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

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

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

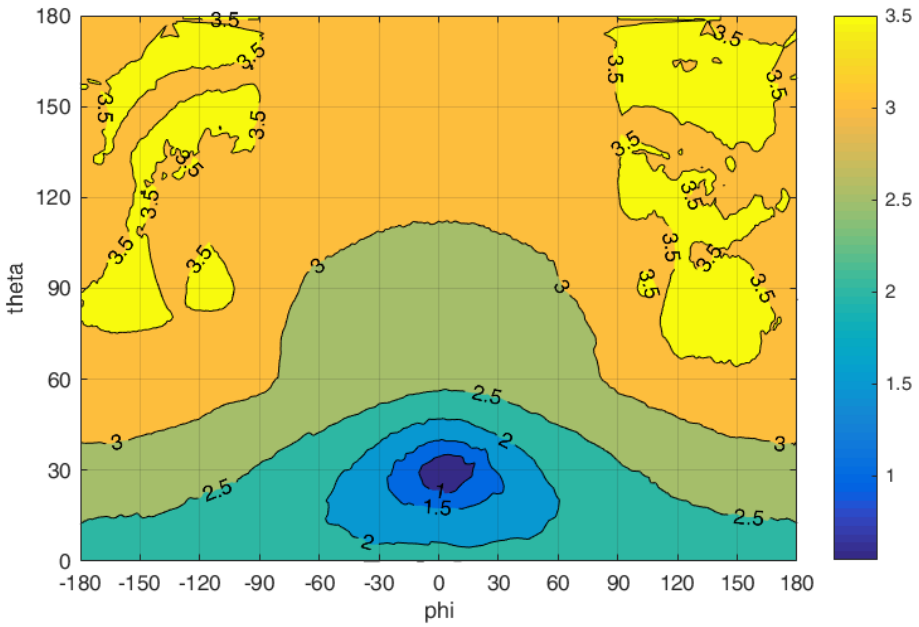
$$f(i) = \frac{\sum_{j=1}^{12} [m(j,i) * (s(j) - b(j))]/s(j)}{\sum_{j=1}^{12} m(j,i)^2/s(j)}. \qquad \text{(A2)}$$

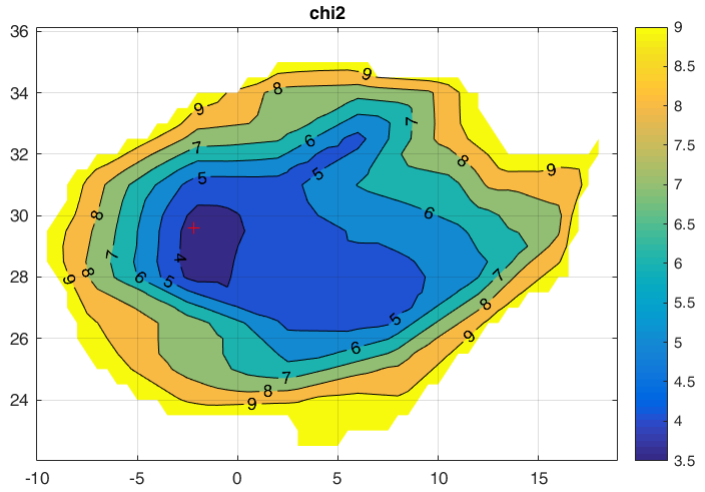
APJSS 216, 32, 2015

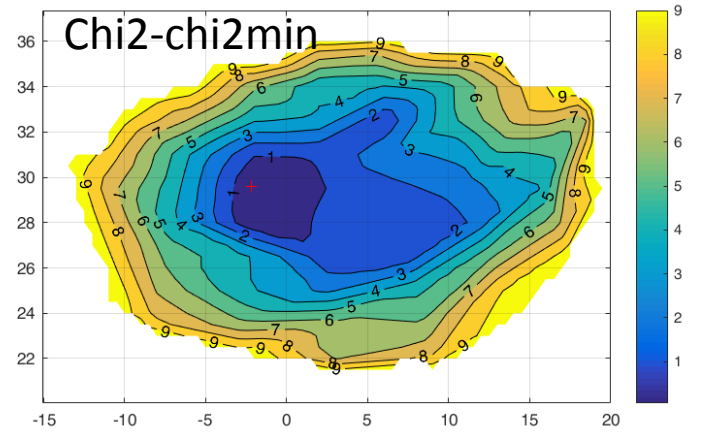
- Provide:
  - source counts/rates table, or
  - response for any source-earth-detector configuration

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

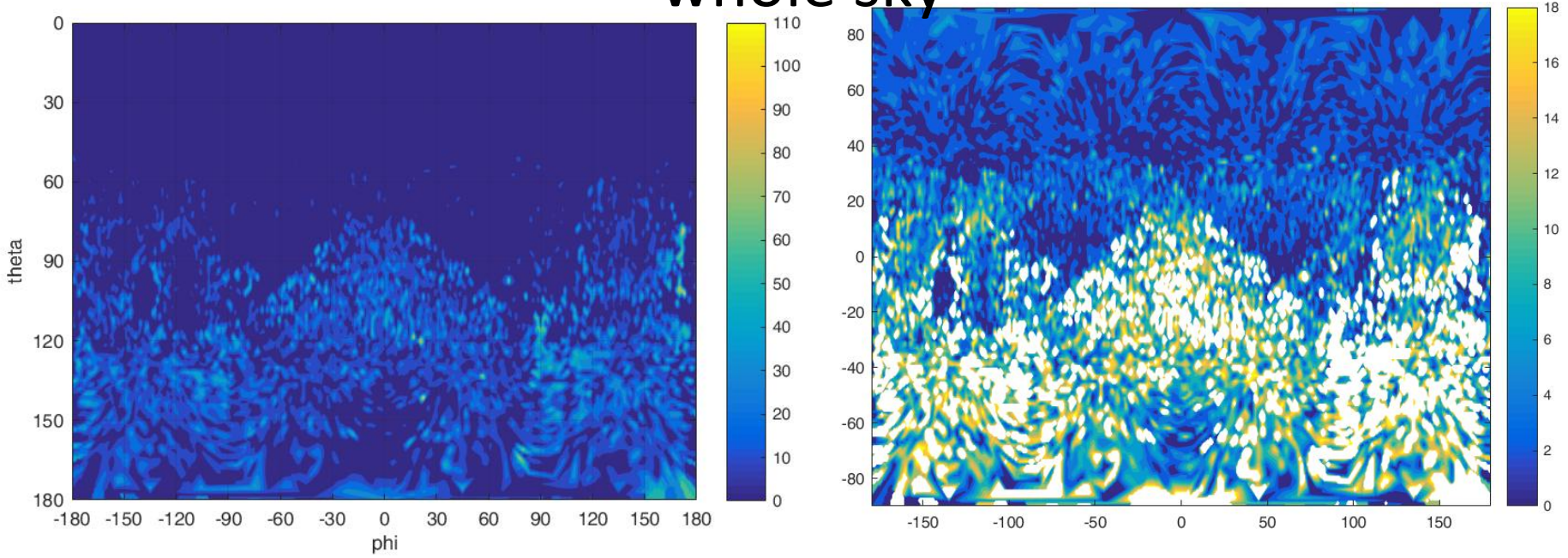
- For src@（30,0）
- minimum chi2 3.4387 at point line 840, i.e (29.6,



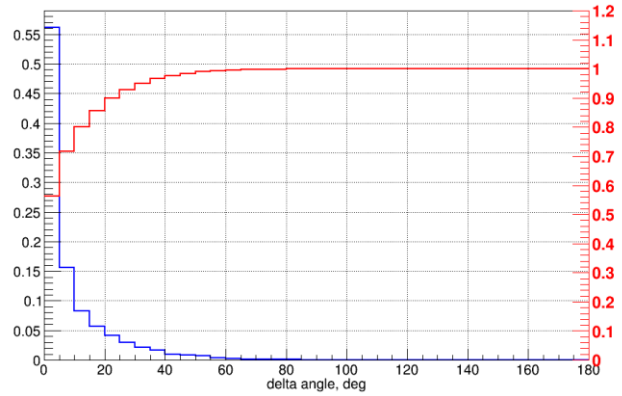


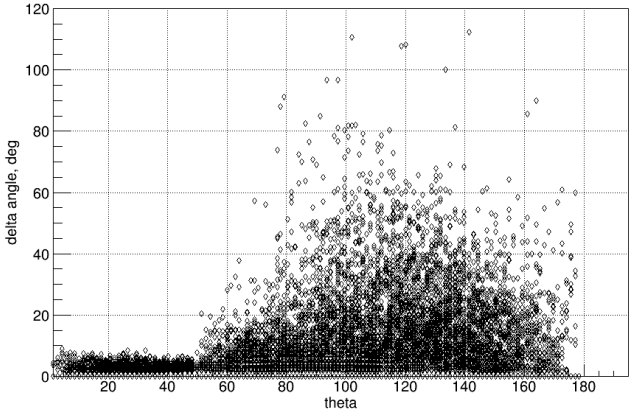


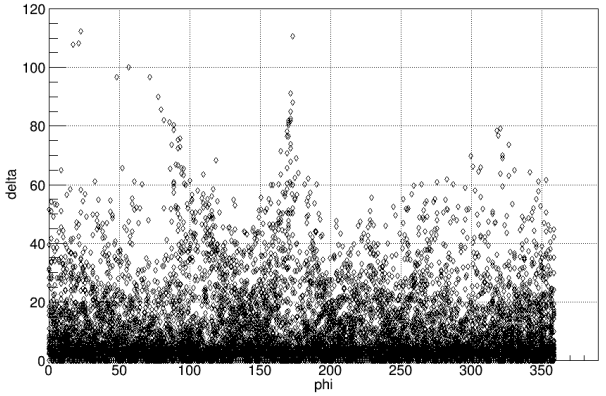
Results for med band spc source@any grid of the whole sky



Statistics based on the result of src @ 12290 grids



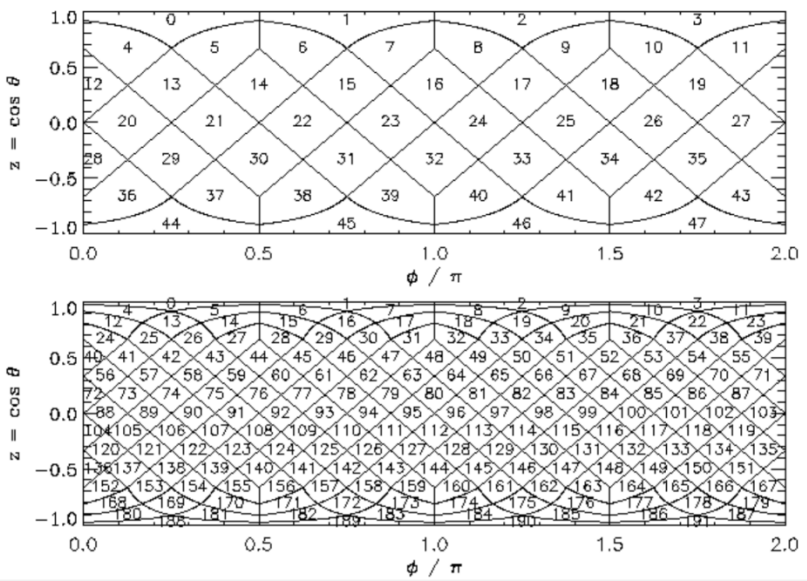




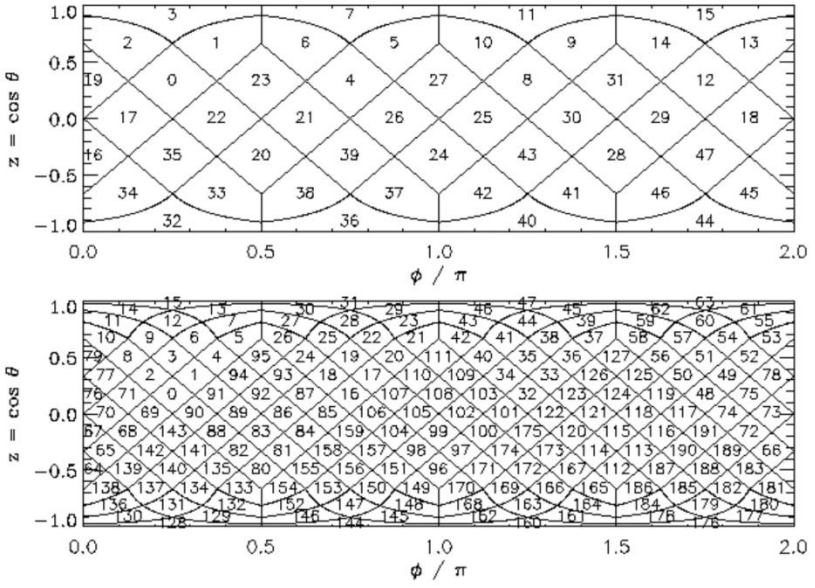
On-orbit Location algorithm

- 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-oribit memory and calculation speed

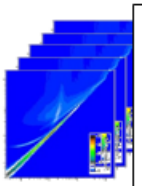
√ HEALPIX Ring scheme



× HEALPIX NESTED scheme

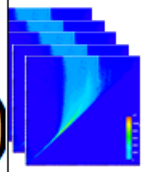


GRM response



$$\Re_{\mathrm{D}}\left(\vartheta,\varphi,E_{\gamma},E_{m}\right)$$

$$\Re_{\mathrm{A}}\left(\psi,A,\vartheta',\varphi',E_{\gamma},E_{s}\right)$$



$$\Re_{\mathrm{T}}\left(E_{\gamma},Ch\right)=\Re_{\mathrm{D}}\left(\vartheta_{\mathrm{o}},\varphi_{\mathrm{o}},E_{\gamma},Ch\right)+\iint\Re_{\mathrm{A}}\left(\psi_{\mathrm{o}},A_{\mathrm{o}},\vartheta',\varphi',E_{\gamma},E_{s}\right)\cdot\Re_{\mathrm{D}}\left(\vartheta',\varphi',E_{\gamma},Ch\right)\mathrm{d}\Omega'$$

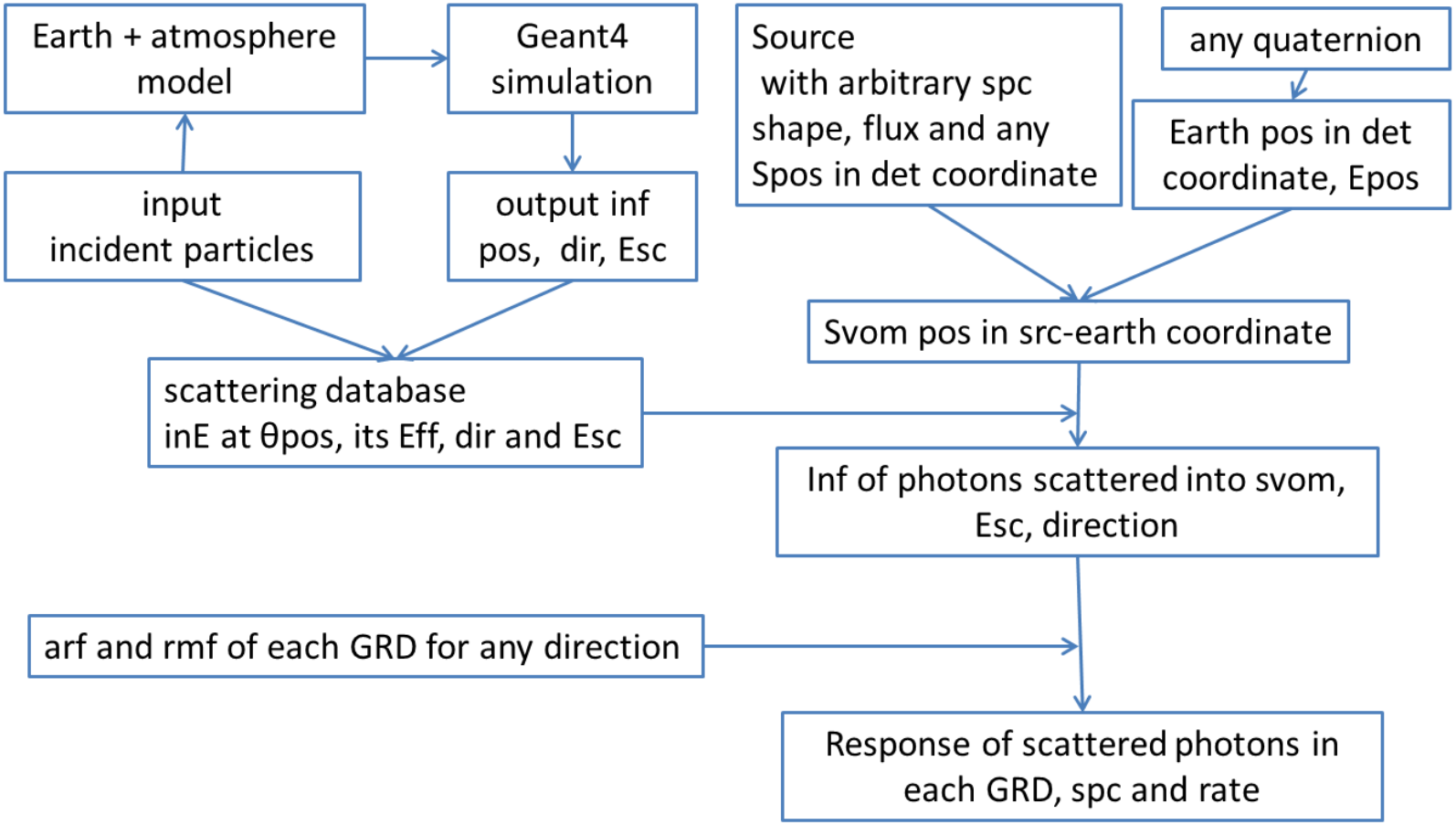
$$C_{i}=\int f(E_{\gamma})\cdot\Re_{\mathrm{T}}\left(E_{\gamma},Ch\right)\mathrm{d}E_{\gamma}$$

Slide from Fermi-GBM-G4SpaceUsers2004

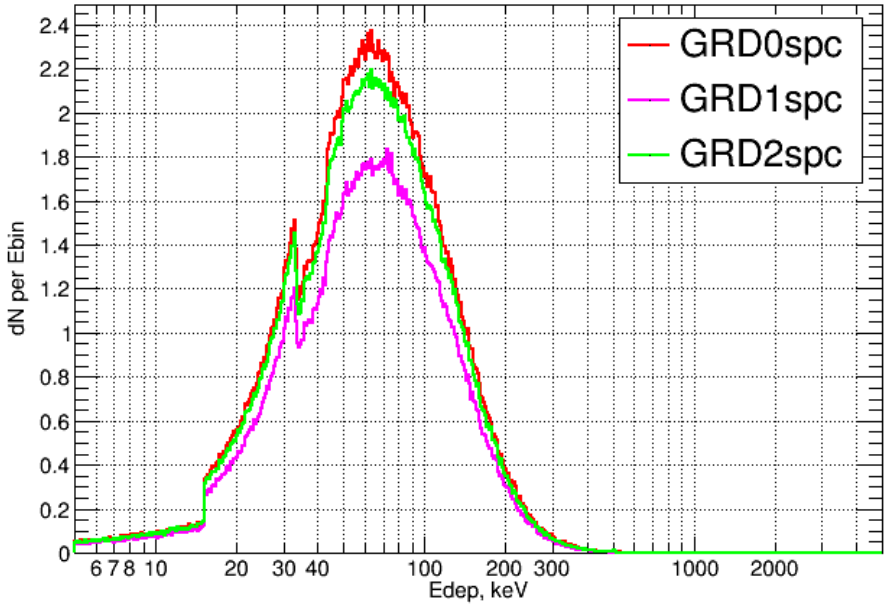
direct rsp: done

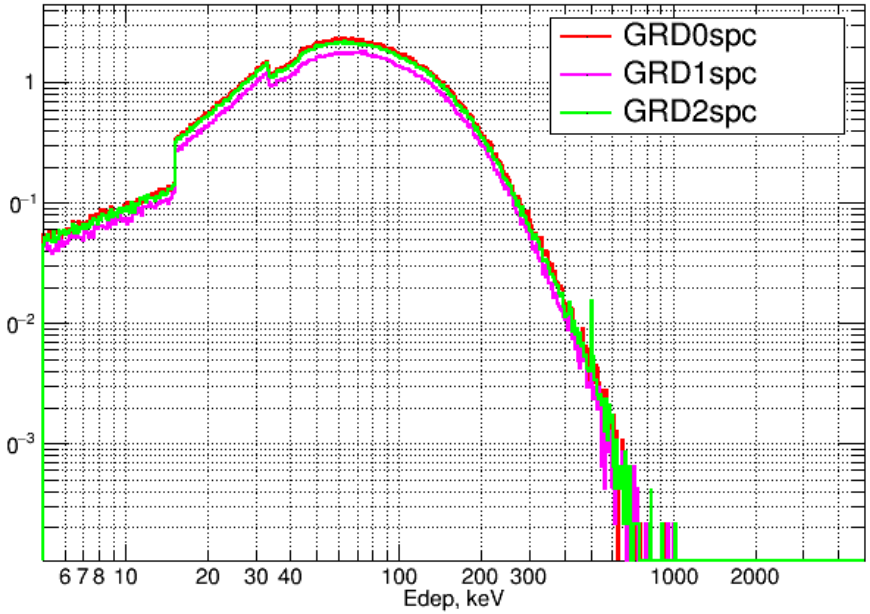
atm rsp: done

GRM atmosphere response



Edep spc on GRD of scattering photons





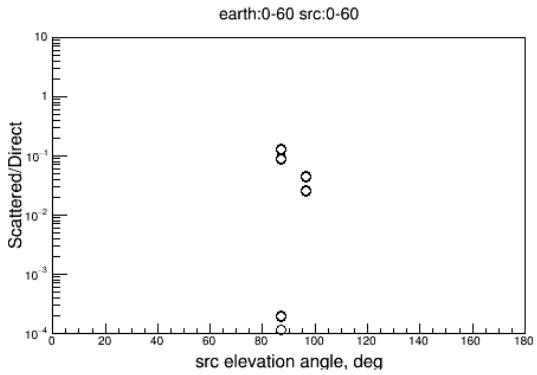
for `0  45  36.75  198.35  147.111  5.3973`

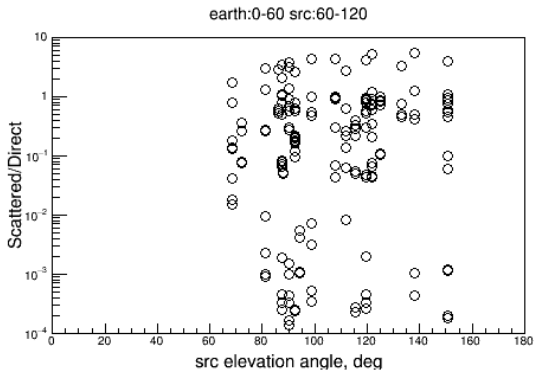
NEpos=0, NSpos=45, NEpos=0→(23.6, 45.), NSpos=45→(156.4, 135.)

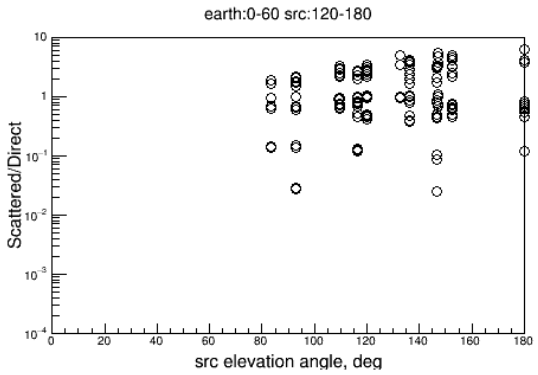
→Ndir=36.75, Natm= 198.35,

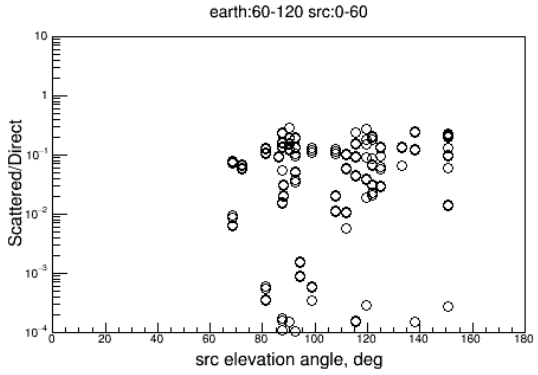
→scatted/direct=5.3973

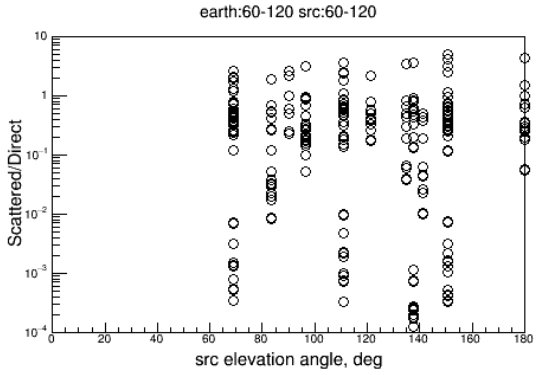
Ratio of scattered/direct counts@50-300keV for GRD0

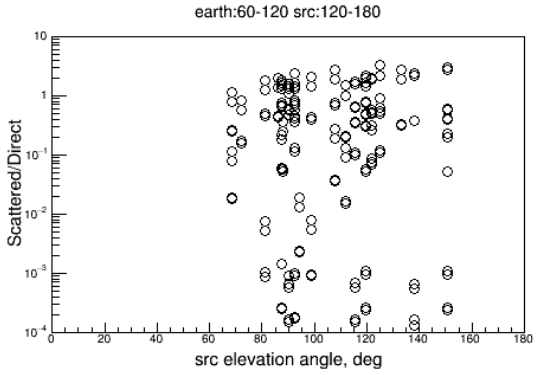


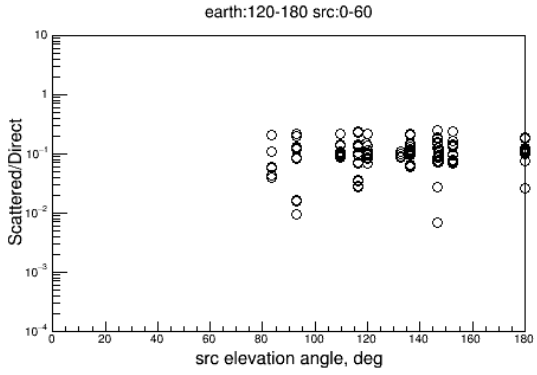


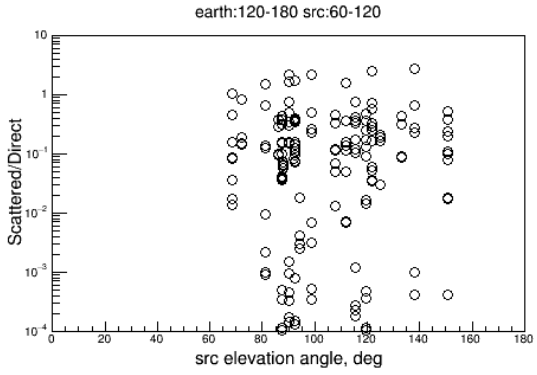


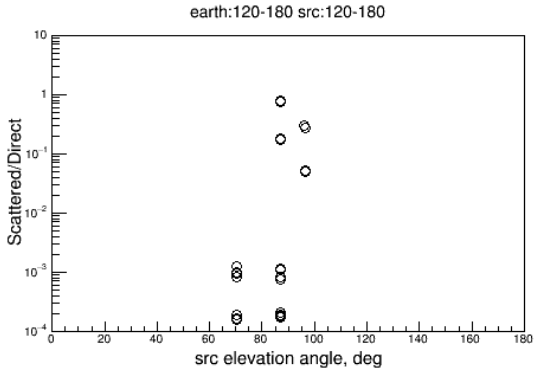






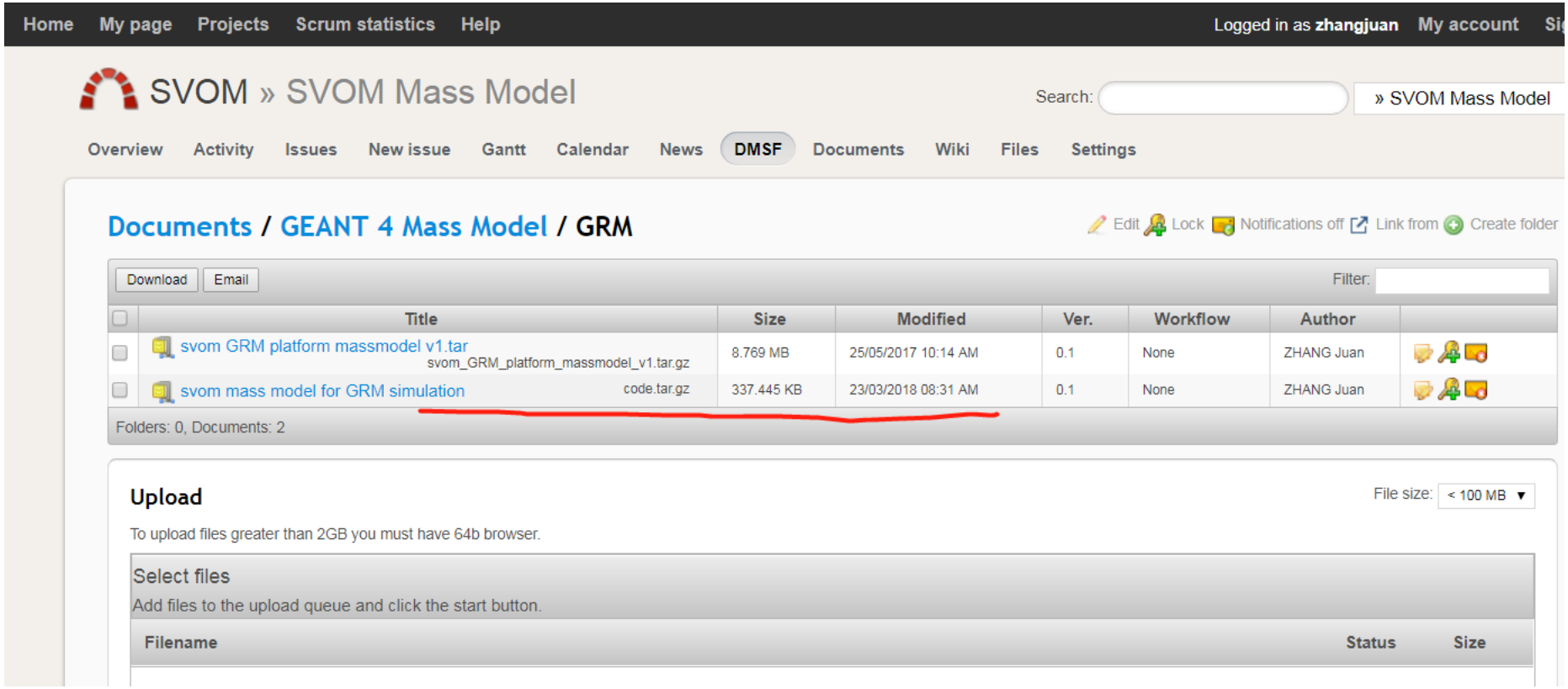






G4 sim for GRM

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



bkg for GBM

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

conclusiong

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