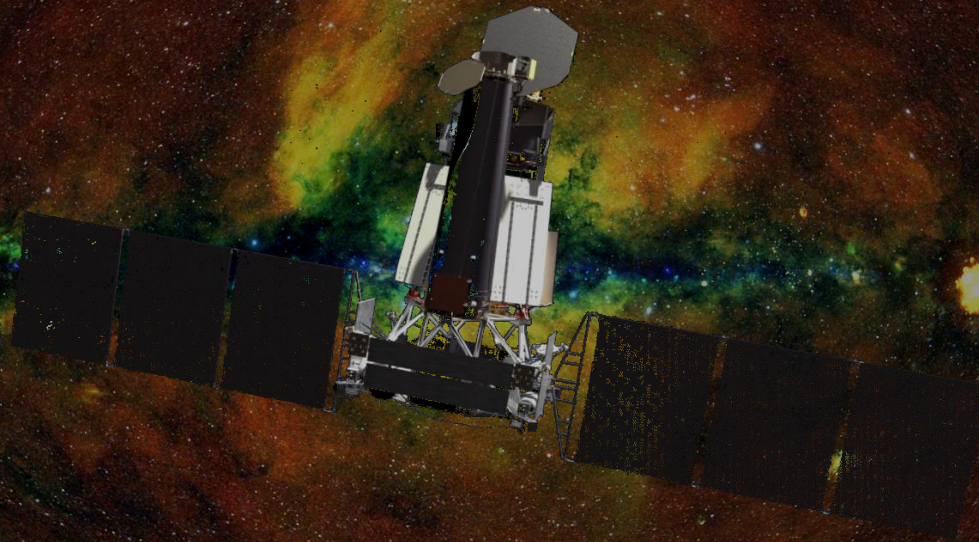


eROSITA on SRG

The new X-ray All-sky Survey



Peter Predehl (MPE)

Fermi Symposium, April 2021

ART-XC (IKI)



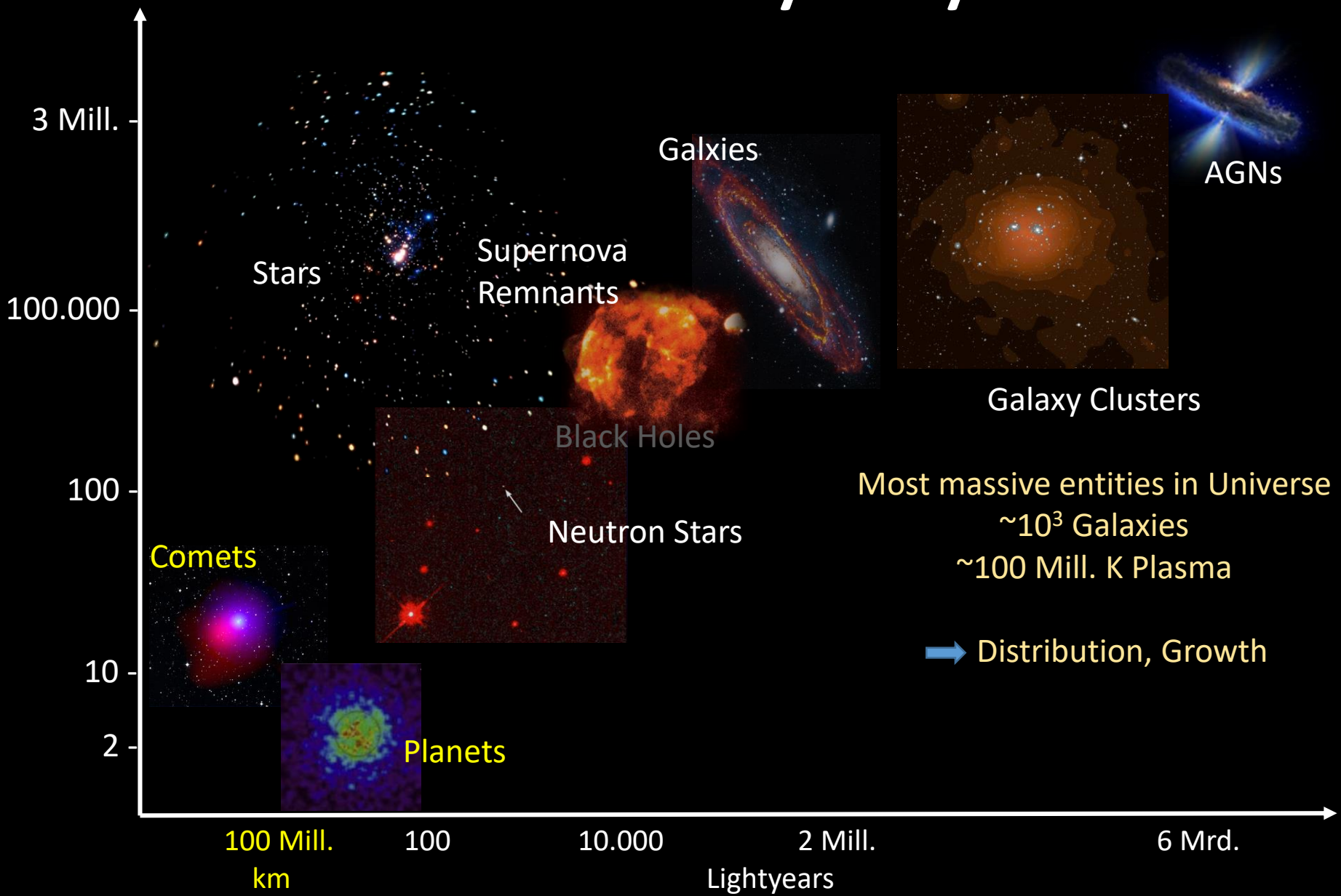
Navigator
(NPO Lavochkin)

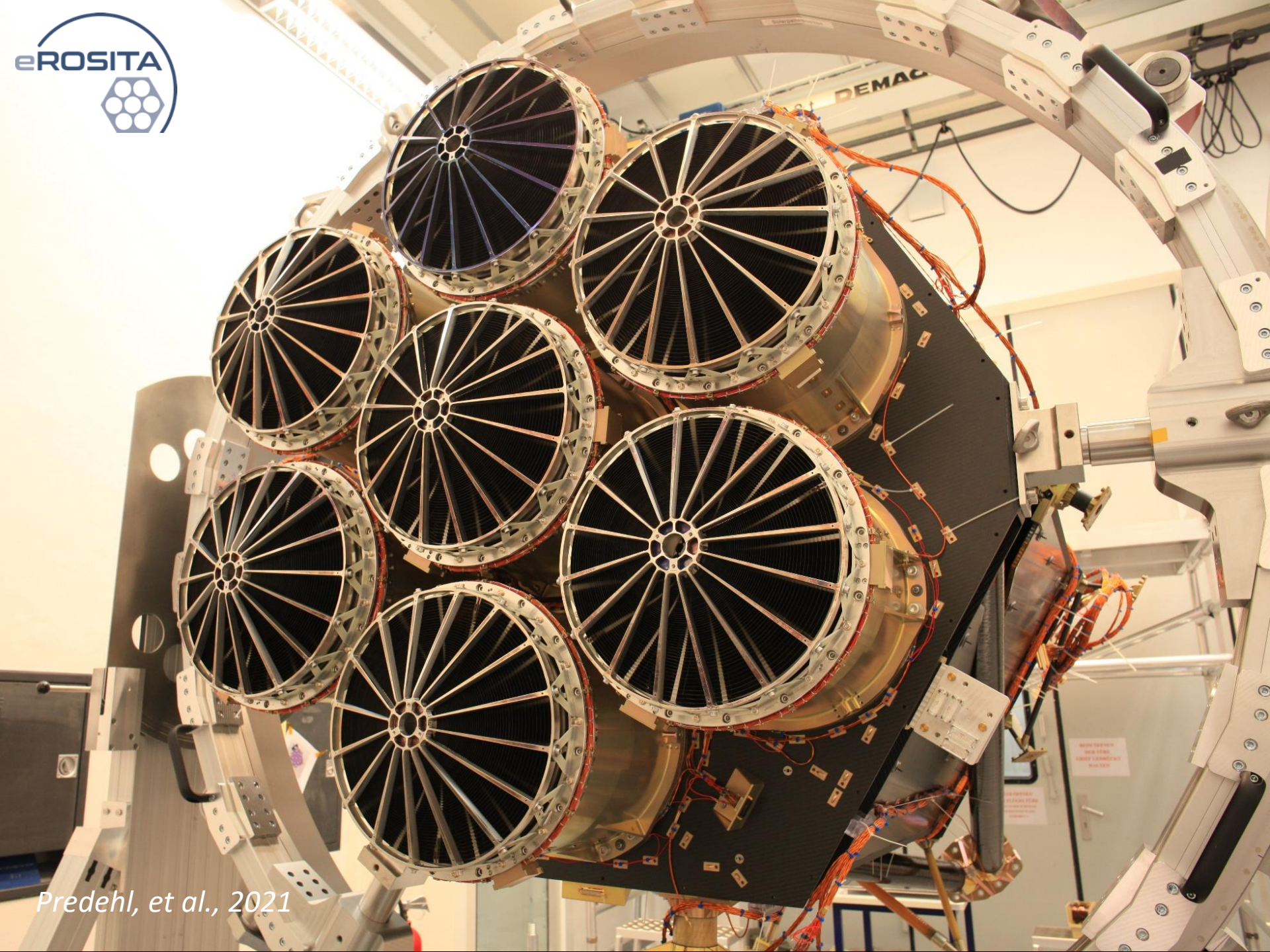


eROSITA (MPE)

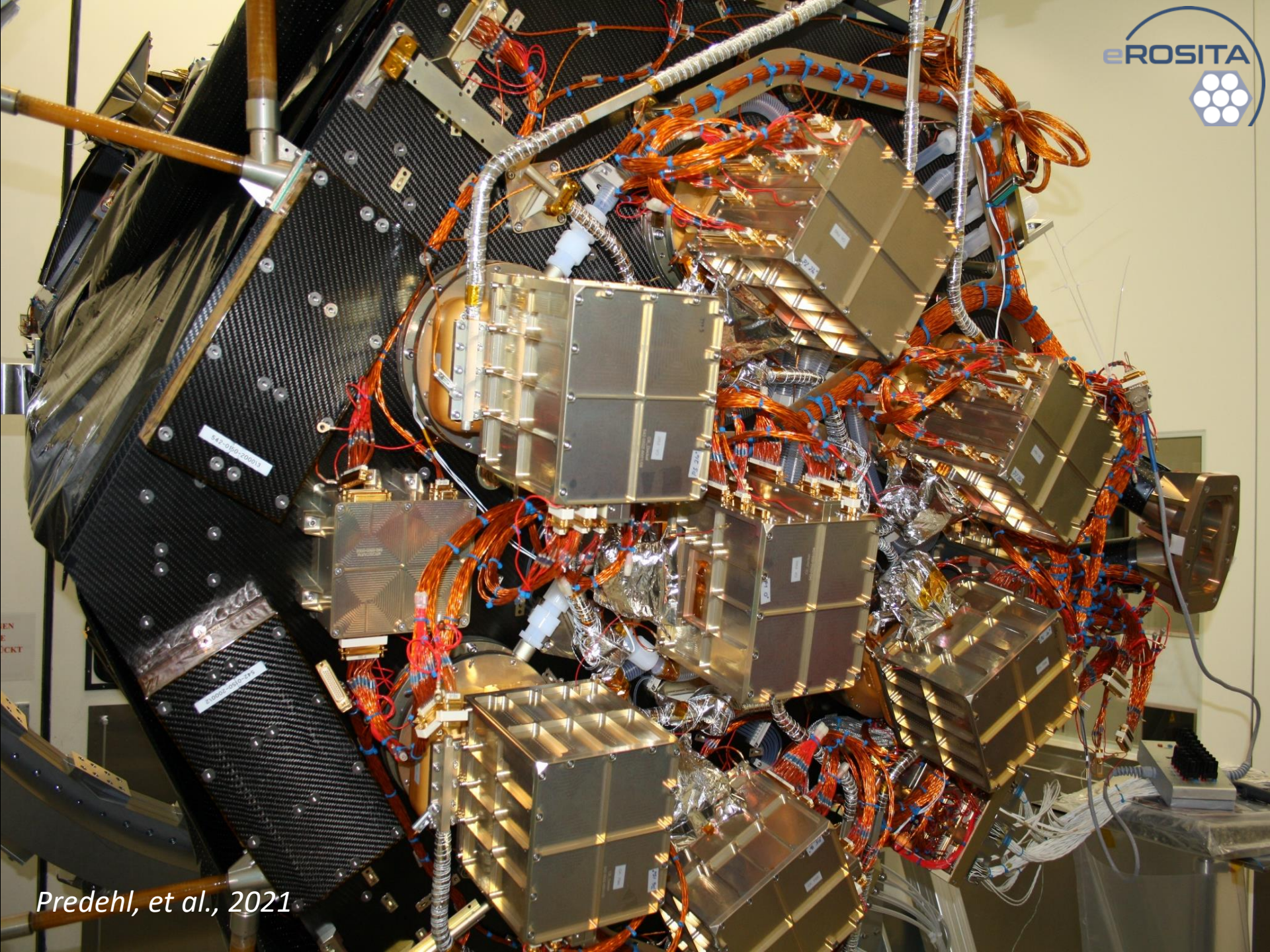
Спектр-РГ

The X-ray Sky





Predehl, et al., 2021



Predehl, et al., 2021

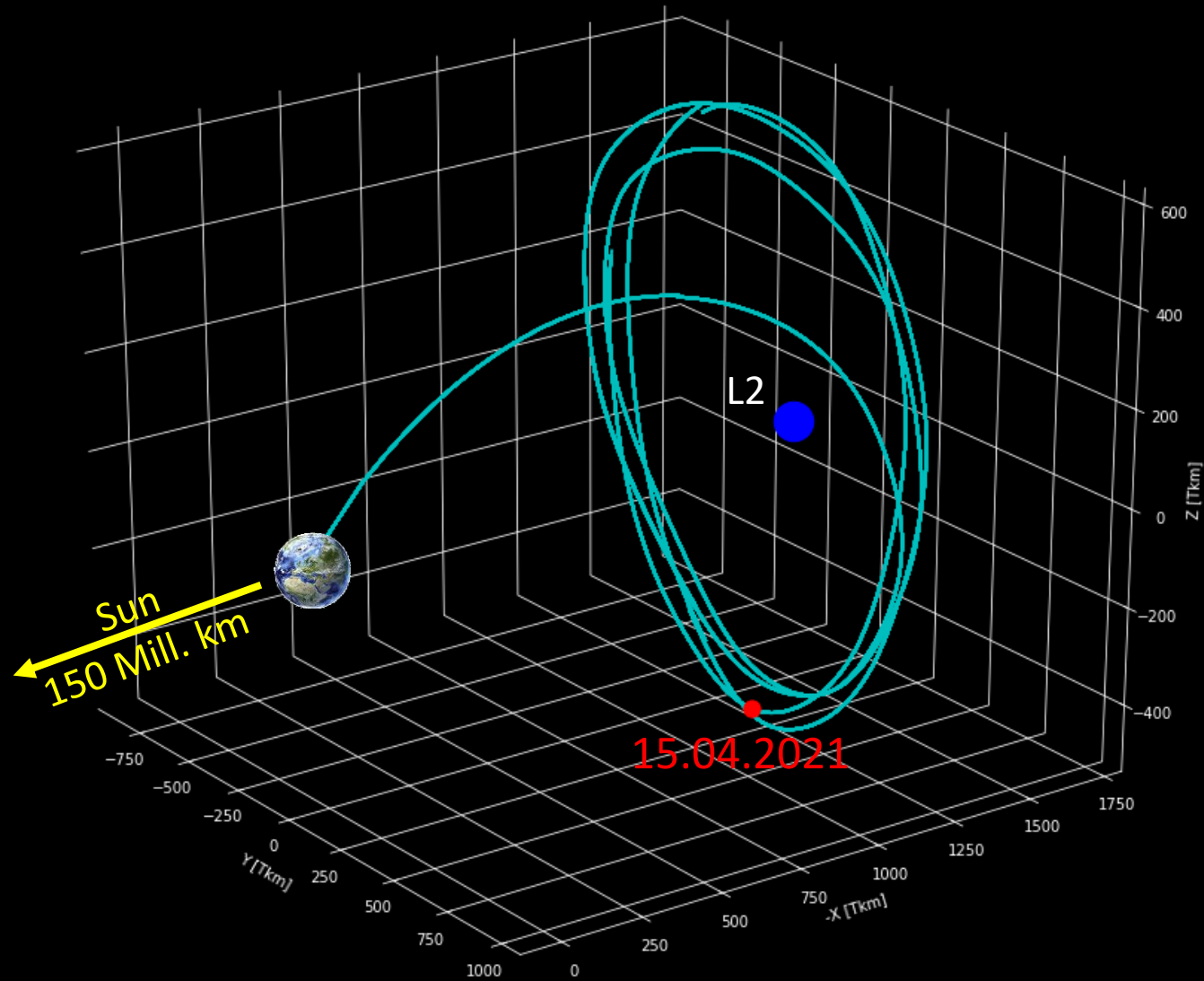
13.07.2019, 17:31

Cosmodrom Baikonur/Kazakhstan

Proton-M / BLOK-DM03



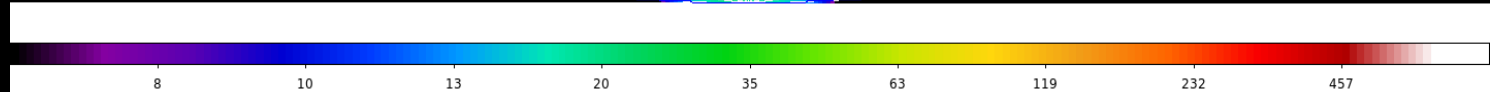
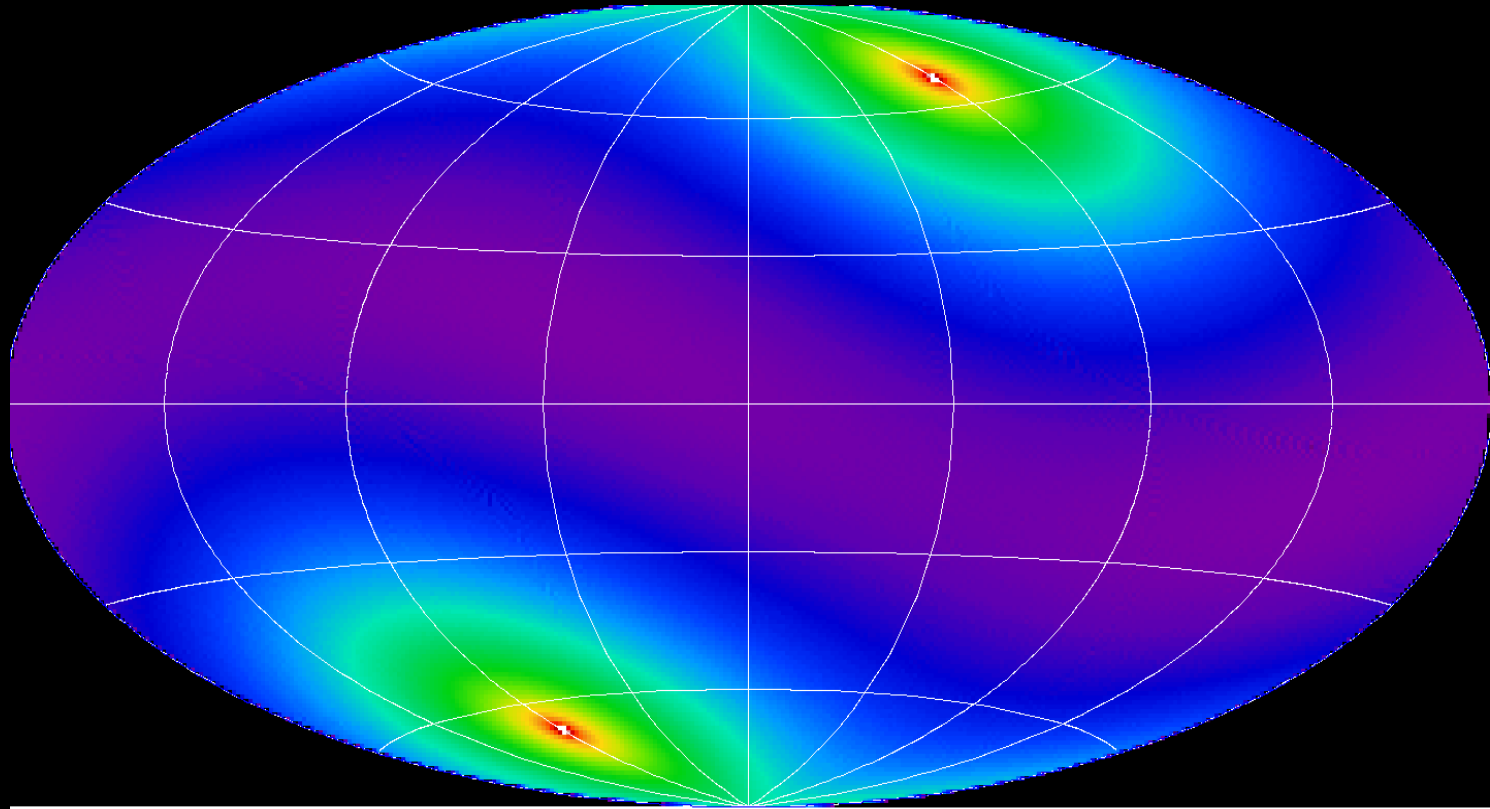
Credit: Roscosmos



- 4 years:
- 2.5 years:

8 all sky surveys (6 rotations/day)
pointed observations

eROSITA Cadence Map



→ # of daily eROSITA visits over 4yrs

Exp.: 10^3 sec

10^4 sec

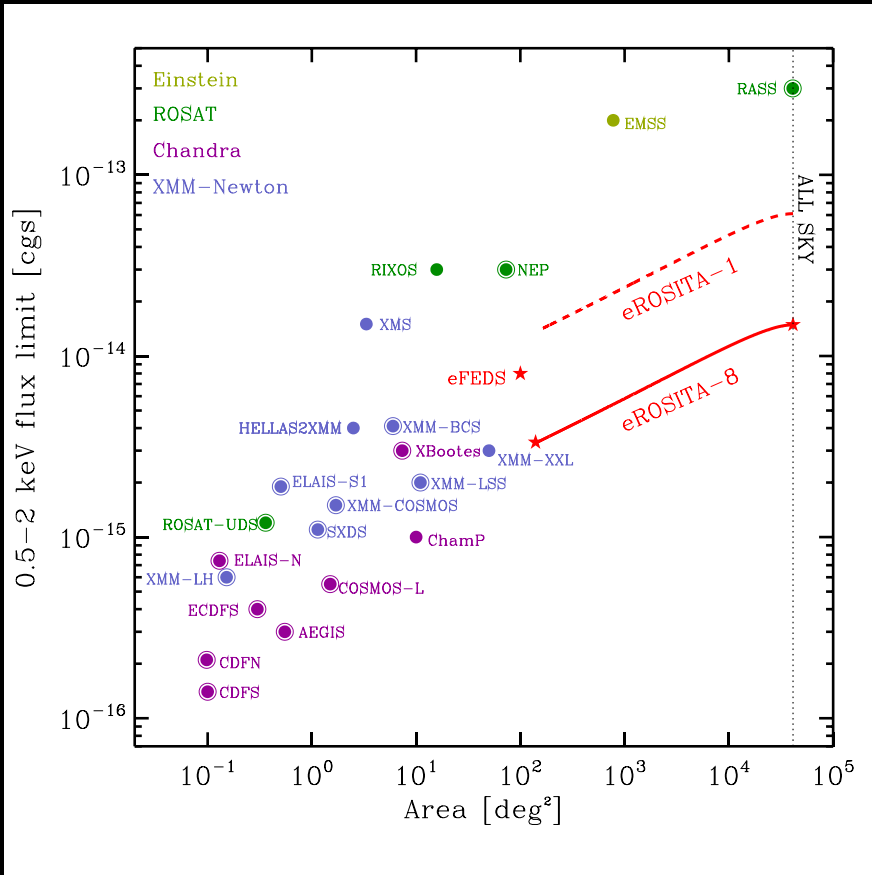
src. conf.



eROSITA surveys in context

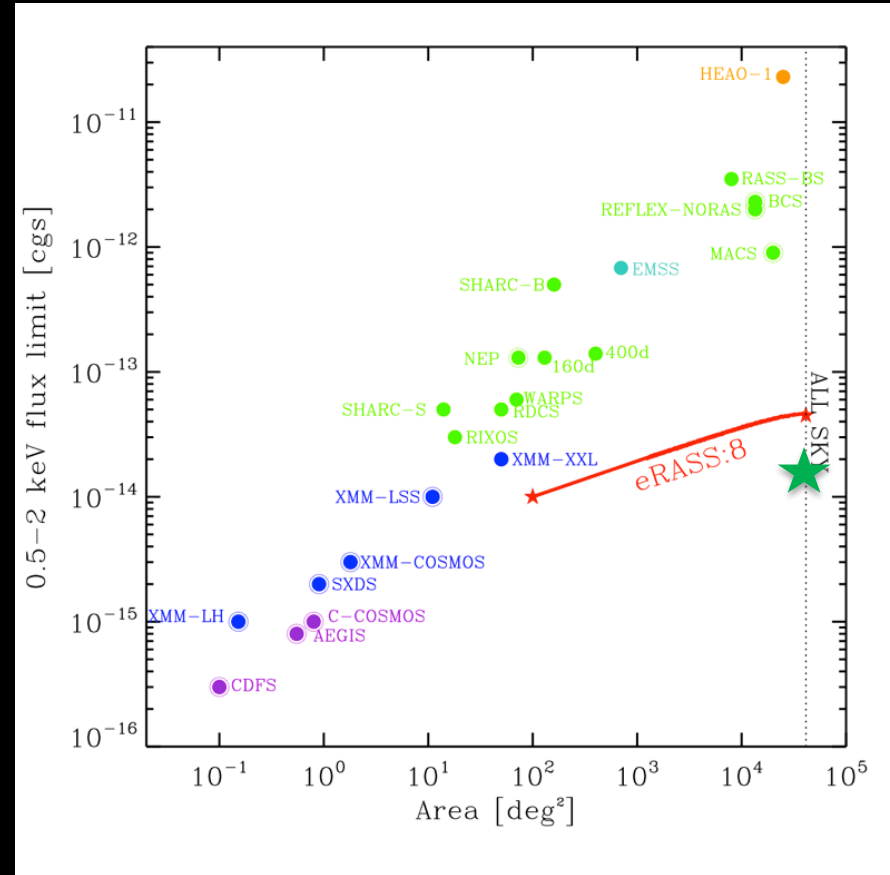


Point sources sensitivity



All sky: 10^{-14} [erg/cm²/s] (0.5-2 keV)

Extended sources sensitivity



All sky: 3.4×10^{-14} [erg/cm²/s] (0.5-2 keV)

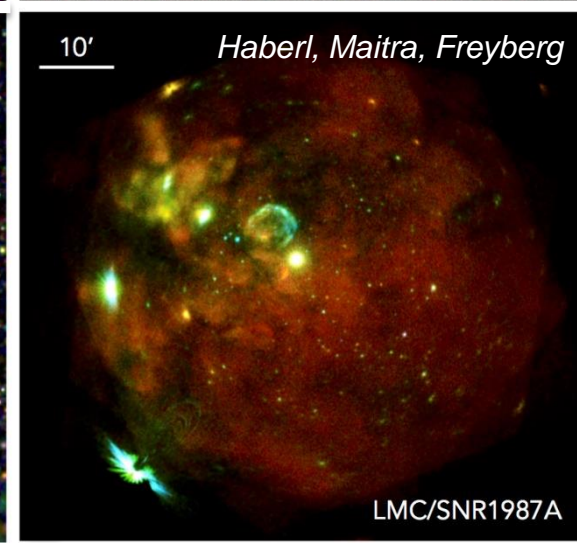
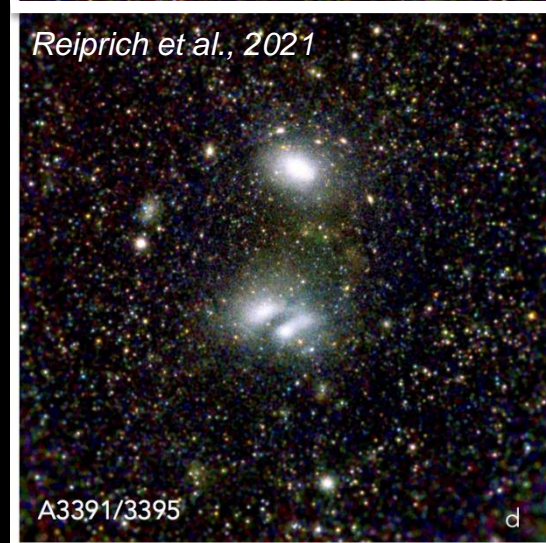
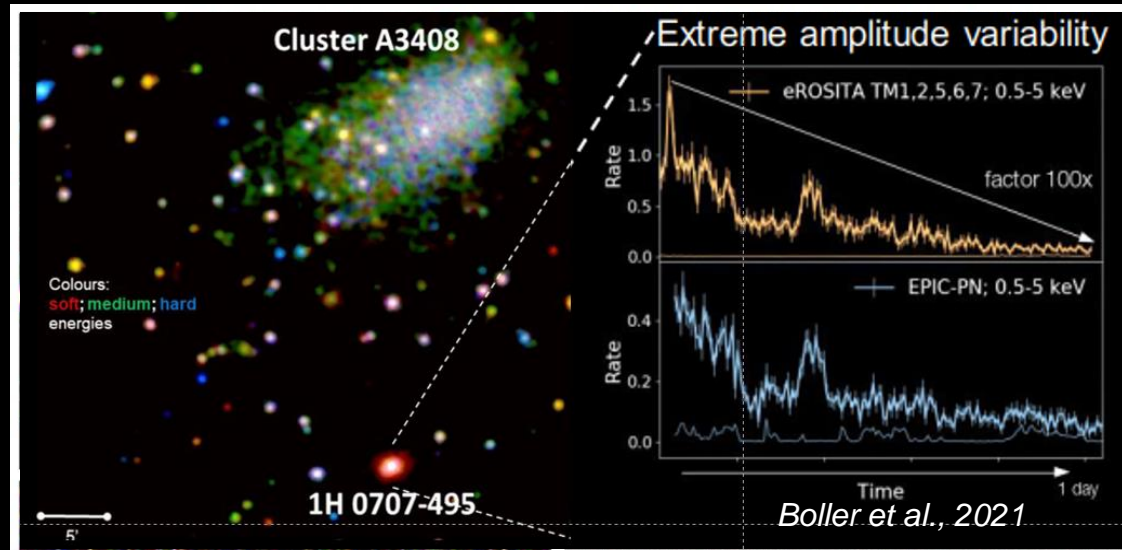
< 1.5 Liu et al. 2021

Merloni et al. 2012

Time Domain Astrophysics with eROSITA

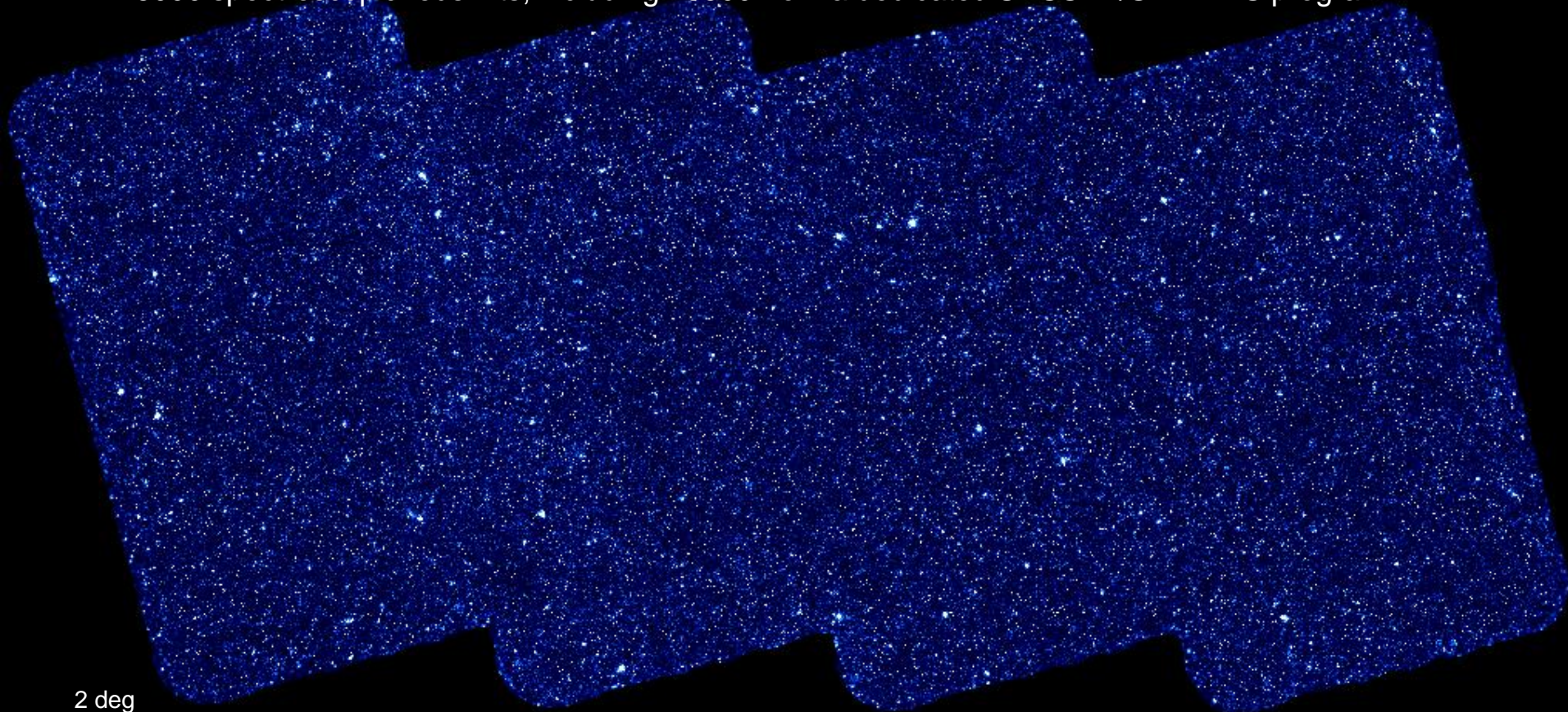
- 50msec time resolution
- 40sec scanspeed + 1 deg FoV
- 4 hours rotation period of SRG
- 1 day overlapping scans at ecliptic equator
 every day at the ecliptic poles
- half year one complete survey
- 4 years 8 surveys

Pulsars, GRBs, Flares from stars and AGN, TDEs



More than 25k point-sources detected

- ~8000 spectroscopic redshifts, including ~3800 from a dedicated SDSS-IV/SPIDERS program

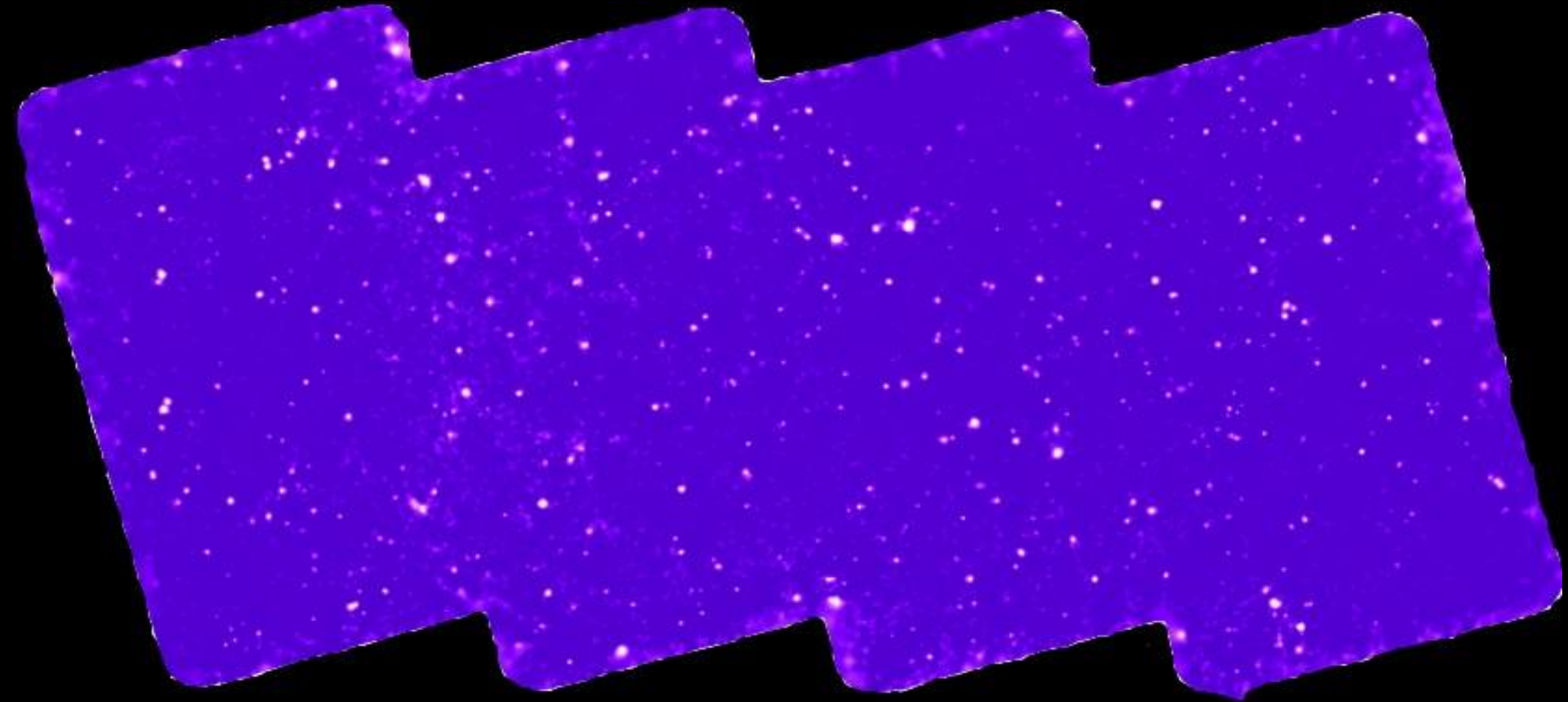


0.2-2.3keV, exposure and vignetting corrected, 1.2ksec

eFEDS Clusters



542 galaxy clusters detected by eROSITA
~ 440 already optically confirmed $0.1 < z < 1.3$

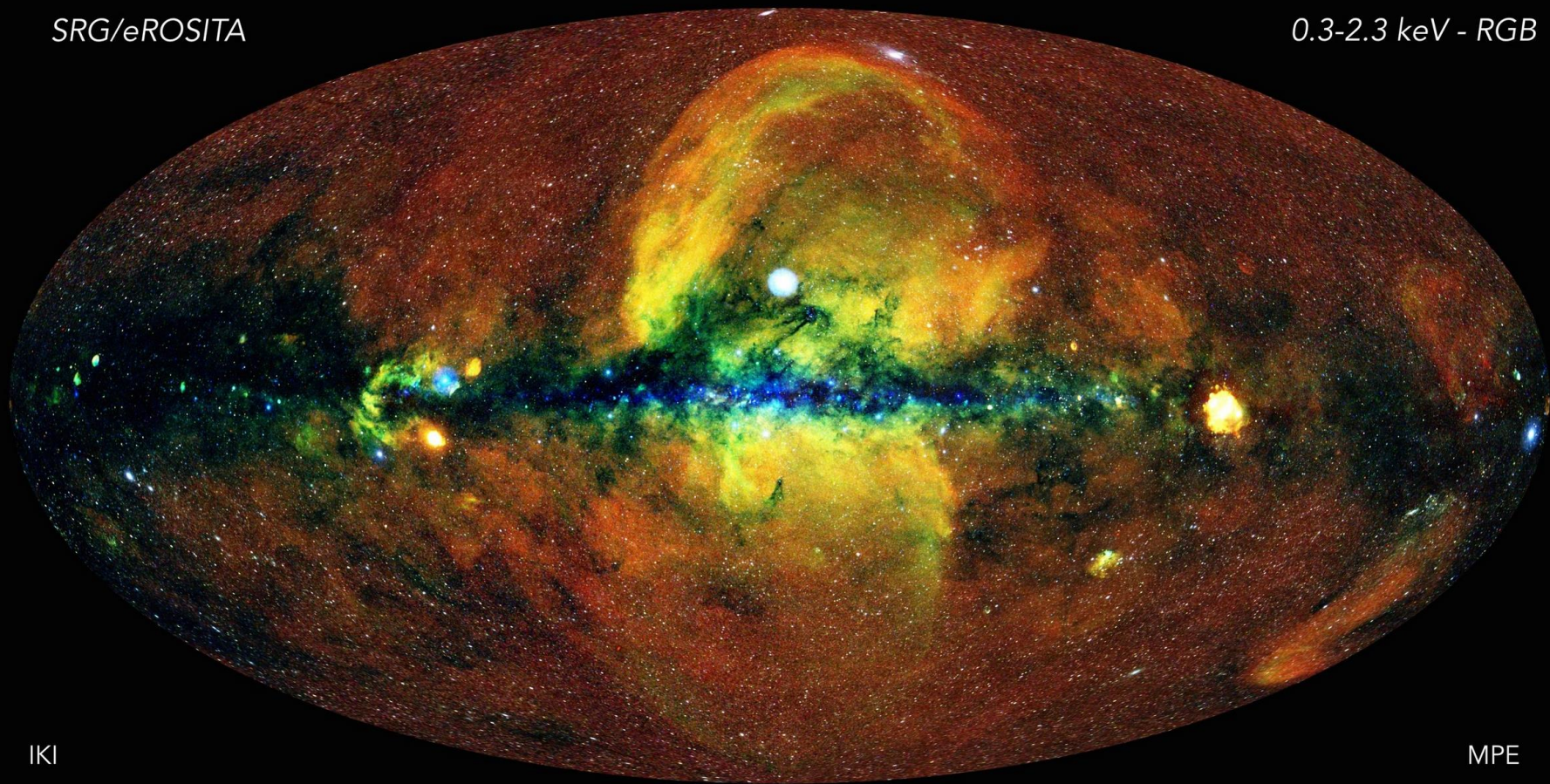


0.2-2.3keV, exposure and vignetting corrected, 1.2ksec

eRASS1

SRG/eROSITA

0.3-2.3 keV - RGB

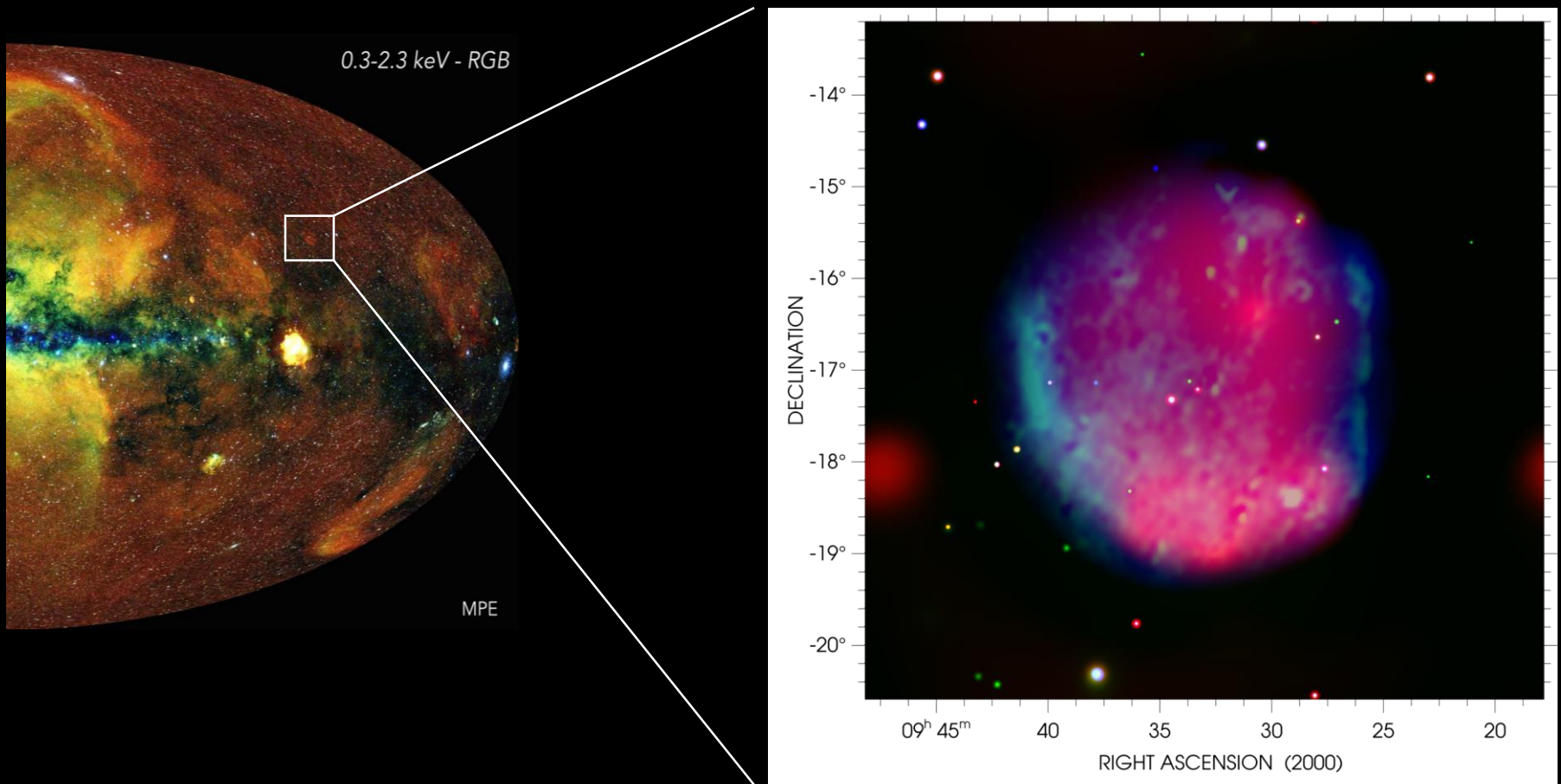


IKI

MPE

> 1.000.000 X-ray sources found

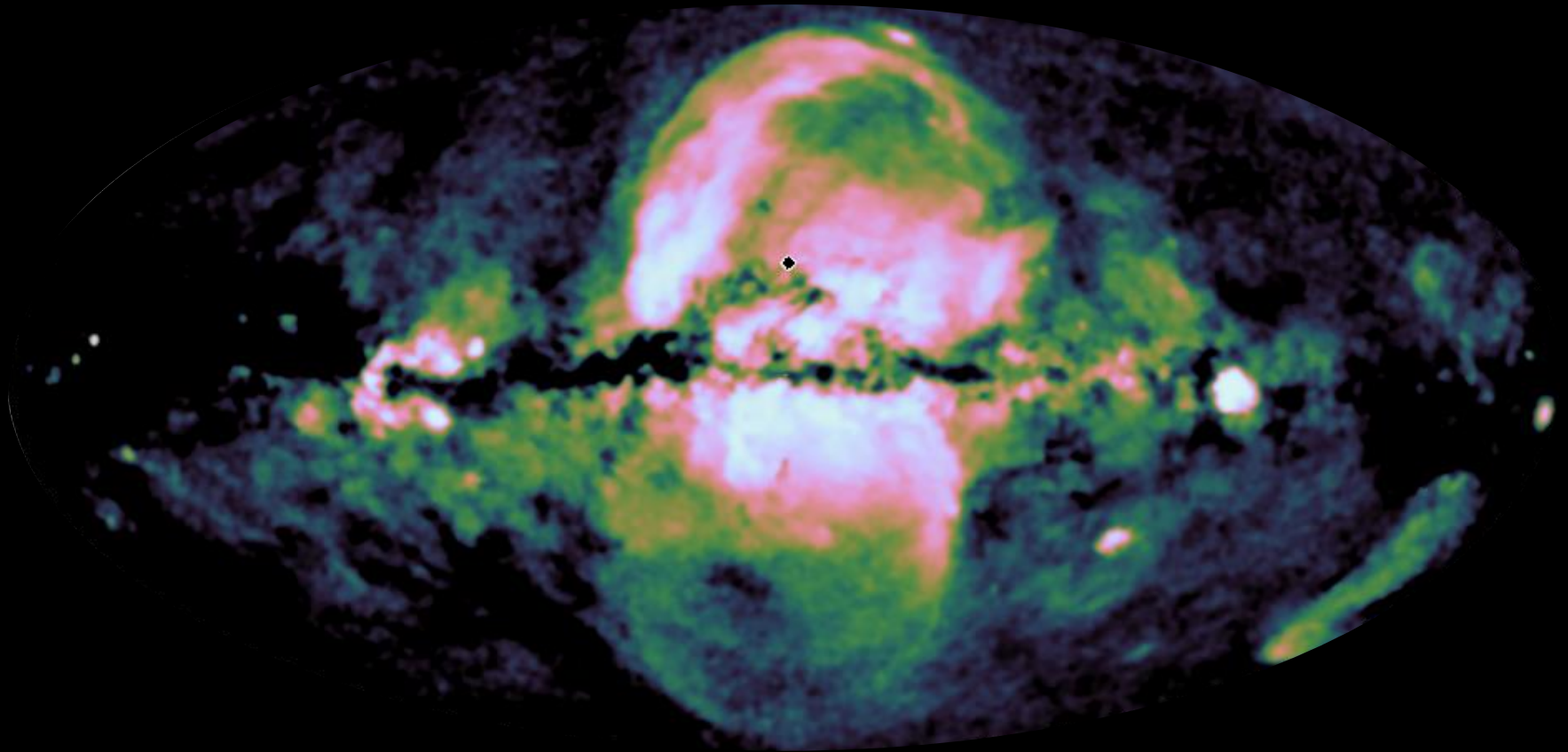
Hoinga – the largest supernova remnant ever discovered with X-rays



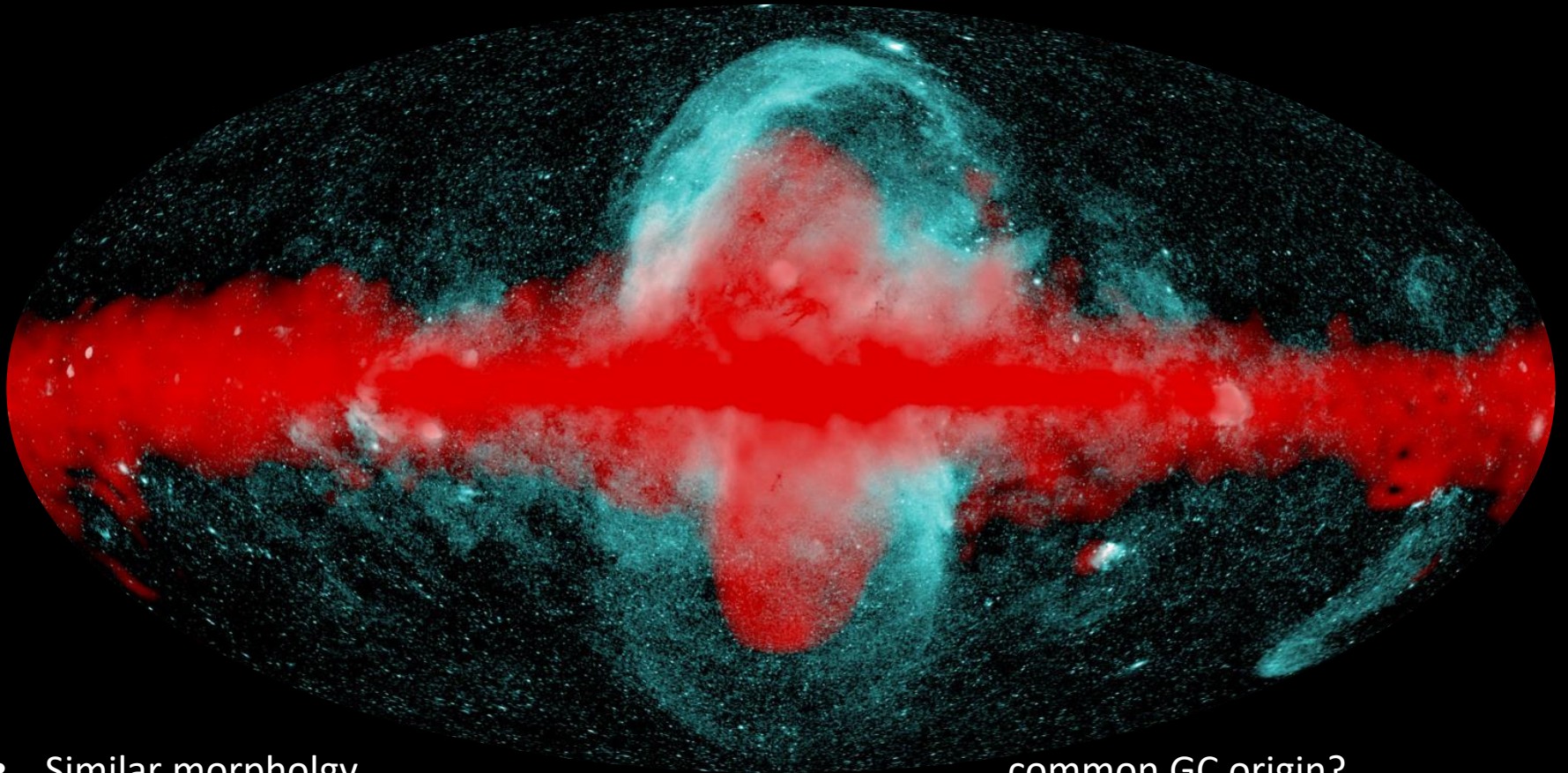
SNR: $4.4^\circ \varnothing$, $d \sim 500 \text{ pc}$, 17 - 30.000 yrs

Becker et al., 2021

„eROSITA Bubbles“



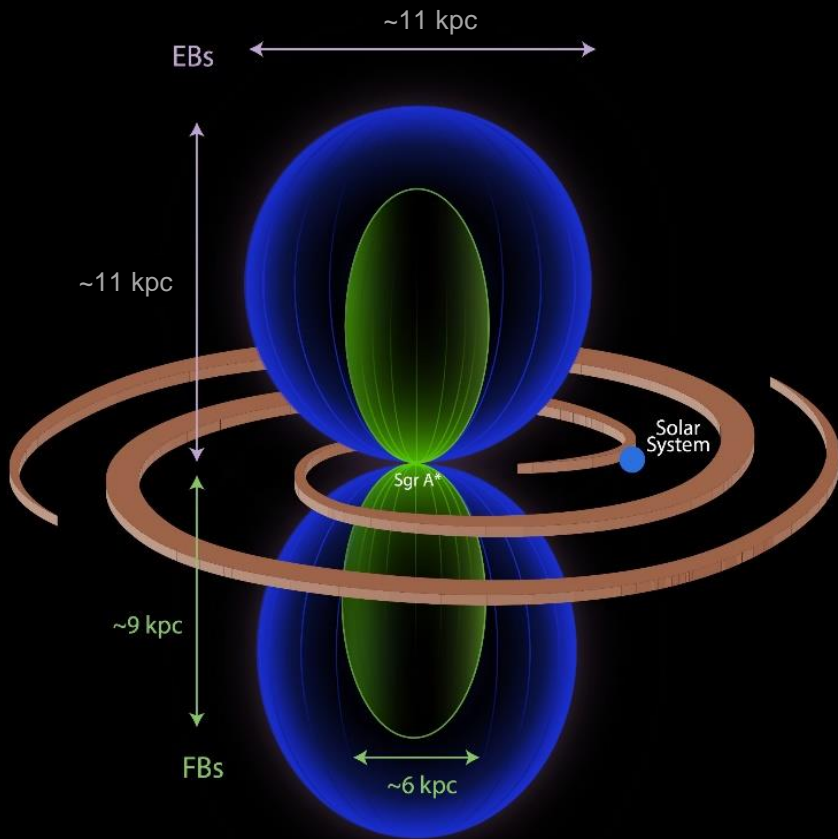
eROSITA & Fermi Bubbles



- Similar morphology
- Boundary between eRO & Fermi is not clear
- Fermi = symmetric, eRO = not
- Starburst or AGN activity

common GC origin?
2 consecutive events?
NPS/Loop I somewhat peculiar
MV quiescent only now?

eROSITA Bubble



Some numbers:

distance	~ 10 kpc
brightness	6×10^{38} ergs $^{-1}$
kT	0.3 keV
t_{cool}	1.9×10^8 yr
v_{exp}	~ 300 kms $^{-1}$
age	~ 20 Mio yr
E_{thermal}	$\sim 10^{56}$ erg
abundance	$0.2 \odot$ (halo)



since April 2020



Operations @Home



Coutinho et al., 2021





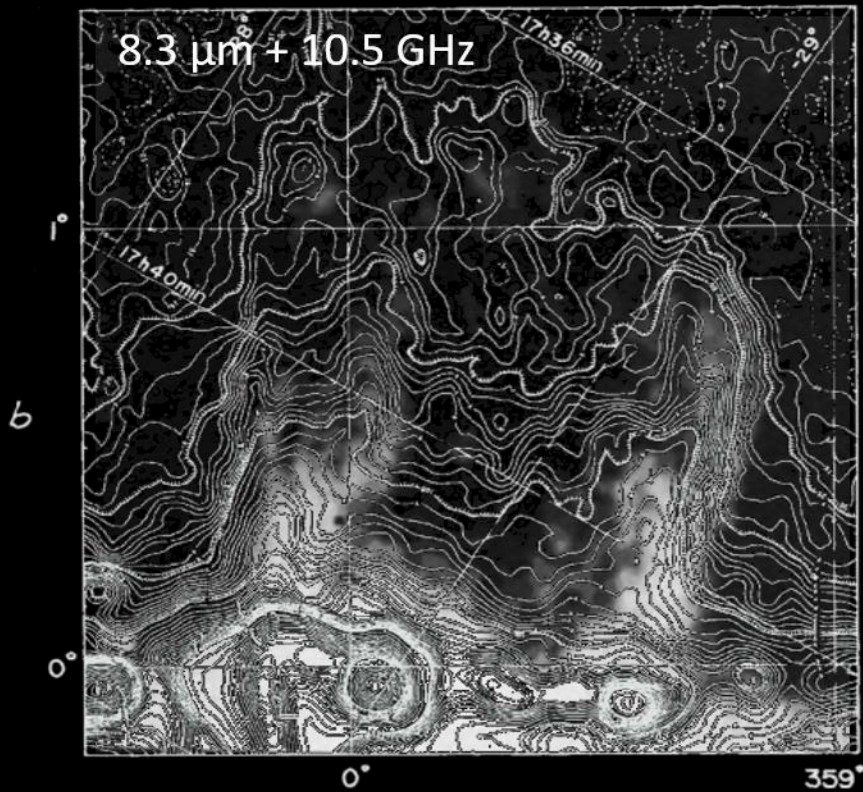
Thank you very much
for your attention



Photo: V. Burwitz (MPE)

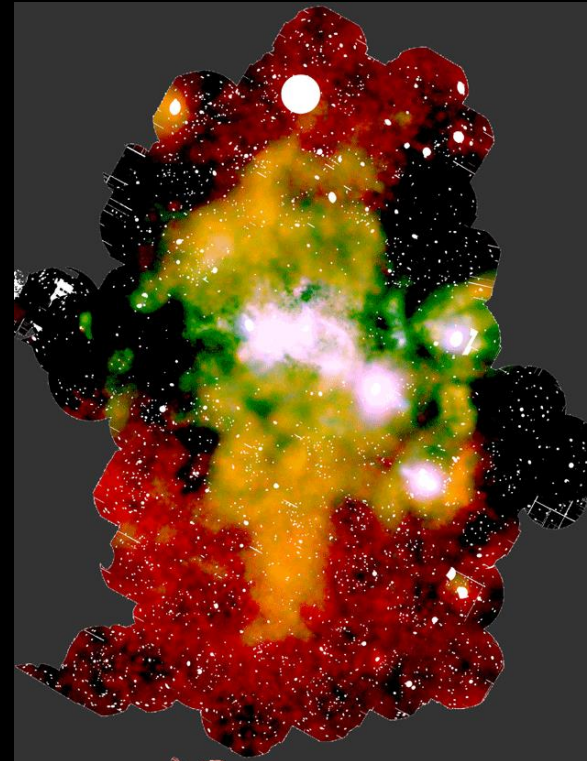


Channeled outflow from GC



Channeled Exhaust

Bland-Hawthorn et al., 2003



X-ray Chimneys

Ponti et al., 2019

eROSITA Collaboration

Core Institutes (DLR funding):

MPE, Garching
University Erlangen-Nuremberg
IAAT (University Tuebingen)
SB (University Hamburg)
Leibniz-Institute for Astrophysics Potsdam

Associated Institutes:

USM (LMU Munich)
AIFA (University Bonn)

Russian Partner Institute:

IKI, Moscow

Industry:

Media Lario/I	Mirrors, Mandrels
Tecnotron/D	PCBs
Kayser-Threde/D	Mirror Structures
Carl Zeiss/D	ABRIXAS-Mandrels
Invent/D	Telescope Structure
pnSensor/D	CCDs
IberEspacio/E	Heatpipes
RUAG/A	Mechanism
HPS/D,P	MLI
+ many small companies	

NPOL – Lavochkin Association

MPE: Scientific Lead Institute, Project Management
Instrument Design, Manufacturing, Integration & Test

Operation, Data Handling & Processing, Archive etc.

