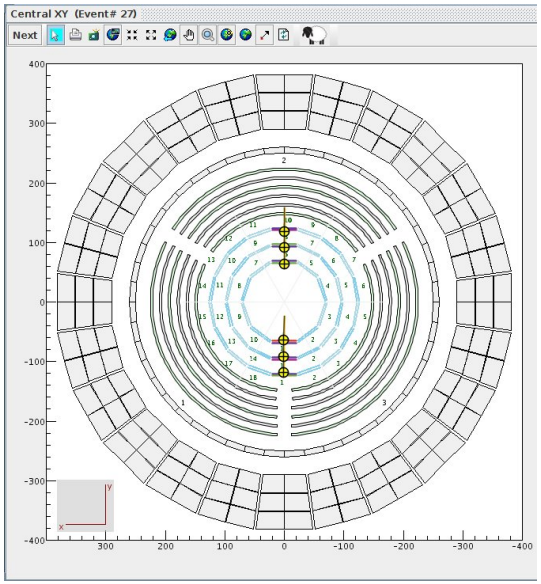
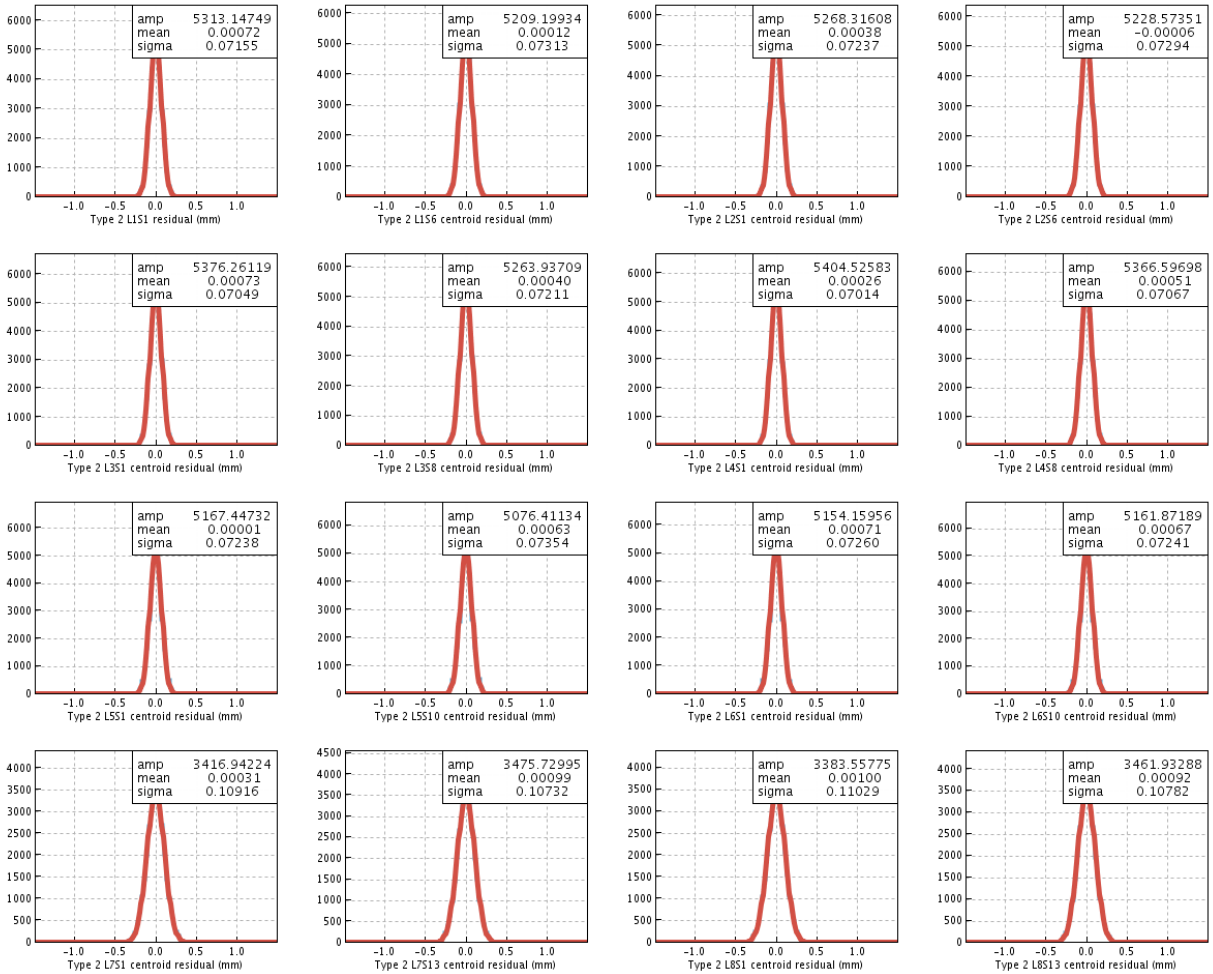
SVT Track-Based Alignment - "The Good"

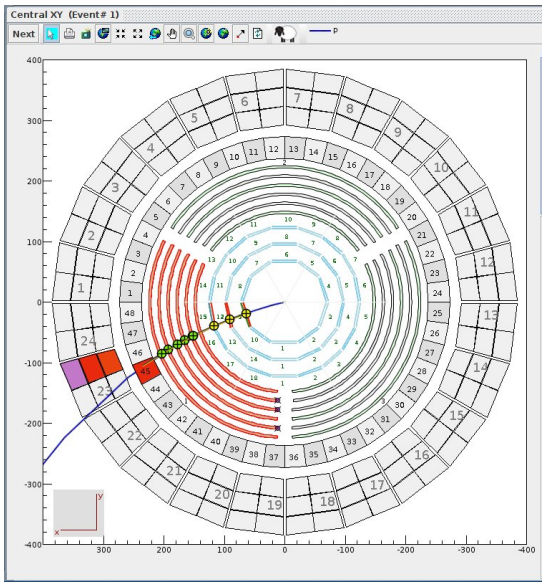
Early results with simulated, type-1, cosmic events (see below) with ideal geometry in simulation show residuals close to zero and widths near specifications.

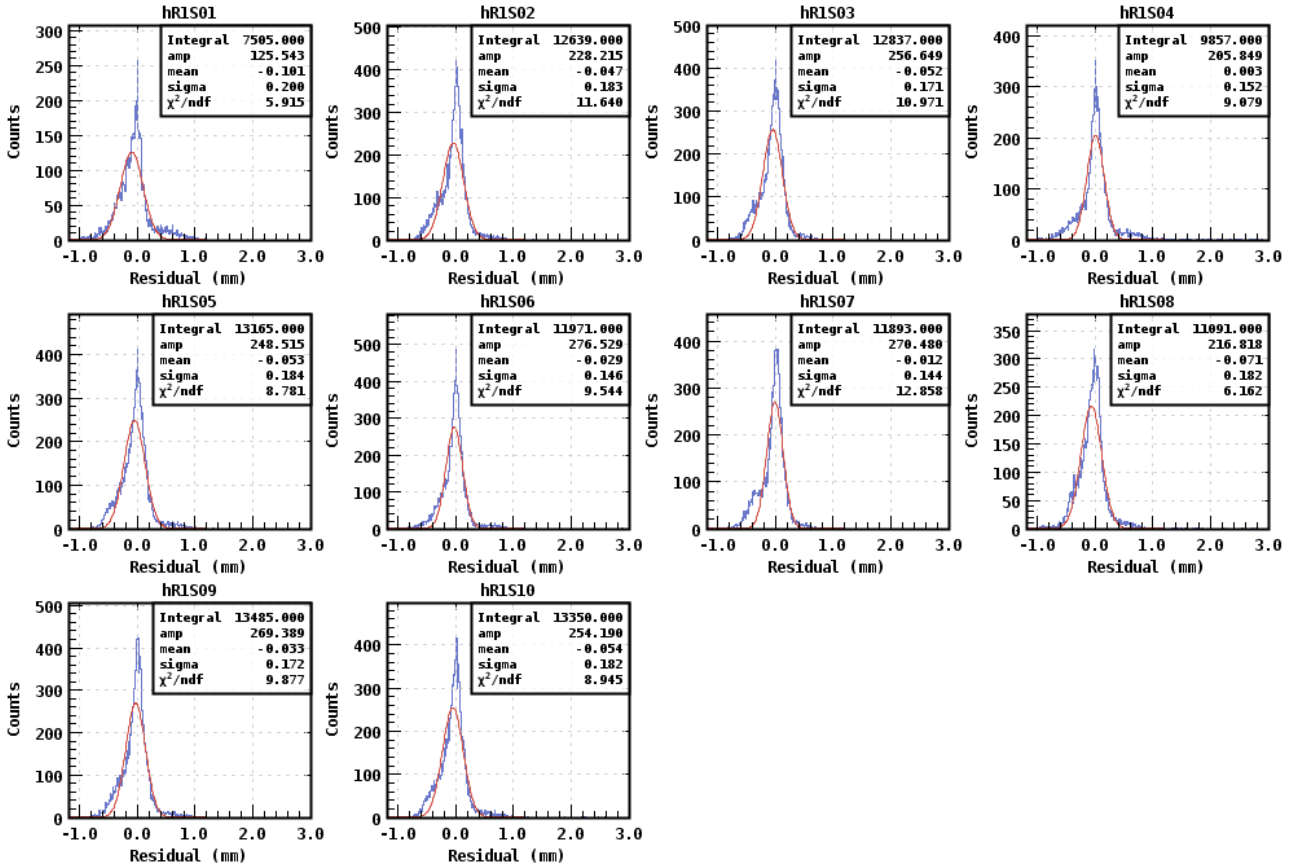




SVT Track-Based Alignment - "Not-So Good"

Simulated, Type-3, events originating from the target (see below) with ideal geometry in simulation show large residuals and widths.

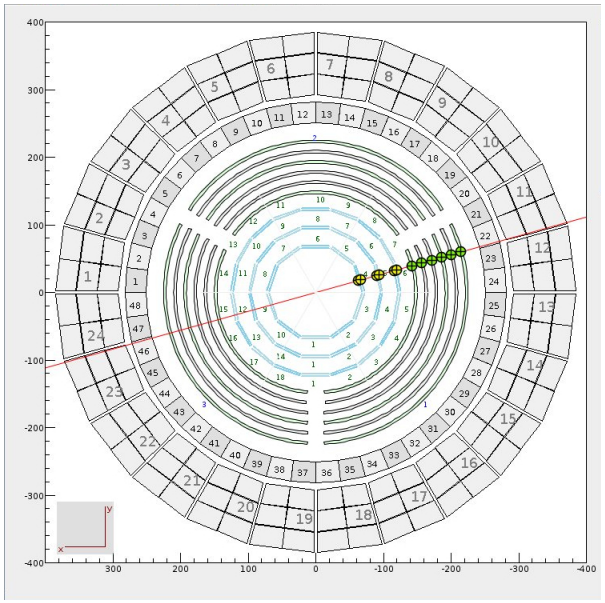


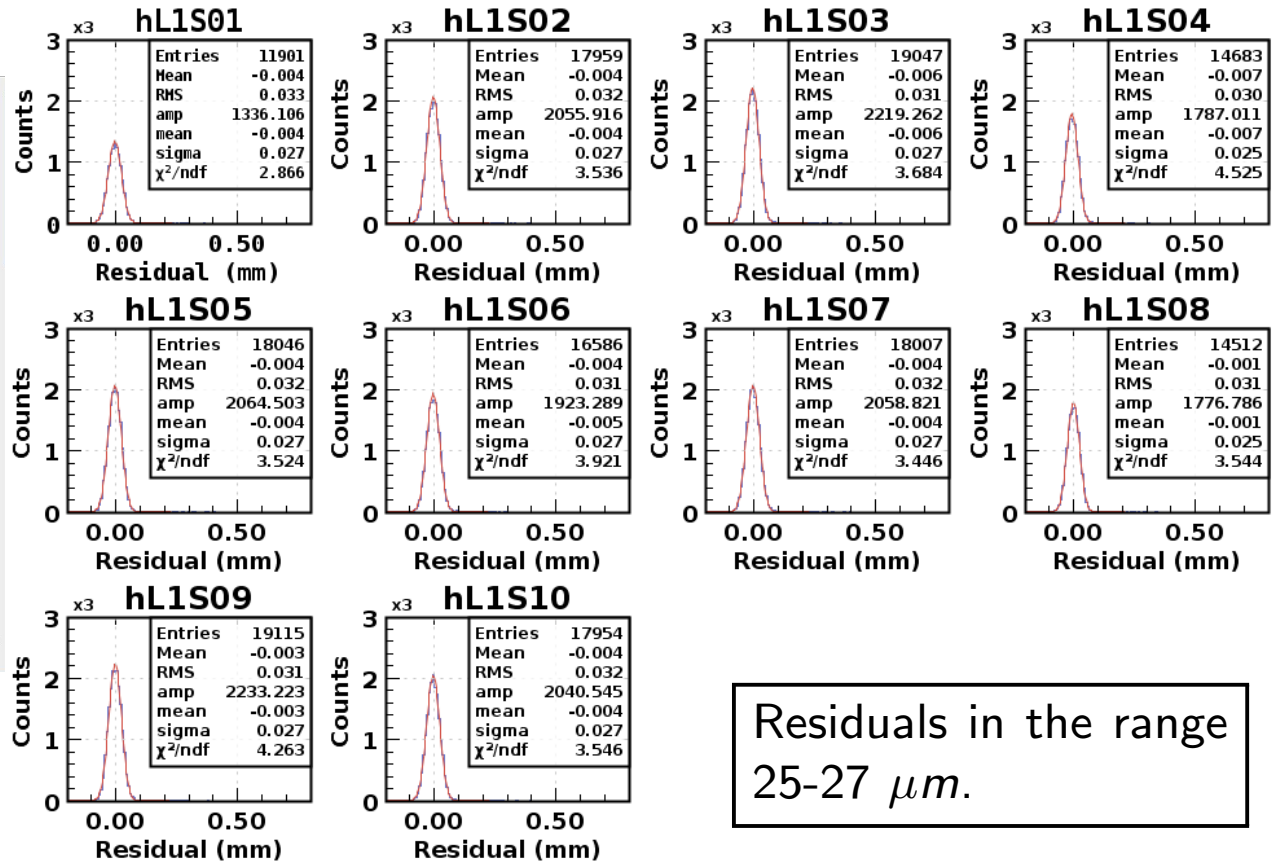


- Residuals in the range $140 - 200\ \mu m$.

SVT: Simulated Events from the Target

Use the *gemc* particle gun to spray protons in the ranges $E_p = 4 - 8$ GeV, $\theta = 80^\circ - 120^\circ$, and all ϕ and reconstruct with Tracker. Magnetic field is zero and micromegas are included in the event. Residuals for layer 1 are shown below. Note the horizontal scale.

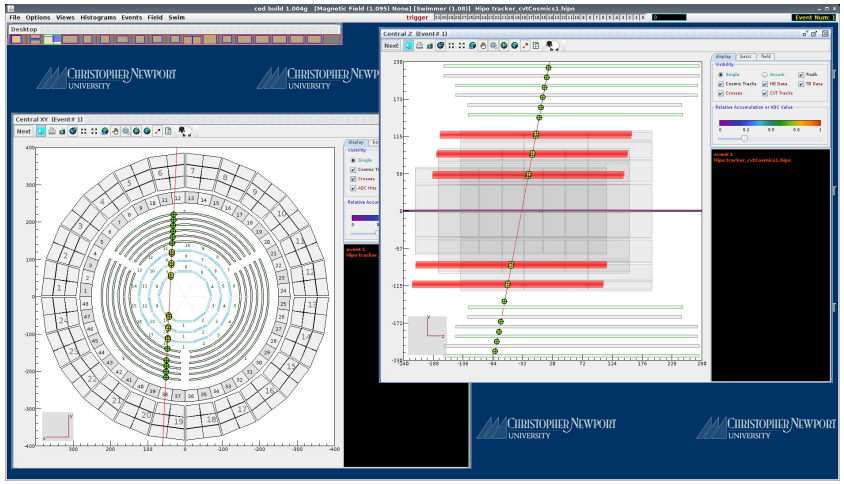


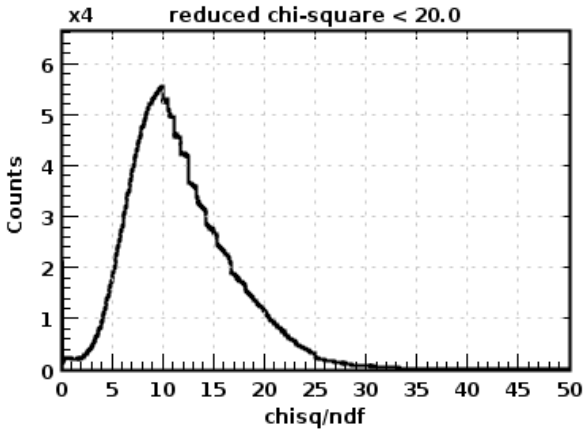


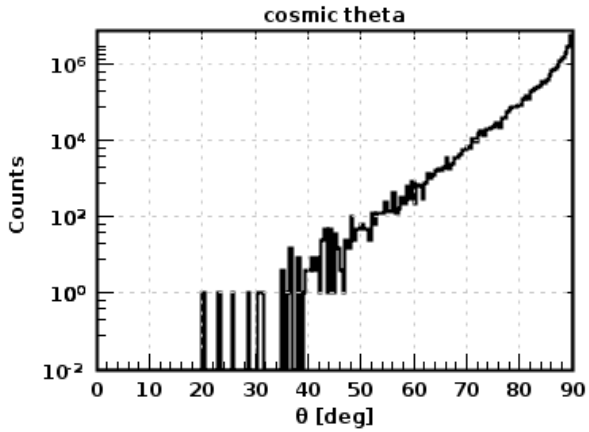
Residuals in the range 25-27 μm.

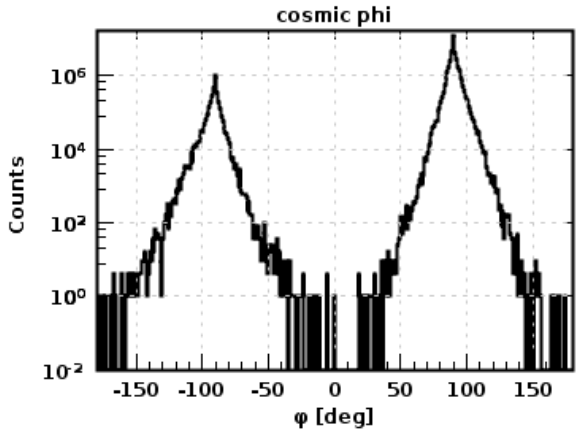
SVT: Simulated Events from Cosmics

Use the *gemc* particle gun to simulate cosmic rays hitting CLAS12. Magnetic field is zero and micromegas are included in the event. Require twelve crosses/layers in the event to be accepted. Distributions for all accepted events are shown below.



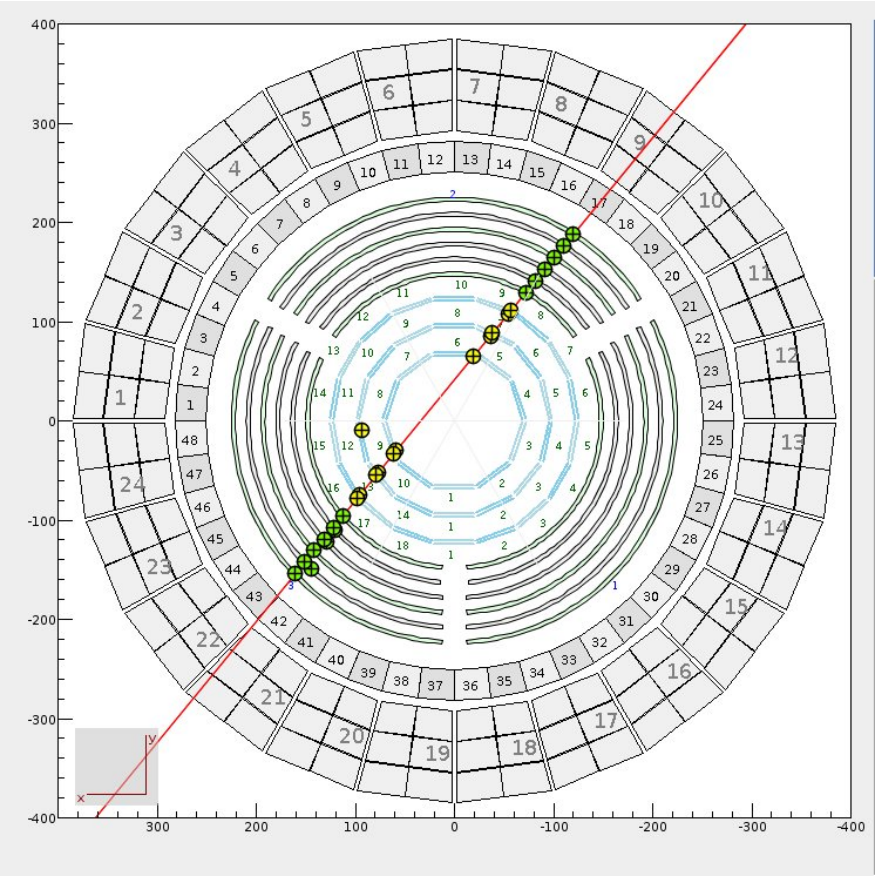






SVT: Simulated Cosmics Layer 1

Simulate cosmic rays with *gemc*. Magnetic field is zero and micromegas are included. Require twelve crosses/layers. Use CVT option in Tracker.



SVT: Simulated Cosmics Layer 1

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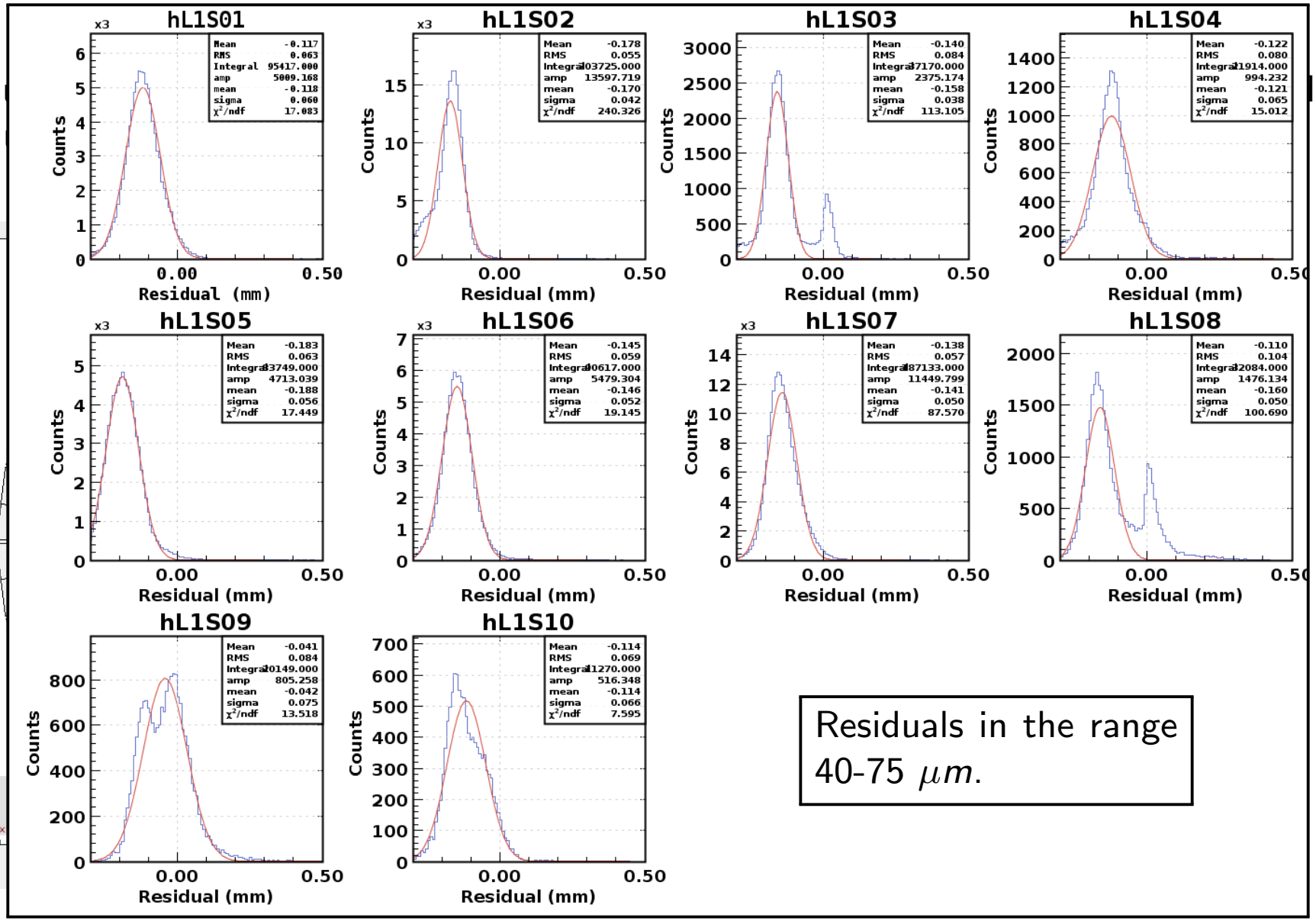
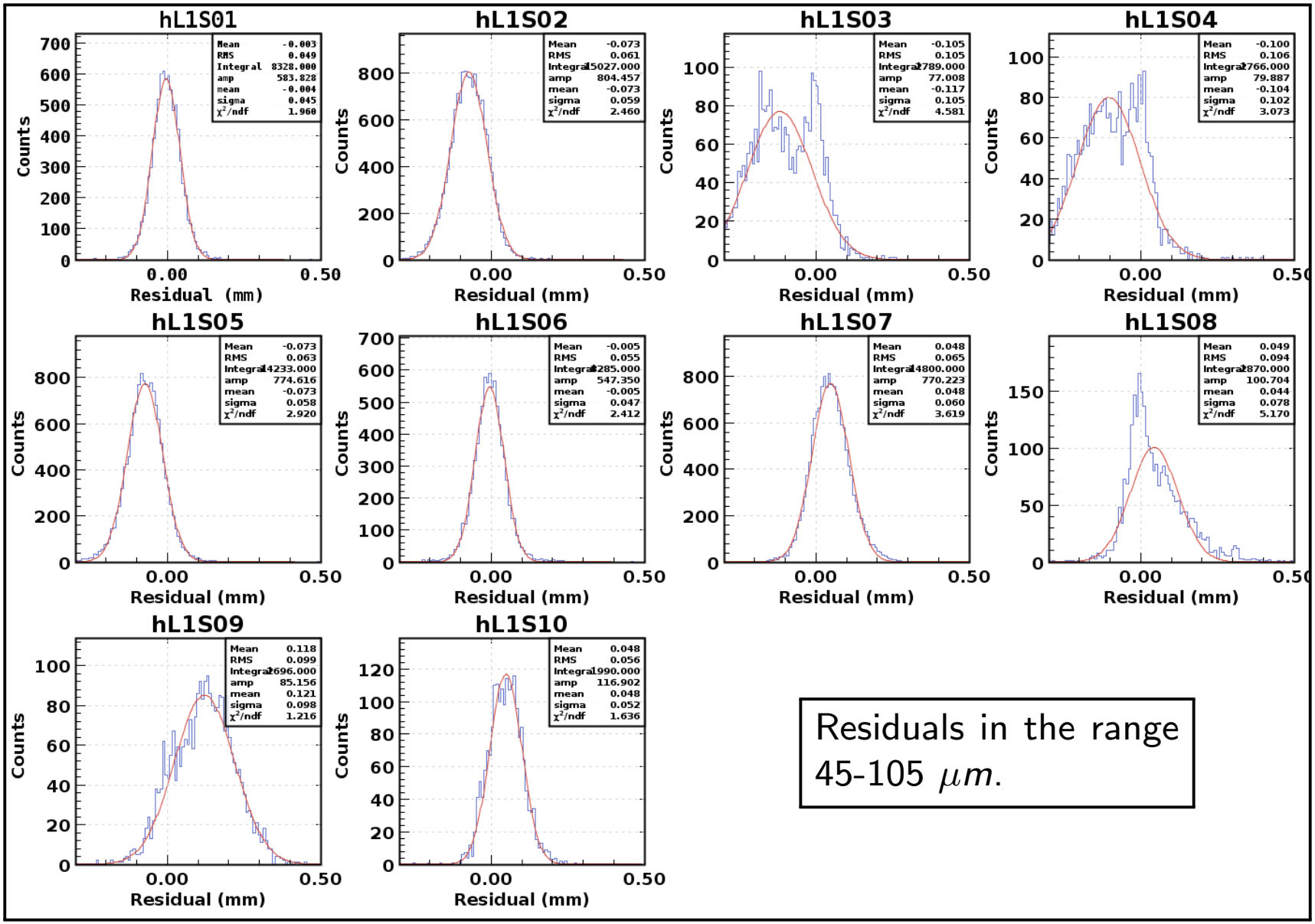


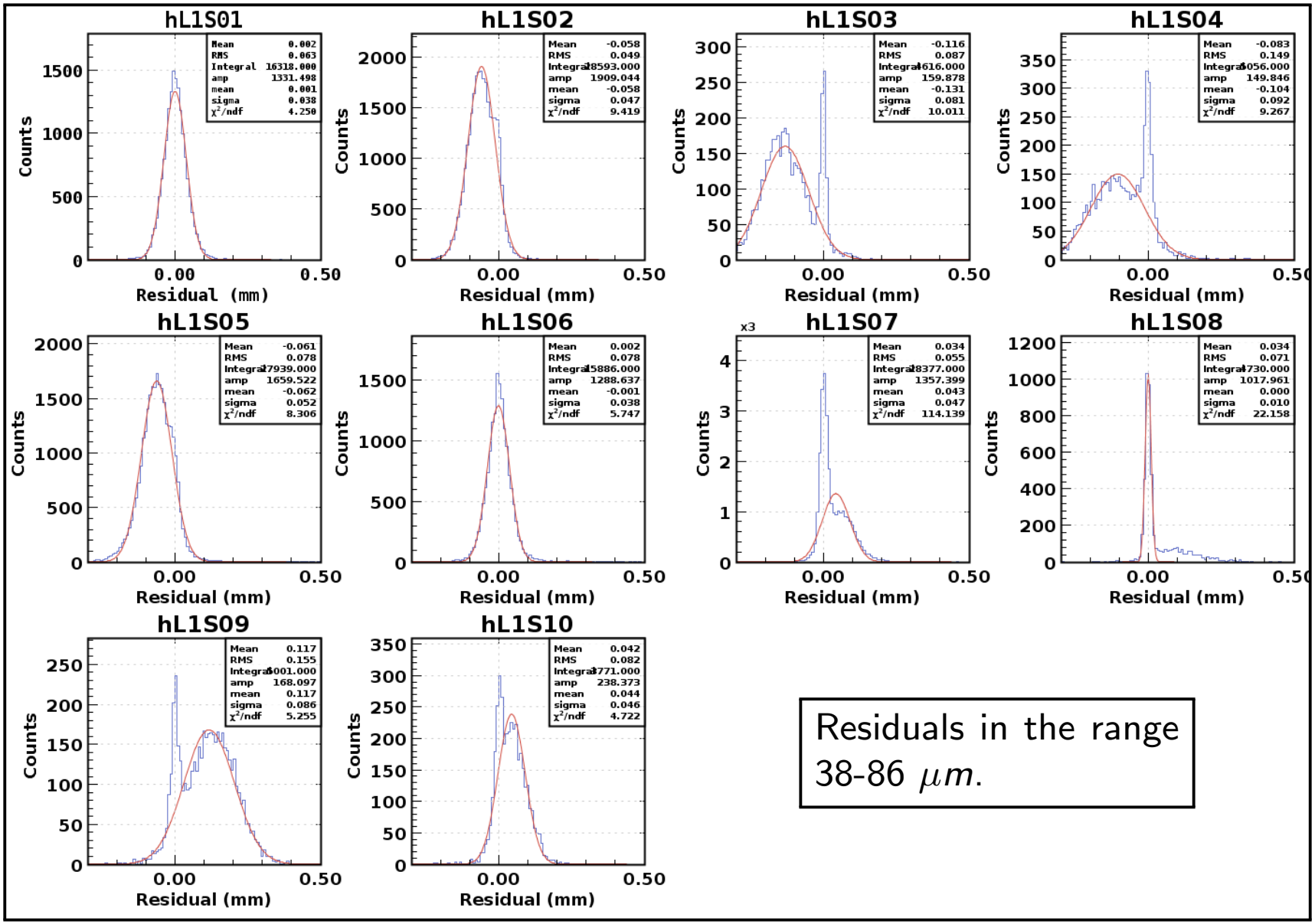
Residuals in the range 40-75 μm.

SVT: Simulated Cosmics Layer 1, no-shim



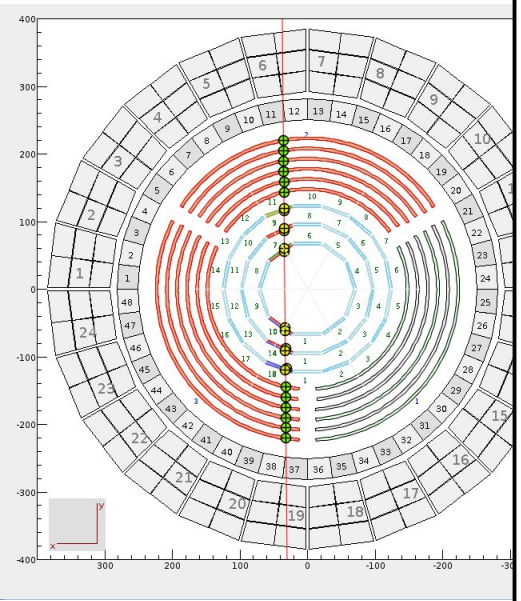
Residuals in the range 45-105 μm.

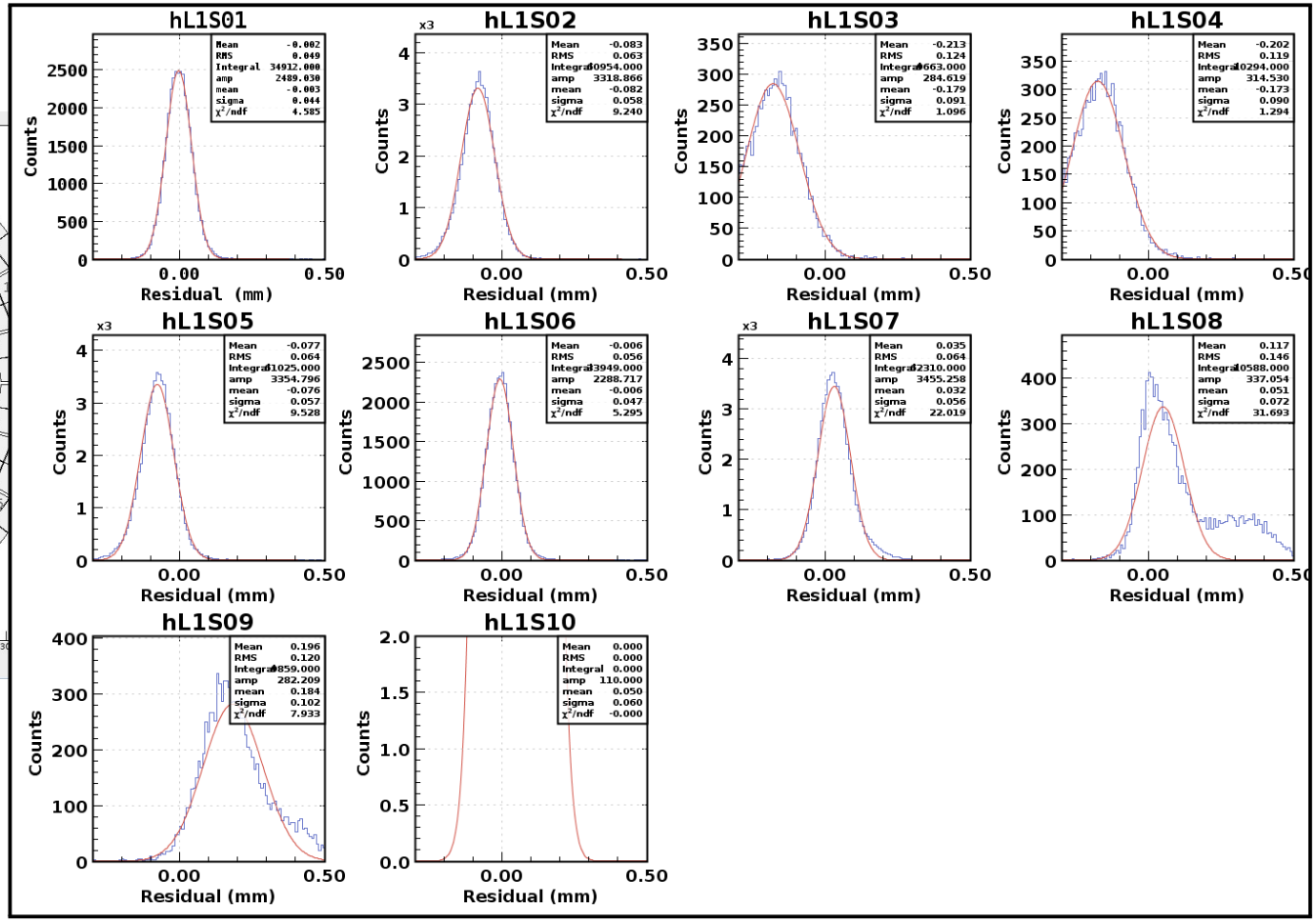
SVT: Simulated Cosmics Layer 1, no-shim, SVT-only fit



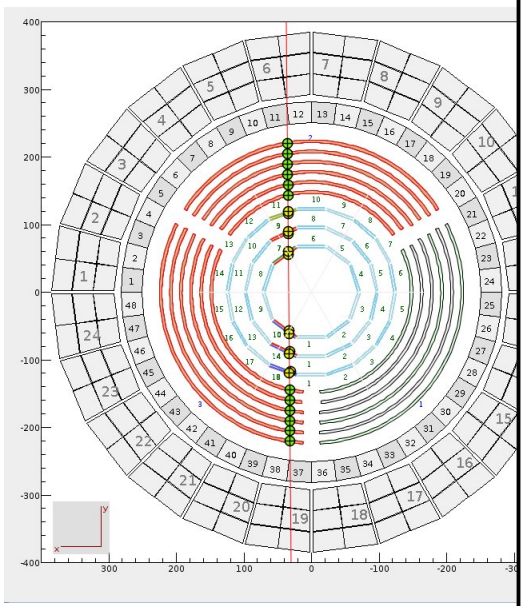
Residuals in the range 38-86 μm.

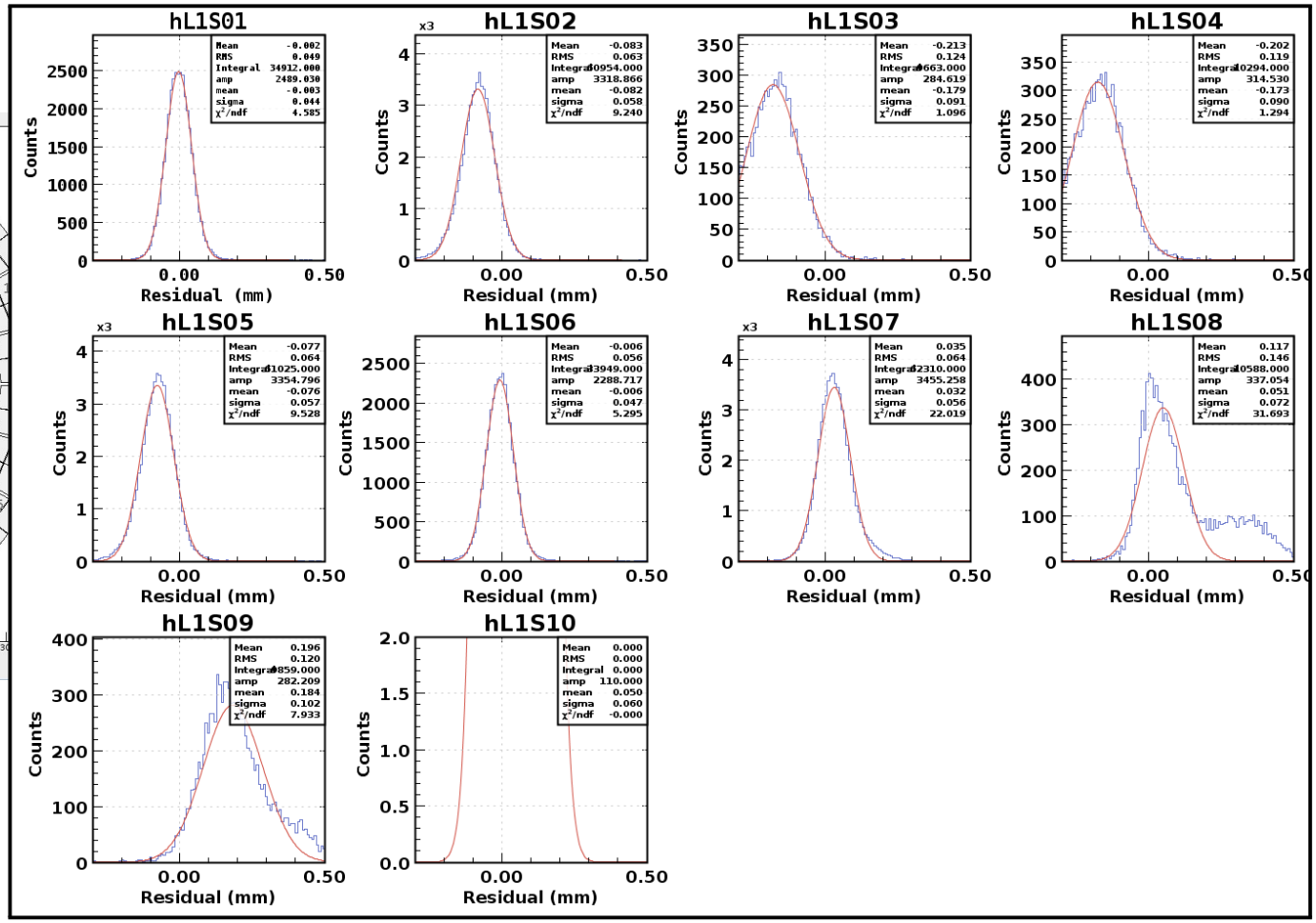
SVT: Simulated Cosmics Layer 1, missing sector 10





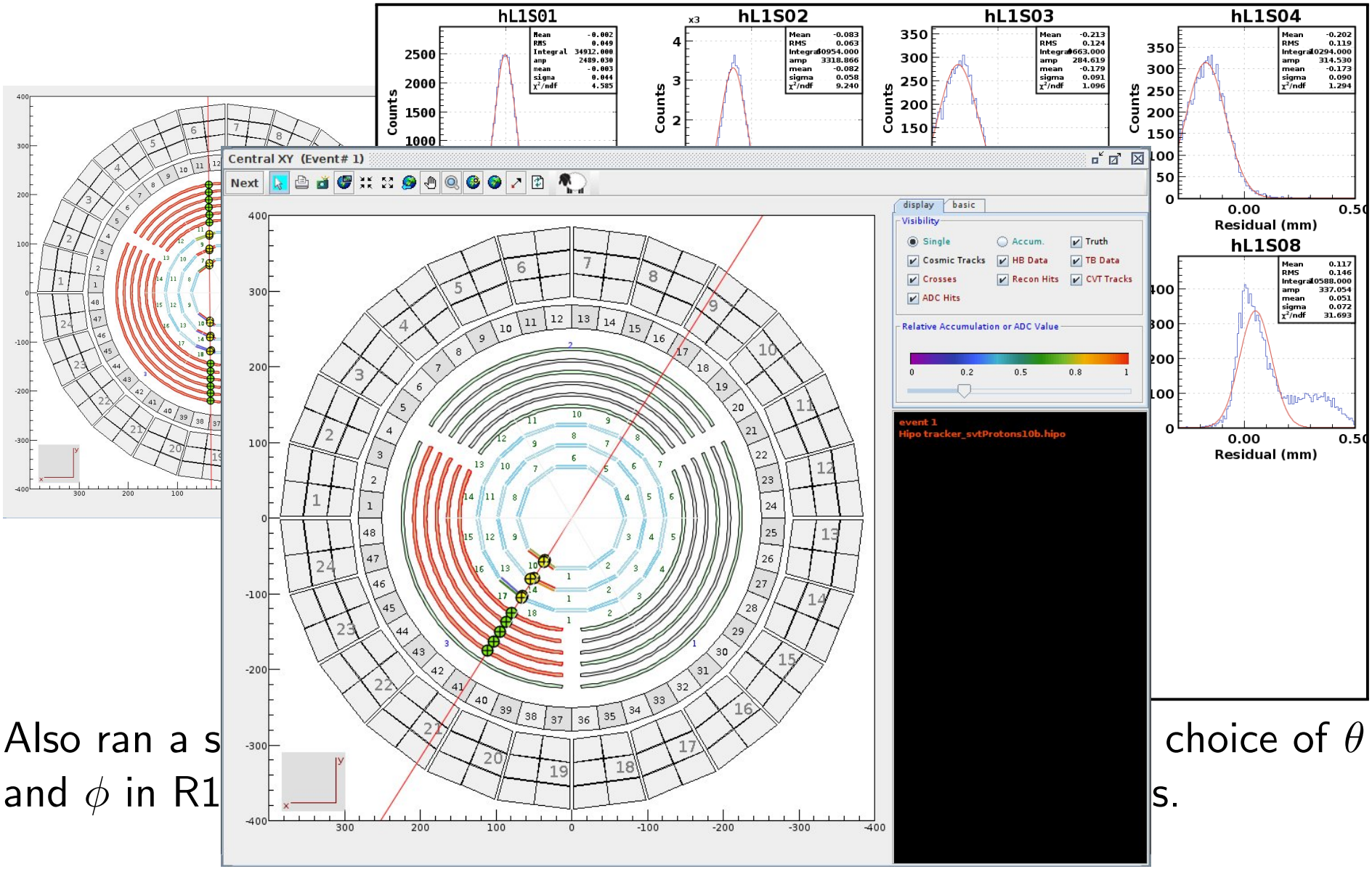
SVT: Simulated Cosmics Layer 1, missing sector 10





Also ran a simulation with events from the target with a single choice of θ and ϕ in R1S10, R2S14, R2S17 and all the residuals were NaNs.

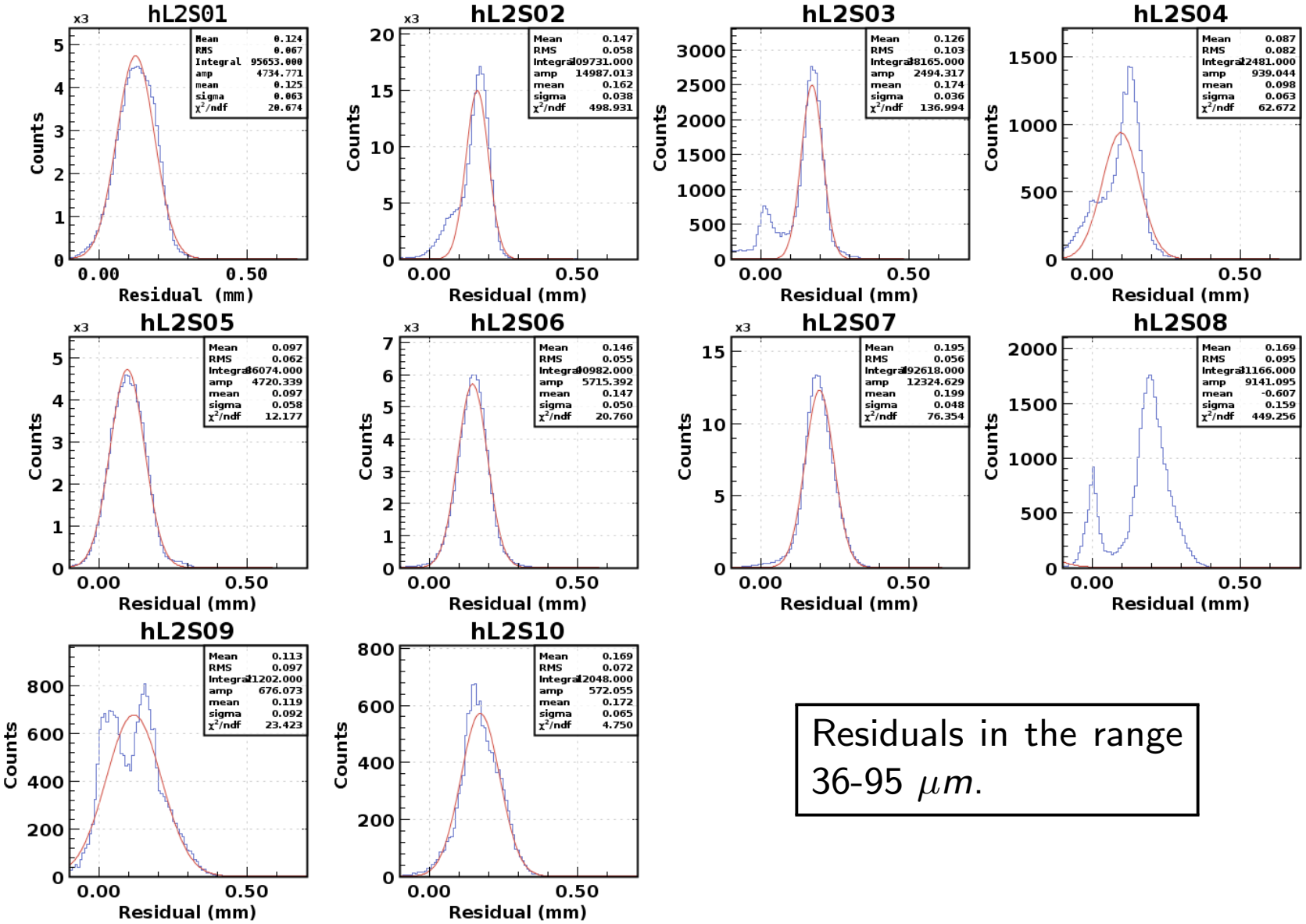
SVT: Simulated Cosmics Layer 1, missing sector 10



Also ran a s choice of θ and ϕ in R1 s.

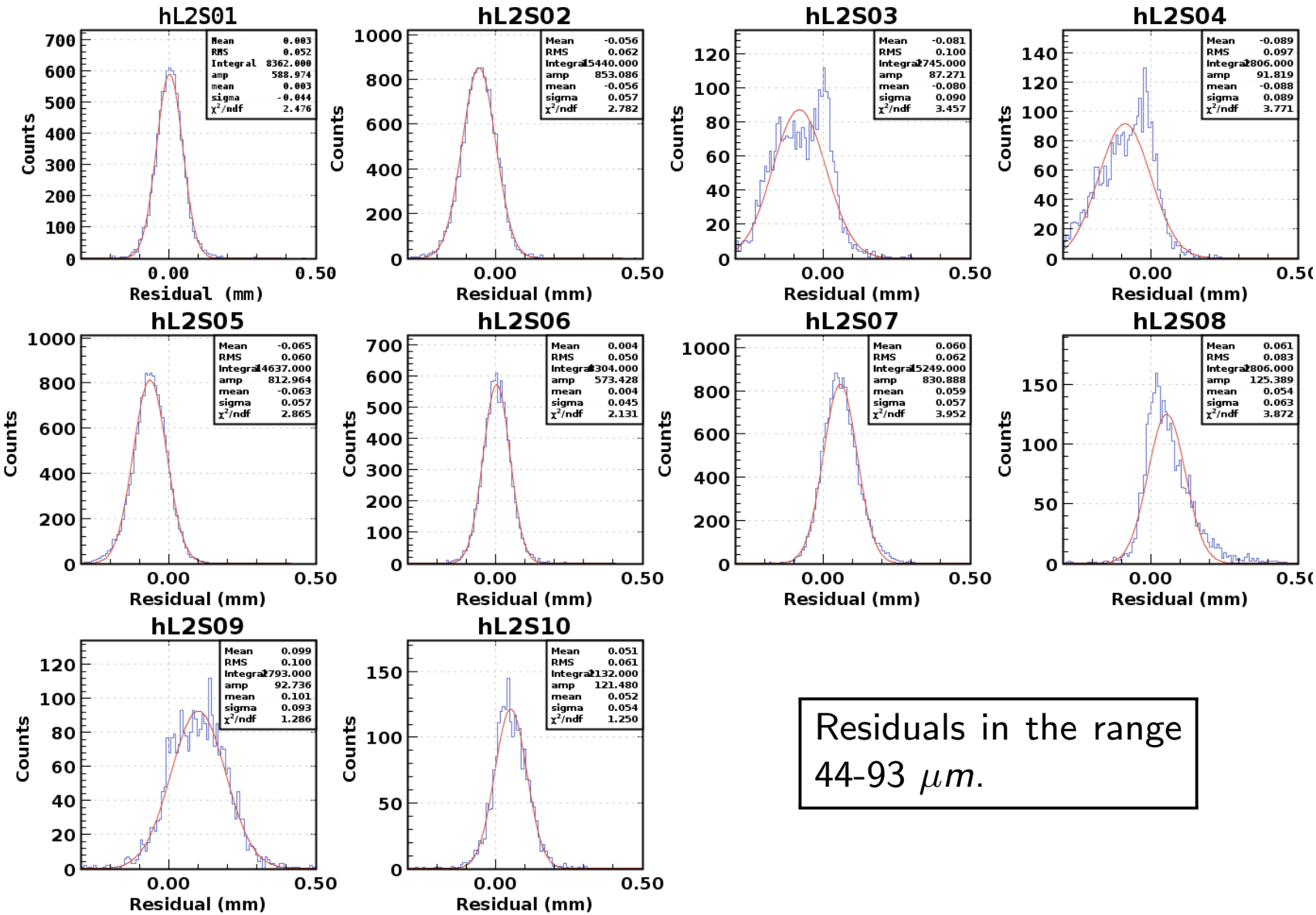
Additional Slides

SVT: Simulated Cosmics Layer 2, shim, CVT fit



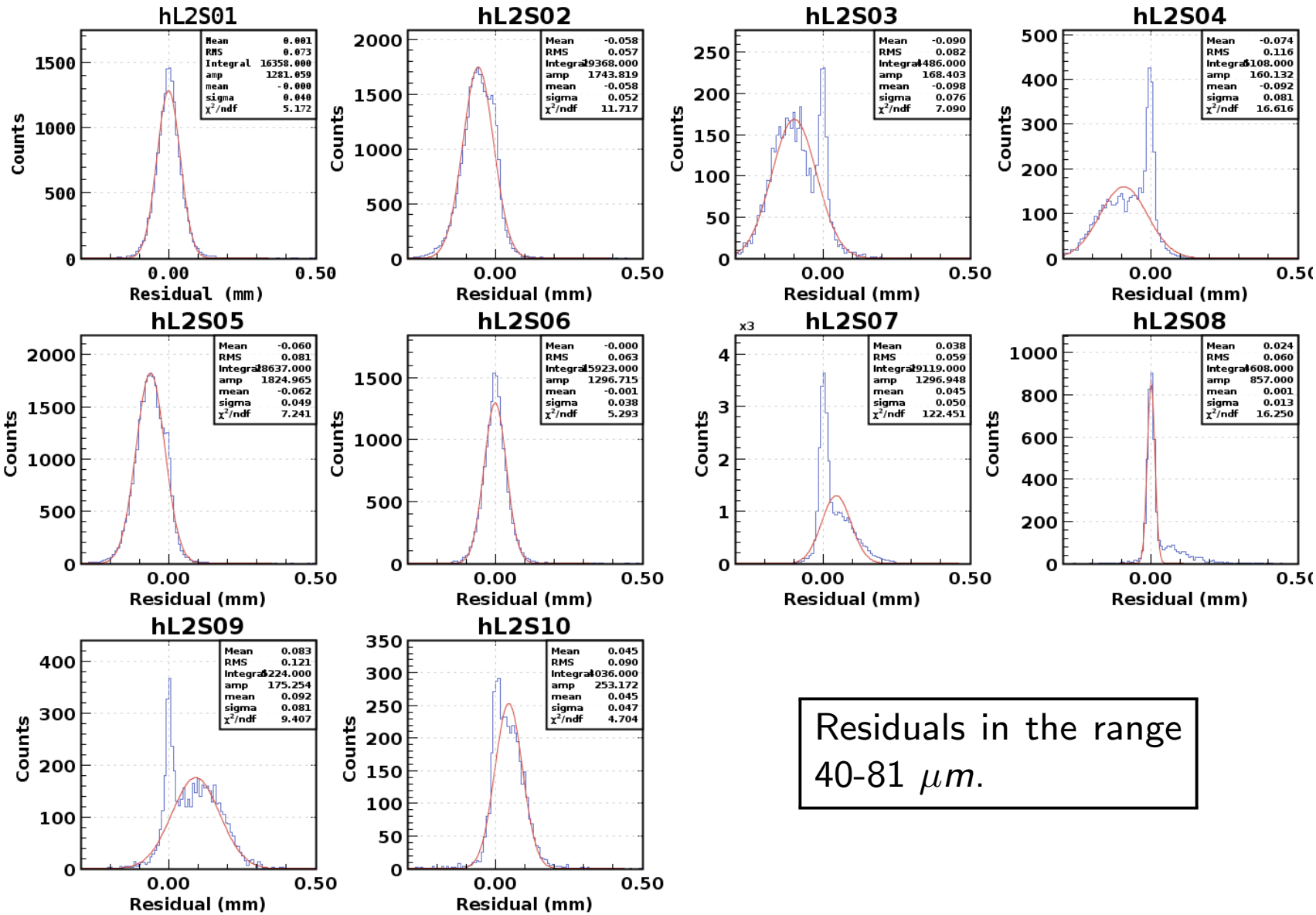
Residuals in the range 36-95 μm.

SVT: Simulated Cosmics Layer 2, no-shim, CVT fit



Residuals in the range 44-93 μm.

SVT: Simulated Cosmics Layer 2, no-shim, SVT-only fit



Residuals in the range 40-81 μm.