eSASS pipeline

Data from Moscow ground tests
Calbration data base
eSASS documention
New eSASS users release, demo script
User feedback, bug reports, feature requests, etc.
Recent activities: SRCTOOL flux corrections
Astrometric correcitons
eSASS pipeline
All-sky survey SIXTE simulations & pipeline testing

Data from Moscow ground tests

- Testing campaigns in Moscow Dec. 2018 + Jan. 2019
- Dual data reception via socket connection +
  file based via IKI data exchange server
- Analysis via EGSE by eROSITA hardware team +
  FITS conversion for eSASS pipeline and NRTA
  (tmsplit, Ingo Kreykenbohm/Bamberg)

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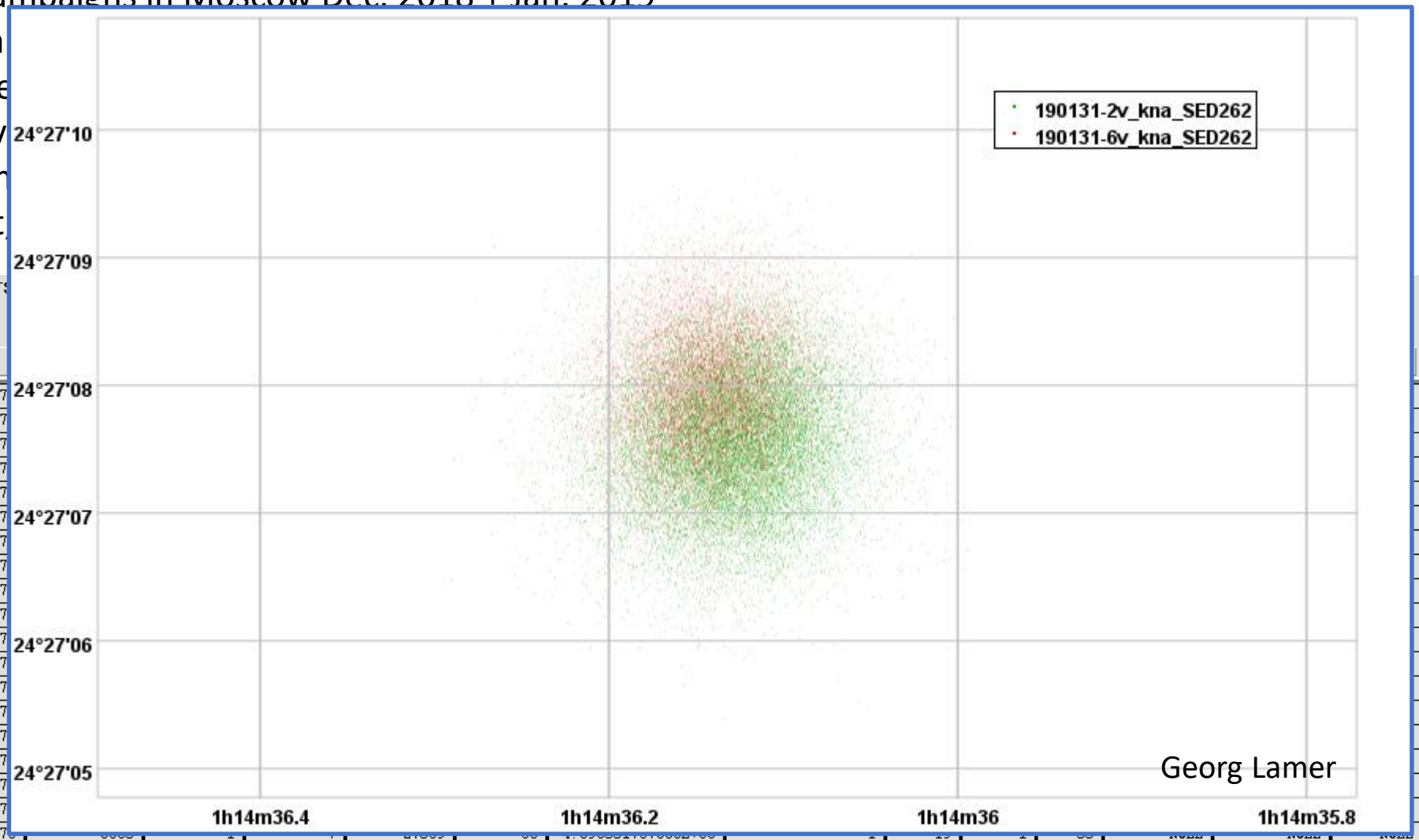
  file base
- Analysis v
  FITS con
  (tmsplit



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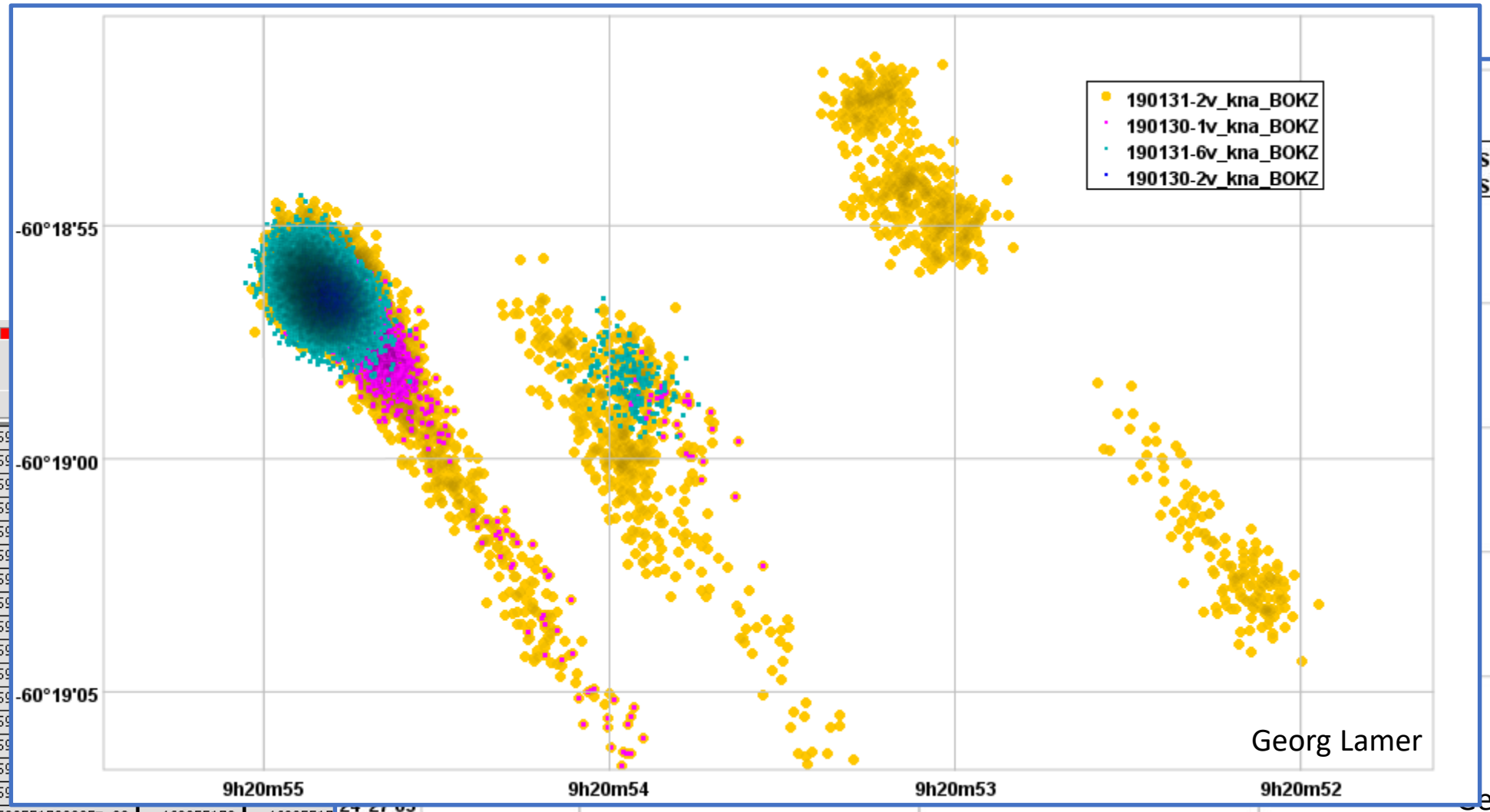
Data from Moscow ground tests



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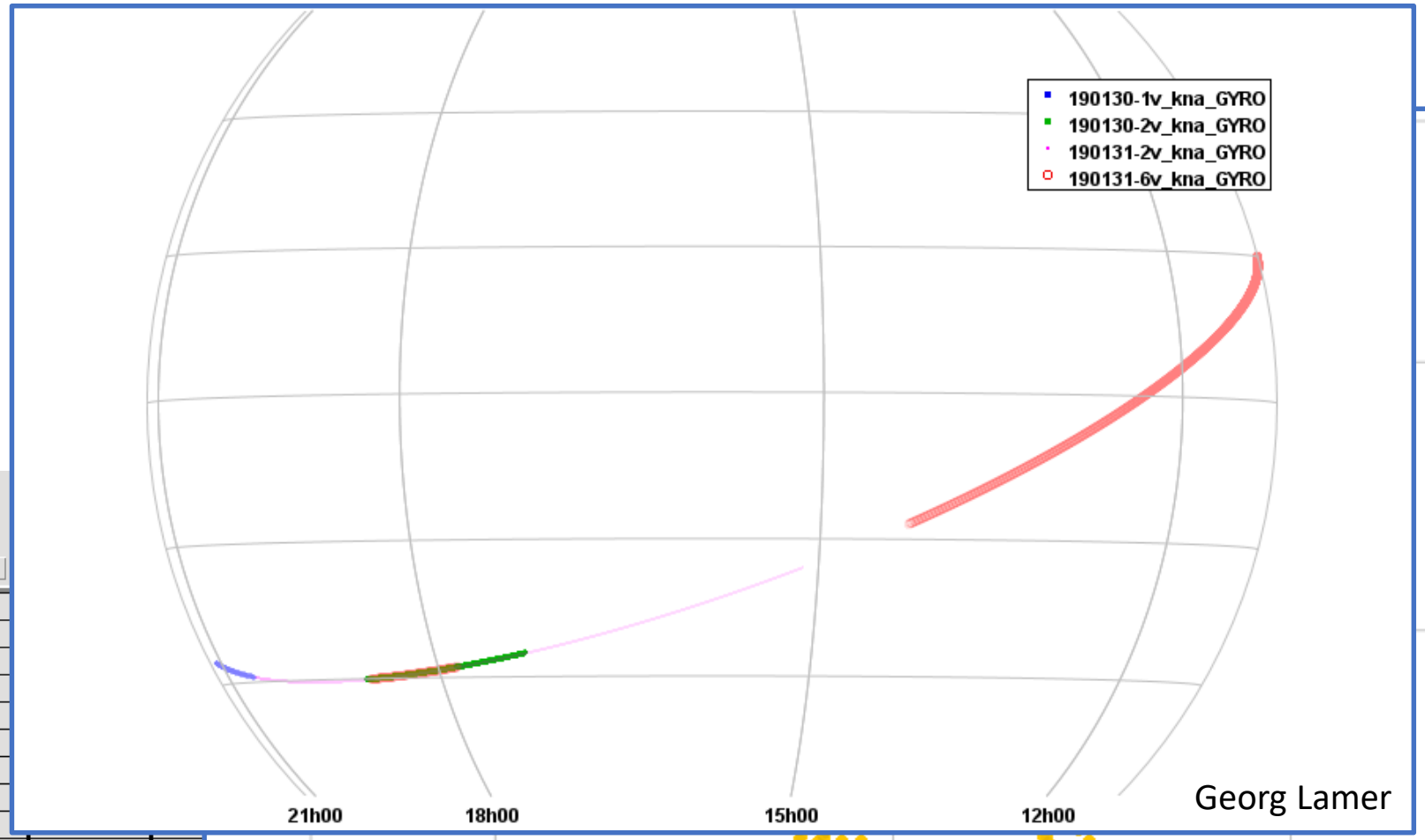

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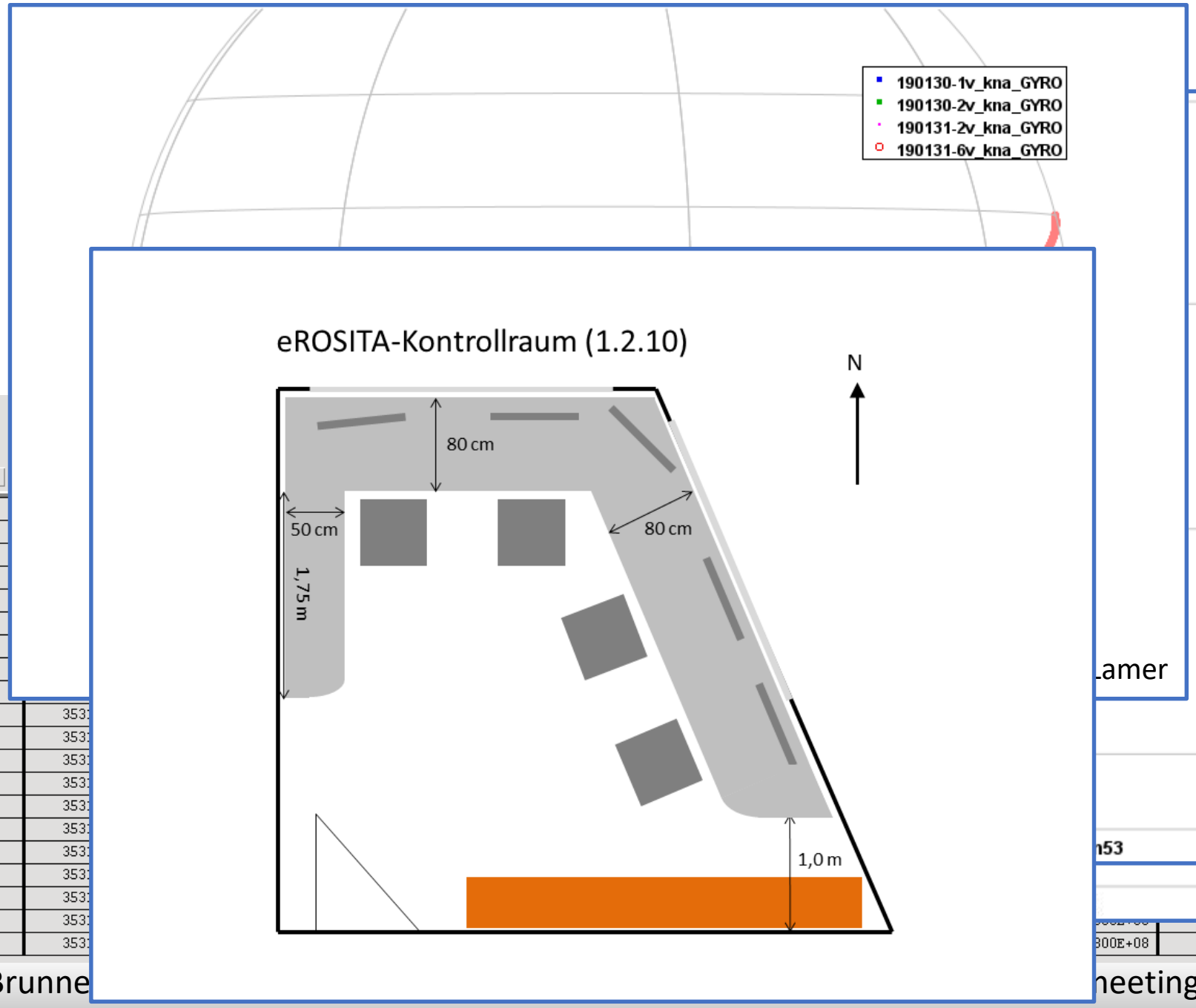
190130-1v_kna_GYRO
190130-2v_kna_GYRO
190131-2v_kna_GYRO
190131-6v_kna_GYRO

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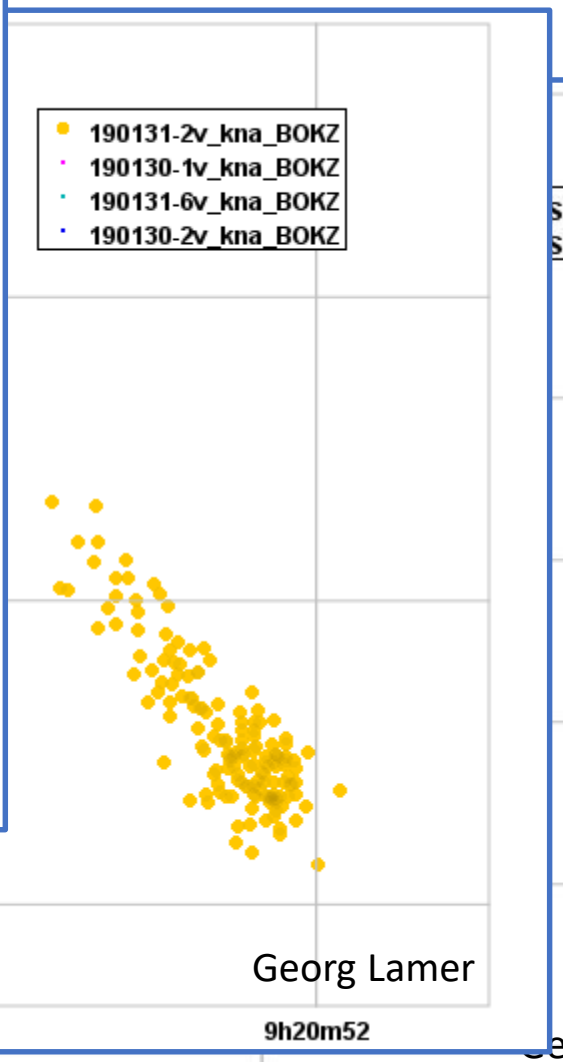
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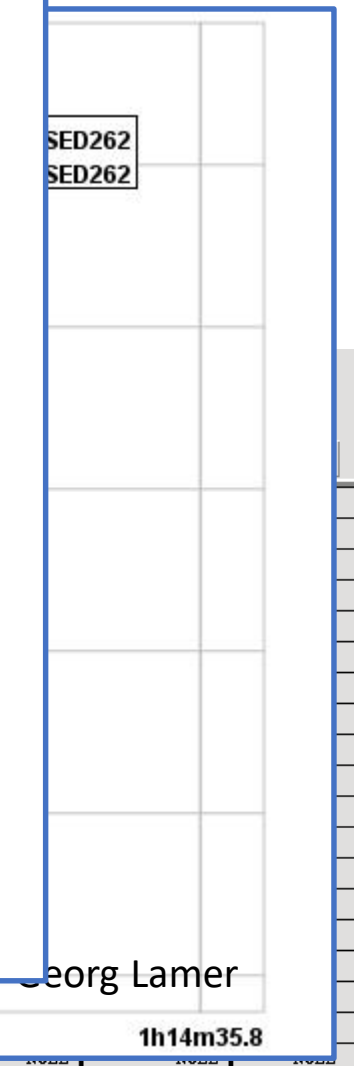
190131-6v_kna_BOKZ
190130-2v_kna_BOKZ
Georg Lamer
9h20m52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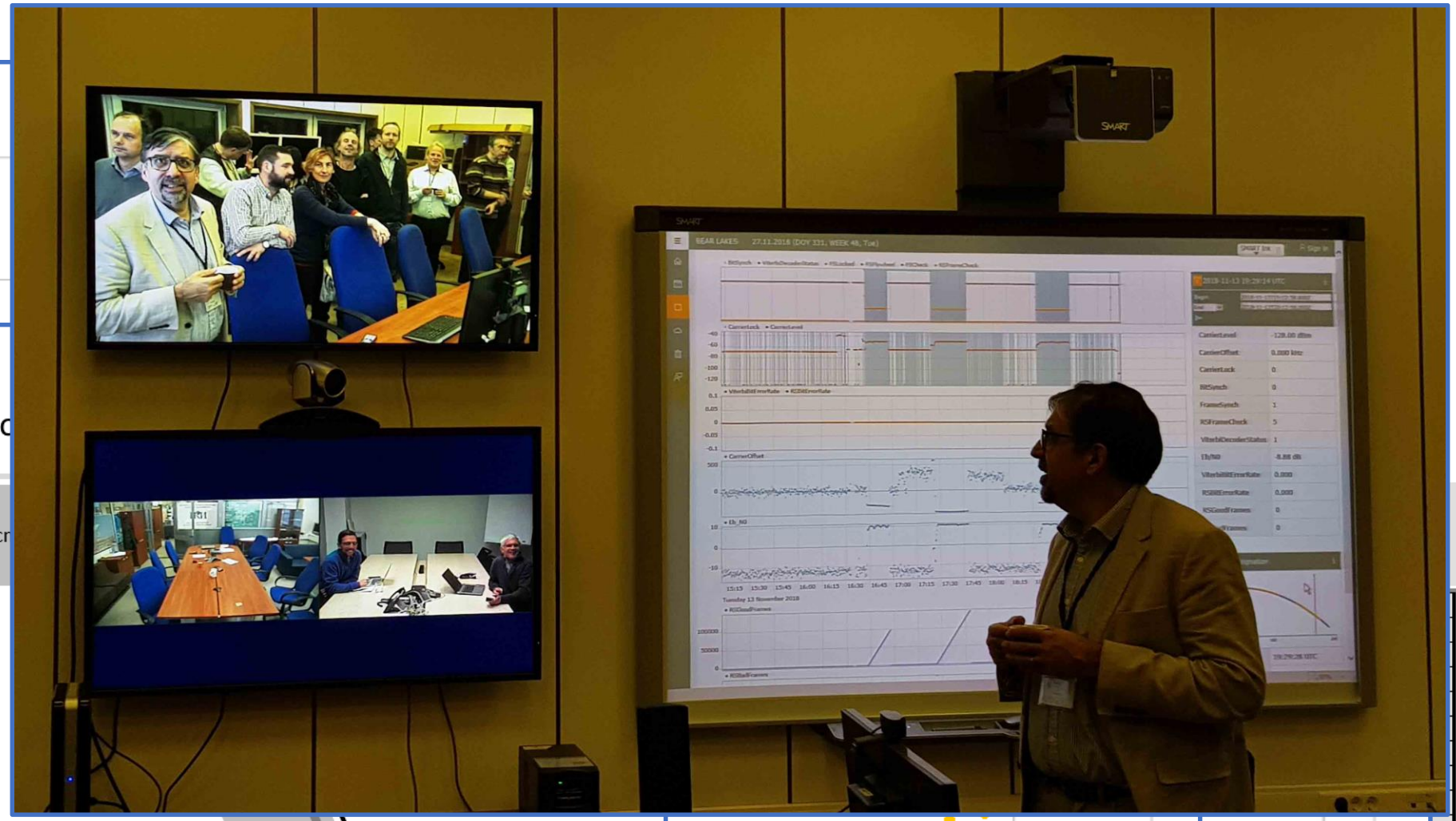
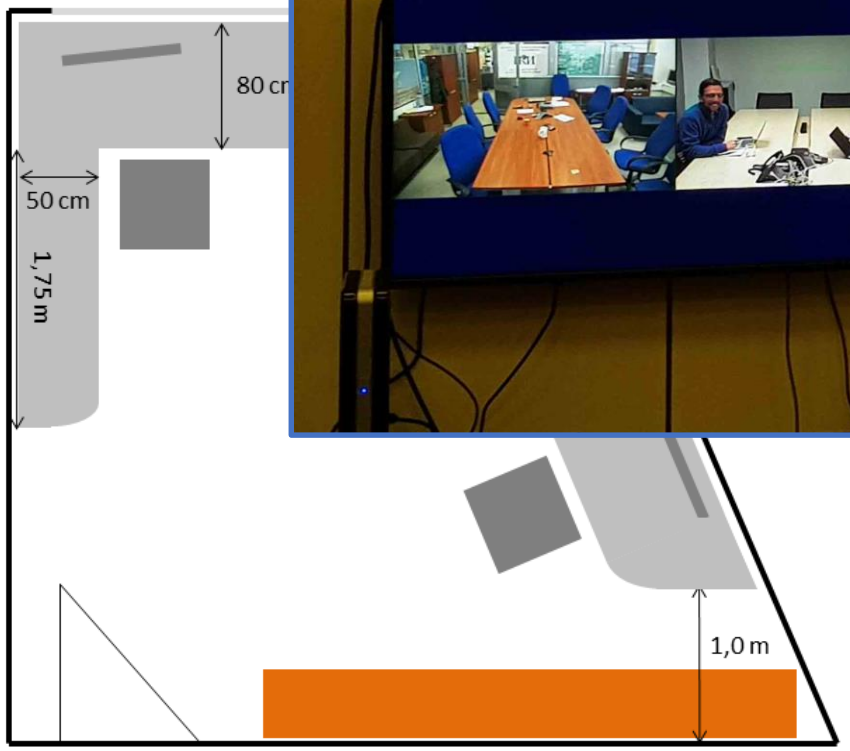
Georg Lamer
1h14m36
1h14m35.8



eROSITA-Kontro



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eRoSITA calibration databas (caldb)

caldb (HEASARC standard) calibration database with additional indexing scheme to support different calibration versions for each eSASS release – NEW: change logs in caldb directory

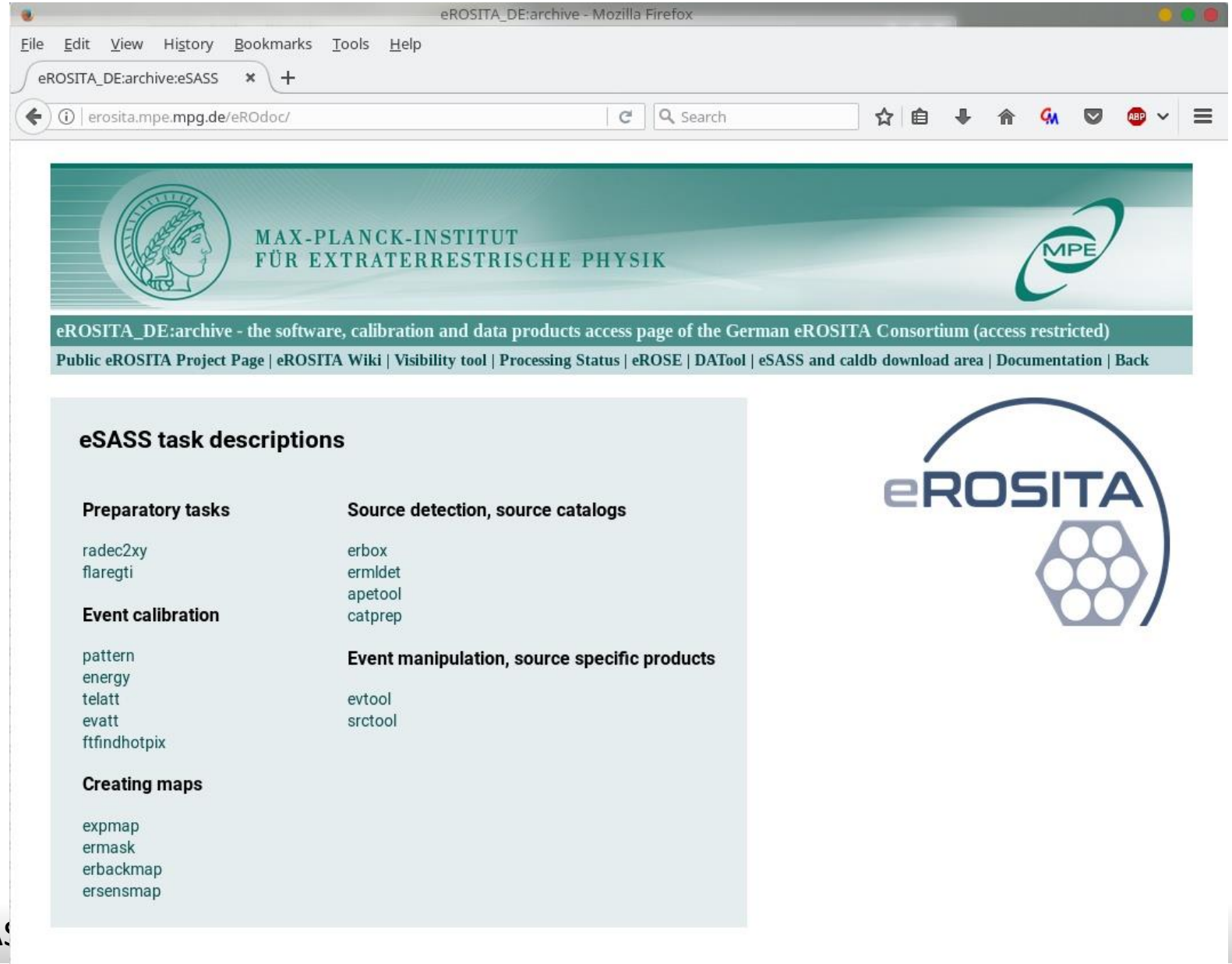
Telescopes				
2DPSF (P/S)	ERBOX	ERMLDET	SRCTOOL	
SLET_PSF	ERMLDET	APETOOL	ERSENSMAP	
TVIGNET	EXPMAP	SRCTOOL		
Detectors				
ENERGY	ENERGY			
BADPIX	FTFINDHOTPIX	PATTERN	EXPMAP	SRCTOOL
OFFSETS	EVPREP			
MIPSMAP	EXPOSURE	EXPMAP		

Cal file type	eSASS task

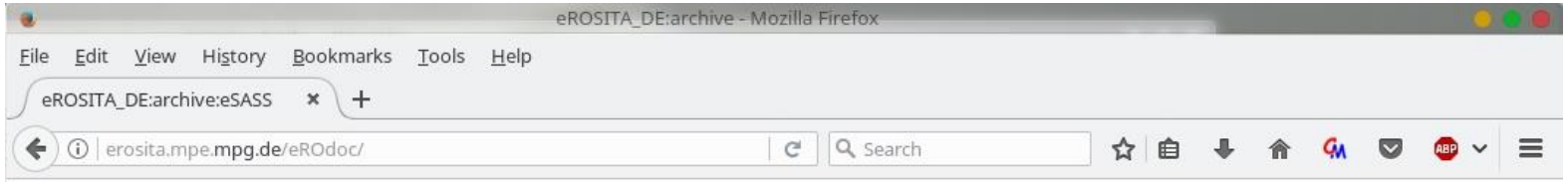
Spectra			
RMF (STD/FINE)	SRCTOOL		
ARF (STD/FINE)	SRCTOOL		
Timing			
TIMECORR	EVPREP	ATTPREP	TIMECORR
Spatial			
FOVMAP	EXPMAP	SRCTOOL	BACKGRND
DETMAP	EXPMAP	SRCTOOL	BACKGRND
Attitude			
SED1/2	BOKZ	GYRO	ATTPREP
General			
INSTPAR	TELATT	EVATT	

Cal file type	eSASS task

eSASS documentation



eSASS documentation



MAX-PLANCK-I
FÜR EXTRATE

eROSITA_DE:archive - the software, calibrati

Public eROSITA Project Page | eROSITA Wiki | Visi

eSASS task descriptions

Preparatory tasks

radec2xy
flaregti

Event calibration

pattern
energy
telatt
evatt
ftfindhotpix

Creating maps

expmap
ermask
erbackmap
ersensmap

Source d

erbox
ermldet
apetool
catprep

Event ma

evtool
srctool

eSASS data products

Pipeline data products file naming scheme
Event files
Source catalogs

eSASS pipeline

Layout of the eSASS pipeline
Archive and processing directory structure
Pipeline control programs
Processing status files
Pipeline parameter files
Parameter subsitution in the pipeline
Interface routines
Environment variables

Telemetry data formats (binary/FITS)

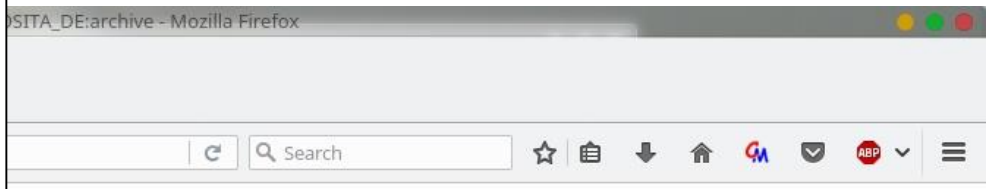
Telemetry data formats (FITS, tmsplit output)
FITS converter and preprocessor output file naming conventions

Additional information is available in the **eSASS Handbook area** in the eROSITA wiki.

eSASS documentation

eSASS Handbook

* eROSITA Helpdesk
* eSASS Task Descriptions
* eSASS cookbook (still under construction; access restricted)
* How to Run eSASS Tasks
* How to install eSASS
* eSASS Releases
* The eSASS Calibration Database
* Using SIXTE Event Files
* Frequently Asked Questions (still under construction)
* Why is eSASS called eSASS?



eSASS data products

Pipeline data products file naming scheme
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pattern
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Creating maps

expmap
ermask
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Event ma

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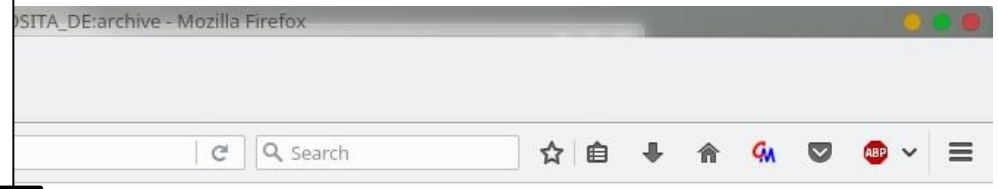
Work flows, scripts
(inputs by Adam Malyali)



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* Why is eSASS called eSASS?

eSASS Users' Frequently Asked Questions

Contents

eSASS errors messages (and crashes)

''Why do I keep getting the error message: "**STOP** Error initializing PIL" when I run eSASS task X?''

This is a relatively frequent error messages which occurs in the following situations:

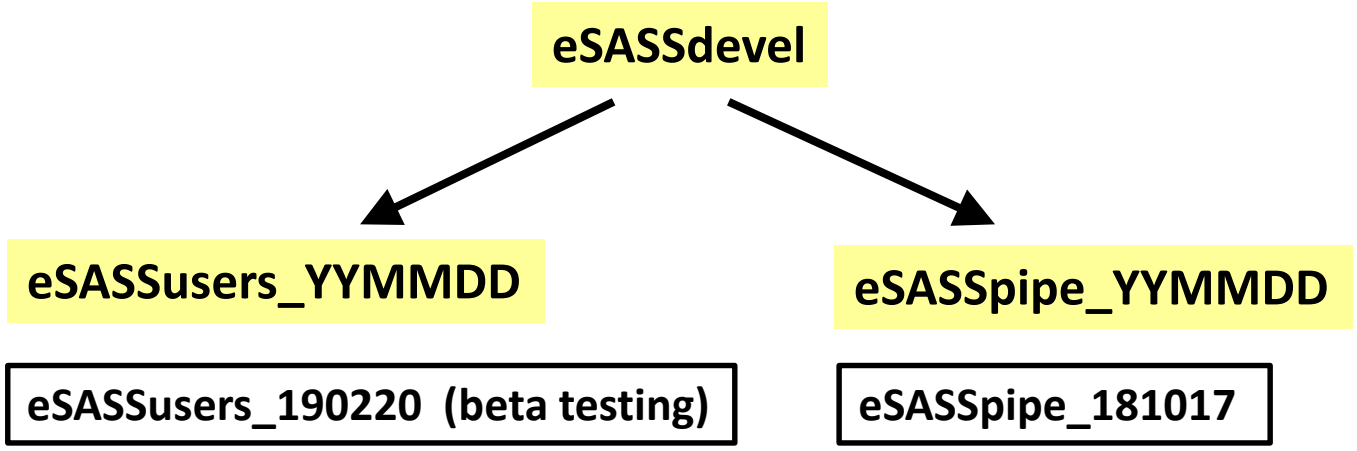
1. You command line call isn't correct. Please make sure you entered all required command line parameters in the correct spelling. Array parameters require string quotes. Use FTOOLS command plist for a list of all task parameters.
2. You recently switched to a different eSASS release. It is possible that the comamnd line of the task in question has changed. Please adjust your scripts and delete the .par file of the task in question from the pfiles directory in your home directory.
3. For whatever reason the .par file of the task in question in the pfiles directory in your home directory may be garbled. Please delete it. It will be automatically recreated once you call the task again.
4. The contents of the PFILES environment variable may not be correct (for whatever reason). In this case the PIL error will occur with each eSASS task you call. The PFILES variable needs to start with the full path of the pfiles directory in your home directory followed by a semicolon. The .par directory of the eSASS release you are using as well as the pfiles directories of any other FTOOLS based tools you may have installed should be listed after the semicolon. The PFILES environment variable should normally be set correctly by the eSASS setup script.

Working with eSASS – new users release

Interactive analysis

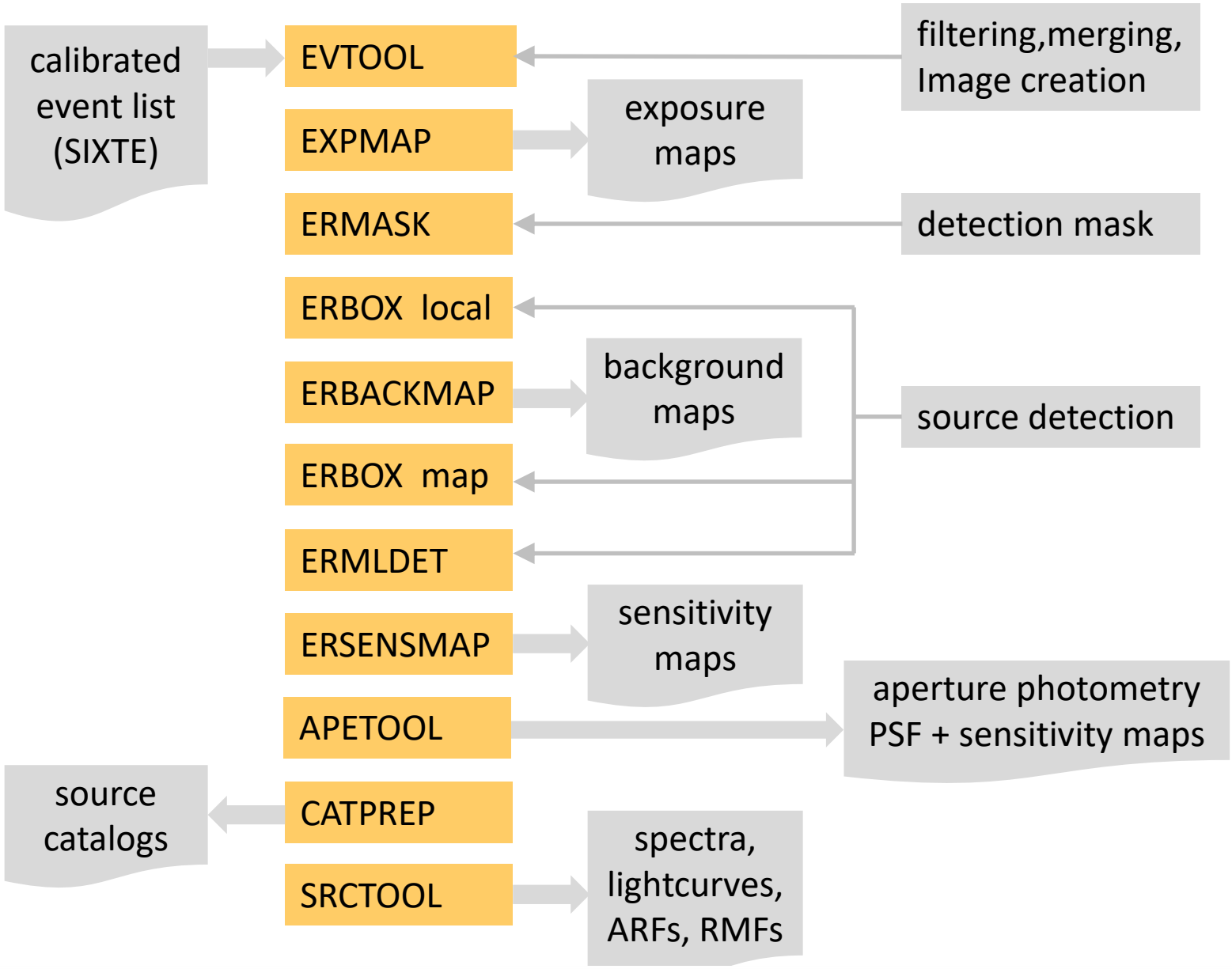
EVTOOL	SRCTOOL
FLAREGTI	
EXPMAP	ERBACKMAP
ERMASK	ERSENSMAP
ERBOX	ERMLDET
APETOOL	CATPREP
TIMECORR	BARYCORR
PATTERN	ENERGY
EVATT	RADEC2XY

Installing and working with eSASS:
https://wiki.mpe.mpg.de/eRosita/eSASS
eSASS info pages (interactive + pipeline):
http://erosita.mpe.mpg.de/eROdoc
eSASS download area (follow instructions in wiki):
http://erosita.mpe.mpg.de/eSASS-download/
eSASS helpdesk: eROSITA-helpdesk@mpe.mpg.de
Mailing list: eROcat@lists.mpe.mpg.de
NEW: monthly eSASS user telecons!



(new autoconf by Philipp Weber – experimental)

eSASS demo script



User feedback, bug reports, feature requests, …

SIXTE/eSASS flux inconsistencies (SRCTOOL, ERMLDET fluxes)

- Florian Pacaud + Bonn team
- MPE: Teng Liu and others
- Thomas Dauser + Bamberg SIXTE team

Mostly solved (ongoing) ⇨ eSASS Q+A splinter

Suggestions for eSASS upgrades

- Miriam Ramos + Bonn team
- Teng Liu
- Alexis + Team

⇨ eSASS Q+A splinter

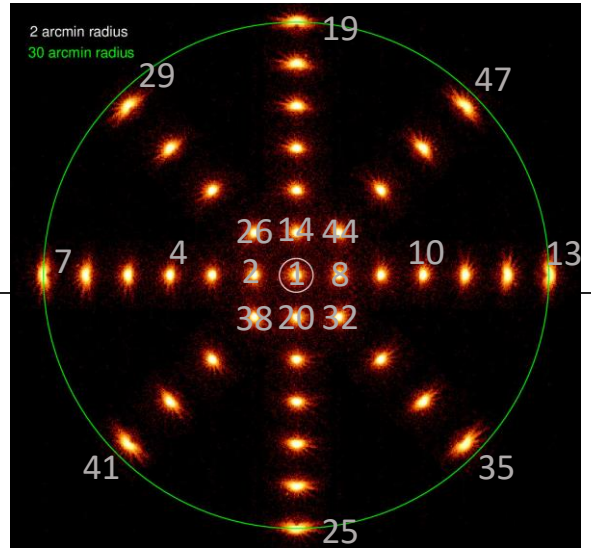
eSASS Q+A splinter session
Wed. 9:00 – 10:30

Feedback, bugs, feature requests, new eSASS users release, etc.

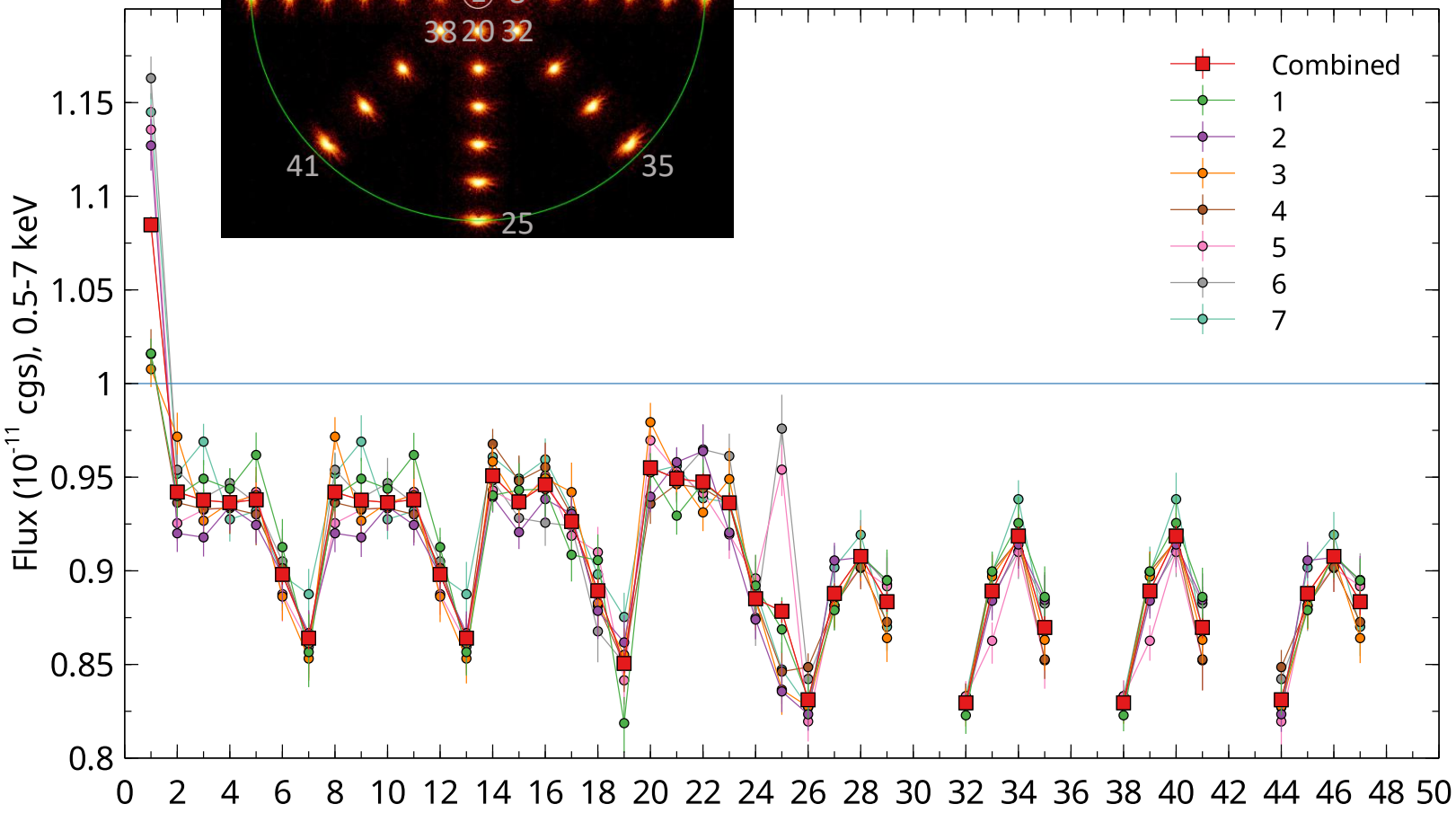
eSASS science requirements meetings ⇨ monthly eSASS user telecons

Fluxes of SRCTOOL extracted spectra as a function of position

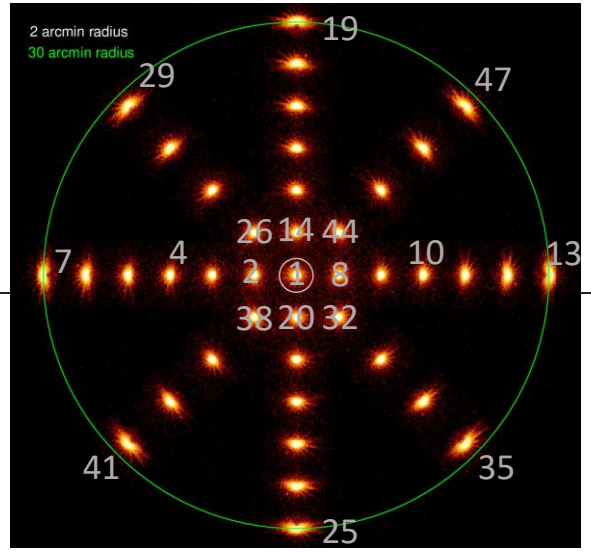
SRCTOOL was using an old PSF based on ray-tracing simulations



PSF provided by Konrad Dennerl

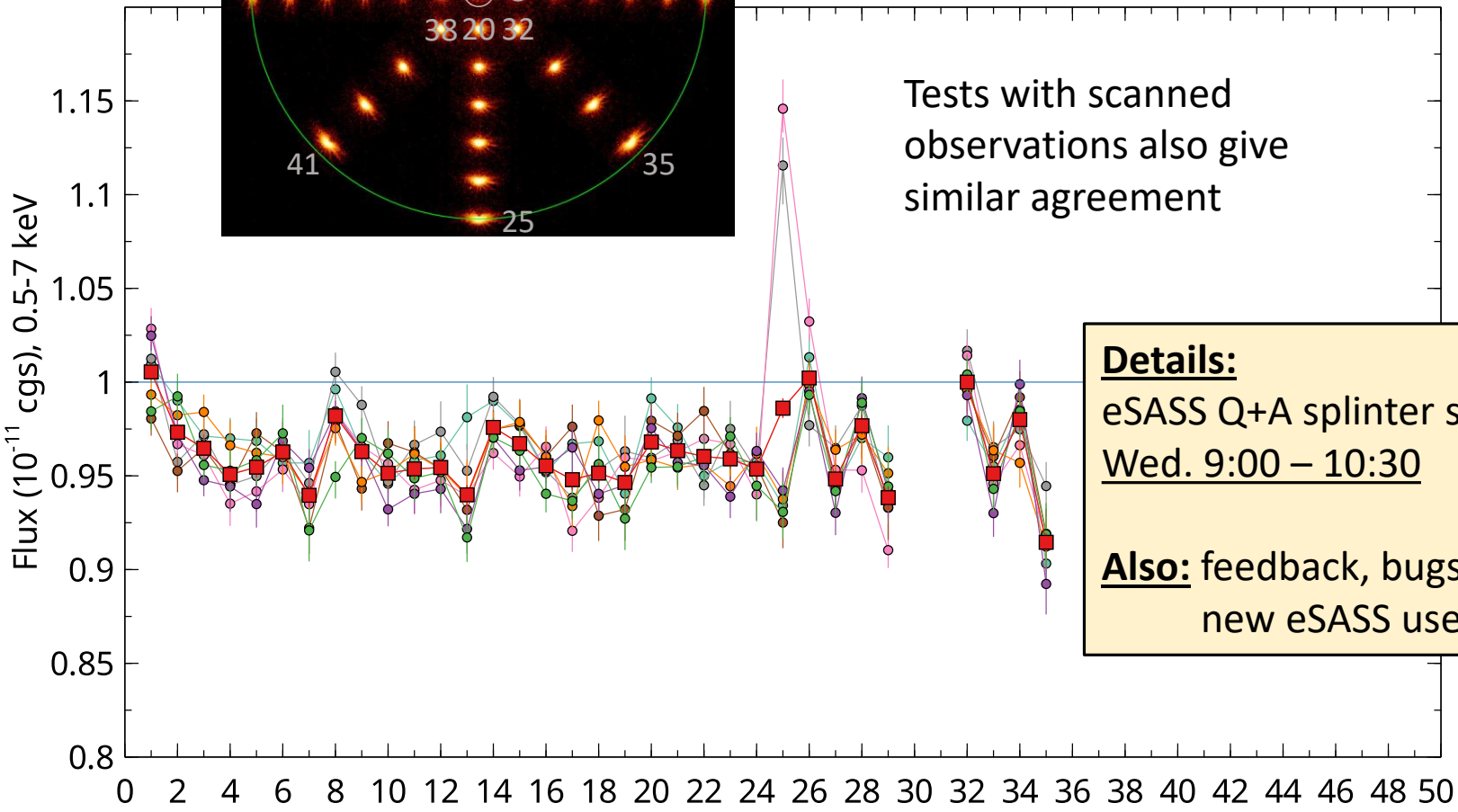


Fluxes of SRCTOOL extracted spectra as a function of position



Updated SRCTOOL PSF using PANTER images to better match SIXTE PSF: now agrees to around 5%

PSF provided by Konrad Dennerl



Tests with scanned observations also give similar agreement

Details:
eSASS Q+A splinter session
Wed. 9:00 – 10:30

Also: feedback, bugs, feature requests, new eSASS users release, etc.

Jeremy Sanders

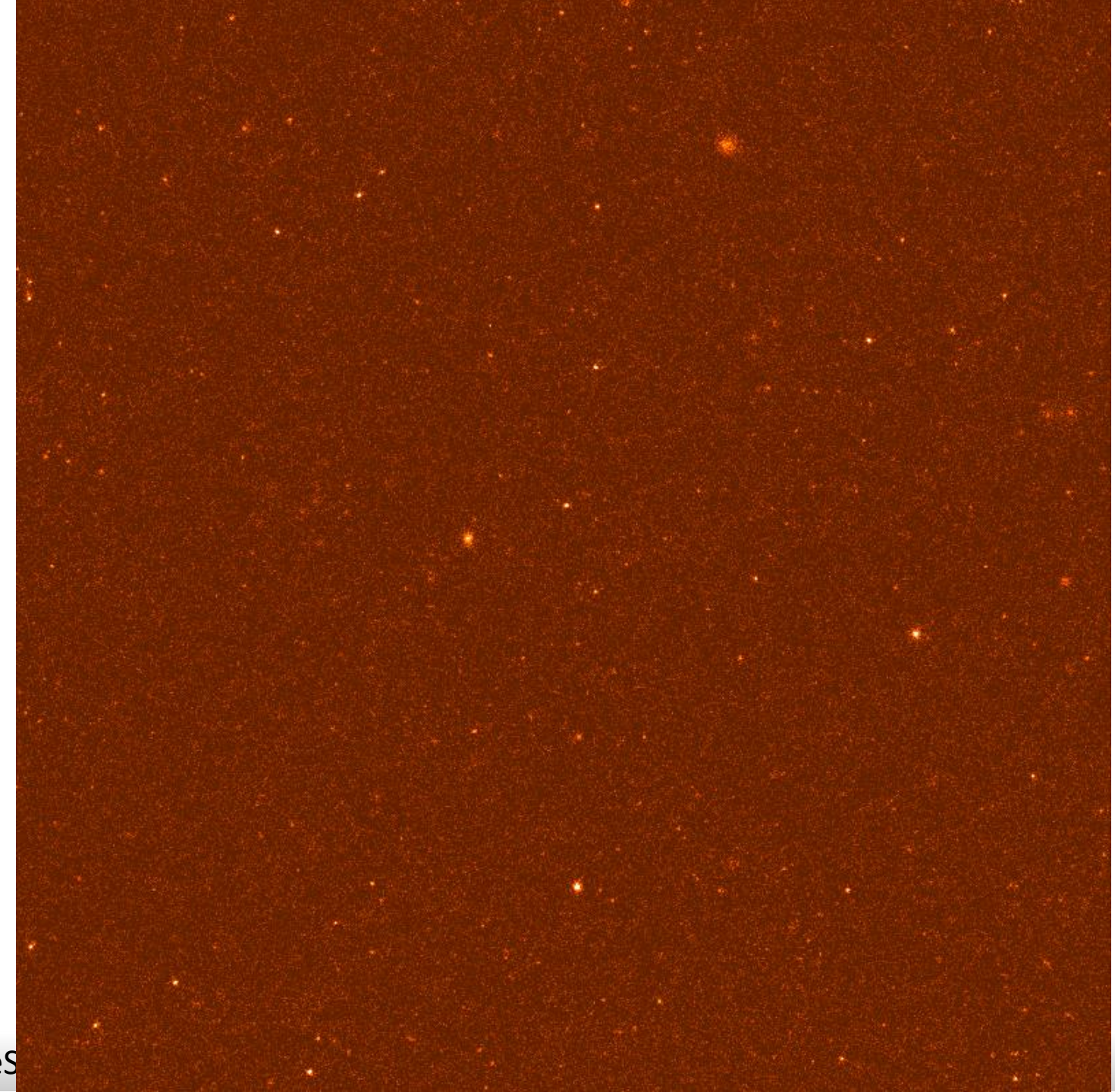
Astrometric corrections

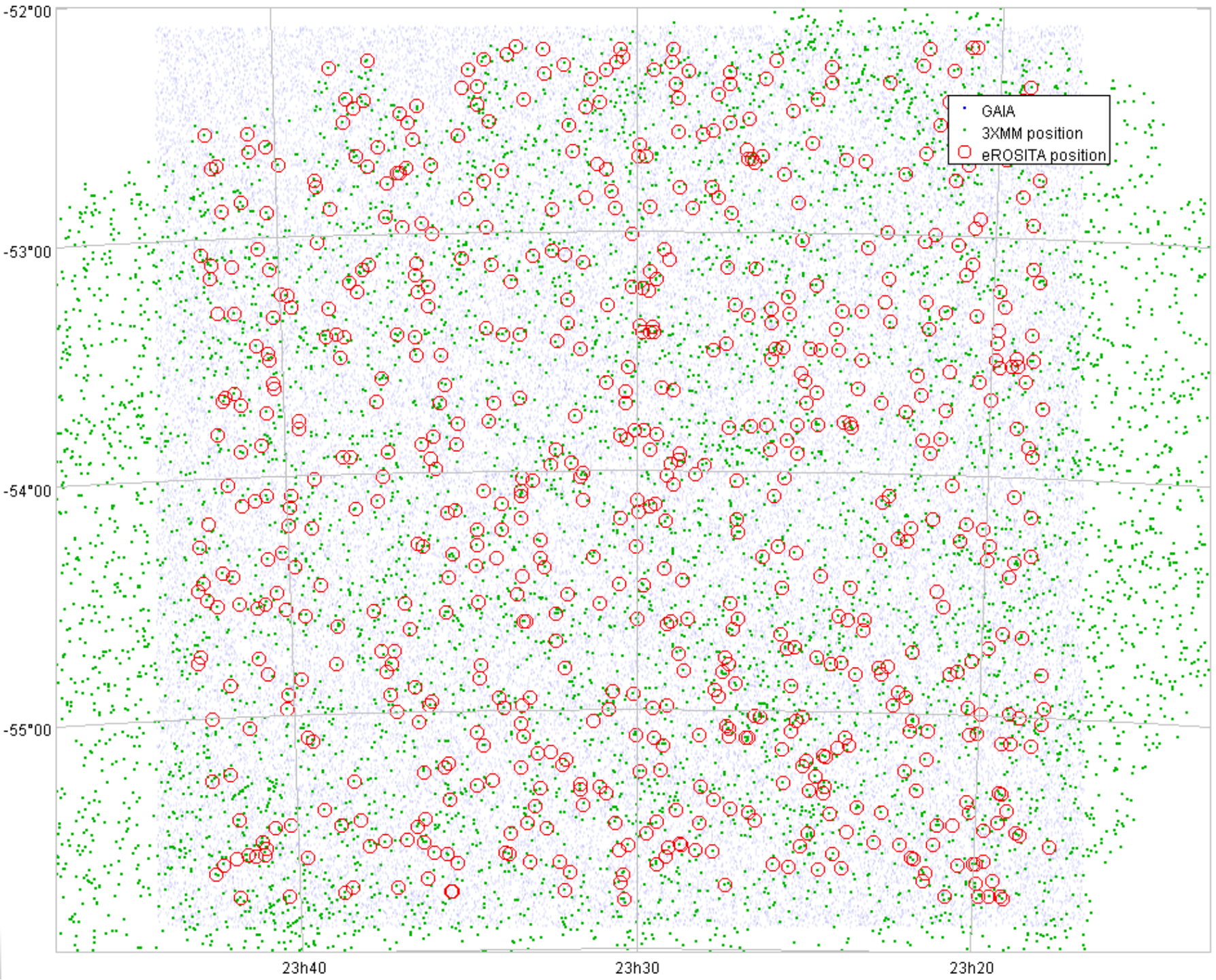
- Mara Salvato (catalogs, NWAY)
- Long Ji (NWAY based algorithm)
- Georg Lamer (testing, eSASS implementation)

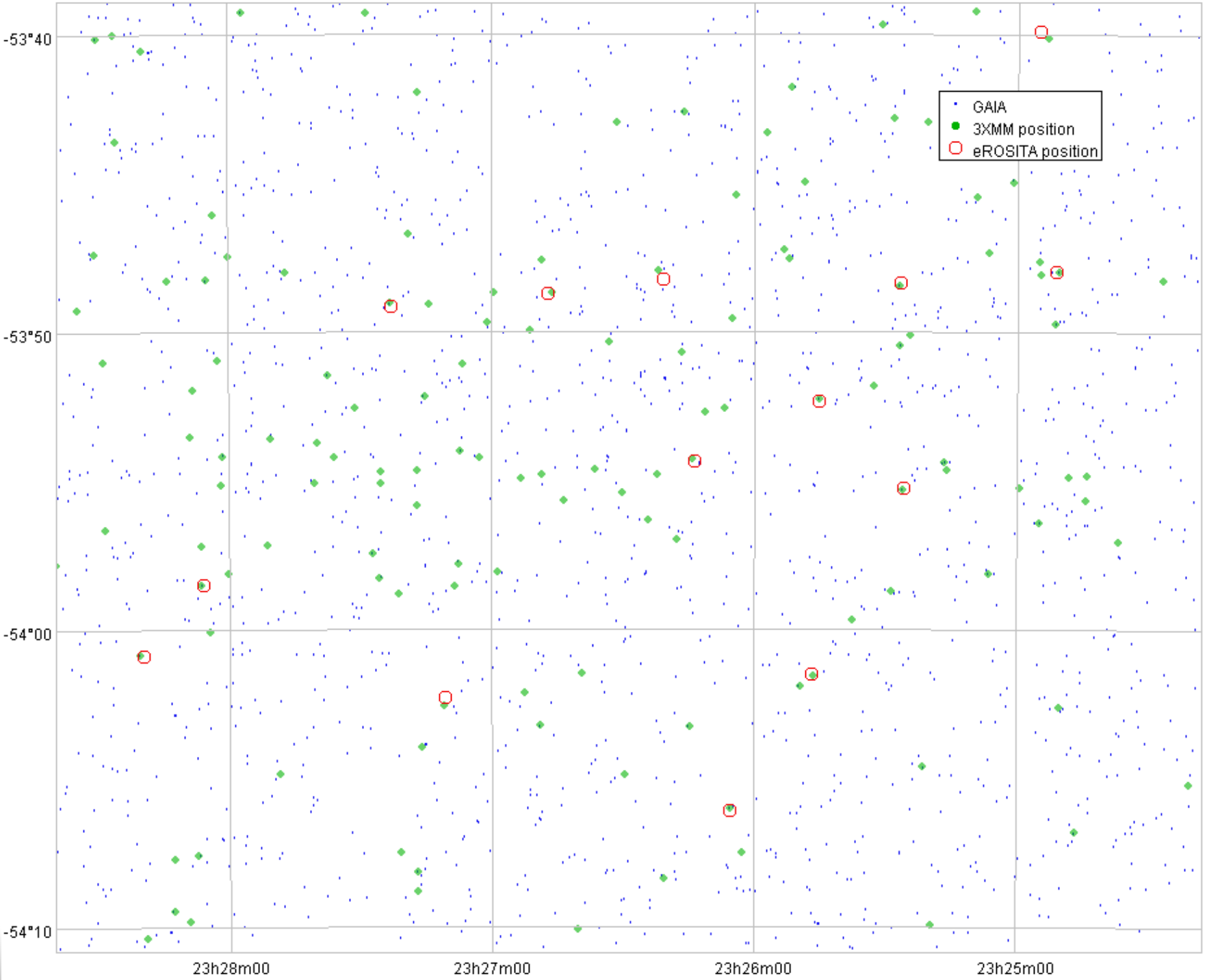
✓ 3XMM in XMM-XXL field south as input list
✓ SIXTE simulation of eROSITA sky tile
✓ After source detection +10 arcsec offset to the DEC positions
✓ NWAY based astrometric correction algorithm with
  - GAIA optical reference and
  - NWAY weights from position in WISE W2 vs. W1-W2 plane

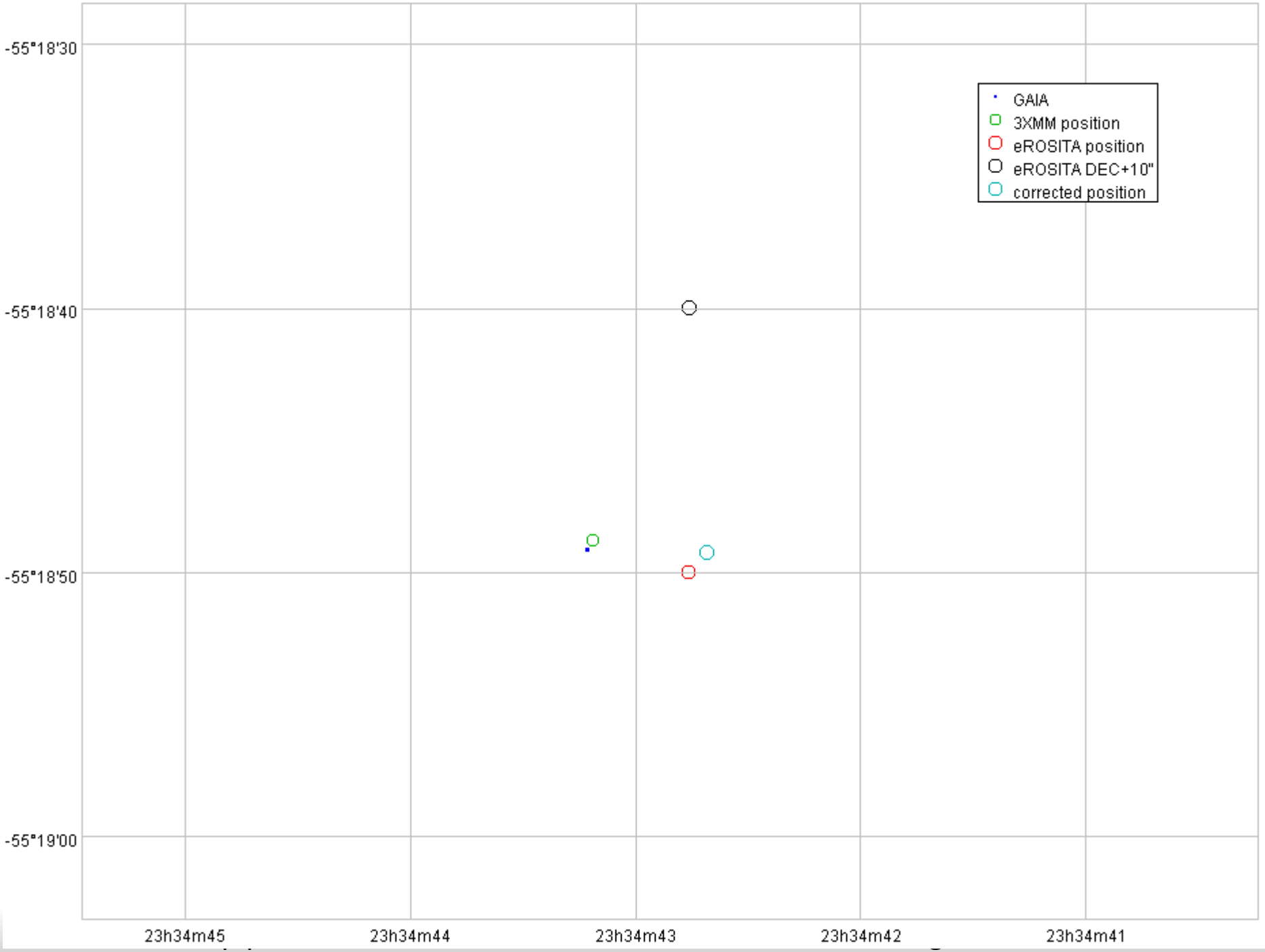
Result:

➢ -9.25" in DEC and -0.69" in RA correction
➢ Remaining offset: 1.03“




-52°00
-53°00
-54°00
-55°00
23h40
23h30
23h20
GAIA
3XMM position
eROSITA position


GAIA
3XMM position
eROSITA position
-53°40
-53°50
-54°00
-54°10
23h28m00
23h27m00
23h26m00
23h25m00


-55°18'30
-55°18'40
-55°18'50
-55°19'00
23h34m45
23h34m44
23h34m43
23h34m42
23h34m41
GAIA
3XMM position
eROSITA position
eROSITA DEC+10"
corrected position

Pipeline processing

EROPIPE
triggers pipeline chains, updates pipeline status, load balancing

input data frames
(science, HK, attitude, etc)
mirrored from IKI/Moscow

Preprocessor:
FITS conversion
packaging in eROdays
test for completeness
archiving

NRTA&QL analysis:
onitoring
k science

SASS TEL chain:
(one per telescope)
event calibration
quality GTI
copy to survey/pointing staging areas

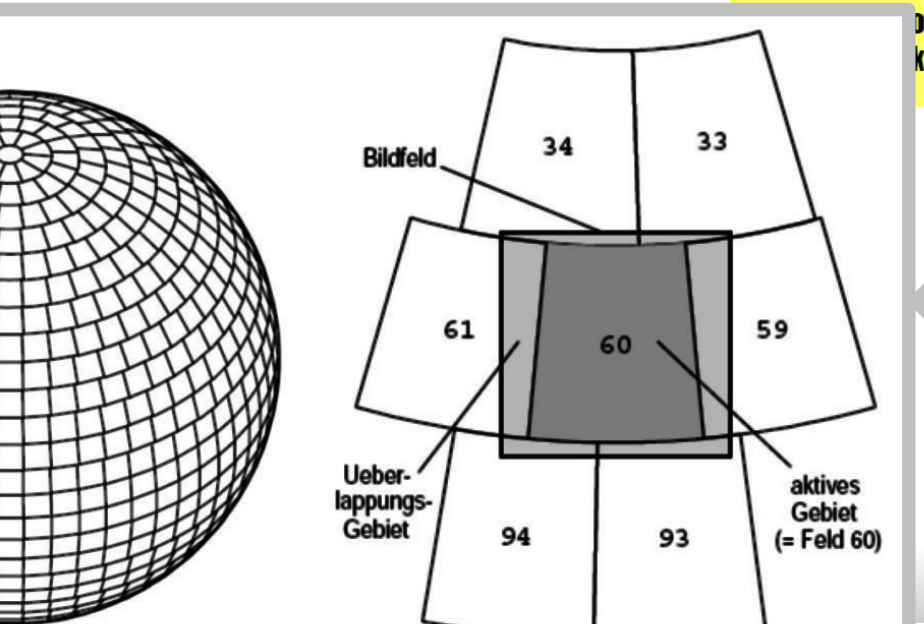
survey/pointing staging areas

SASS EXP chain:
collect from staging areas &
merge event files
make images & exposure maps

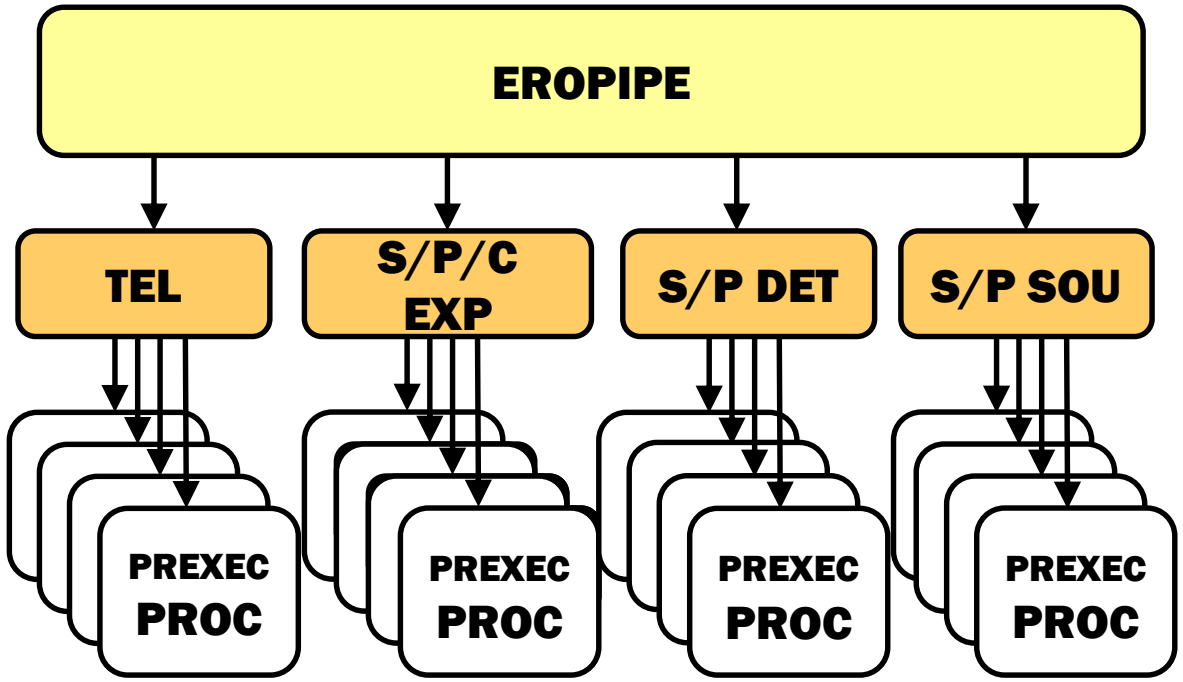
SASS DET chain:
perform several source detection &
characterization algorithms
make backgroud & sensitivity maps

SASS SOU chain:
make source specific products
(spectra, time series, etc.)

raw data | archive | products



Pipeline control



Pipeline control program: initiates processing of task chains, prepares chain parameter files, updates and reads processing status files

200+ processing chains are executes concurrently on eROSITA servers, several pipeline configurations (and eSASS releases) may be be active in parallel

SIXTE simulations for pipeline testing

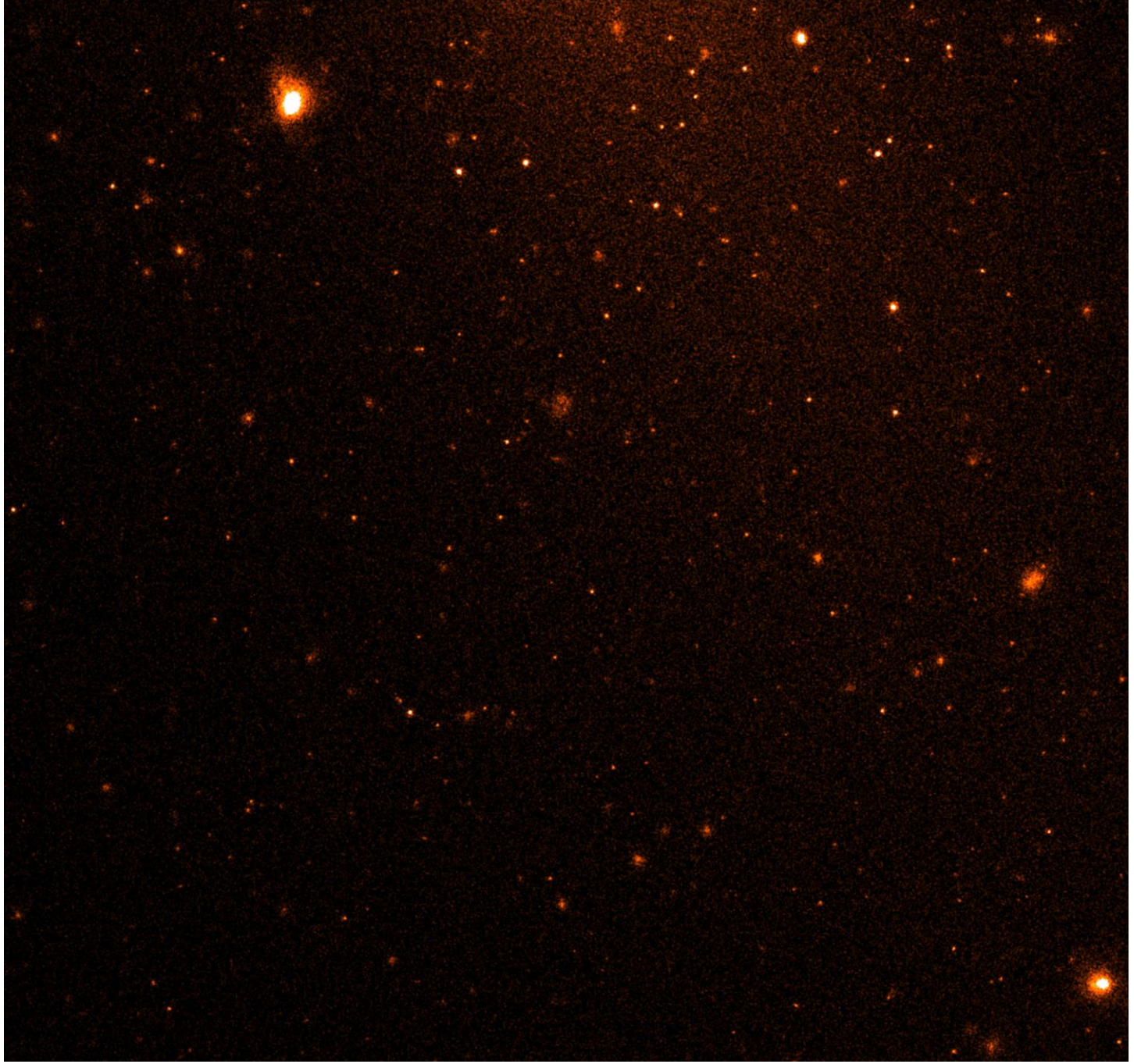
Christoph Großberger, Philipp Weber + Bamberg SIXTE team

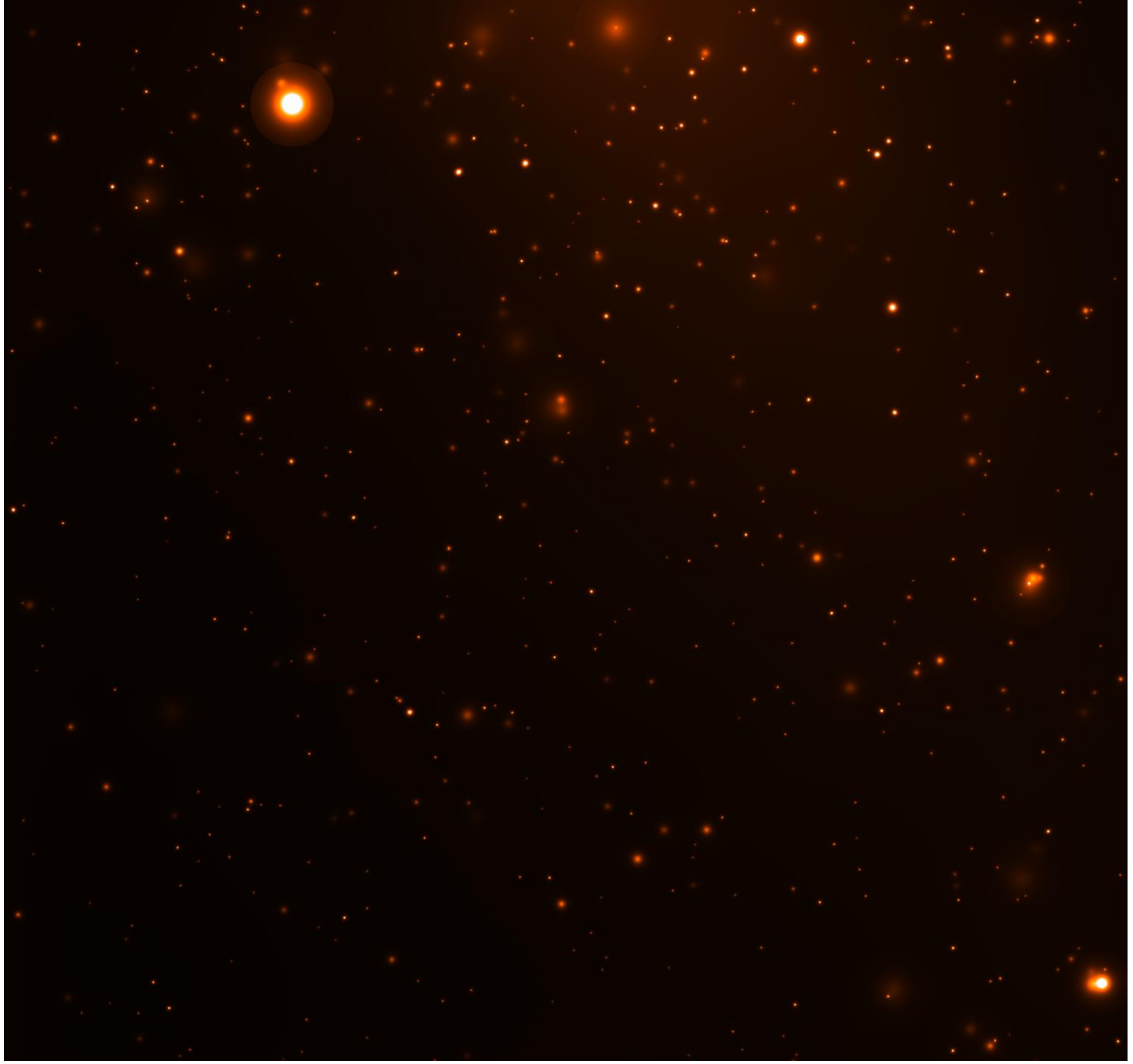
- One year all-sky survey simulation
  Inputs for SIMPUT: AGN (Nicolas Clerc)
  Cluster images (Jermy Sanders)

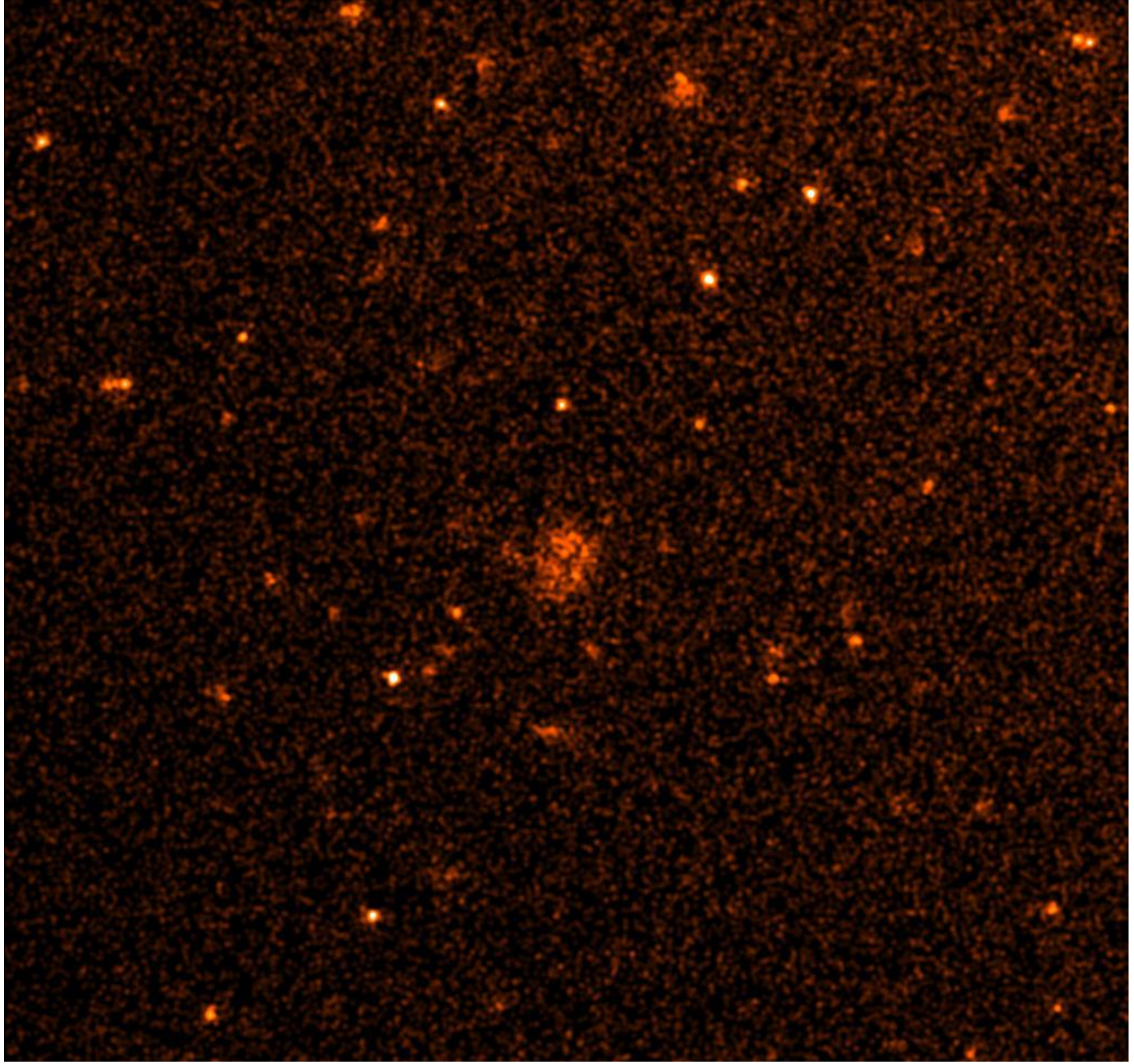
- New all-sky survey simulation after
  - SIXTE/eSASS coordinate system corrections:
    RAWX/RAWY, roll angles – Thomas Dauser, Georg Lamer
  - Improved SIMPUT, inputs by Johan Komparat, Jeremy Sanders, Joe Mohr + team
  - New attitude file (Jan Robrade)

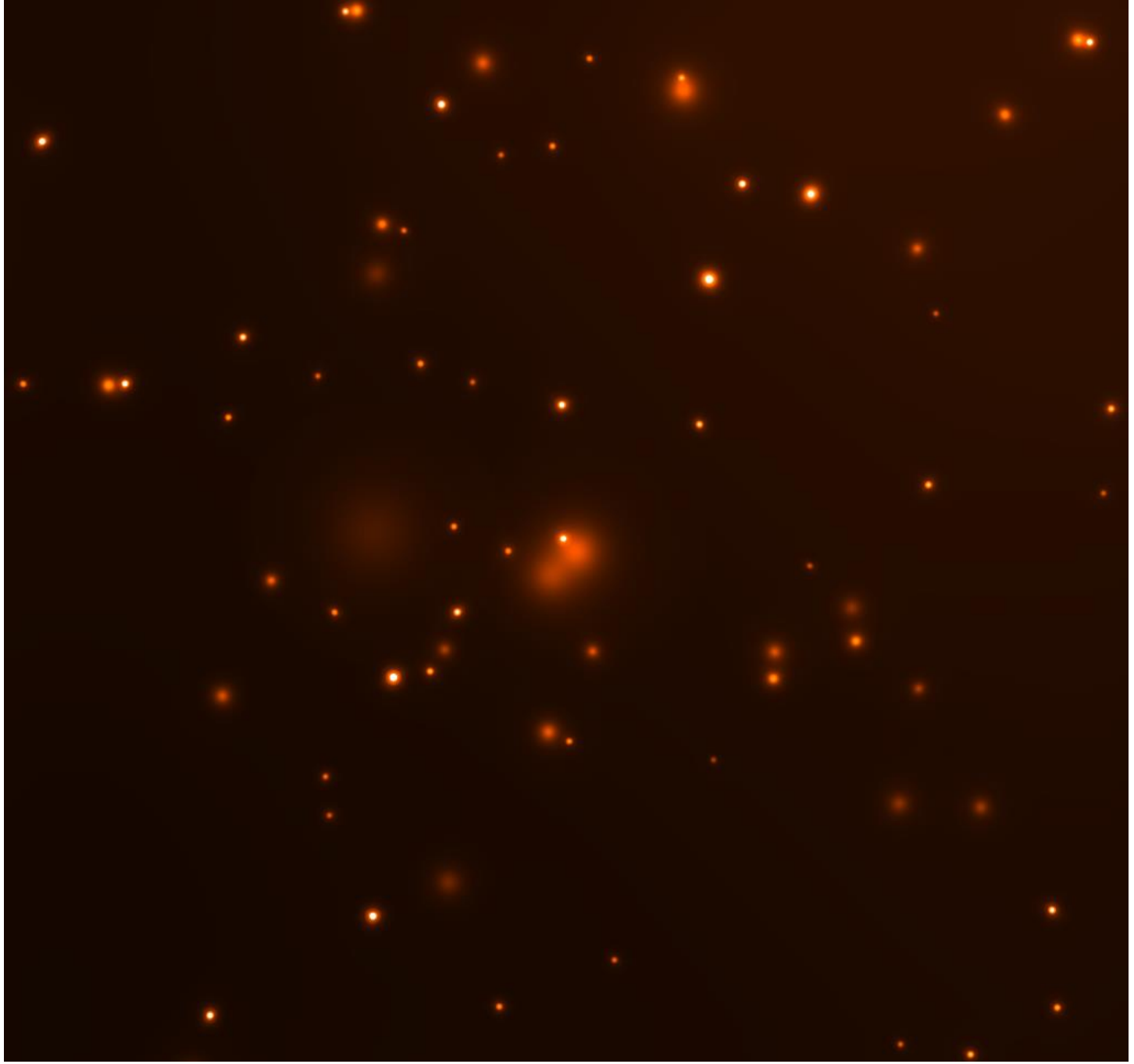
- Full CalPV simulation (same simput + targets)

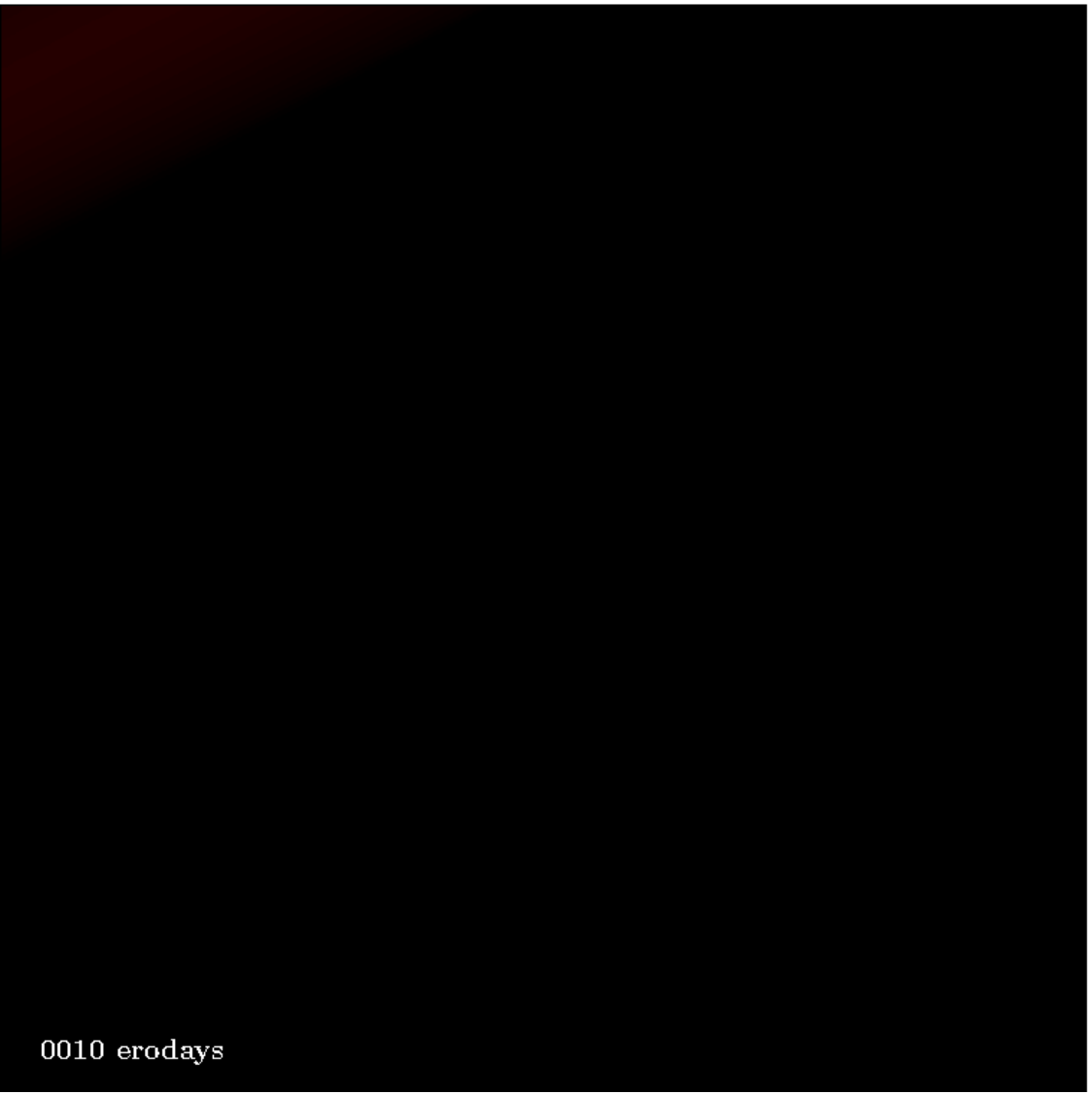
Example dataset: eRASS1 simulation of deep all-sky survey tile:
exposure map – photon image – ERMLDET source map
movies: 20 eROdays/s - processing+movies by Christoph Großberger

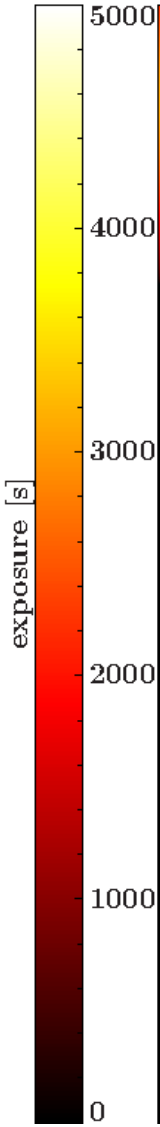









0010 erodays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4000
3000
2000
1000
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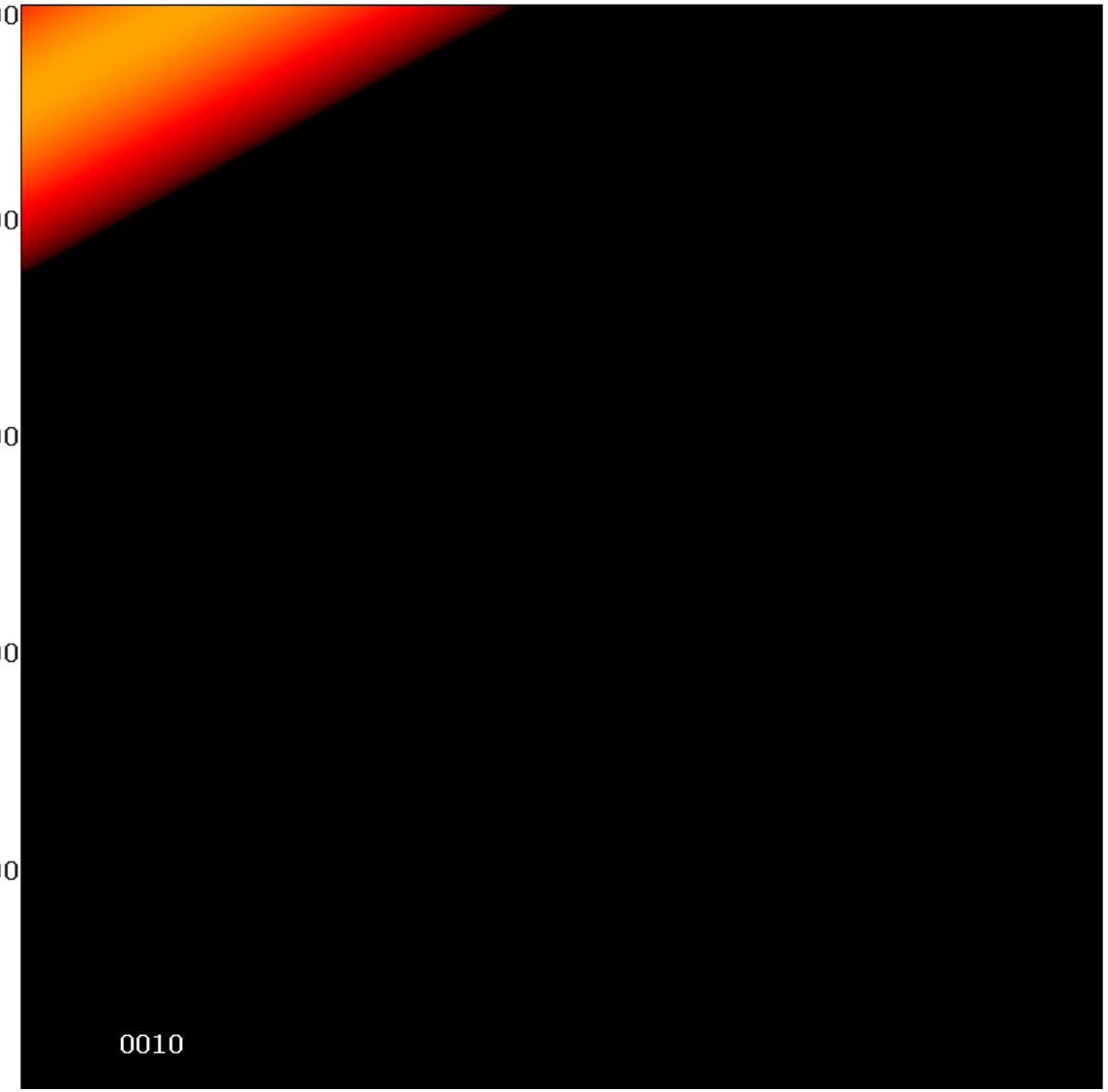
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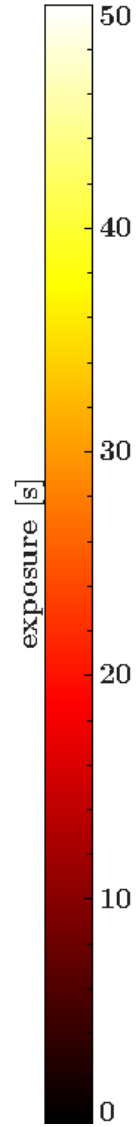
exposure [s]
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30
20
10
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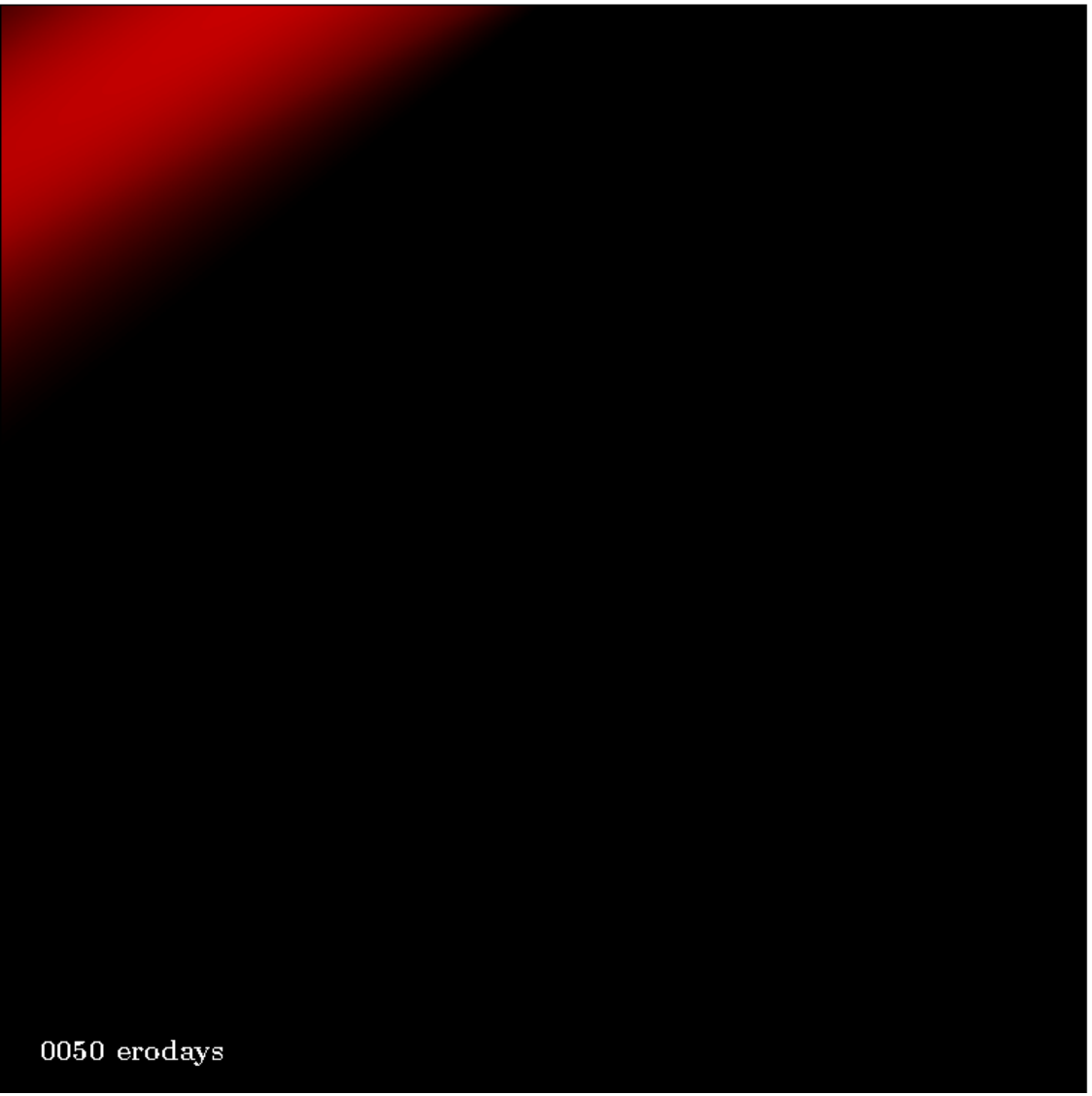
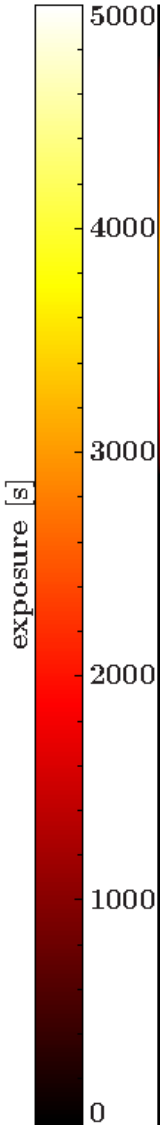

0050 erodays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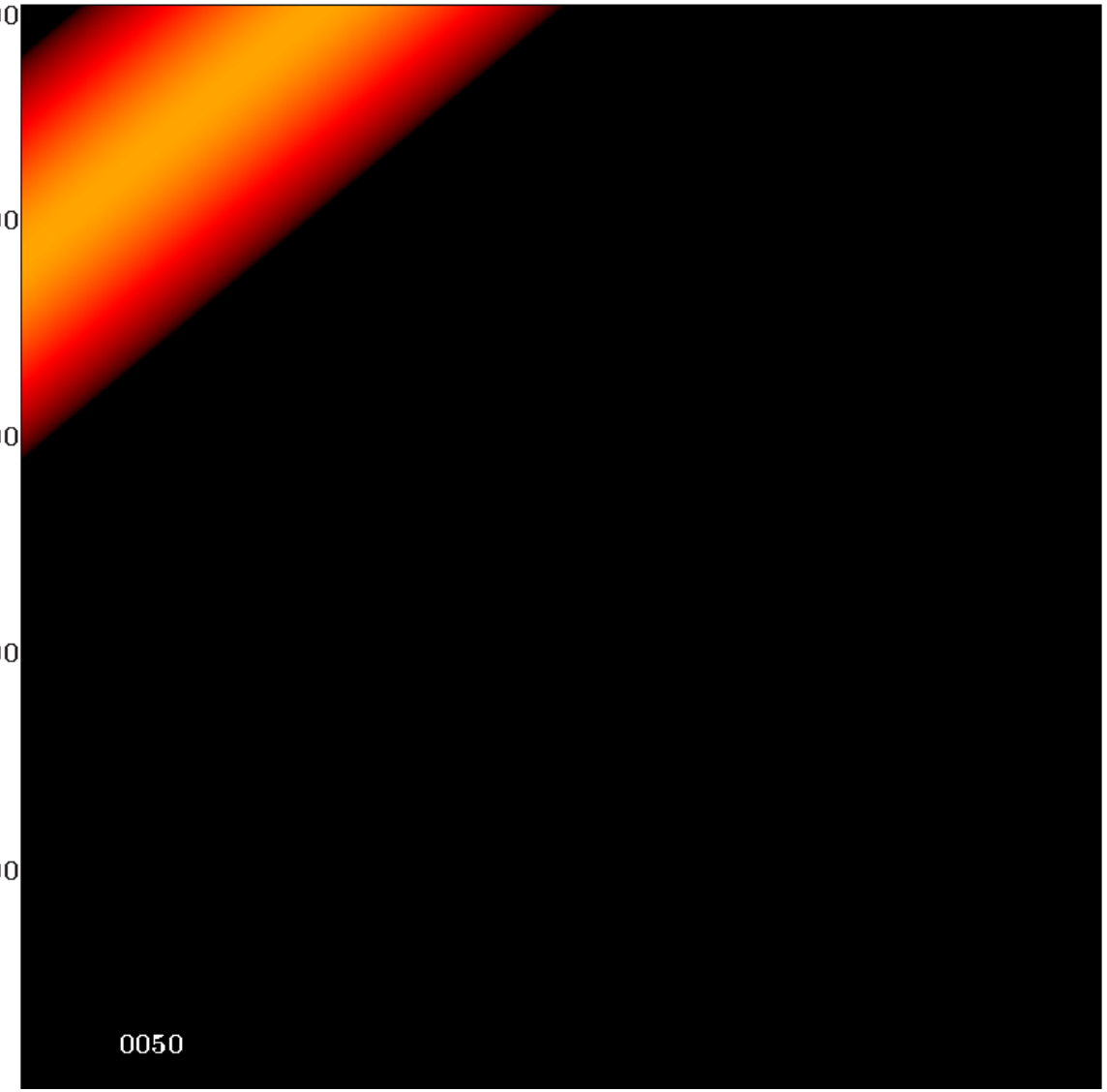
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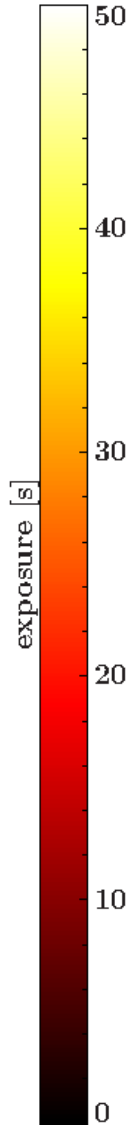
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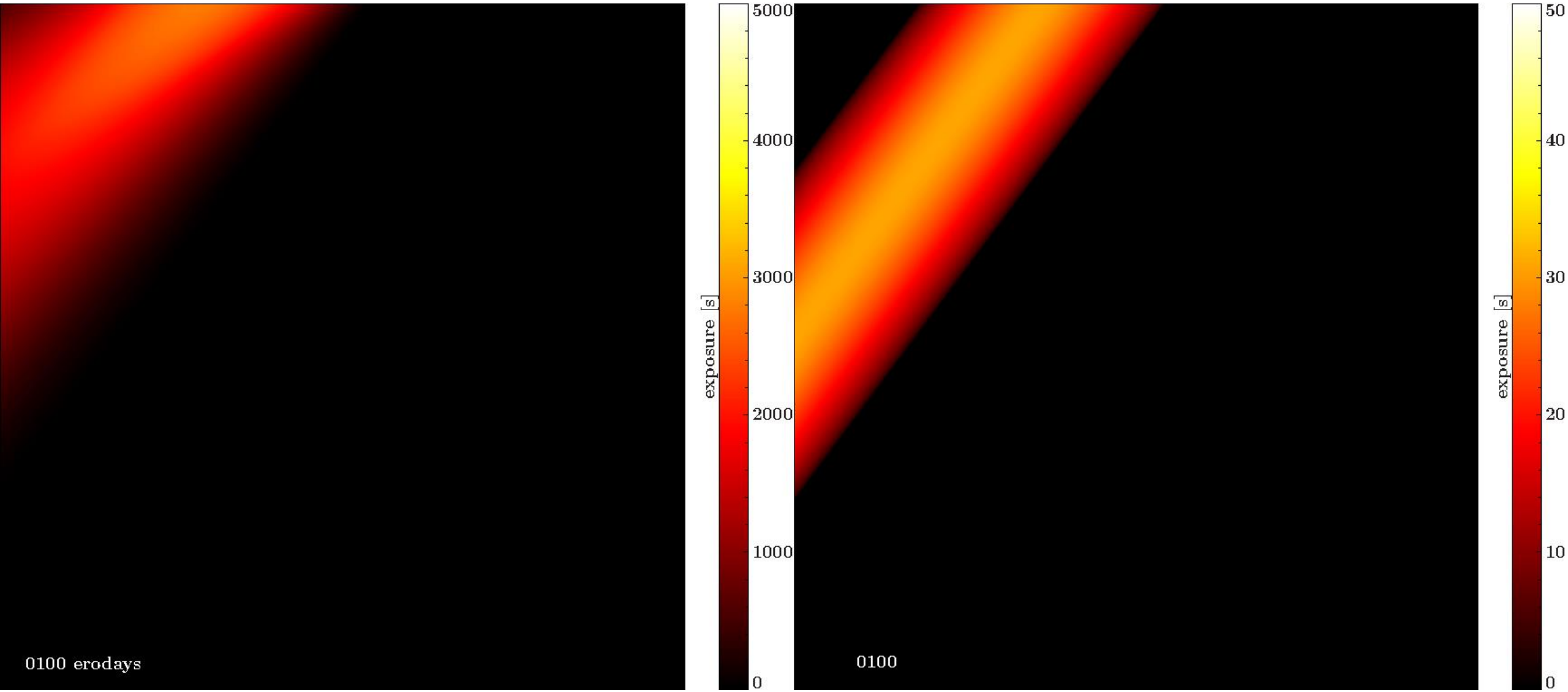
0100 erodays
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1000
0
0100
exposure [s]
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30
20
10
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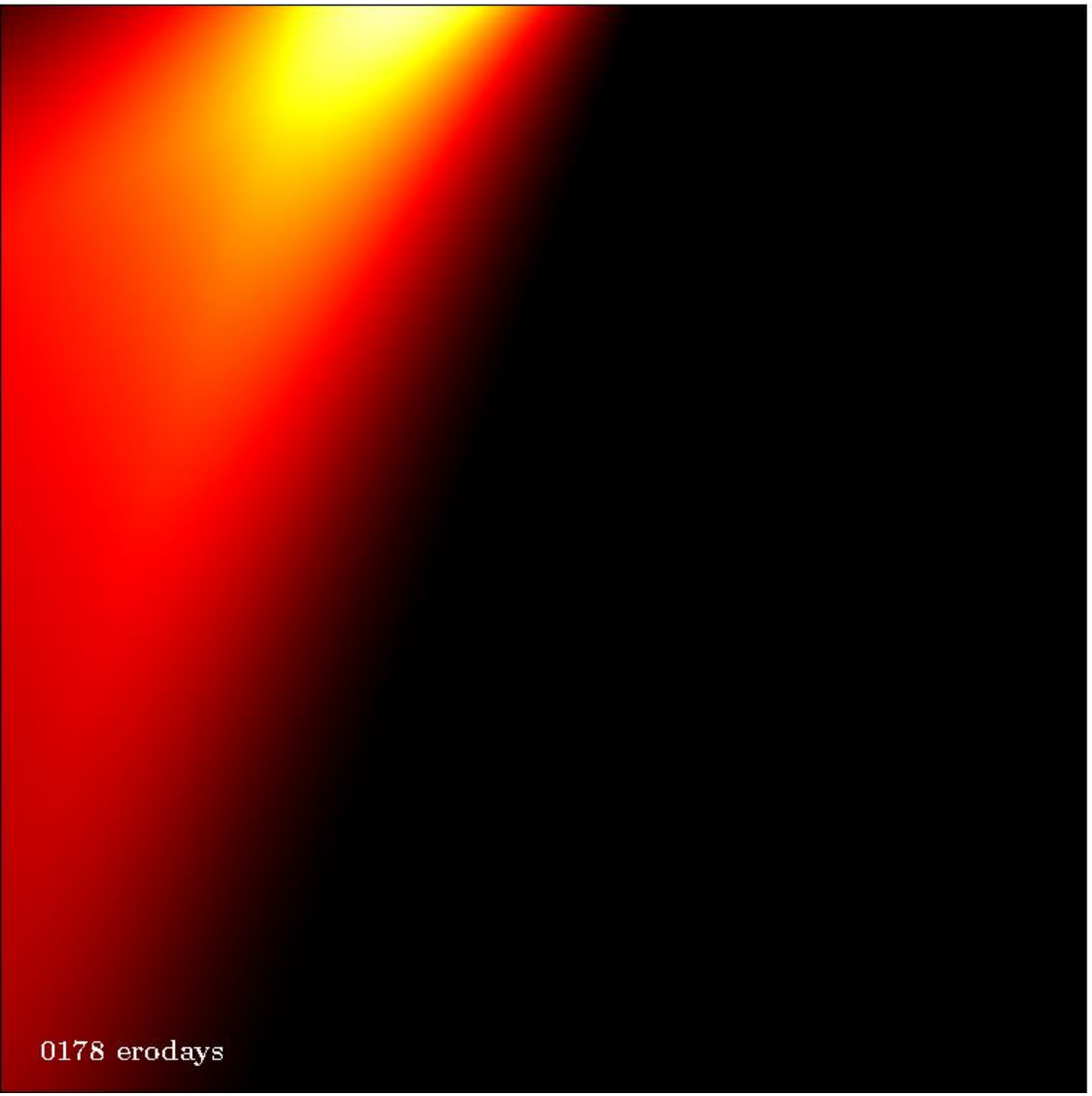
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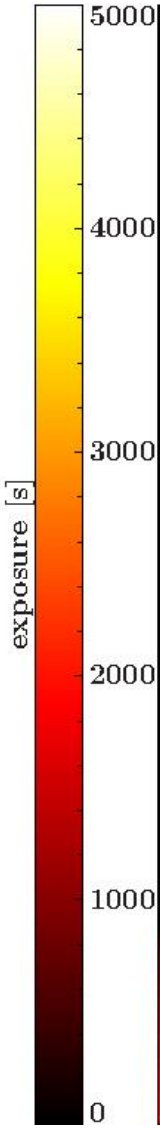
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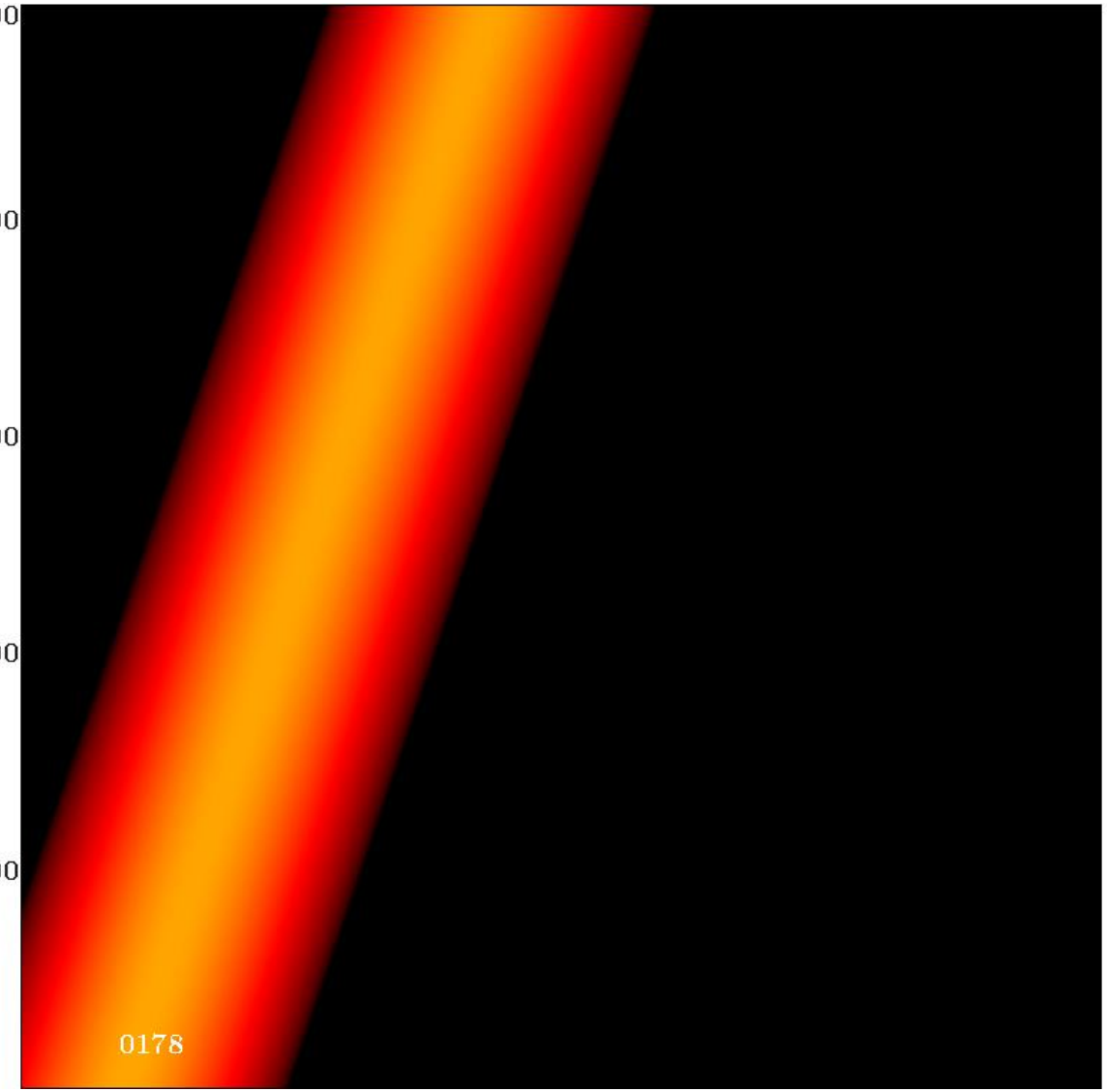
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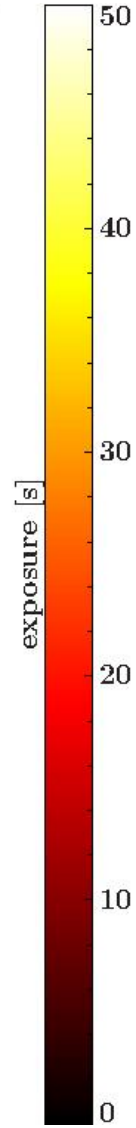
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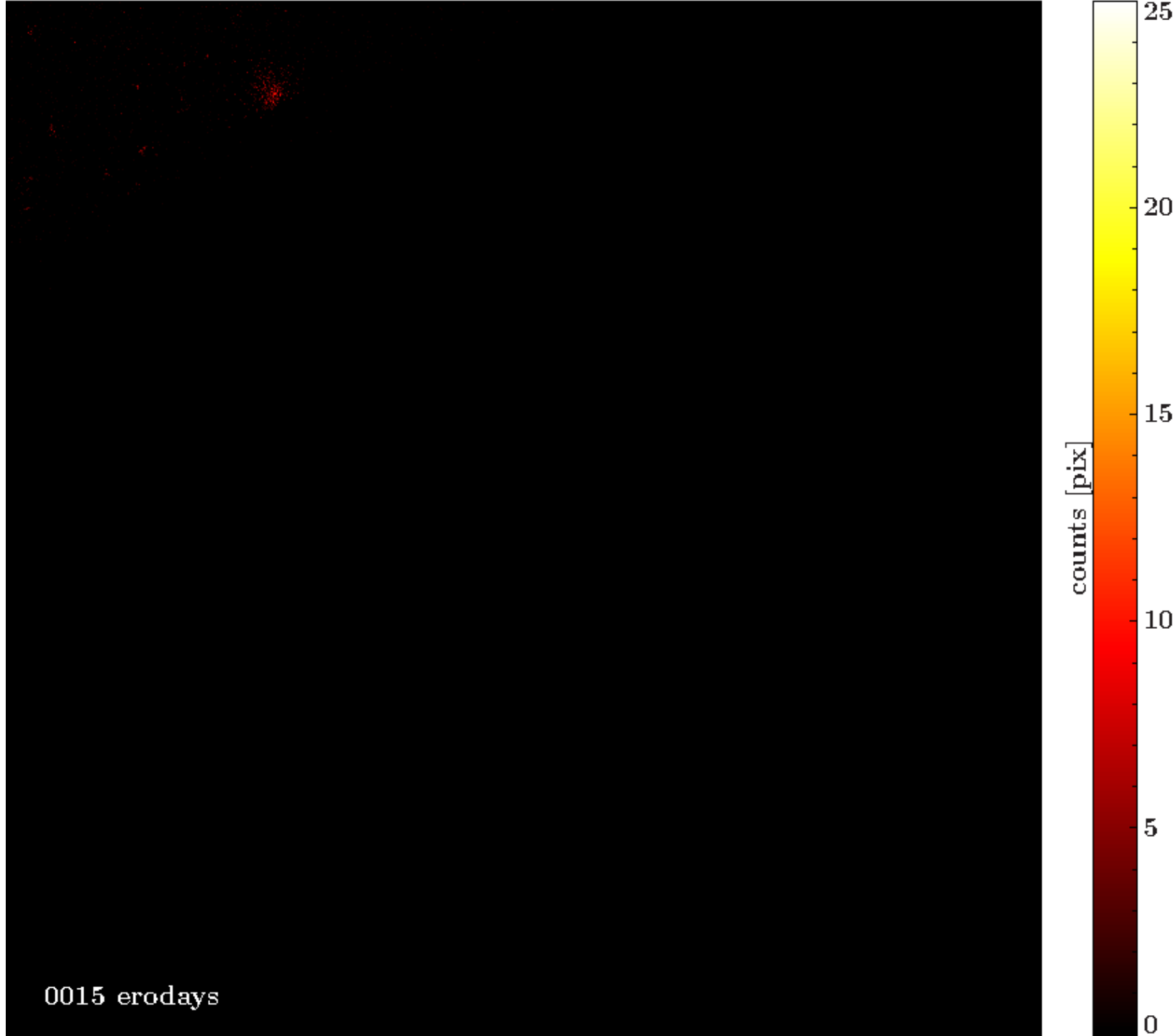
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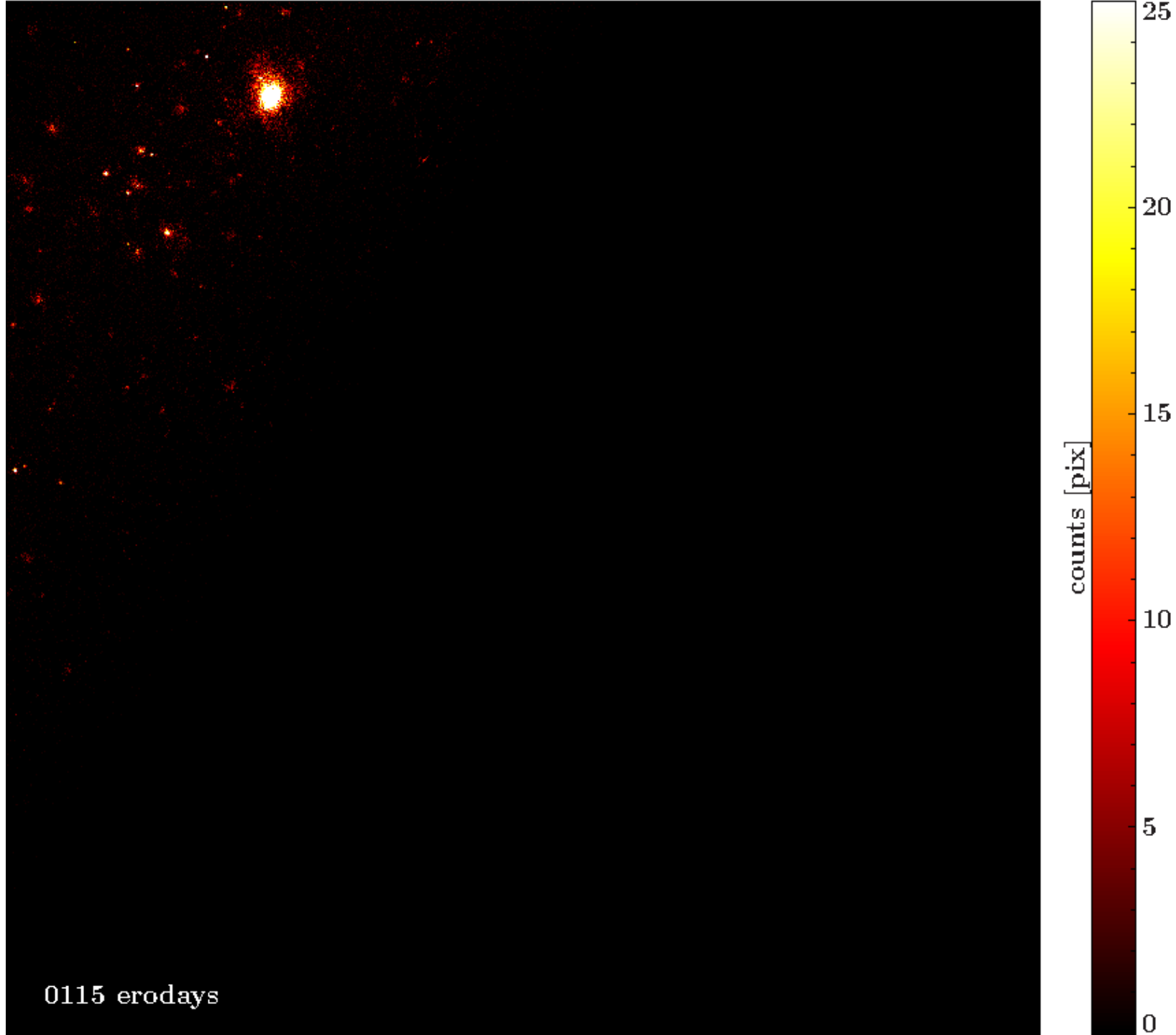
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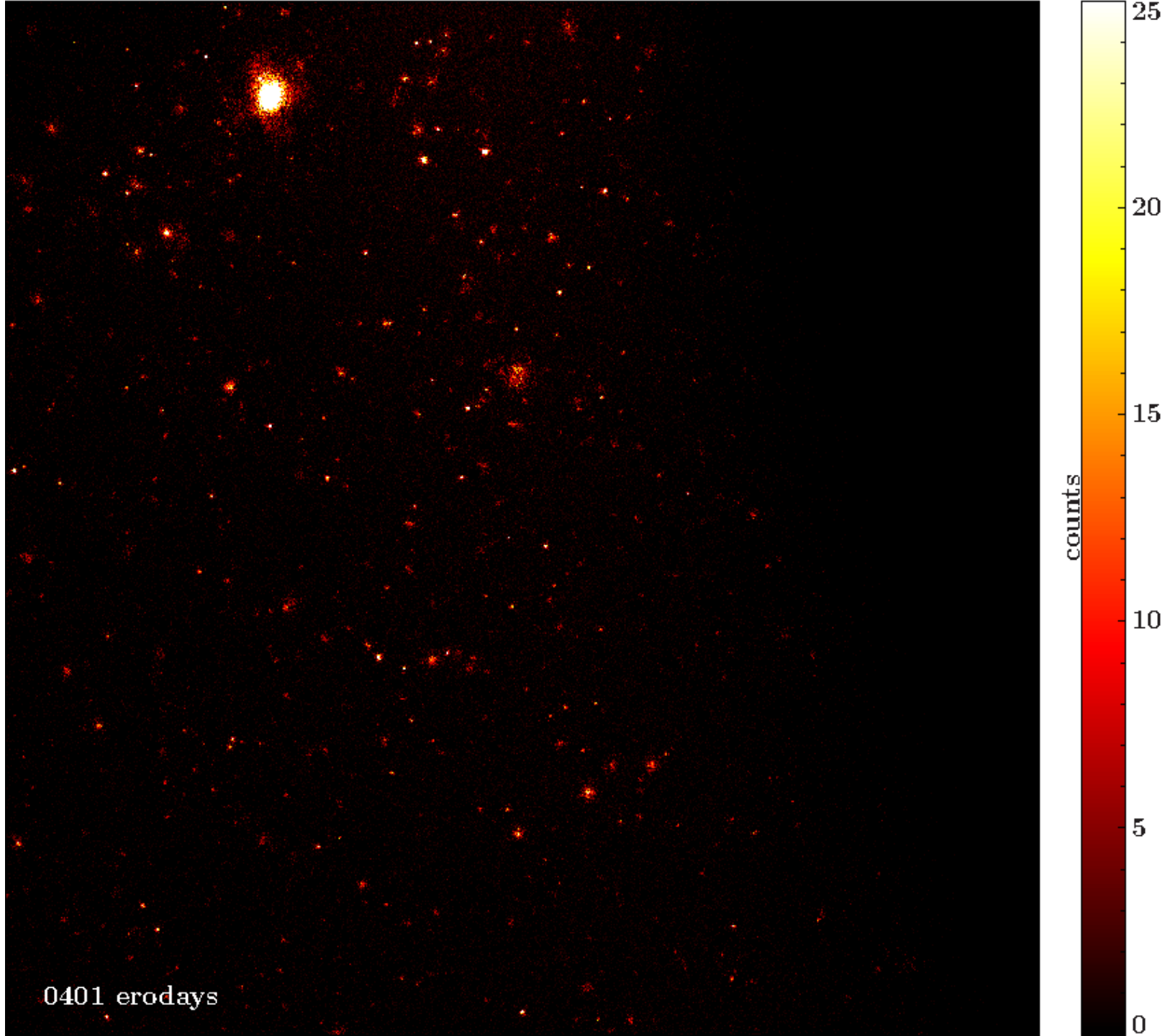
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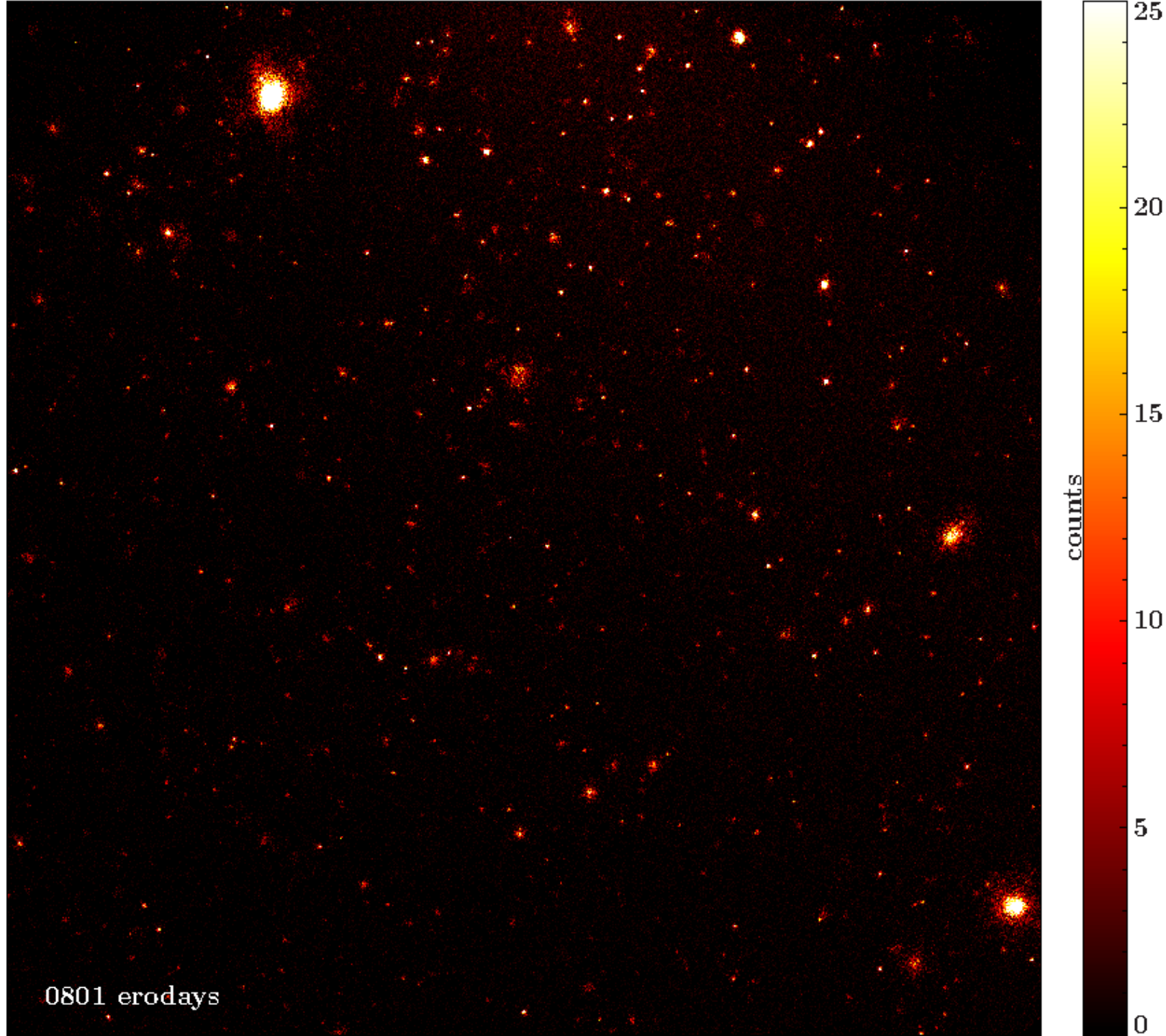
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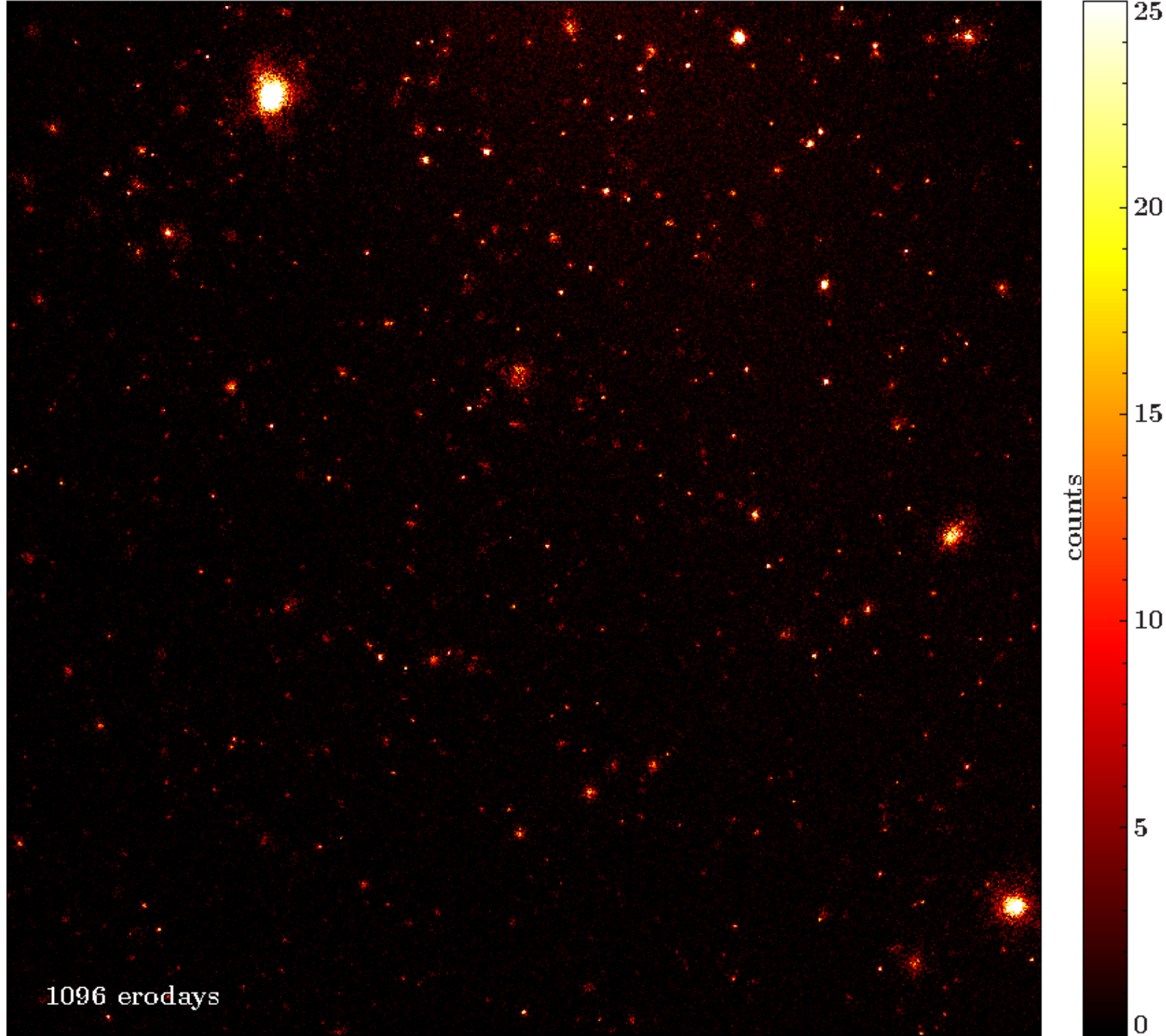
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