NuSTAR simulation: Estimation of ghost rays from the COMA cluster center

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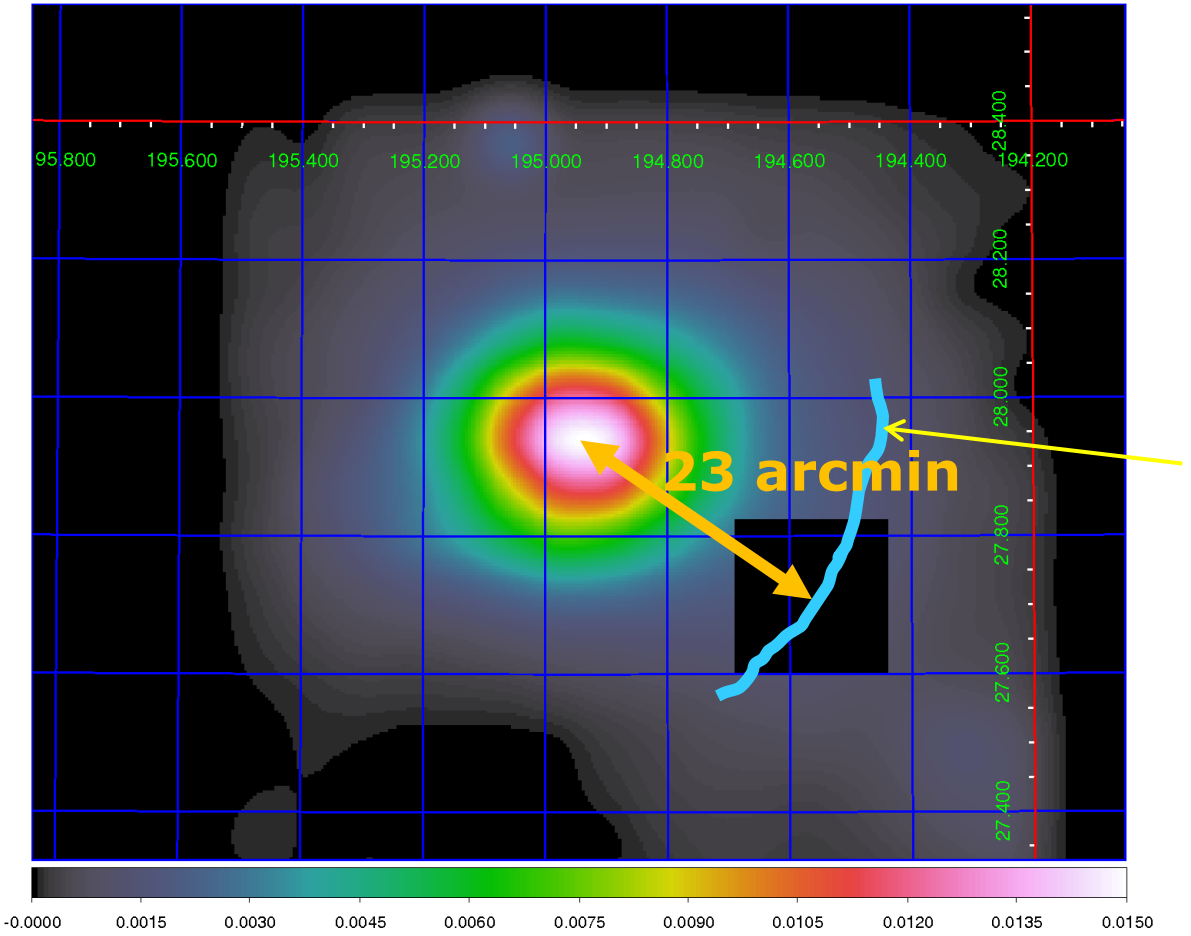
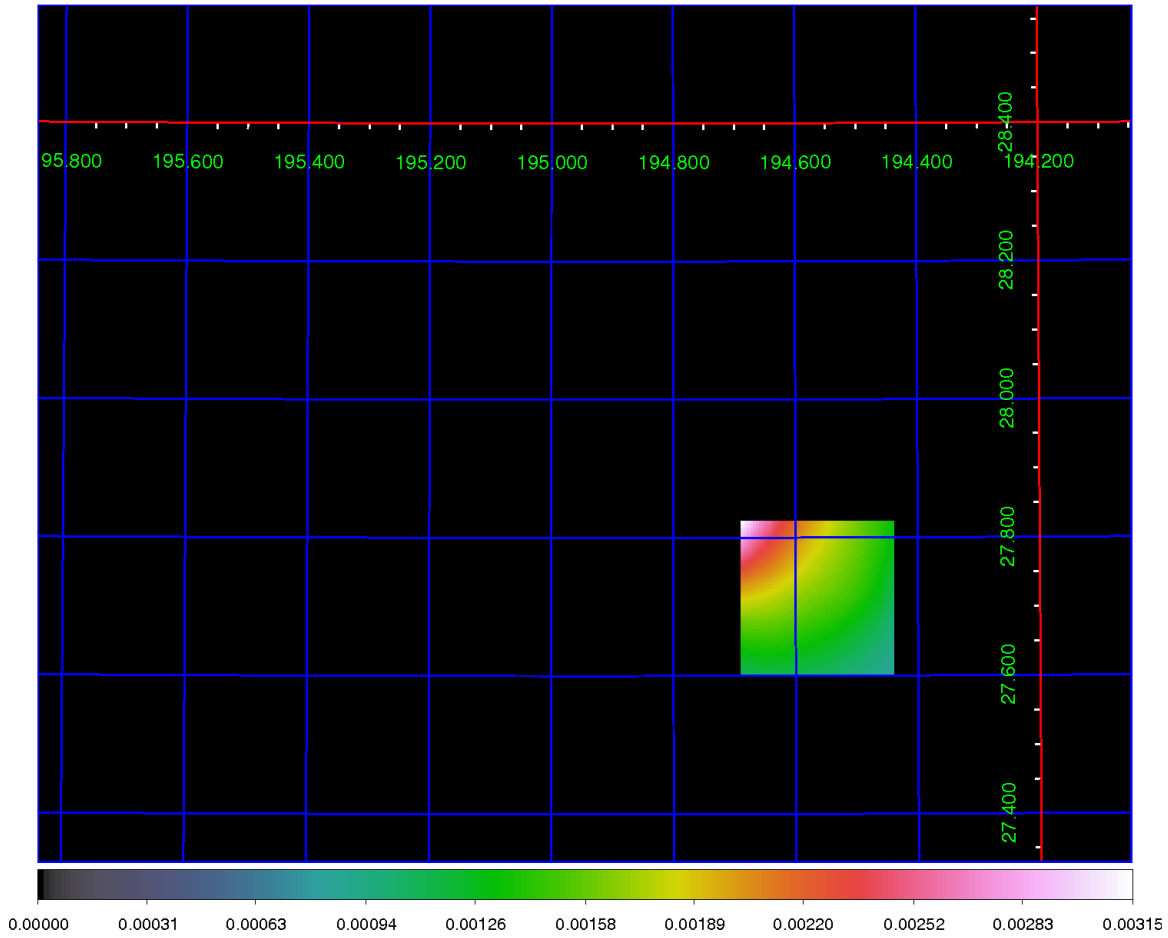
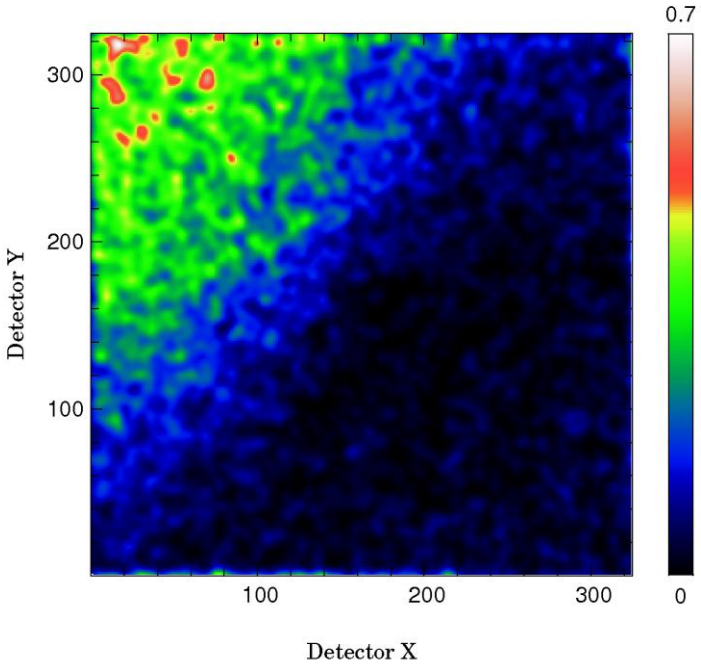
Alternative to nusim

- MT_RAYOR

The Coma cluster from an XMM mosaic image (smoothed)




95.800
195.600
195.400
195.200
195.000
194.800
194.600
194.400
194.200
28.400
28.200
28.000
27.800
27.600
27.400
0.00000
0.00031
0.00063
0.00094
0.00126
0.00158
0.00189
0.00220
0.00252
0.00283
0.00315



A simulation of the 'empty' box in the previous slide.

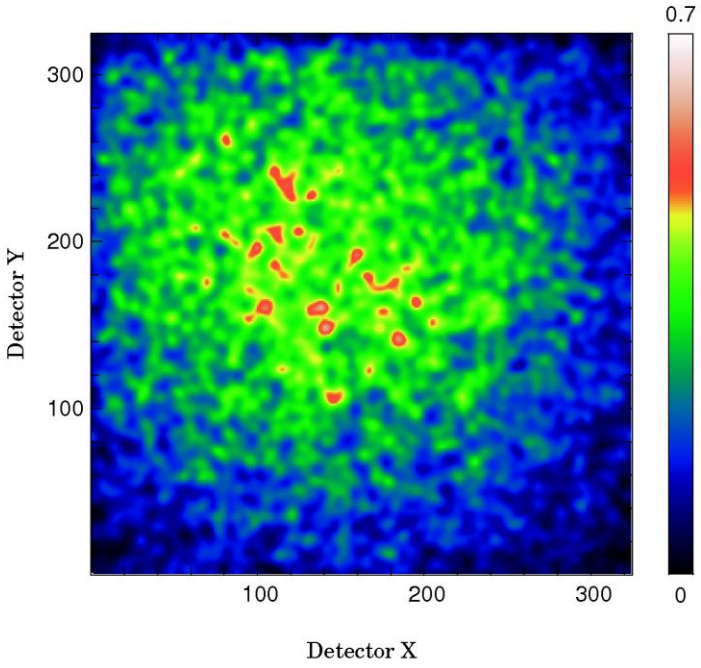
The number of counts (3 – 80 keV) is 12400.

No background has been included.

Thermal bremsstrahlung with kT = 8.4 keV

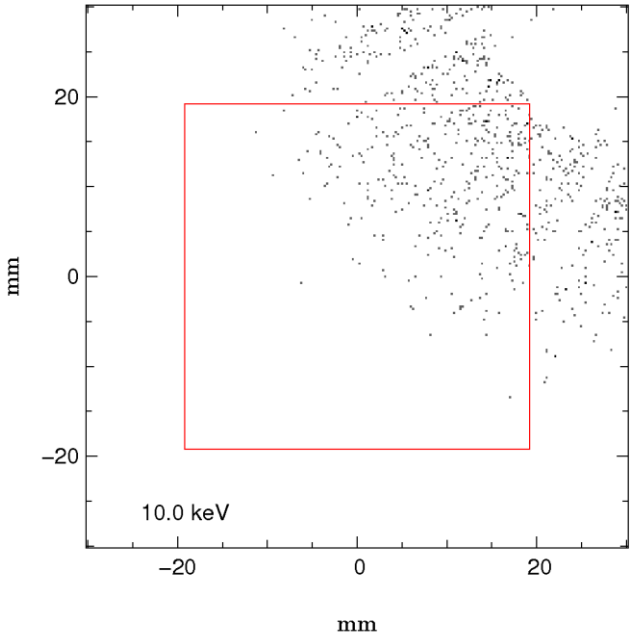
The observation time was taken to be 8 10^4 s.

Below a simulation of the box itself. The two plots have the same colorscale.



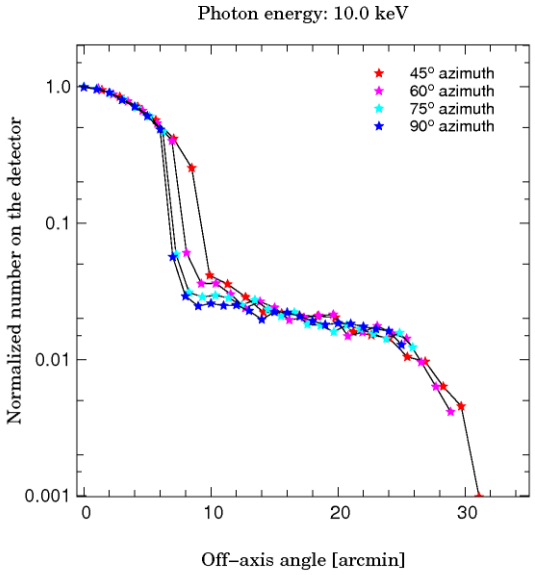
Both images have been smoothed with a gaussian of sigma 3 pixels.

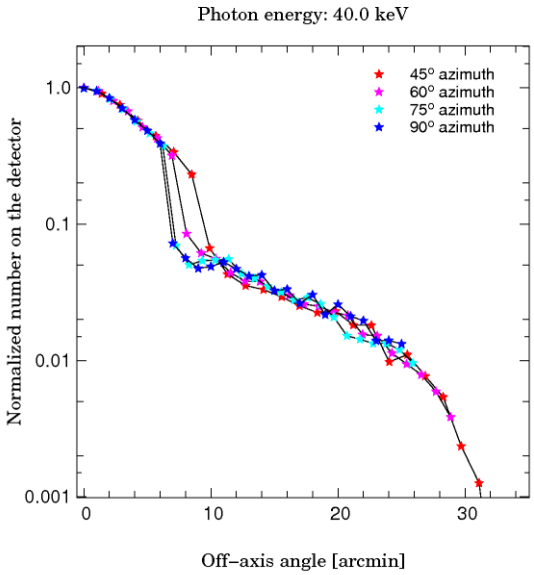
The number of counts (3 – 80 keV) is 24900.

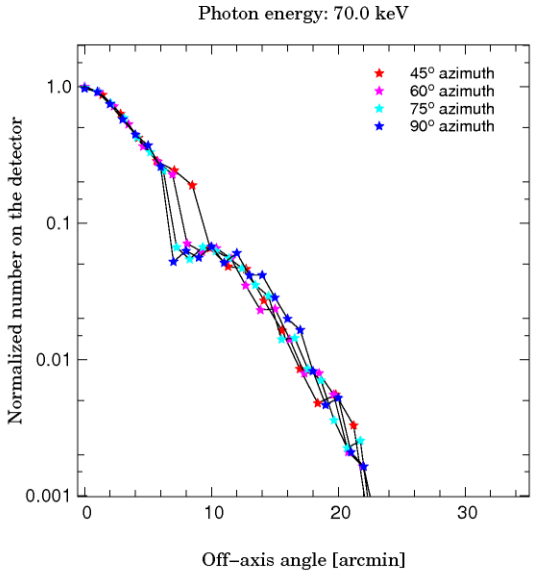


To the left: An example of a point source 23′ offaxis with an azimuth of 45° . The figure shows the photons on the focal plane and the red square indicates the NuSTAR detector (38 .4 mm on the side).

The plots below show the number of counts (corrected for the coefficient of reflection) that fall on the detector from a point source of an arbitrary but constant strength as a function of off-axis angle.







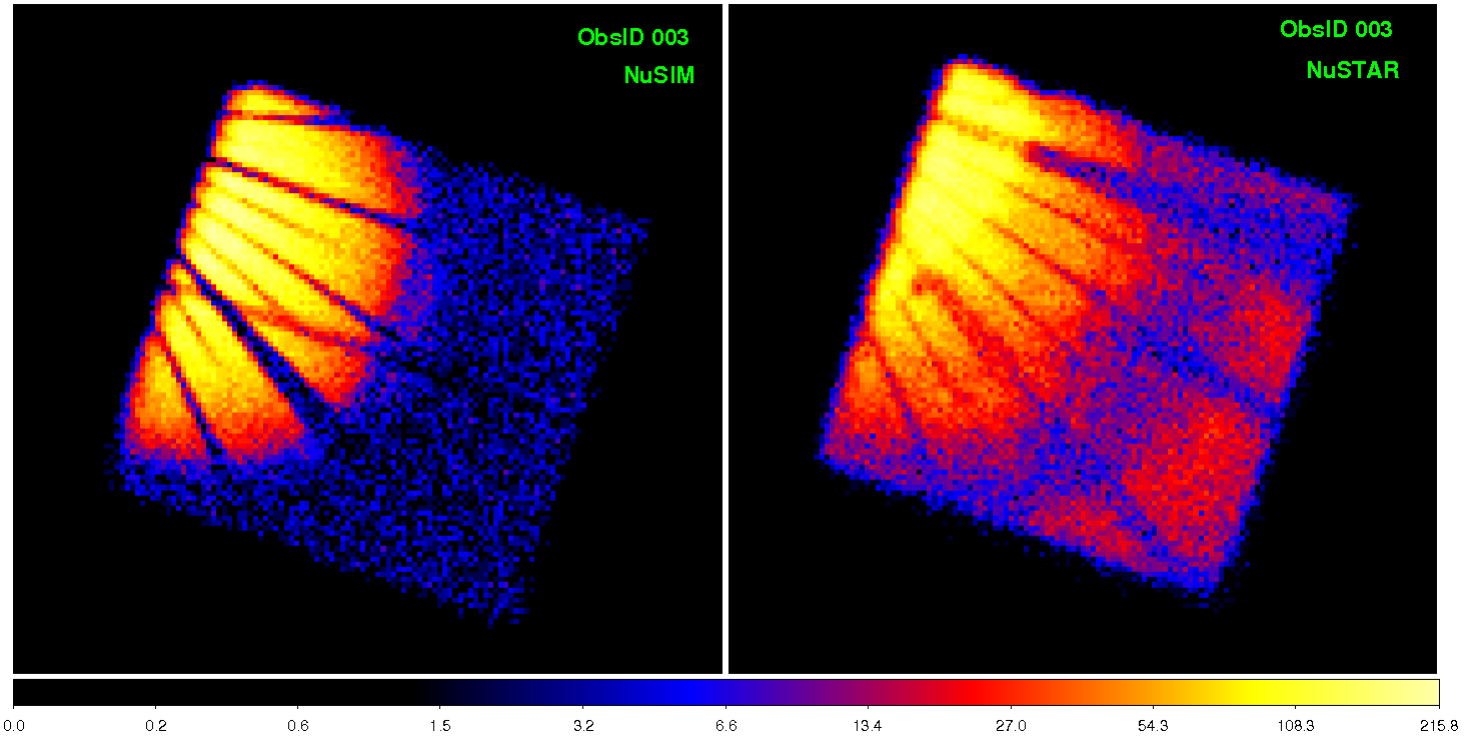
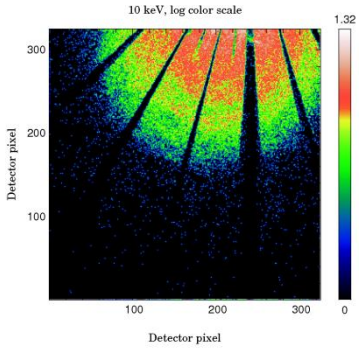
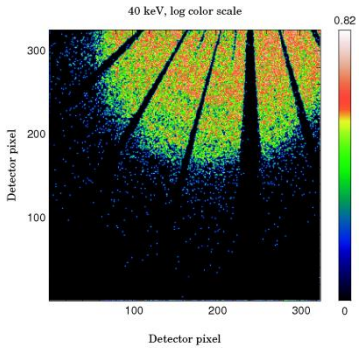
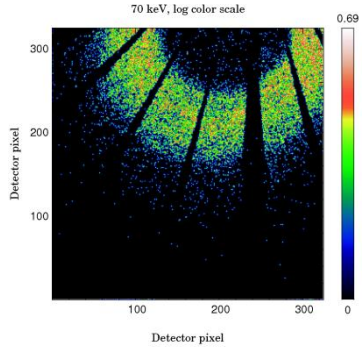


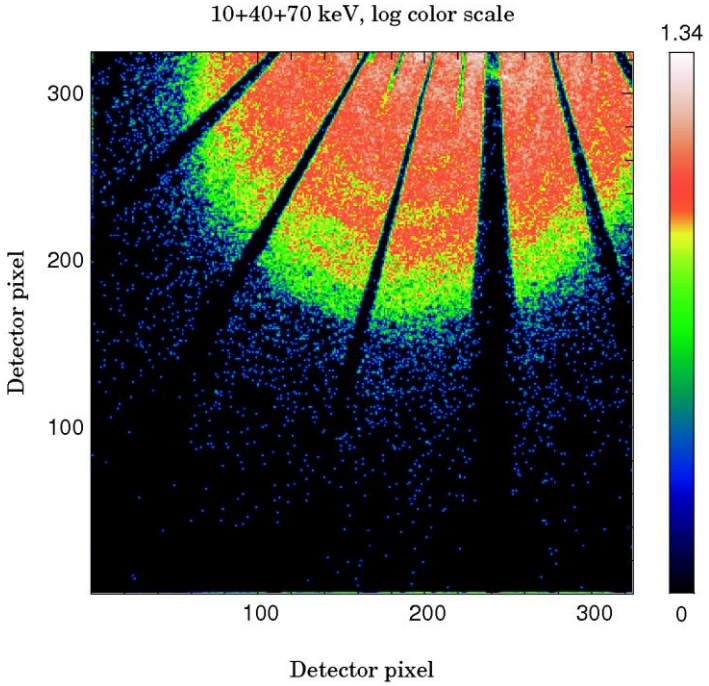
Figure from presentation by John Tomsick, March 7, 2013, (simulation 'nusim' by Andreas Zoglauer).

4U1630-47 is at an off-axis angle of 12.7'.





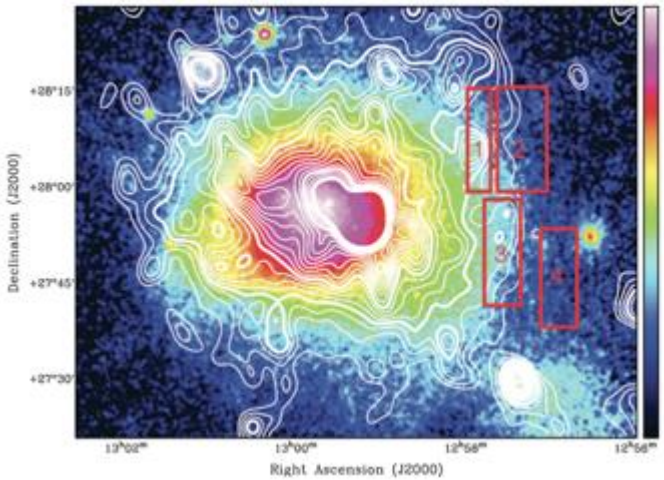




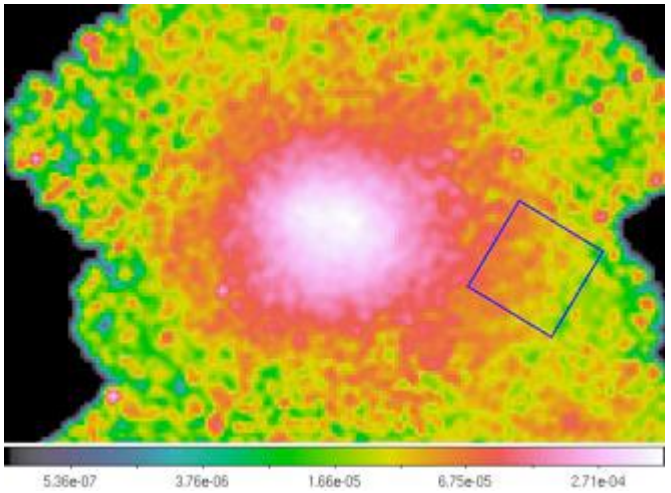
A pointsource situated at an off-axis angle of 12.7', when the optical axis is centered on the detector. The chip-gap is ignored as well as the background.

Tool: MT_RAYOR.

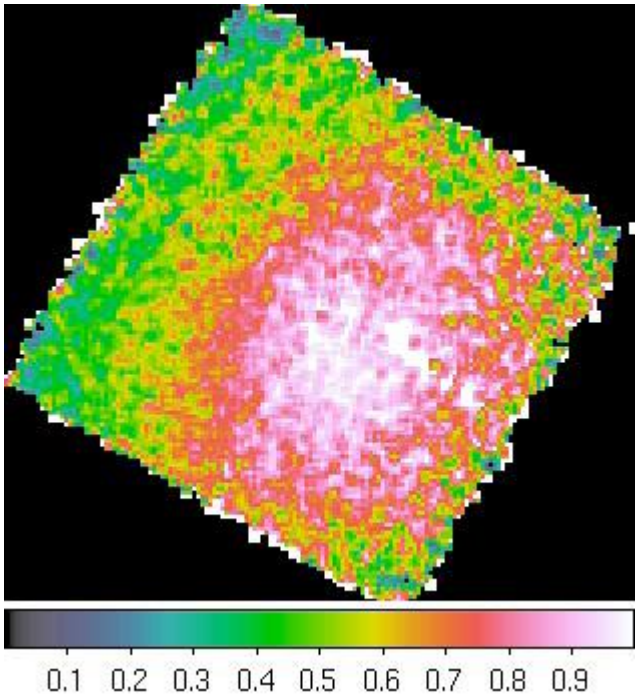
Nusim results by DW from july 2012



Brown and Rudnik 2010



Suggested pointing



Fraction of double bounce photons to all photons

That's it for now ...