

GBL Refitting update

PF

10/28/2019



U.S. DEPARTMENT OF
ENERGY

Stanford
University

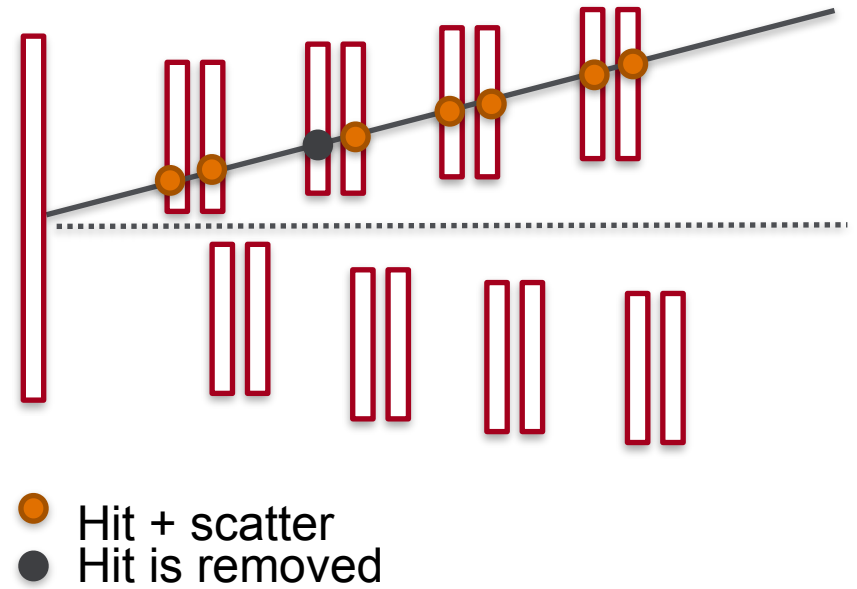
SLAC NATIONAL
ACCELERATOR
LABORATORY

- Revisited the Unbiased hit-on-track residuals driver
- The reason being that a whole track finding was re-performed removing hits on layers=> residuals were then defined wrt the closest measurement in the removed layer.
- Unbiased residuals are now formed from the original GBL track
 - GBLStripClusterData list is persisted
 - GBLPoint under check is removed and substituted with a scatter (to keep MCS effects)
 - GBL Trajectory is refit (*)
 - Hit-on-track is computed
- This, in principle, should be the right way to compute the residual

- (*) GBL doesn't converge over a single refit. I haven't iterated the refit yet

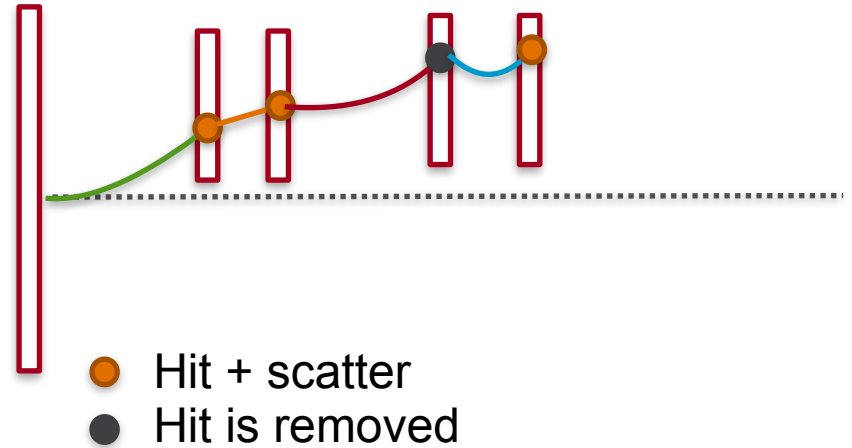
Computation of the unbiased residuals

- Added persistency of the GBLStripClusterData associated to a GBL Fit trajectory
- Each GBLStripClusterData object holds:
 - ID for the sensor
 - measurement (+err) in local coord
 - Track fit position (for biased residual)
- Loop on the hits, each hit is removed and substituted with a scatter
- GBL Refit is re-performed

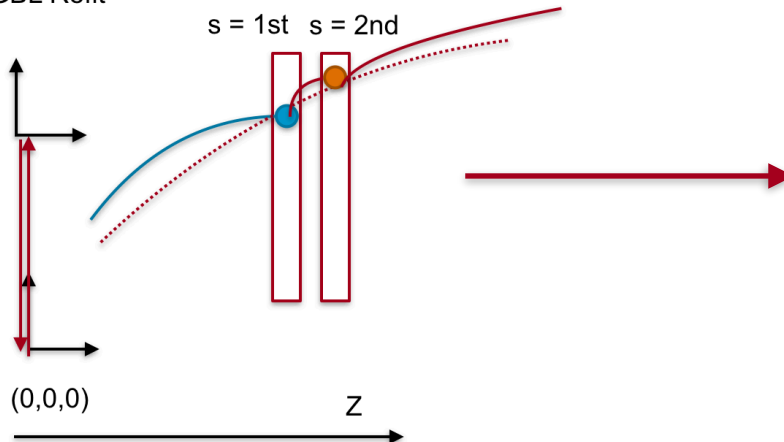


Computation of the unbiased residuals

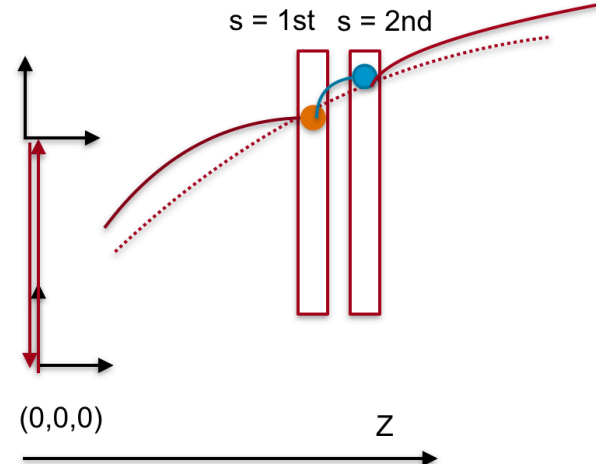
- GBL track has different track states on surface at each sensor
- Extrapolated track position corrected for each track state on surface
- $r = m - e$



- GBL Point => locPar / locCov
- GBL Point
- ⋯ Original helix
- GBL Refit

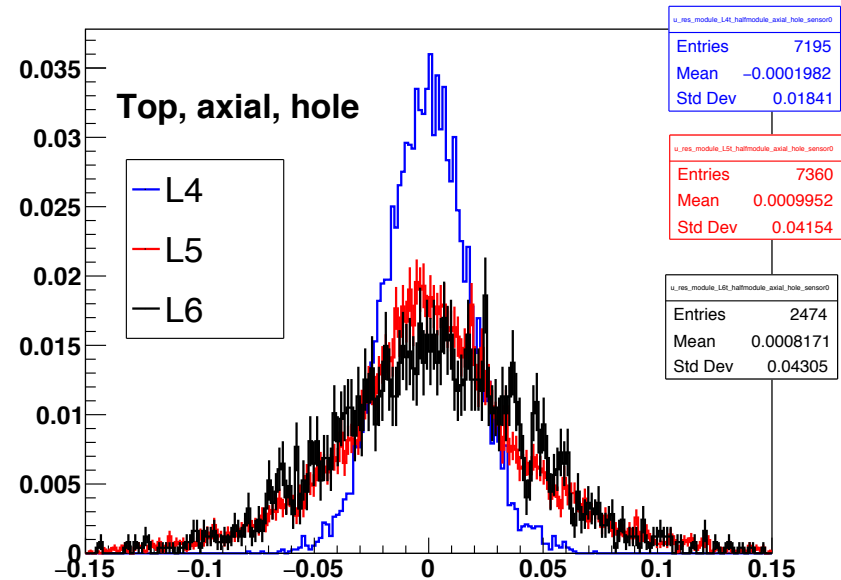
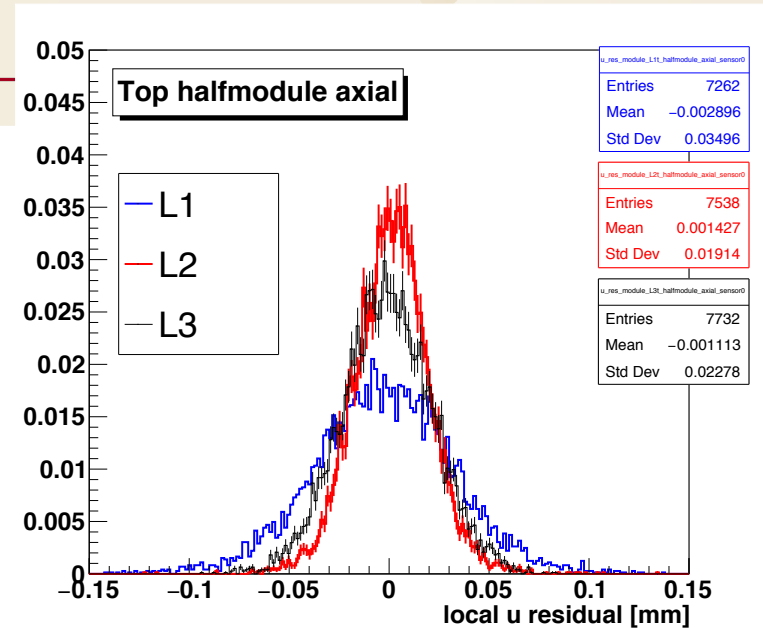


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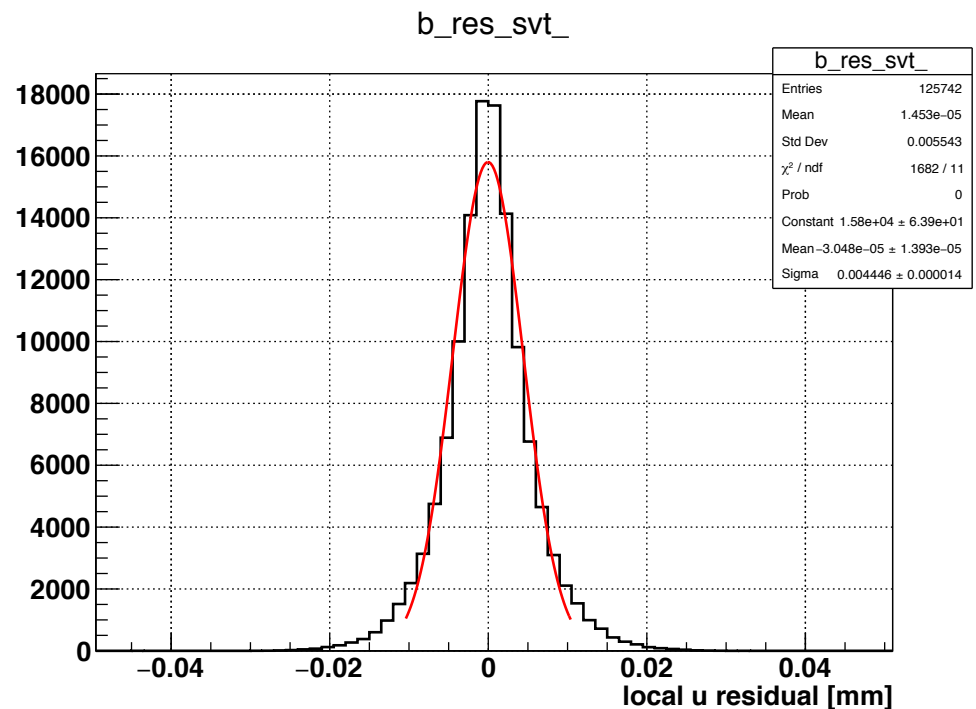
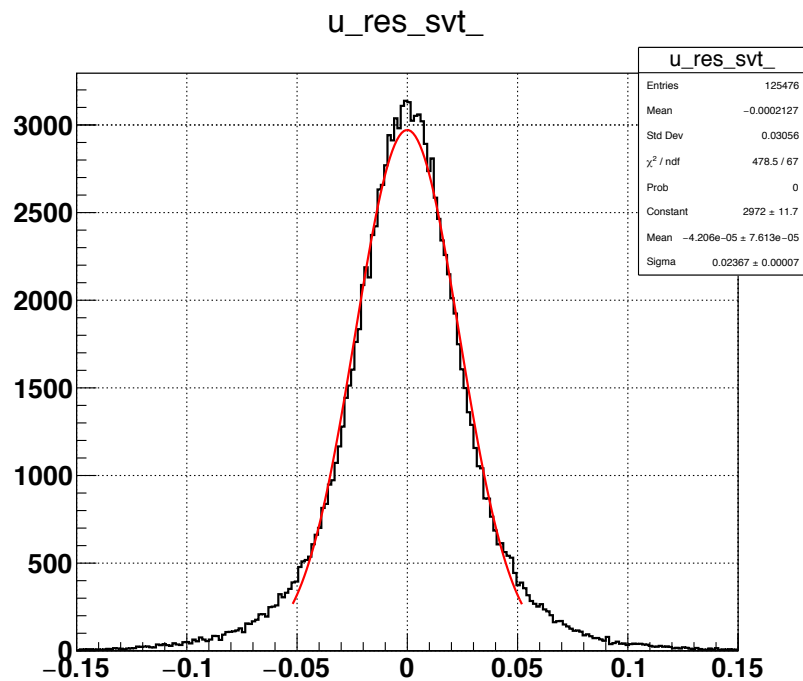
Unbiased Residuals

- Unbiased residuals are centered on zero with a width $\sim 23\mu\text{m}$ [avg] for single electrons at $\sim 2.4\text{GeV}$
- RMS Ly2 \sim RMS Ly4 (?)
- MS not included for holes-on-tracks
- Single GBL Refit for unbiased track



Unbiased Residuals

- About factor 5 better width for biased residuals (reasonable?) 23um (U) / 4.4um (B)
- Reasonable gaussian shape (~ 1.5 sigma fit range) away from tail effects
- Full scattering not included



- Would like to check the effects of moving a module of translation in global Y and see if that reflects over the unbiased residuals. That should be 1-1 if I got everything correct....