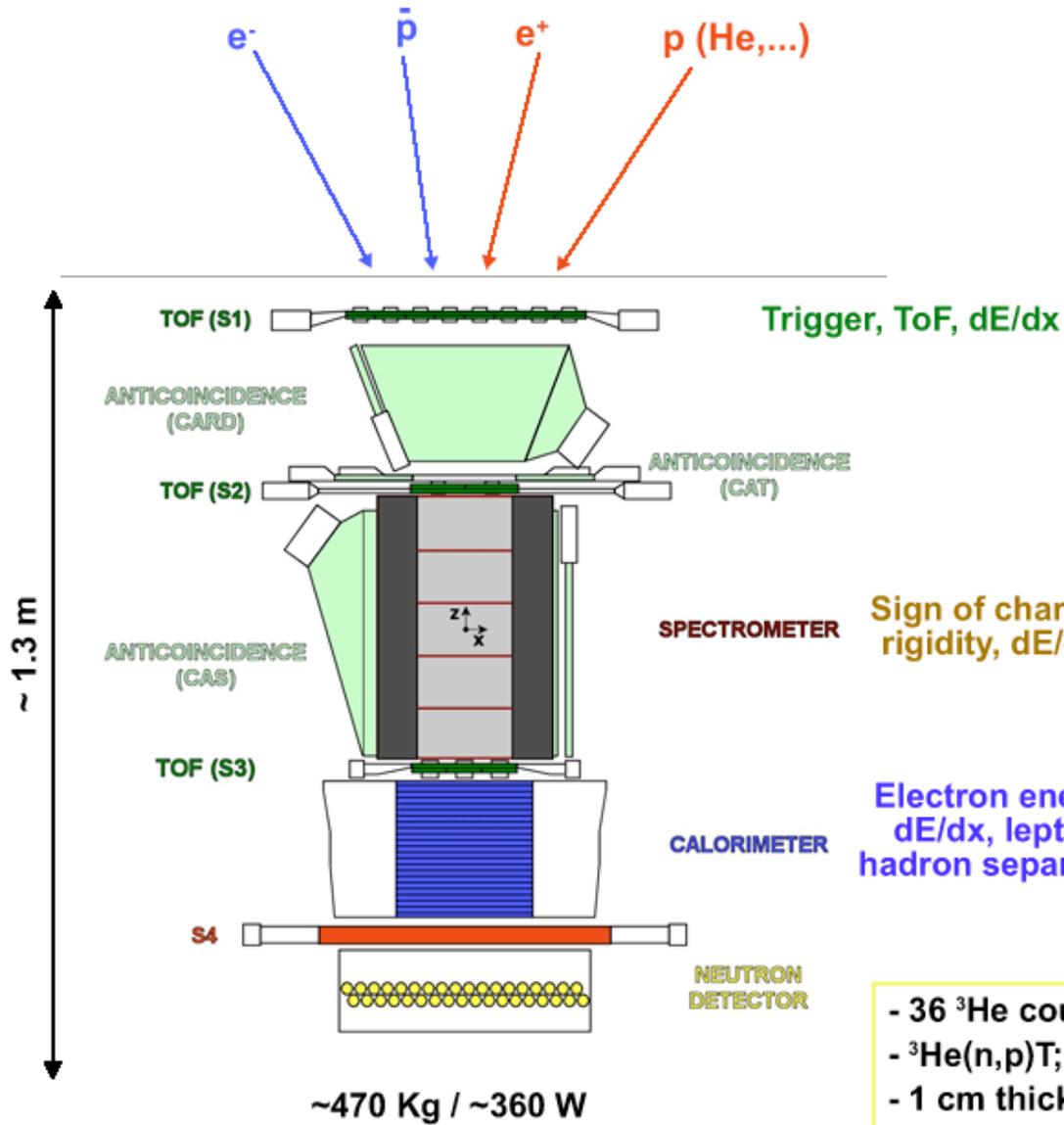


Pitch-angular distribution of particles trapped in Radiation Belt

Malakhov V.V., Mikhailov V.V. Grishantseva L.A.
On behalf of PAMELA collaboration



- S1, S2, S3; double layers, x-y
- plastic scintillator (8mm)
- ToF resolution ~300 ps (S1-3 ToF >3 ns)
- lepton-hadron separation < 1 GeV/c
- S1.S2.S3 (low rate) / S2.S3 (high rate)

- Permanent magnet, 0.43 T
- 21.5 cm² sr
- 6 planes double-sided silicon strip detectors (300 μm)
- 3 μm resolution in bending view → MDR
- ~800 GV (6 plane) ~500 GV (5 plane)

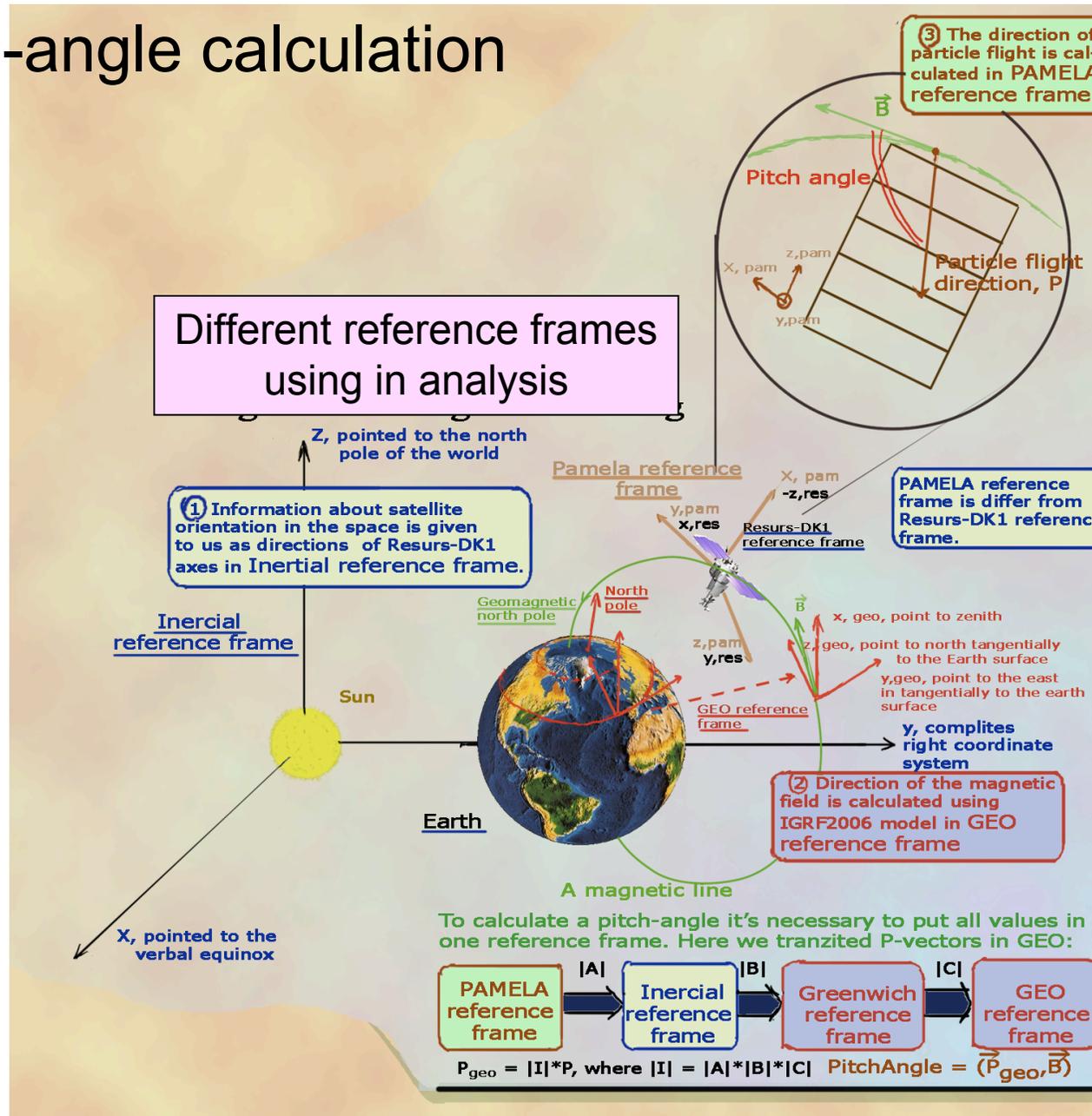
- 44 Si-x / W / Si-y planes (380)
- 16.3 X0 / 0.6 L
- dE/E ~5.5 % (10 - 300 GeV)
- Self trigger > 300 GeV / 600 cm² sr

Sign of charge, rigidity, dE/dx

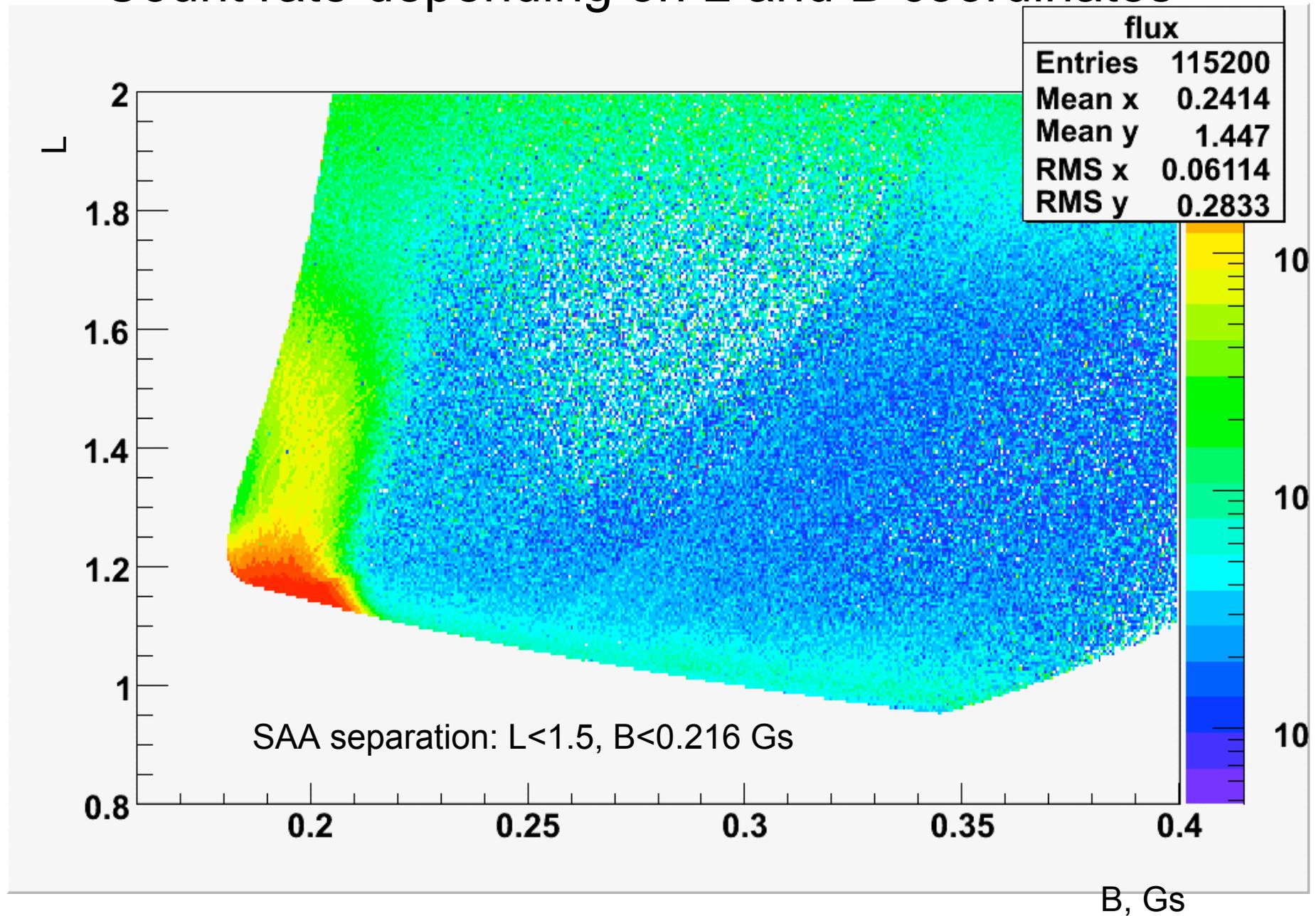
Electron energy, dE/dx, lepton-hadron separation

- 36 ³He counters
- ³He(n,p)T; E_p = 780 keV
- 1 cm thick poly + Cd moderator
- 200 μs collection

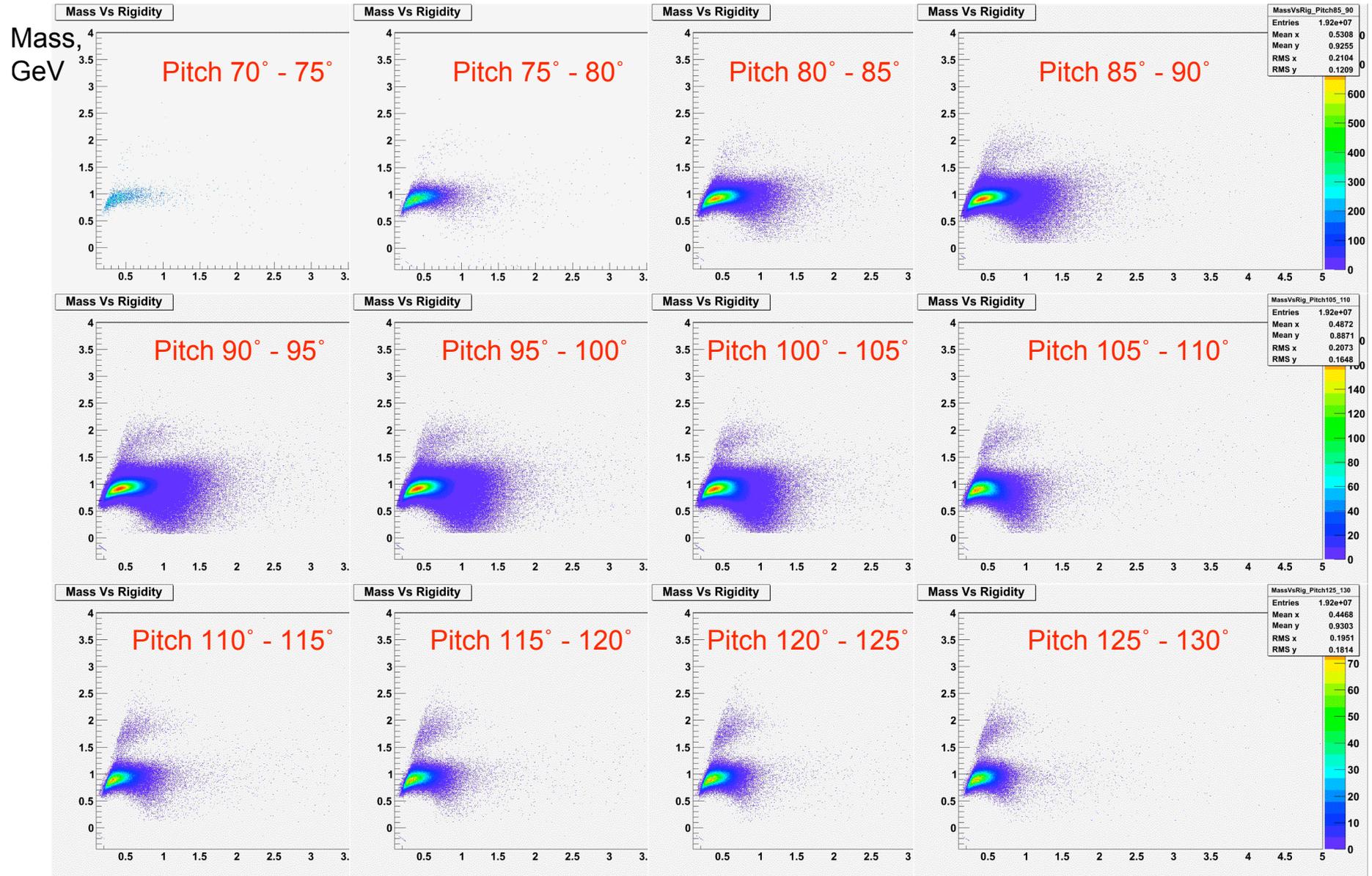
A pitch-angle calculation



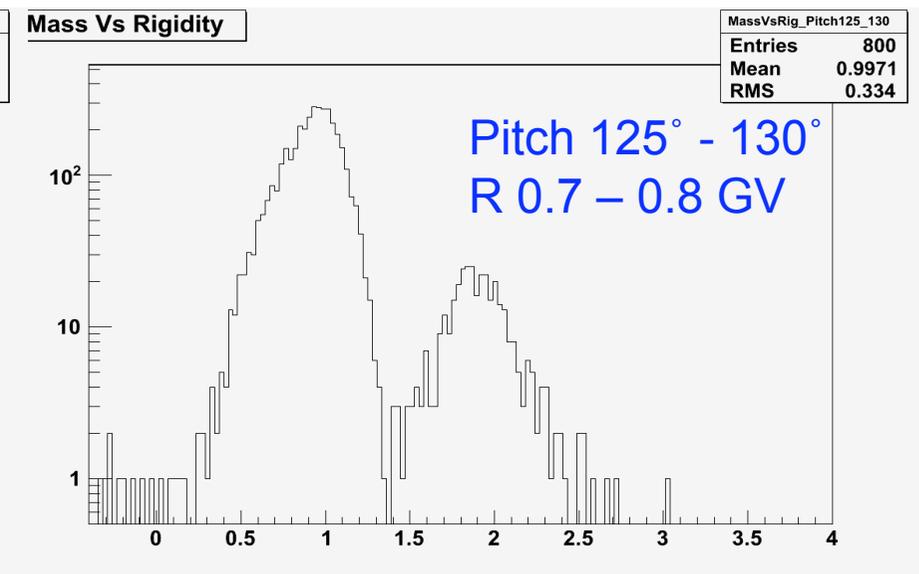
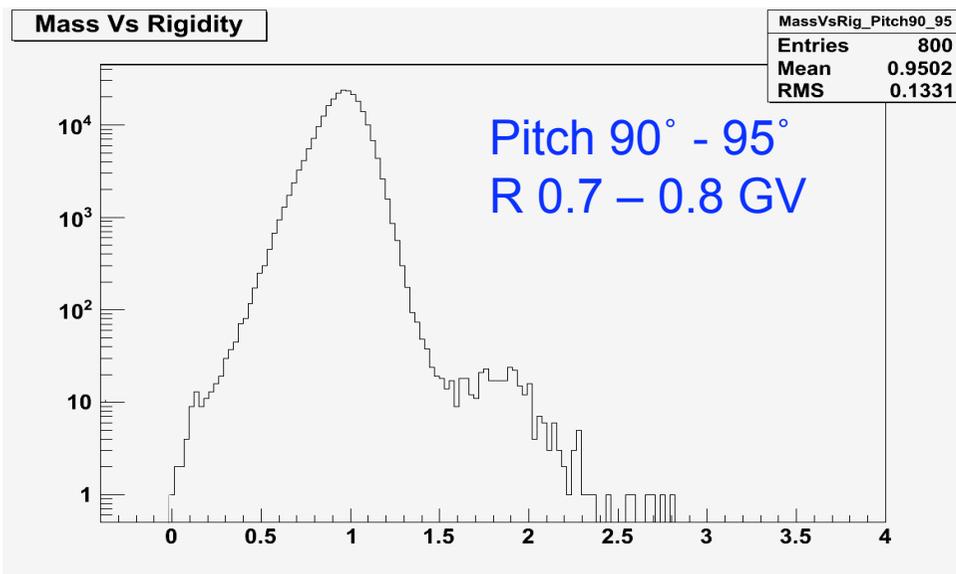
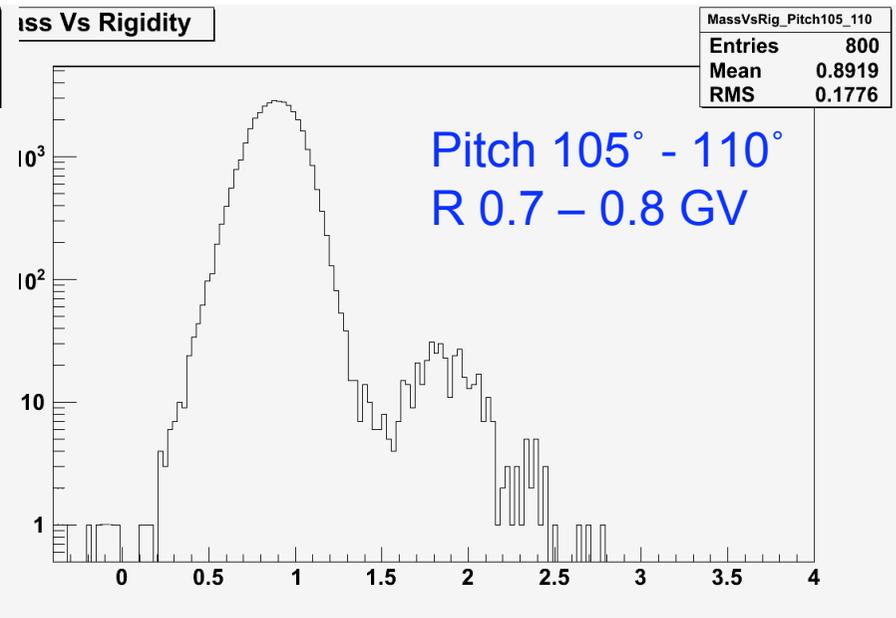
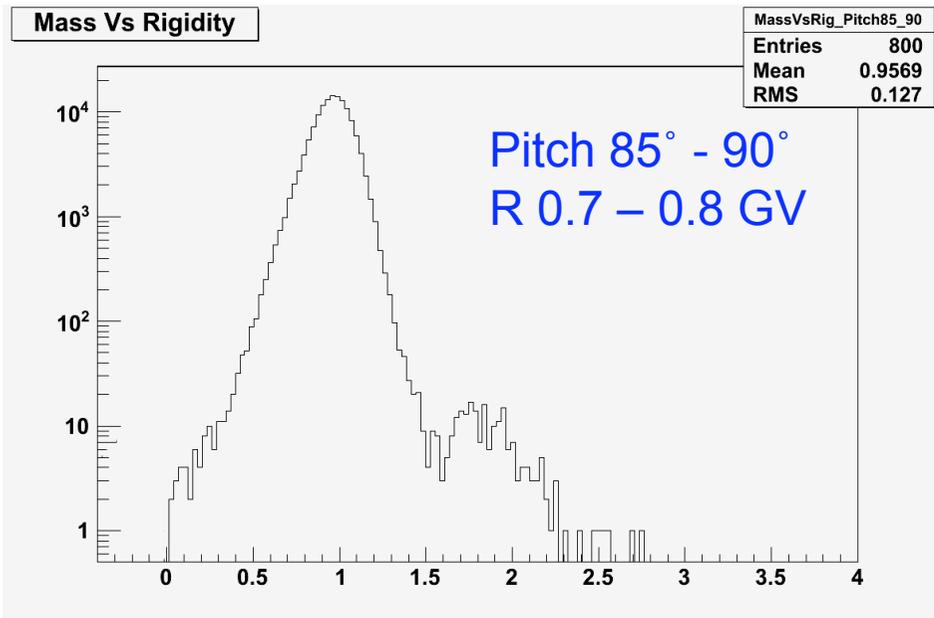
Count rate depending on L and B coordinates



Z1particle Mass distribution for different pitch-angles

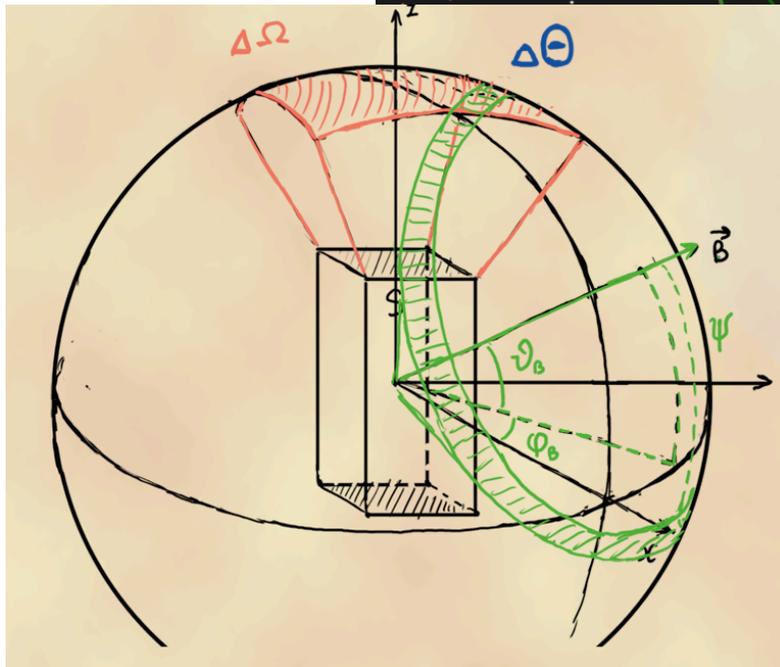
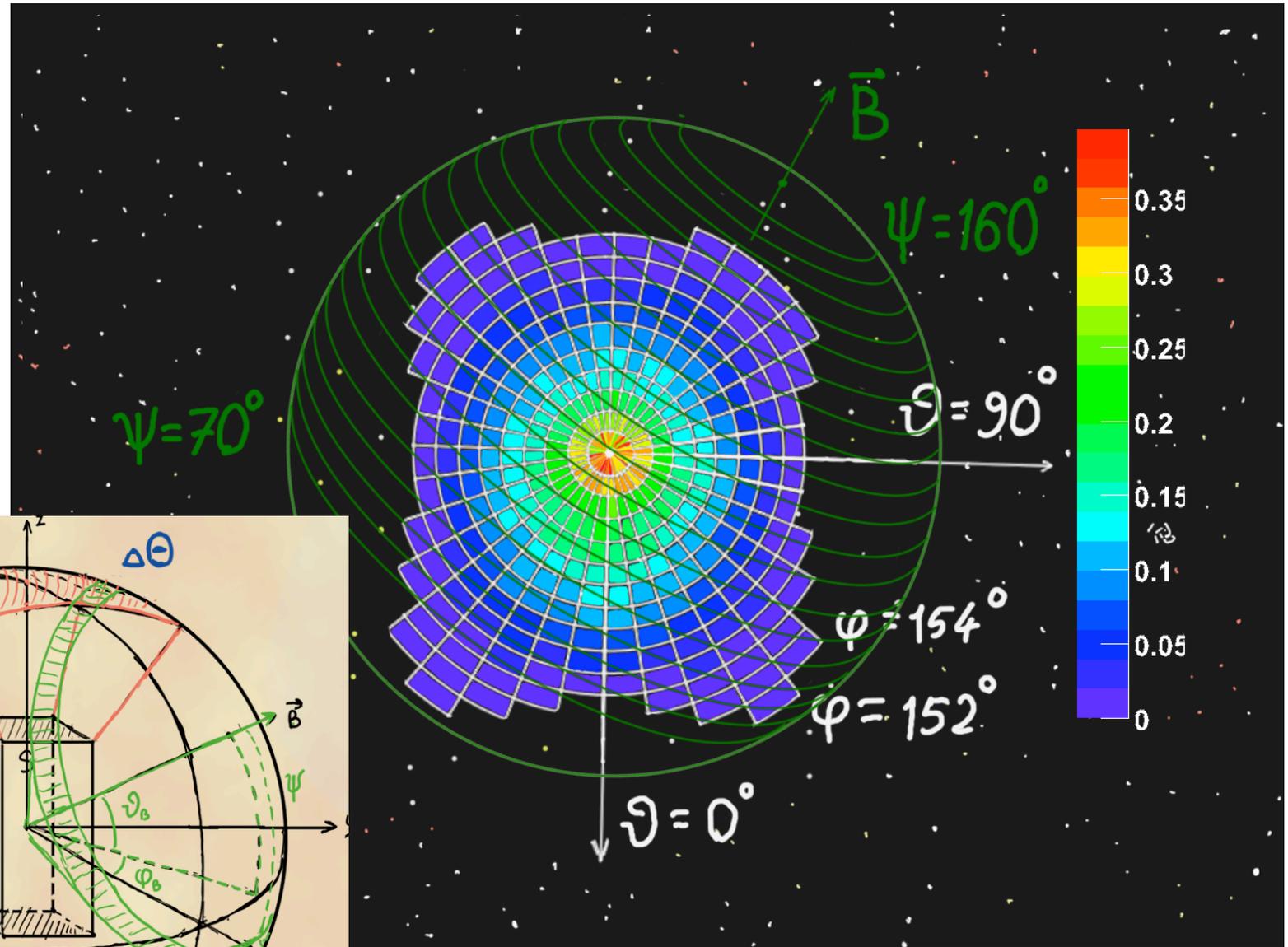


R, GV

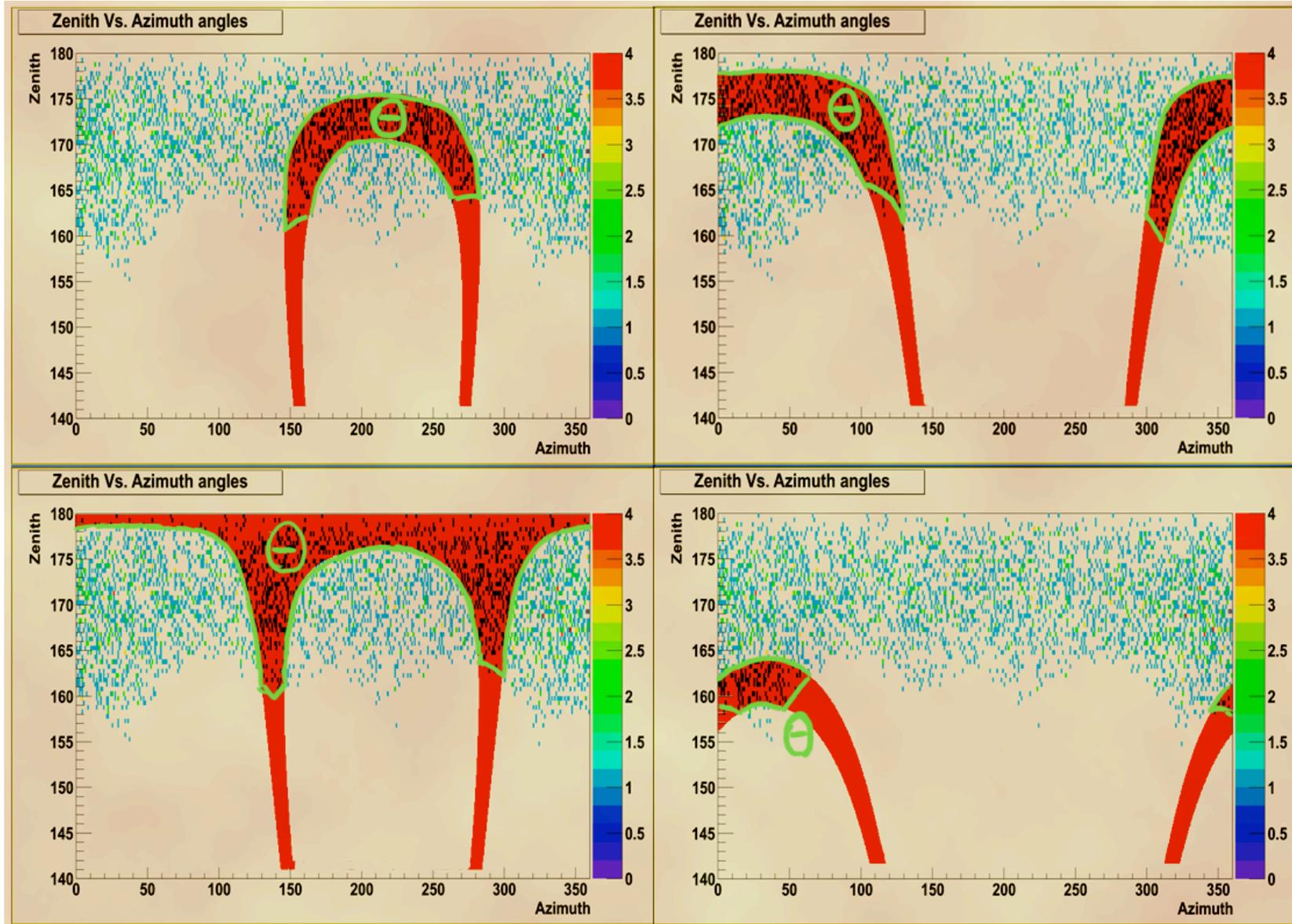


Mass, GeV

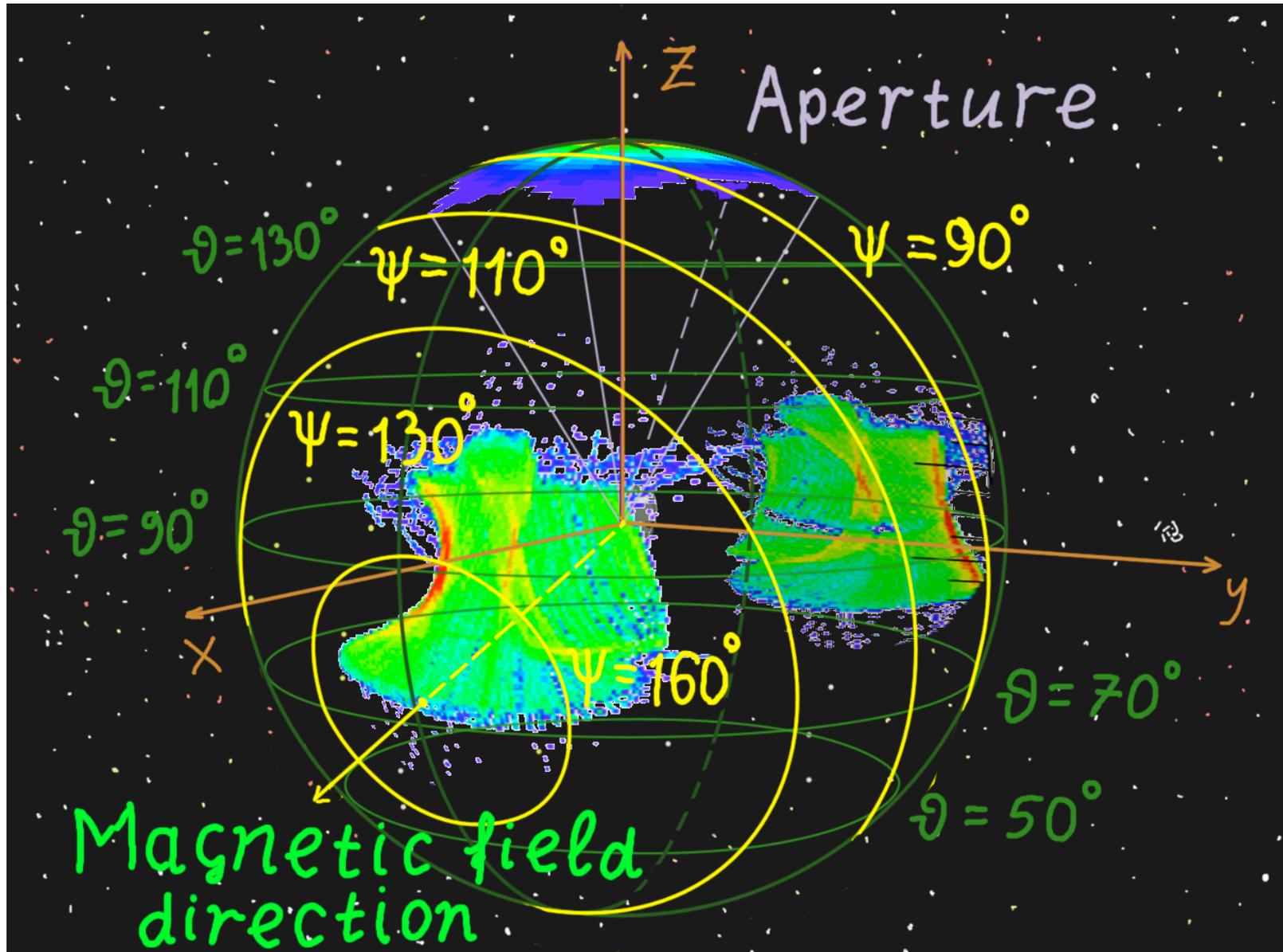
Angular efficiency and different orientation of B



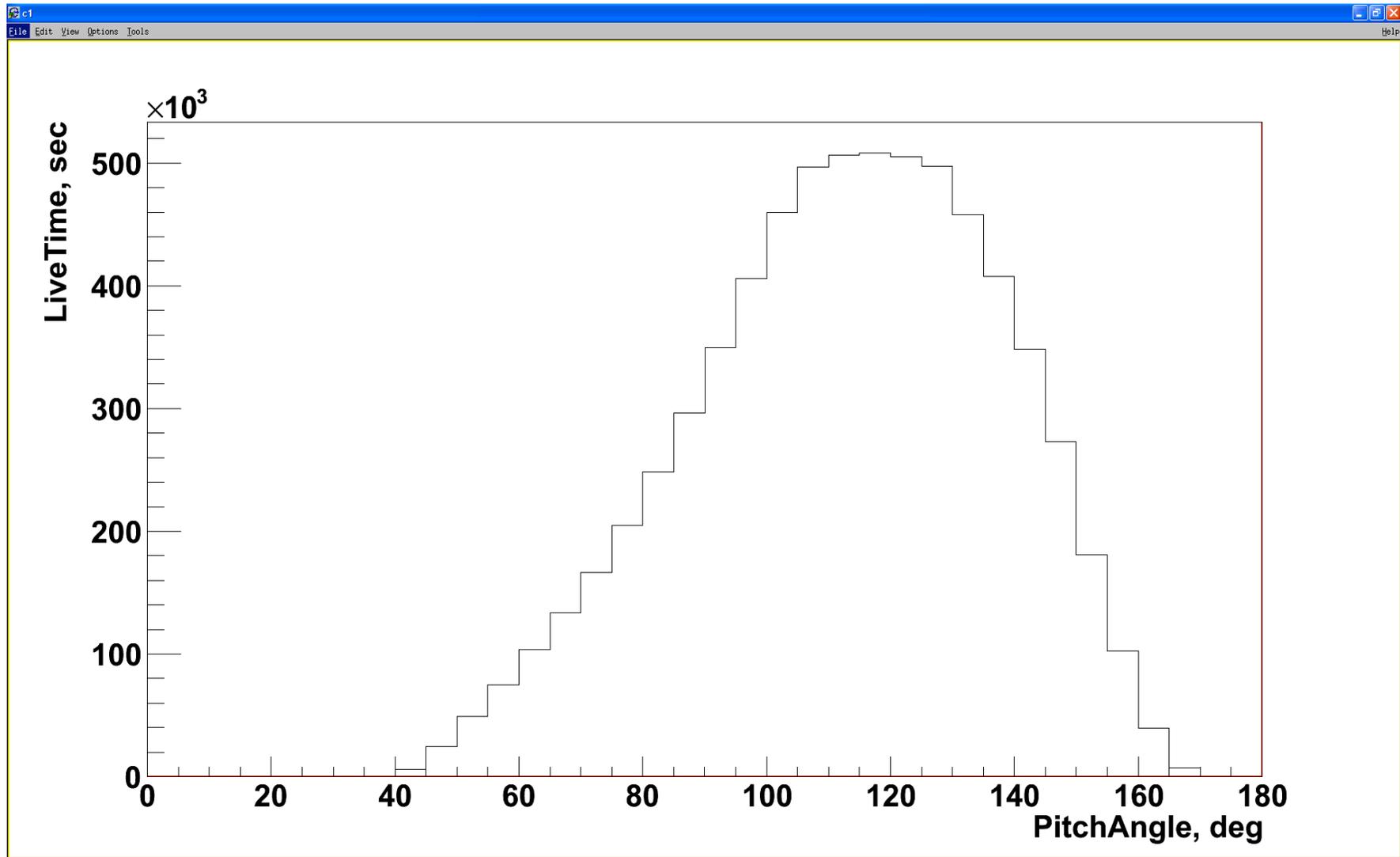
Sensitive part of instrument aperture



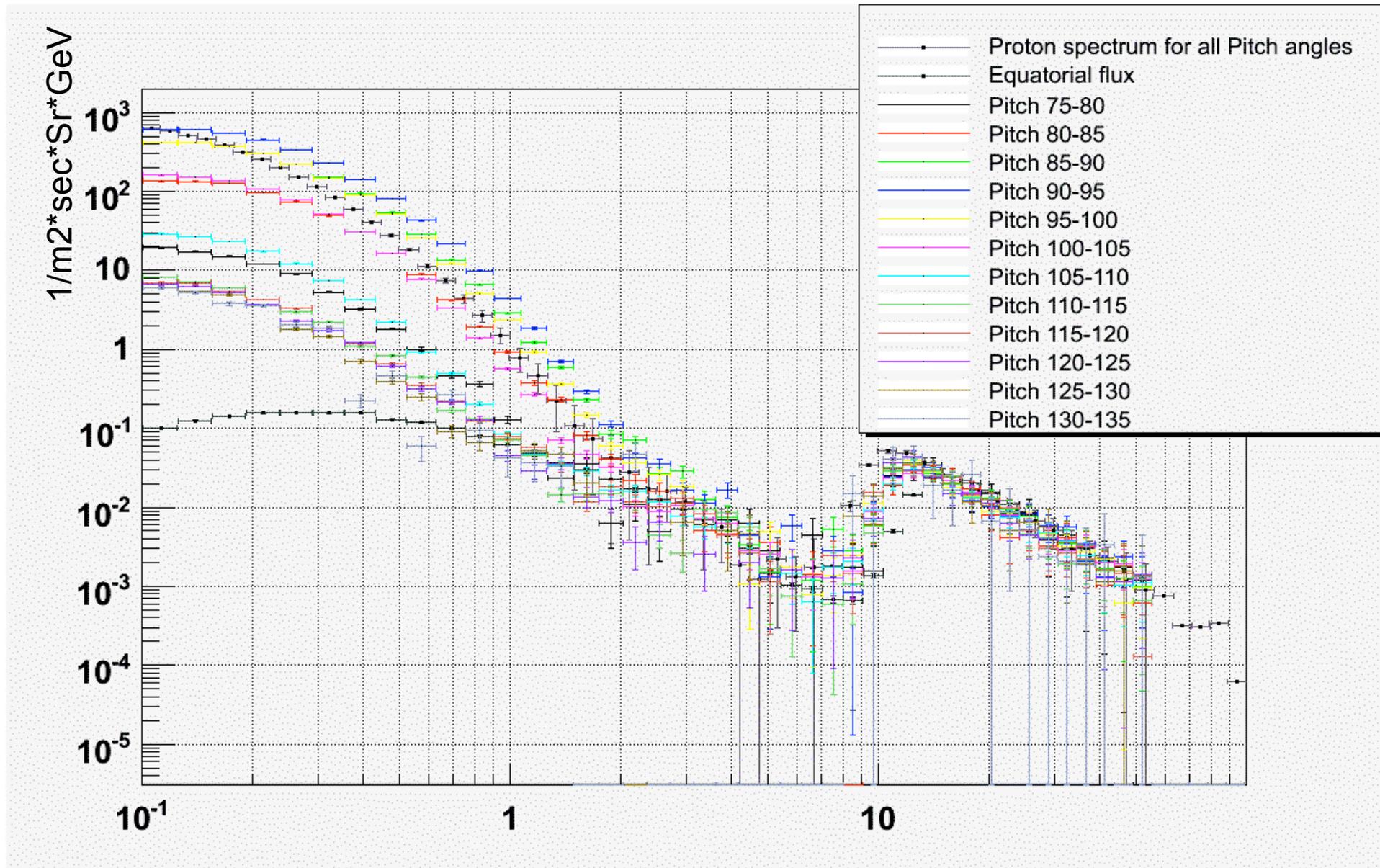
Distribution of orientation of magnetic field vector orientation in PAMELA reference frame



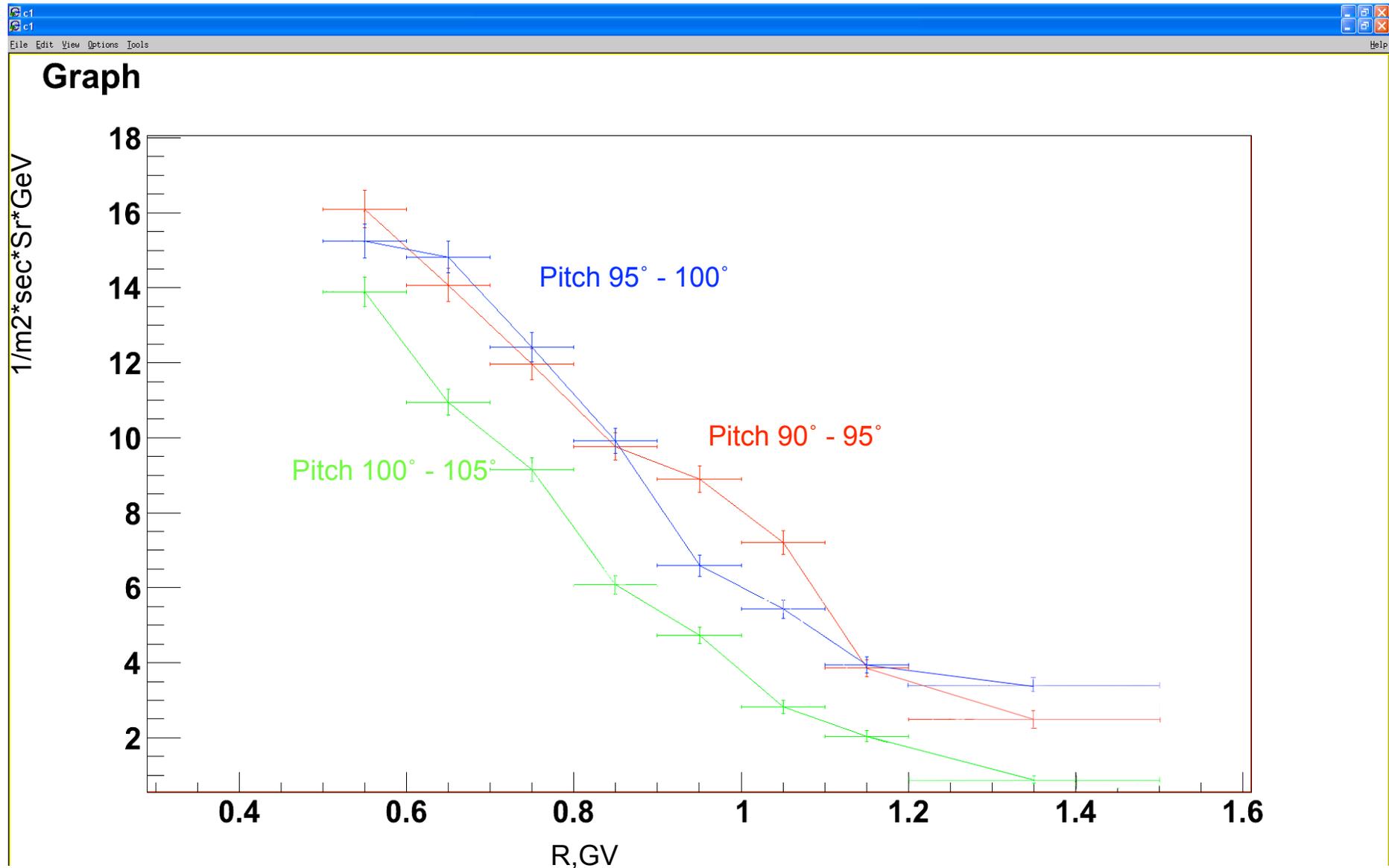
Exposition of Instrument depending on pitch-angles



Protons spectra for different pitch-angles



Deuterons spectra for different pitch-angles



Conclusion:

Mass distribution of particles in radiation belt with $z=1$ were obtained

Method of reconstruction of pitch-angle distribution was developed.

Preliminary spectra of protons and deuterons in energy range 0.6 – 1.5, trapped in radiation belt were obtained using this method.

Thanks!