BLC Analysis using the ISDC System

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MPE Dec 2001

This presentation can be obtained from
www.gamma.mpe−garching.mpg.de/~aws/integral.html

Data and s/w at ISDC
Remote logon from MPE, works fine

Analysis of ^{60}Co, ^{137}Cs, ^{241}Am @125m

useful for getting experience with ISDC data,
following SPI BLC pipeline development

spiskymax imaging
at various angles
multiple detectors
dithering
IRF performance

New IRF with central absorber

PROBLEMS

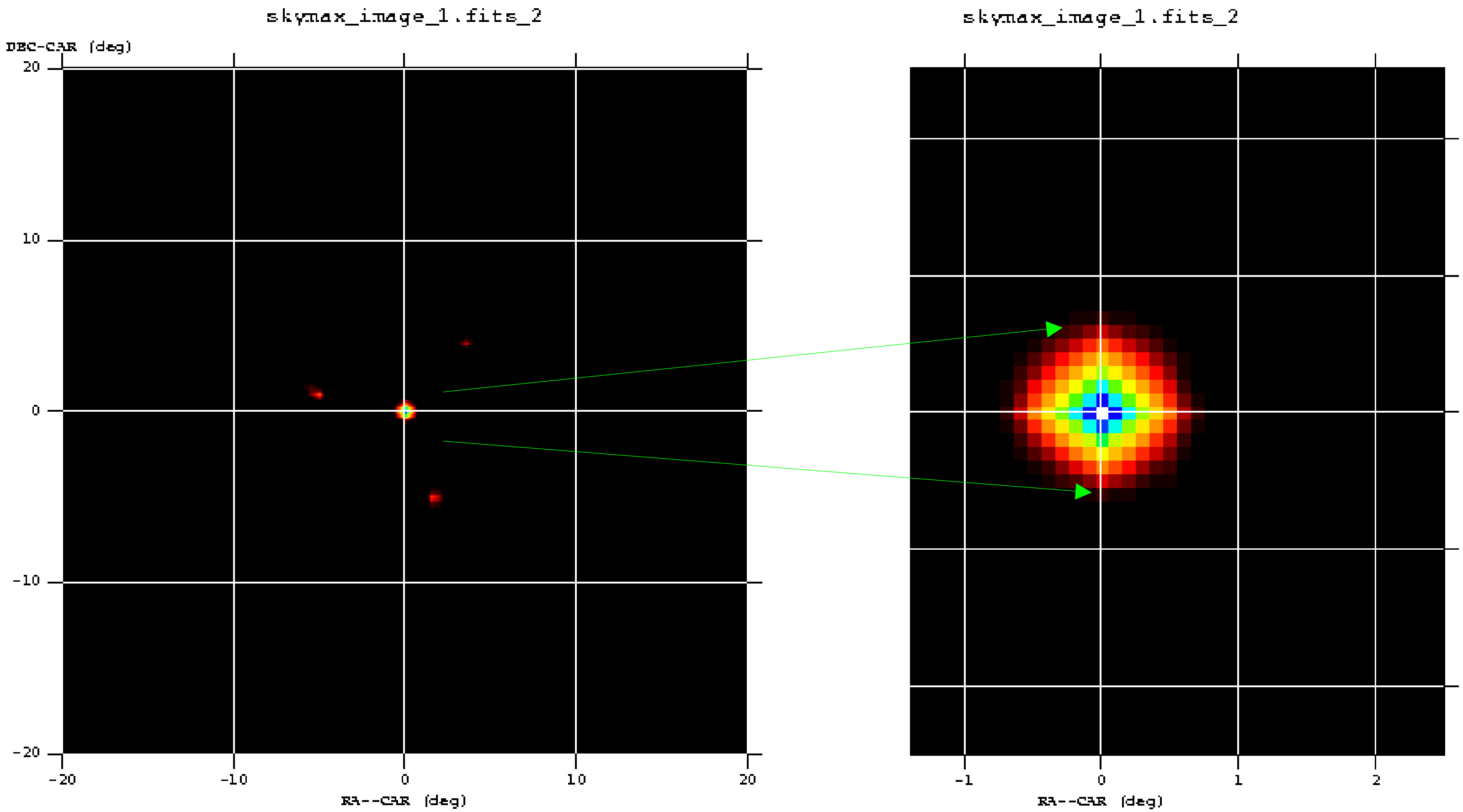
Most BLC data available but still a few gaps

No monitor calibration available for ^{137}Cs

Singles BLC run 31

^{60}Co 1173 keV 125m on−axis

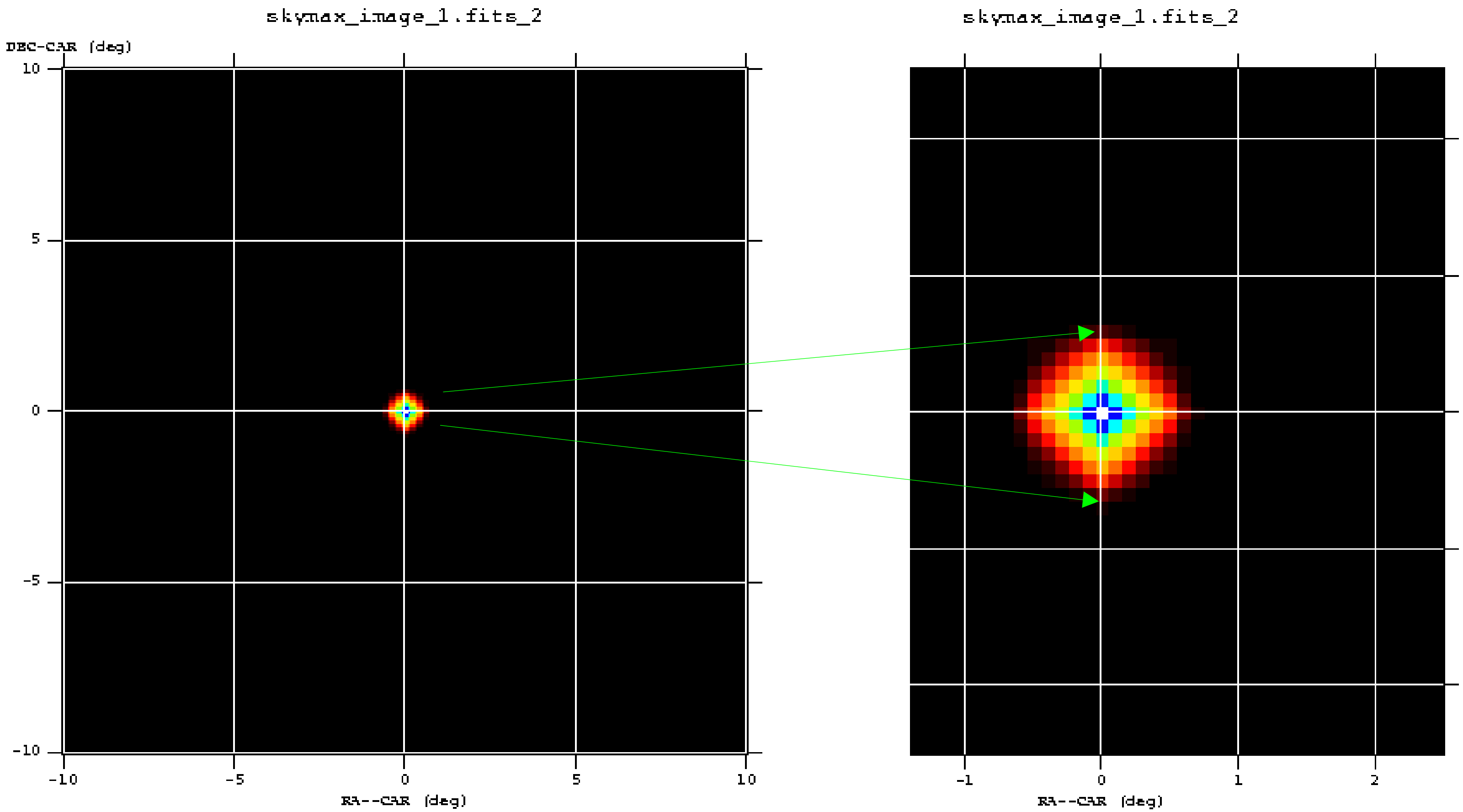
spiskymax IRF from GSFC



Singles+PSD+doubles+triples BLC run 31

^{60}Co 1173 keV 125m on−axis

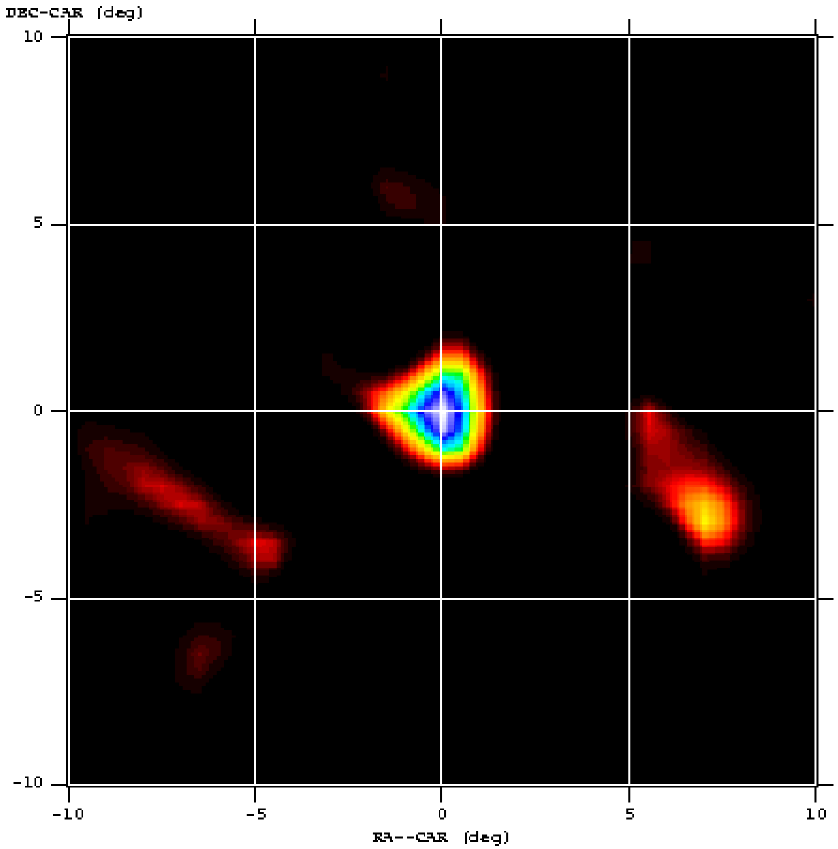
spiskymax IRF from GSFC



Singles+PSD+doubles+triples   BLC run 37

^{60}Co 125m   2^{o}

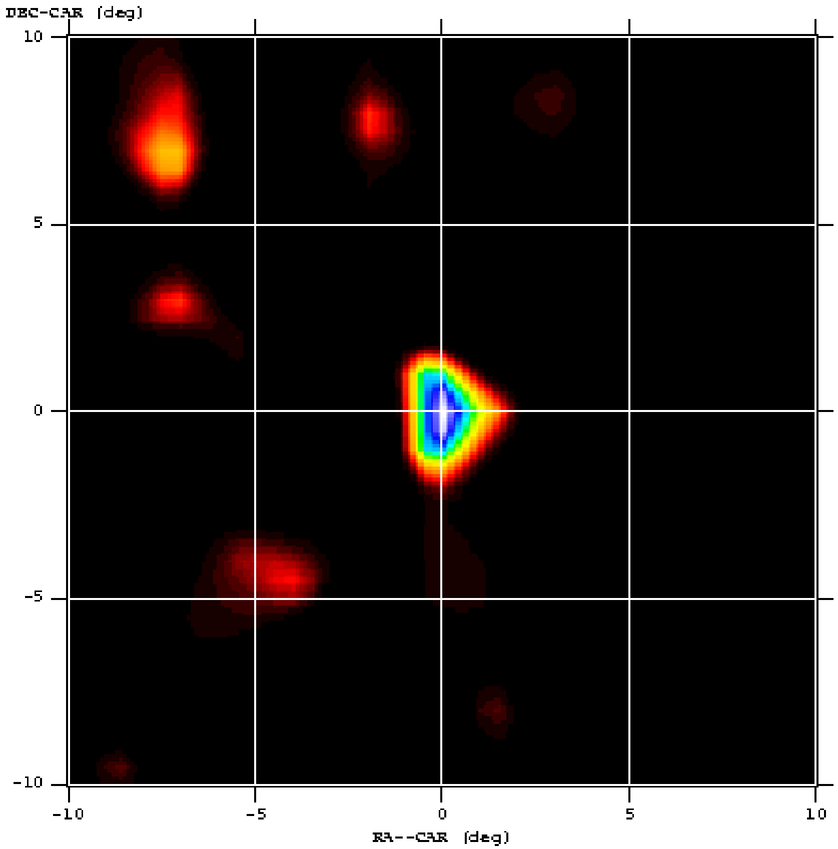
spiskymax   IRF from GSFC



Singles+PSD+doubles+triples   BLC run 47

^{60}Co 125m   –2°

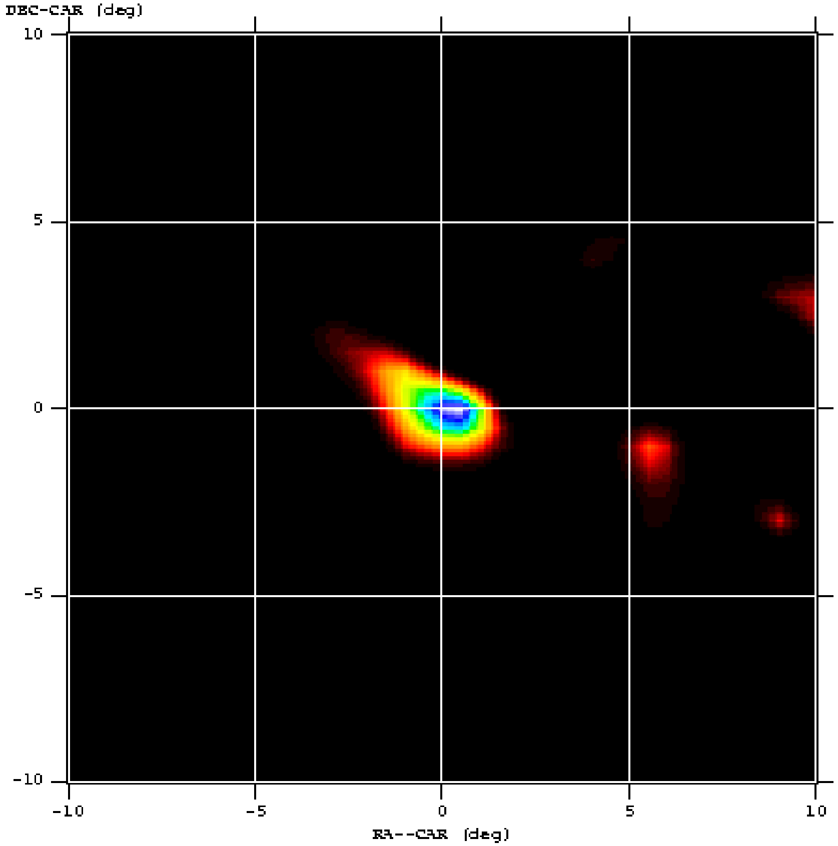
spiskymax   IRF from GSFC



Singles+PSD+doubles+triples   BLC run 38

^{60}Co 125m   4°

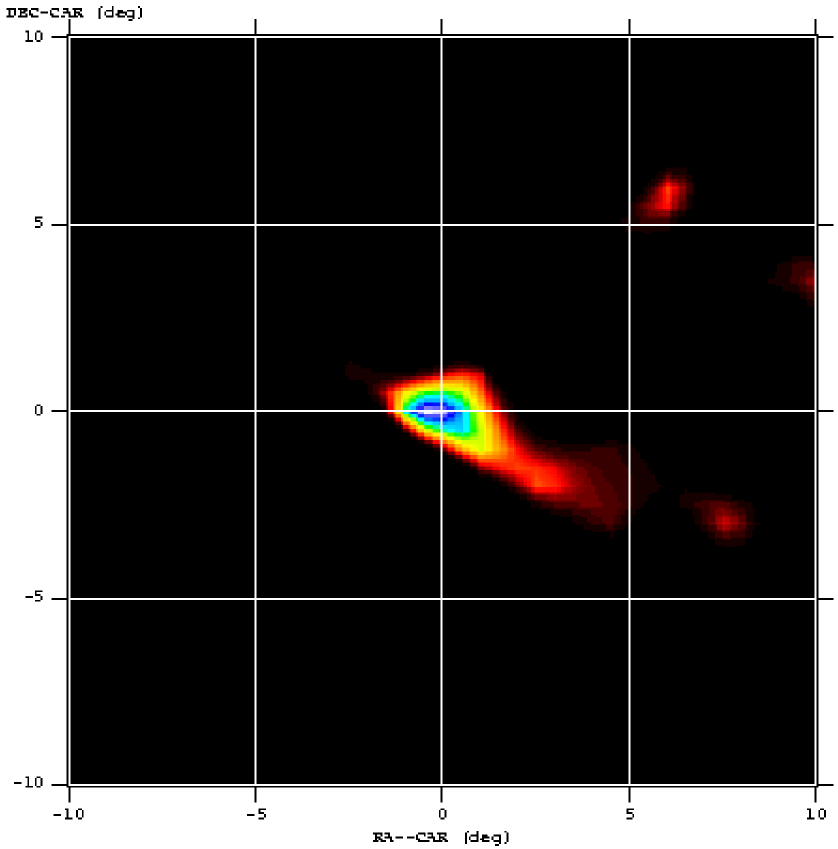
IRF from GSFC



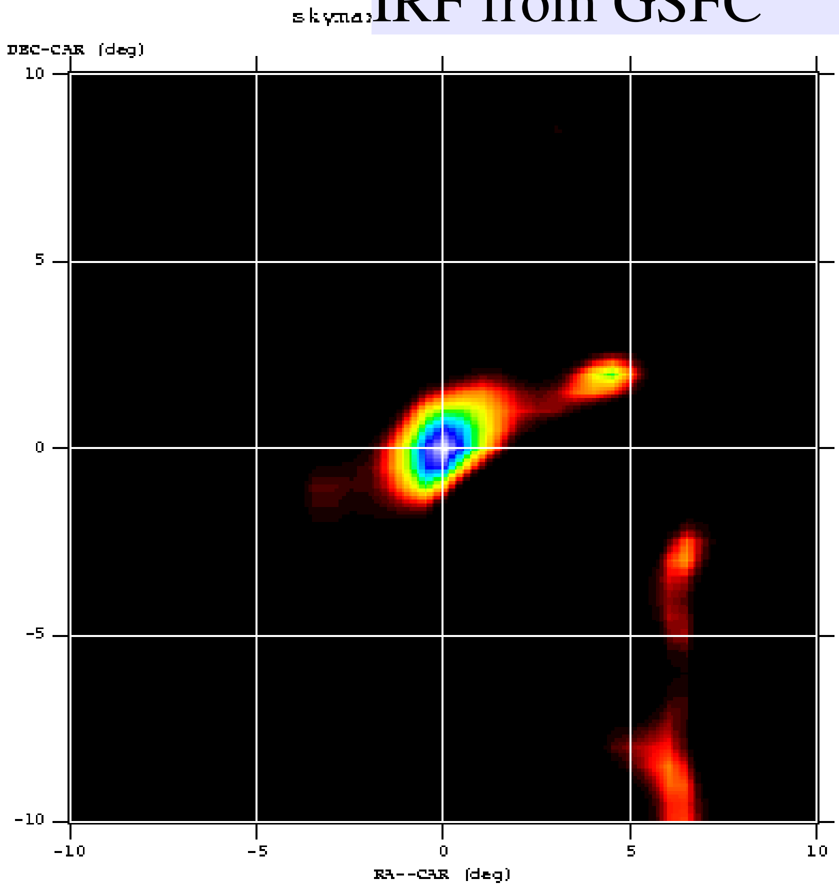
Singles+PSD+doubles+triples   BLC run 39

^{60}Co 125m   6^{o}

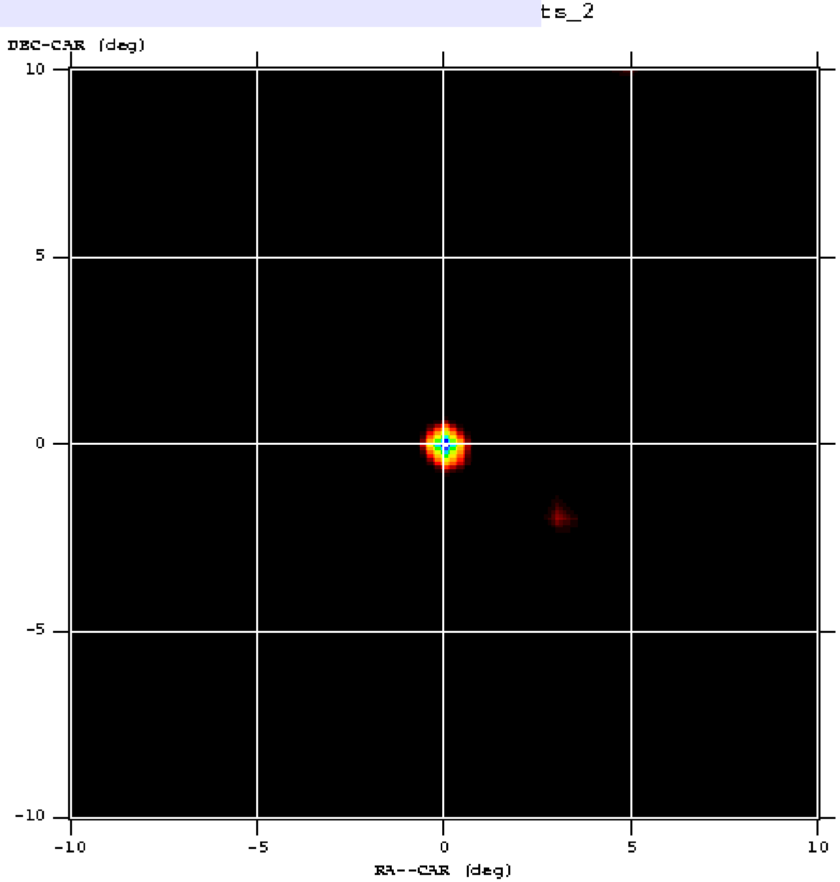
IRF from GSFC



Singles+PSD+doubles+triples BLC run 40, 41
^{60}Co 125m source at 8^{o} , 10^{o}
IRF from GSFC

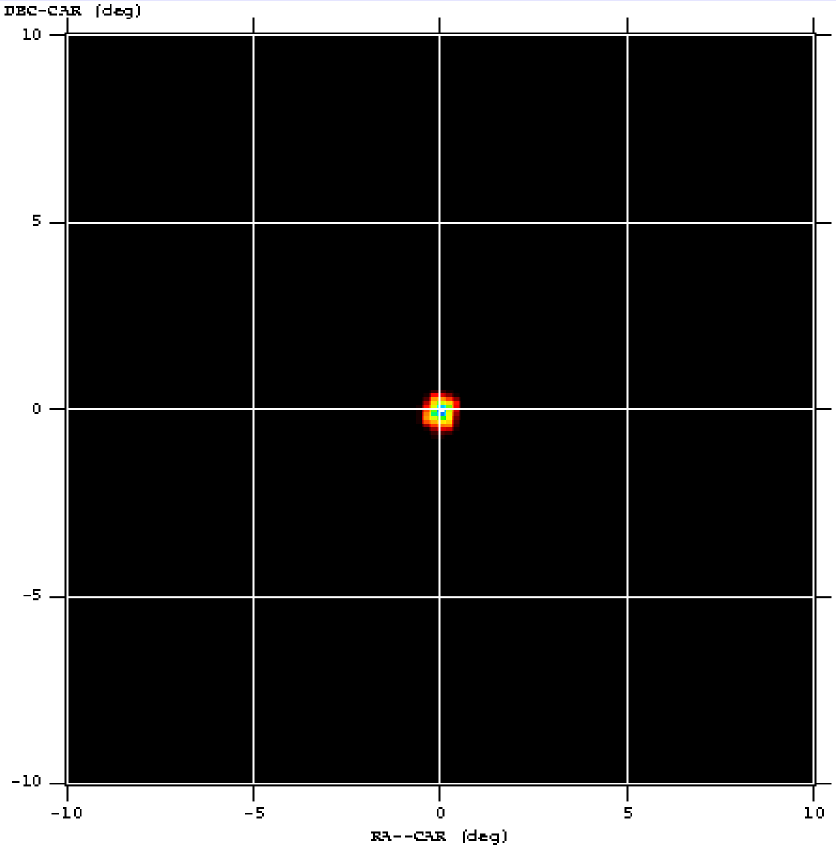


8^{o}



10^{o}

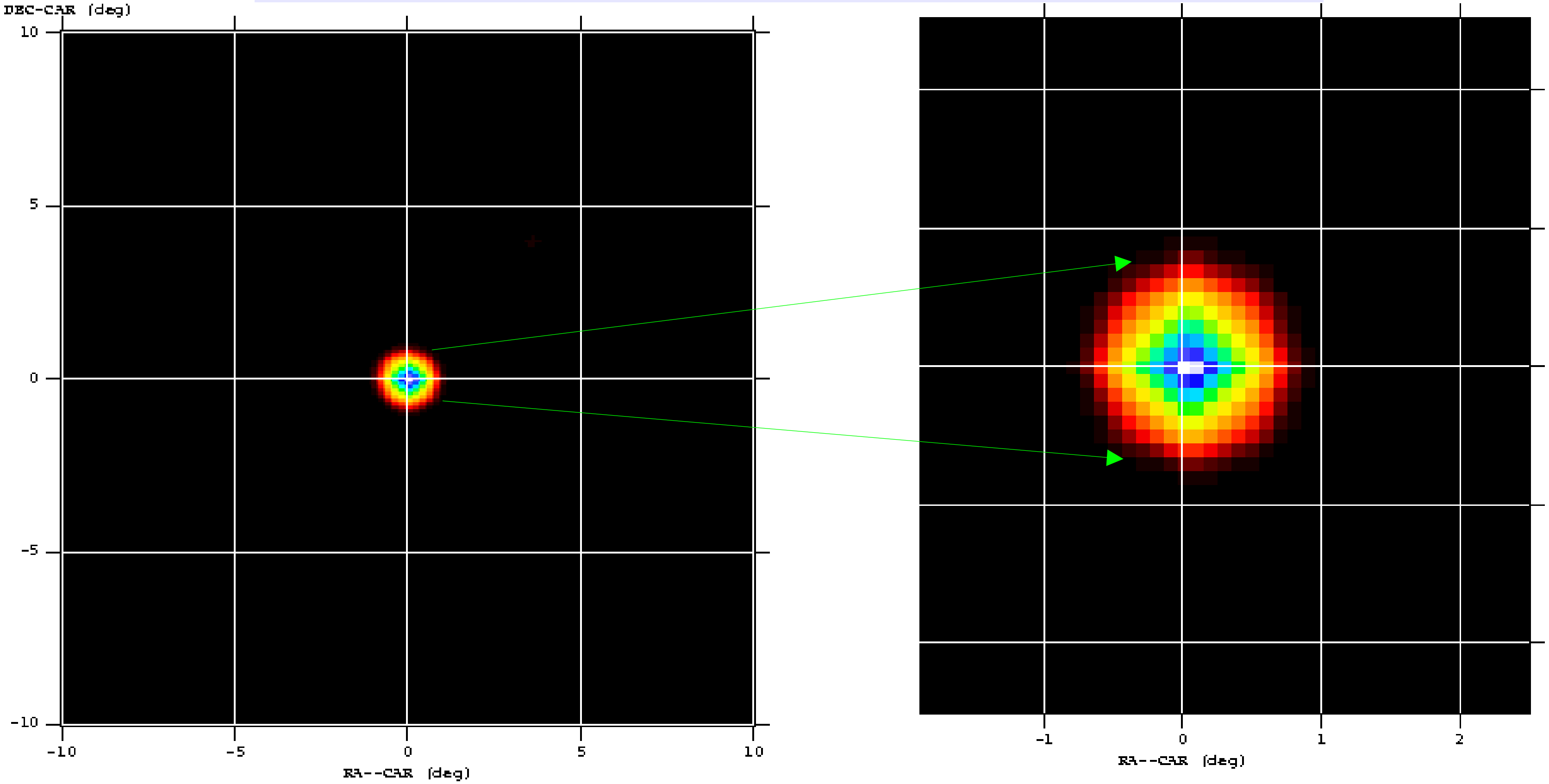
Singles+PSD + doubles +triples
BLC run 214
^{60}Co 125m   1 pointing on−axis 30° *rotation about X*
spiskymax   IRF from GSFC



Multidetectors: Singles+PSD + doubles +triples

^{60}Co 125m   11 pointings

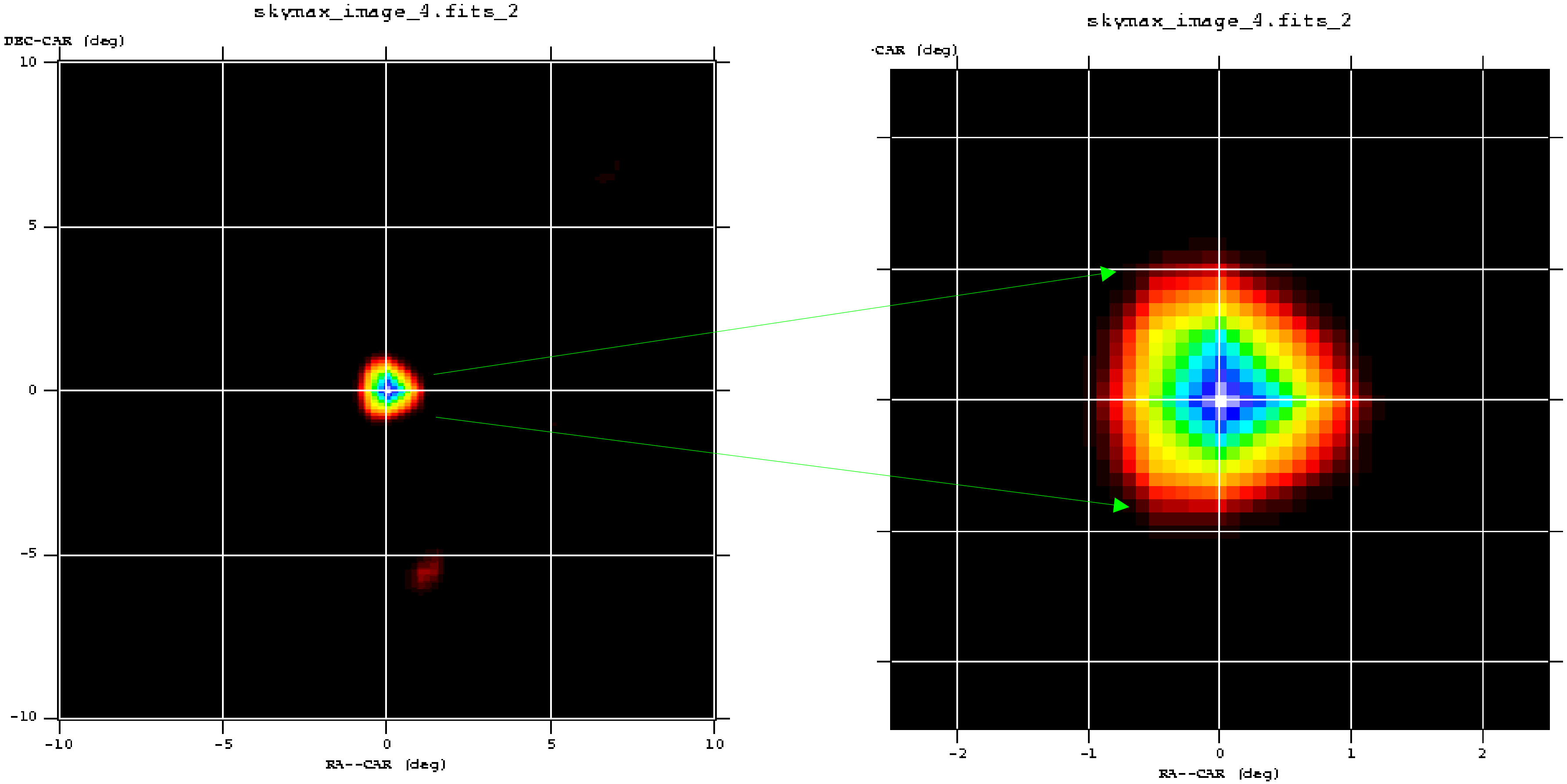
spiskymax   IRF from GSFC



Multidetectors: doubles + triples ONLY

^{60}Co 125m   1 pointing, on–axis, BLC run 31

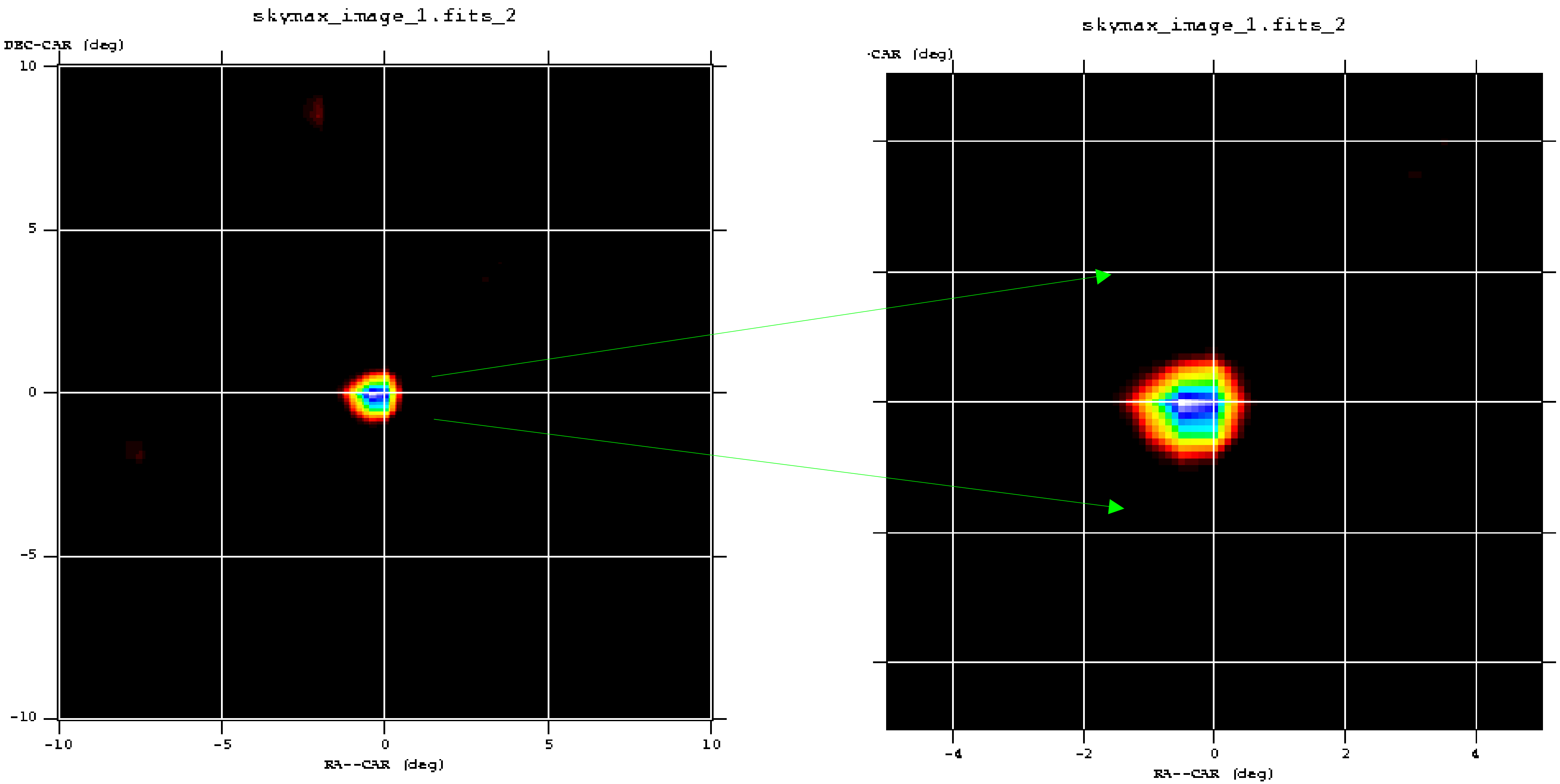
spiskymax   IRF from GSFC



Multidetectors: doubles + triples ONLY

^{60}Co 125m   1 pointing, 2°, BLC run 37

spiskymax   IRF from GSFC

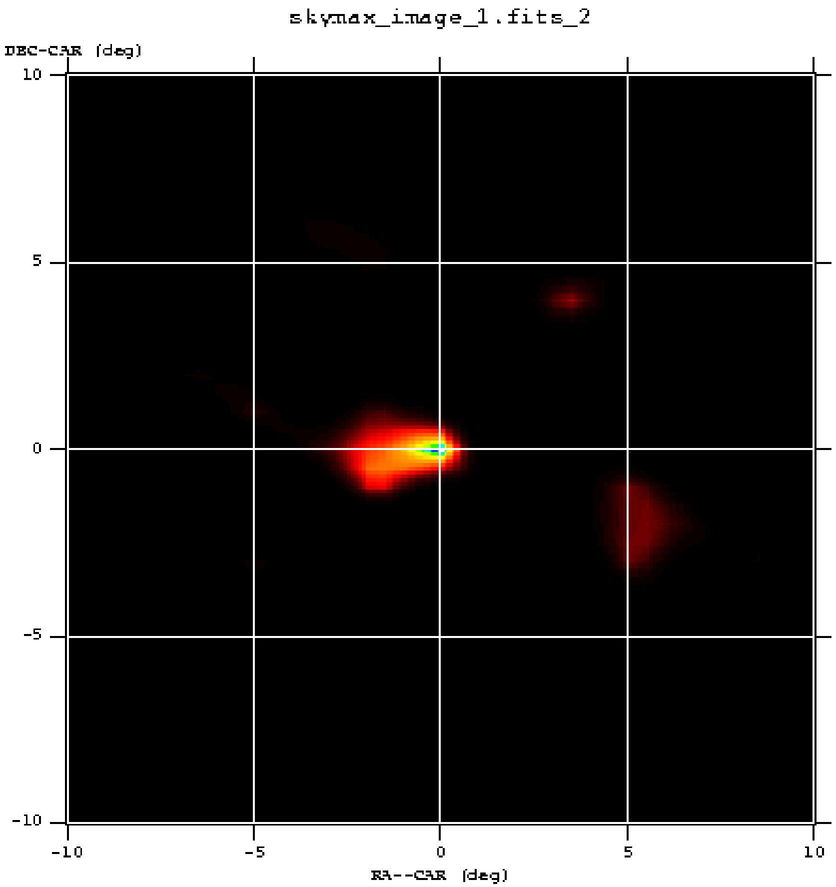


Multidetectors: singles +PSD +doubles + triples

^{60}Co 125m 2 pointings, 2°, BLC run 31+37 *SUMMED*

spiskymax IRF from GSFC

Analysed as single pointing –> 2 sources 2° sep



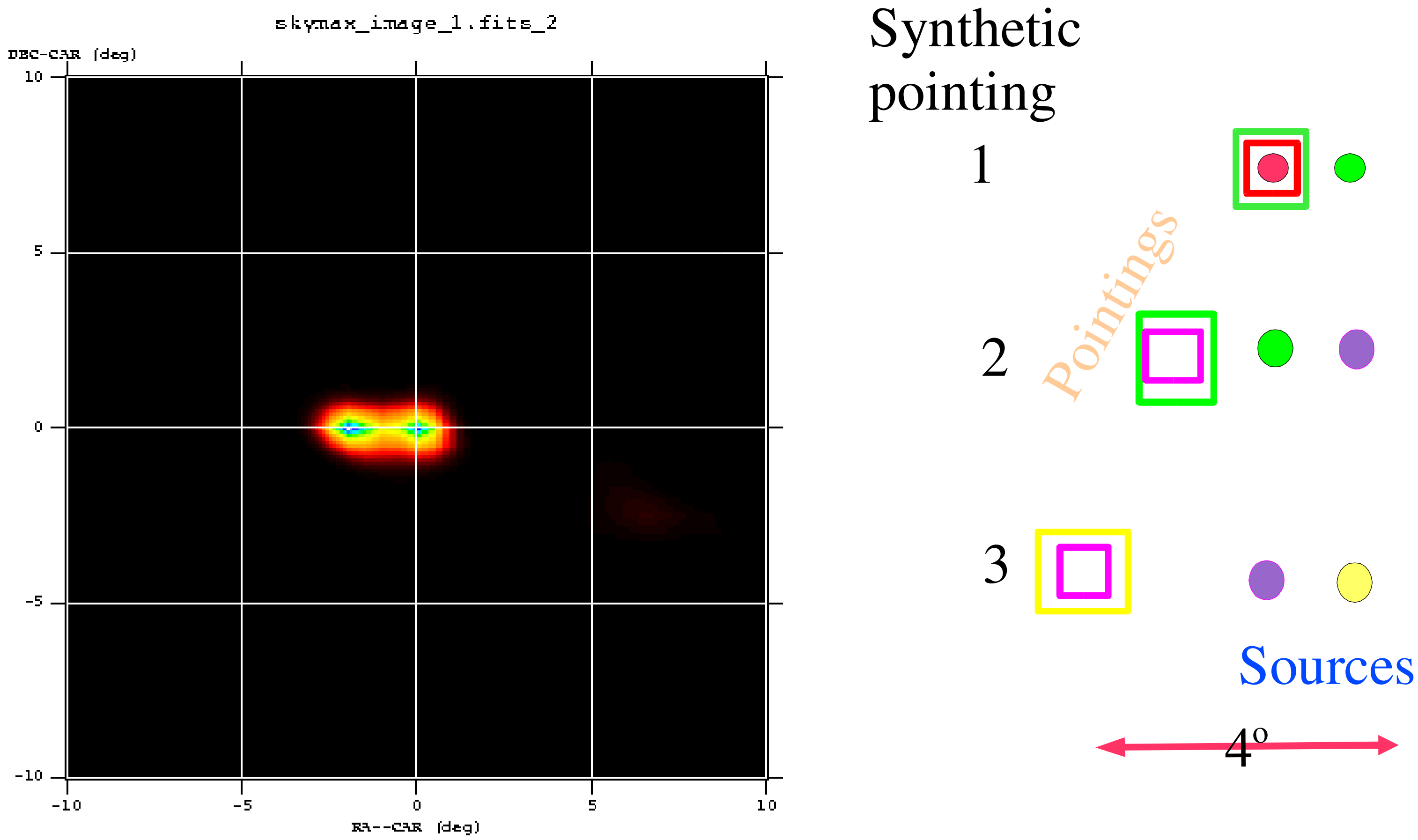
In absence of dithering: poor result

Synthesize dithered observation of 2 sources separated by 2°

^{60}Co 125m singles + PSD +doubles+triples

5 pointings, *spisumhist* to synthesize data

Shows how dithering improves imaging by sampling full mask pattern



Synthesize dithered observation of 2 sources separated by 2°

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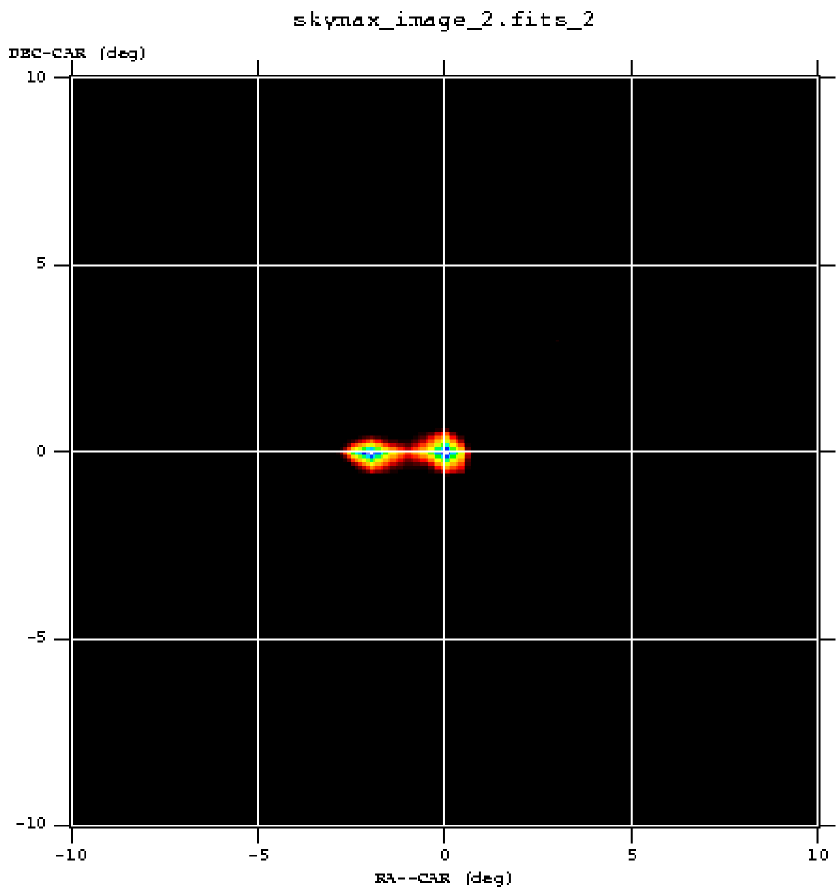
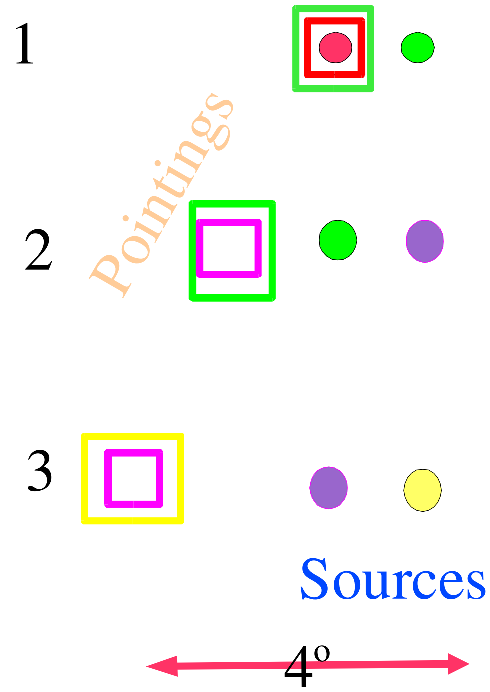


Higher iteration

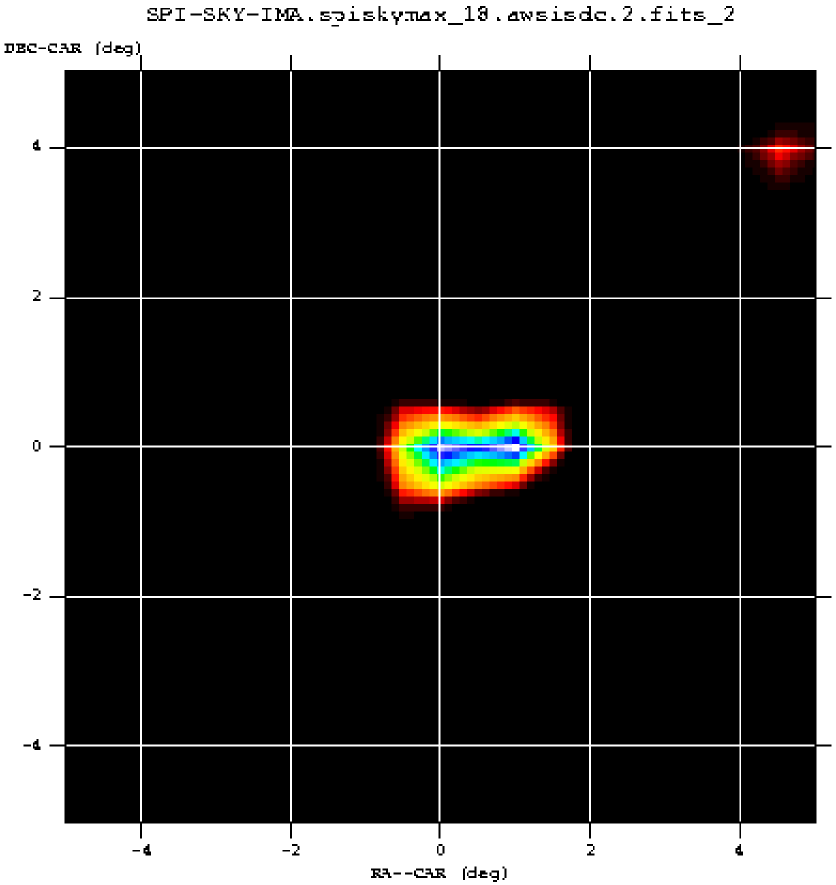
Synthetic pointing

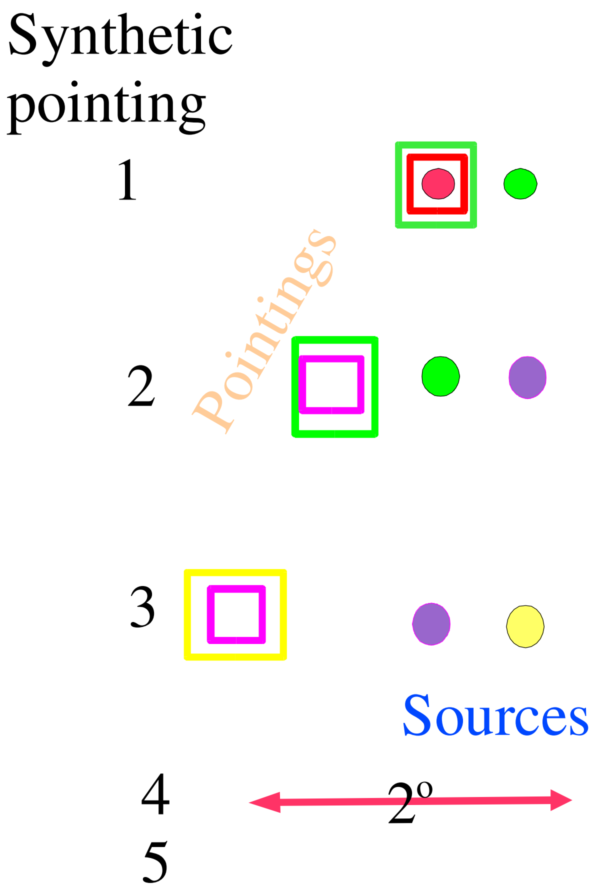


Synthesize dithered observation of 2 sources separated by 1°

^{60}Co 125m singles + PSD +doubles+triples

5 effective pointings, *spisumhist* to synthesize data



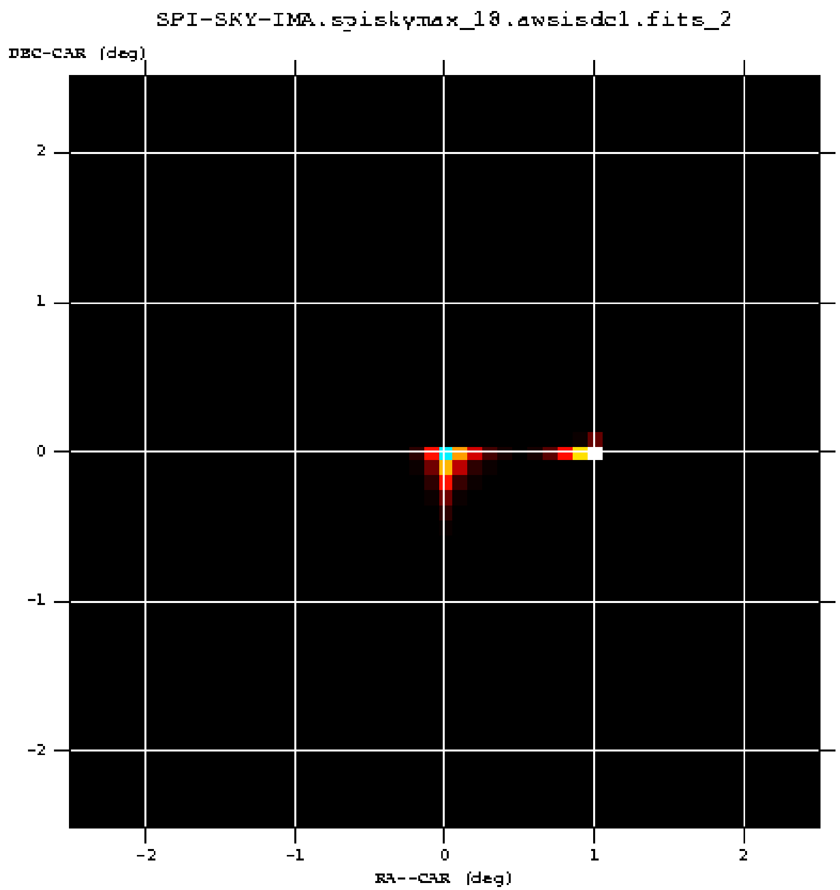


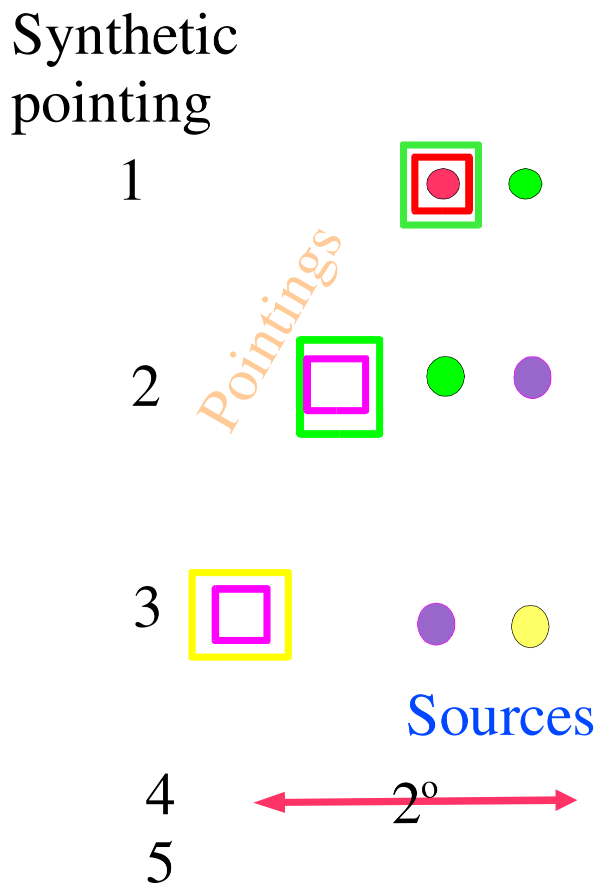
Synthesize dithered observation of 2 sources separated by 1°

^{60}Co 125m singles + PSD +doubles+triples

5 effective pointings, *spisumhist* to synthesize data

Higher iteration



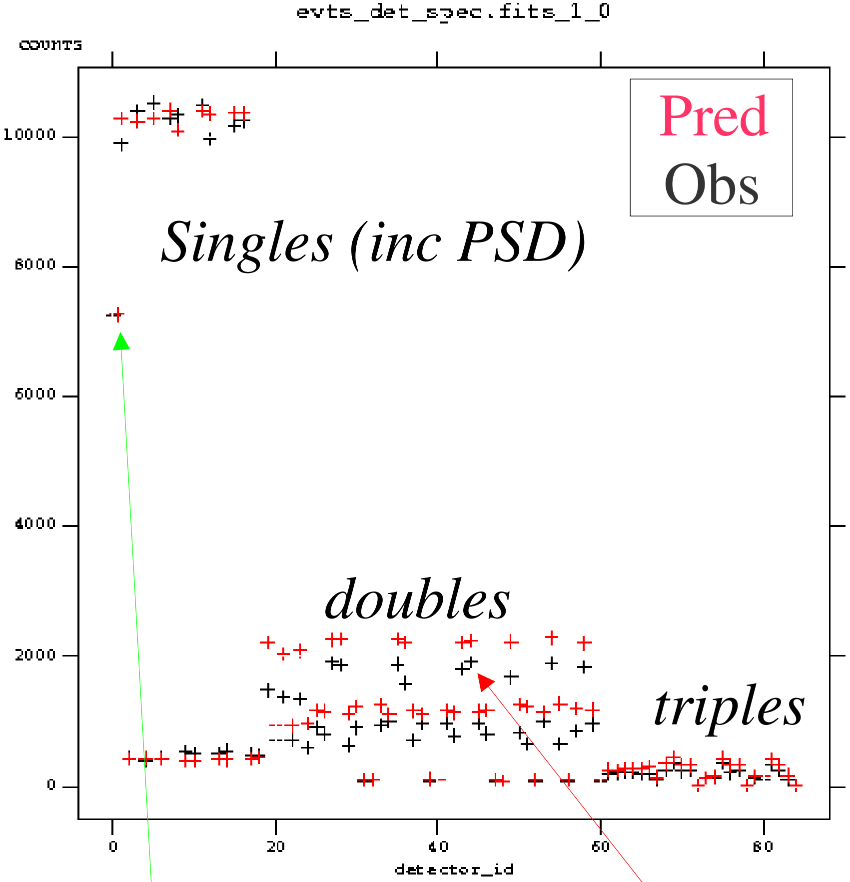


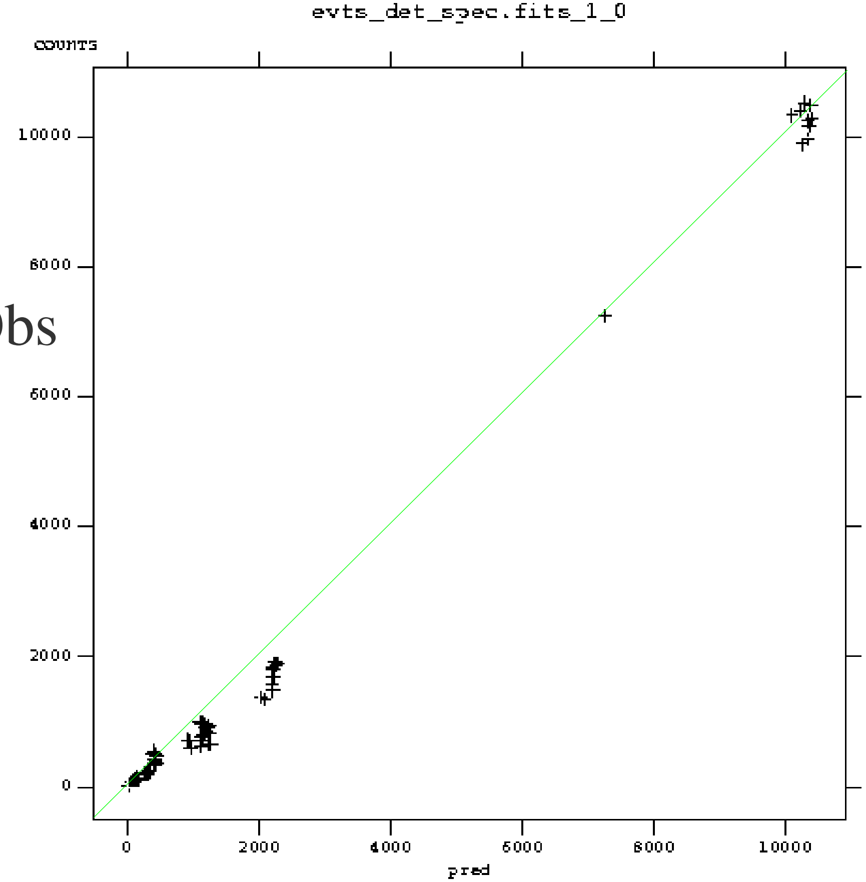
Spihist 2.1.1 and livetime problems: improved in next slide

Comparison of observed and predicted counts

^{60}Co 125m using new GSFC IRFs.

BLC Run 31 on–axis





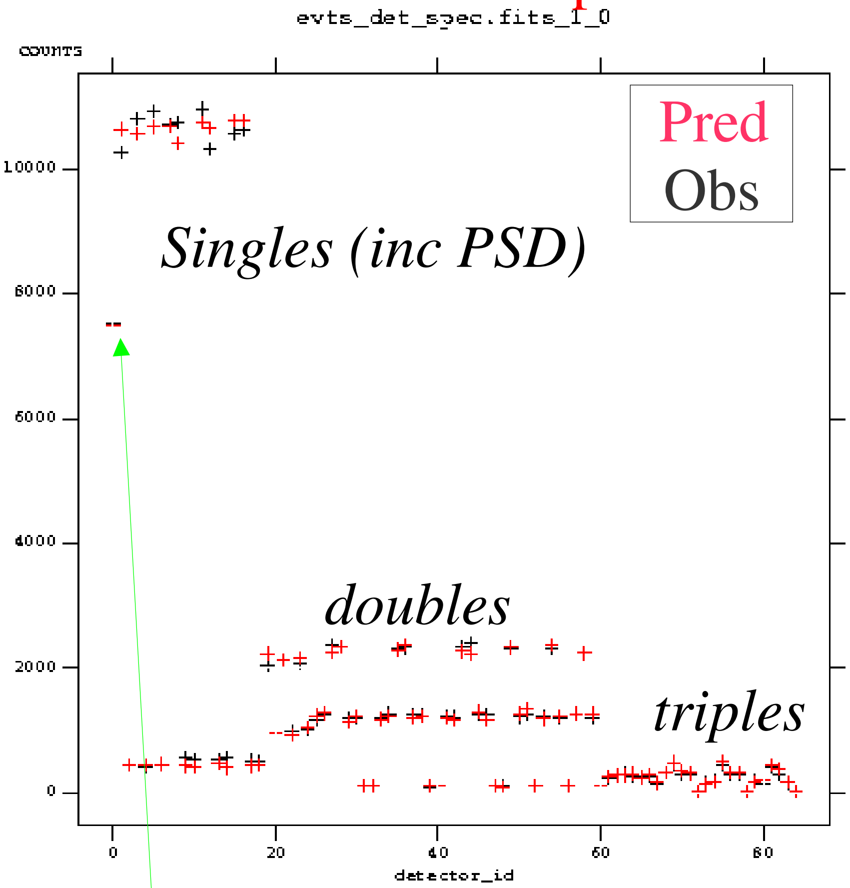
Pred

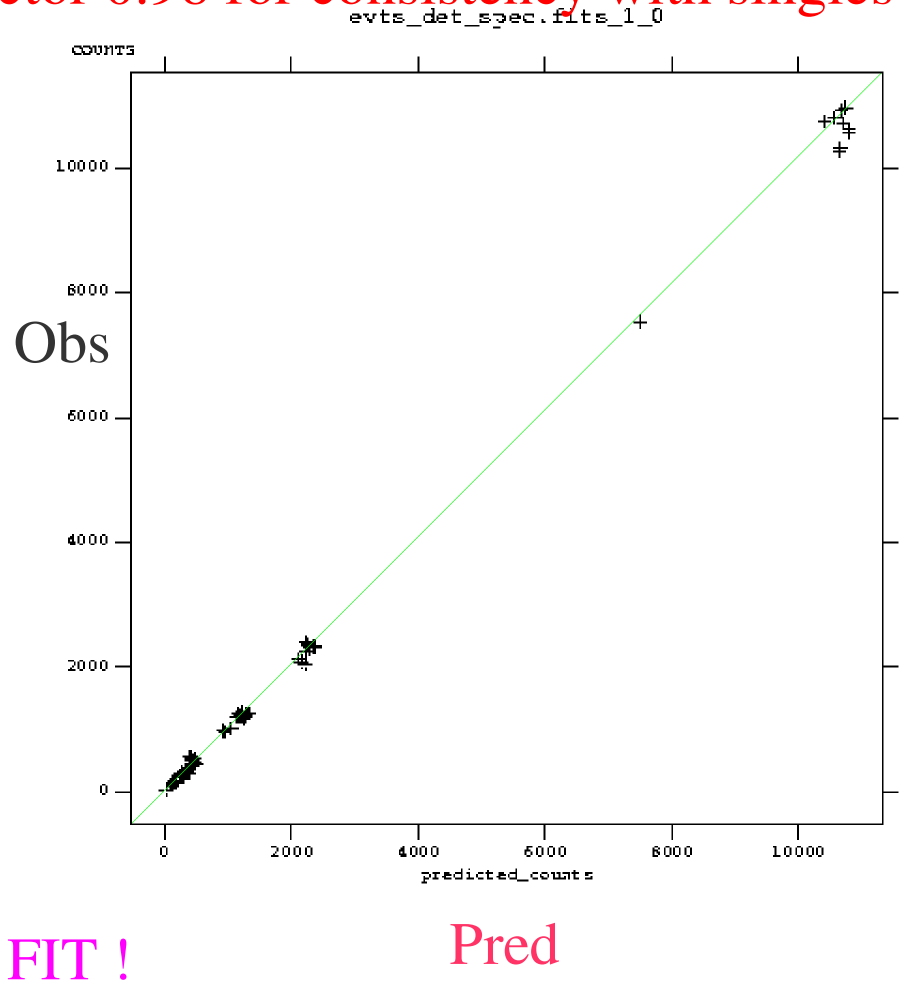
Doubles overpredicted!

Central obscurer well modelled

Comparison of observed and predicted counts
^{60}Co 125m using new GSFC IRFs.

BLC Run 31 on–axis, spihist 2.1.2
multiples livetime factor 0.98 for consistency with singles



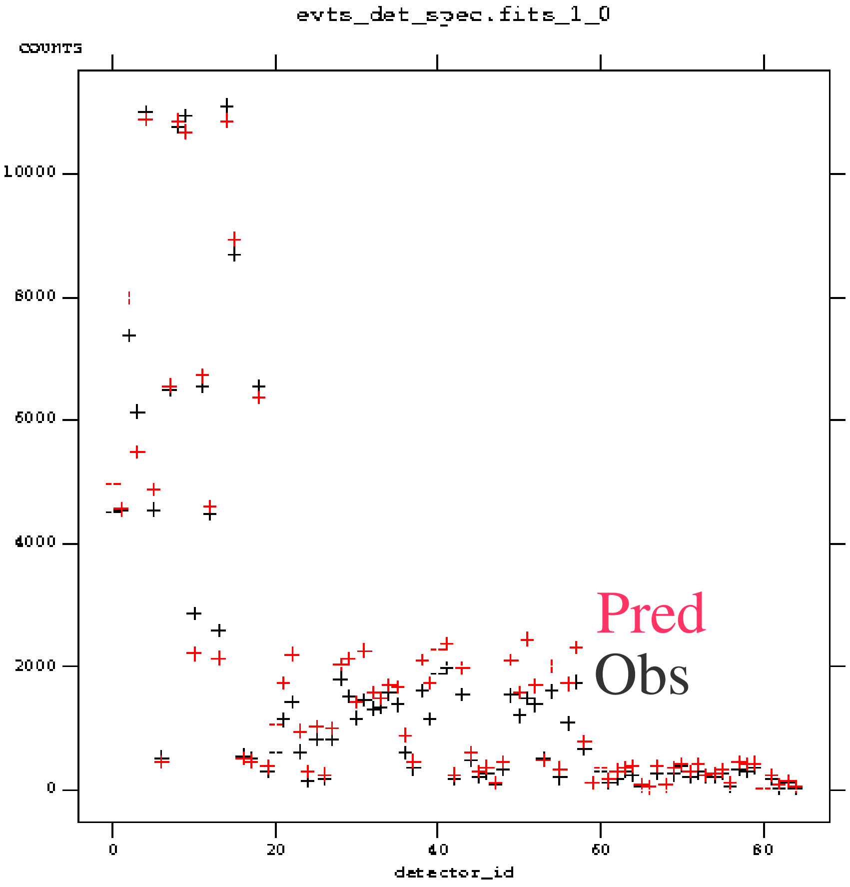


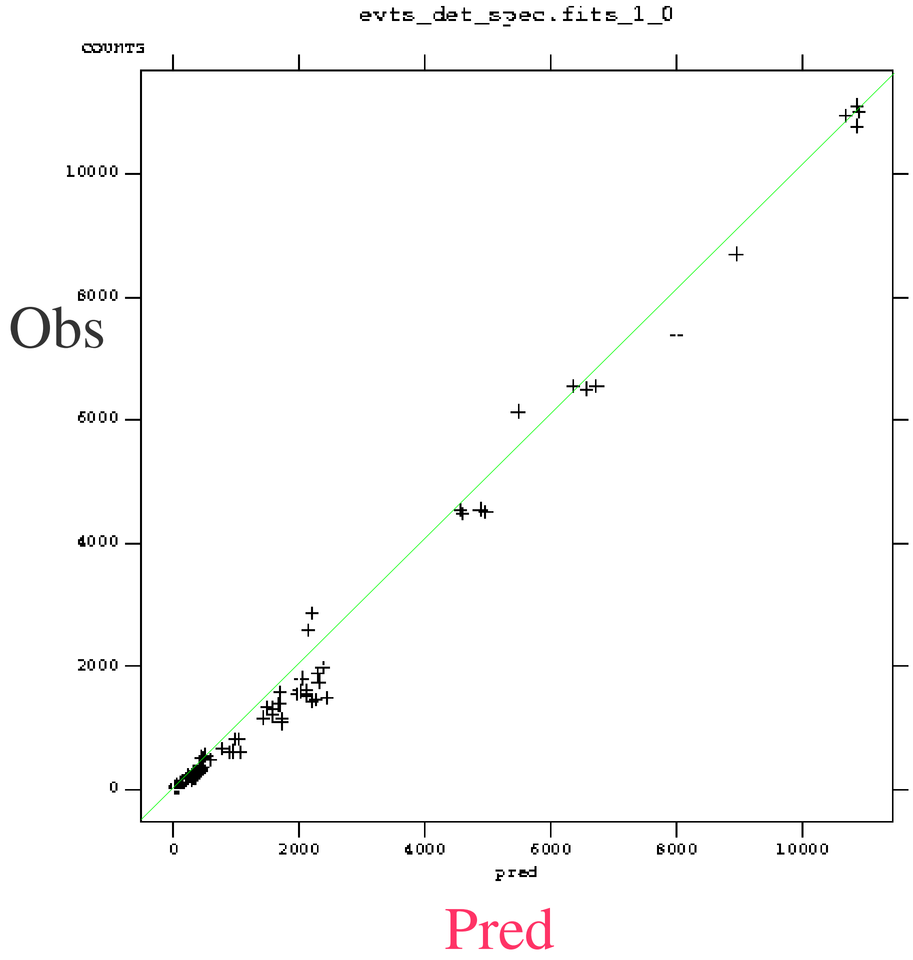
GOOD FIT !

Central obscurer well modelled

Comparison of observed and predicted counts
^{60}Co 125m using GSFC IRFs.

BLC Run 37   inclination = 2°

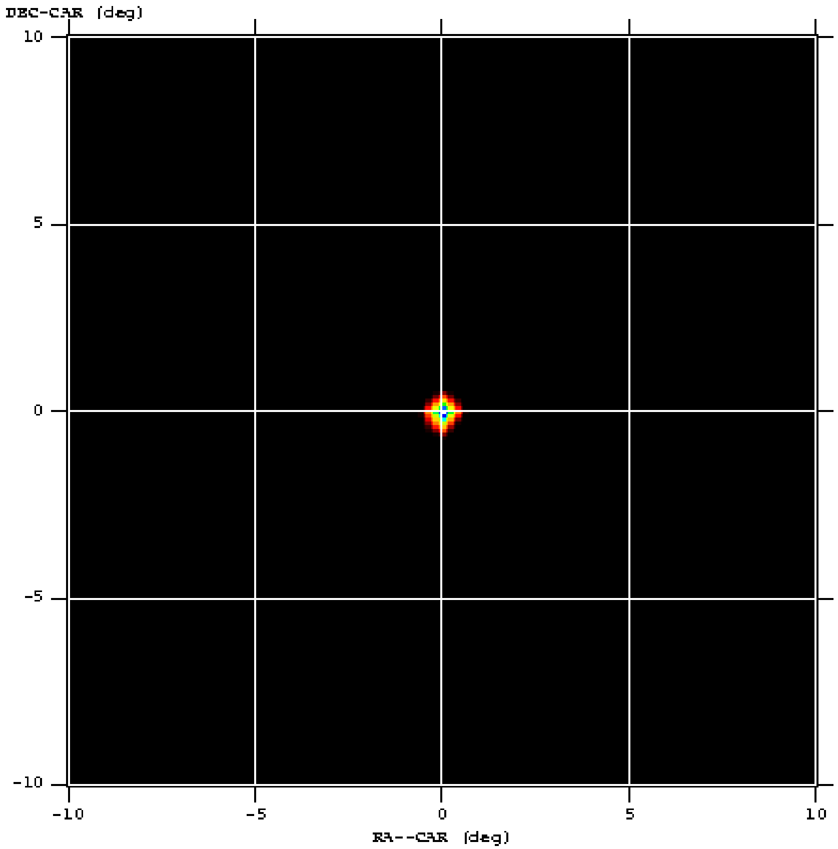




Singles+PSD+doubles+triples   BLC run 65

^{137}Cs 125m 0 °

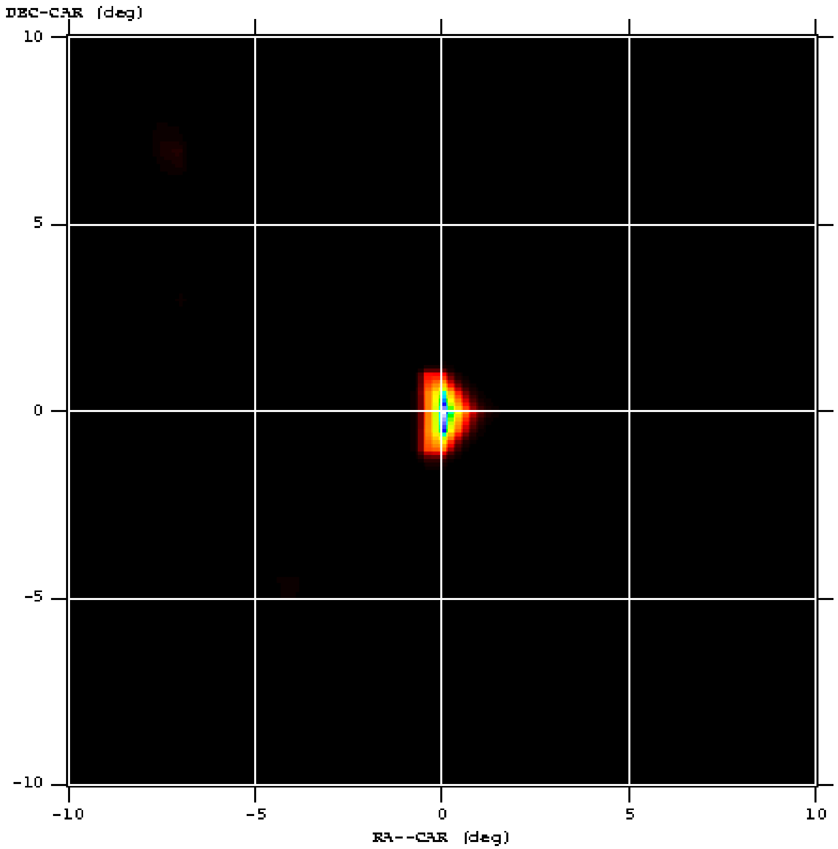
spiskymax   IRF from GSFC



Singles+PSD+doubles+triples   BLC run 66

^{137}Cs 125m 2 ^{o}

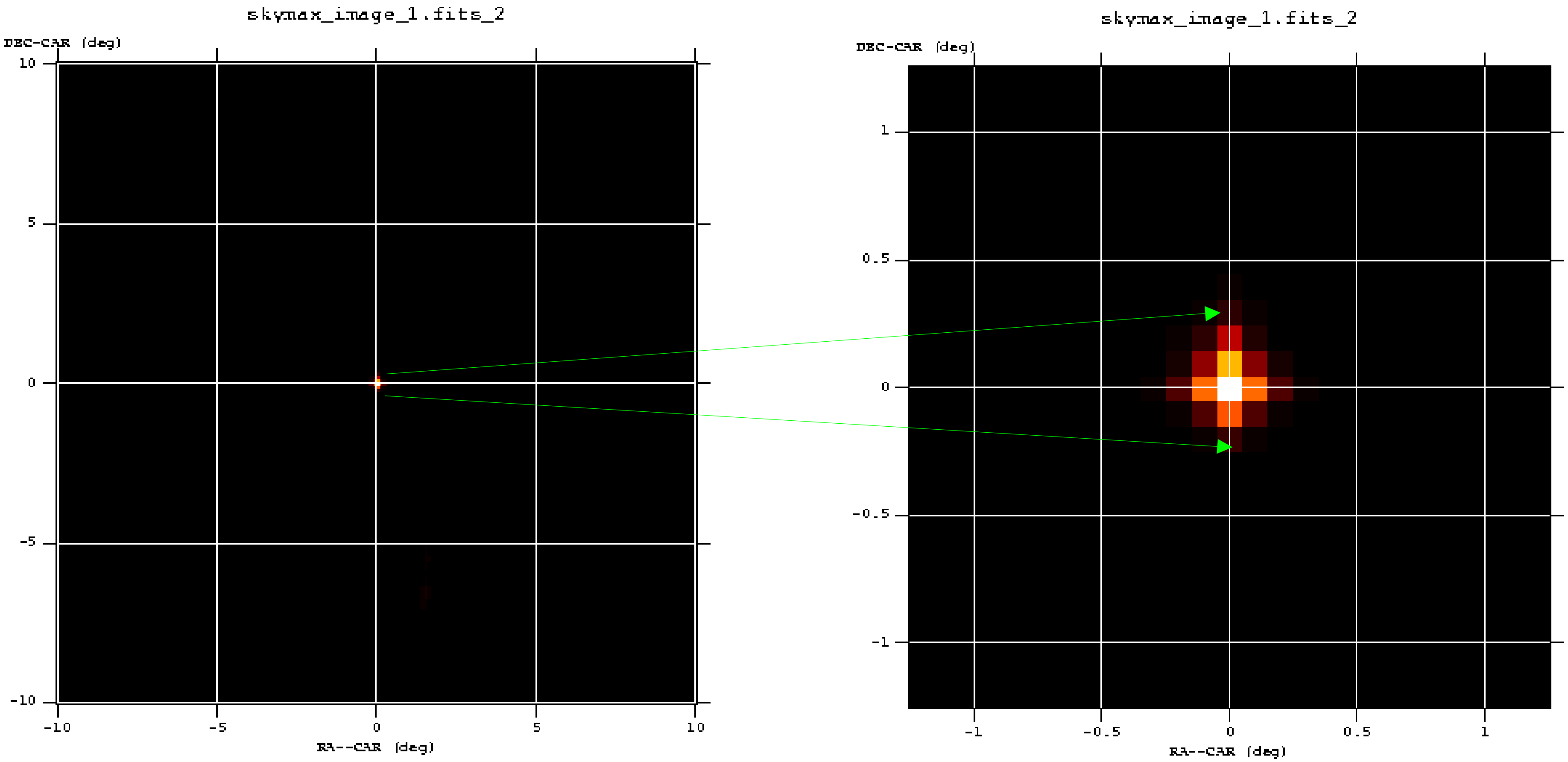
spiskymax   IRF from GSFC



Singles+doubles+triples   BLC run 134

^{241} Am 59.5 keV 125m 0^{o}

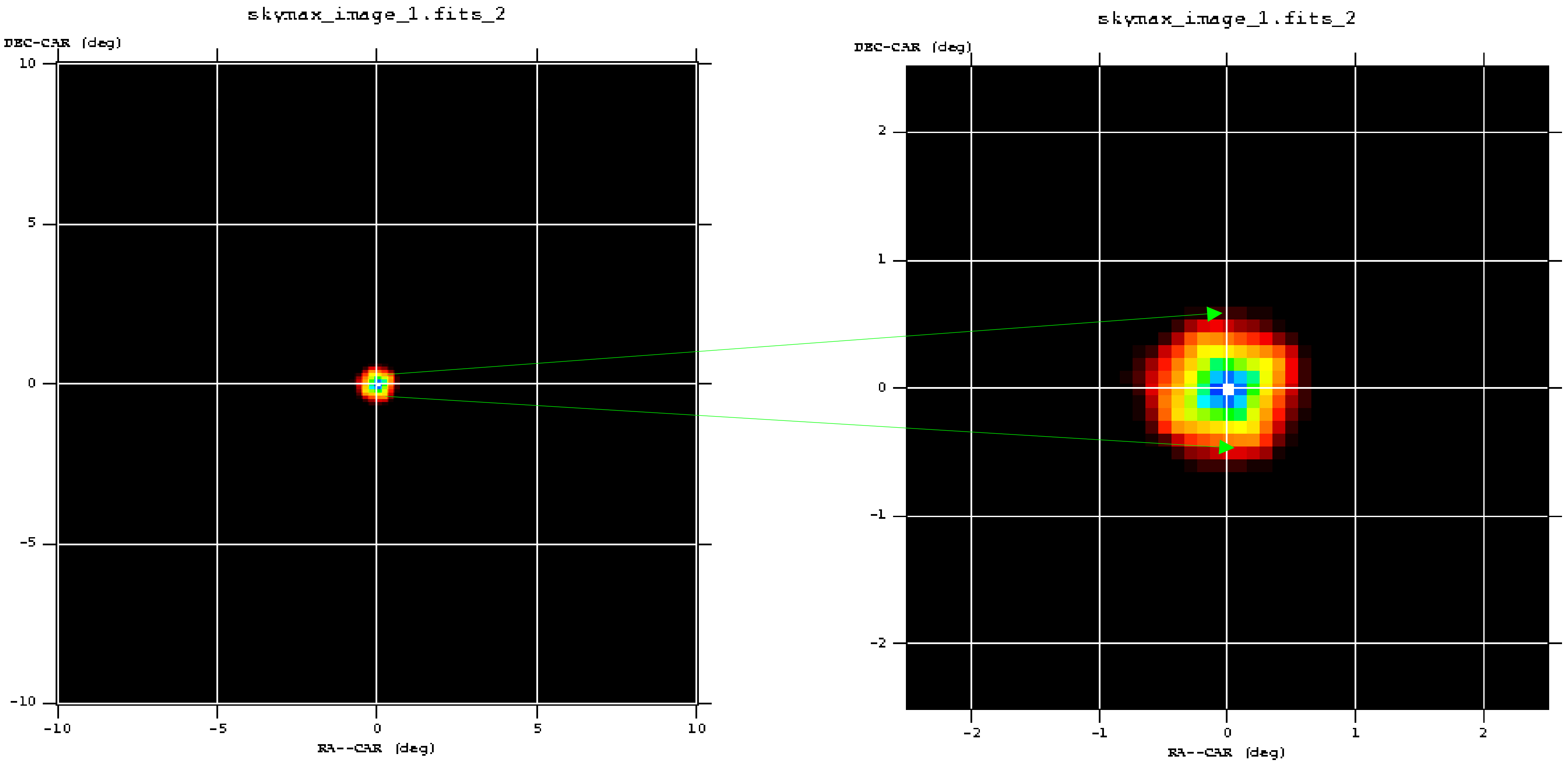
spiskymax   IRF from GSFC



Singles+doubles+triples   BLC run 329

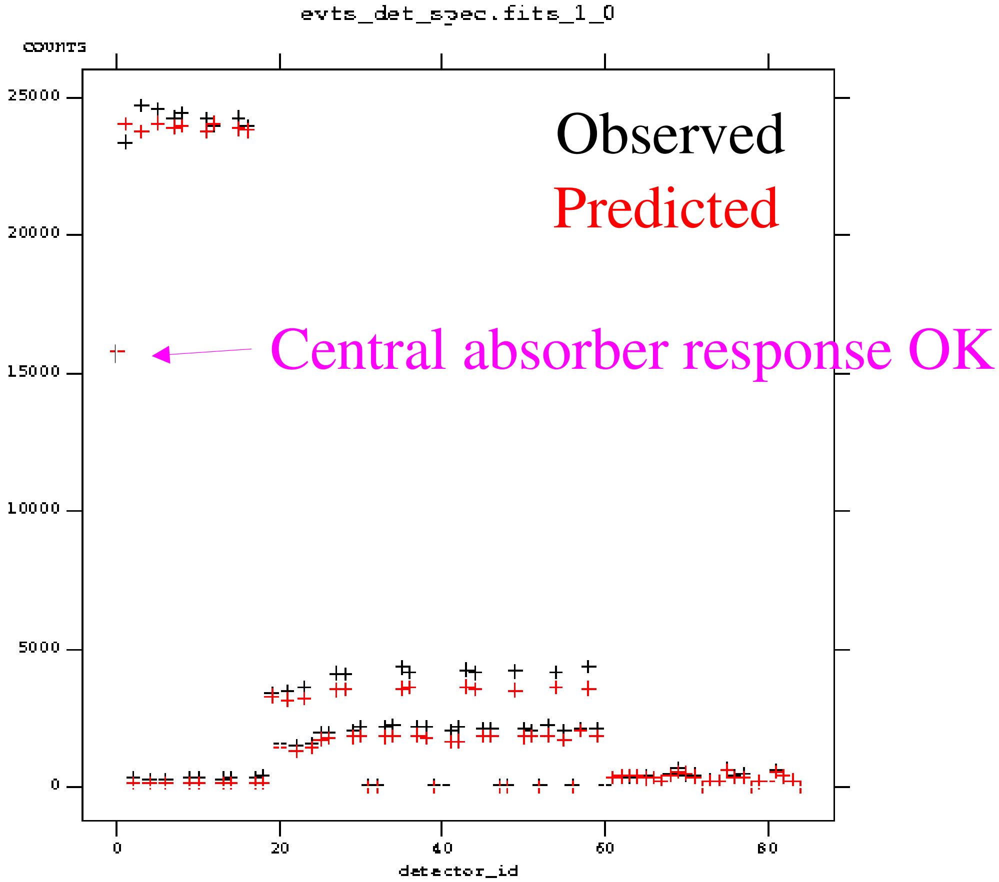
^{24}Na 2754 keV 125m 0°

spiskymax   IRF from GSFC



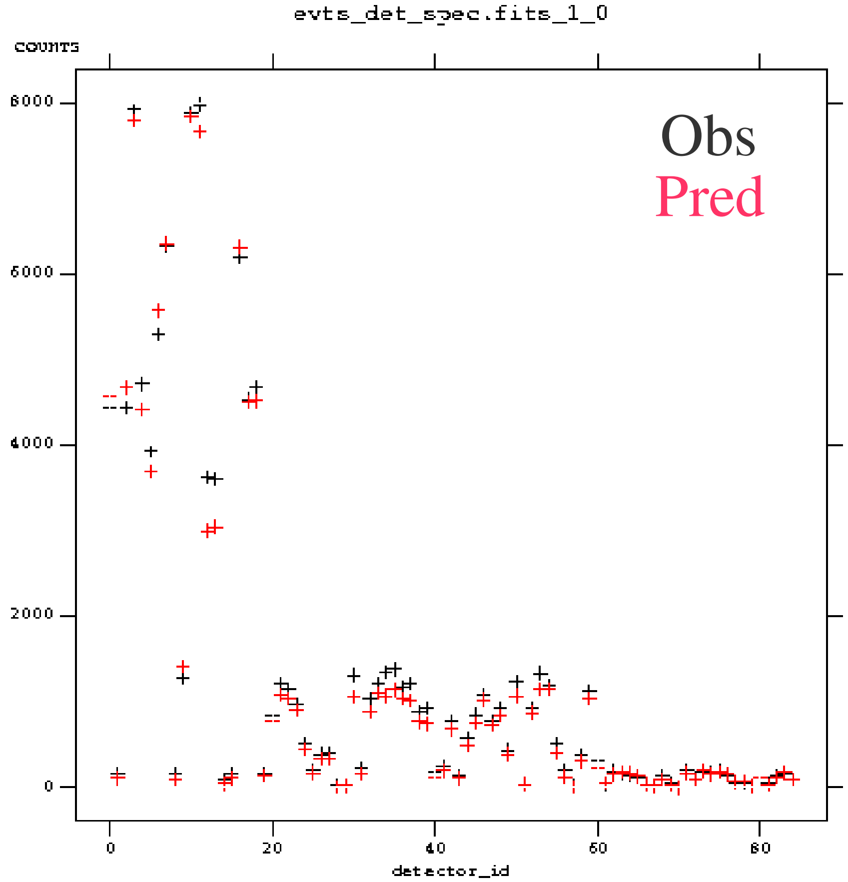
^{137}Cs 661 keV

BLC Run 65   0°

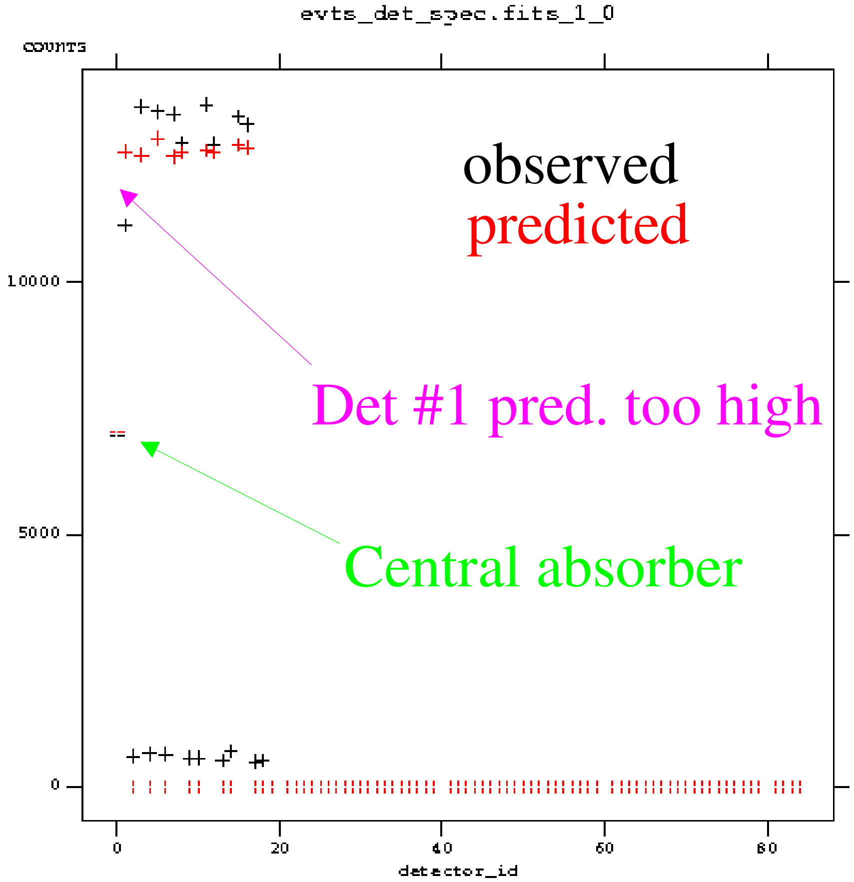


Comparison of observed and predicted counts ^{137}Cs 125m using GSFC IRFs.

BLC Run 66 2°



^{241}Am 59.5 keV BLC run 134 on–axis

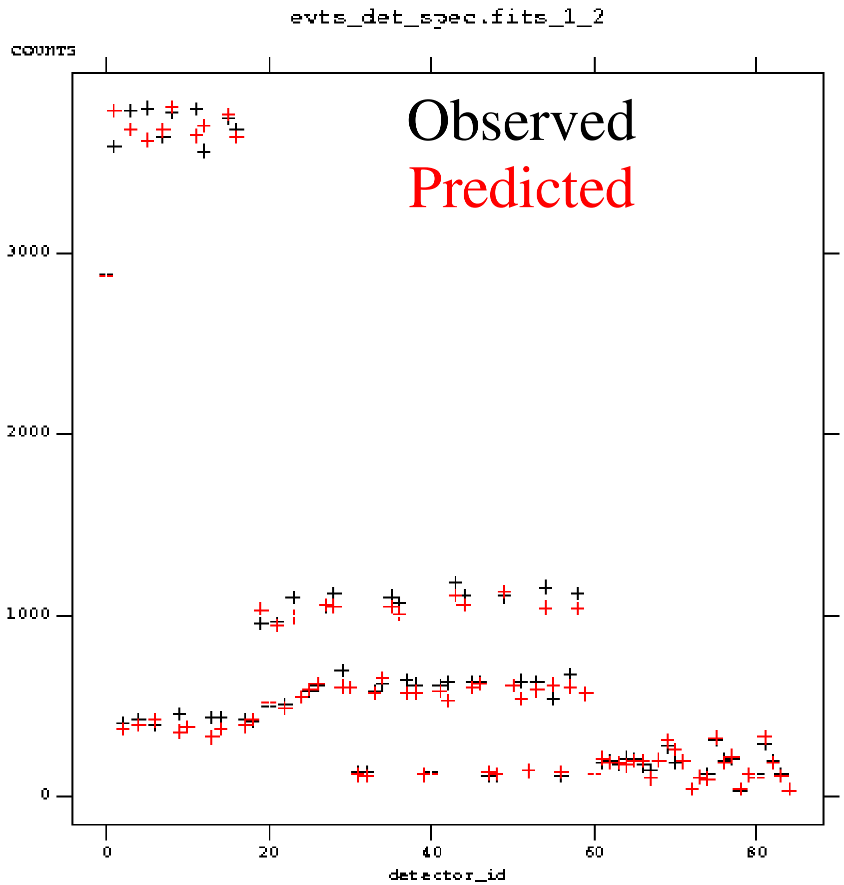


NB prediction *without* background

^{24}Na 2754 keV BLC run 329 on–axis

on–axis, spihist 2.1.2

multiples livetime factor 0.98 for consistency with singles



Absolute long–distance source fluxes

Using new GSFC response, singles+doubles+triples

Monitor values using *gaspan* + *Schanne & Tauzin calibration*

^{60}Co 1173 keV

BLC 125m run 31 *spiros* fitted flux = **1.54** cm^{-2} s^{-1}

^{60}Co 1332 keV

Monitor–> 2.11 cm^{-2} s^{-1}

BLC 125m run 31 *spiros* fitted flux = **1.70** cm^{-2} s^{-1}

Monitor–> 2.22 cm^{-2} s^{-1}

spiros/monitor=0.73, 0.77 cf GSFC photopeak ratio ~ 0.8 OK

^{241}Am 59.5 keV

BLC 125m run 134 *spiros* fitted flux = 0.725 cm^{-2} s^{-1}

Monitor–> 0.681 cm^{-2} s^{-1}

spiros/monitor=1.06 cf GSFC photopeak ratio ~ 0.8 !

^{137}Cs 661 keV

BLC 125m run 65 fitted flux = 1.44 cm^{-2} s^{-1}

?? monitor–>1.74 cm^{-2} s^{-1}

[Monitor value from B. Teegarden, preliminary]

Absolute long–distance source fluxes

Flux measured at various angles

^{60}Co 1173 keV

BLC 125m runs 31– 47 *spiros* fitted fluxes cm^{-2} s^{-1}

Angle	flux
–2	1.54
–1	1.55
–0.5	1.56
0	1.54
0.5	1.57
1	1.58
2	1.56
4	0
6	1.55
8	1.57
10	1.56