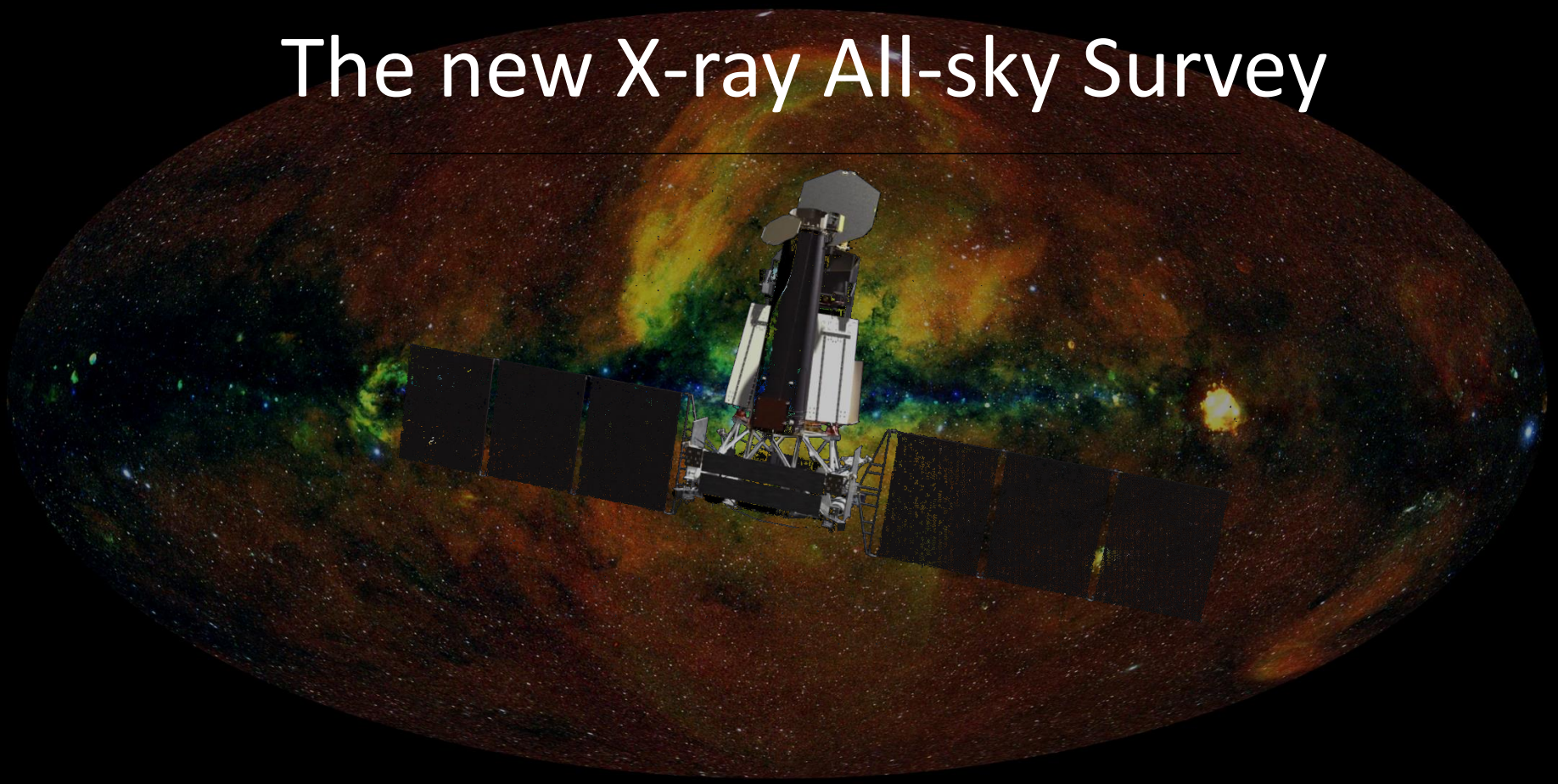
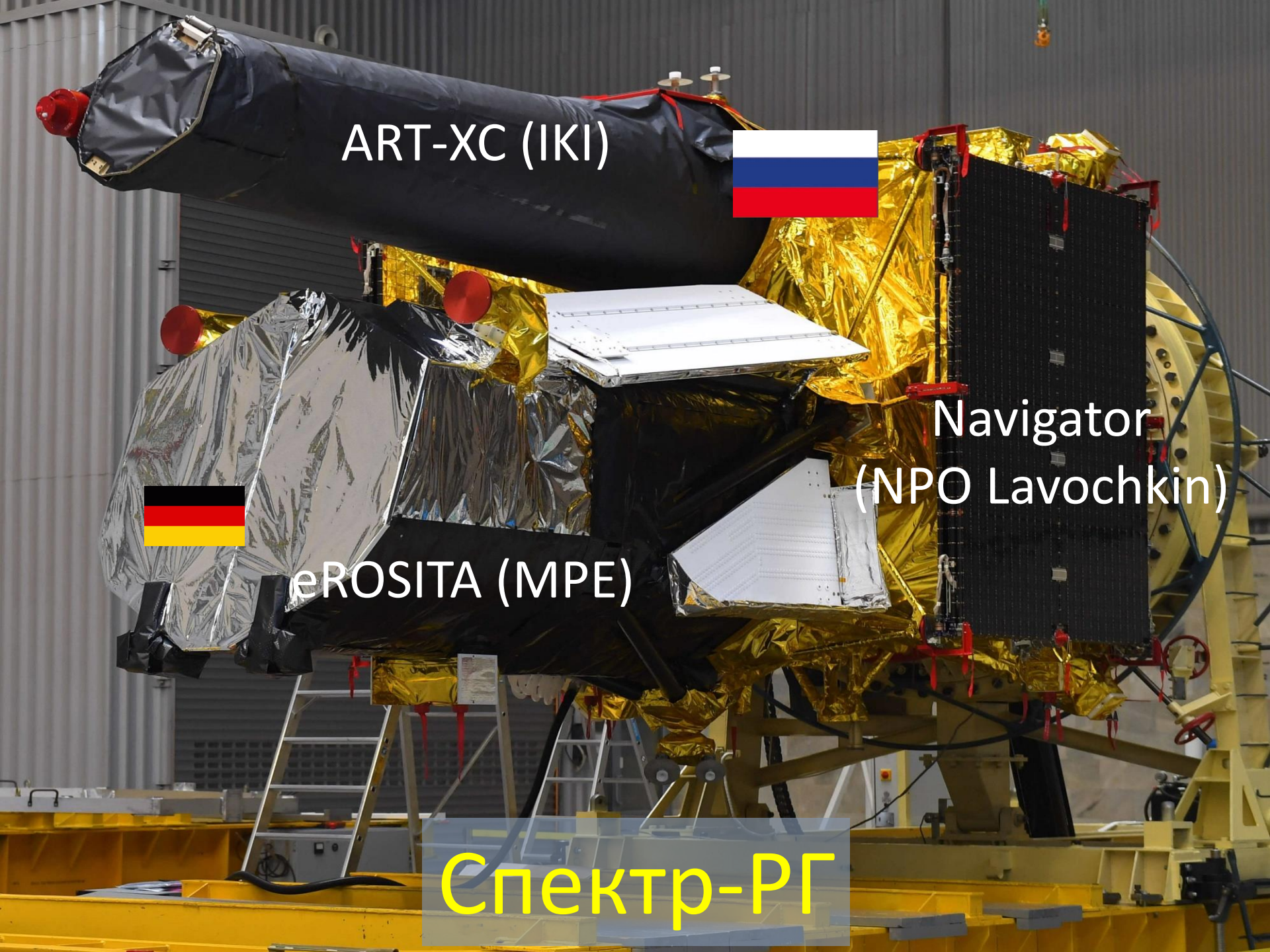
eROSITA on SRG
The new X-ray All-sky Survey



Peter Predehl

THESEUS Conf., March2021


ART-XC (IKI)
Navigator
(NPO Lavochkin)
eROSITA (MPE)
Спектр-РГ

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

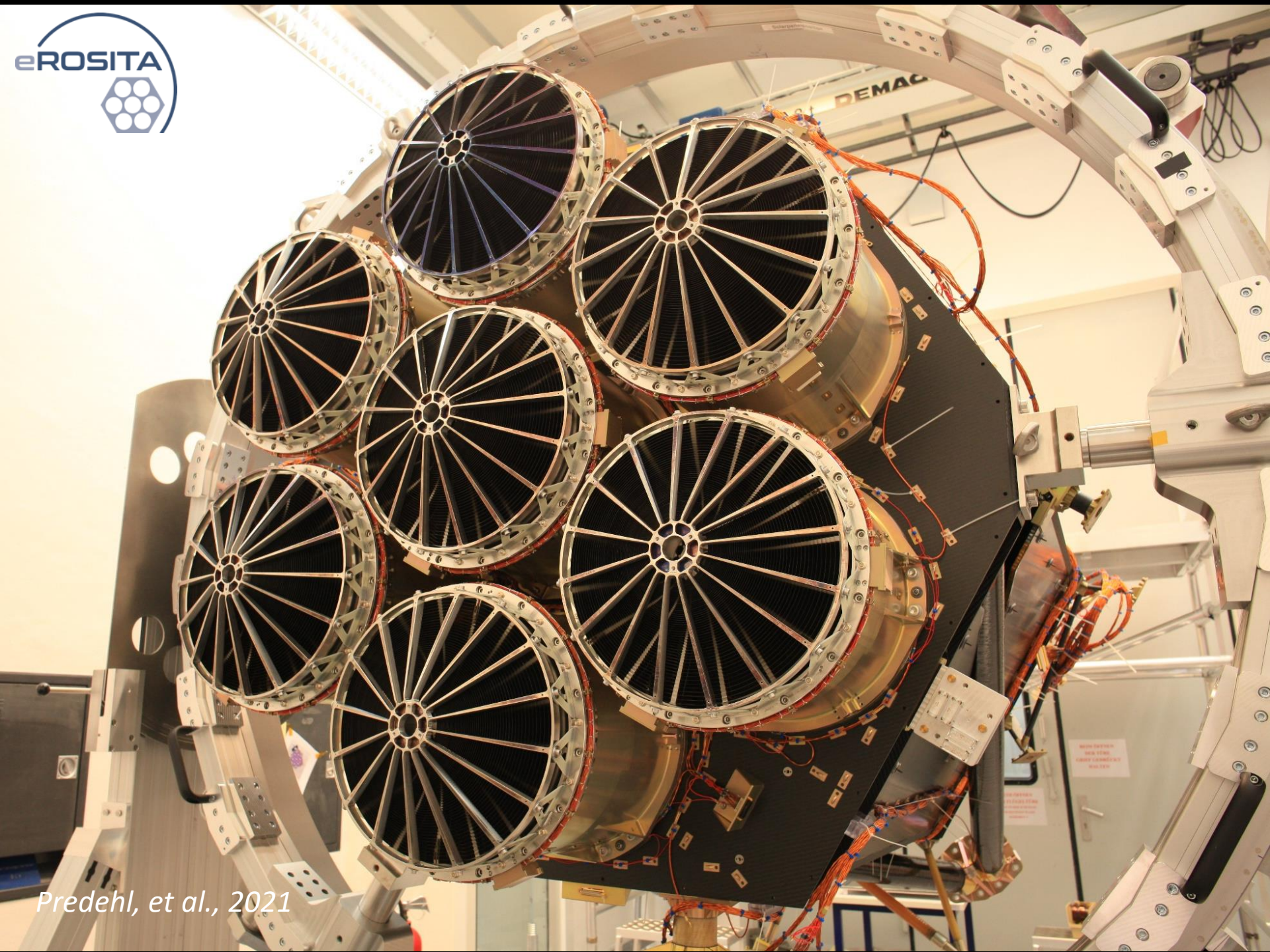
Industry:

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

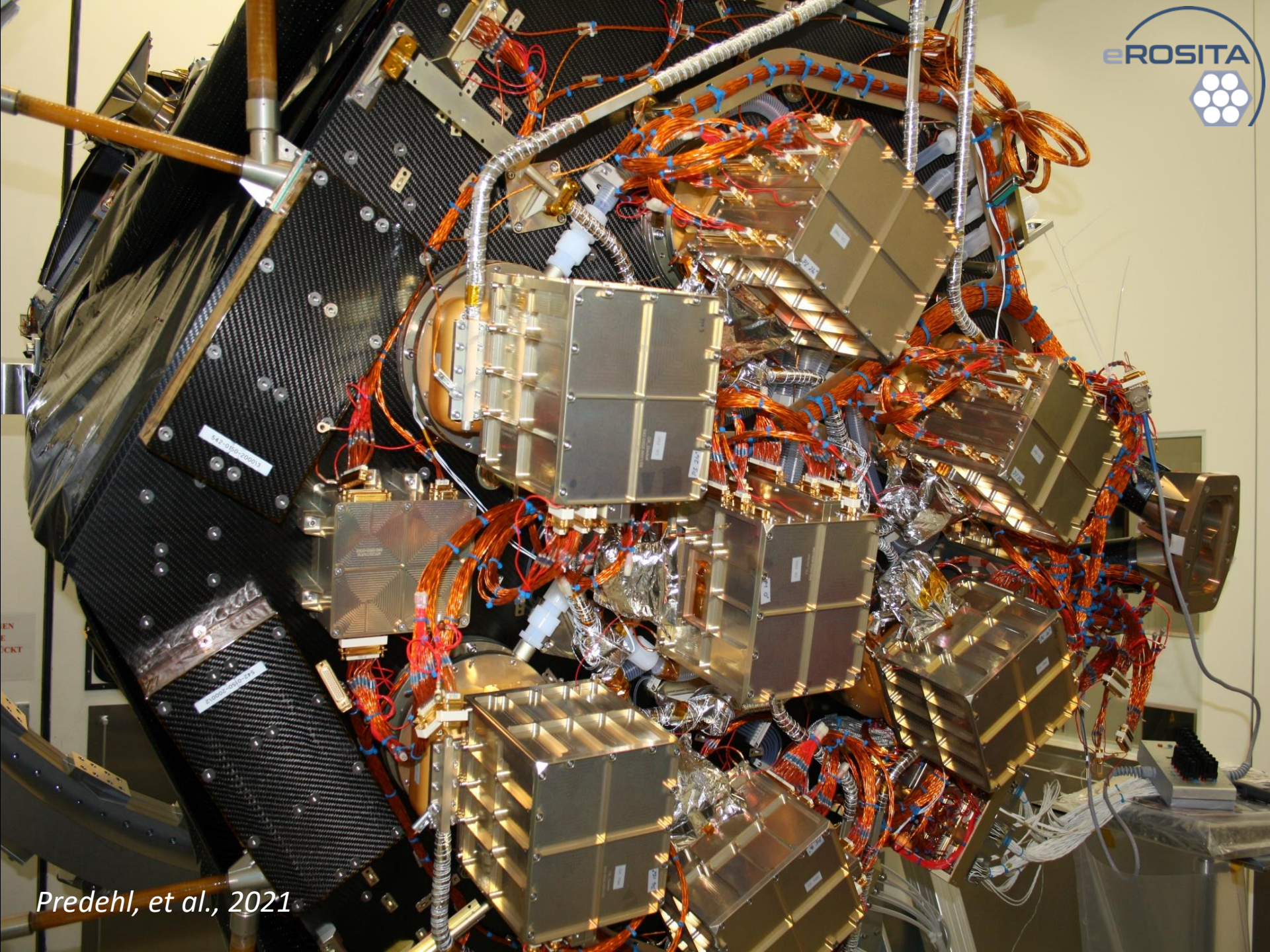
+ many small companies

NPOL – Lavochkin Association

MPE: Scientific Lead Institute, Project Managment
Instrument Design, Manufacturing, Integration & Test
Operation, Data Handling & Processing, Archive etc.



Predehl, et al., 2021



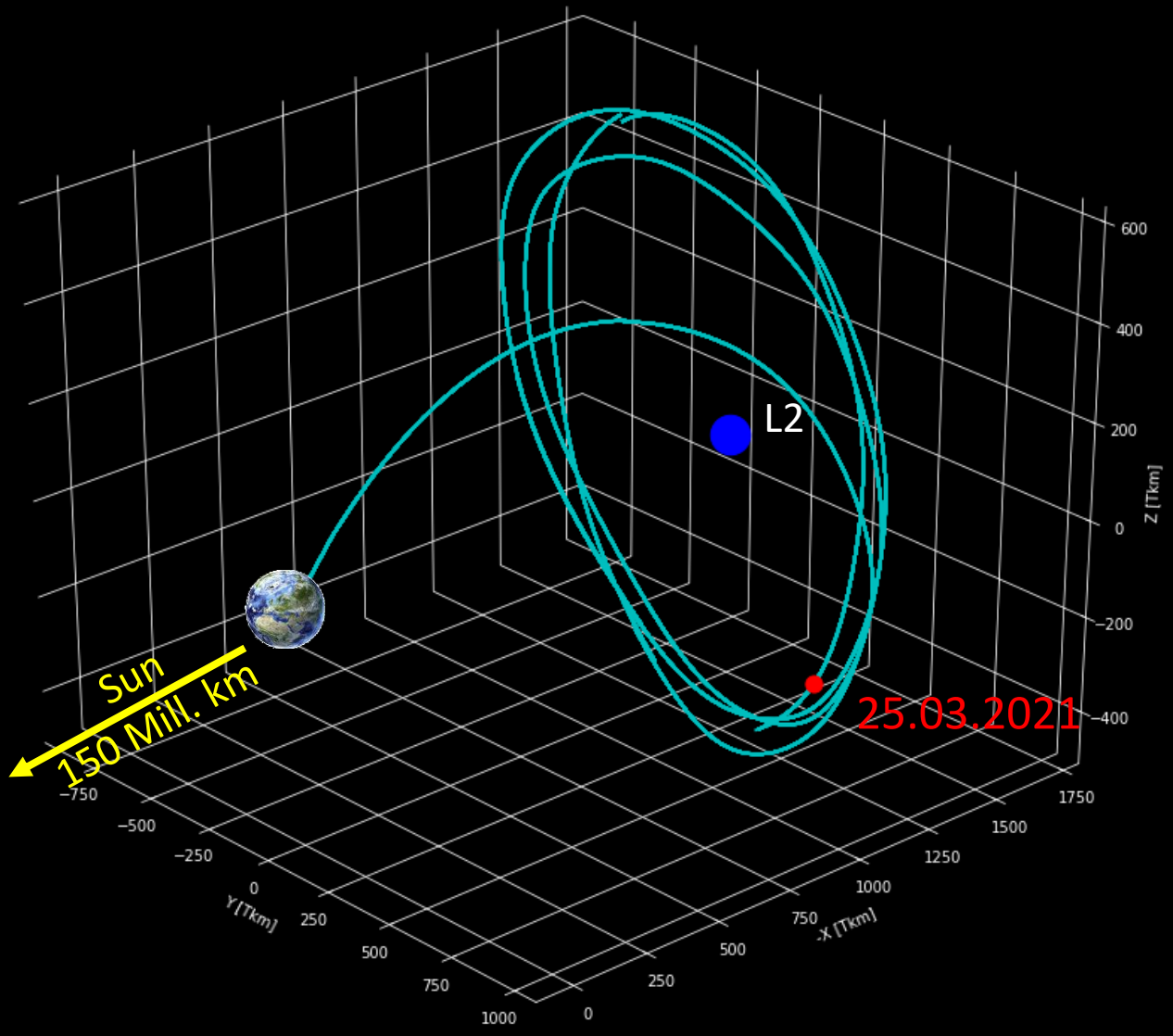
Predehl, et al., 2021

13.07.2019, 17:31

Cosmodrom Baikonur/Kazakhstan

Proton-M / BLOK-DM03

Credit: Roscosmos



- **4 years**: 8 all sky surveys (6 rotations/day)
- **2.5 years**: pointed observations
- **Ground Segment**: 2 x 70m antennas (Bear Lakes and Ussiriysk), daily contact (up to ~4 hours); data transfer directly to MPE via Moscow NPOL / IKI



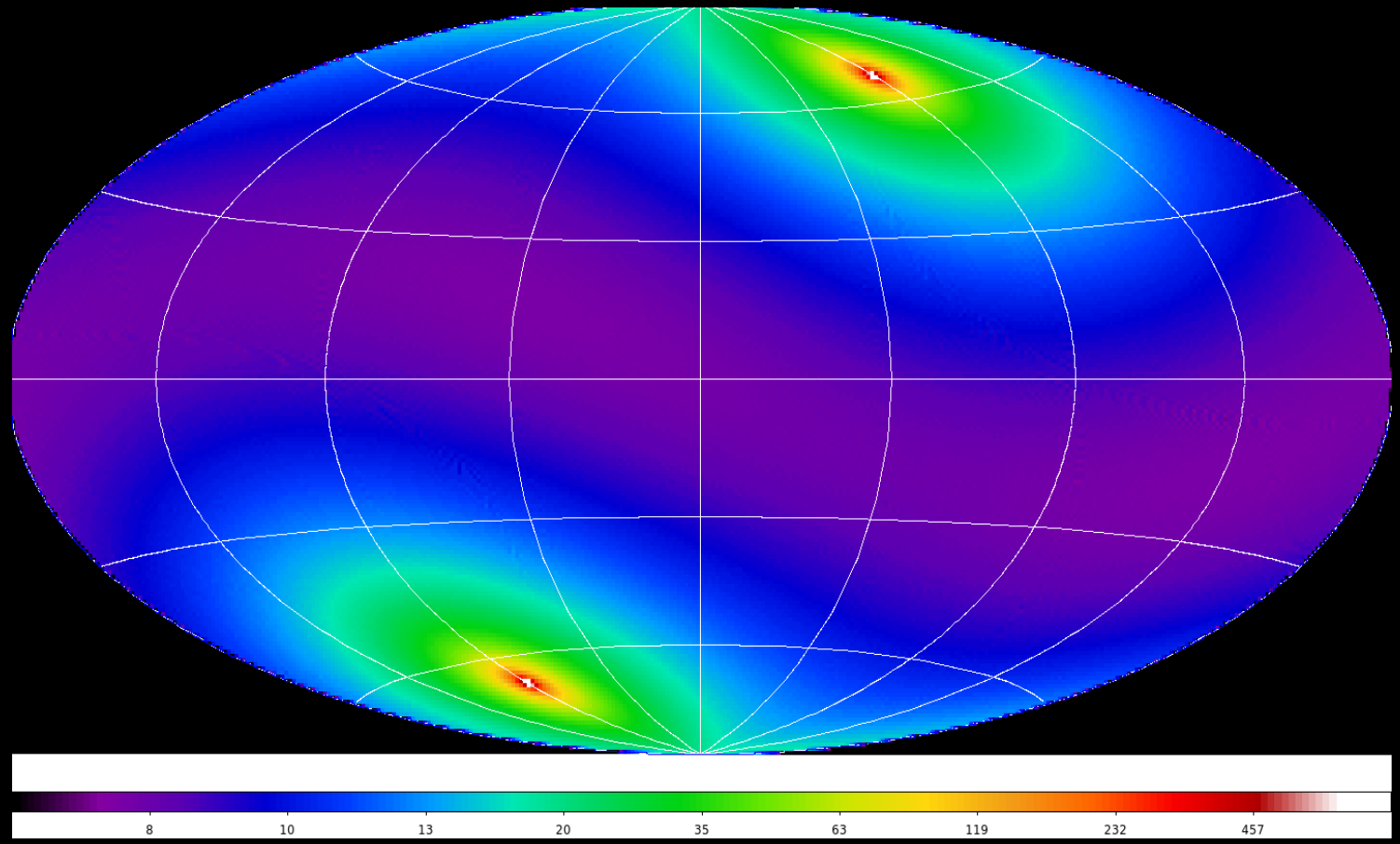



since April 2020

Operations @Home


Coutinho et al., 2021

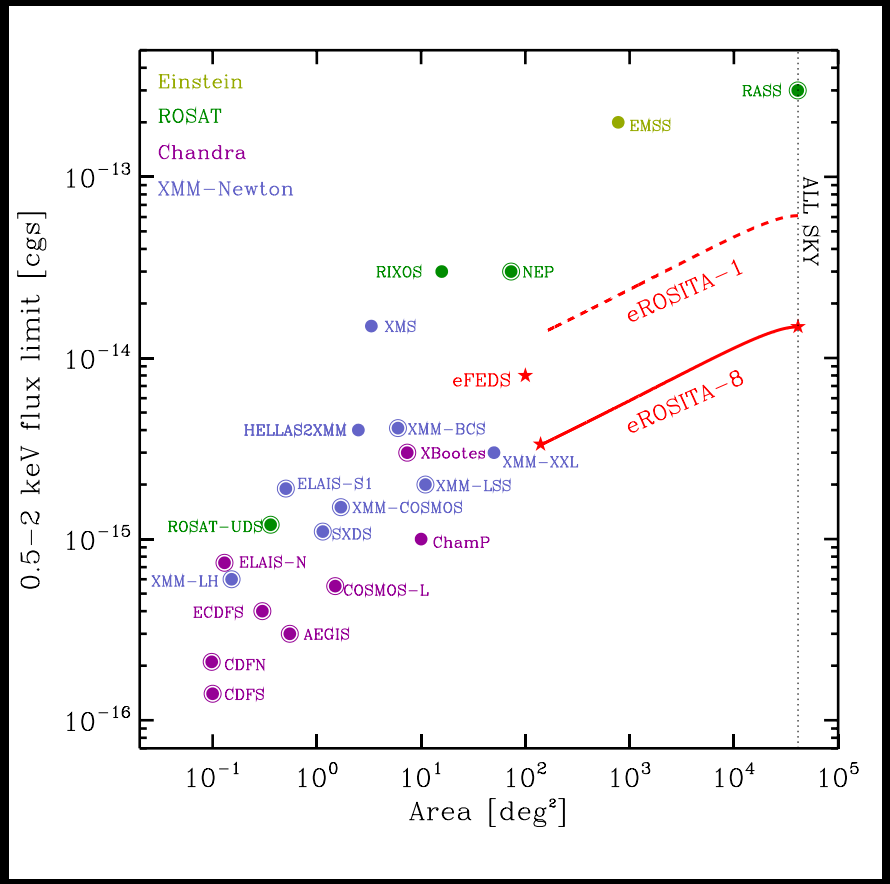
eROSITA Cadence Map



Exp.: 10^3 sec 10^4 sec src. conf.

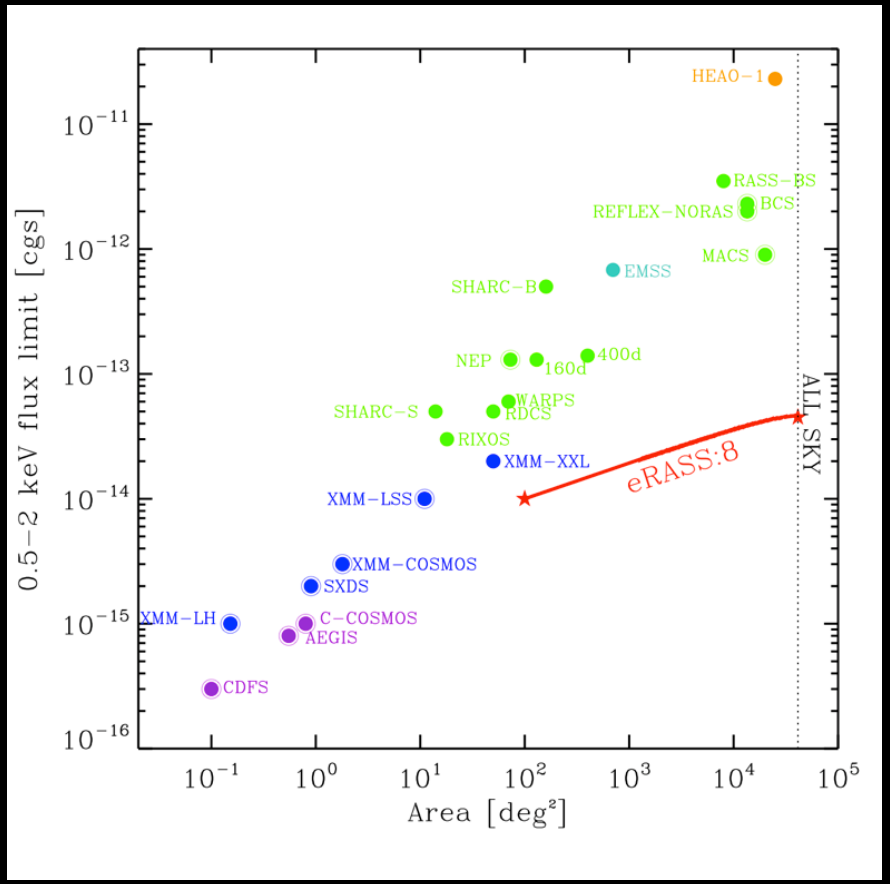
eROSITA surveys in context

Point sources sensitivity



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

Extended sources sensitivity



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

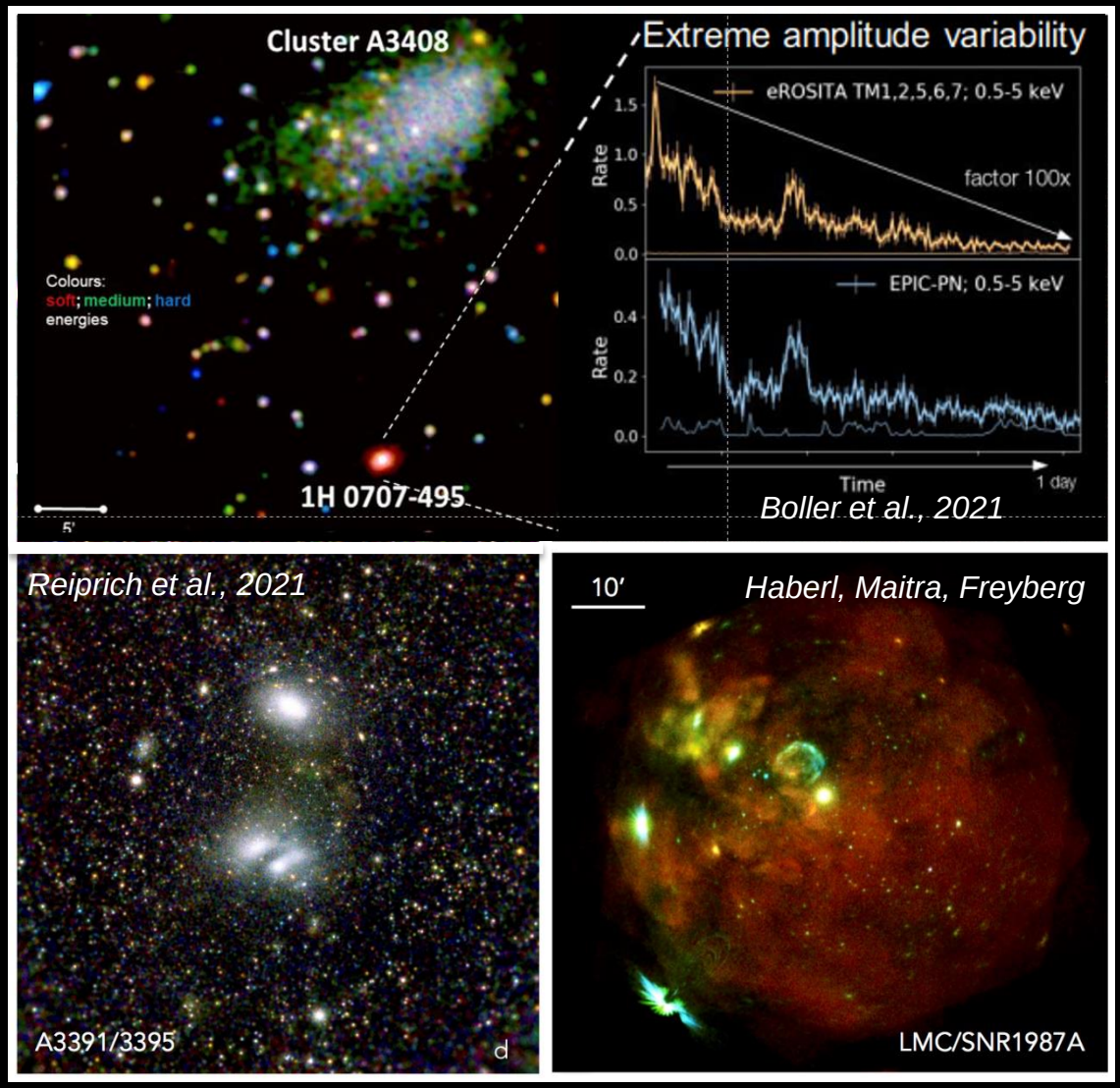
Merloni et al. 2012

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

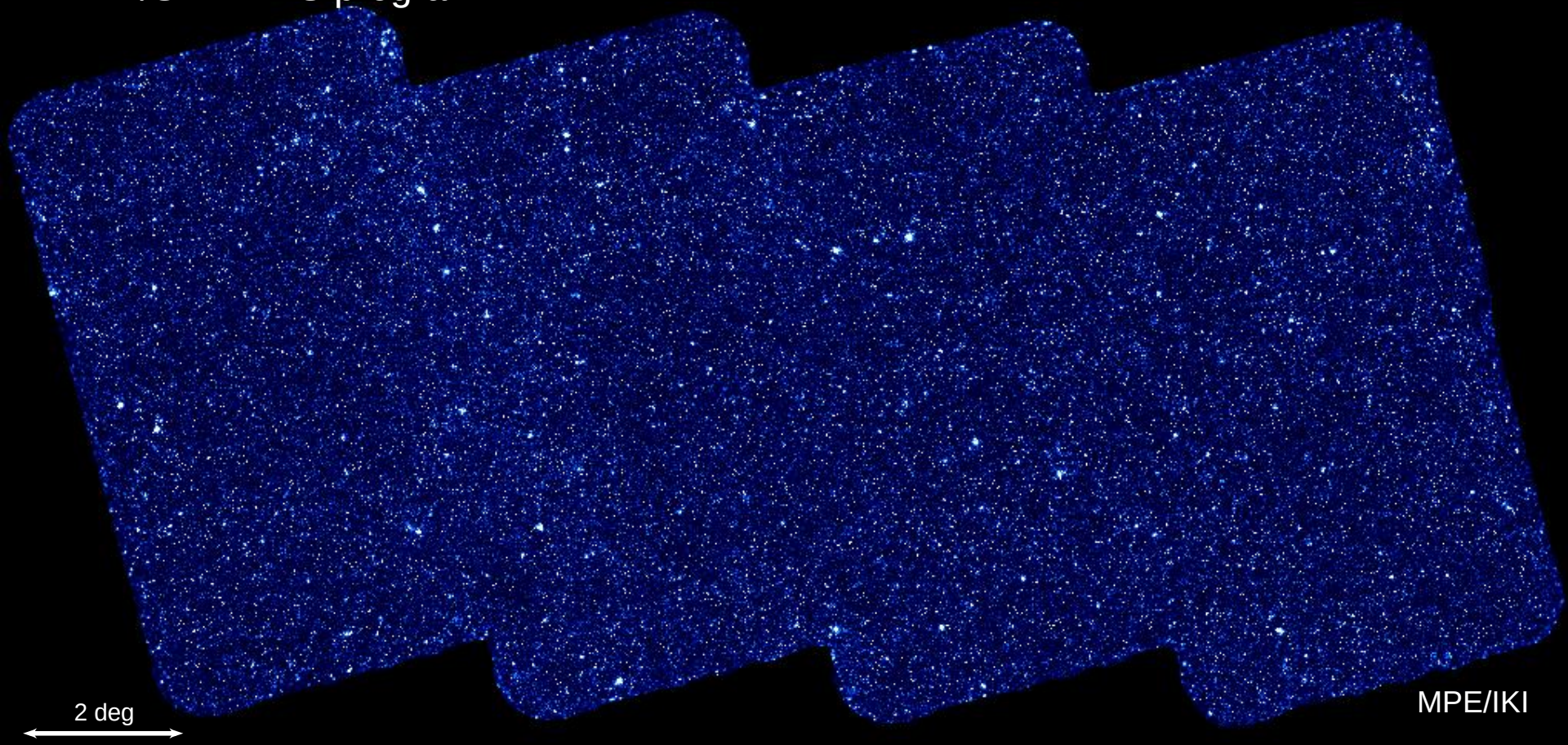
Pulsars, GRBs, Flares from stars and AGN, TDEs

Highlights from CalPV phase



eFEDS AGN

- More than 25k point-sources detected
- ~8000 spectroscopic redshifts, including ~3800 from a dedicated SDSS-IV/SPIDERS program

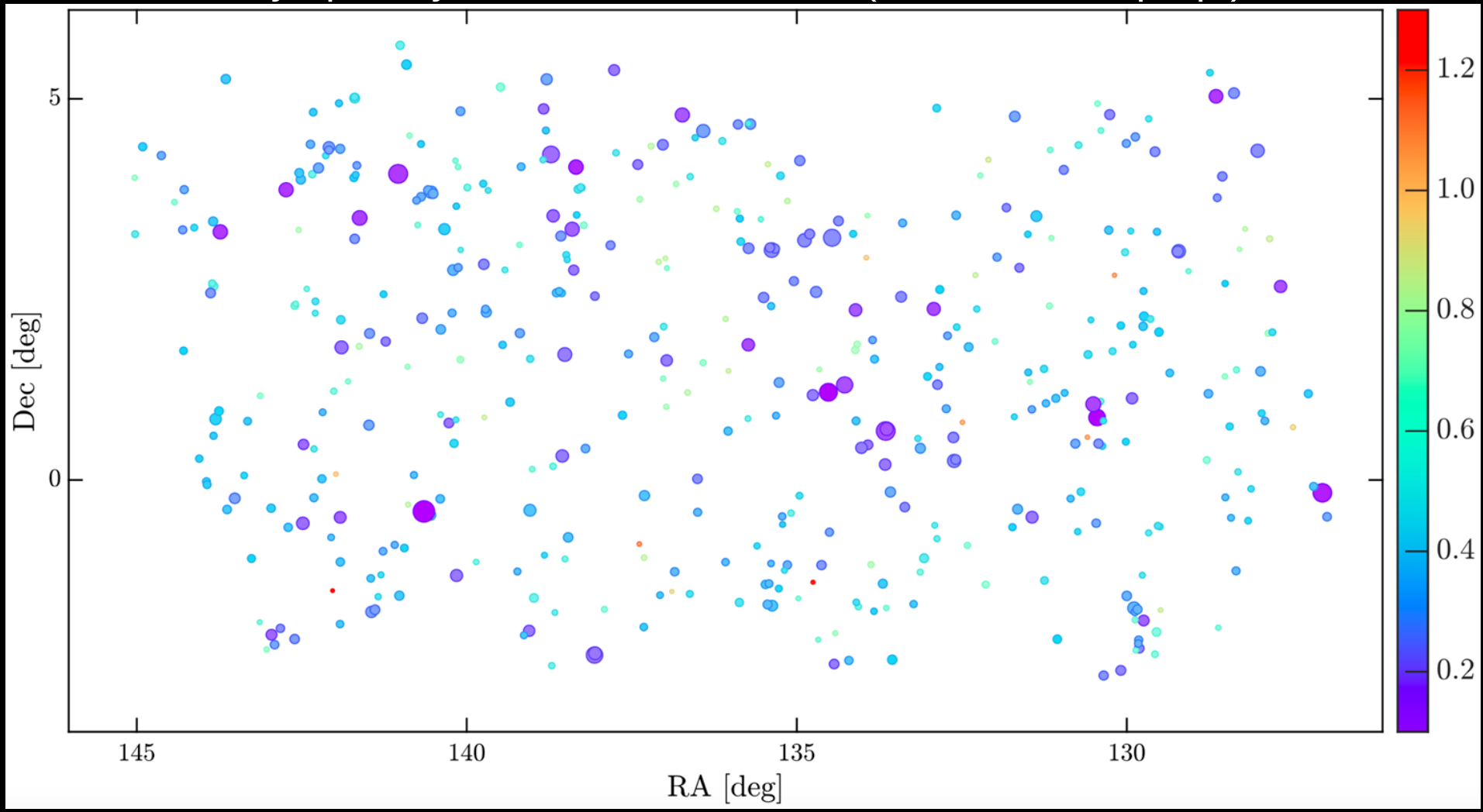


Credit: H. Brunner, M. Ramos-Ceja

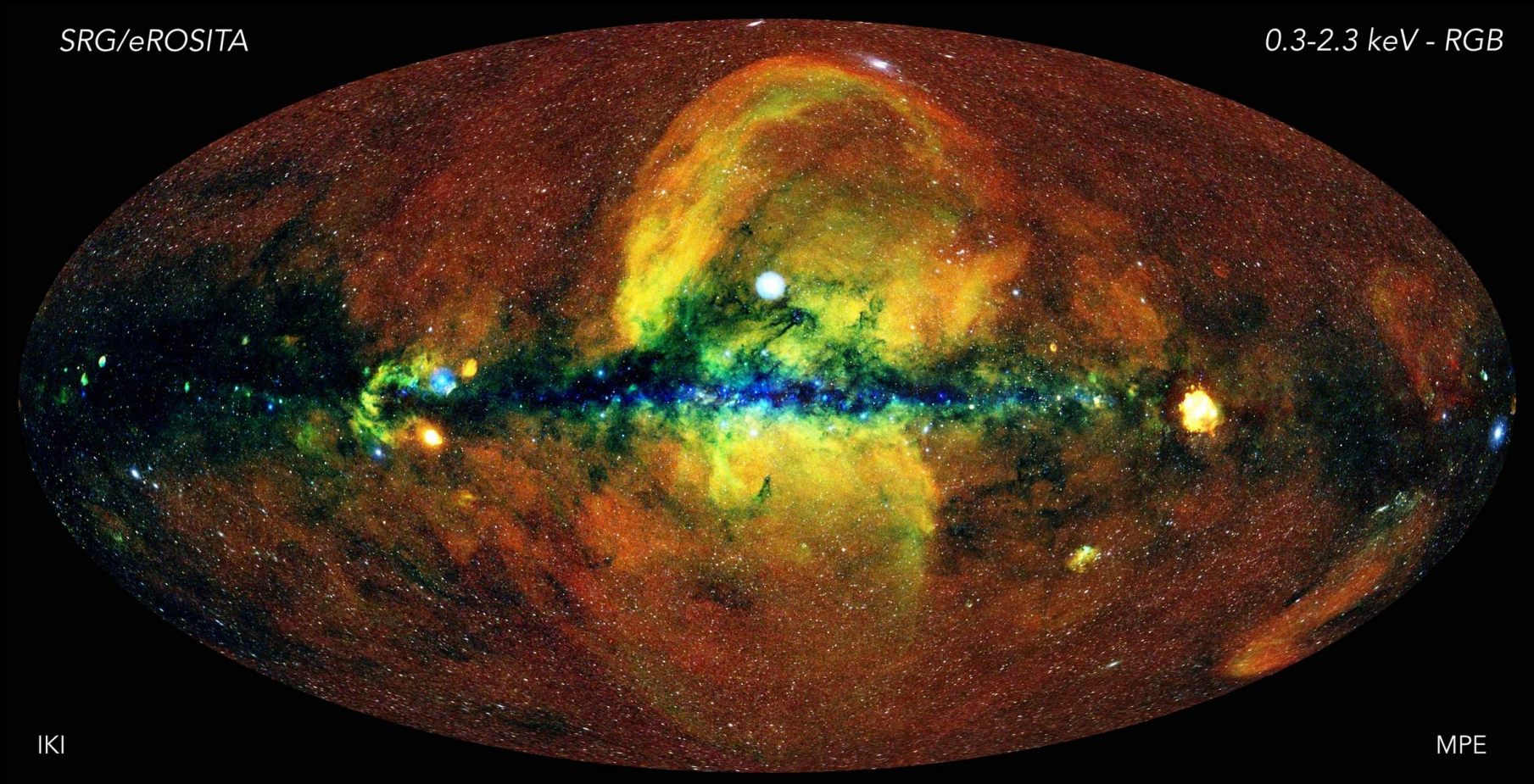
Exposure corrected image in the 0.5–2.0 keV band

eFEDS Clusters

542 galaxy clusters detected by eROSITA (Liu et al. in prep.)
~ 440 already optically confirmed, 0.1<z<1.1 (Klein et al., in prep.)



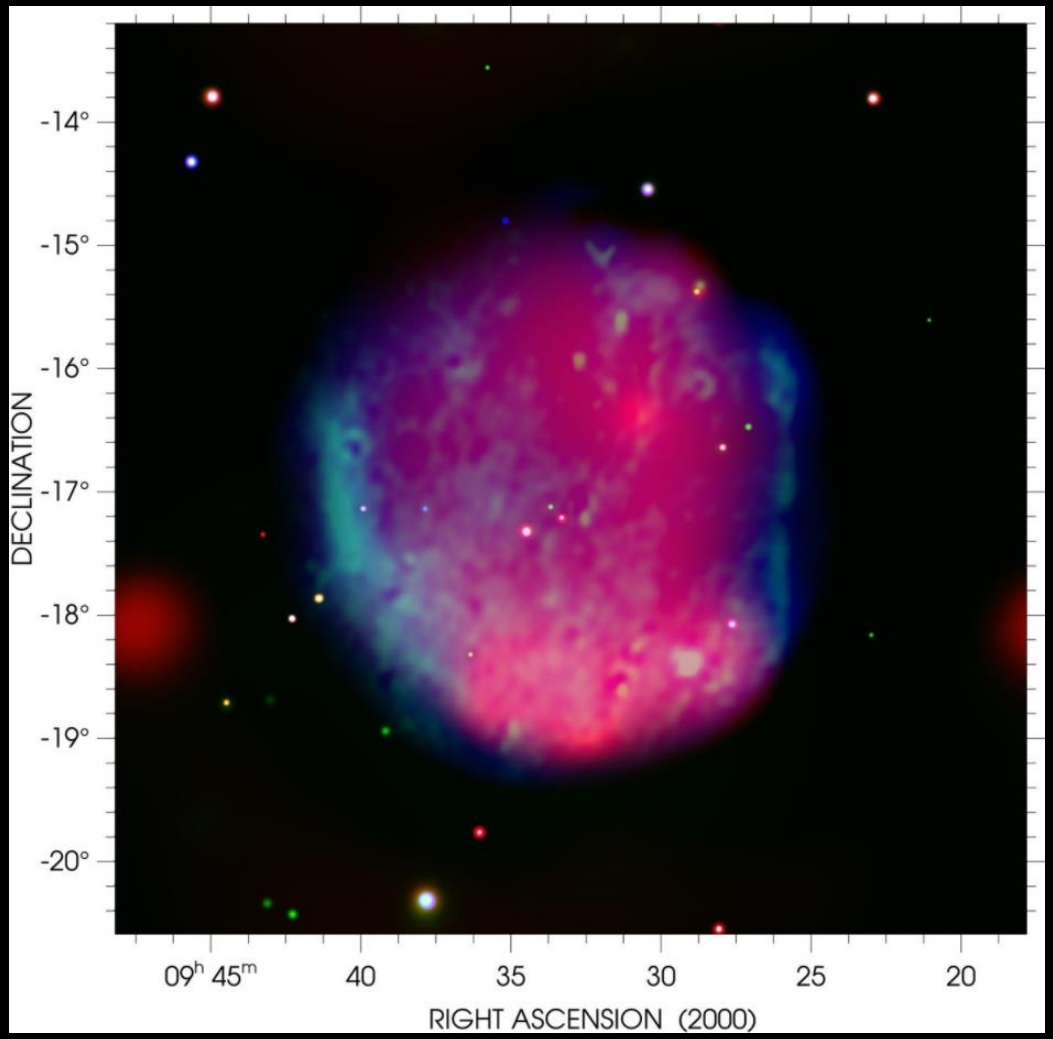
eRASS1



> 1.000.000 X-ray sources found

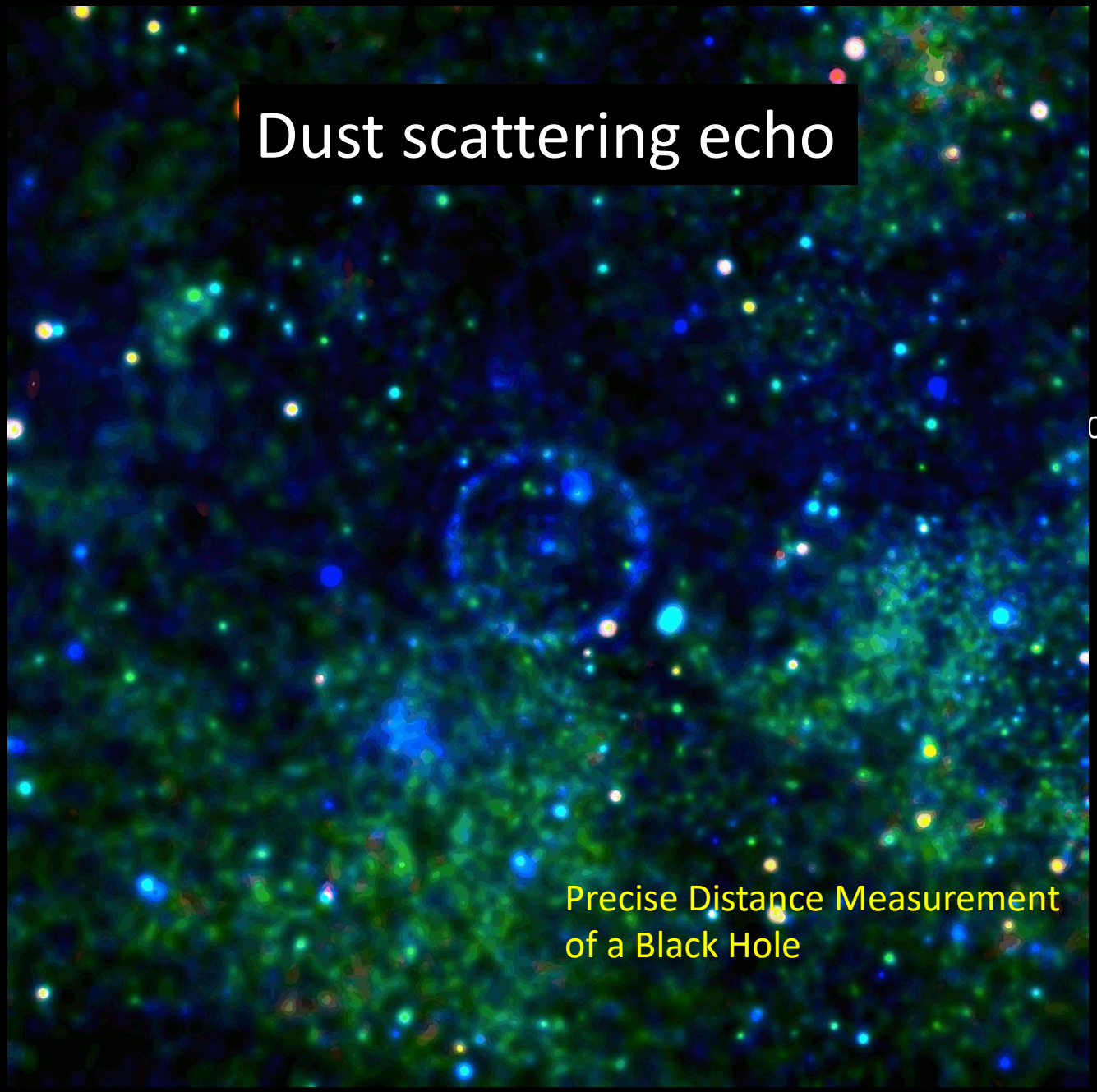
Predehl, Sunyaev, et al., 2020

Hoinga – The largest X-ray detected SNR



Becker, Hurley-Walker et al., 2021

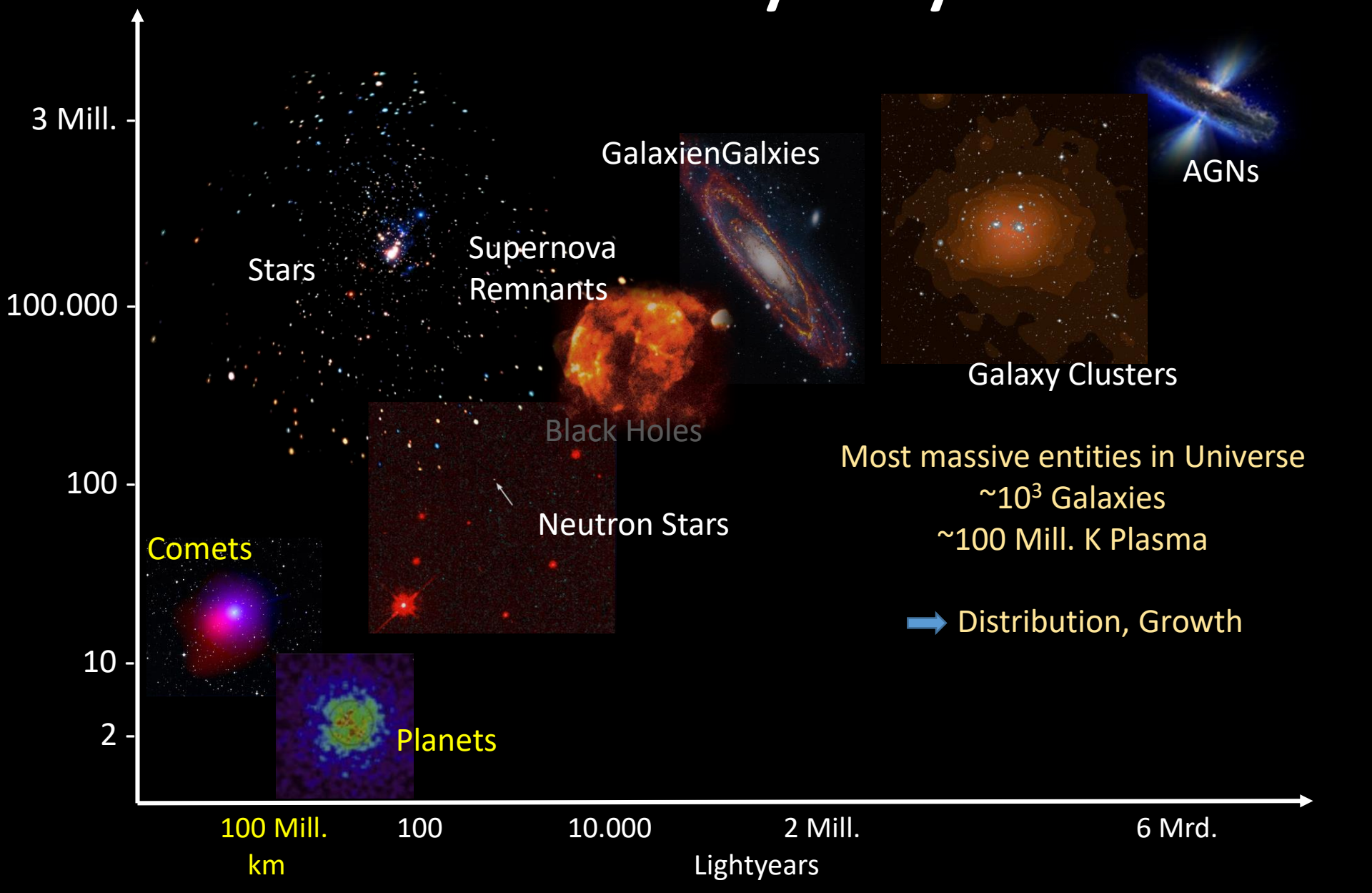
Dust scattering echo

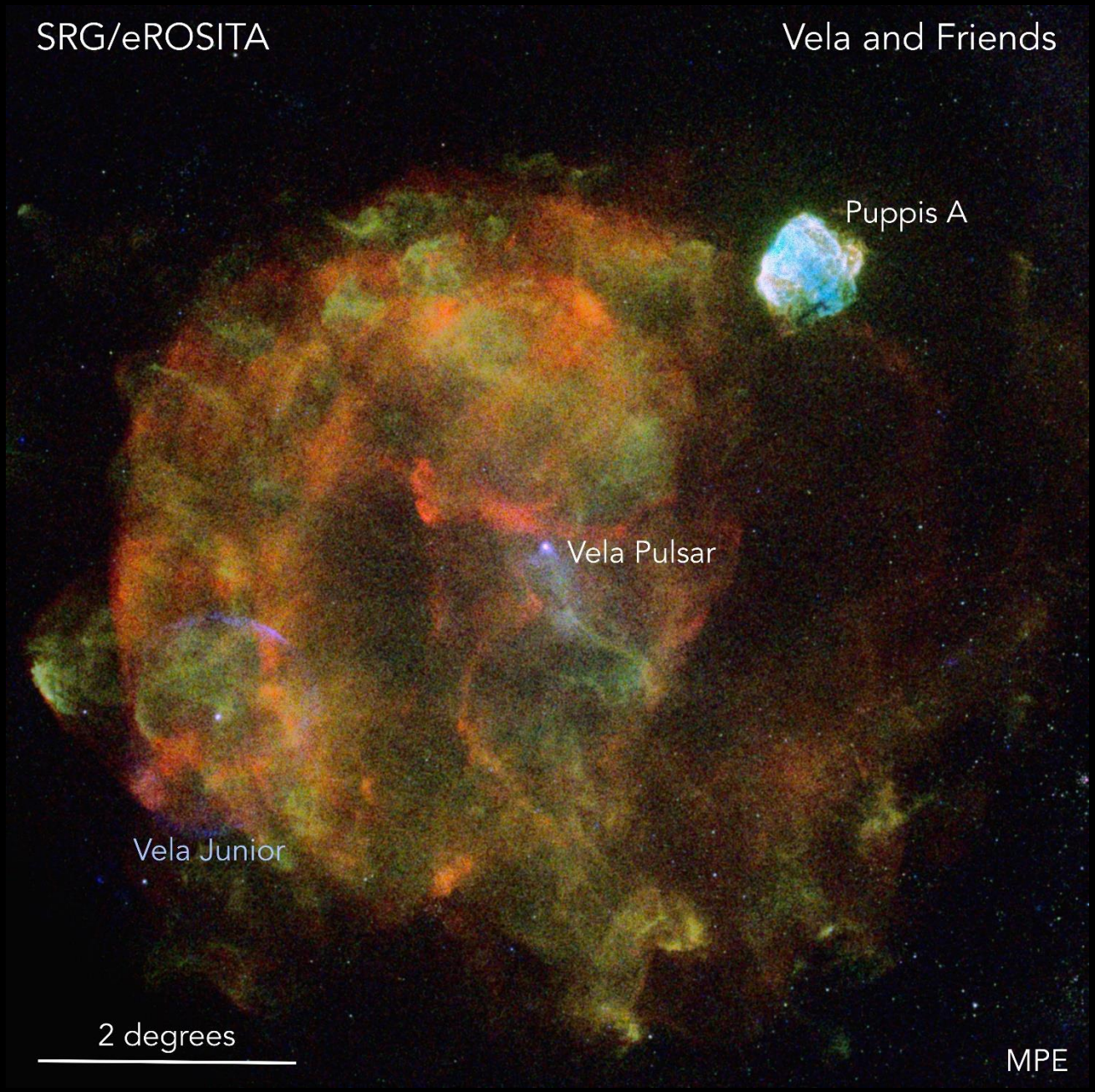


G. Lamer et al. 2021

Photo: V. Burwitz (MPE)

The X-ray Sky


3 Mill.
100.000
100
10
2
Stars
Supernova Remnants
GalaxienGalxies
AGNs
Galaxy Clusters
Black Holes
Neutron Stars
Comets
Planets
Most massive entities in Universe
~10³ Galaxies
~100 Mill. K Plasma
Distribution, Growth
100 Mill. km
100
10.000
2 Mill.
6 Mrd.
Lightyears



P. Predehl, W. Becker (MPE)