

Roapmap for GRM rsp and loc

Location algorithm

Method: same as that used for Fermi/GBM, chi-2 minimum

For each of 41,168 positions in the grid, i , we find

$$\chi^2(i) = \sum_{j=1}^{12} \frac{[s(j) - b(j) - f(i) * m(j, i)]^2}{b(j) + f(i) * m(j, i)}, \quad (\text{A1})$$

where $s(j)$ and $b(j)$ are the total observed and background rates, respectively, observed between 50 and 300 keV in detector j ; $m(j, i)$ are the model rates in the same energy range for detector j in row i ; and $f(i)$ is the normalization factor for row i such that

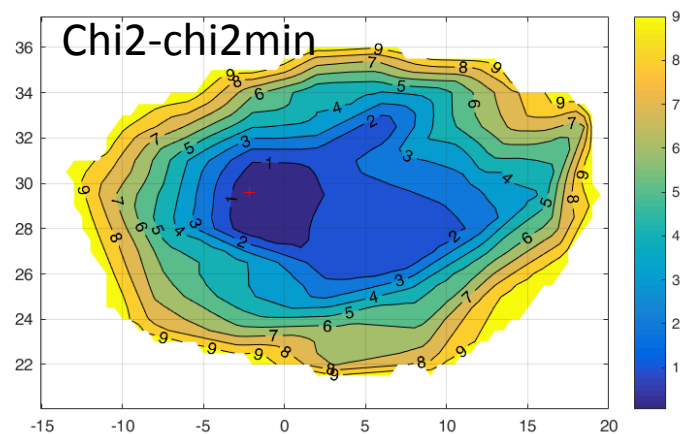
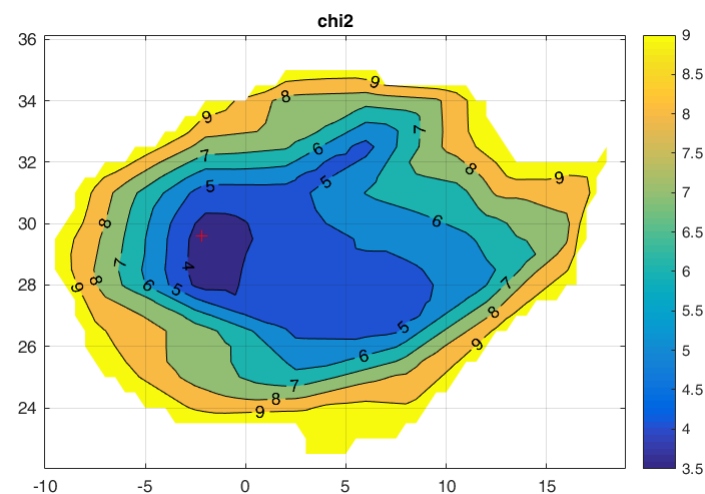
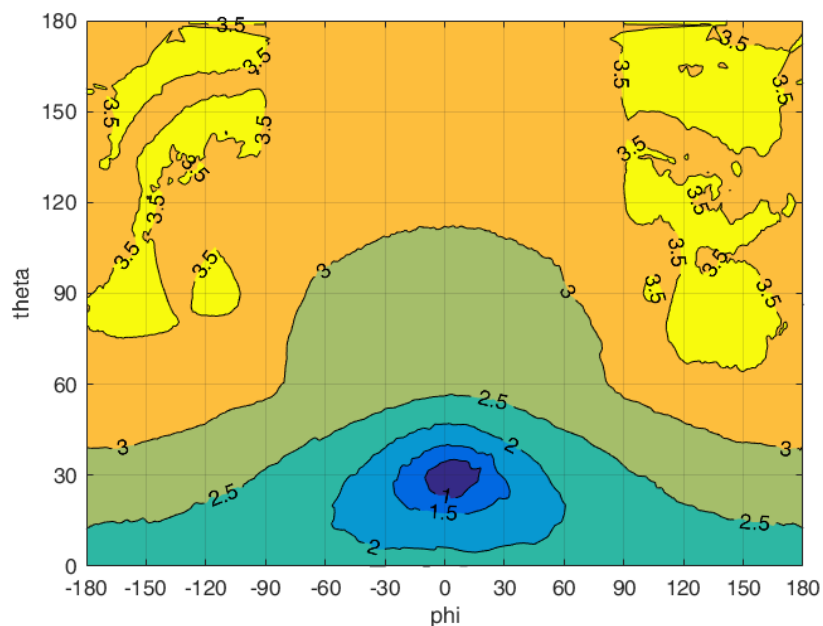
$$f(i) = \frac{\sum_{j=1}^{12} [m(j, i) * (s(j) - b(j))] / s(j)}{\sum_{j=1}^{12} m(j, i)^2 / s(j)}. \quad (\text{A2})$$

APJSS 216, 32, 2015

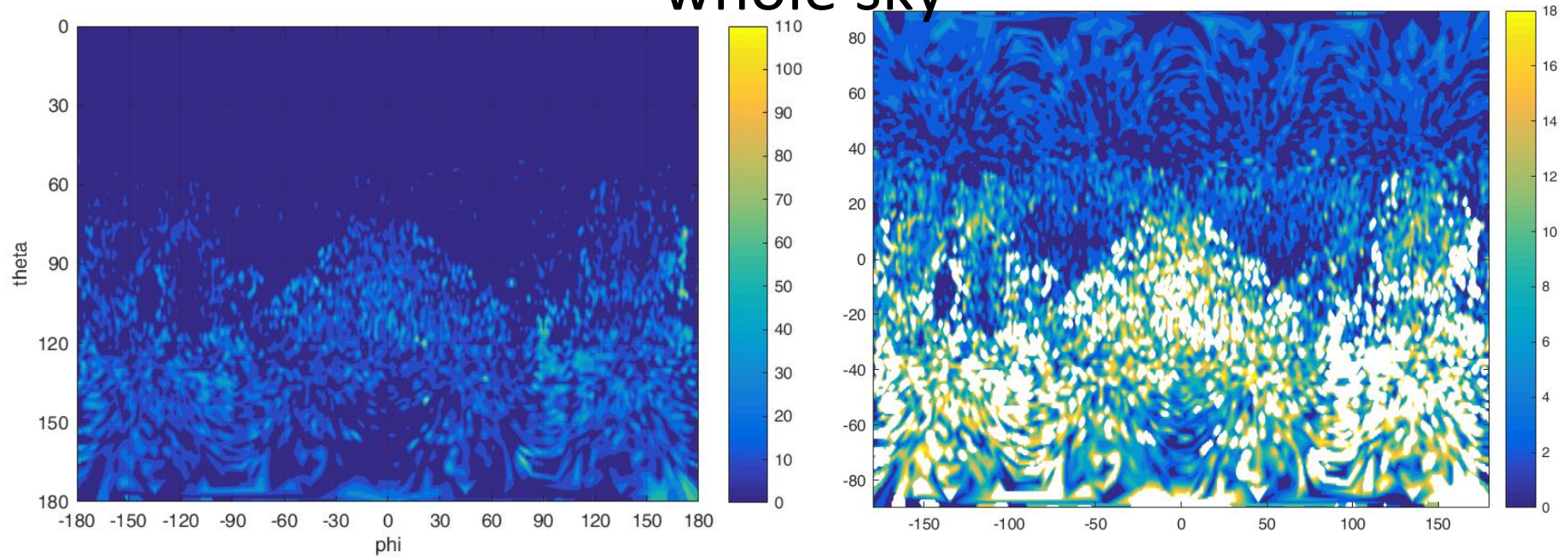
- Provide:
 - source counts/rates table, or
 - response for any source-earth-detector configuration

Loc based on 20-50keV and 50-300keV

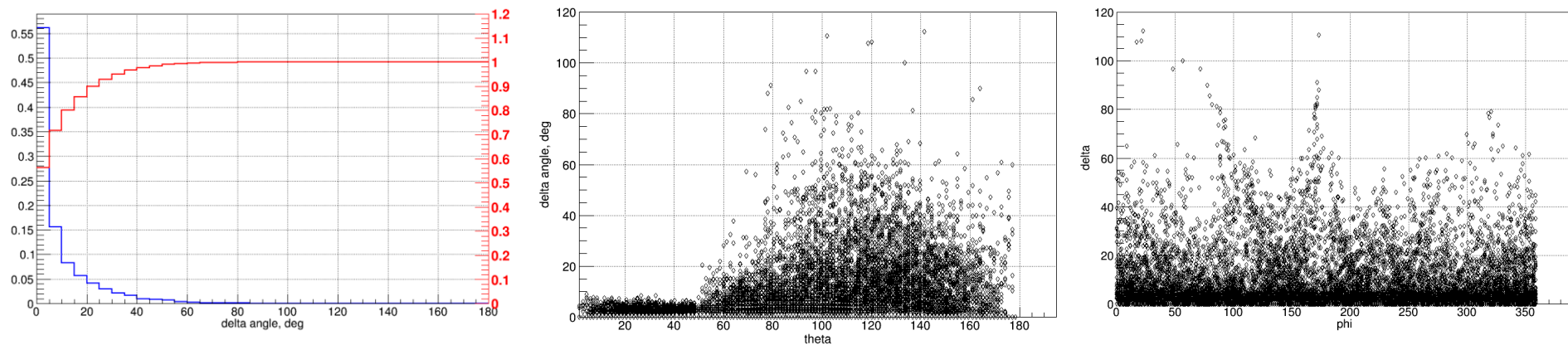
- For src@ (30,0)
 - minimum chi2 3.4387 at point line 840, i.e (29.6,



Results for med band spc source@any grid of the whole sky



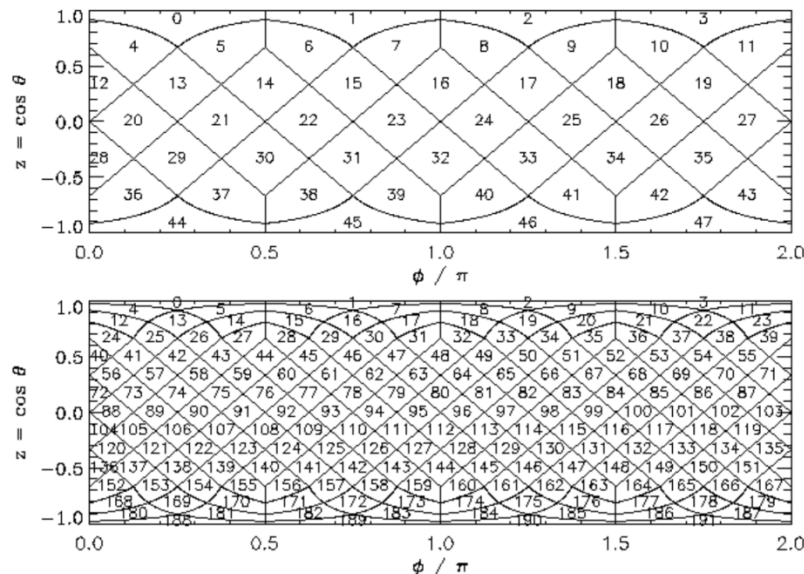
Statistics based on the result of src @ 12290 grids



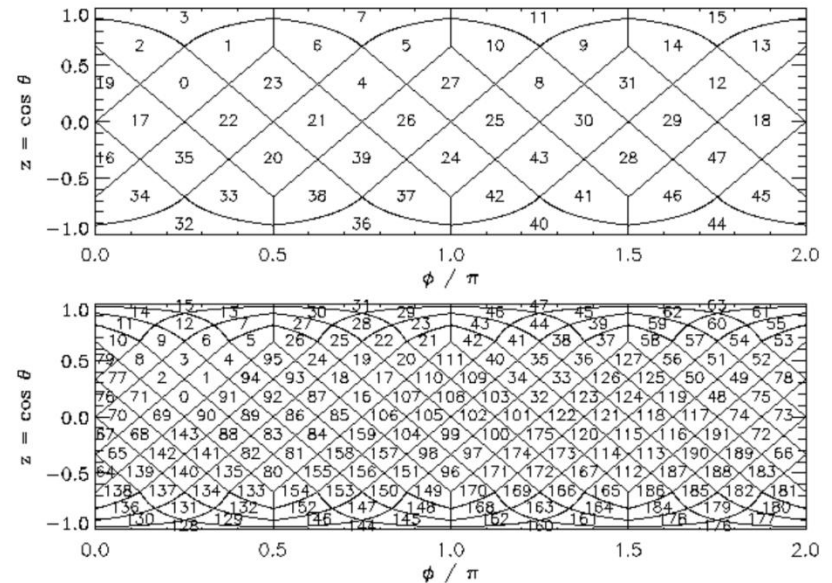
On-orbit Location algorithm

- A counts table has been provided to Wenxing(IHEP/GRM), who is responsible for the on-orbit software
 - calculation time is satisfied, $< 1s$
 - grid 12×64 , nested grid, limited by the on-orbit memory and calculation speed

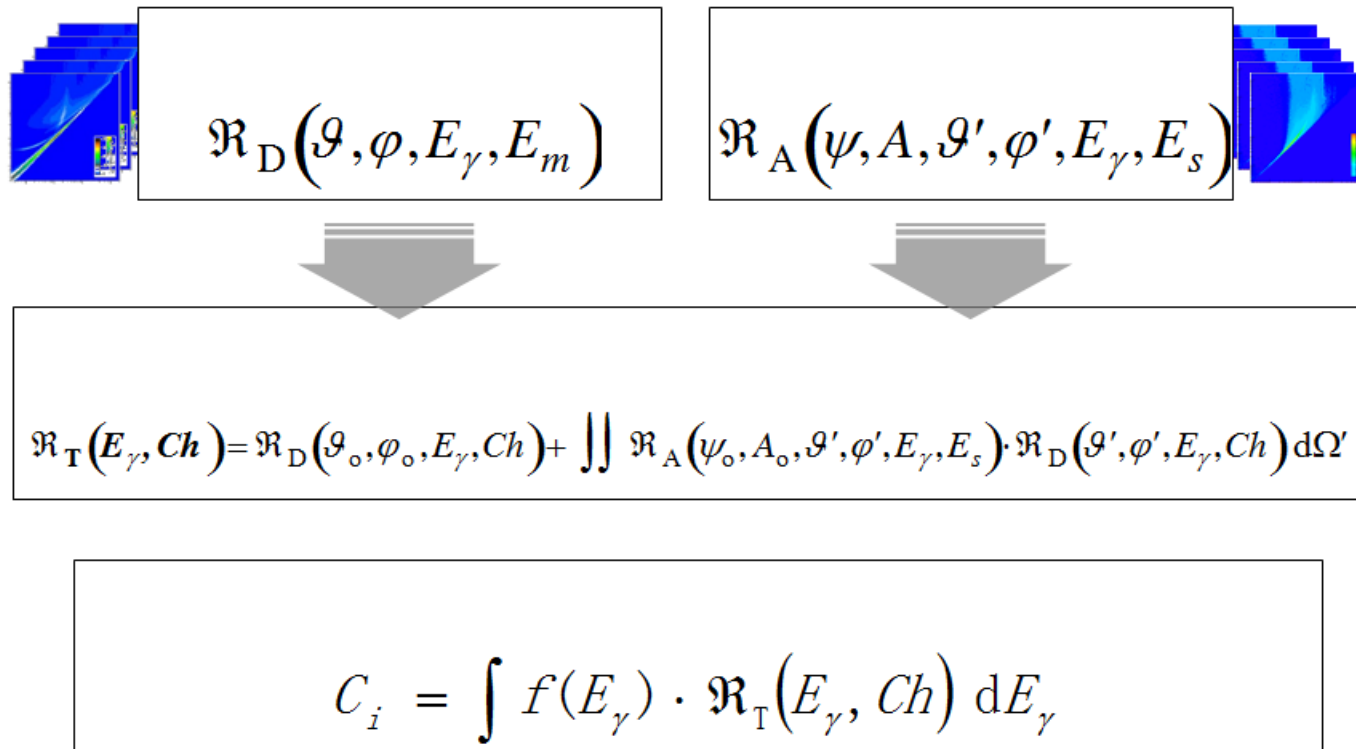
✓ HEALPIX Ring scheme



✗ HEALPIX NESTED scheme



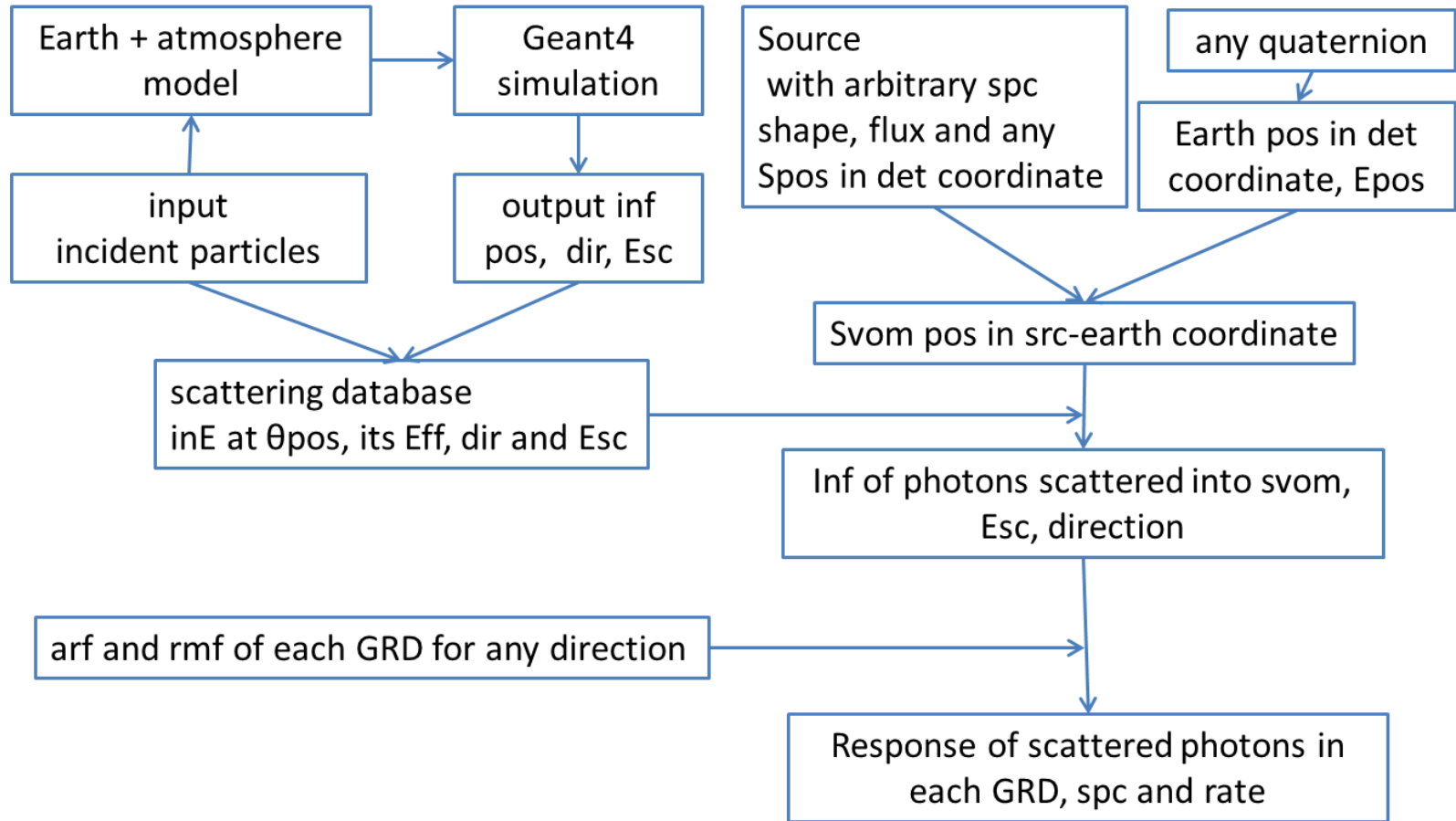
GRM response



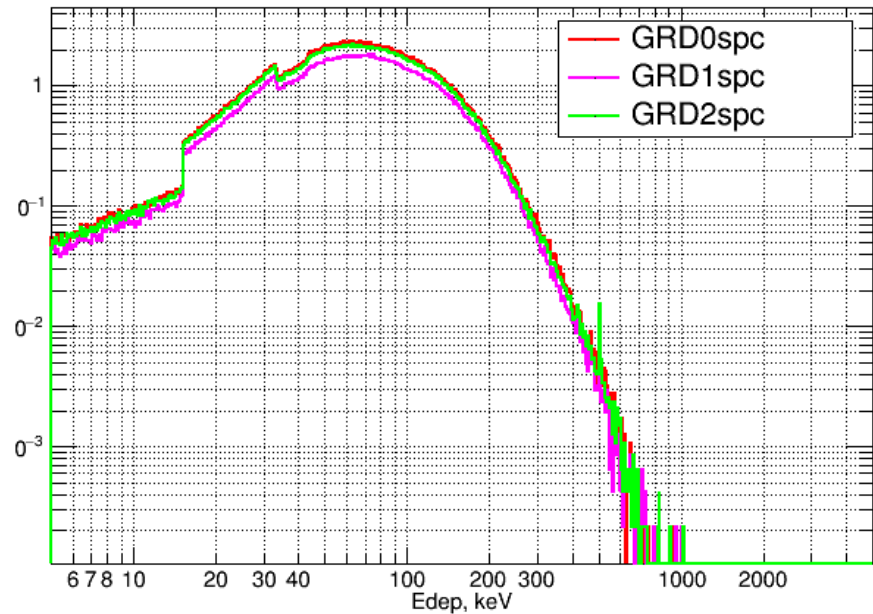
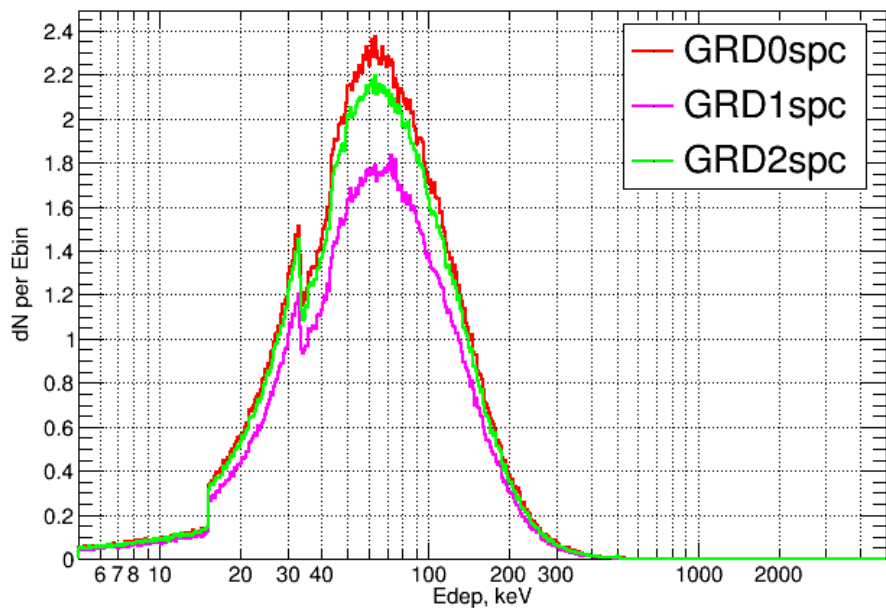
Slide from Fermi-GBM-G4SpaceUsers2004

direct rsp: done
atm rsp: done

GRM atmosphere response



Edep spc on GRD of scattering photons



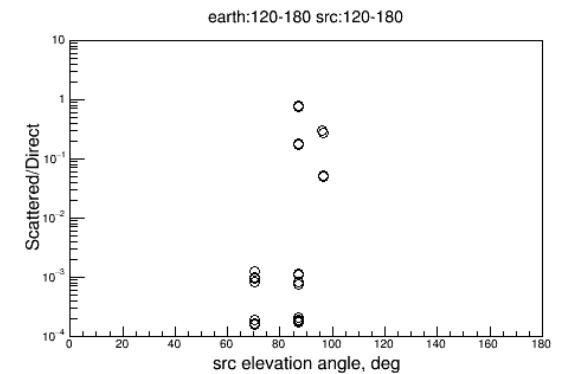
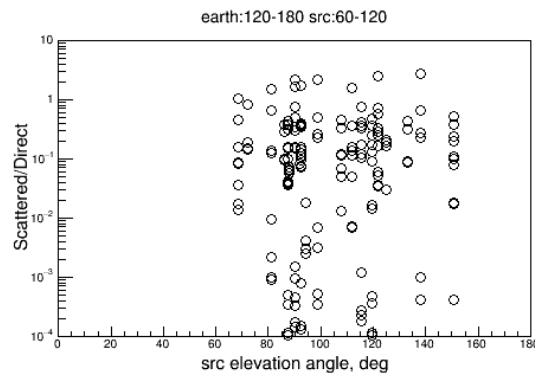
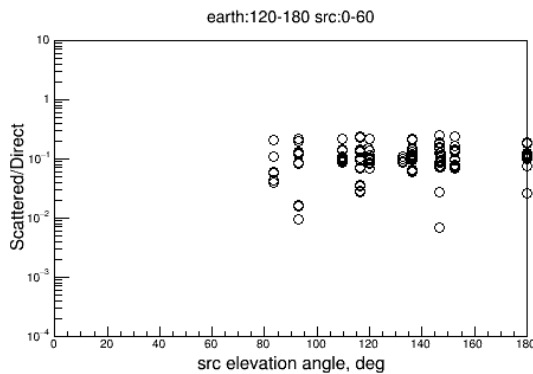
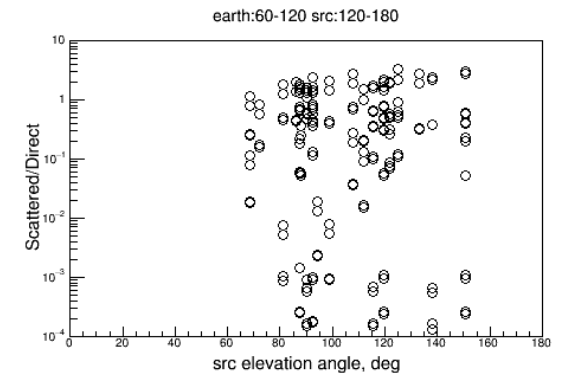
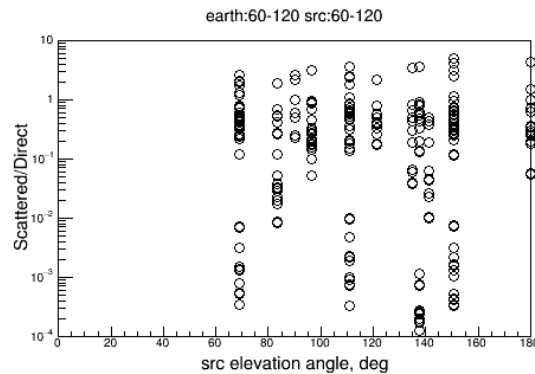
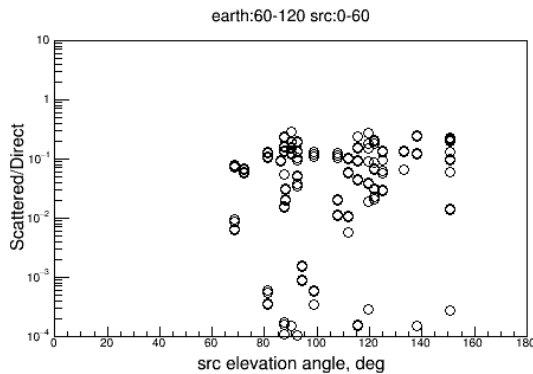
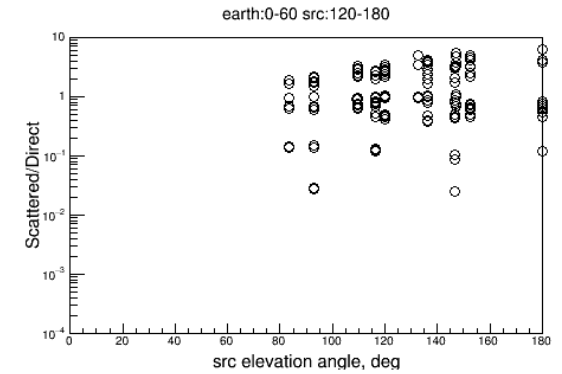
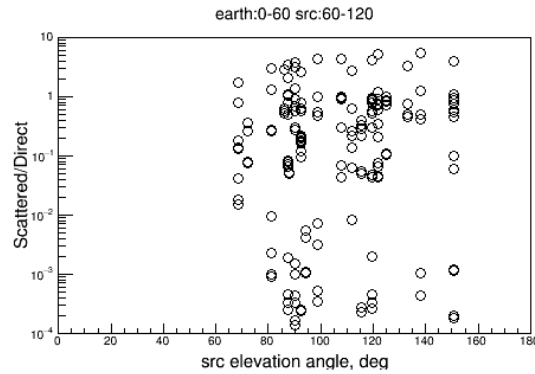
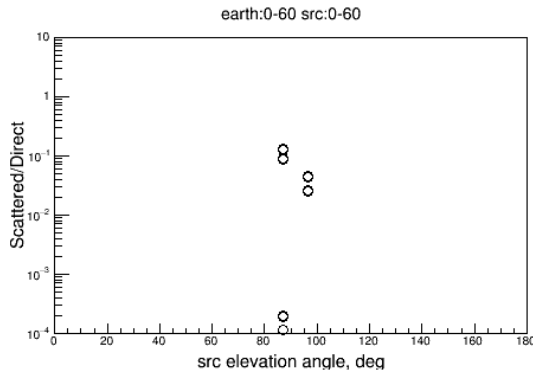
for 0 45 36.75 198.35 147.111 5.3973

NEpos=0, NSpos=45, NEpos=0→(23.6, 45.), NSpos=45→(156.4, 135.)

→Ndir=36.75, Natm= 198.35,

→scatted/direct=5.3973


Ratio of scattered/direct counts@50-300keV for GRD0



G4 sim for GRM

- https://forge.in2p3.fr/projects/svom-mass-model/dmsf?folder_id=528

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bkg for GBM

- 1. simulation data given by Fei, Or
- 2. hxmt obs data
- 3. Fermi GBM obs data

conclusion

- rsp with atm: done
- loc: done
- sim code: done
- bkg: used a simple one
- caldb: waiting the experiment data