Primary Vertex pulls

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April 01, 2003
Vertex and Beamline Meeting

- Pulls with different Track Refit versions
- The PrimeVtx with beam constraint
  - With beam constraint

Track Refitting

Using Official 4.9.1 Monte Carlo Sample (2000 events).
Simulation and reconstruction: 4.9.1
Same PrimeVtxFinder code for all tests.

Track Refitting in 4.9.1

- No Track refit with 4.9.1hpt1
- Track refit in 4.9.1hpt1 with/without SimInitManager: No difference
- Track refit in 4.9.1hpt1 with updated TrackRefitter (4.10.0int1)

  ```
  cvs checkout -r v4_10_0int1 TrackingUserHL/src/TrackRefitter.cc

  cvs checkout -r v4_10_0int1 TrackingUserHL/TrackingUserHL/TrackFitting/
                              TrackRefitter.hh
  ```
- Track refit in 4.9.1hpt1 with updated TrackRefitter (4.10.0int1) and TrackingKal from head(03/03/25).

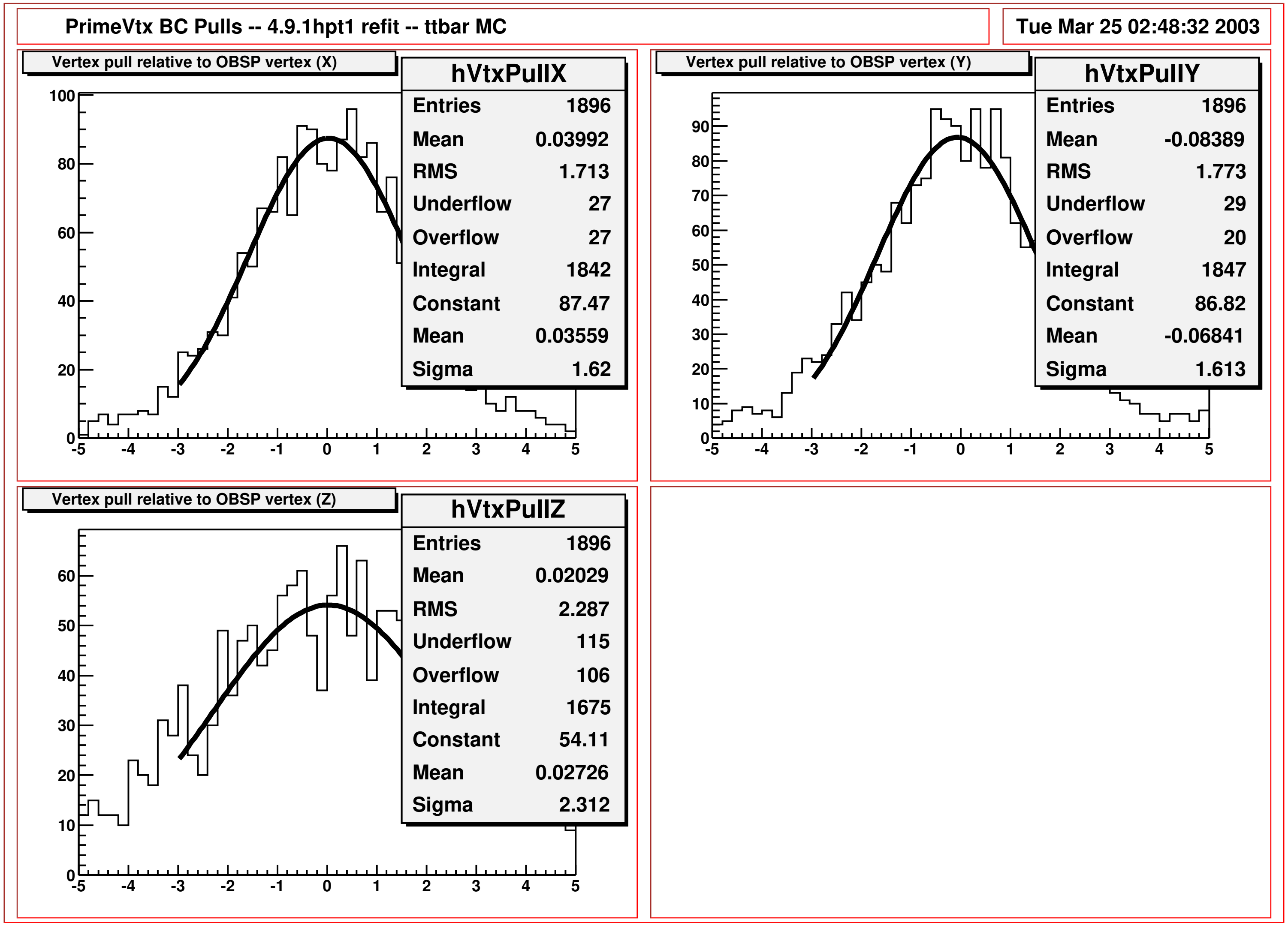
Track Refitting in 4.10.0

Track Refitting from 4.10.0int1 and SiHitResolutionSet.cc

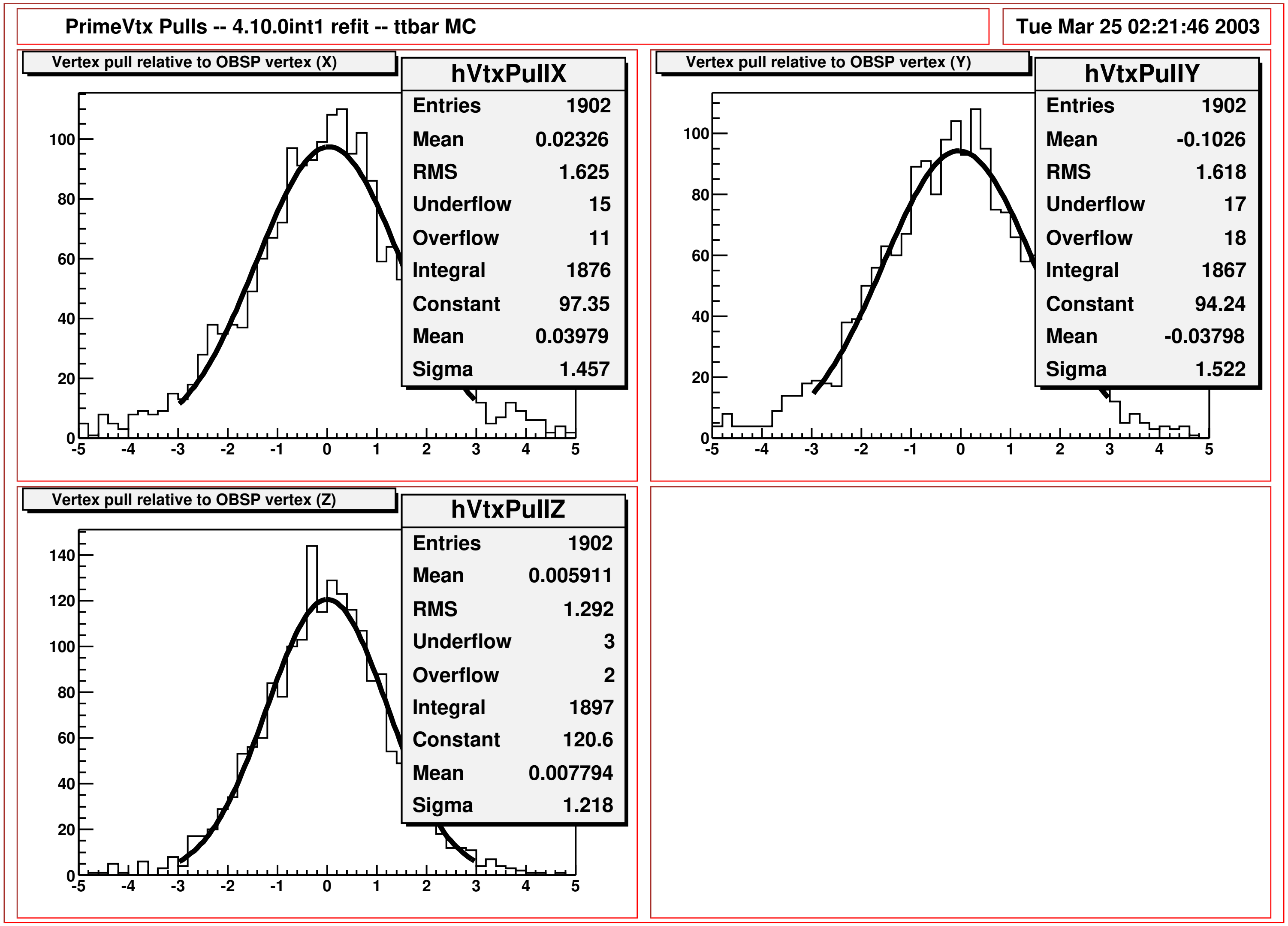
```
cvs checkout -r v4_10_0int1 TrackingObjects/src/SiHitResolutionSet.cc
```

Top MC: PrimeVtx Pulls – 4.9.1hpt1 Track Refit

Using Official 4.9.1hpt1 Monte Carlo



Top MC: PrimeVtx Pulls – 4.10.0 Int1 Track Refit



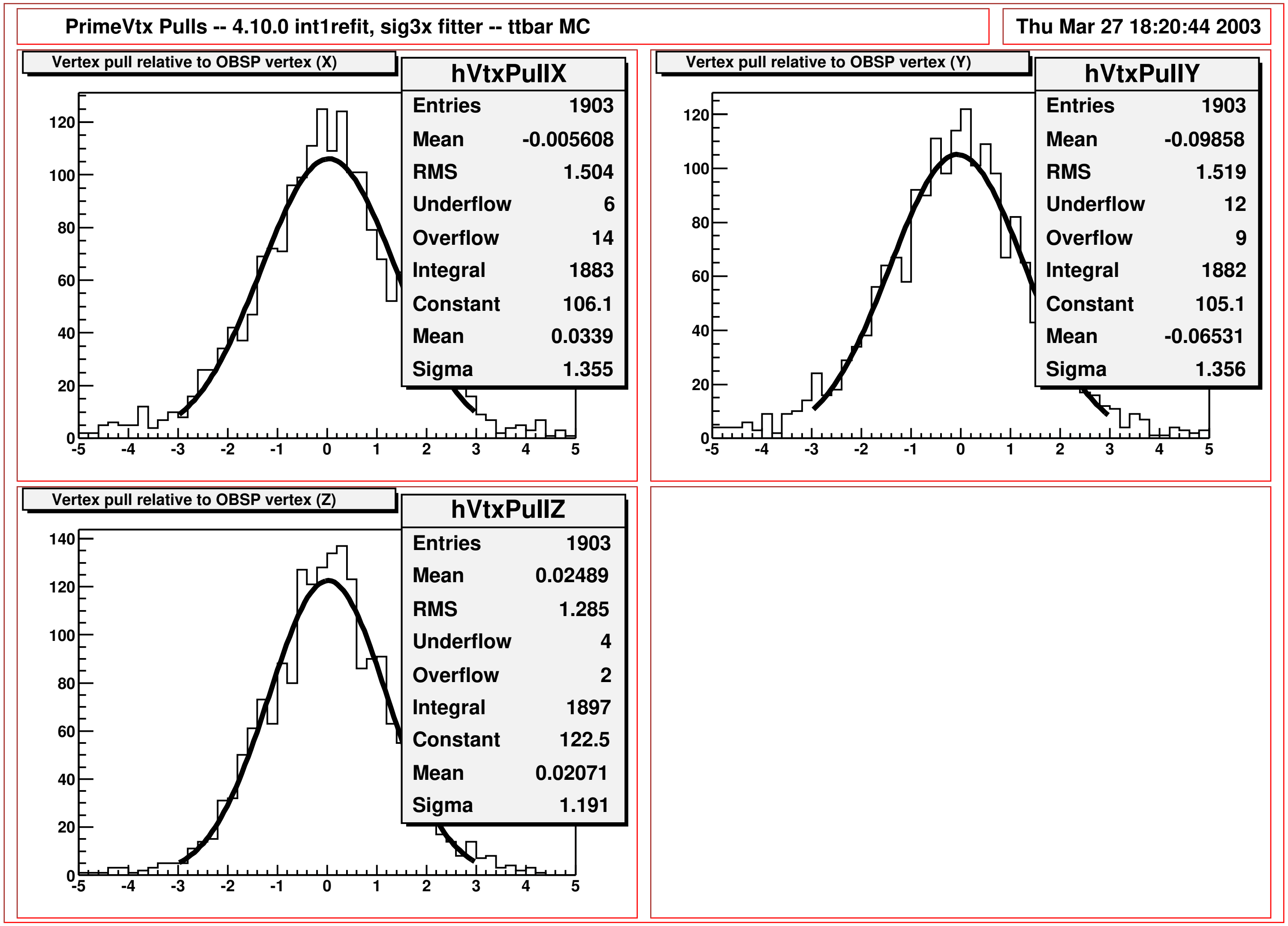
Vertex Pulls and TrackRefitting

- Using Official 4.9.1 Monte Carlo Sample (2000 events).
- Simulation and reconstruction: 4.9.1
- Same PrimeVtxFinder code for all tests.

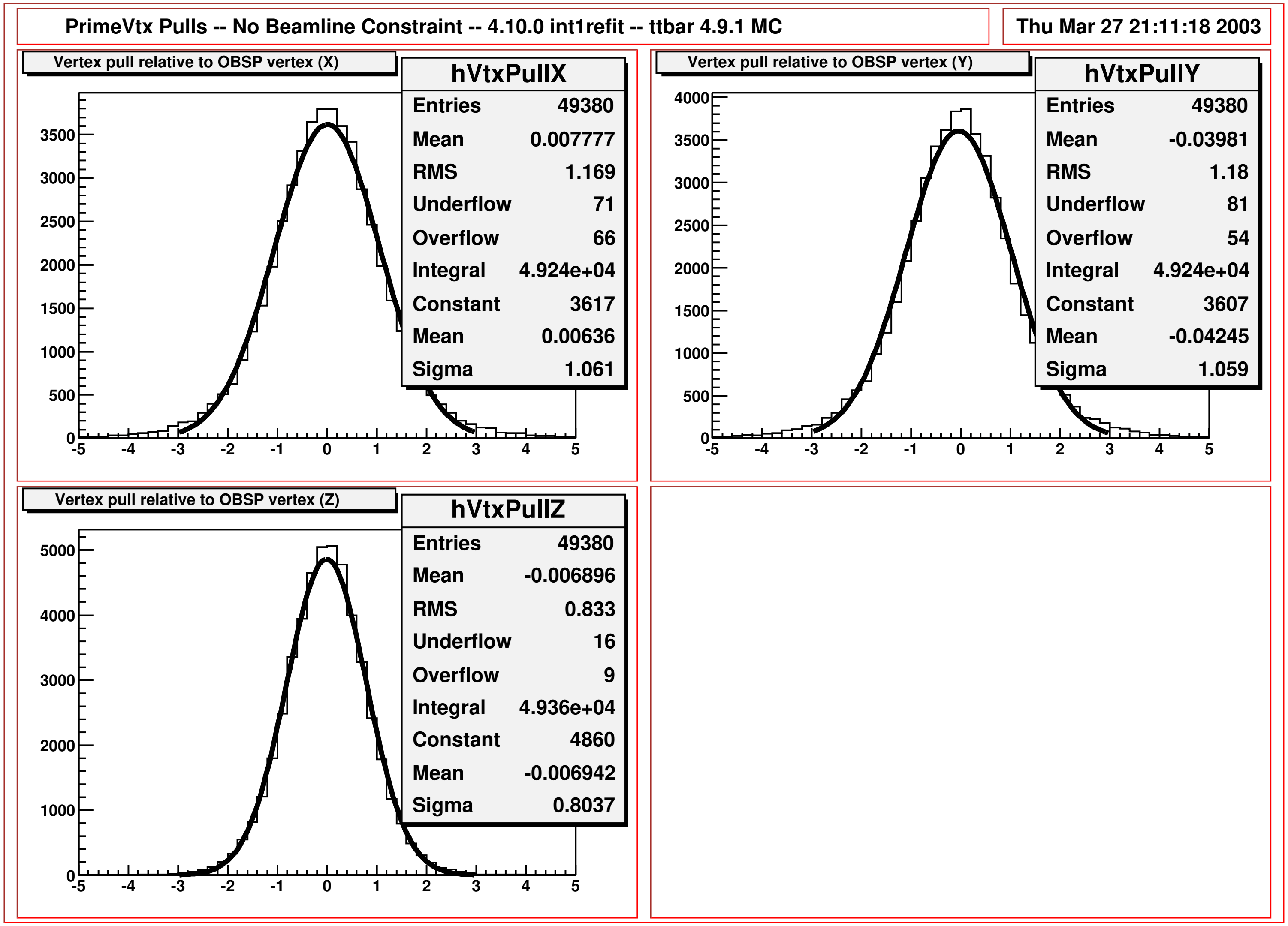
PrimeVertexFit Pulls				
Offline link	TrackRefit test	x	y	z
4.9.1hpt1	4.9.1 def - no track refit	1.564	1.573	2.449
4.9.1hpt1	4.9.1hpt1 track refit	1.620	1.613	2.312
4.9.1hpt1	4.10.0int1 track refit	1.594	1.627	2.339
4.9.1hpt1	4.10.0int1 track refit + dev TrackingKal	1.411	1.467	1.191
4.10.0	4.10.0 track refit	1.414	1.478	1.232
4.10.0	4.10.0int1 track refit+SiHitResolution	1.457	1.522	1.218
4.10.0	4.10.0int1 track refit+SHR w/ Si G3X	1.355	1.356	1.191
4.10.0	4.10.0int1 track refit w/ Si G3X	1.286	1.303	1.199

- TrackingKal package used by TrackRefitter has changed from 4.9.1hpt1
- Changes improve the vertex pulls
- Si G3X fitter gives better pulls than KalFitter

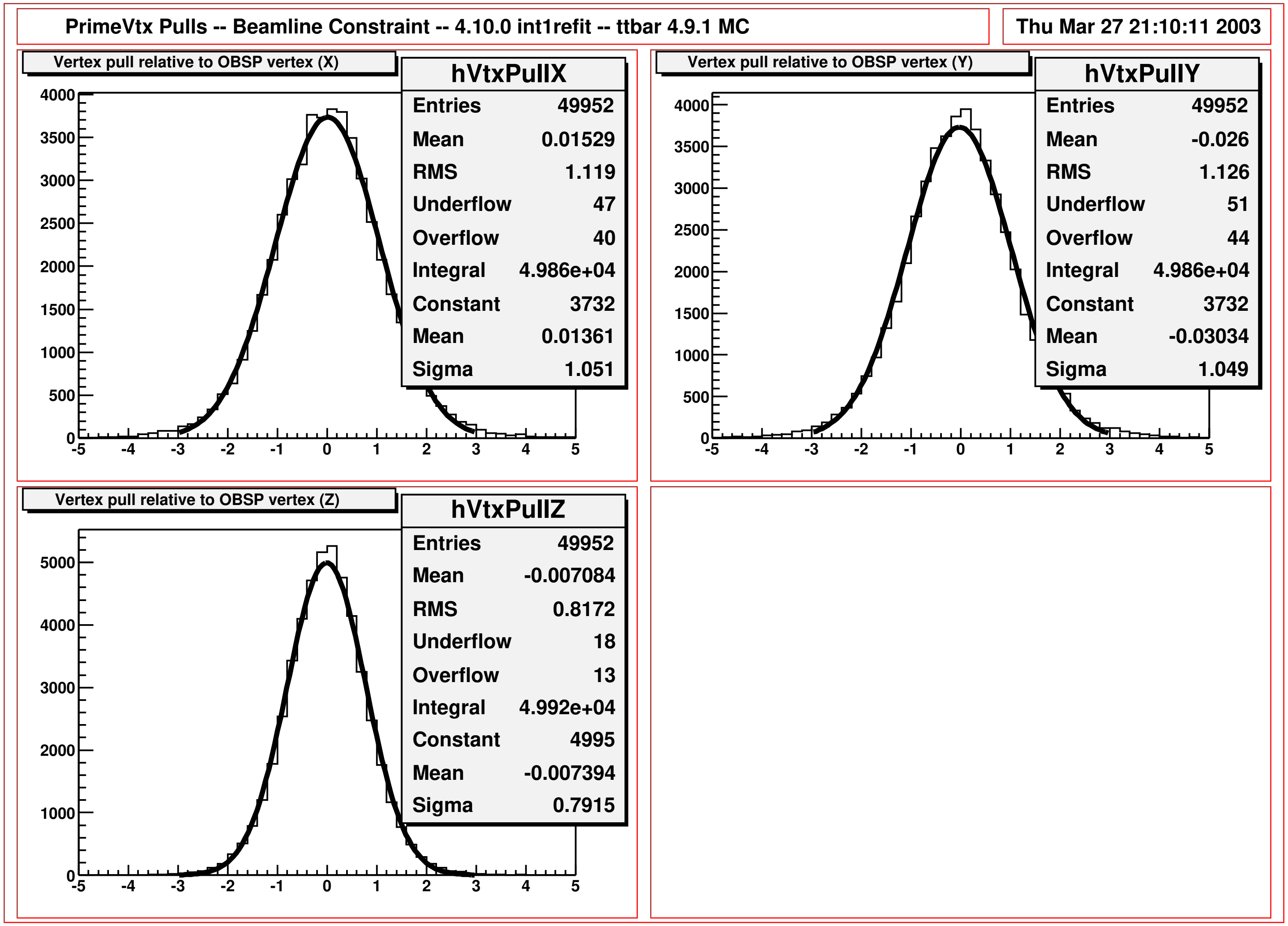
Top MC: PrimeVtx Pulls – 4.10.0 Int1 Si G3X Track Refit



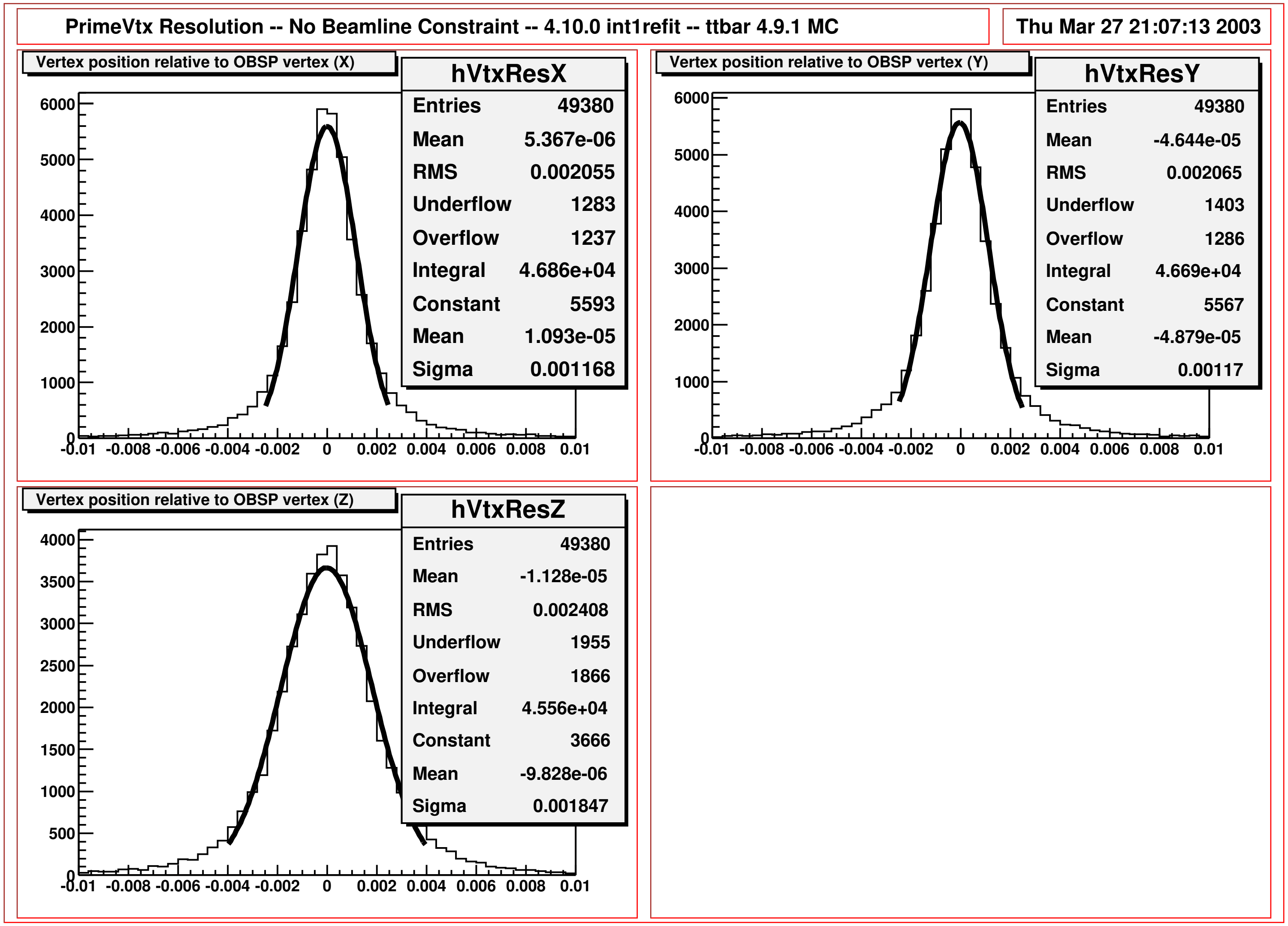
Top MC: PrimeVtx Pulls



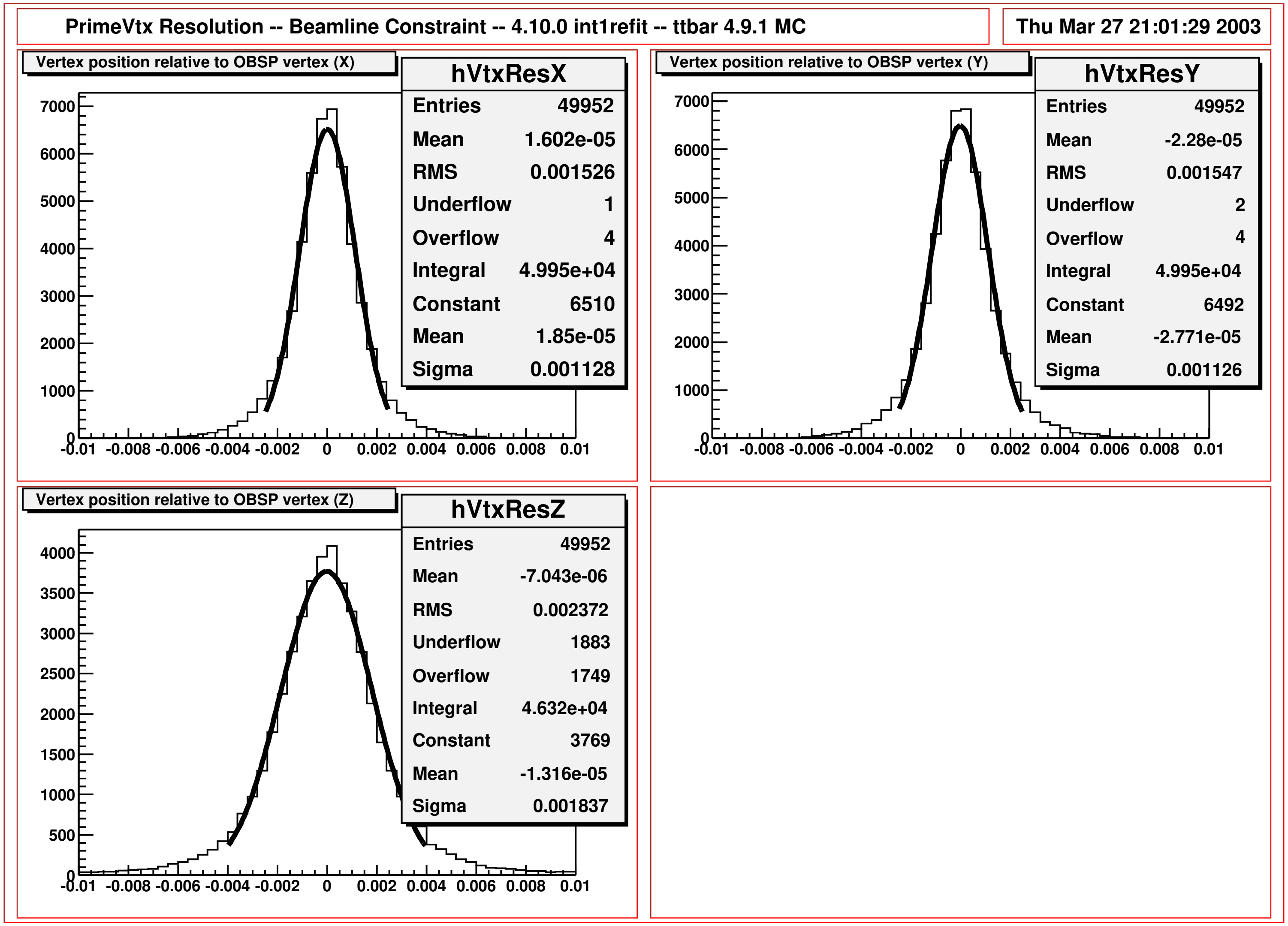
Top MC: PrimeVtx with Beamline Constraint: Pulls



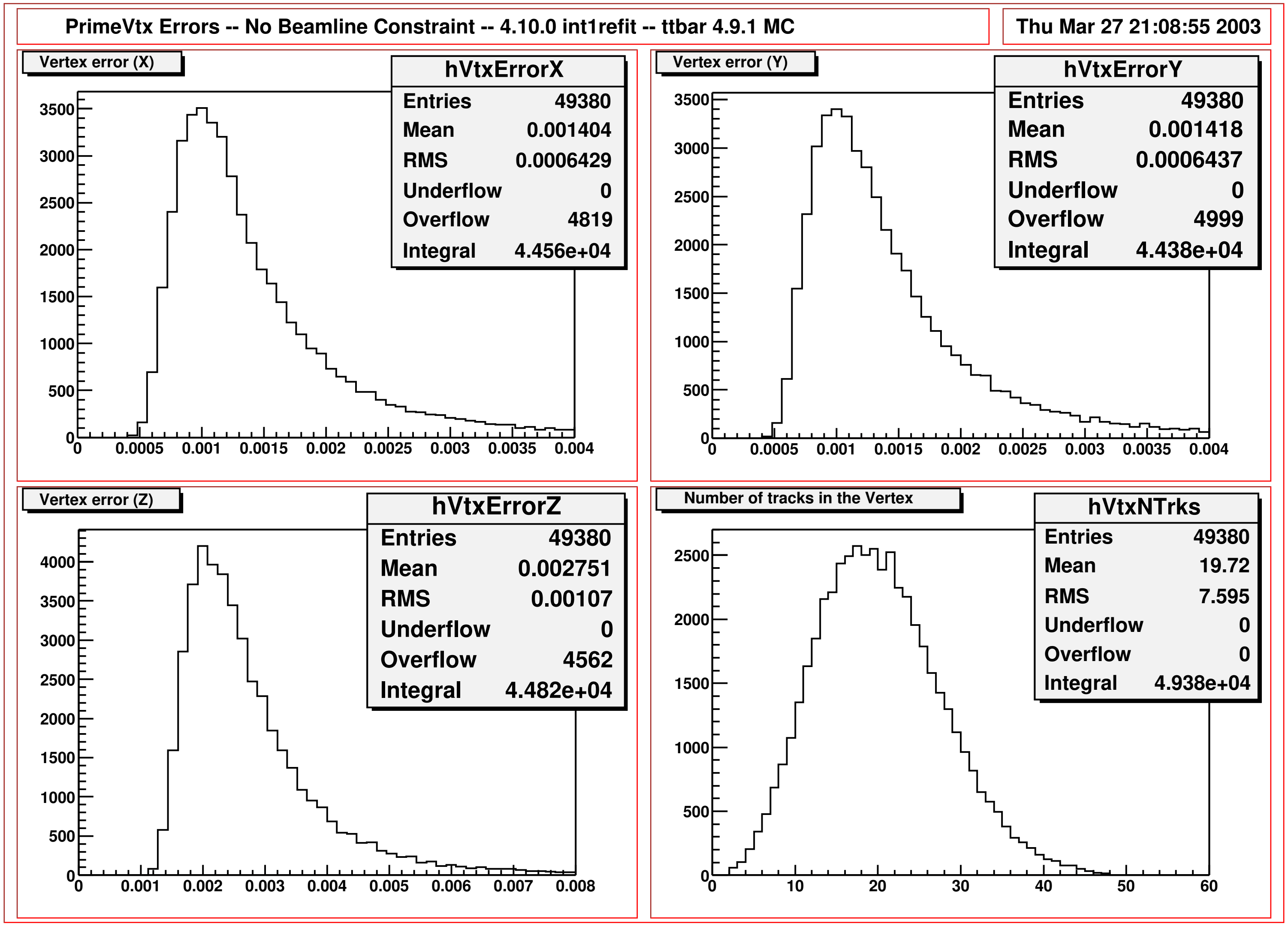
Top MC: PrimeVtx: Resolution



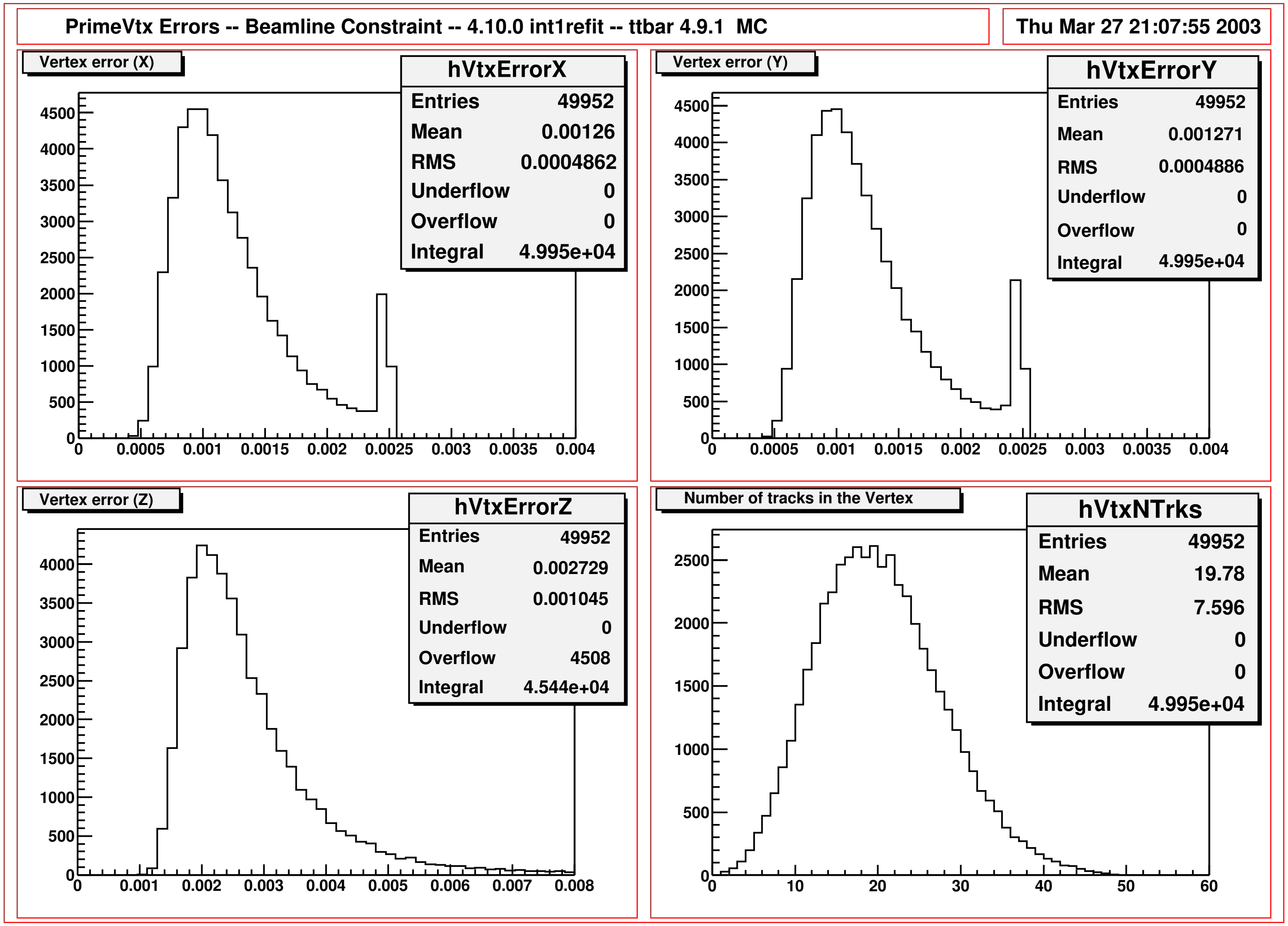
Top MC: PrimeVtx with Beamline Constraint: Resolution



Top MC: PrimeVtx Errors



Top MC: PrimeVtx with Beamline Constraint: Errors



Top MC: PrimeVtx Beamline Constraint: Errors versus Z