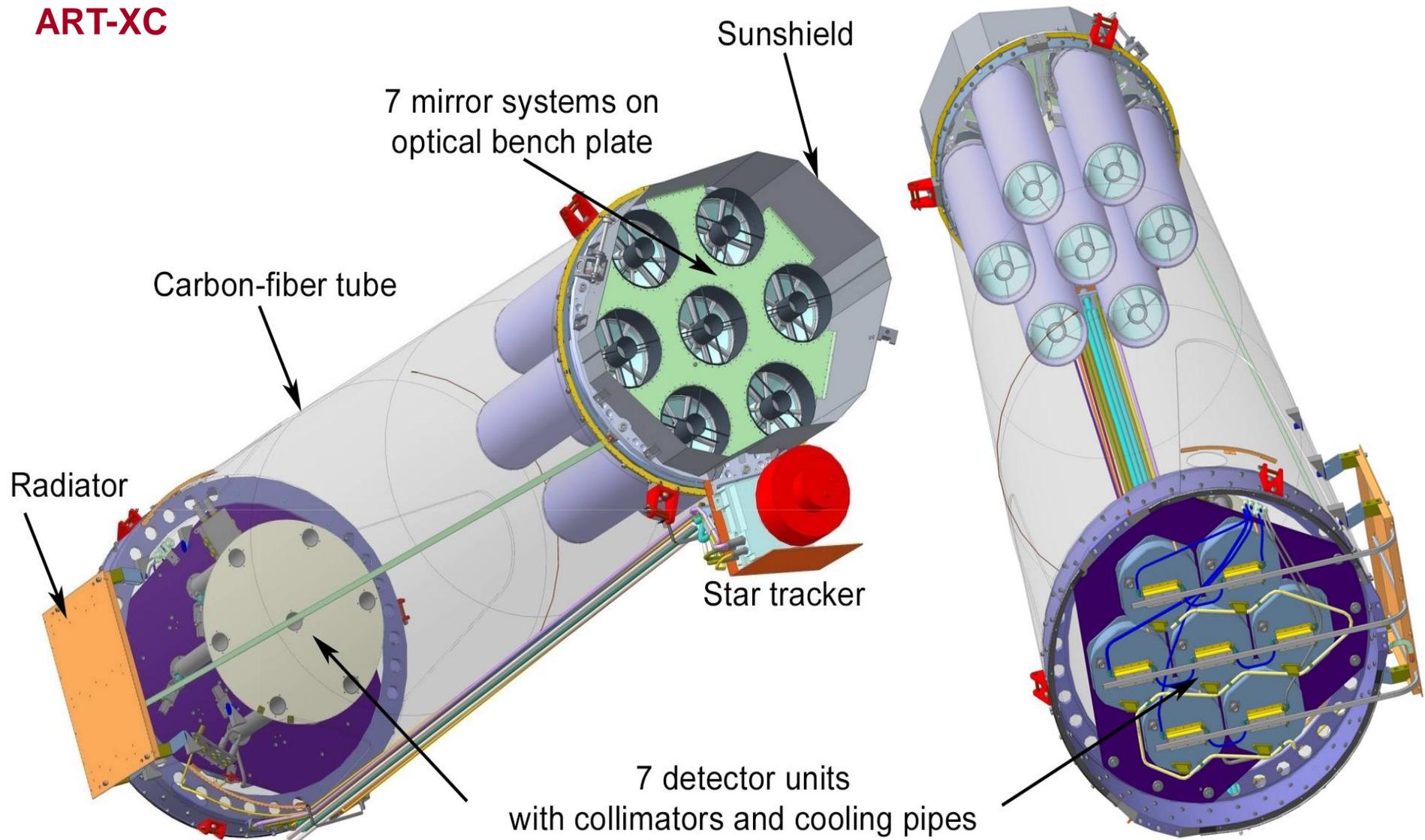
:

FoV

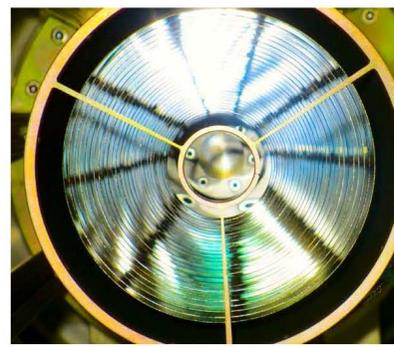
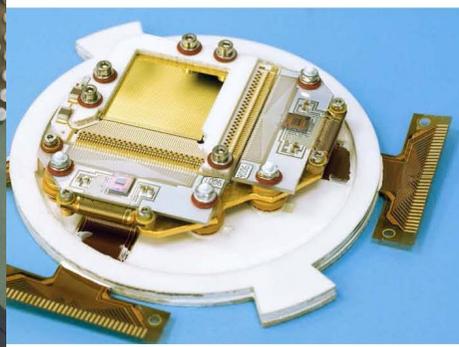
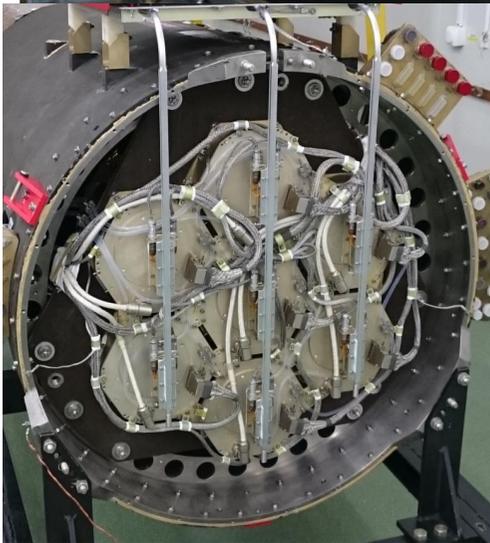


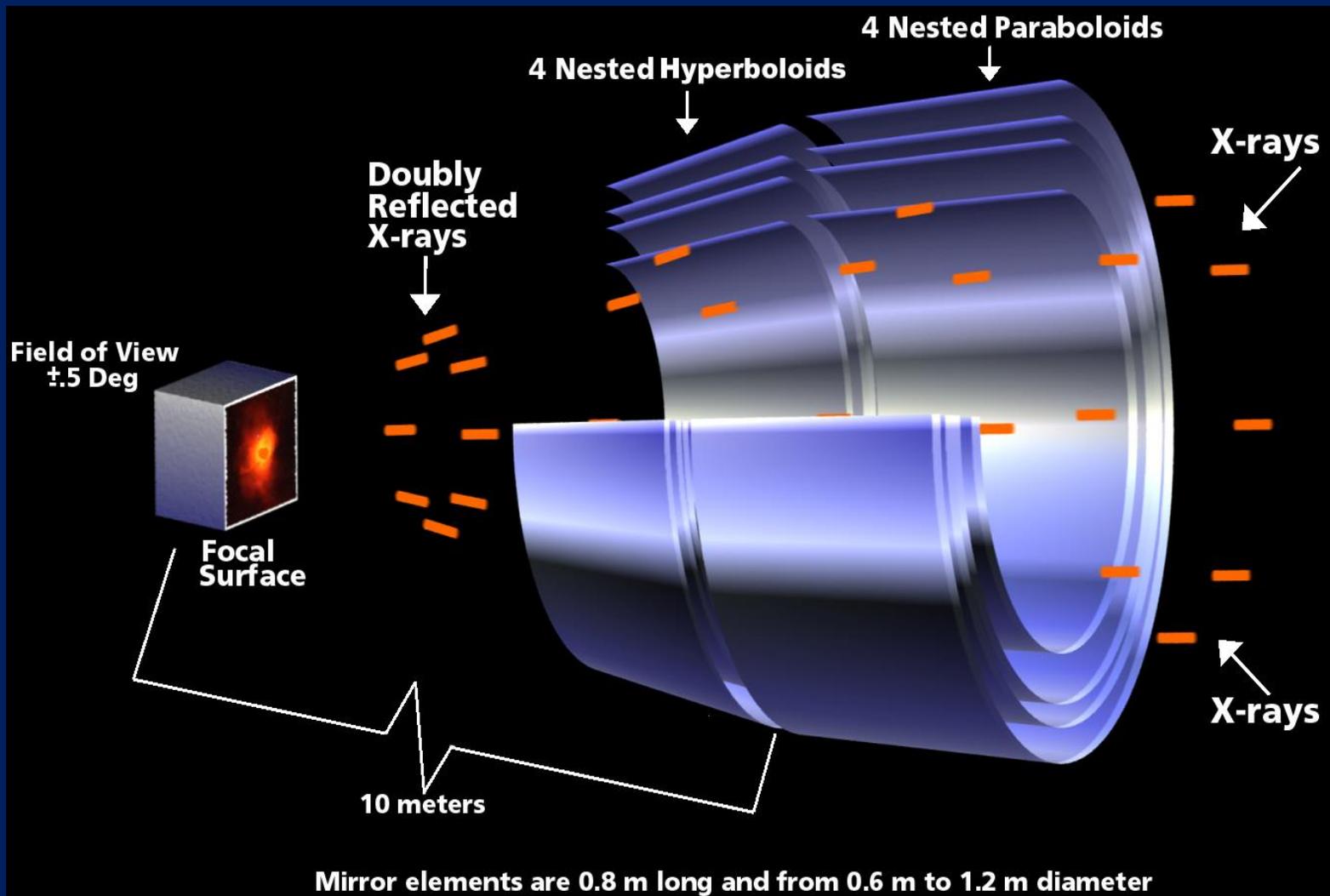


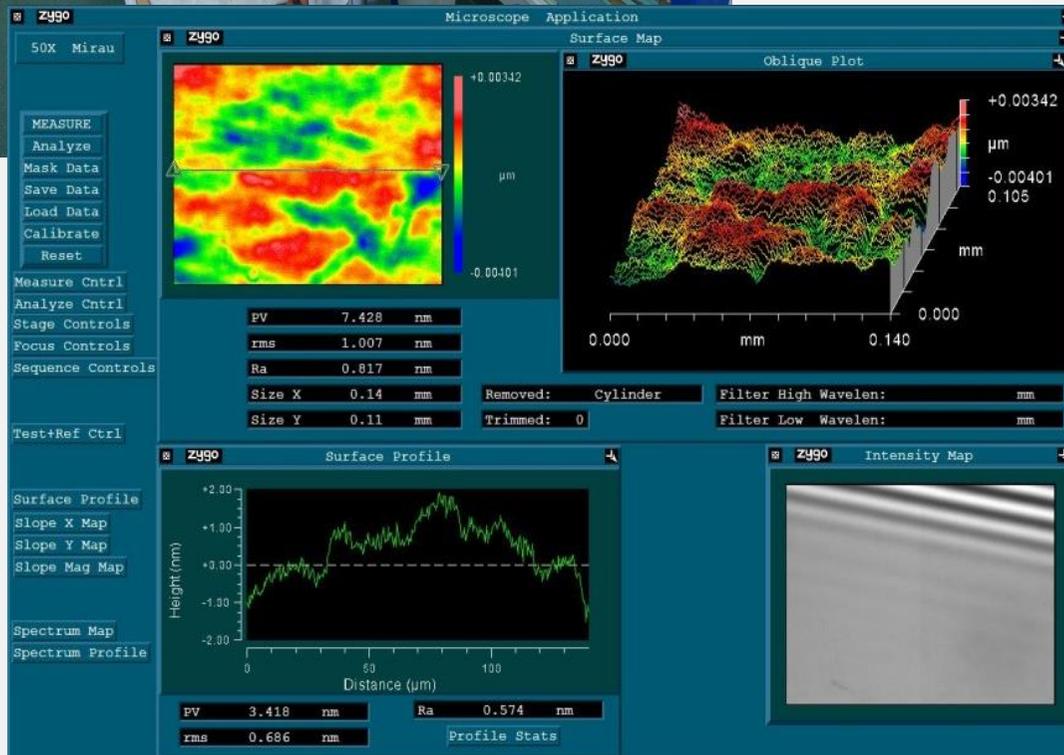
ART-XC

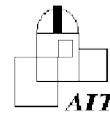


T ART-XC . . .

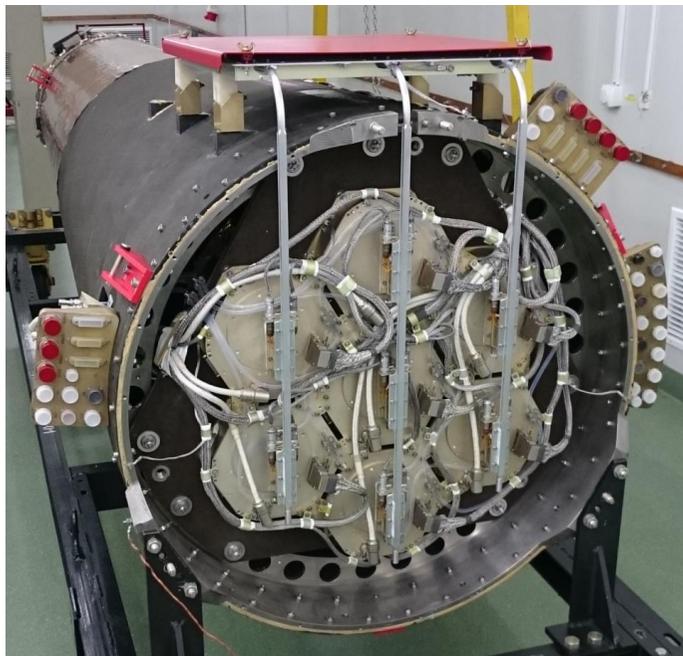
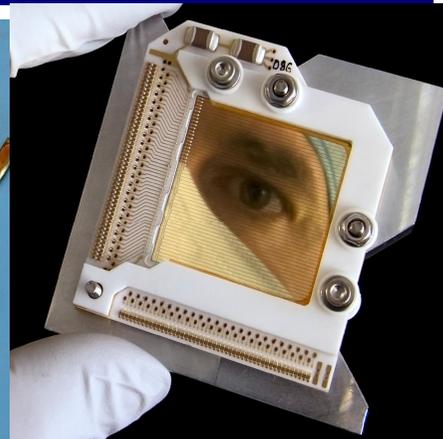
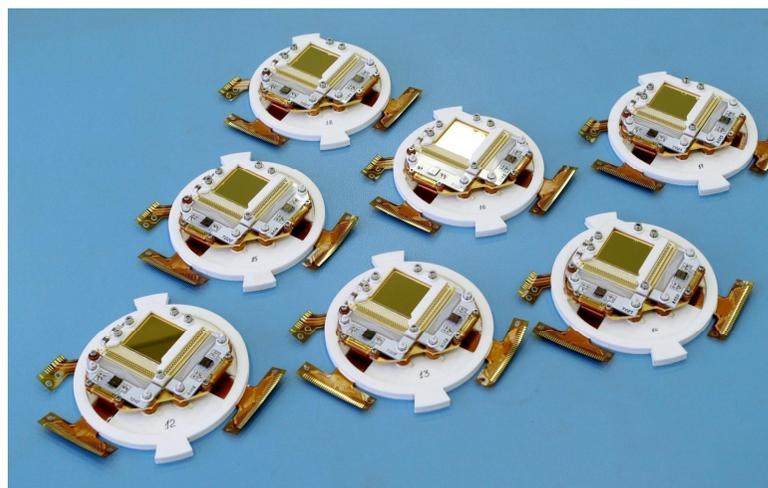


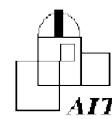






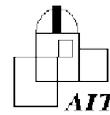
**ART-XC: детекторы
DSSD CdTe**
Разработано и
сделано в ИКИ РАН







SRG



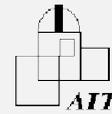
February 25, 2019



ИКИ

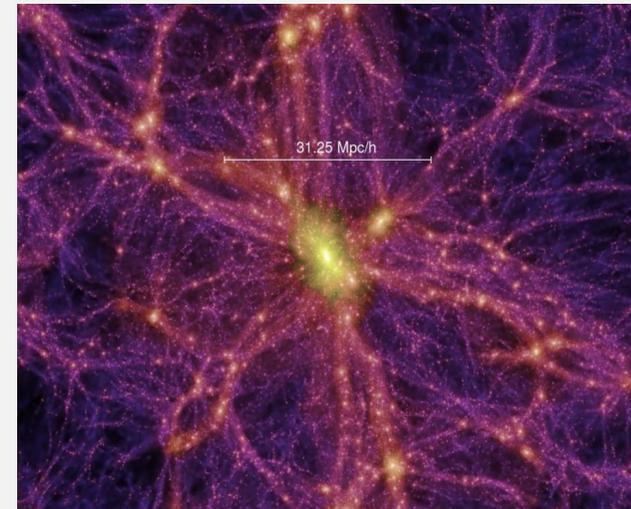


РФЯЦ
ВНИИЭФ



100 000

≥ 3



$\geq 3.5 \times 10^{14} M_{\odot}$ ($T \geq 4.5$)
 $z=2$

$\geq 2.3 \times 10^{14} M_{\odot}$ ($T \geq 3.5$)
 $z=1$

$\geq 10^{14} M_{\odot}$ ($T \geq 2$)
 $z=0.4$

THE BIG BANG

INFLATION

eRosita/
 $3 \cdot 10^{14} M_{\text{sun}}$

GALAXY EVOLUTION
CONTINUES...

DARK ENERGY?

FIRST STARS
400,000,000 YEARS
AFTER BIG BANG

THE DARK AGES

COSMIC MICROWAVE
BACKGROUND
400,000 YEARS AFTER
BIG BANG

FIRST GALAXIES
1,000,000,000 YEARS
AFTER BIG BANG

Now
13,700,000,000 YEARS
AFTER BIG BANG

$3 \cdot 10^{14} M_{\text{sun}}$
3,000,000,000

FORMATION OF
THE SOLAR SYSTEM
8,700,000,000 YEARS
AFTER BIG BANG

Image credit: Rhys Taylor, Cardiff University

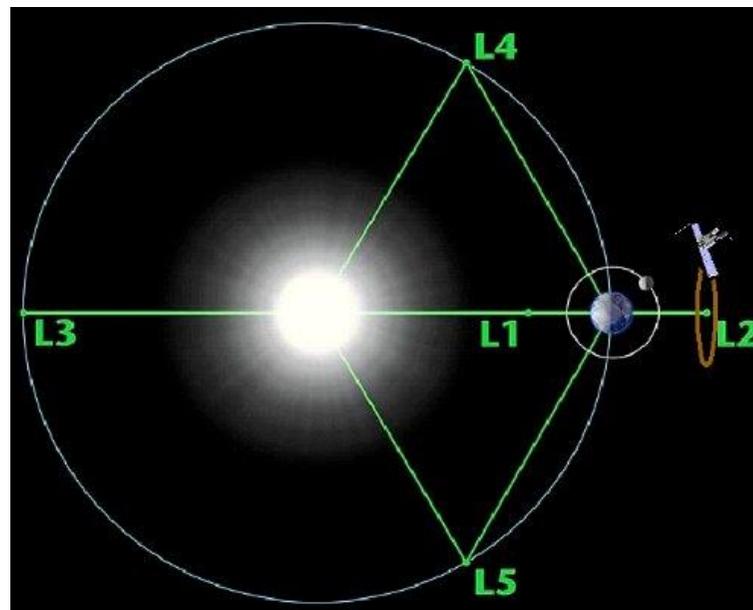


13.07.19



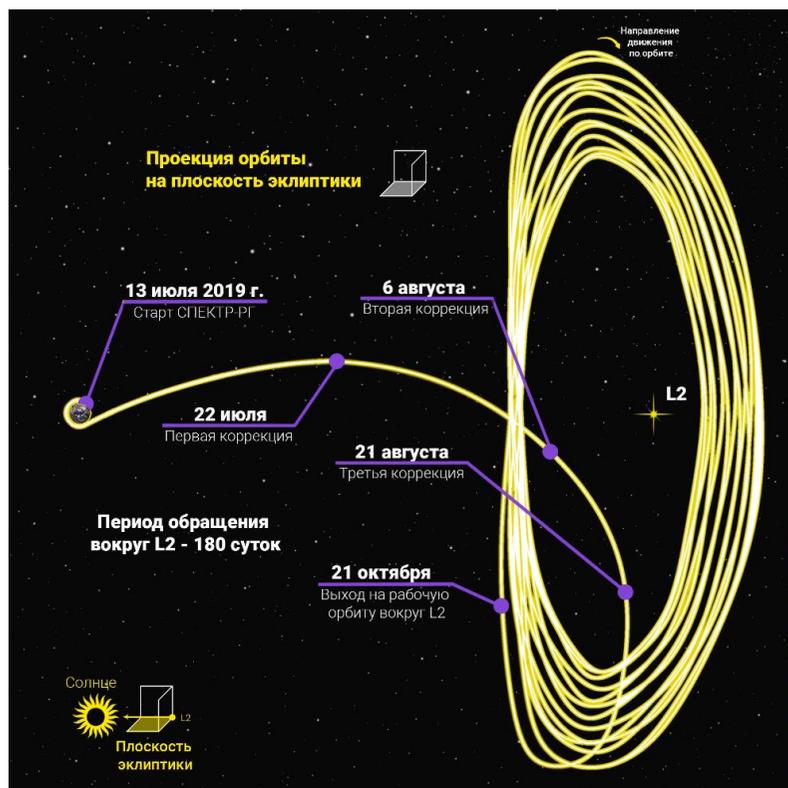
Proton-M

Buster DM-3



Ё 4

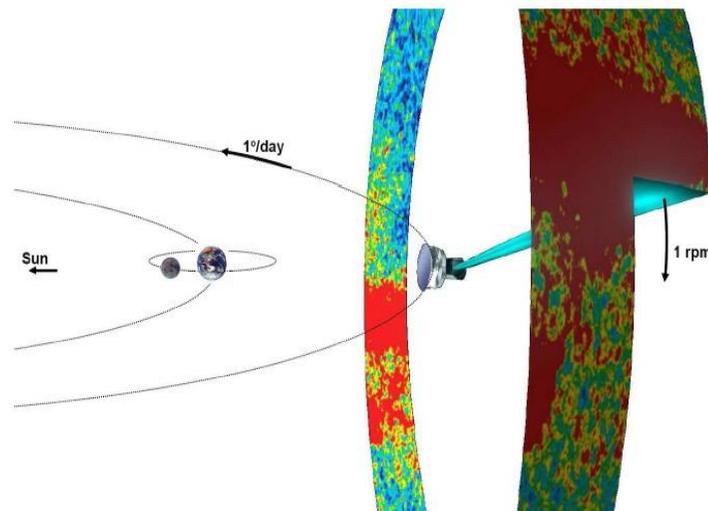
+2.5



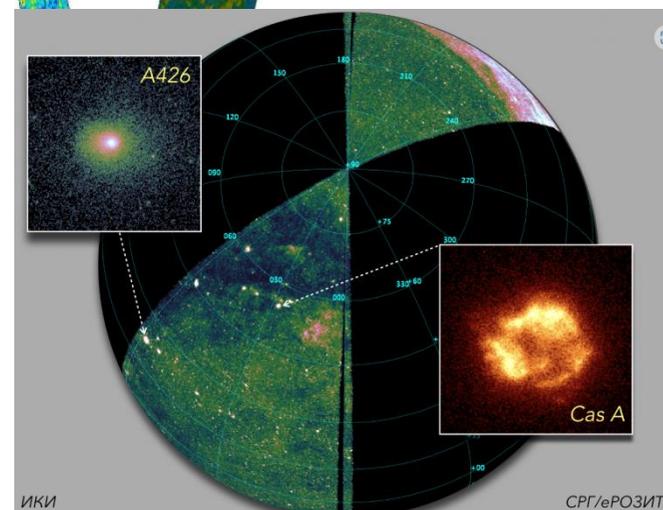
4

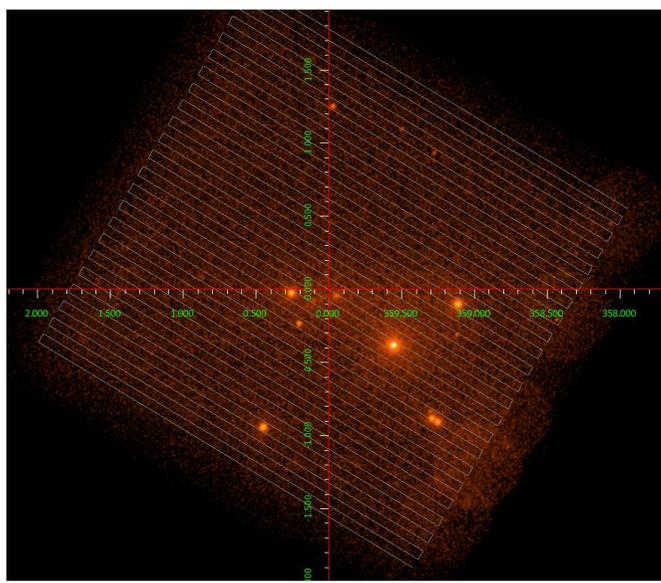
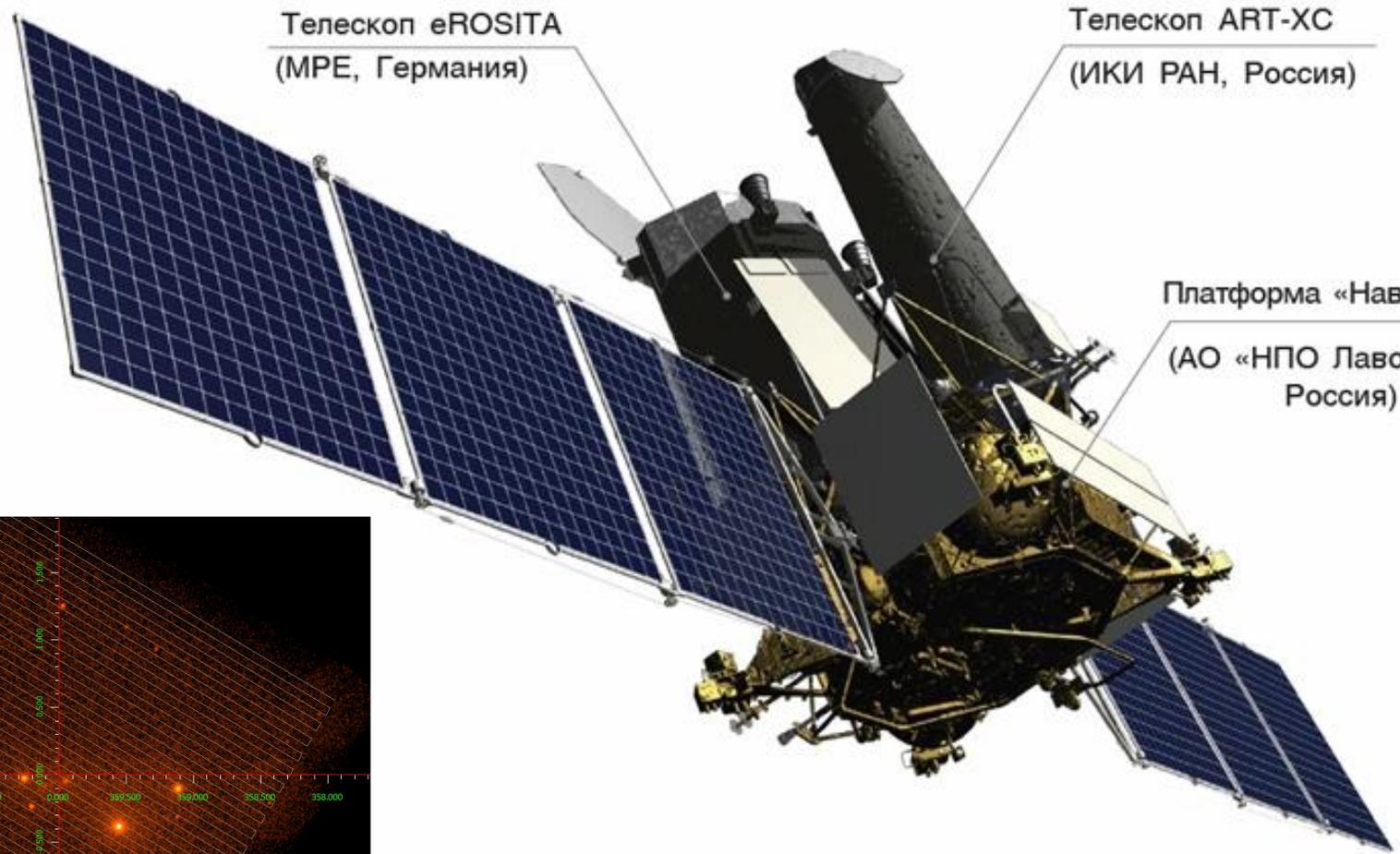
8

4



6

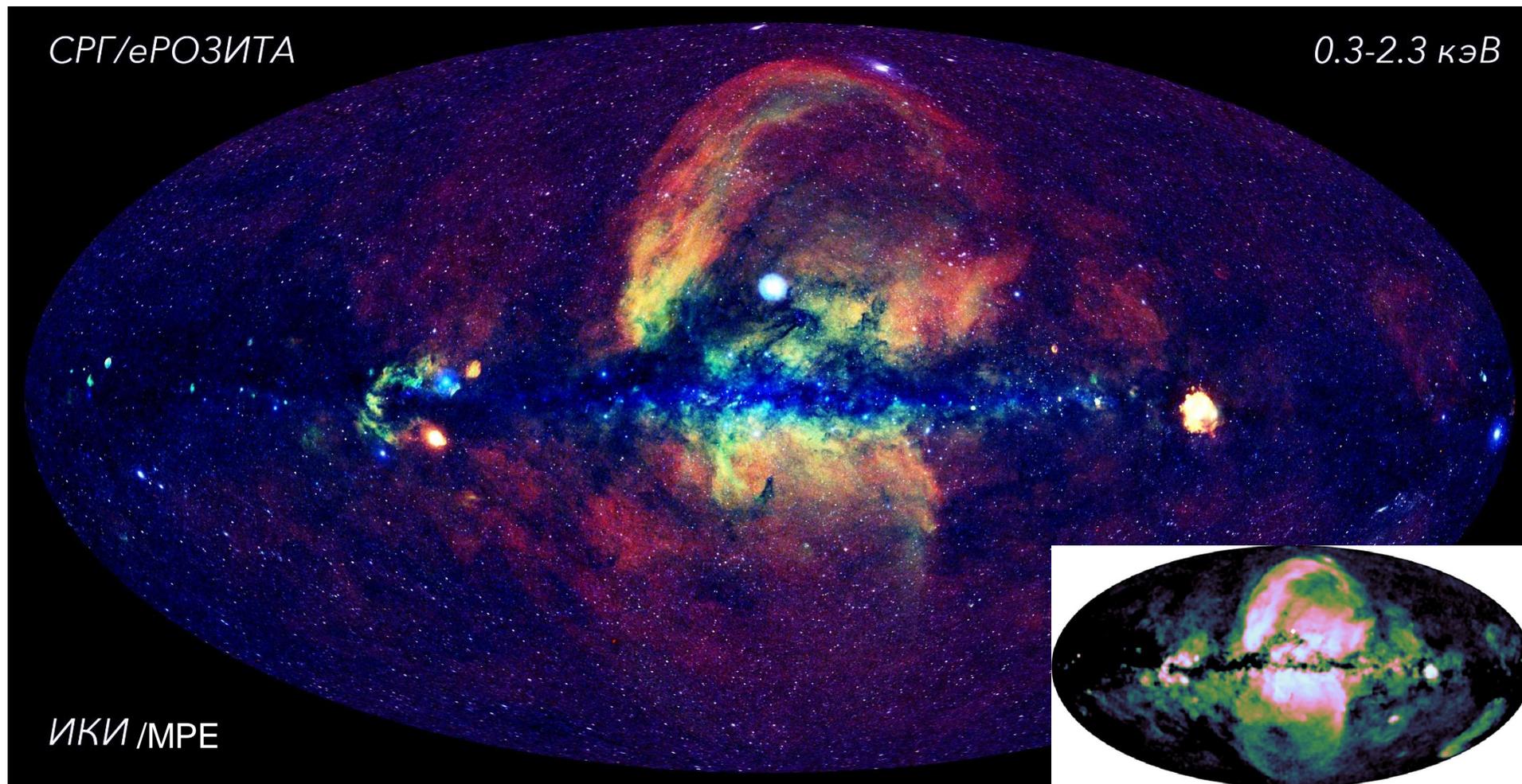




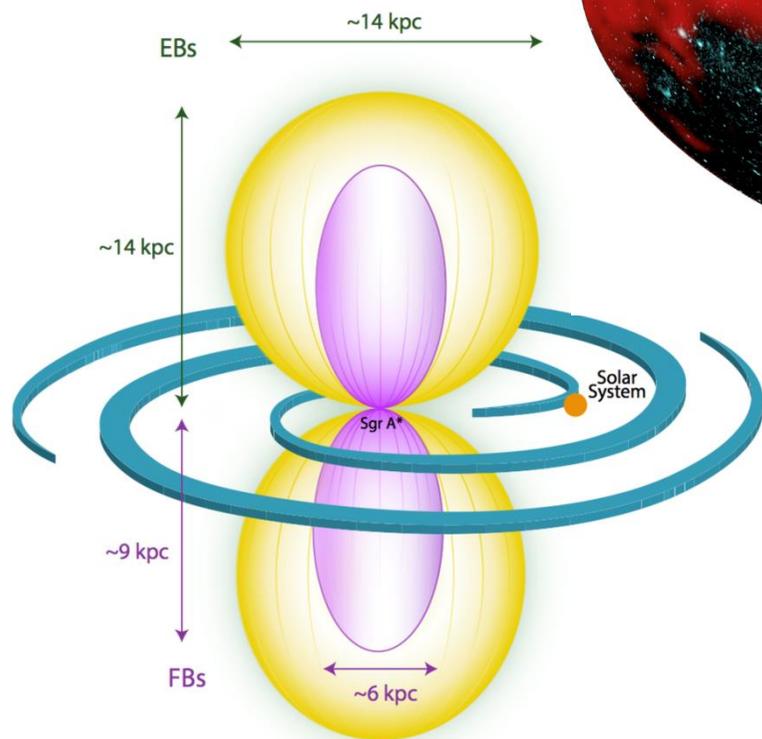
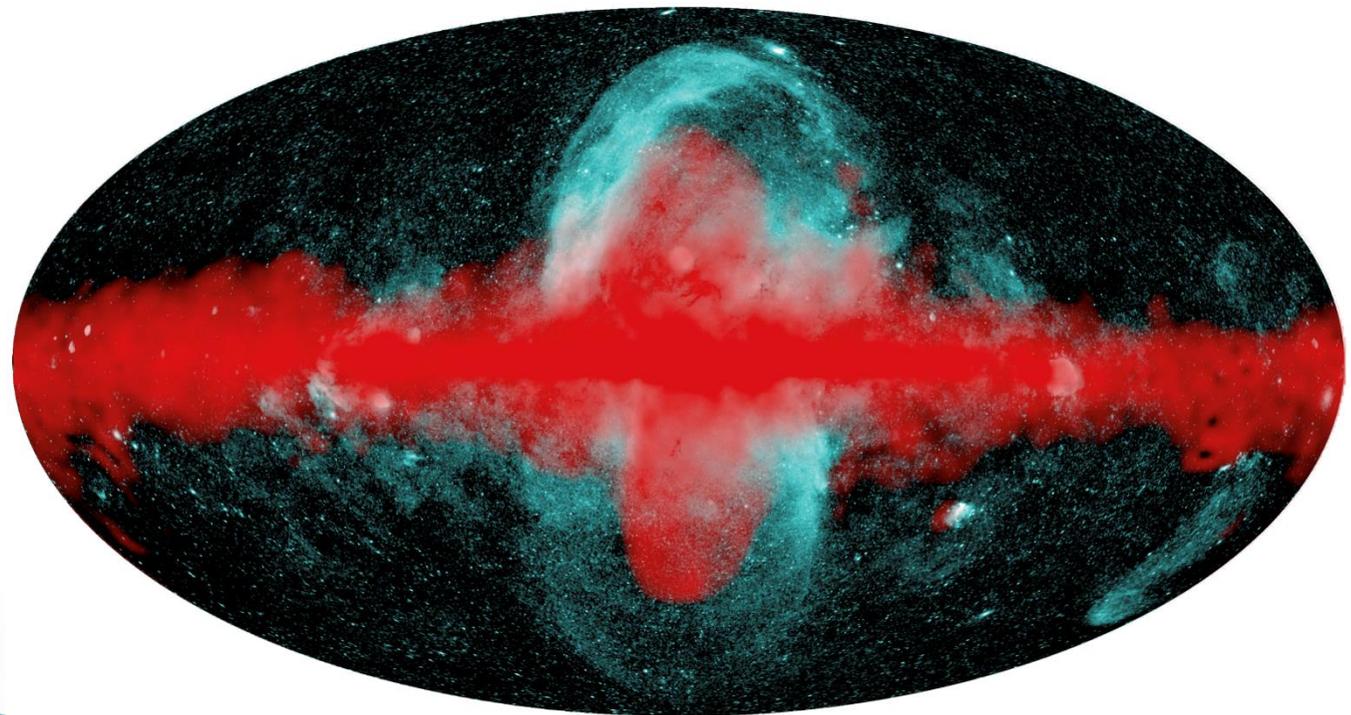
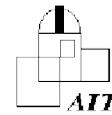
eRosita

СРГ/еРОЗИТА

0.3-2.3 кэВ

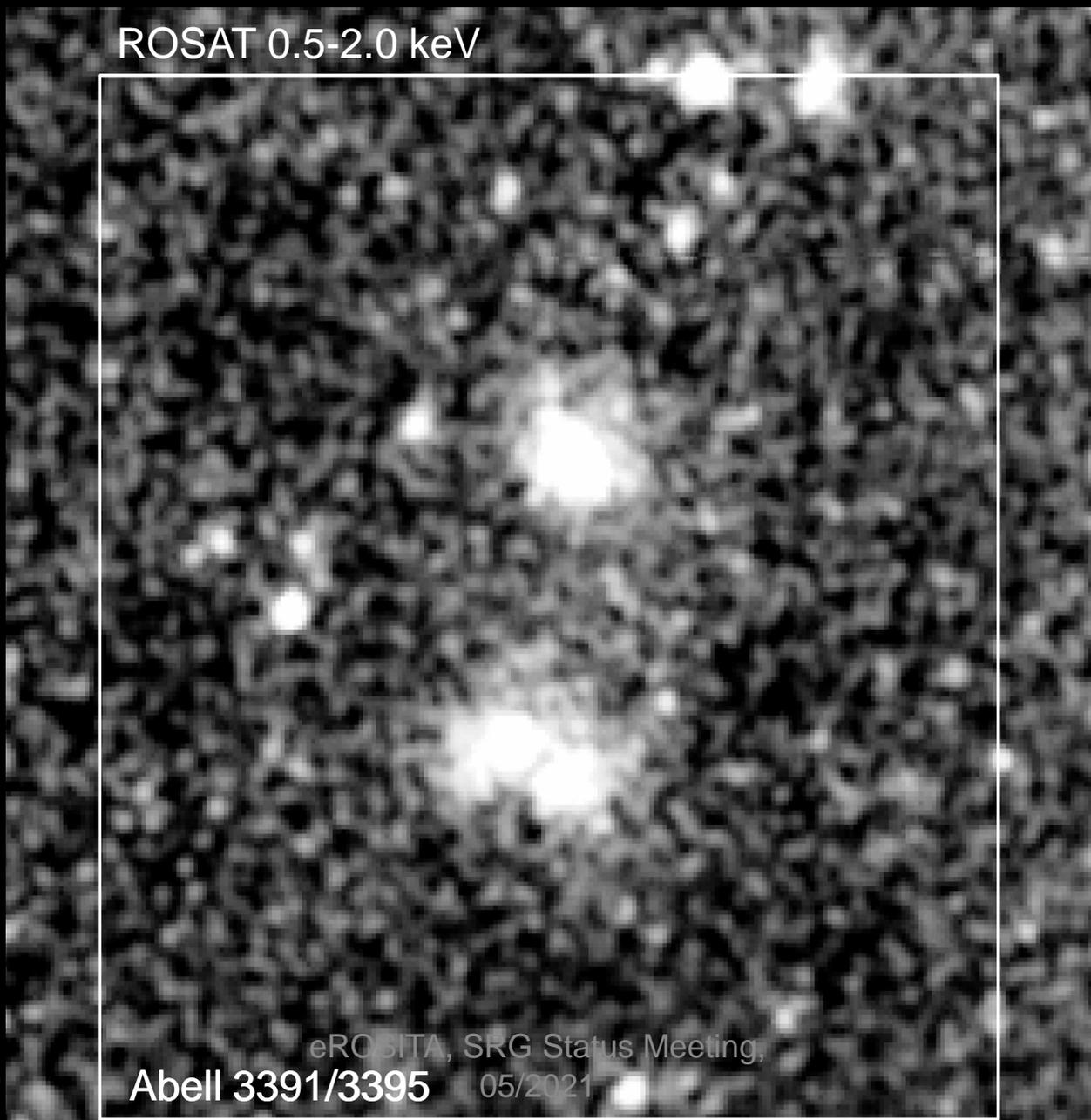


ИКИ / МРЕ





PV phase: A3391/A3395



Reiprich et al.

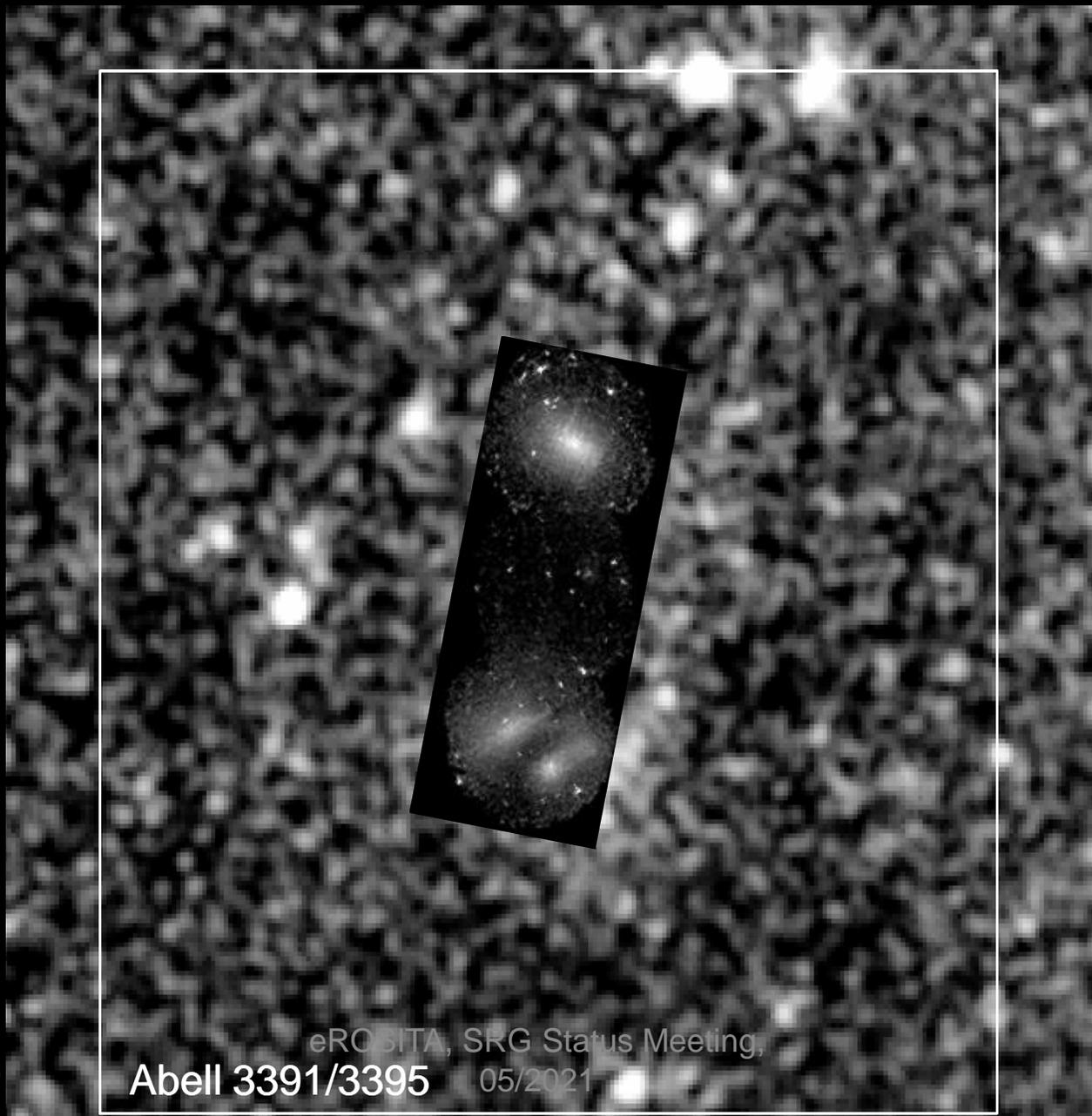
eROSITA, SRG Status Meeting,
Abell 3391/3395 05/2021



PV phase: A3391/A3395



XMM-Newton
0.4-1.25 keV



Reiprich et al.

eROSITA, SRG Status Meeting,
Abell 3391/3395 05/2021



PV phase: A3391/A3395



SRG/eROSITA 0.2-2.0 keV



XMM-Newton
0.4-1.25 keV

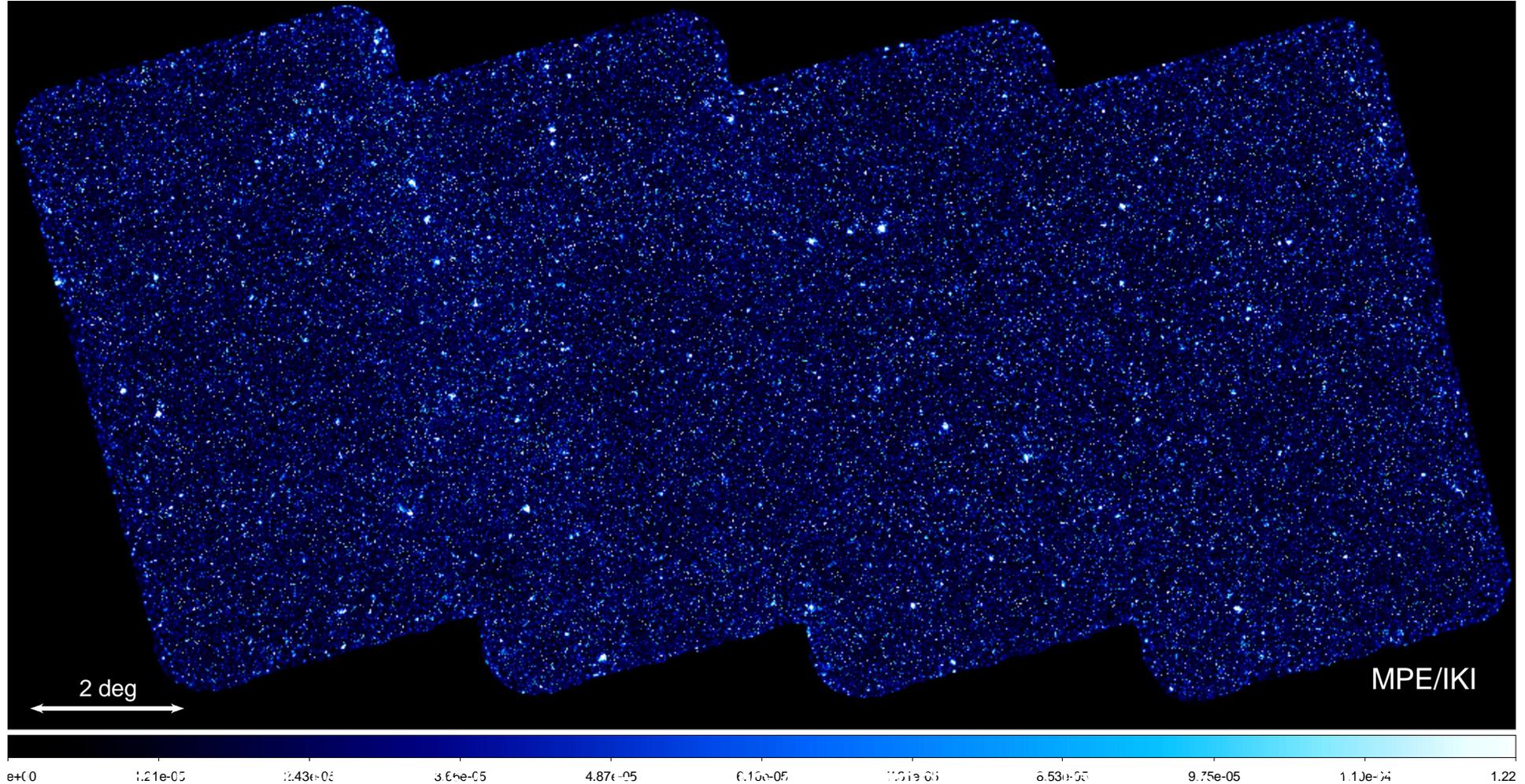
Reiprich et al.

eROSITA, SRG Status Meeting,
Abell 3391/3395 05/2021

MPE/IKI



eFEDS: a preview survey

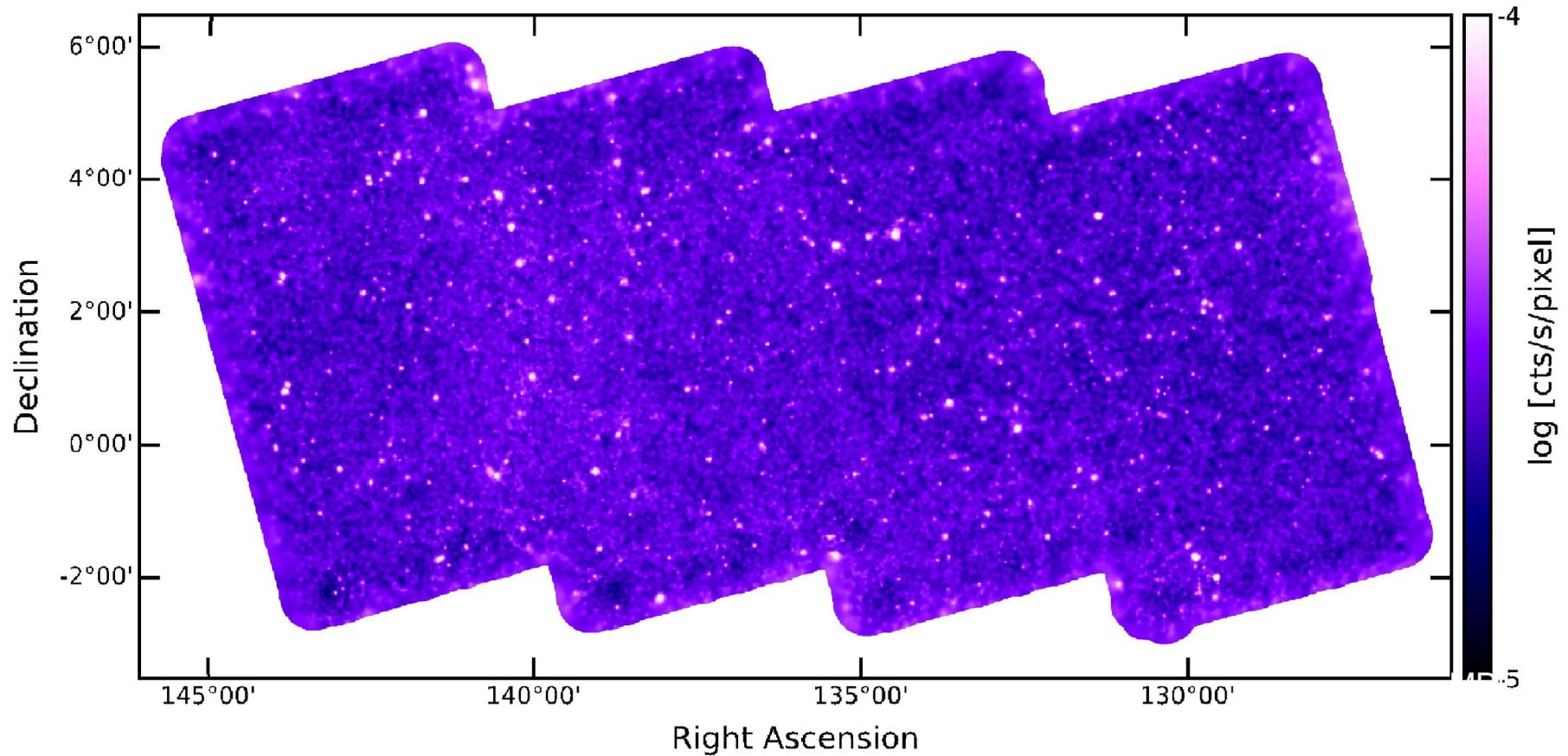




eFEDS Clusters



Point-sources subtracted 0.2-2.3 keV image (courtesy J. Sanders, MPE)





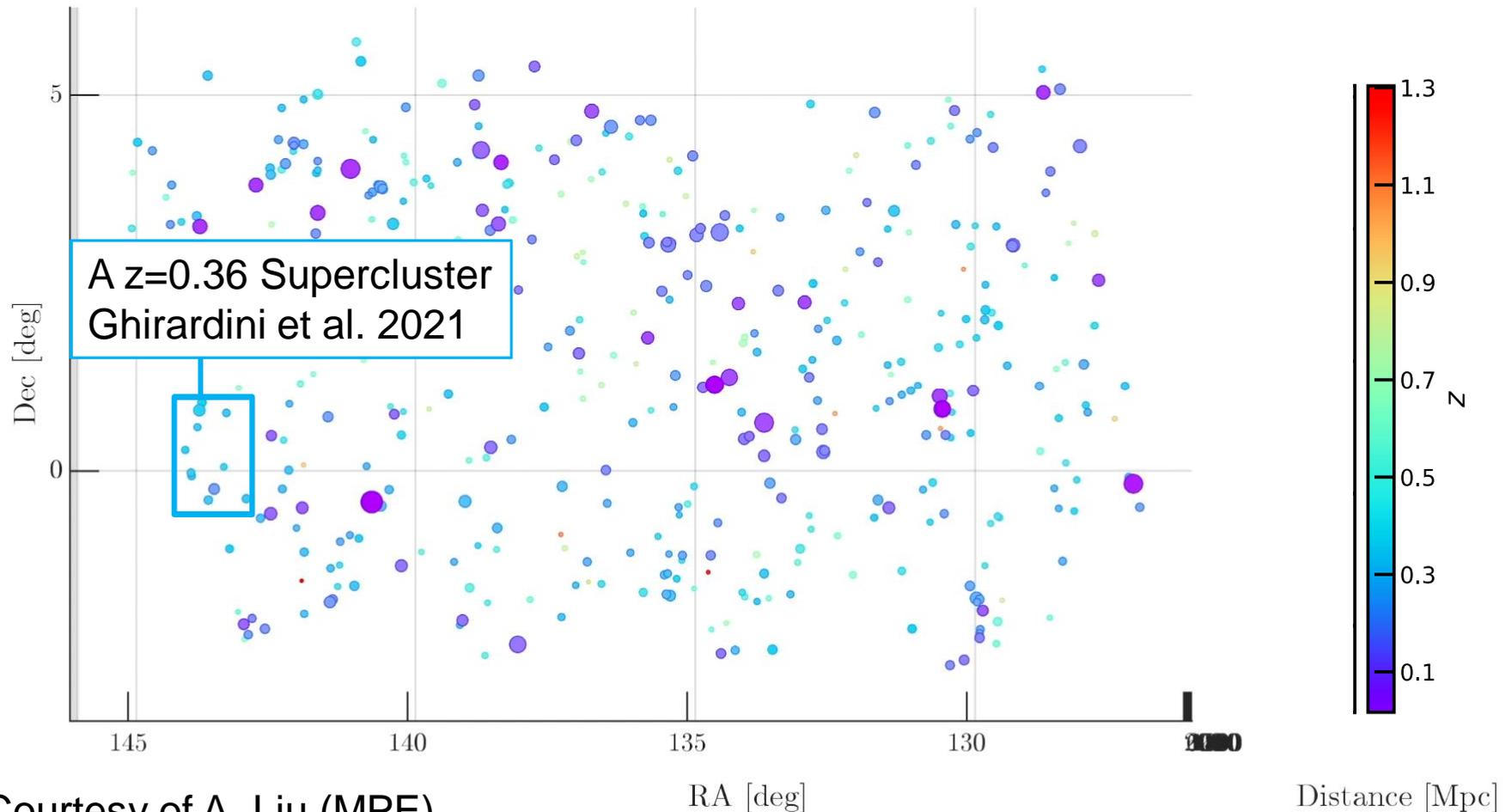
eFEDS Clusters



542 galaxy clusters detected by eROSITA (Liu+ 2021)

~ 470 already optically confirmed (using HSC, DECaLS), $0.1 < z < 1.3$ (Klein+ 2021)

For ~200 enough X-ray counts to estimate ICM temperature (Ghirardini+2021)



Courtesy of A. Liu (MPE)

eROSITA, SRG Status Meeting,
05/2021



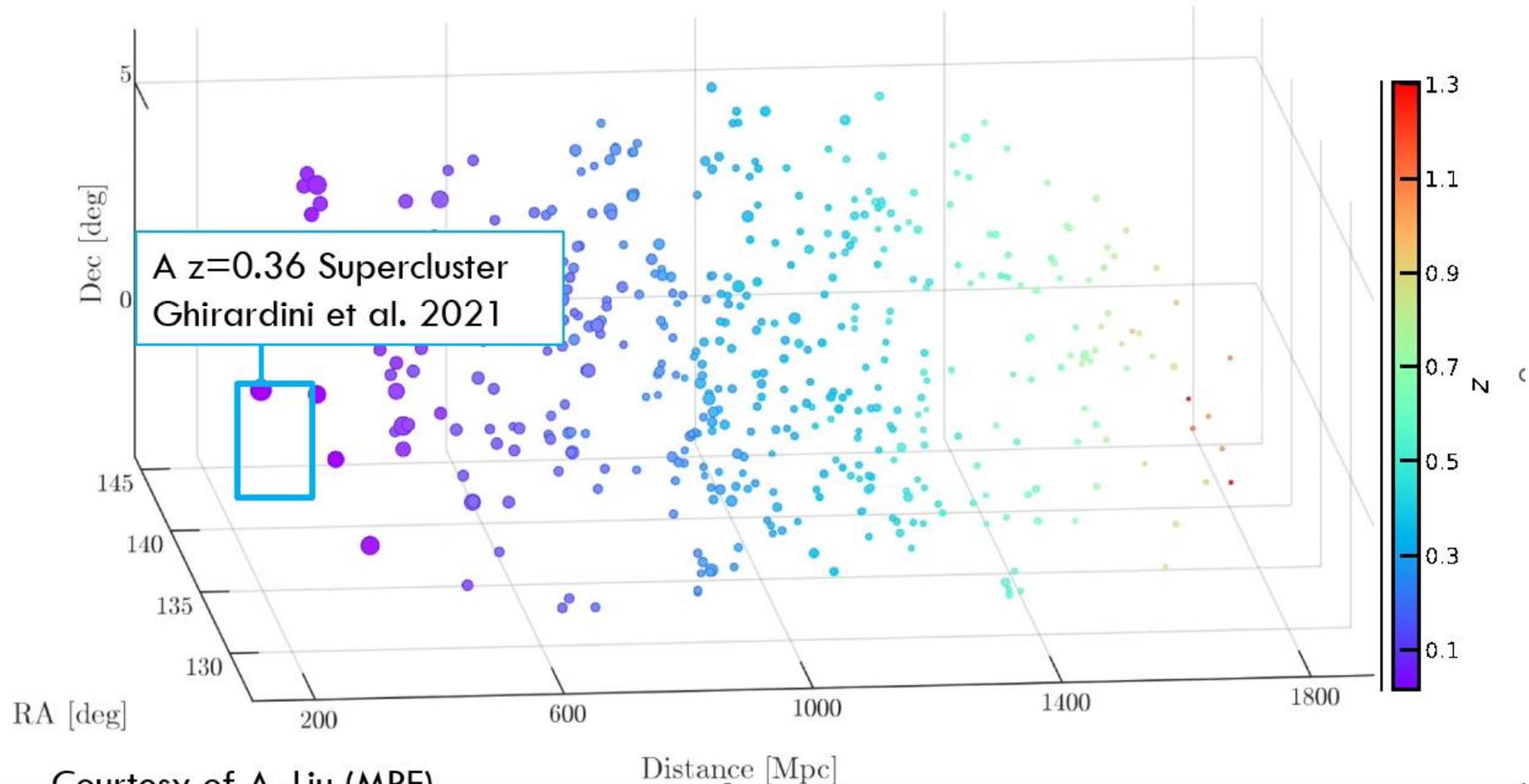
eFEDS Clusters



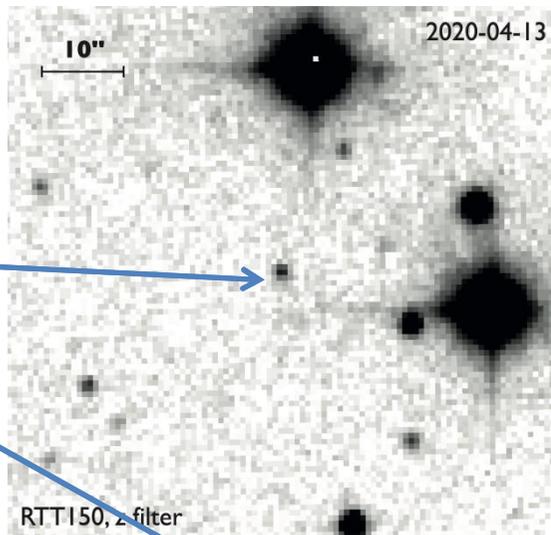
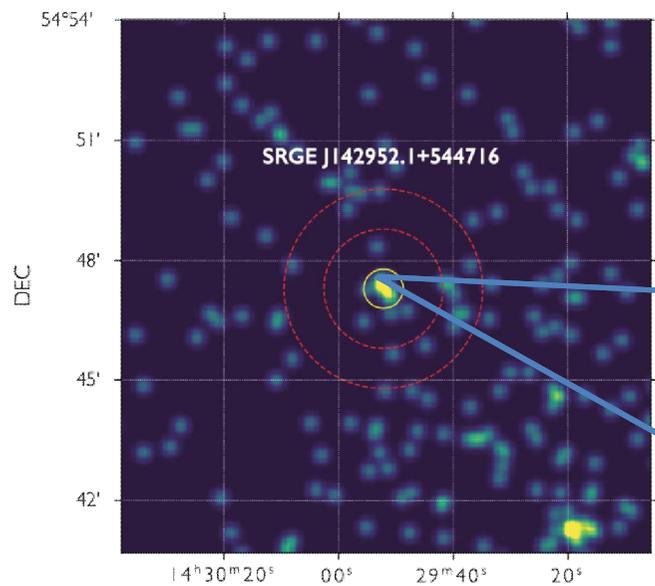
542 galaxy clusters detected by eROSITA (Liu+ 2021)

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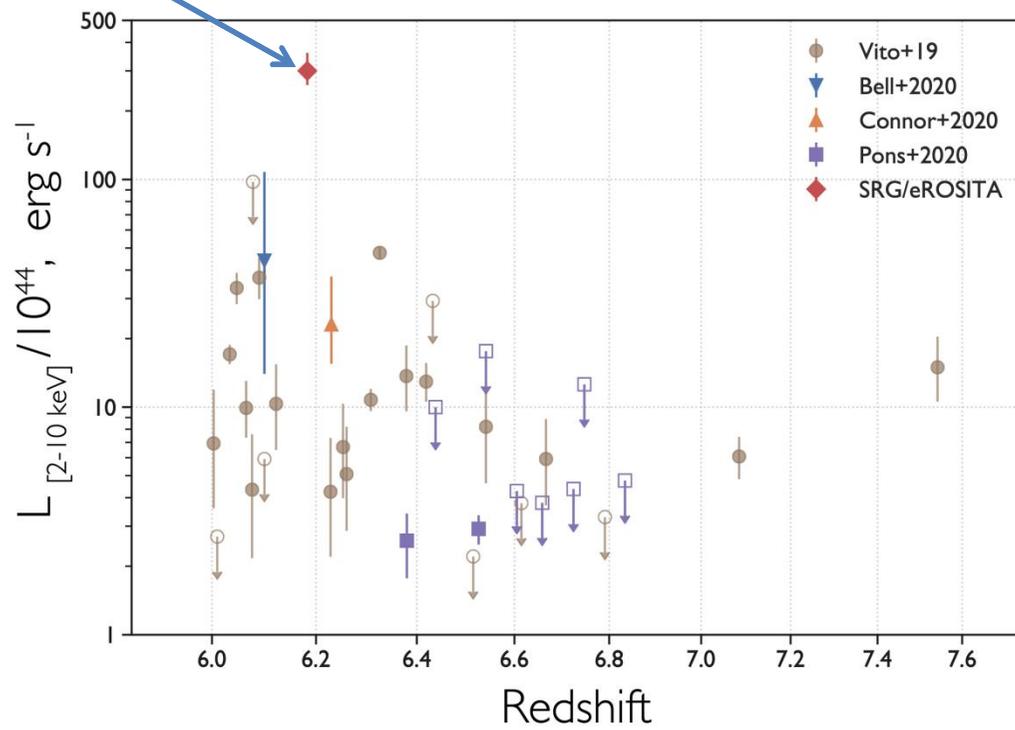
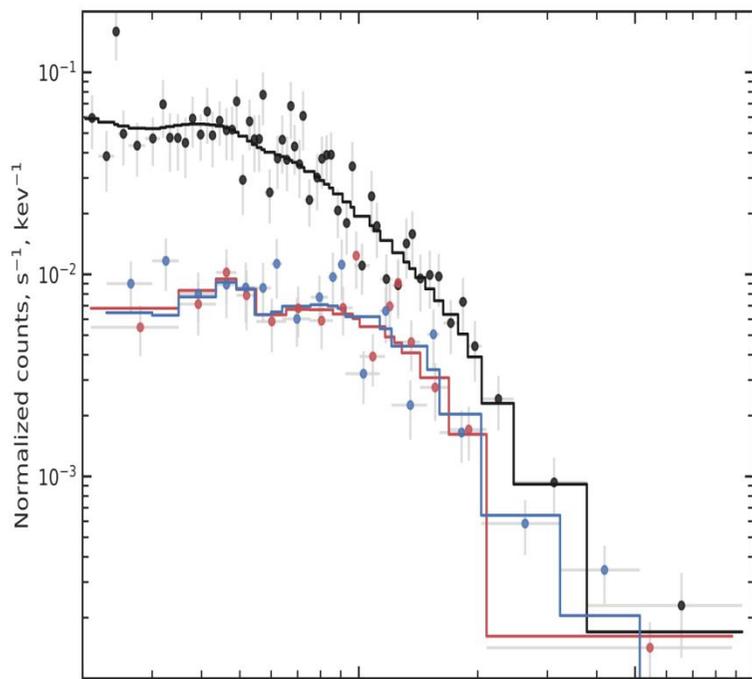
For ~200 enough X-ray counts to estimate ICM temperature (Ghirardini+2021)



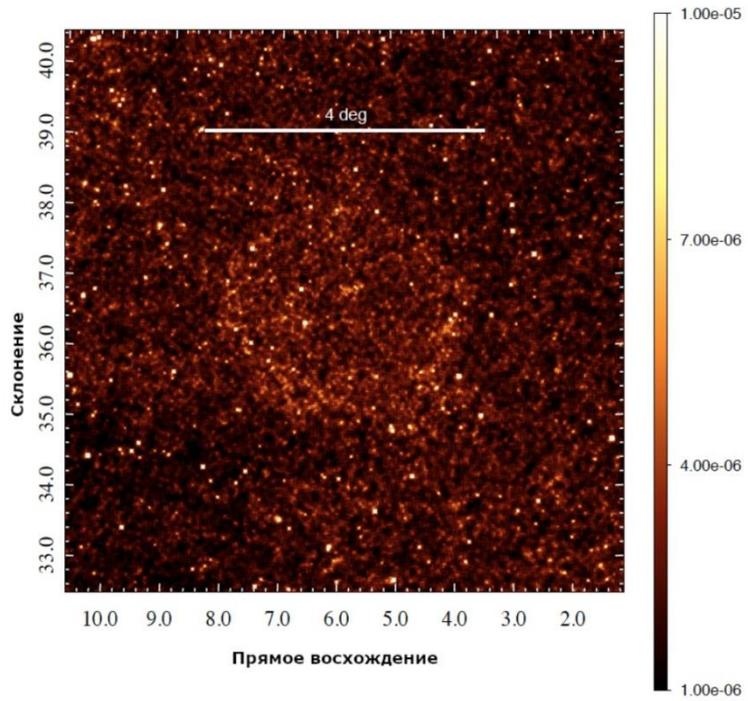
Courtesy of A. Liu (MPE)



$z=6.18$



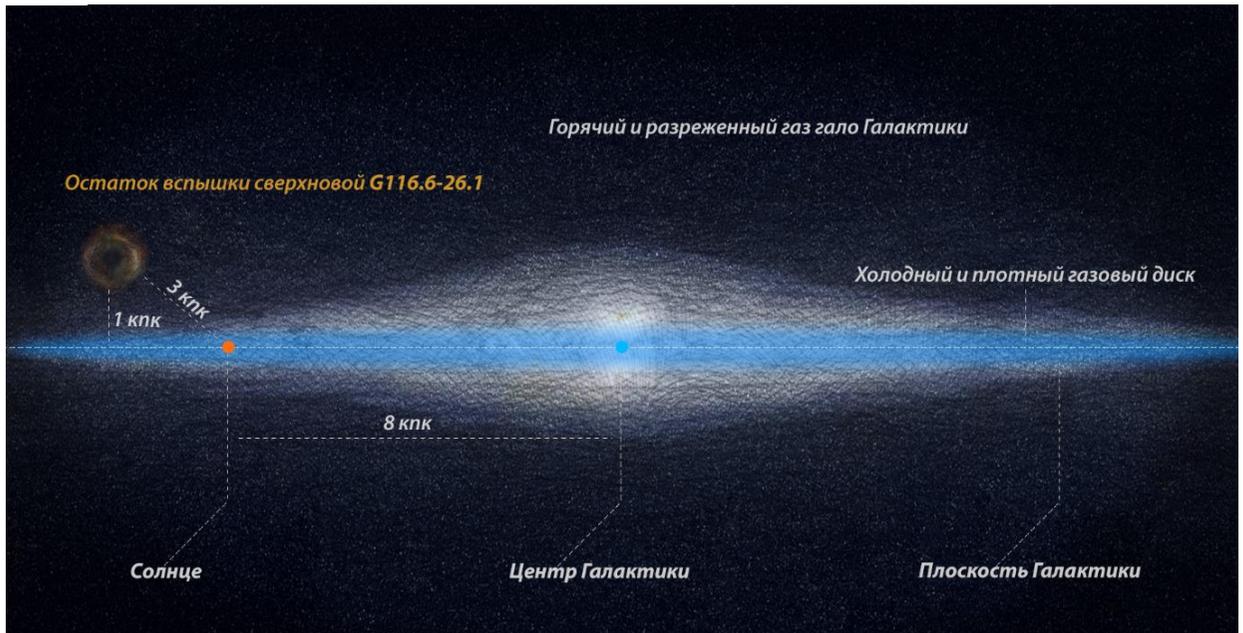
G116.6-26.1



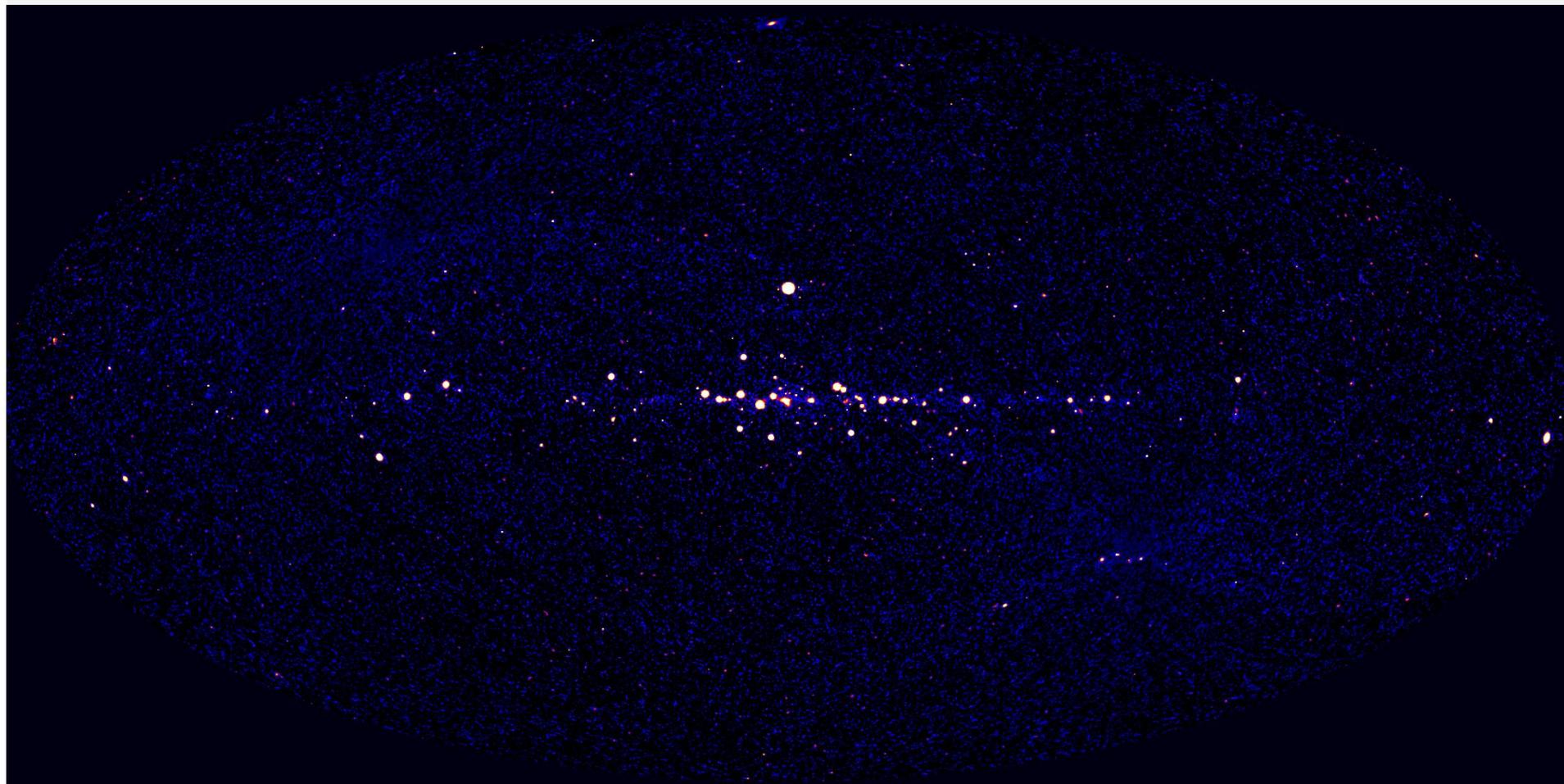
«

• ,

»



ART-XC



~ 870

$\sim 4 \times 10^{-12}$

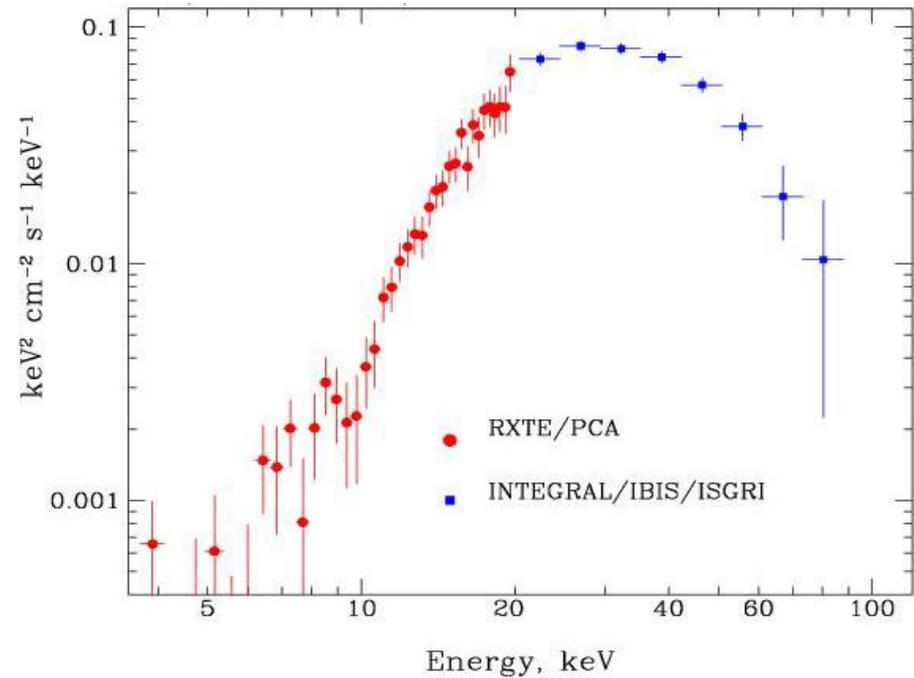
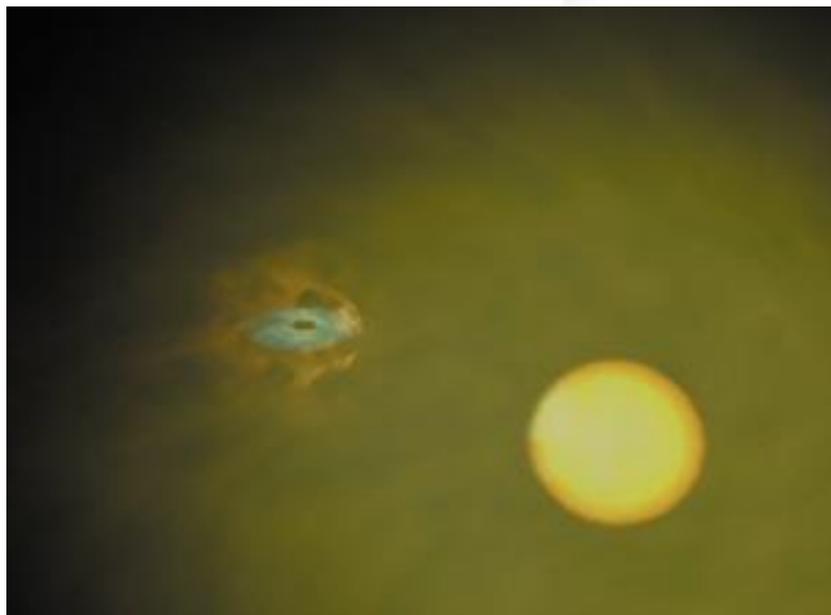
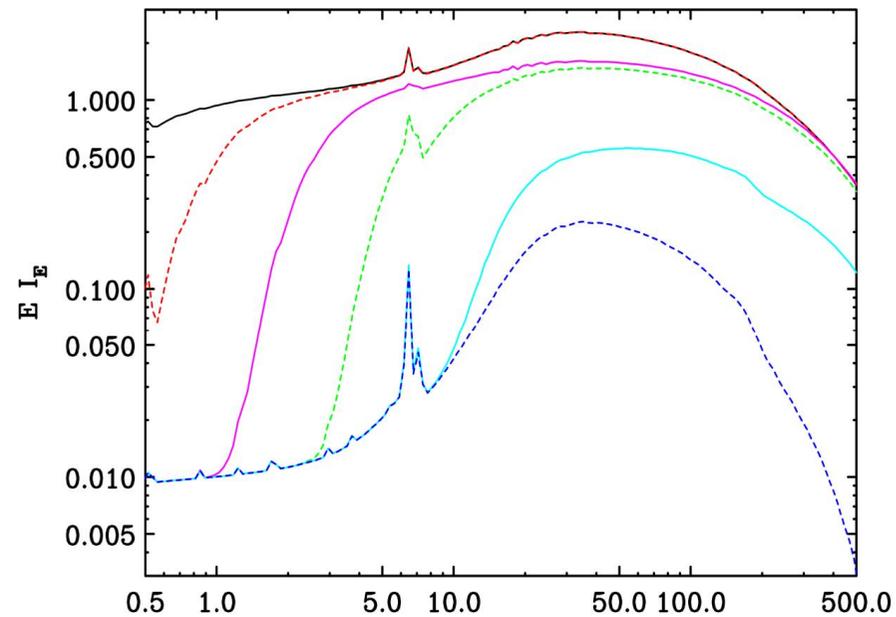
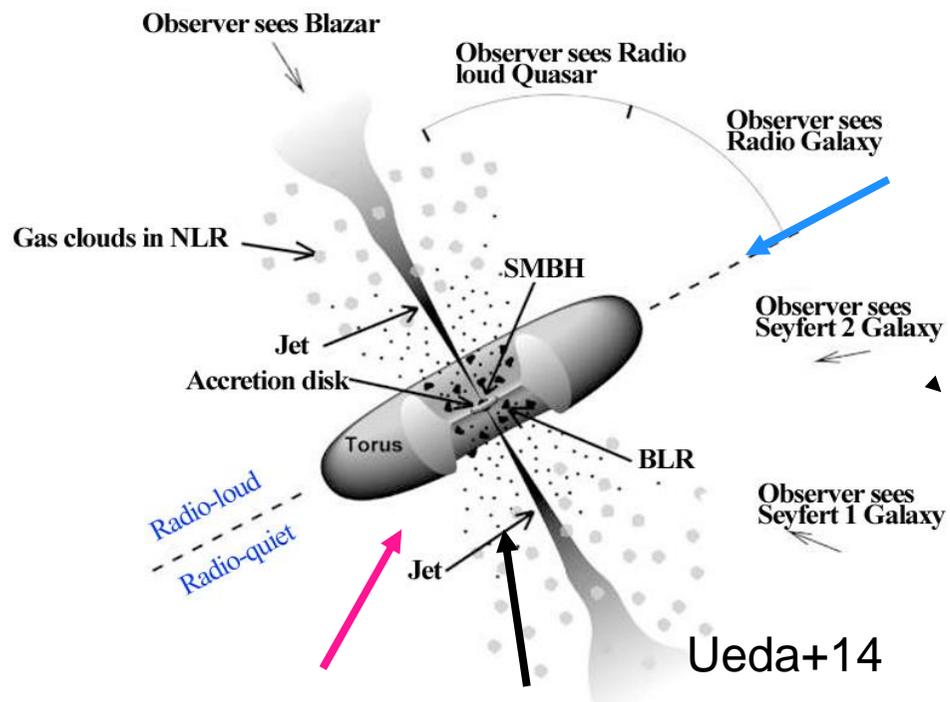
// 2

~50

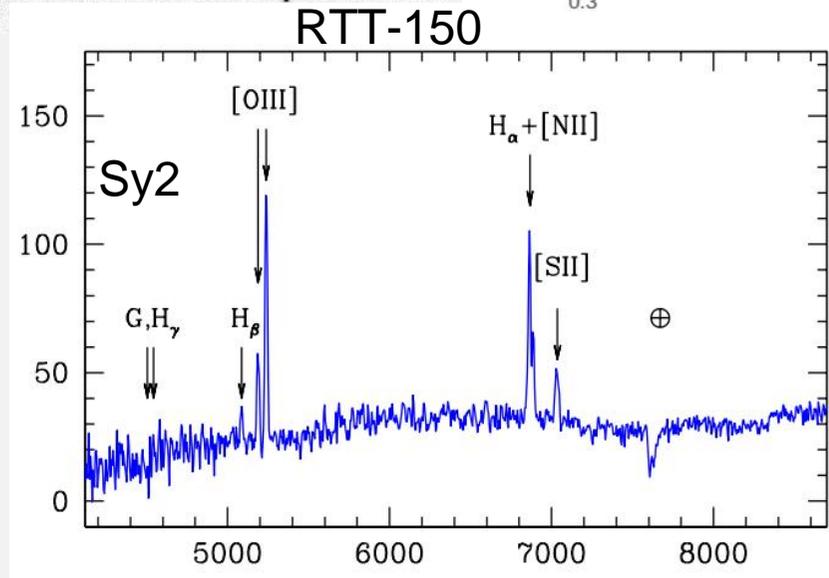
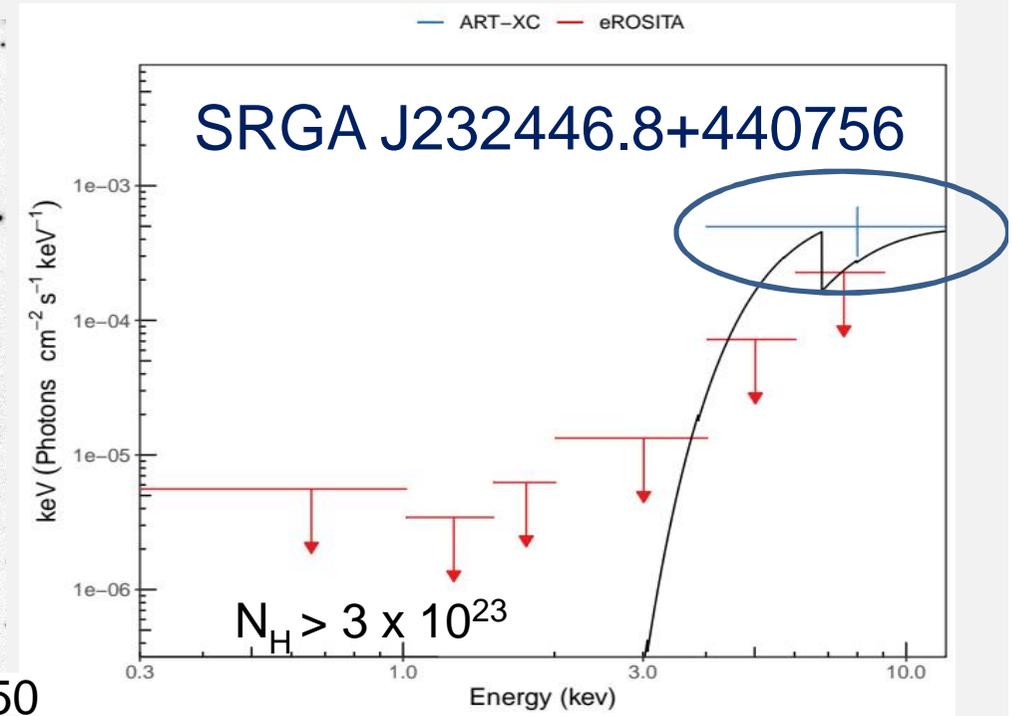
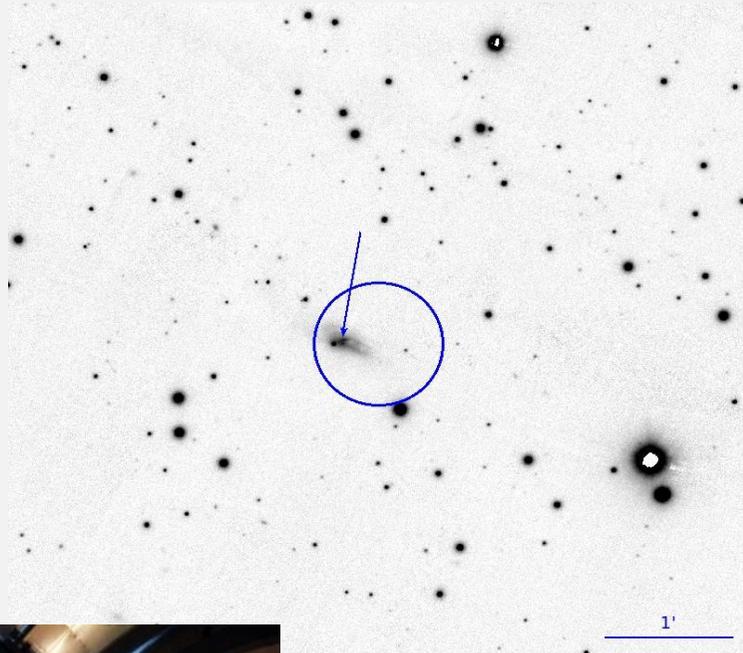
$\sim 8 \times 10^{-13}$

// 2.

~3500-4500



ART-XC

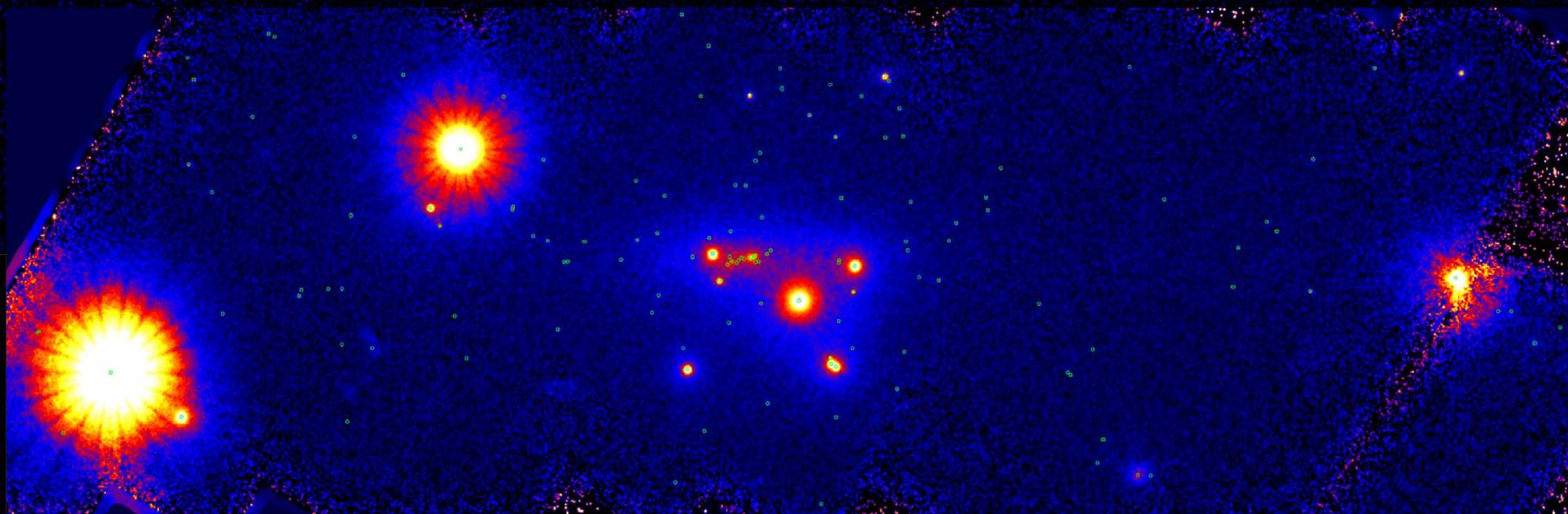


$z = 0.0462$
 $d \sim 200$

Zaznabin et al. 2021

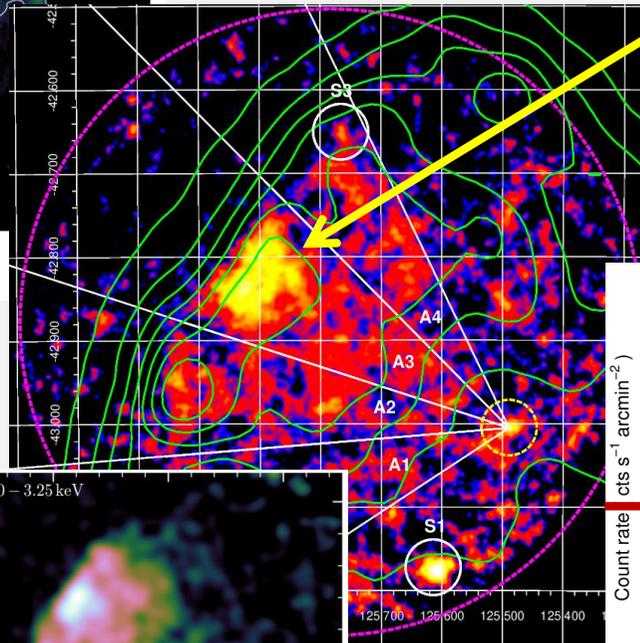
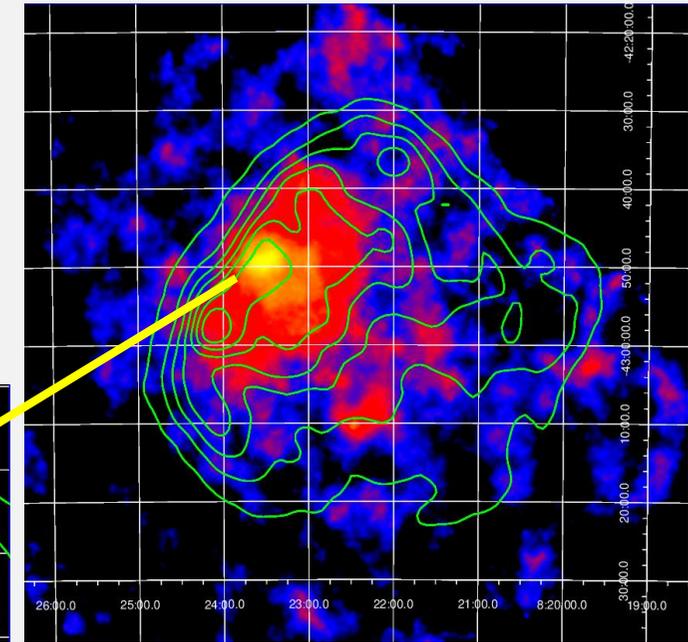
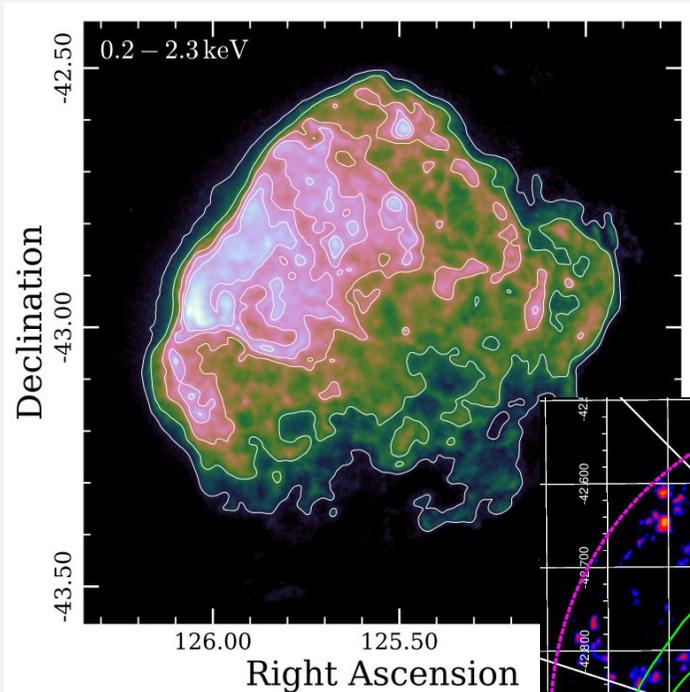
Центр Галактики

СРГ / ART-XC им. М.Н. Павлинского, 4-12 кэВ



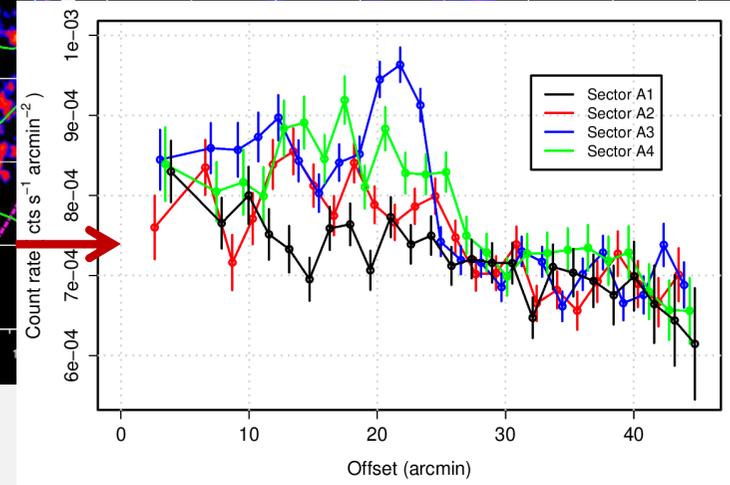
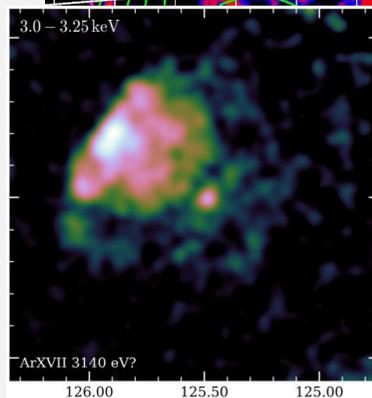
ART-XC

A (Puppis A)



..the region which stands out clearly as the hardest extended source of emission within Puppis A.. which in combination lead to a pronounced tail towards high energies (see also Krivonos et al. 2021).

Mayer et al. 2021

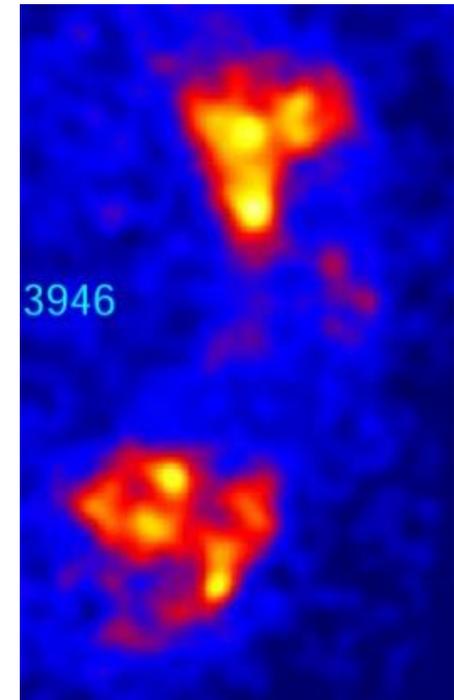
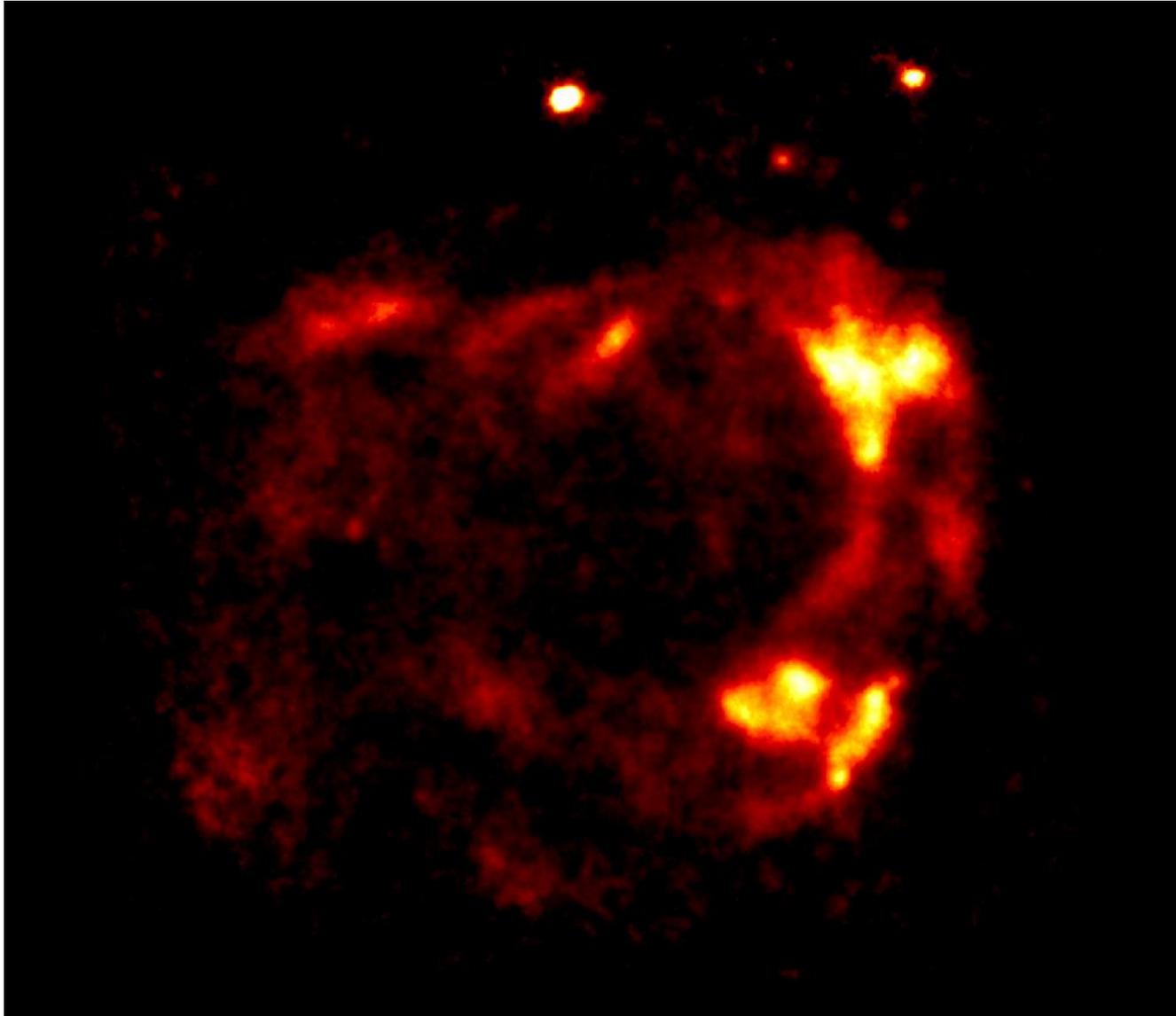


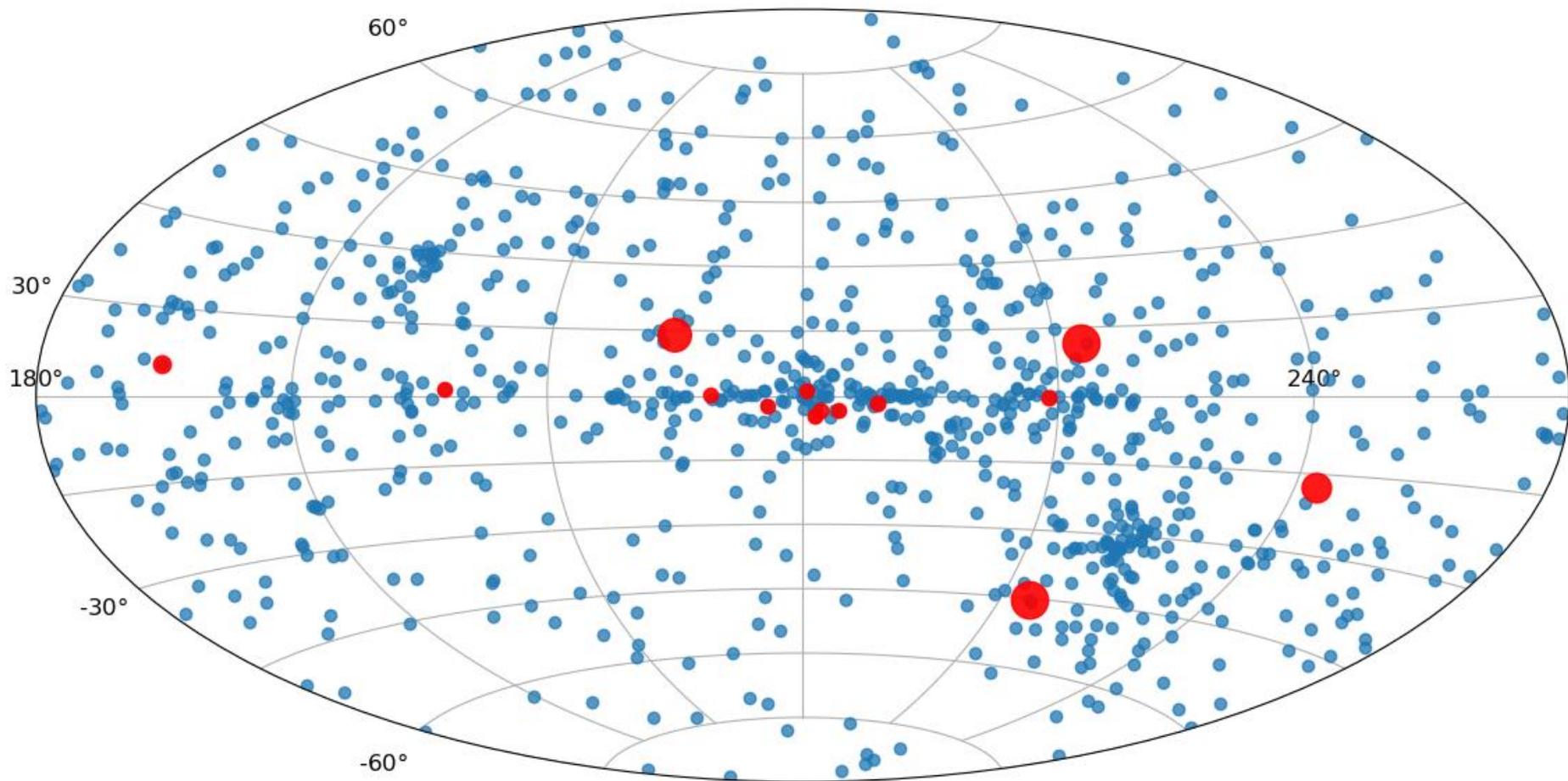
Krivonos et al. 2021

ART-XC

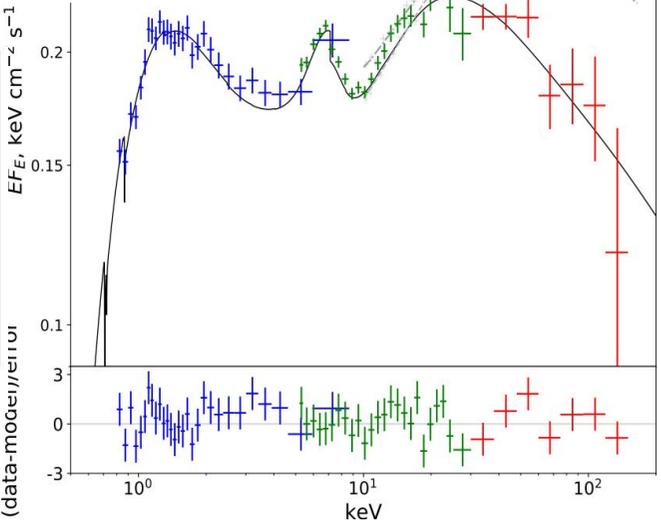
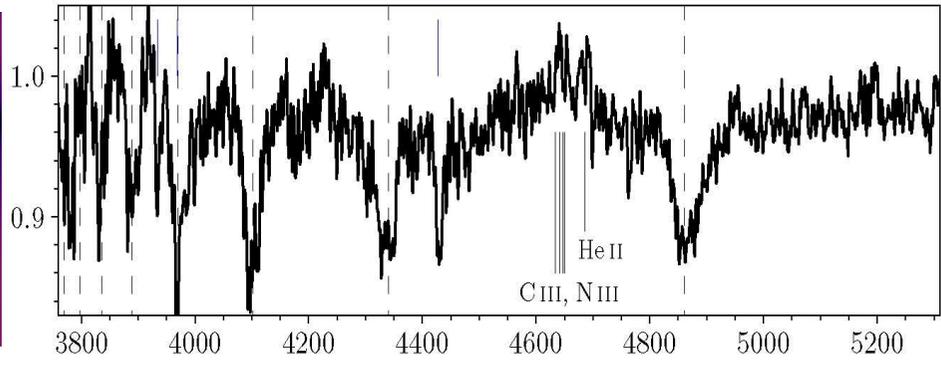
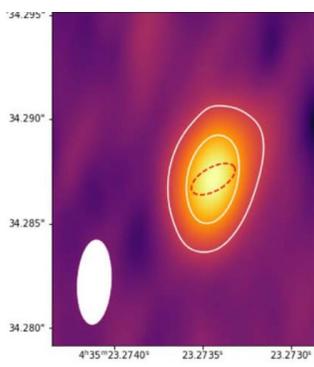
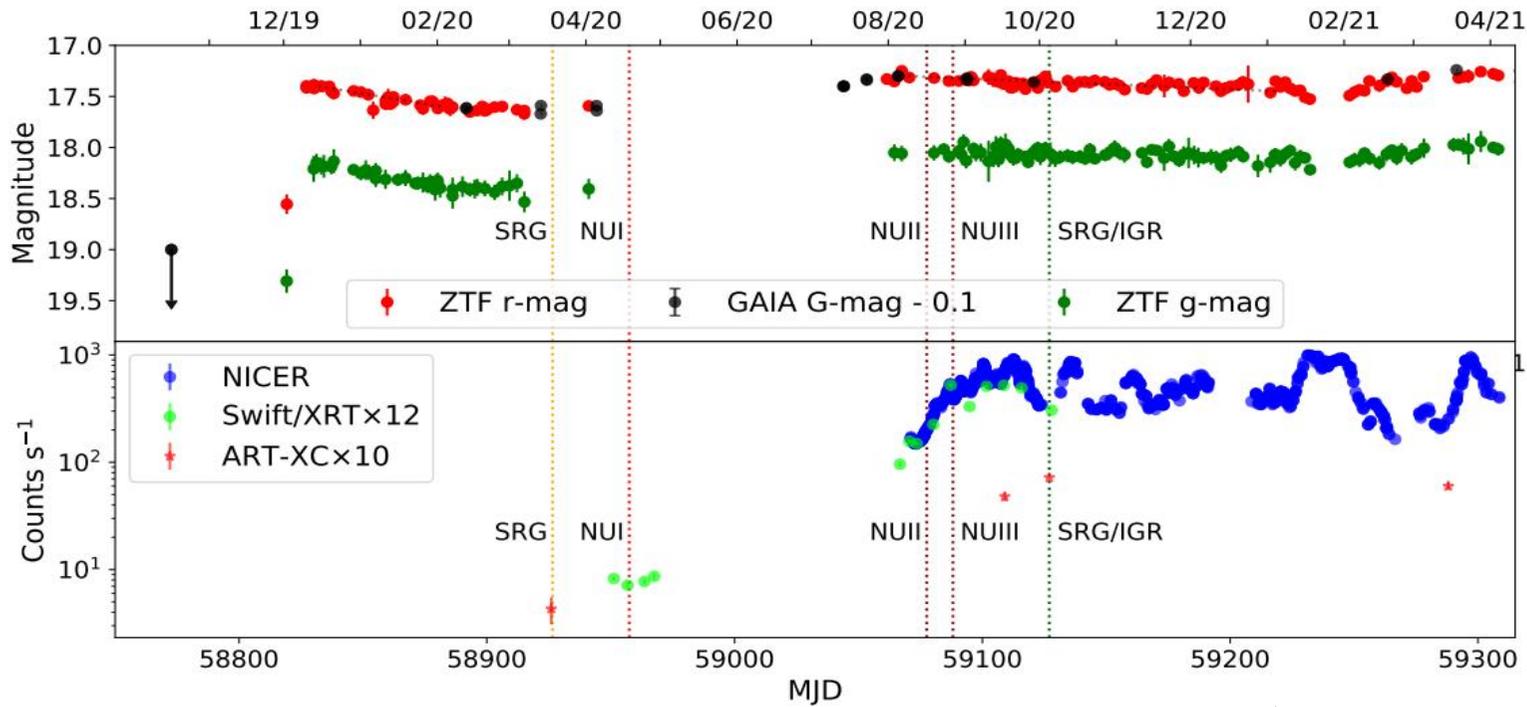
RXJ1713,

2022 .





SRGAJ043520.9+552226:

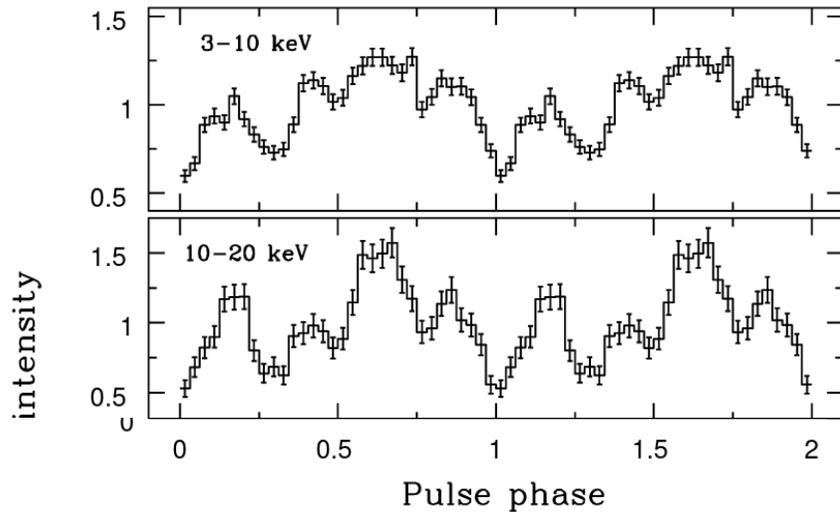


Yao+20a,b
Yadlapalli+21

, , 2.5

Mereminsky et al. 2021

«towards the complete population of faint X-ray pulsars»

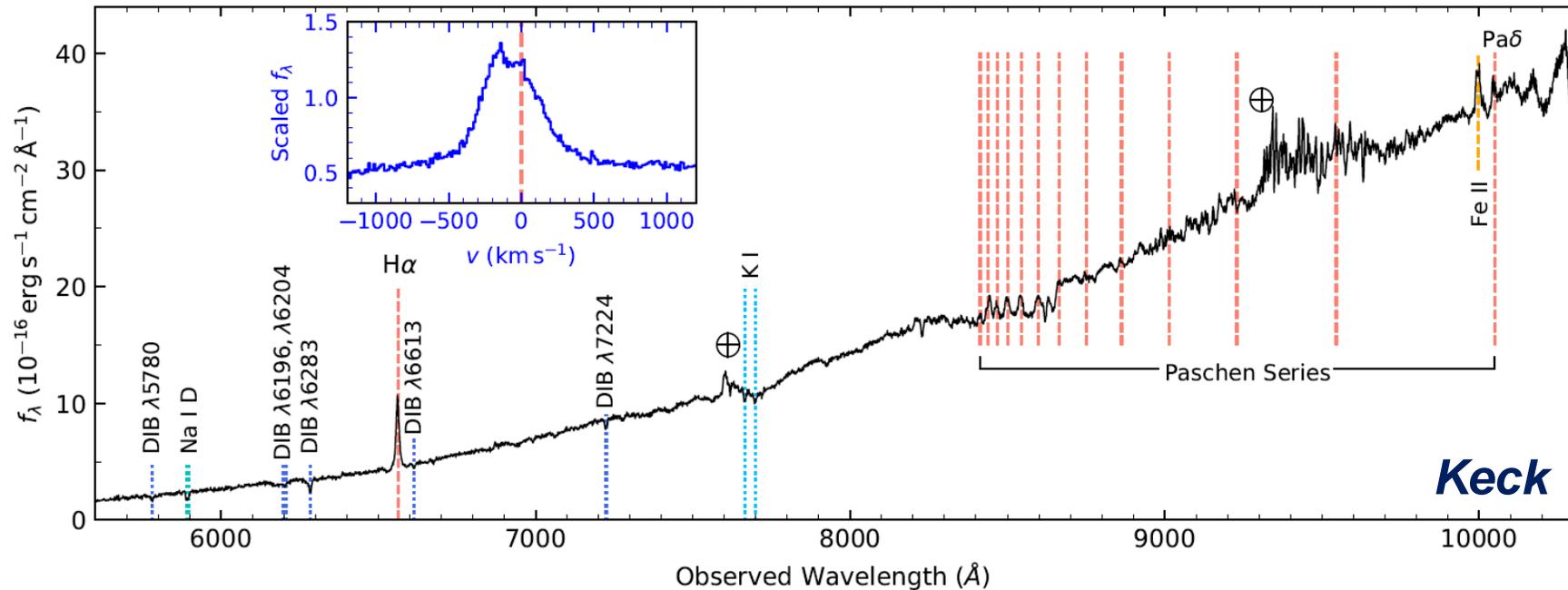


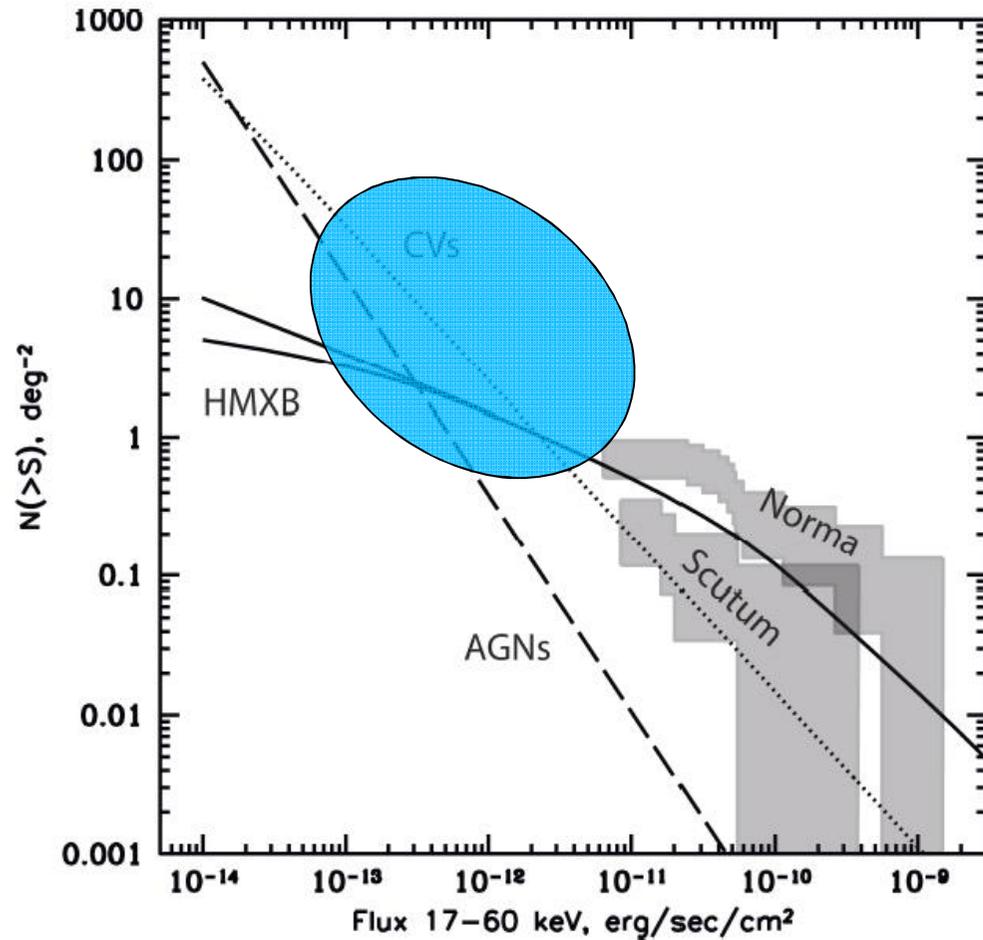
SRGA J204318.2+443815 ~ 740 c

Lutovinov et al. 2021b

SRGA J124404.1-632232 ~ 540 c

Doroshenko et al. 2021





Lutovinov et al. 2013

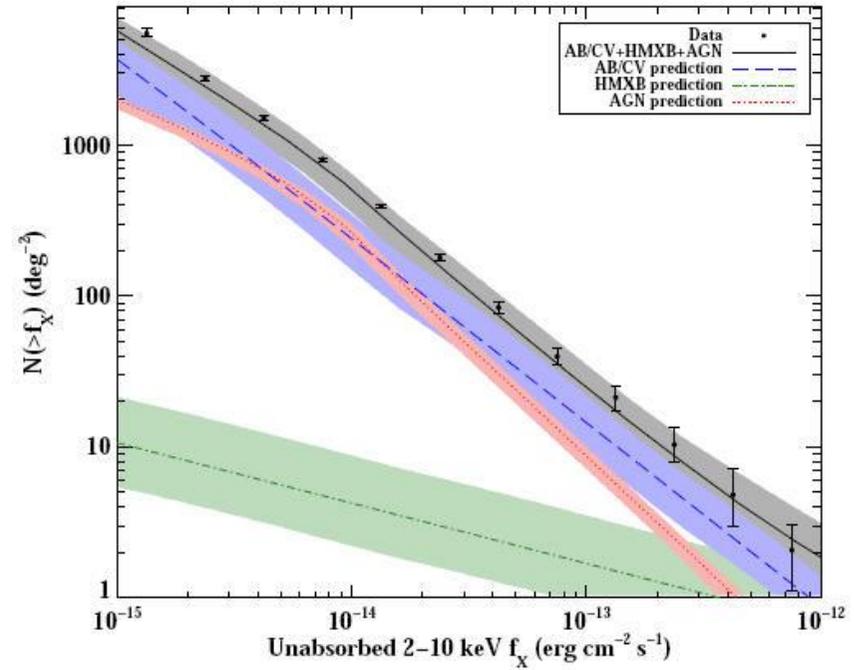
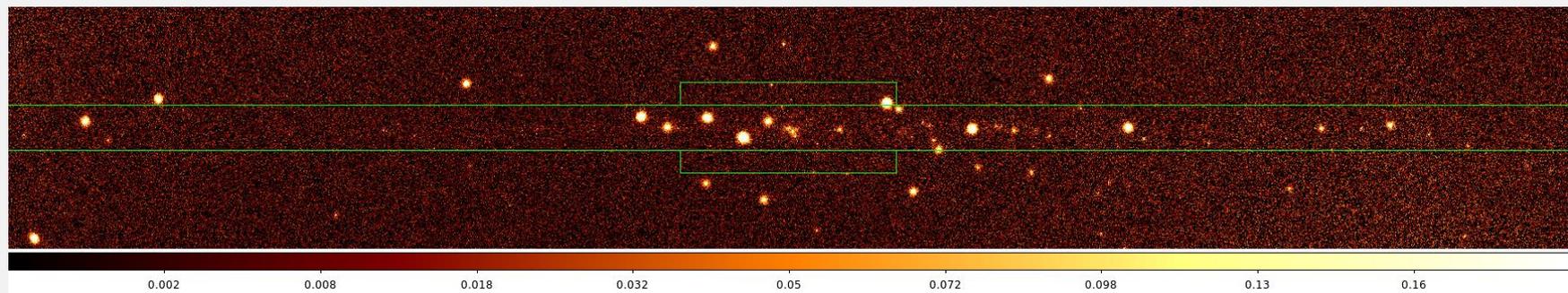


Figure 19. The observed number-flux distribution compared to the combined estimates of the expected AB/CV, HMXB, and AGN flux distributions based on the luminosity functions of these populations from other surveys. Esti-

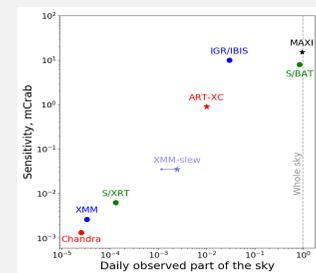
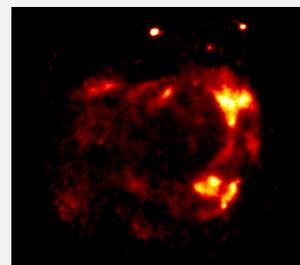
Fornasini et al. 2014

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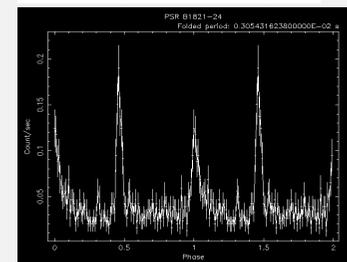
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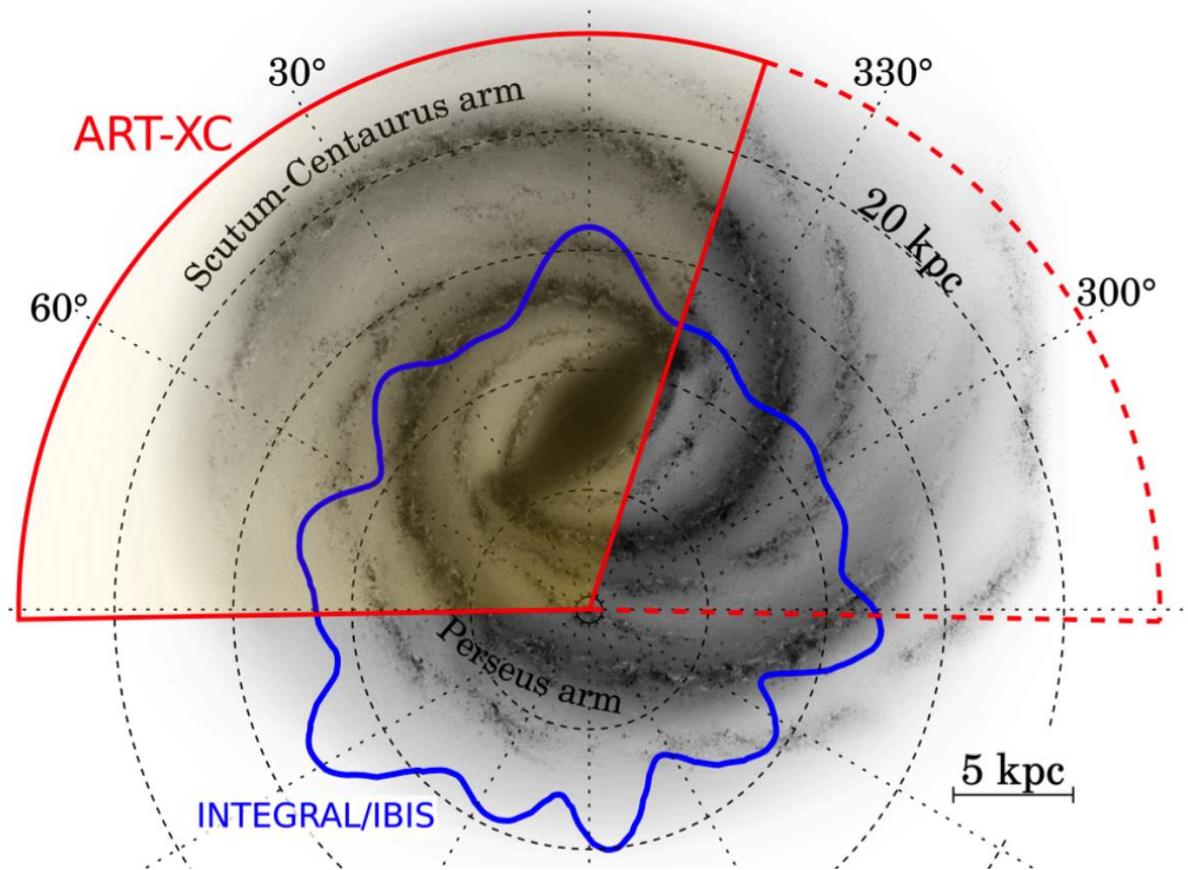
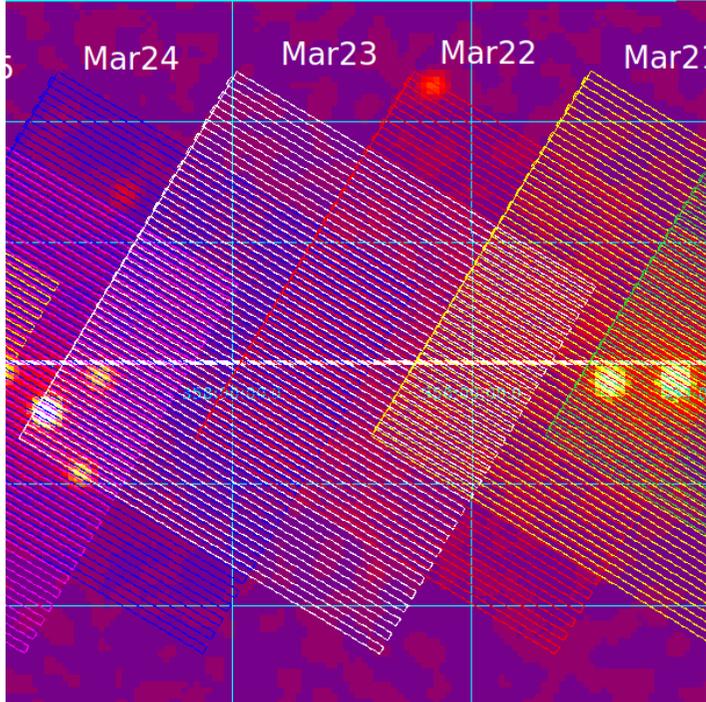
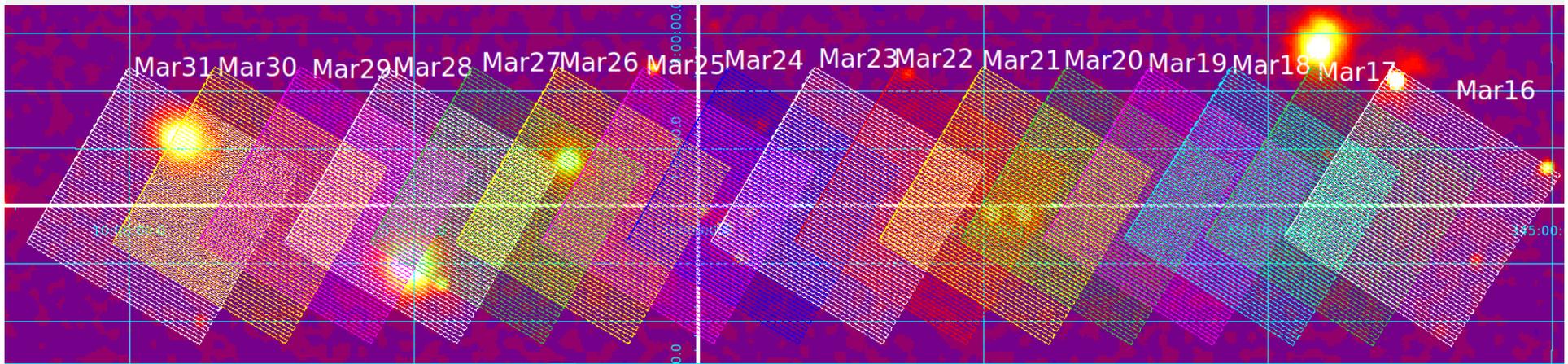


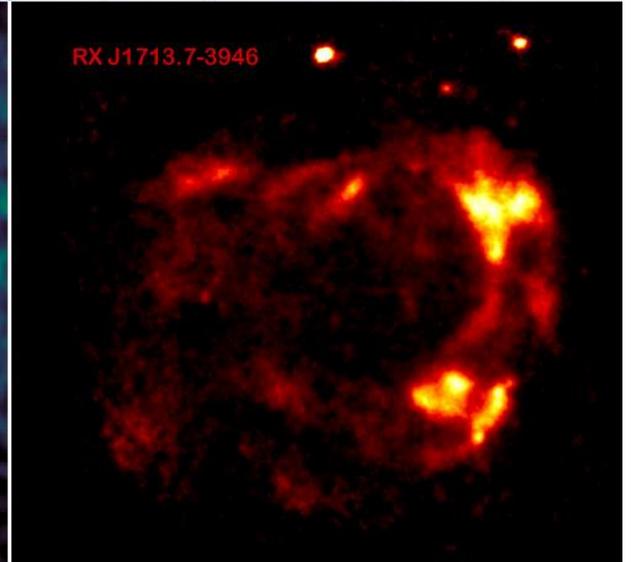
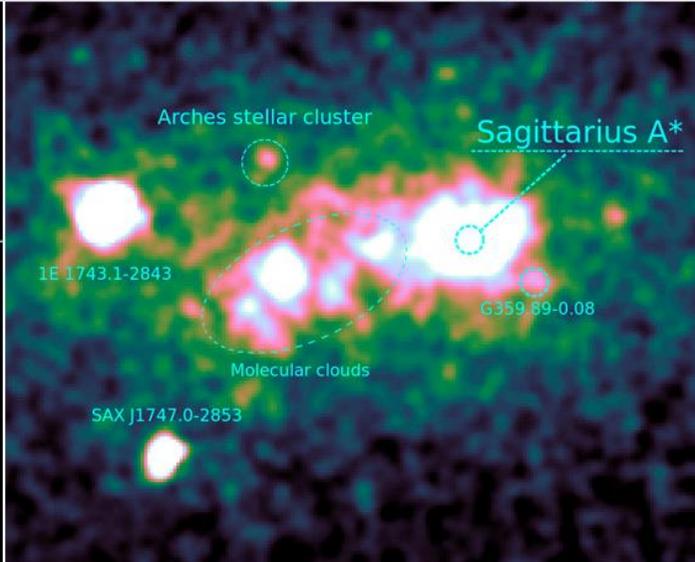
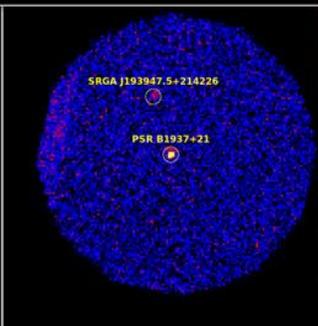
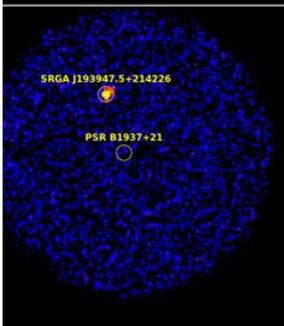
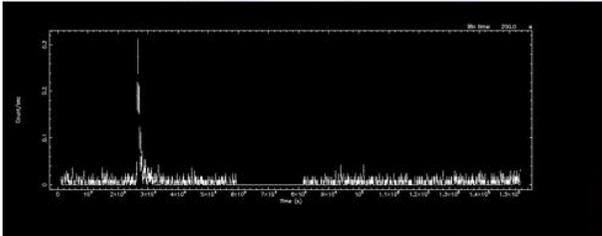
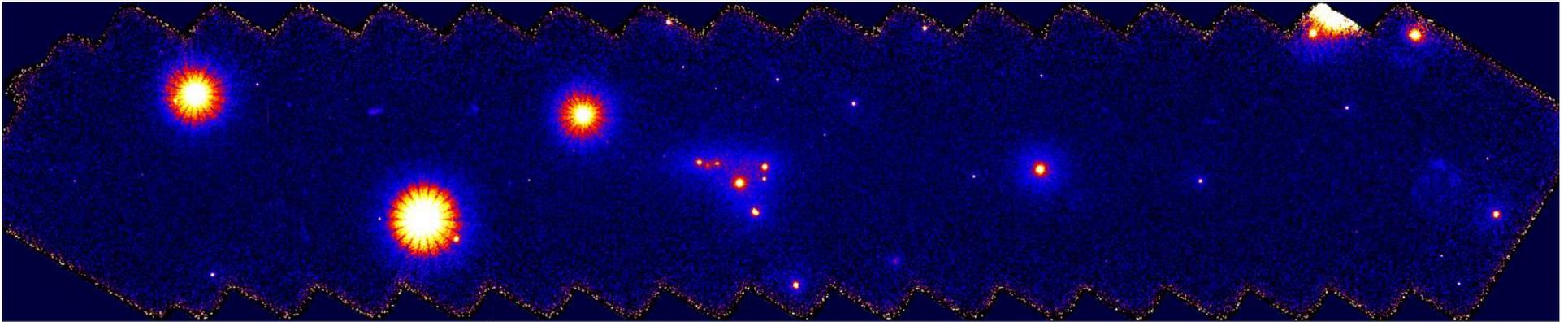
ART-XC
(Legacy Survey of the ART-XC Objects)

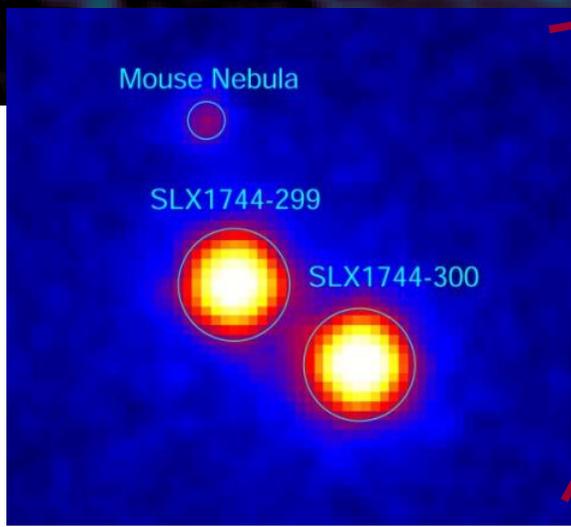
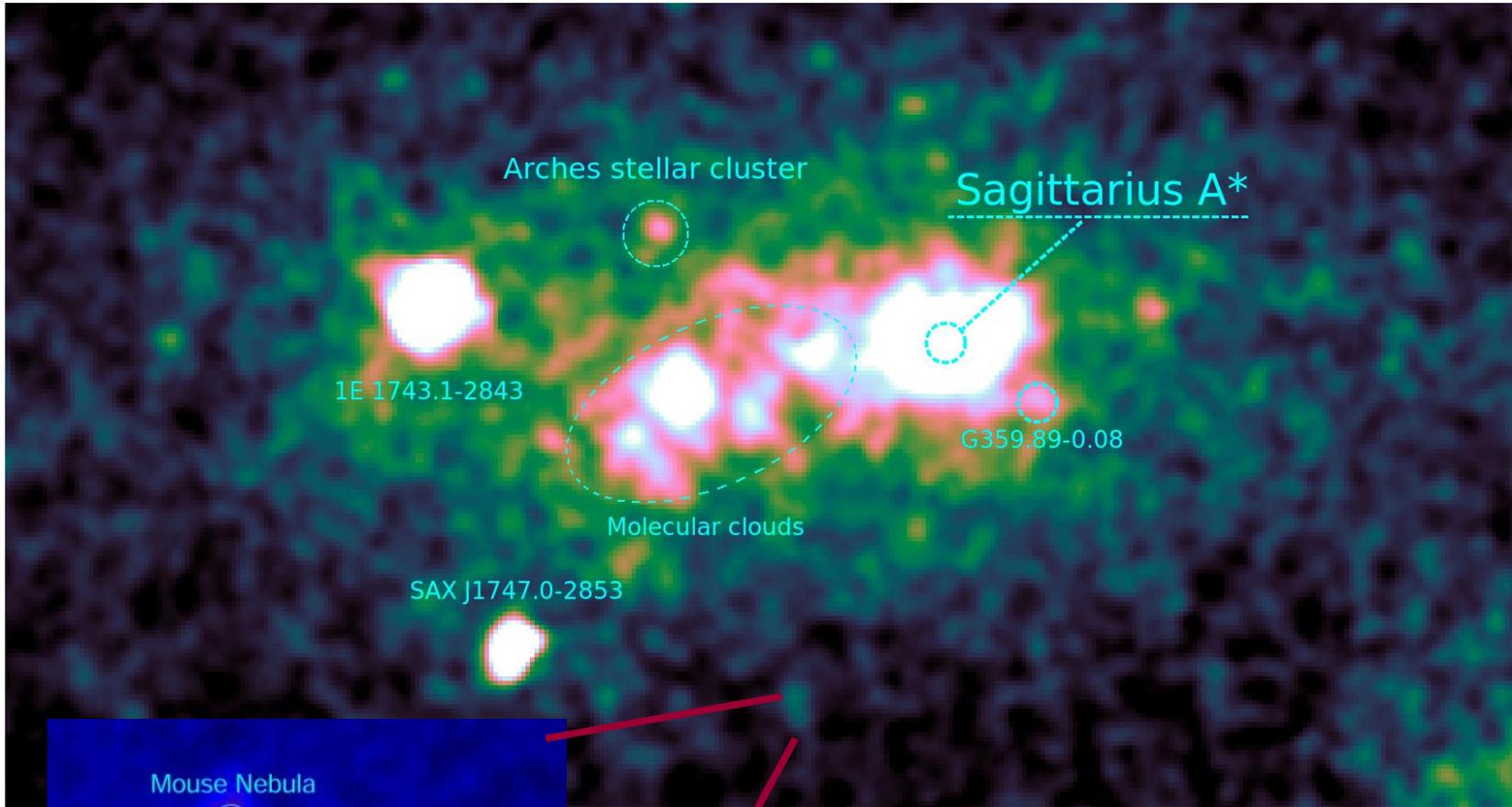


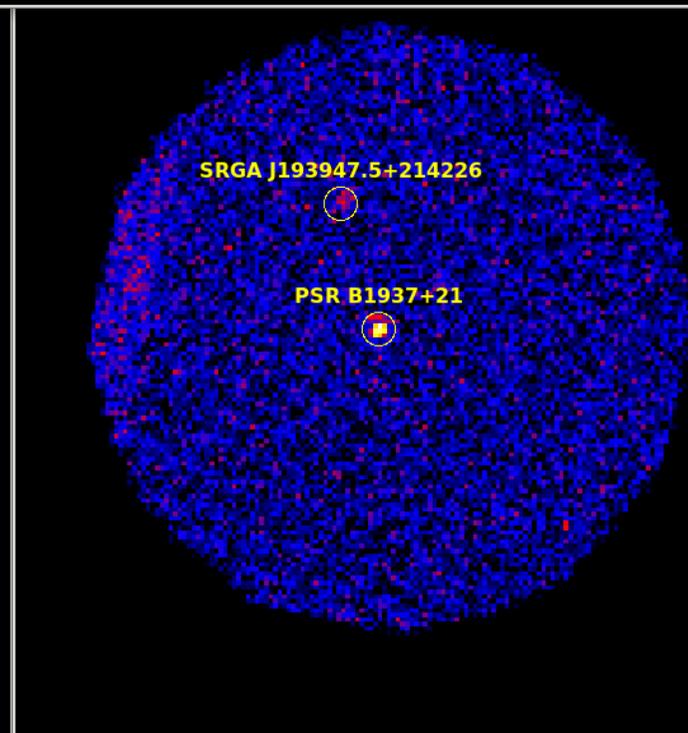
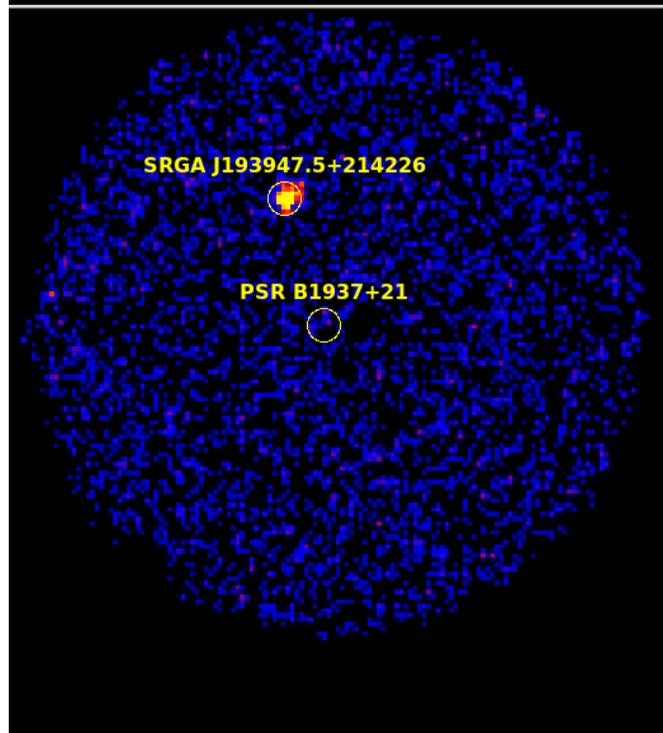
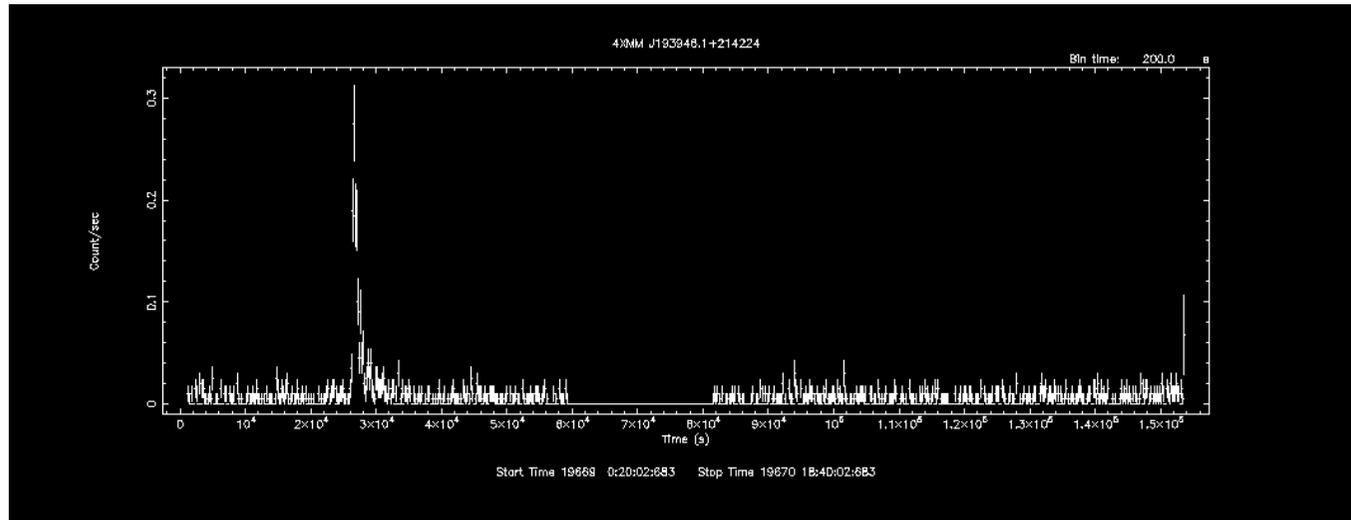
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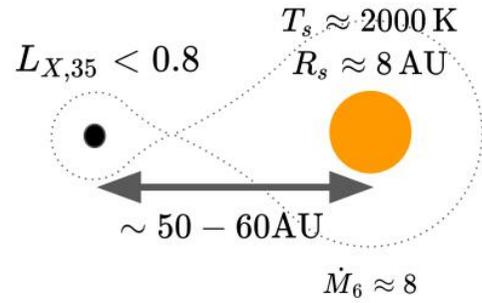
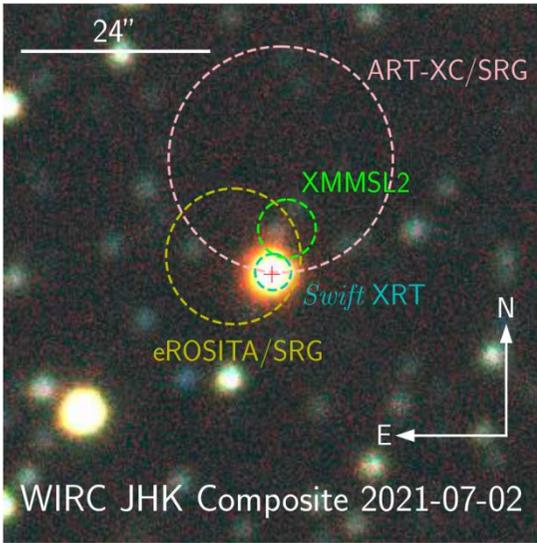


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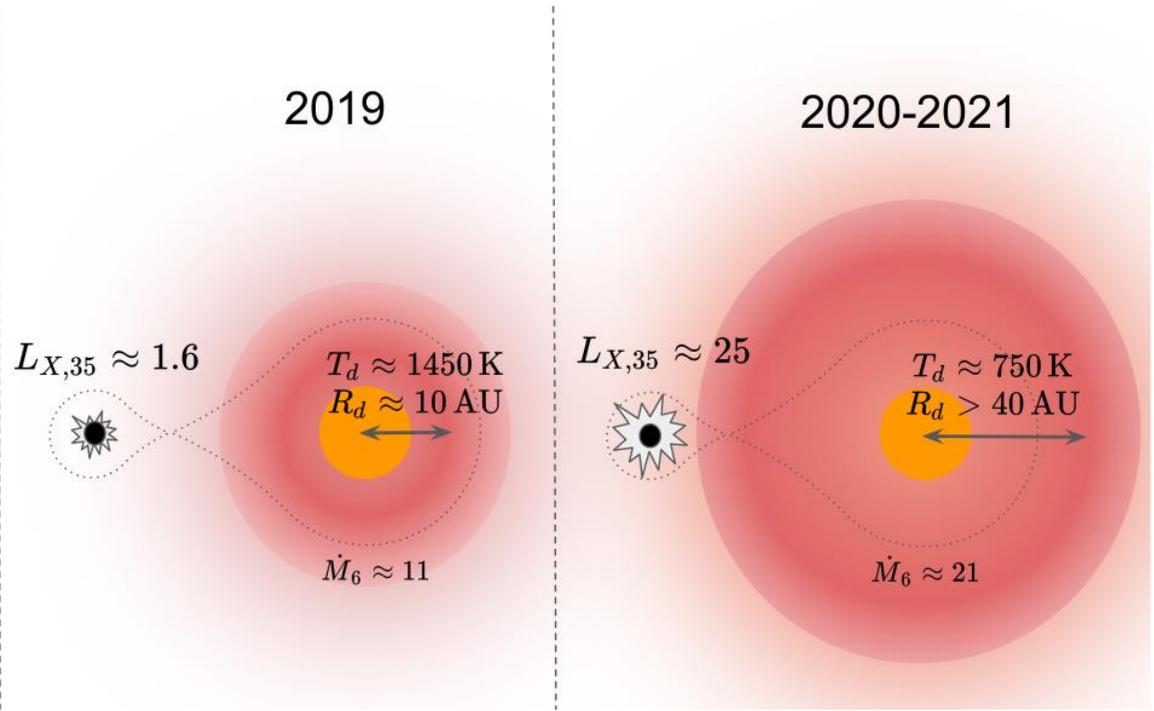
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K.De (MIT), I. Mereminskiy et al, 2022



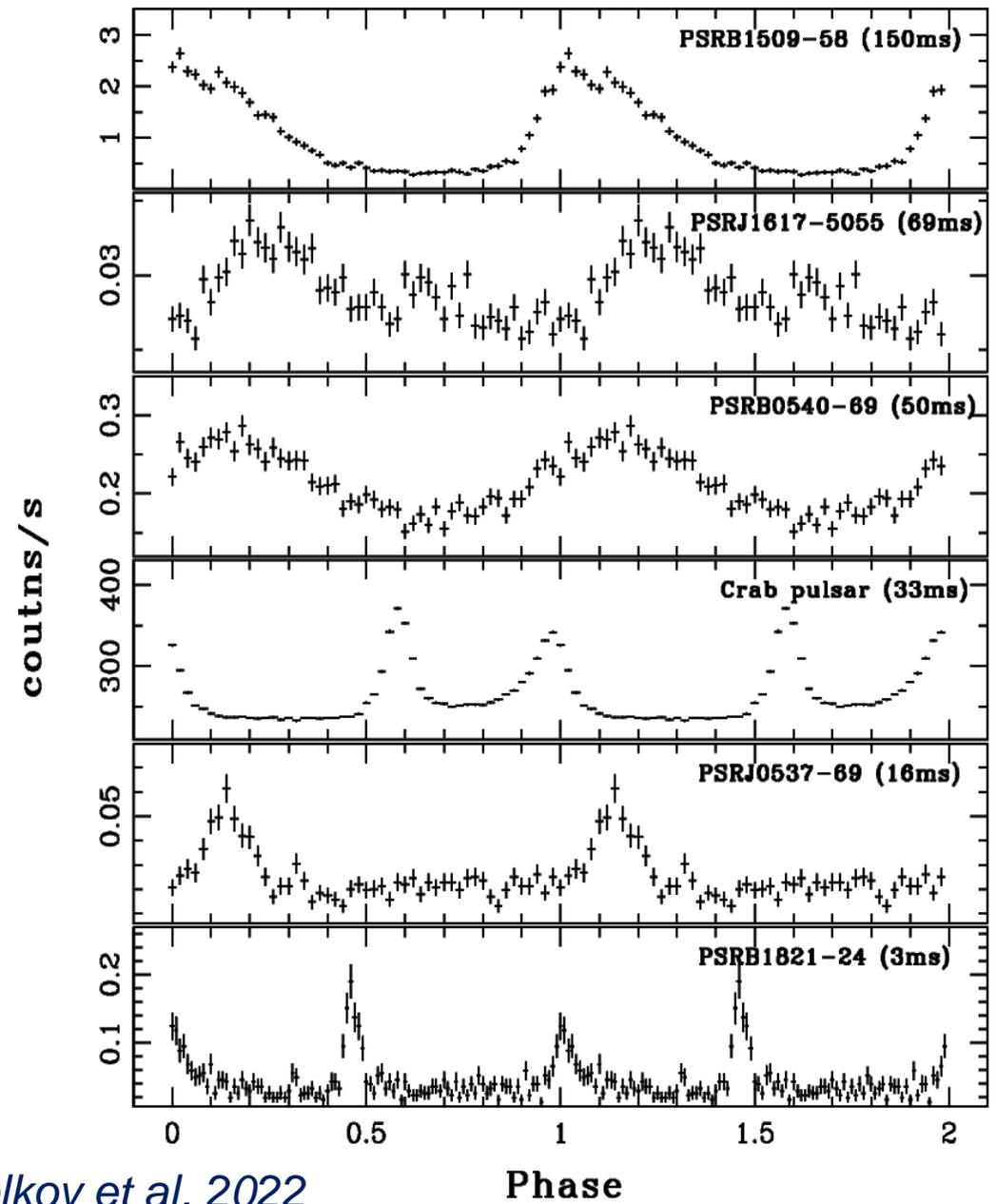
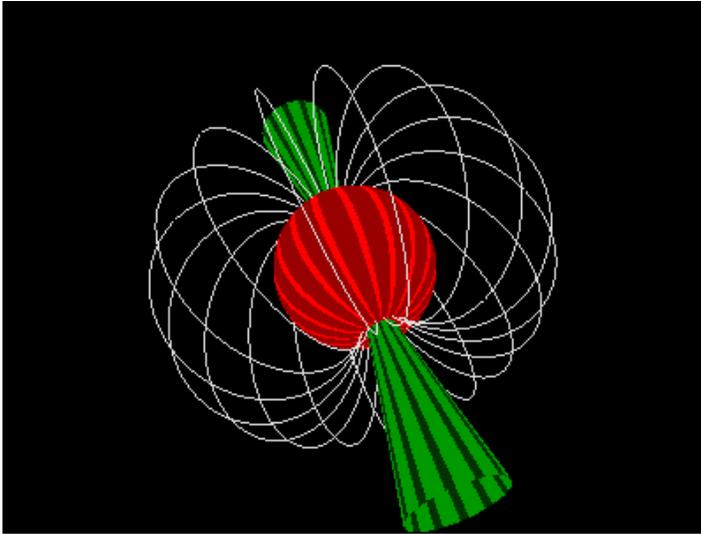
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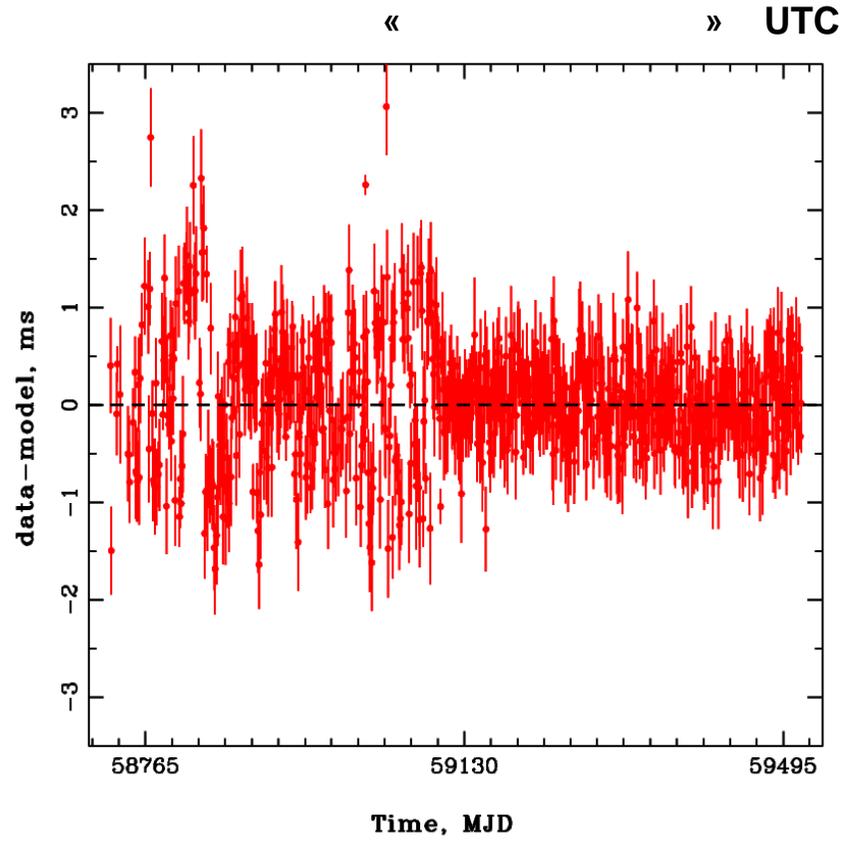
2020-2021

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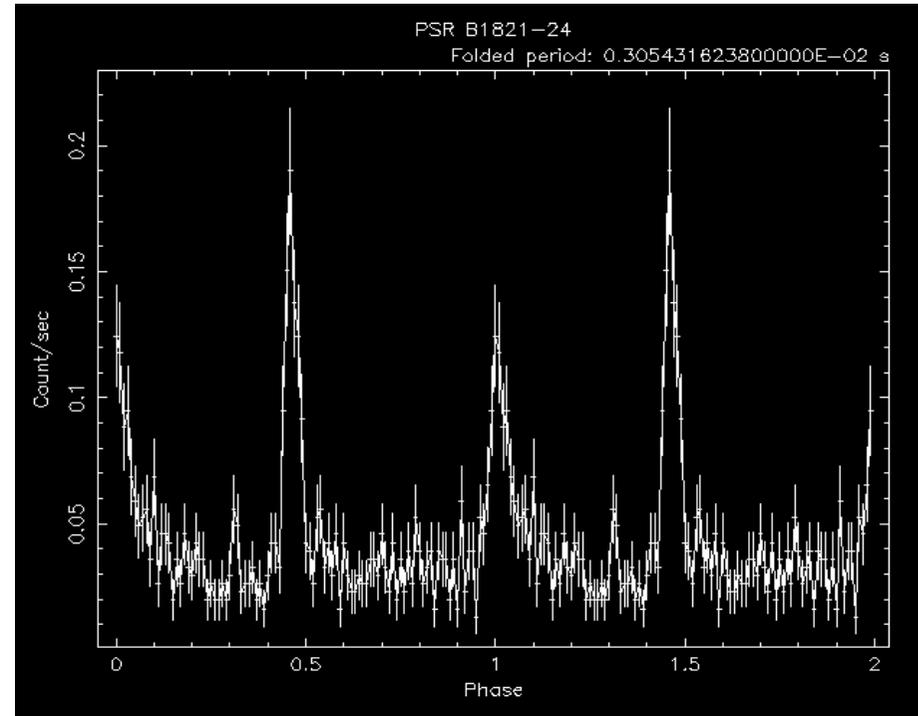


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