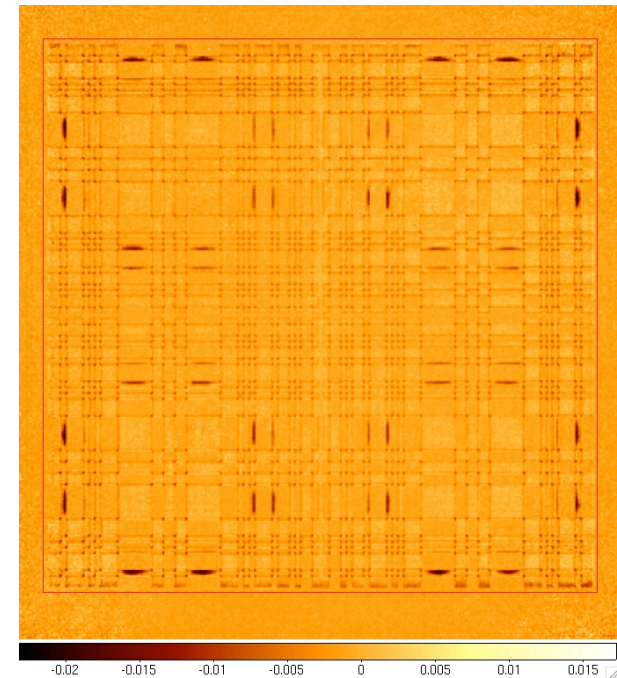


IBIS mask calibration status: latest developments

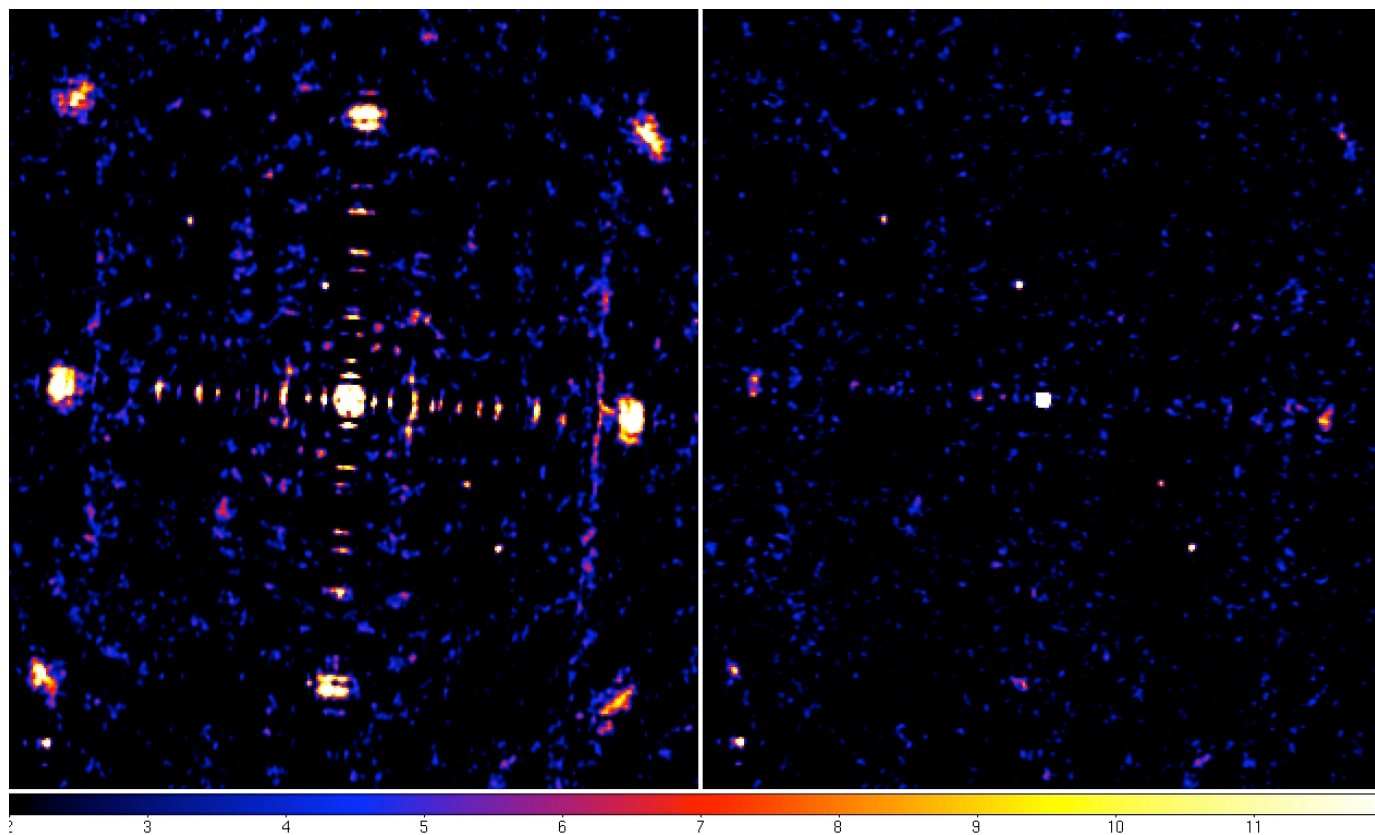
*Fabio Mattana (APC Paris)
on the behalf of
François Lebrun, Simona Soldi
and the IBIS/ISGRI team Paris-Saclay*



INTEGRAL User Group, June 16-17, 2010 - ESTEC Noordwijk



New imaging in OSA



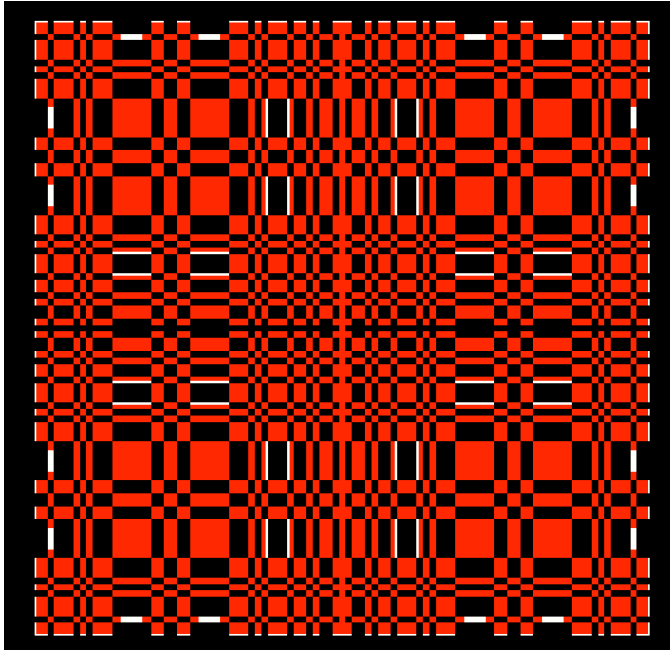
OSA-8

OSA-9

Remarkable improvement,
ghost residuals still present (11σ or less, 0.3%)



Excluded regions in OSA-9



Excluded regions: white

Components:

- bolts and screws
- potting
- mask borders

« Radiography » to measure the mask transparency

- minimize the rejected signal
- refine the source subtraction

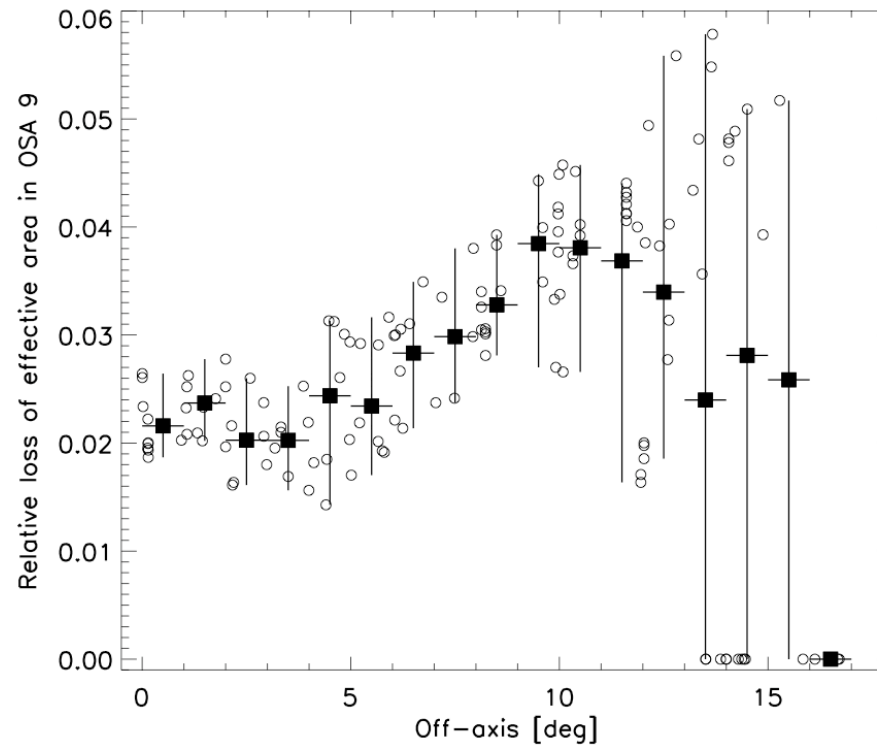


Loss of effective area in OSA-9



One source (Crab)

- on-axis loss $\sim 2.2\%$
- maximum loss $\sim 4.5\%$ ($< 10^\circ$ off-axis)





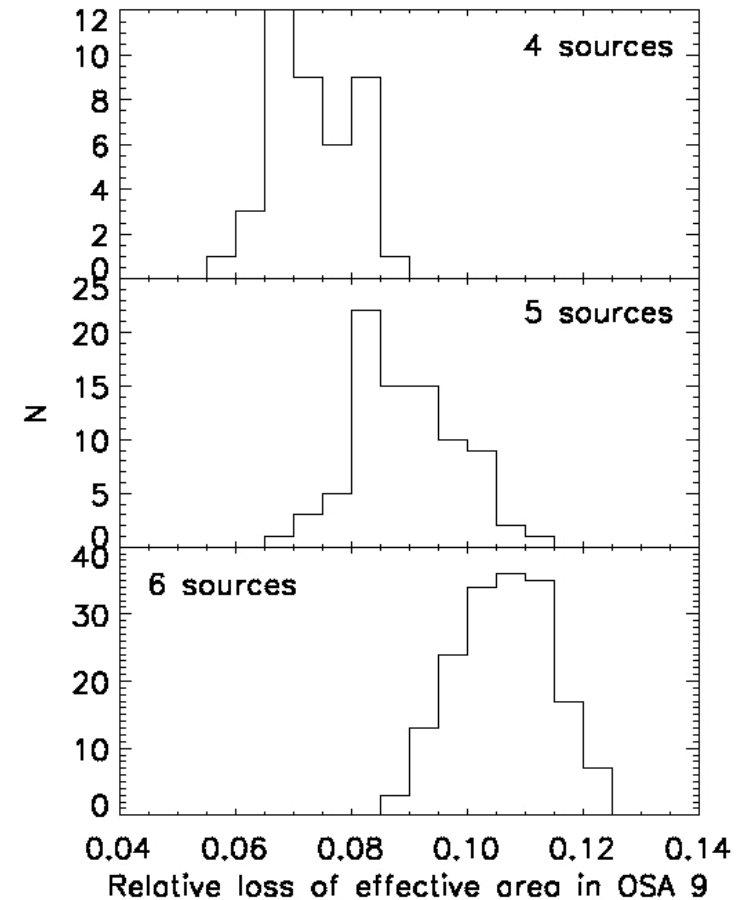
Crowded fields



Inner Galactic disk

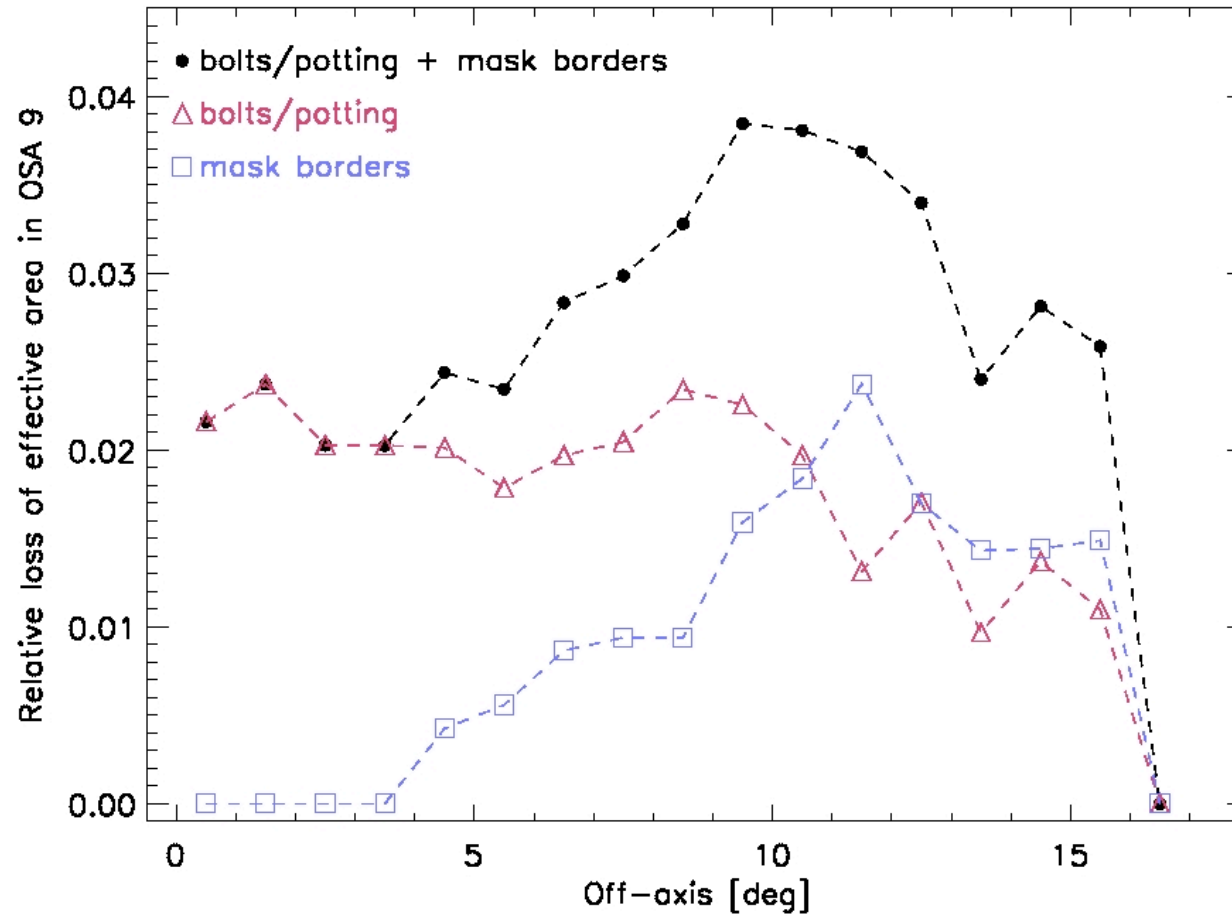
# sources	Mean	Max
4	7.4%	8.7%
5	8.9%	11.2%
6	10.6%	12.3%

The loss of effective area is not negligible



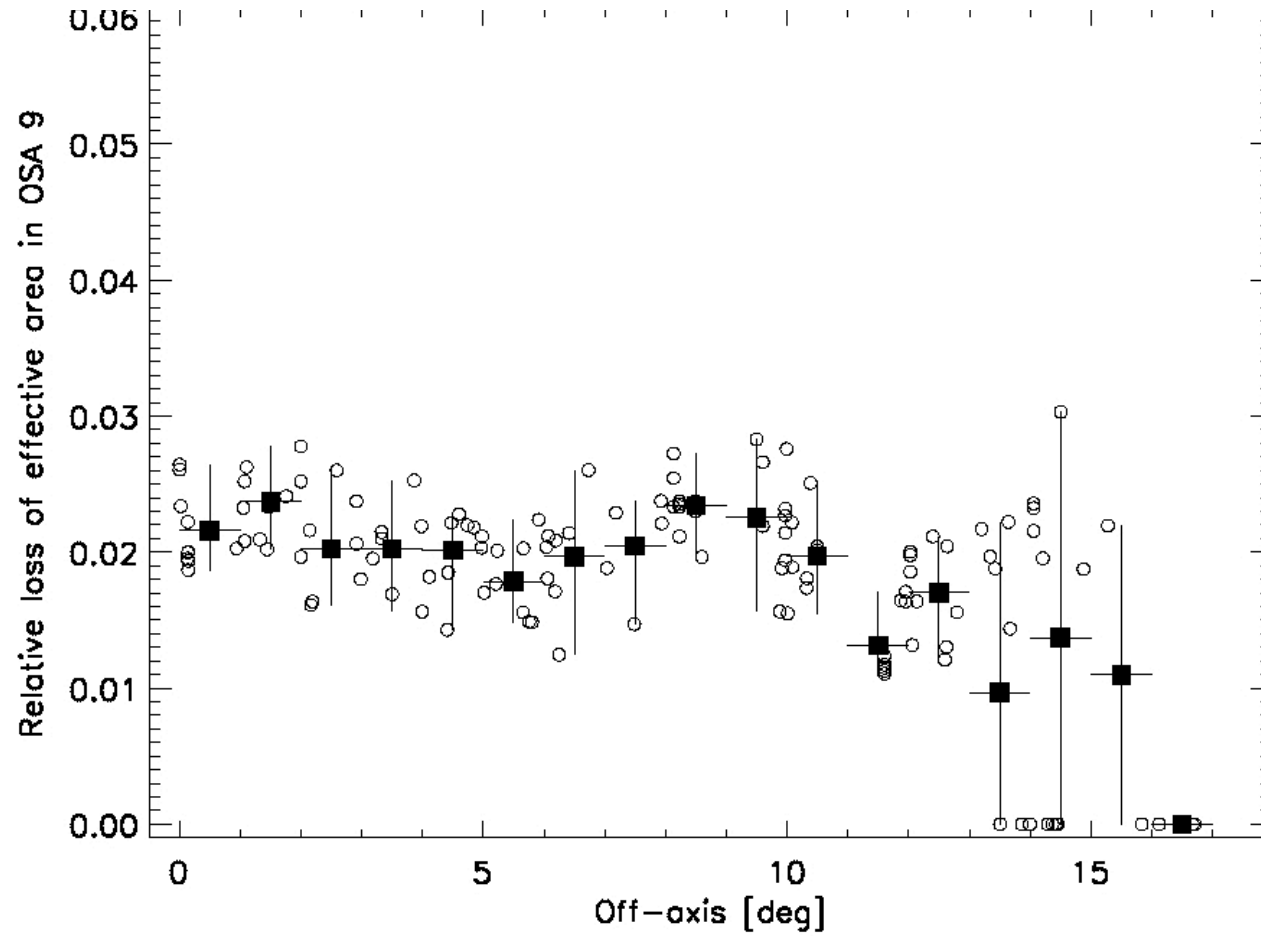


Bolt/potting vs. borders



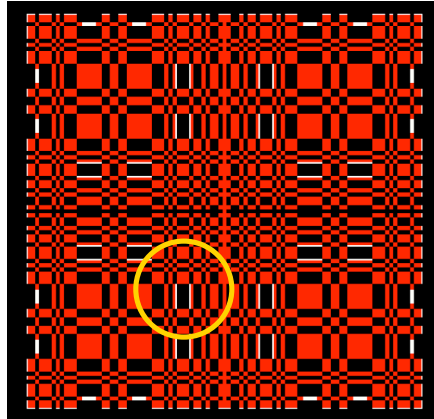


Loss of effective area: bolts/potting only

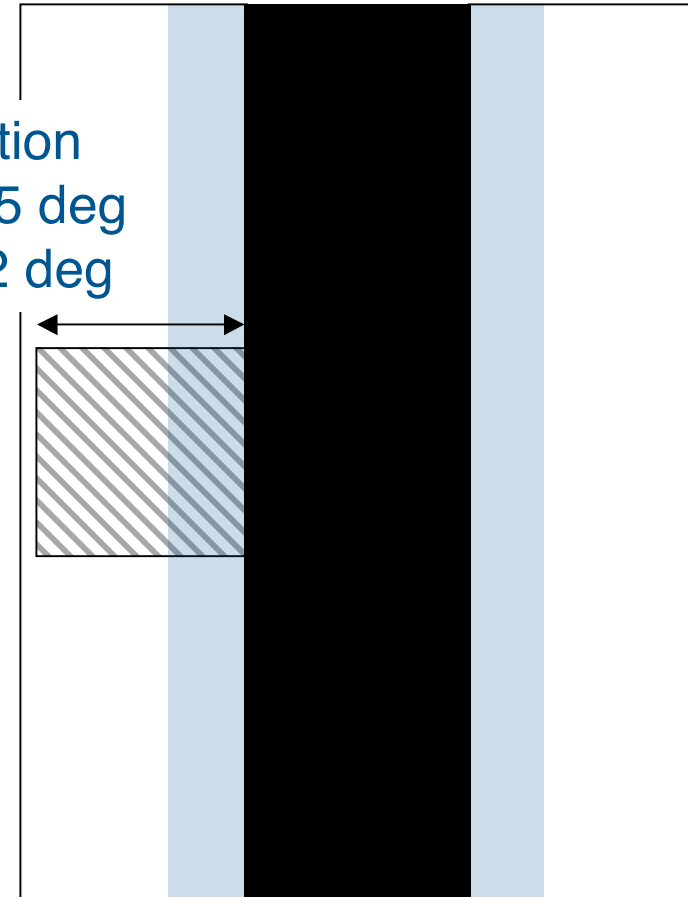




Defect spreading



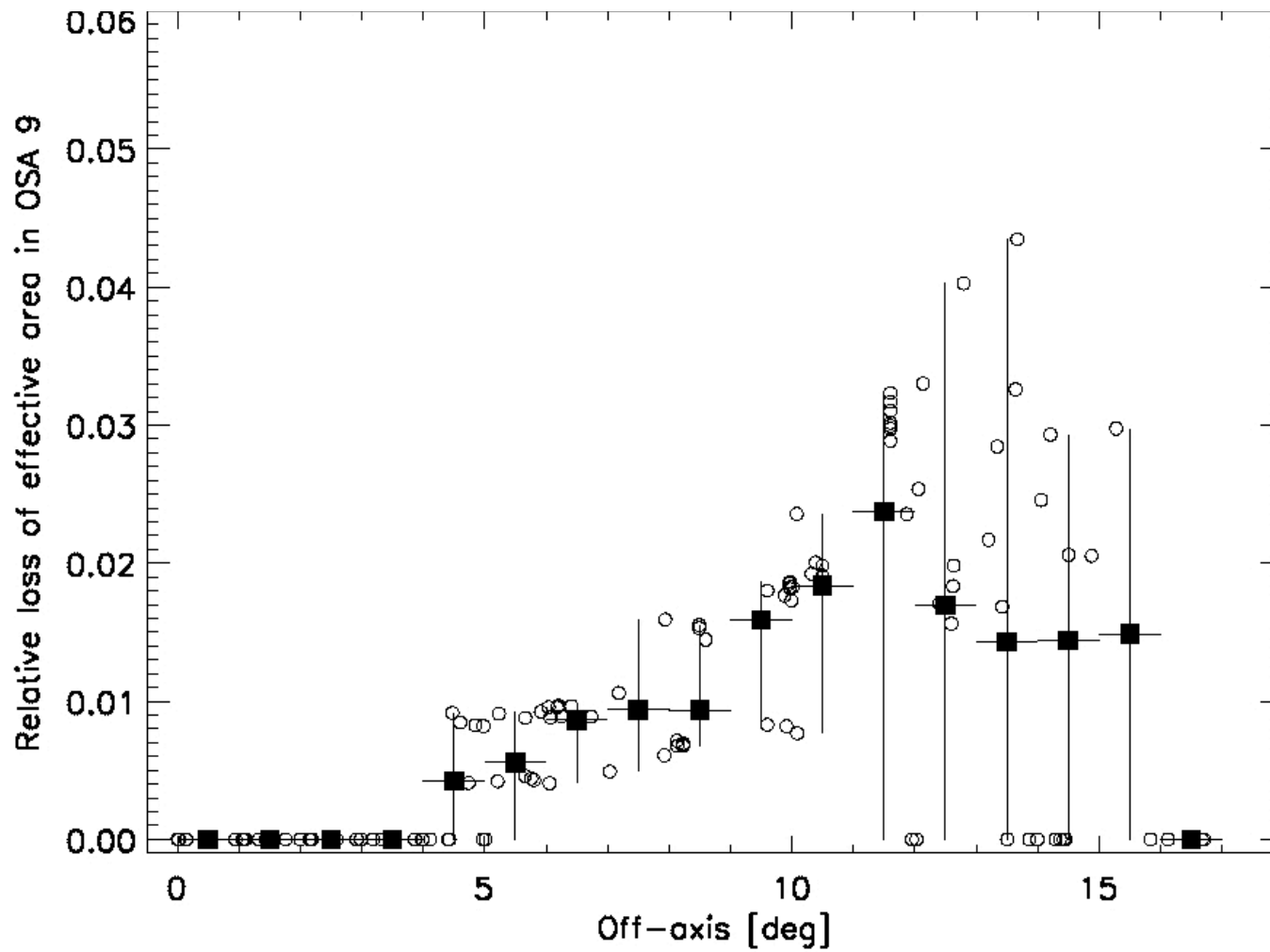
Screw projection
6.3 mm @ 4.5 deg
17 mm @ 12 deg



- The exclusion region due to the screws should be one-sided
- Screw projection overcoming the exclusion region
- A treatment depending on the off-axis and roll angle is required even in the FCFOV

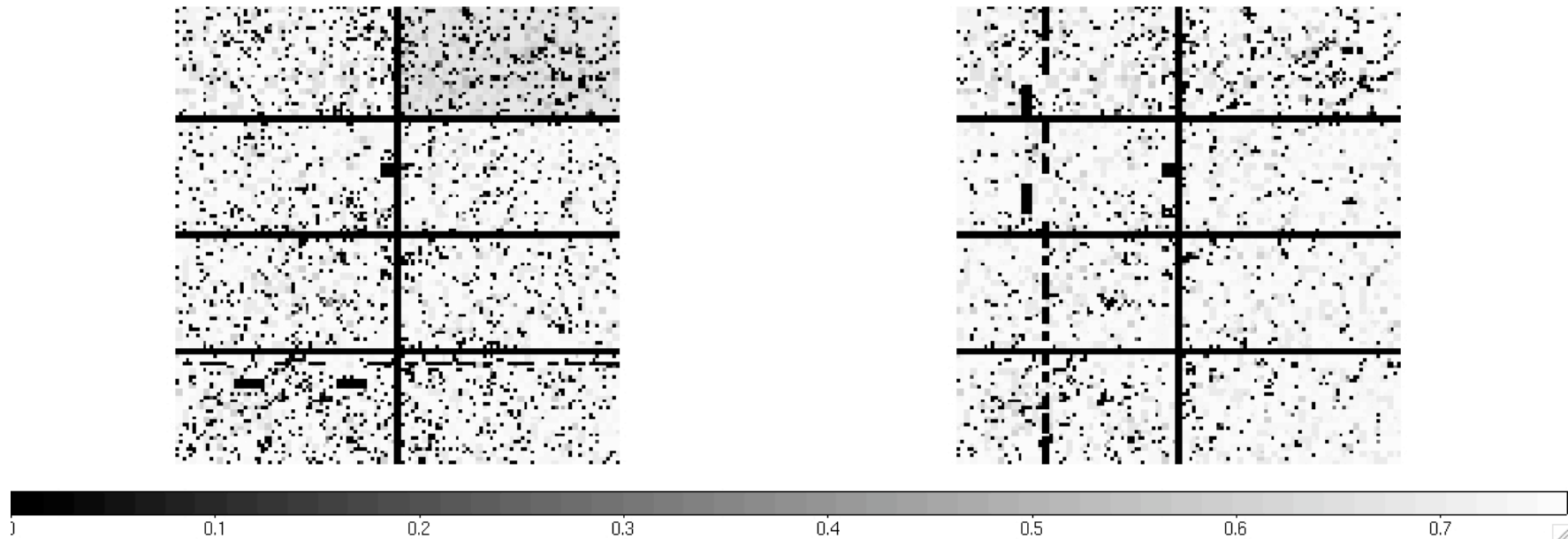


Loss of effective area: mask borders only





Mask borders

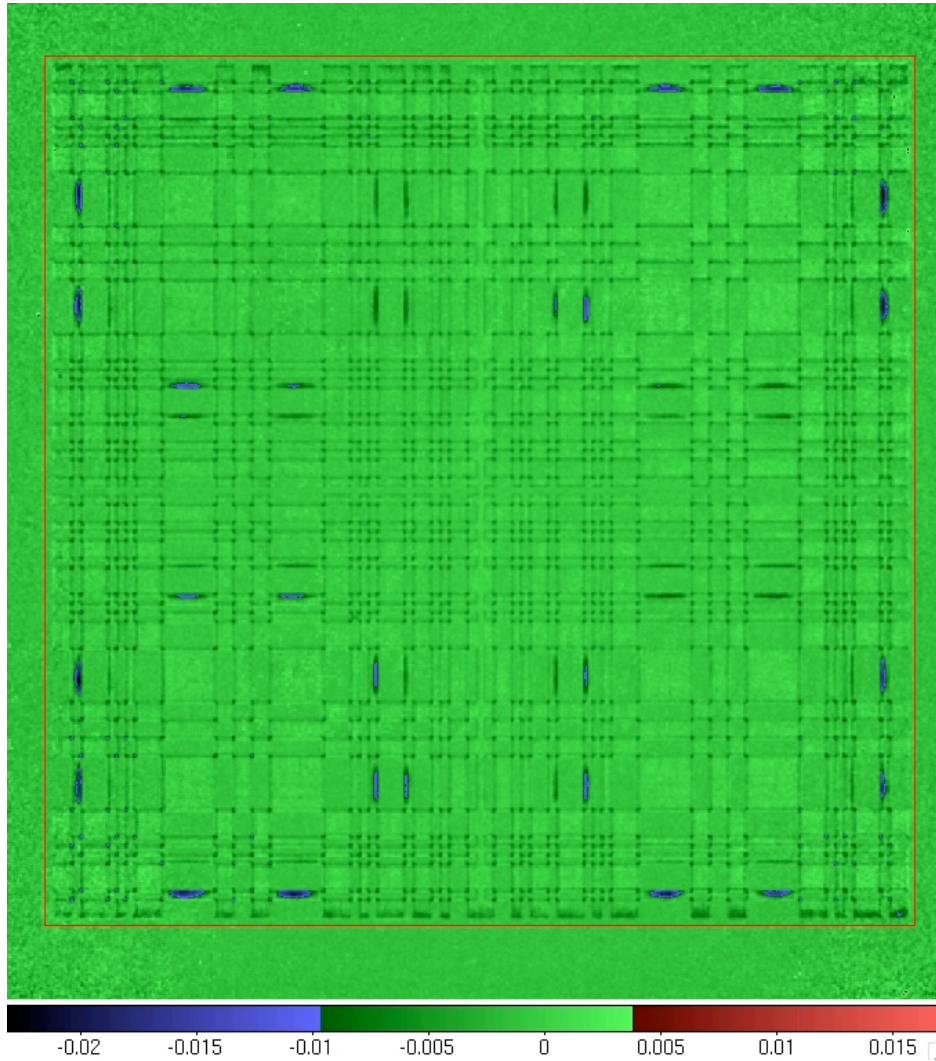


Examples of efficiency maps with exclusion of one mask border

A major contribution to the loss of the effective area in the PCFOV

Actual size and nature of the border defects : unknown

Possible dependence on the off-axis angle



Cyg X-1 + Crab combined

- rounded bolt/potting
- two borders

Goal: ~1% precision

1 Msec exposure required
on each mask corner

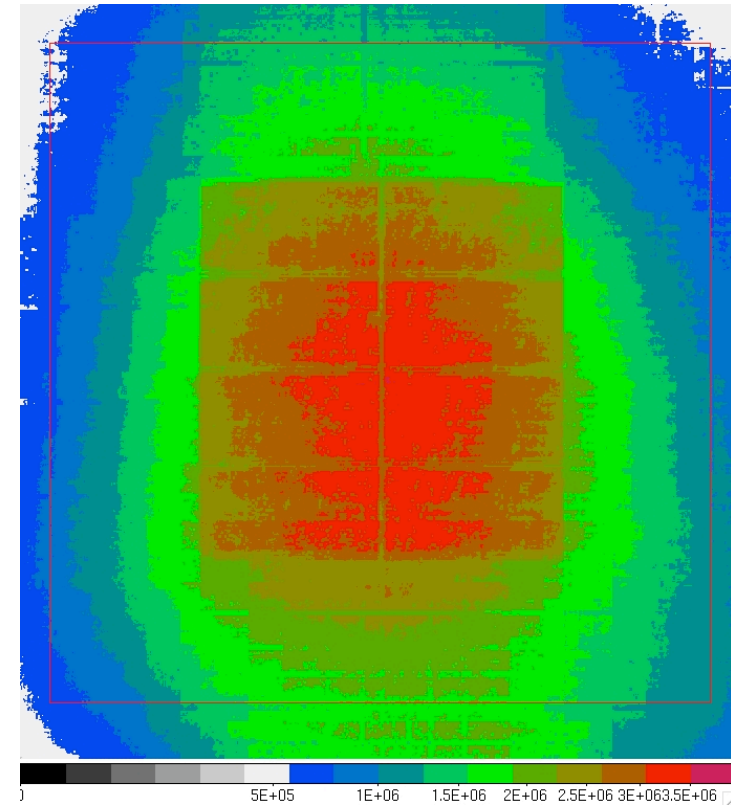


IBIS mask exposure today



Effective exposure (dead-time corrected)

Mask corner	Total (ks)
+y,+z	530
-y,+z	550
-y,-z	710
+y,-z	1090



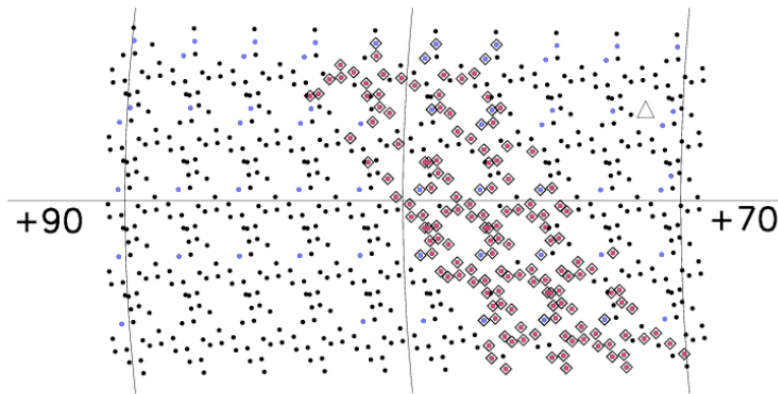
Top corners less exposed



Key Project on the Cygnus region

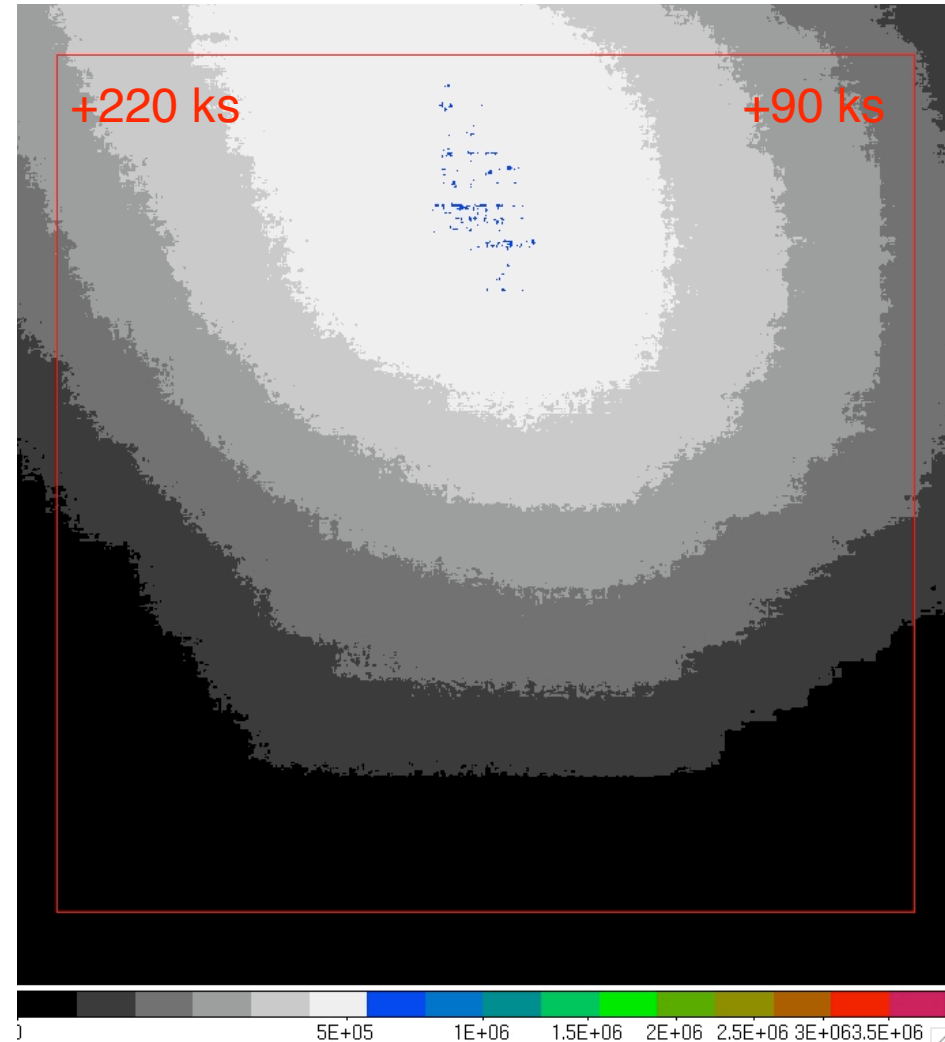


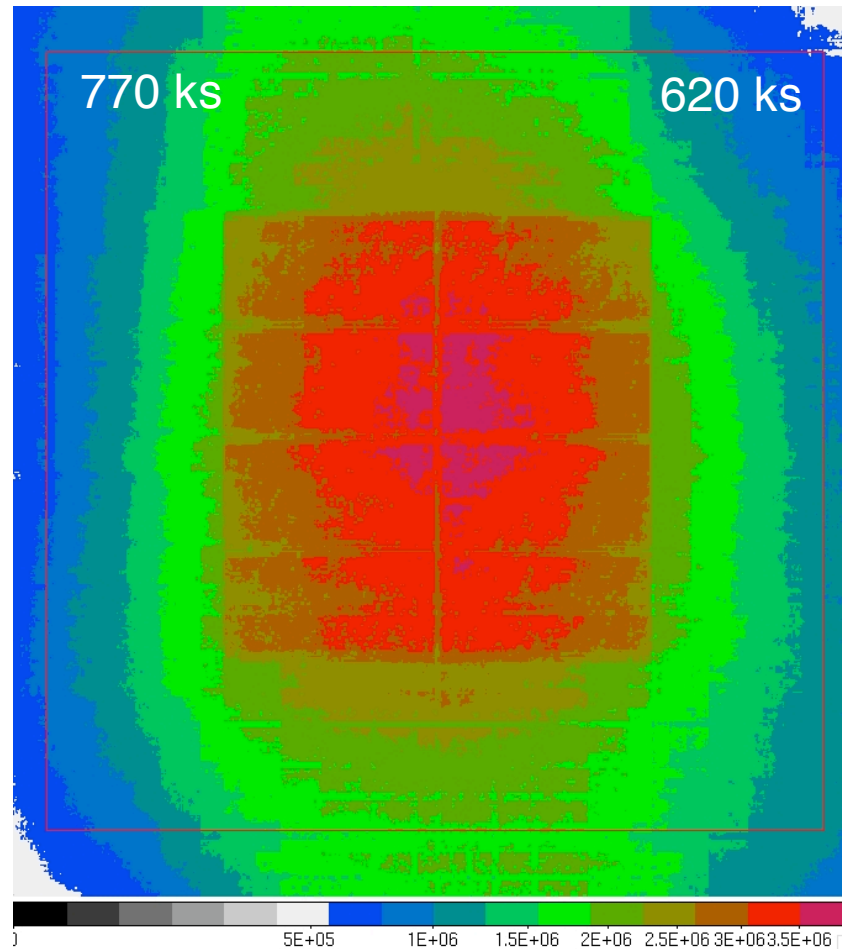
Nucleosynthesis and
electron positron annihilation
(KP 720026, PI: P. Martin)



Raster pattern : 207 useful pointings

To be completed on
October/November 2010





Mask « radiography » toward completion



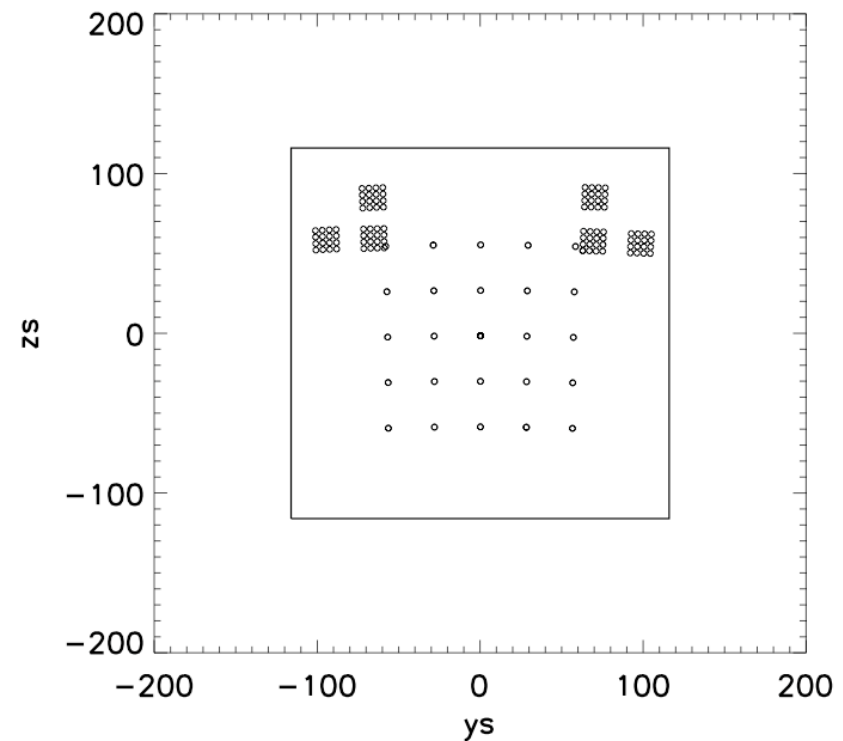
Calibration perspectives



More observations needed on the less exposed mask corners

- Crab extended 5 x 5 (2.33°)
- Dedicated pointings
 - 70 ks/rev. per corner
- New TAC-accepted programs
 - more than one source in the FoV
 - pointing constraints

Pointing pattern revs. 902-903





Implementation



- Straightforward in OSA
 - excluding measured regions
- Beyond OSA
 - finer mask sampling
 - off-axis and azimuth dependence (e.g. mask thickness, screws' projection, borders)
 - energy-dependent opacity: more than one mask



Conclusions



- Mask « radiography » ~70% completed
- More observations needed on the less exposed mask corners

Left-over slides

