

# Pass 4 and Preparing for the LAT Handoff to NASA

Why we can't go with the DC2 Analysis (Pass 3)

- 1) Background Model known to be wrong
- 2) ACD Tile geometry known to be wrong (swapped Tiles)
- 3) Pass 3 had poor (inadequate) low energy background rejection and holes at all energies (ACD Ribbons, etc. – new variables need for nTuple)
- 4) Pass 3 didn't use the final set of (Cal) energy correction Tools (Pol d'Averzac's final "LastLayer Alg.")

How many iterations will be required to get this all correct?

Estimate 2 months/iteration – With LAT Handoff sometime in August this suggest time for atmost 1 iteration (a Pass 5)

## Pass 4 Punch List *(first circulated on Feb. 4)*

- 1) Change event axis in CalValsCorrTool to Tkr1 definition (thanks – P. Bruel)
- 2) New ACD Variable (addition to AcdValsTool)

Distance of closest approach to an ACD Ribbon

(whether not Ribbon fired)

Suggested Alg.:

- a) determine if trajectory goes out top (0) or which of the 4 sides (1-4).
- b) depending on entering surface – loop over all ribbon segments
- c) keep and report smallest value.

This avoids having to check the POCA for each DOCA calc. and limits the sampled ribbon segments to only those on the entering surface.

Suggested nTuple Var. name: AcdTkrRibbonDoca

- 3) New Tkr. Vars. (Additions to TkrValsTool)

TkrLATEdge = 742 – max(abs(Tkr1X0), abs(Tkr1Y0))

(presently this appears as CTBTrkLATEdge in the nTuple)

Track Dispersion: Mean-square distance between track start locations relative to Tkr1

$$\text{TrkDispersion} = \frac{1}{(N_{\text{Tkrs}} - 1)} \sum_2^{N_{\text{Tkrs}}} |\Delta\vec{X}_i|^2 \text{ if } \hat{t}_i \cdot (\Delta\vec{X}_i) > 0 \text{ else } |\Delta\vec{X}_i|^2 - (\hat{t}_1 * \Delta\vec{X}_i)^2$$

where  $\Delta\vec{X}_i = (\vec{X}_i - \vec{X}_1)$

If  $N_{\text{Tkrs}} < 2$  TrkDispersion = 0.

- 4) New Trk-Cal Variables – Where to put them? – Historically these have gone into CalValsTool.

CalTkrXtalDispersion: Dispersion of Cal. Xtals about Tkr1 Trajectory weighted by energy (?)

$$CalTkrXtalDispersion = \frac{1}{E_{CalRaw}} \cdot \sum_{i=1}^{N_{Xtals}} ((\vec{X}_i - \vec{X}_{Tkr1})^2 - ((\vec{X}_i - \vec{X}_{Tkr1}) \cdot \hat{t}_{Tkr1})^2) \cdot E_i$$

CalTkrXtalDispTrunc: Same as above after throughing out 10% furthest (Not largest contributors) tracks

## Data Reprocessing Requirements

All Gamma Run: need 2M

Background: 2B run (1B to train with and 1B to investigate residual)  
*(this is minimal – 4-5B would be better)*

Diffuse: 1 day (as before)