

Closer to Reality

From Last Talk (7-Jan-06) – things seemed Great! However ...

- 1) In estimating the SRD I use the normalized (true) Extra Galactic Diff Rate instead of our absolute(meas.) rate...
Issue: the acceptance (A_{eff}) falls off at lower energies
(there's almost a factor of 3 here)

- 2) Our intend operational mode is "Rocking" exposing our backside
Issue: Large gaps between CalModules
(there's another factor of ~ 1.3 here)

This analysis: Input:

- 1) First day of 5B Bkg. Run: dataset v7r3p5 (Includes rocking)
- 2) Extra Galactic Diff: dataset v7r3p5
- 3) All Gamma rep-V7r3p4 dataset, runs 401-800

All these datasets are "CTnew" mean application of the cuts shown by Julie prior to download

Input:
CTnew

Levels:
BKG: 22486
DIFF: 30308
GAM: 107276

FT1ZenithAngle > 100

Levels:
BKG: 20406
DIFF: 29795
GAM: 105090

High Energy e-
Filter

Levels:
BKG: 20242
DIFF: 29792
GAM: 103208

Heavy Ion
Filter

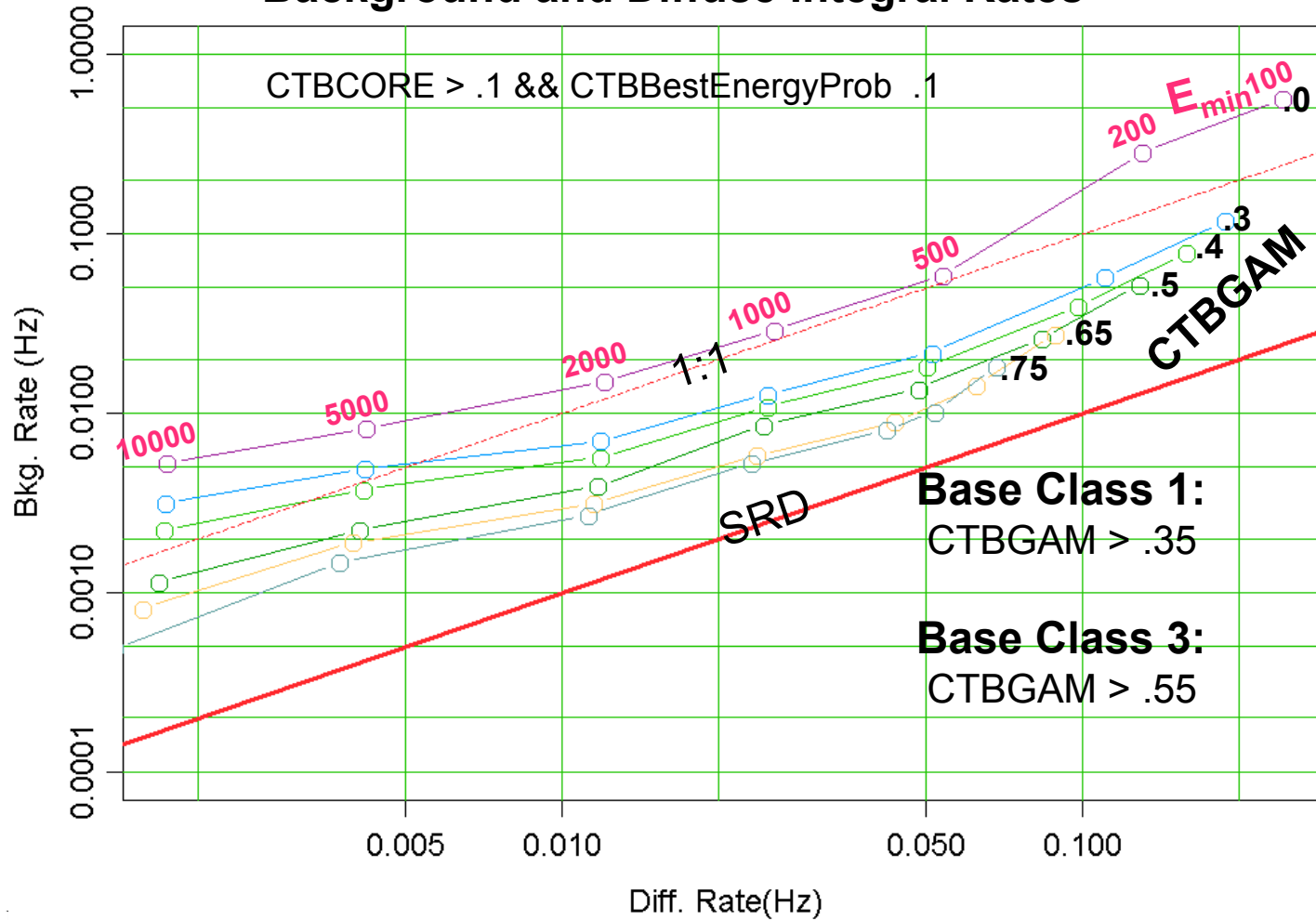
Levels:
BKG: 20210
DIFF: 29792
GAM: 103201

Scrambled Tkr
Filter

Levels:
BKG: 19967
DIFF: 29773
GAM: 103143

see next chart for Filter Definitions

Background and Diffuse Integral Rates



Hi Energy e- Filter:

$((\min(\text{abs}(\text{Tkr1XDir}), \text{abs}(\text{Tkr1YDir})) < .01 \ \& \ \text{Tkr1DieEdge} < 10 \ \& \ \text{AcdActiveDist3D} > 0 \ \& \ \text{AcdActDistTileEnergy} > .2) |$
 $(\text{Tkr1SSDVeto} < 7 \ \& \ \text{AcdActiveDist3D} > -3 \ \& \ \text{AcdActDistTileEnergy} > .15) |$
 $(\text{AcdActiveDist3D} > (-30 + 30 * (\text{Tkr1FirstLayer} - 2))) \) \ \&$
 $\text{CTBBestEnergy} > 5000$

Heavy Ion Filter:

$\text{CTBBestEnergy} > 5000 \ \& \ ((\text{CalTransRms} - 1.5 * \text{Tkr1ToTTrAve}) < 5)$

Scrambled Track Filter:

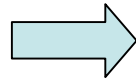
$(\text{Tkr1FirstLayer} - \text{Tkr2FirstLayer}) < 0 \ \& \ \text{Tkr2FirstLayer} > 4 \ \& \ \text{Tkr2TkrHDoca} > 100$

Cosmic Proton:

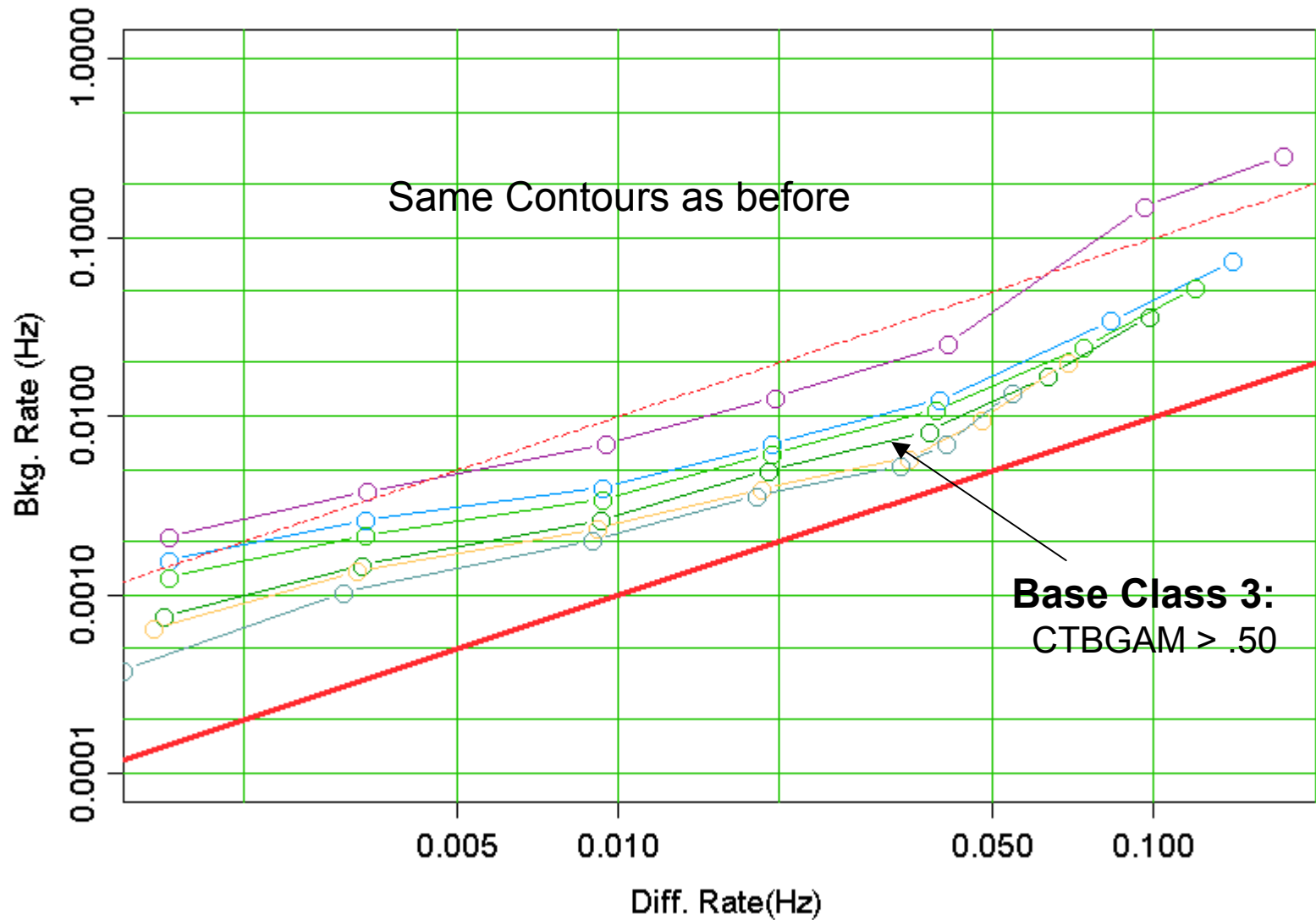
$\text{Tkr1FirstLayer} < 6 \ \& \ \text{AcdActiveDist3D} > -80 \ \& \ ((\text{AcdActDistTileEnergy} + \text{AcdActiveDist3D}/100) > 1)$

Base Class 3:

CTBCORE > .35 &&
CTBBestEnergyProb > .35

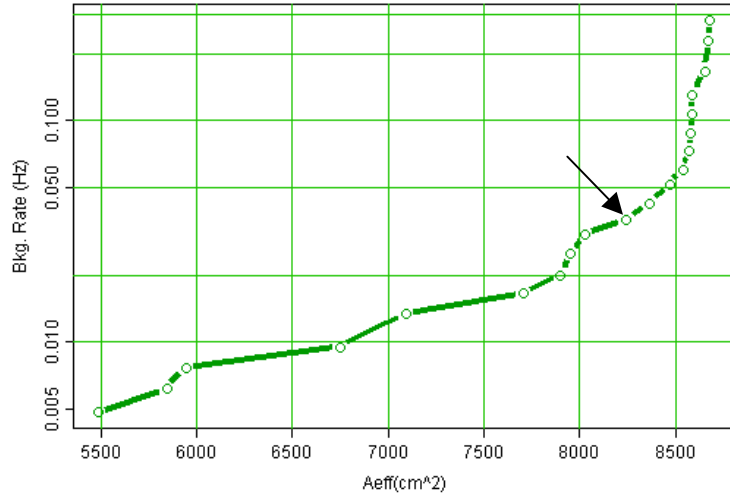


Levels:
BKG: 11650
DIFF: 22200
GAM: 77987

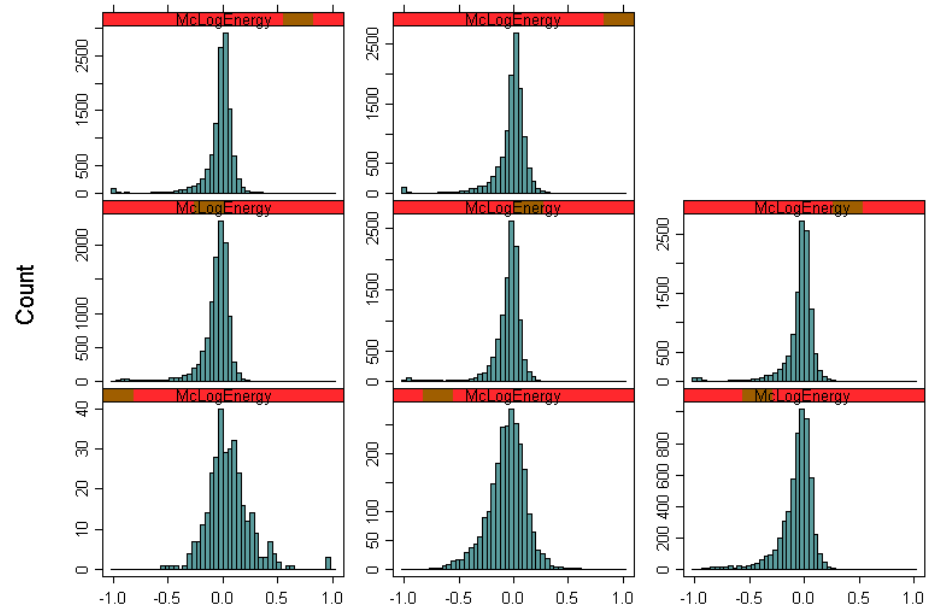
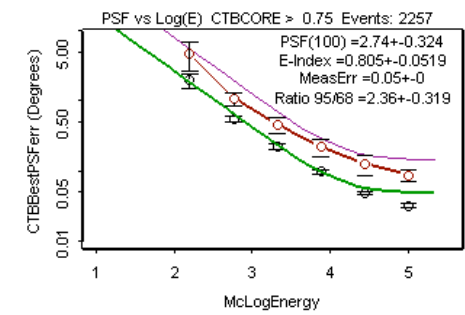
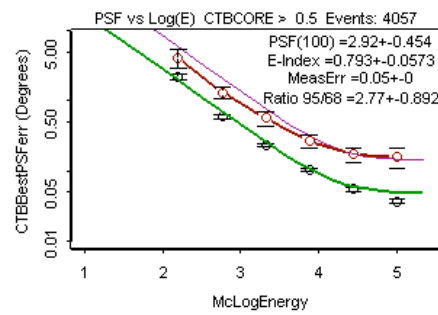
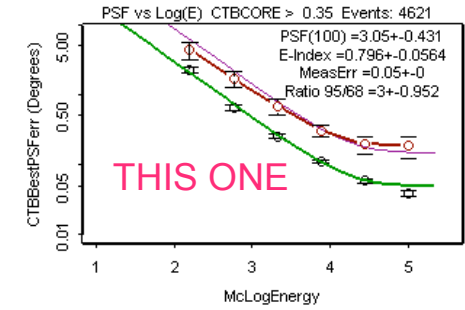
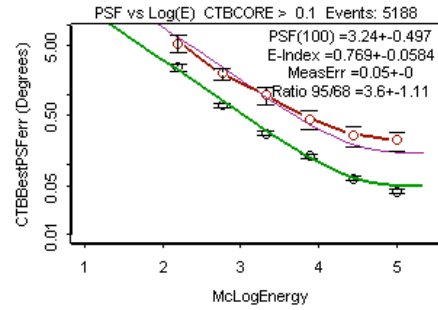
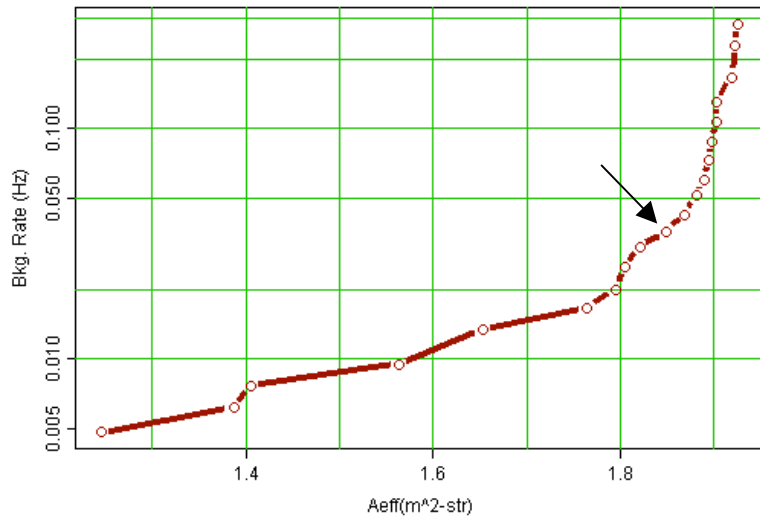


Base Class 3 Cuts

On Axis



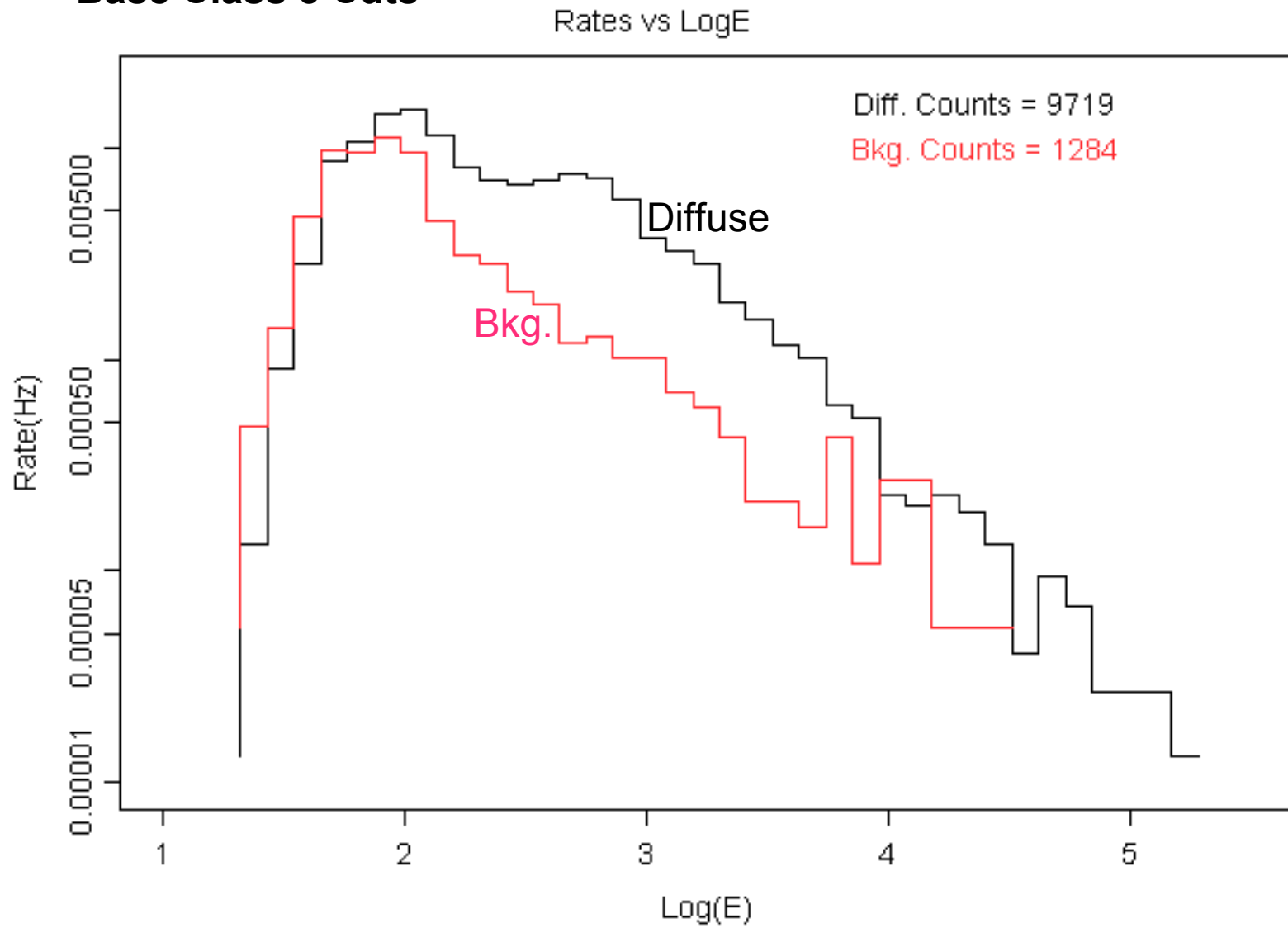
$A_{eff} \times FoV$

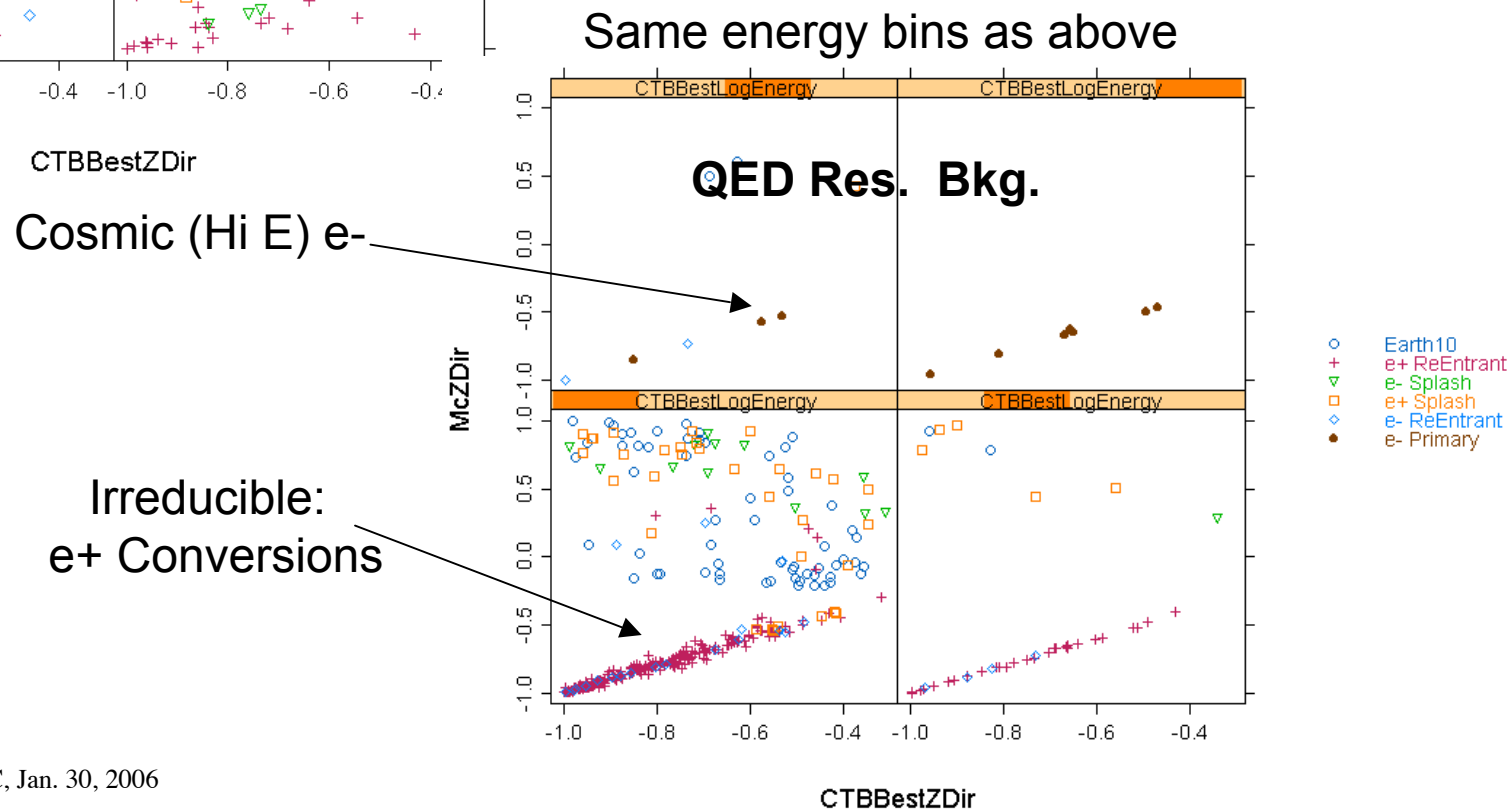
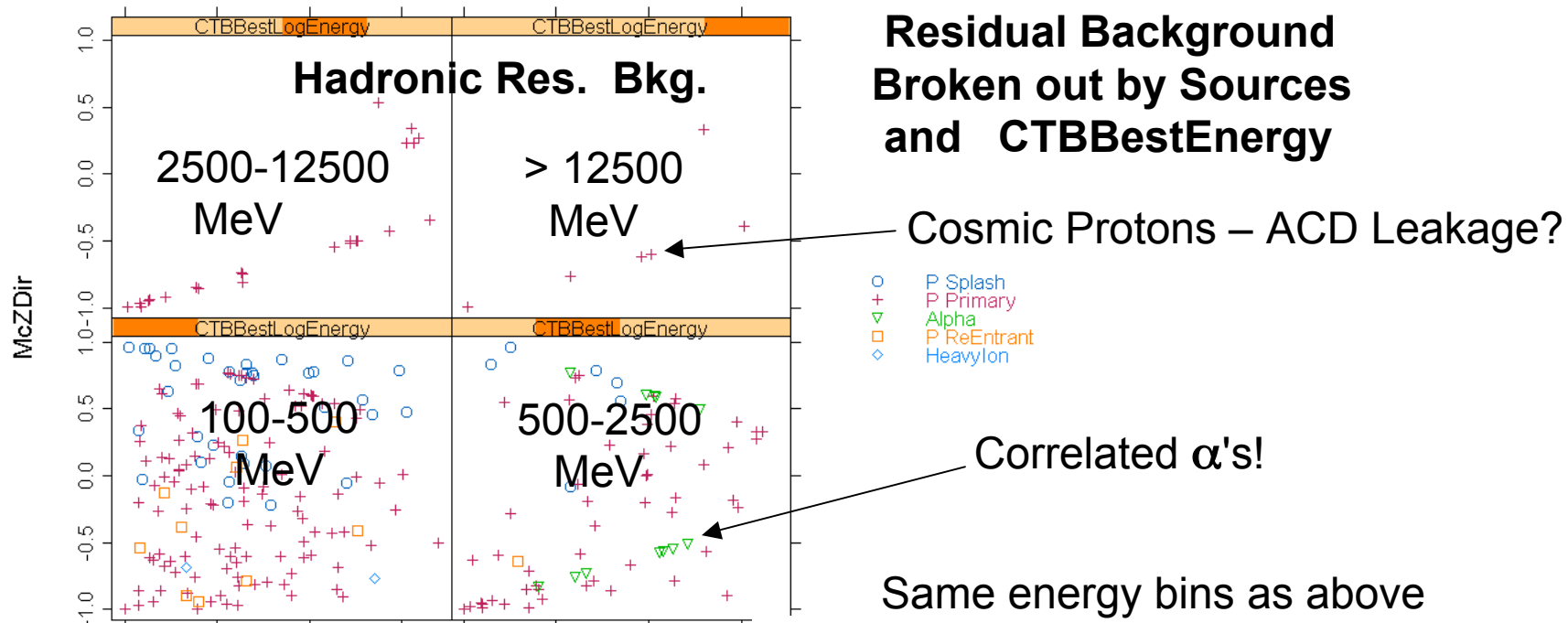


CTBBestDeltaEoE



Base Class 3 Cuts





ACD Leakage

Correlated Events:
McDirErr < .1

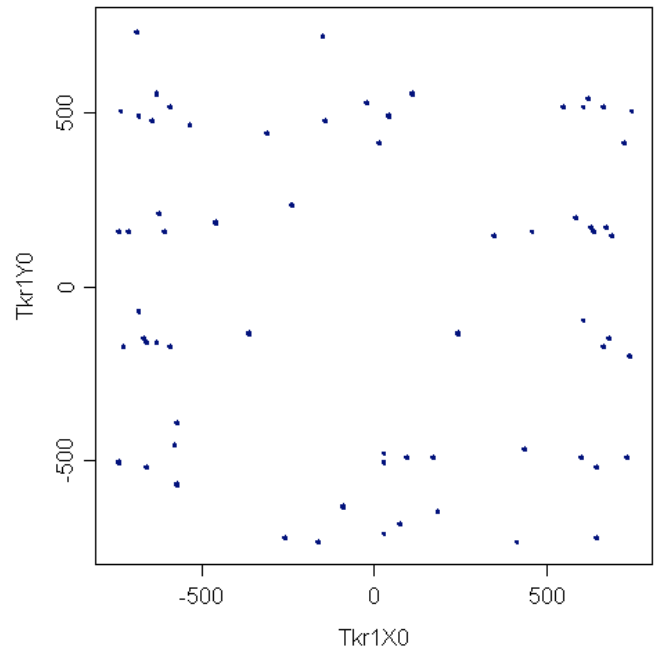
and not e+
Mcid != -1

72 events

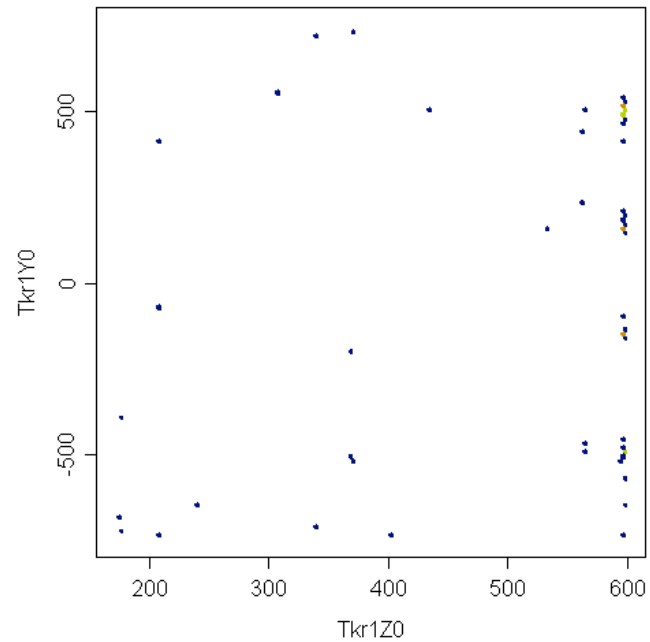
Require events start in
Top Layer
Tkr1Z0 > 590

Composition:

Levels:
P Primary: 19
e- ReEntrant: 16
e- Primary: 7
Alpha: 7



Side Ribbons don't go
to top!



Counts

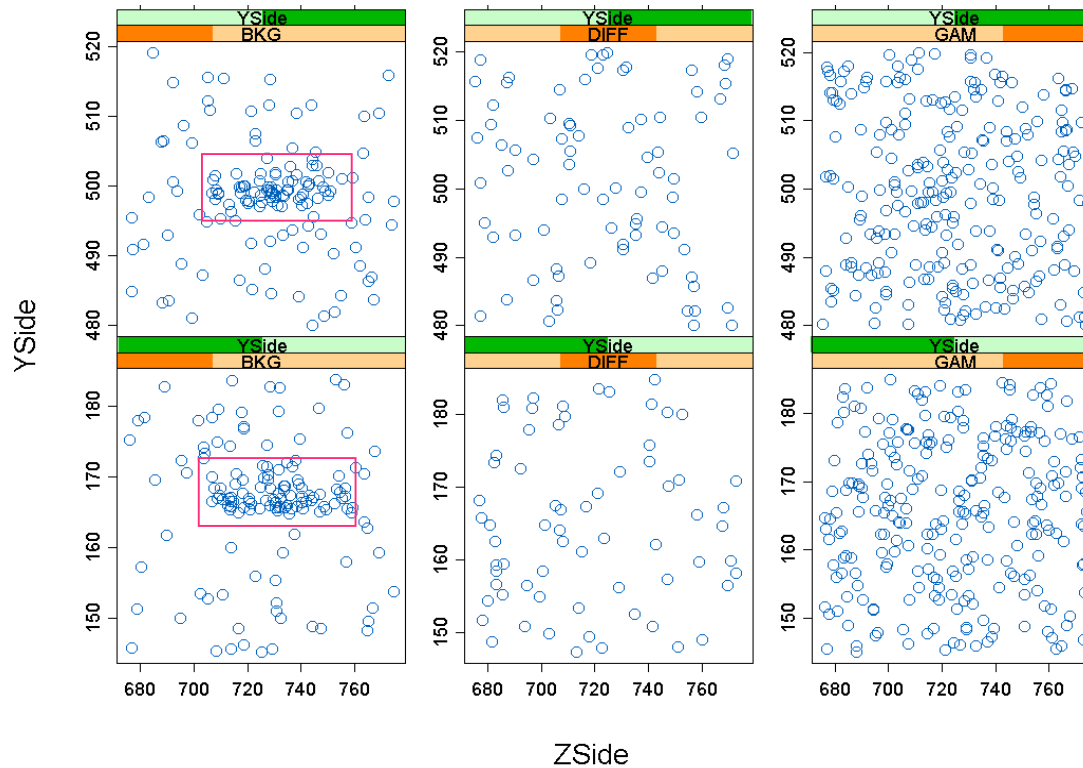
Estimate 47 events
are leaked in
this way

These are the Top
Corner Leakers found
in the hand-scan

Project Tracks to \pm Const. X Sides and fold to YSide > 0:

$$\text{YSide} = \min(\text{abs}(\text{Tkr1Y0} - \text{abs}((832 - \text{abs}(\text{Tkr1X0})) / \text{Tkr1XDir}) * \text{Tkr1YDir}), 742)$$

$$\text{ZSide} = \min(\text{abs}(\text{Tkr1Z0} - \text{abs}((832 - \text{abs}(\text{Tkr1X0})) / \text{Tkr1XDir}) * \text{Tkr1ZDir}), 800)$$



All Data

Data Inside Holes

Levels:	
BKG:	20406
DIFF:	29795
GAM:	105090

Levels:	
BKG:	154
DIFF:	21
GAM:	90

All Gamma Ineff. = $90/105090 = .1\%$

Suspect the same is true on Const. Y Sides – Evidence poor –

Const. X Sides
Holes Removed

Event.Type	
Level Name	Counts
BKG	20252
DIFF	29774
GAM	105000

McSource.Type	
Level Name	Counts
P Primary	3490
P ReEntrant	469
Earth10	5781
HeavyIon	184
P Splash	2295
e+ Splash	3724
e- Splash	1352
e+ ReEntrant	2465
e- Primary	39
e- ReEntrant	432
Alpha	18
e+ Primary	3
Gamma	29774
All Gamma	105000

Both Sides
Holes Removed

Event.Type	
Level Name	Counts
BKG	20197
DIFF	29733
GAM	104870

McSource.Type	
Level Name	Counts
P Primary	3475
P ReEntrant	467
Earth10	5767
HeavyIon	183
P Splash	2293
e+ Splash	3718
e- Splash	1351
e+ ReEntrant	2457
e- Primary	39
e- ReEntrant	428
Alpha	16
e+ Primary	3
Gamma	29733
All Gamma	104870

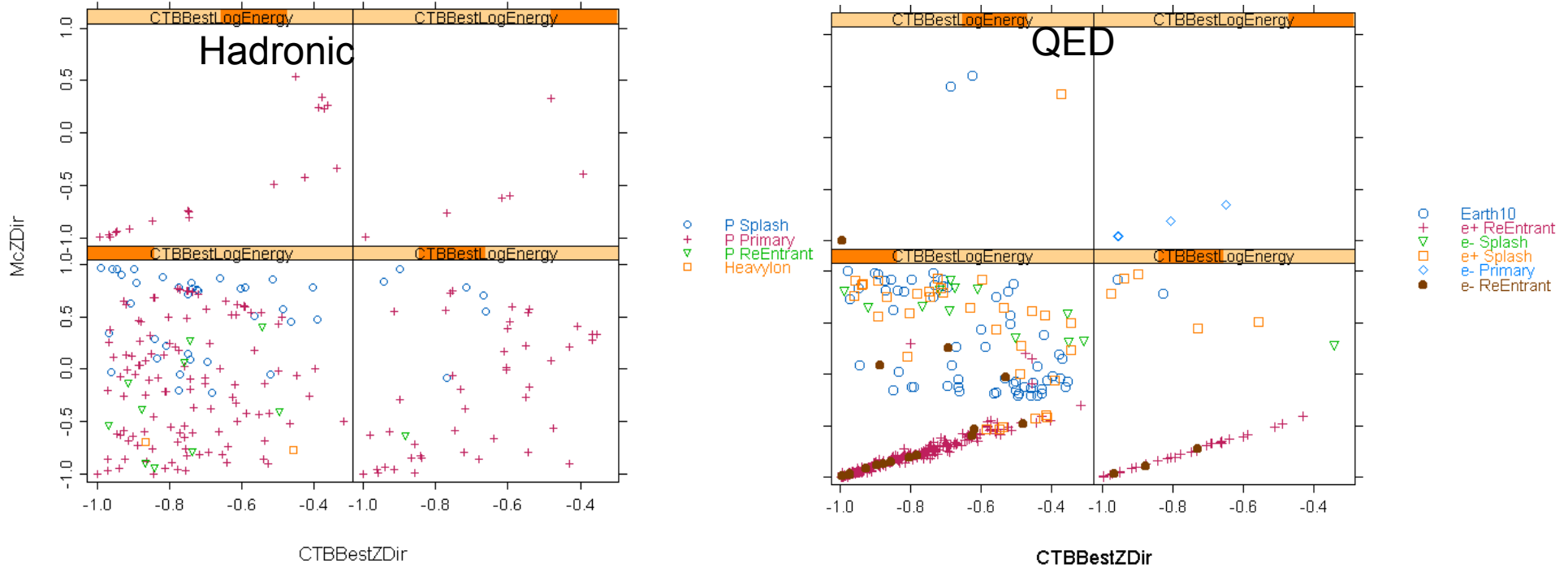
Difference

Levels:
BKG: 55
DIFF: 41
GAM: 130

Combined:

BKG: 209
DIFF: 63
GAM: 220

Remaining Base Class 3 Residuals



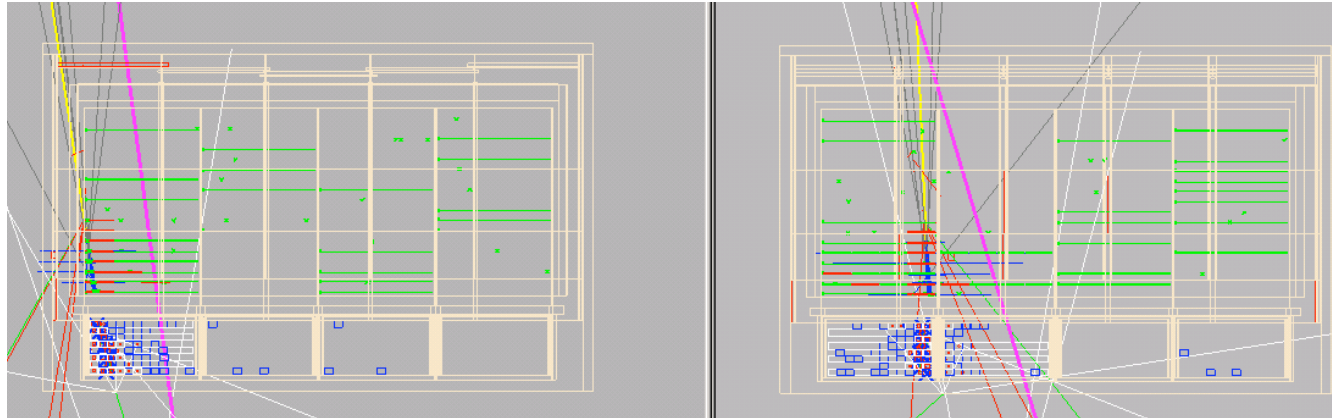
Next step: separate out the CTBBestEnergy > 1 GeV and *hand scan*

69 Events after
X,Y Side Holes

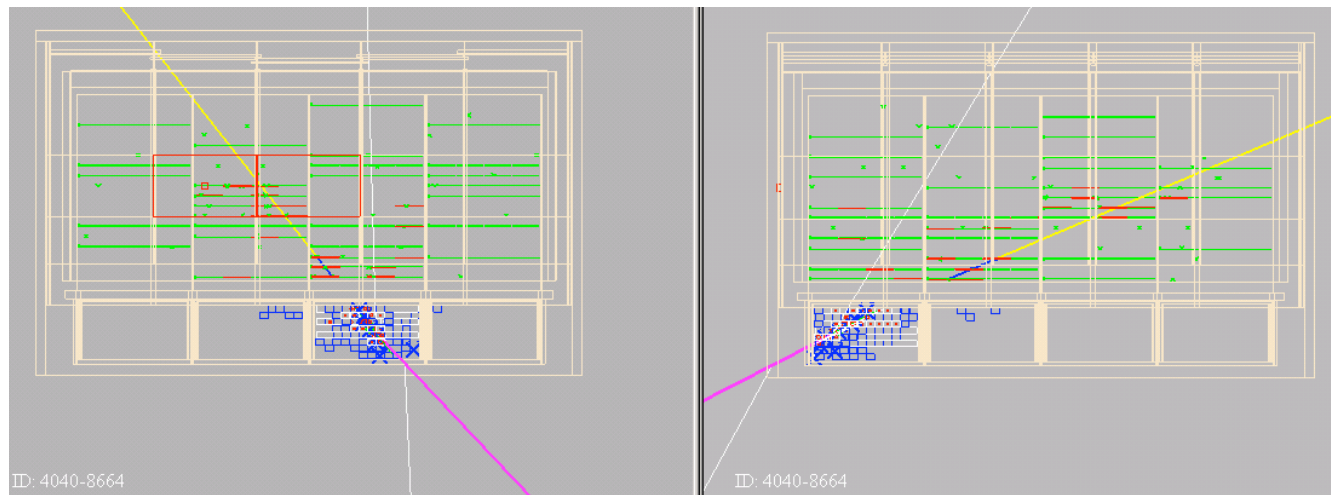
McSource.Type	
Level Name	Counts
e+ Splash	1
P Primary	50
e- Primary	4
e+ ReEntrant	9
P Splash	1
Earth10	3
e- ReEntrant	1

Uncorrelated Events

P Primary
12.17GeV
Tracking error in Y

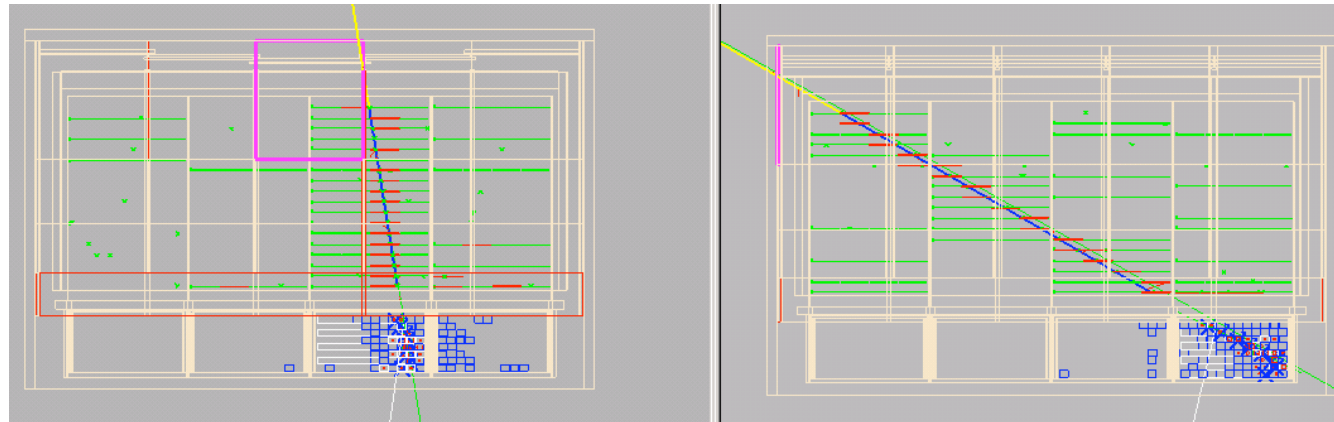


e+ Back-Entering
1.71GeV
Shower Stub in
Tracker

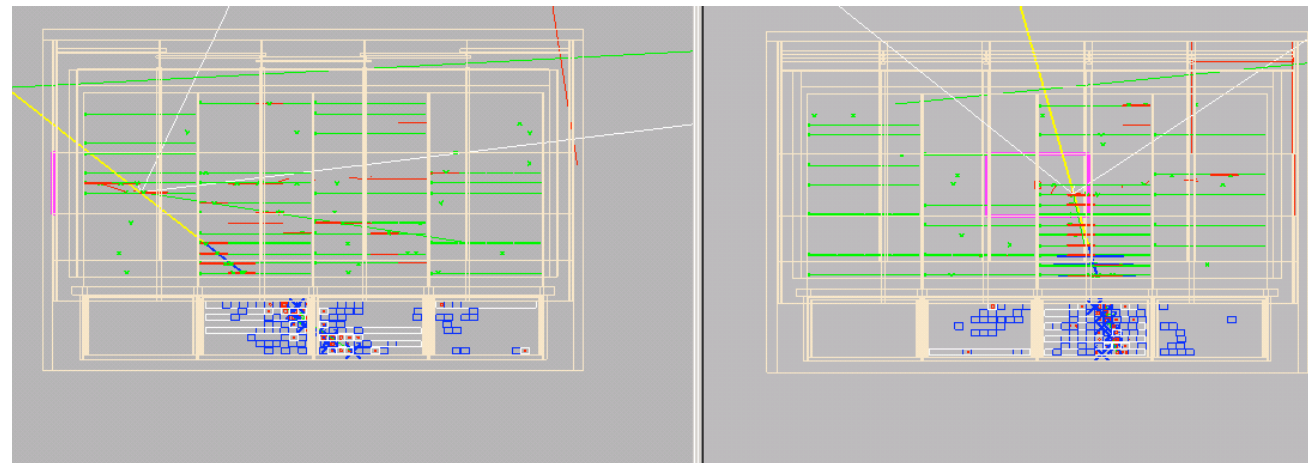


Correlated Events

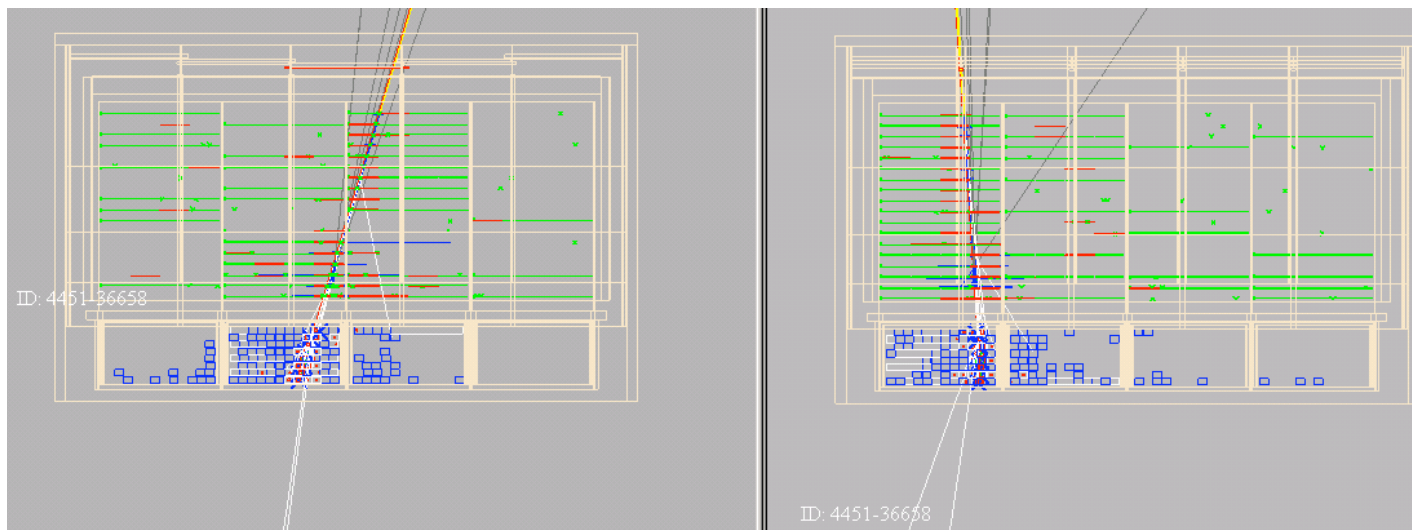
P Primary
32.55 GeV
Acid Tile
McPosHit 49KeV
Ribbon Slot
(10 of these)



P Primary
4.494 GeV
Acid Tile
McPosHit 1.57 MeV
No ACD Digi



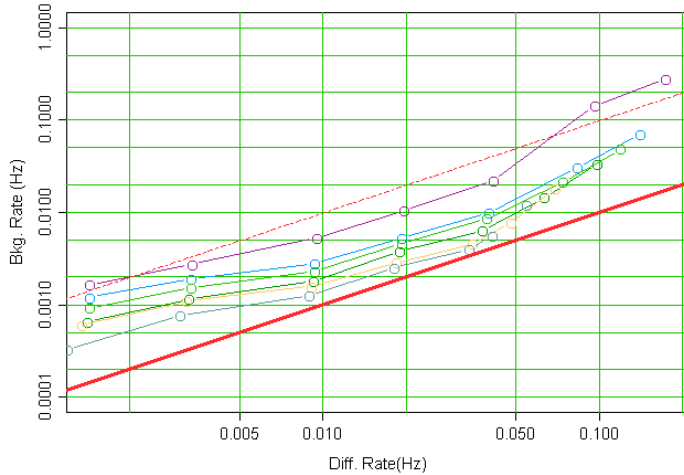
e- cosmic
6.65 GeV
Ribbon Ineff.



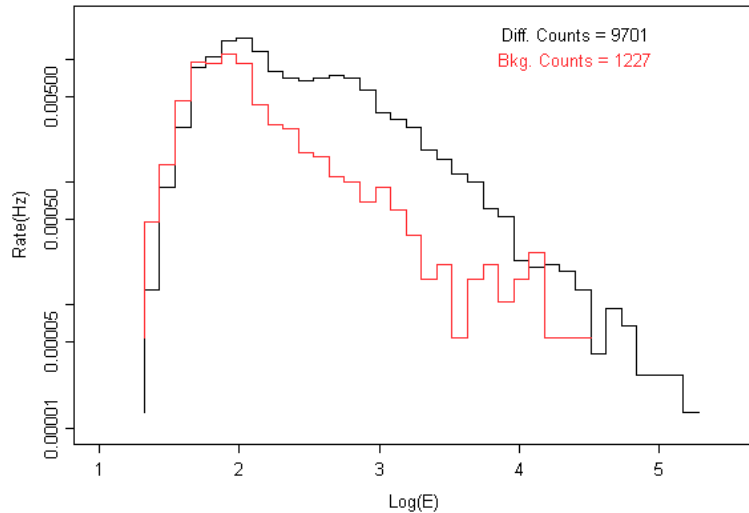
And so on...

Speculation: We may be able to kill most(all) of the Correlated Bkg. > 1 GeV
 If so where will we be -

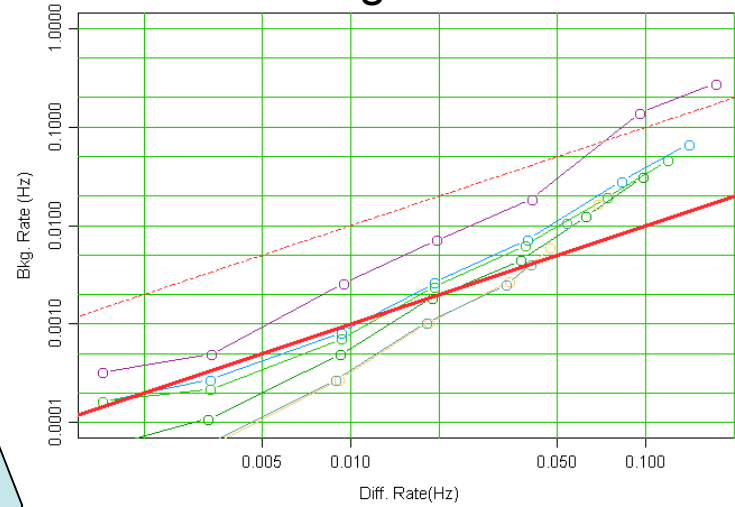
Present Status



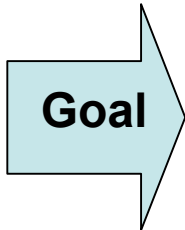
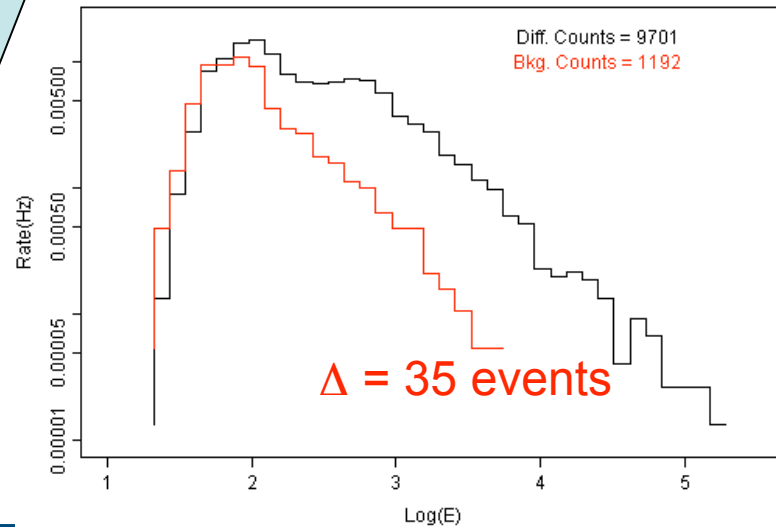
Rates vs LogE



Corr. Bkgs. Removed



Rates vs LogE

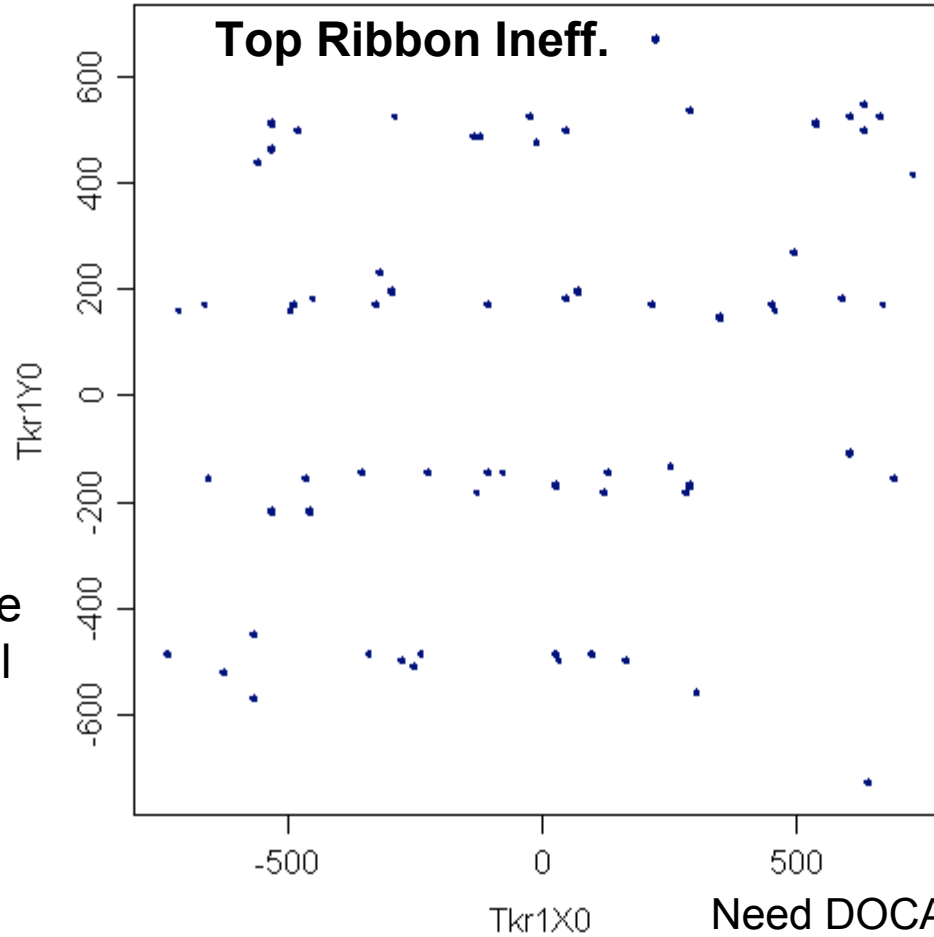


And... 45% Already There:

16 of these events are CTBBestEnergy > 1 GeV

Req.
CTBBestZ0 > 590
(Starts at the Top)
&
McDirErr < .1
(Correlated Event)

This will be an issue
on the sides as well



69 Events Total
(out of 365)

Counts

Need DOCA to nearest Ribbon
whether or not it was hit....