

Alignment with beam halo MC

Andrea Parenti

05/05/2009

Outline:

- Alignment with Beam Halo (BH) only
- Alignment with Minimum Bias (MB) only
 - Alignment with BH + MB

Initial geometry and parameters

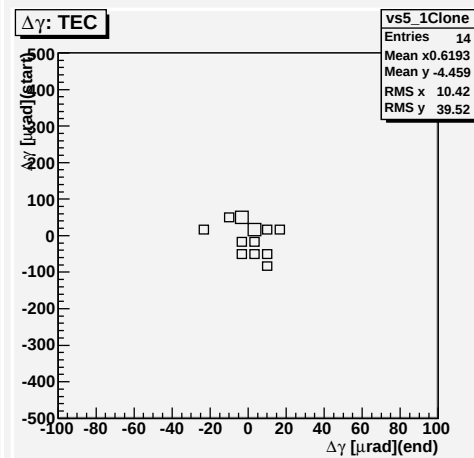
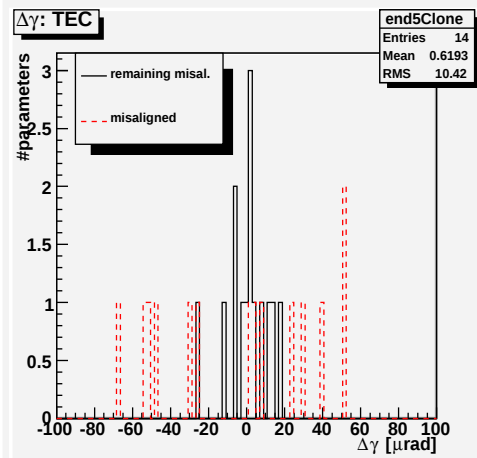
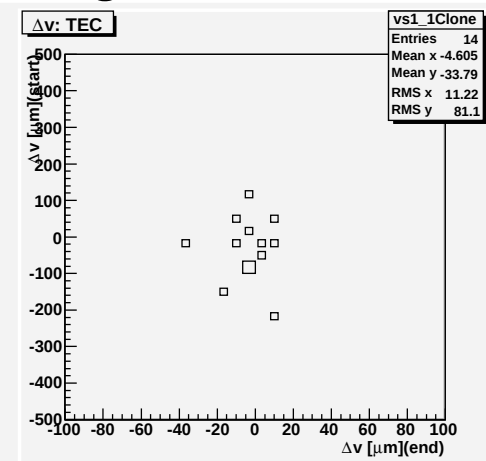
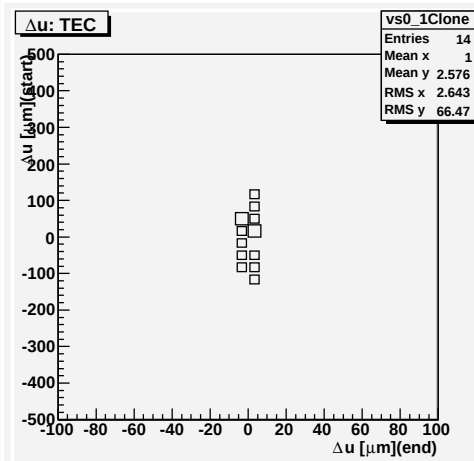
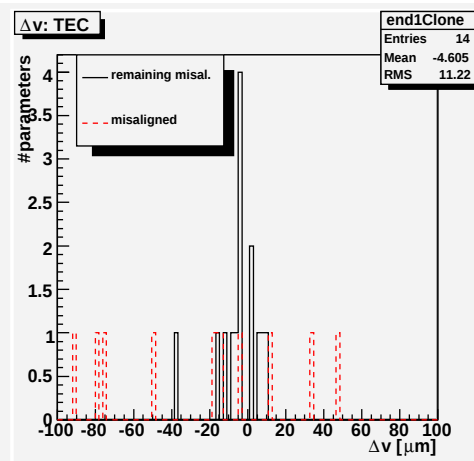
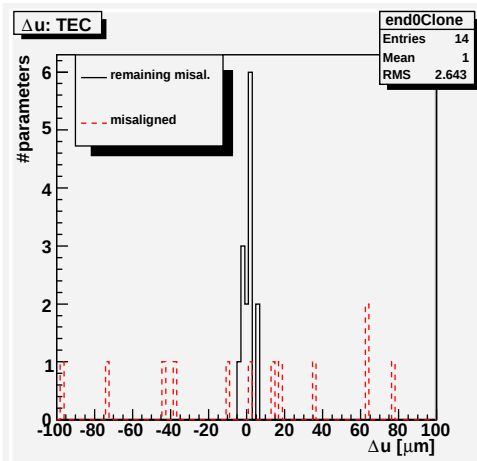
- Alignment is done of High level structures:
'TIDRingsLayers13,110001',
'TrackerTECDiskLayers11,cc000c',
'TrackerTECDiskLayers24,110001',
'TrackerTECDiskLayers55,cc000c',
'TrackerTECDiskLayers69,110001'
- Start from ideal geometry + custom misalignment
 - TIDRings & TECDisks as in 10pbScenario
 - TIDRings: 185 μm (u,v), 850 μrad (γ)
 - TECDisks: 70 μm (u,v), 30 μrad (γ)
 - no misalignment applied on smaller structures, and on the barrel sub-detectors

Alignment with beam halo

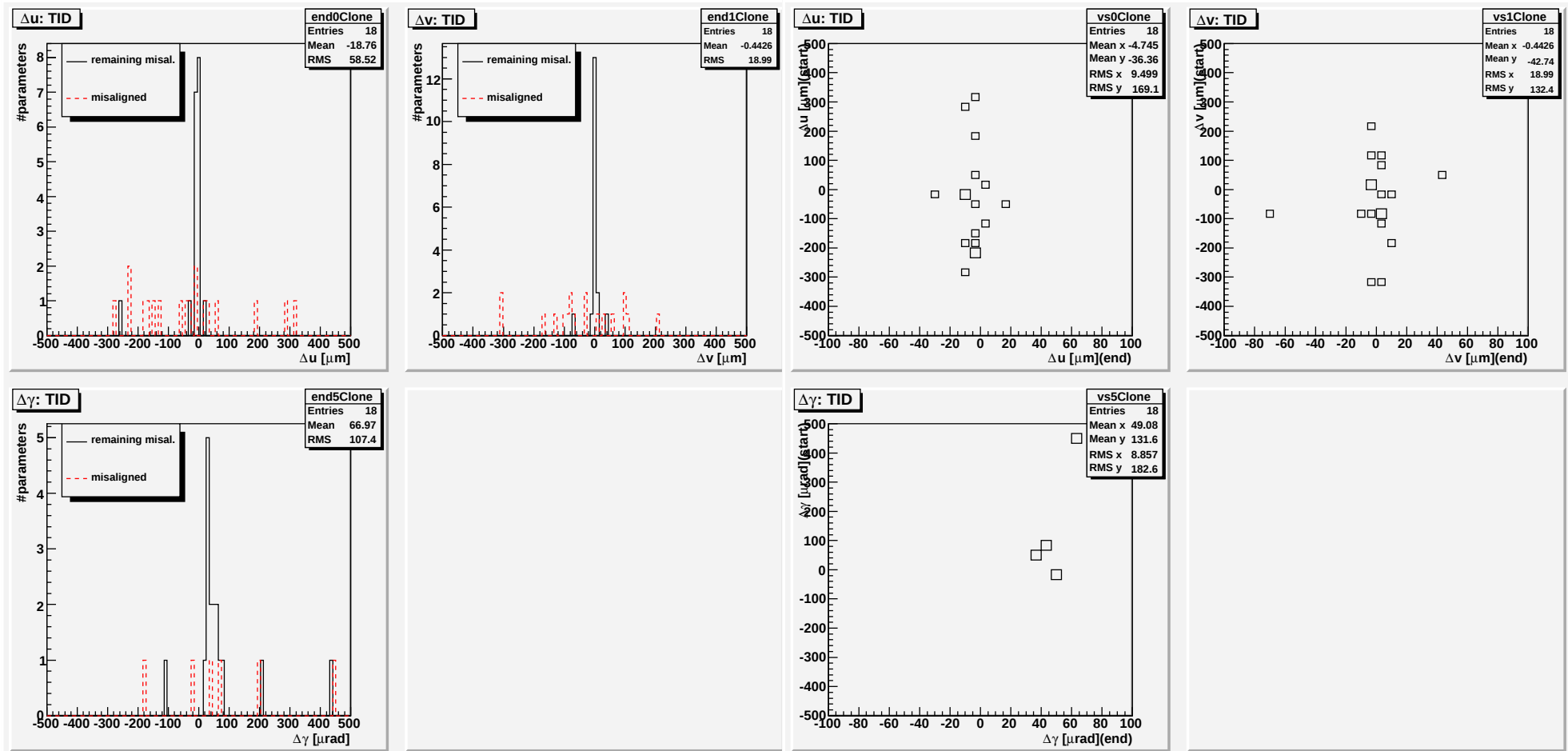
- Based on 20X beam halo Monte Carlo
 - the available statistics is limited: ~60k events
- Track collection: ALCARECOTkAlBeamHalo
- Track selection:
 - $ptMin = 0.$
 - $etaMin = -999.$ / $etaMax = +999.$
 - $nHitMin = 6$ / $nHitMin2D = 2$
 - $chi2nMax = 50.$
 - $minMultiplicity = 1$
- Nb. of selected tracks: ~31200

Alignment with BH: TEC results

- Initial and remaining misalignment:



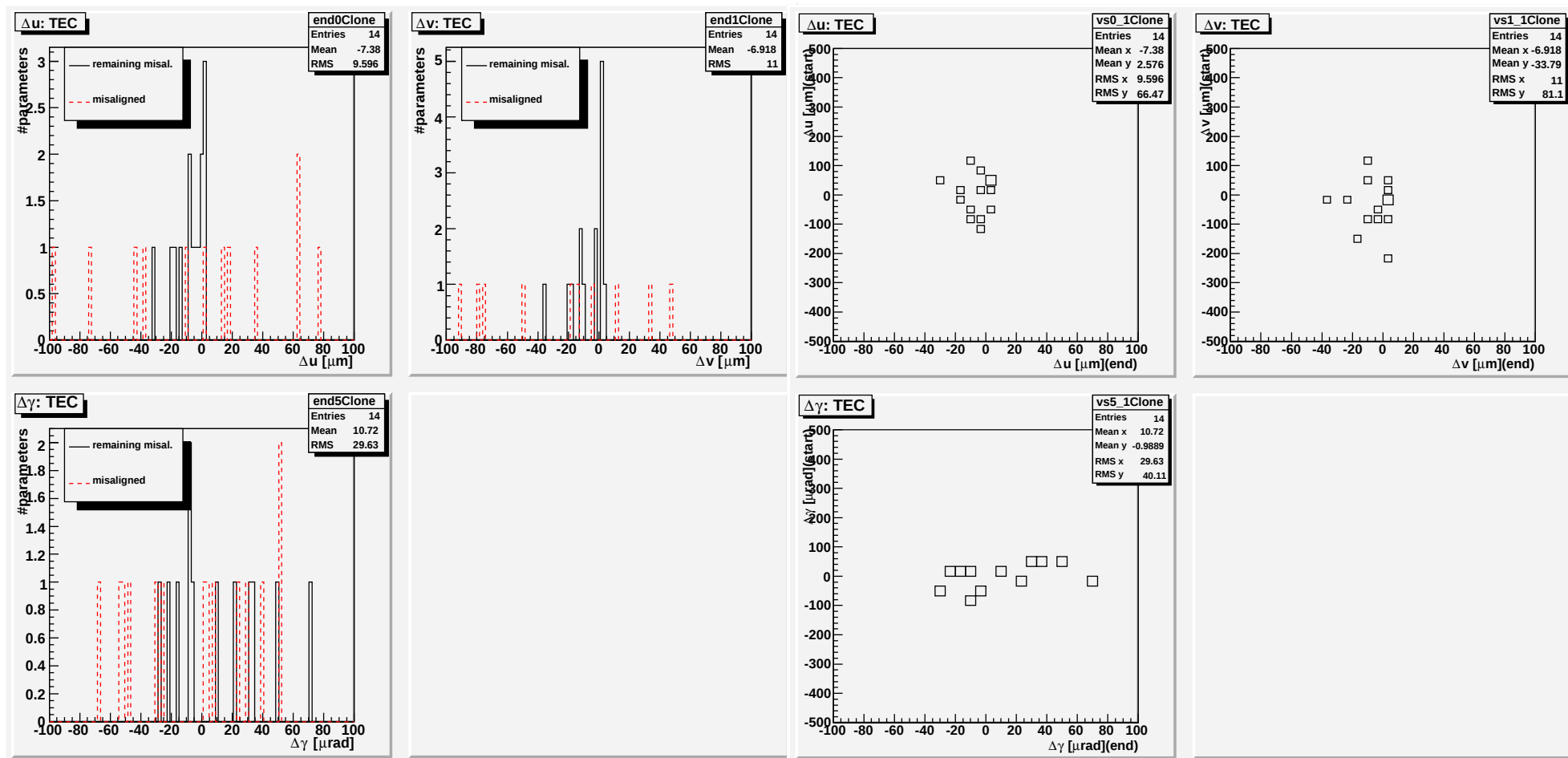
Alignment with BH: TID results



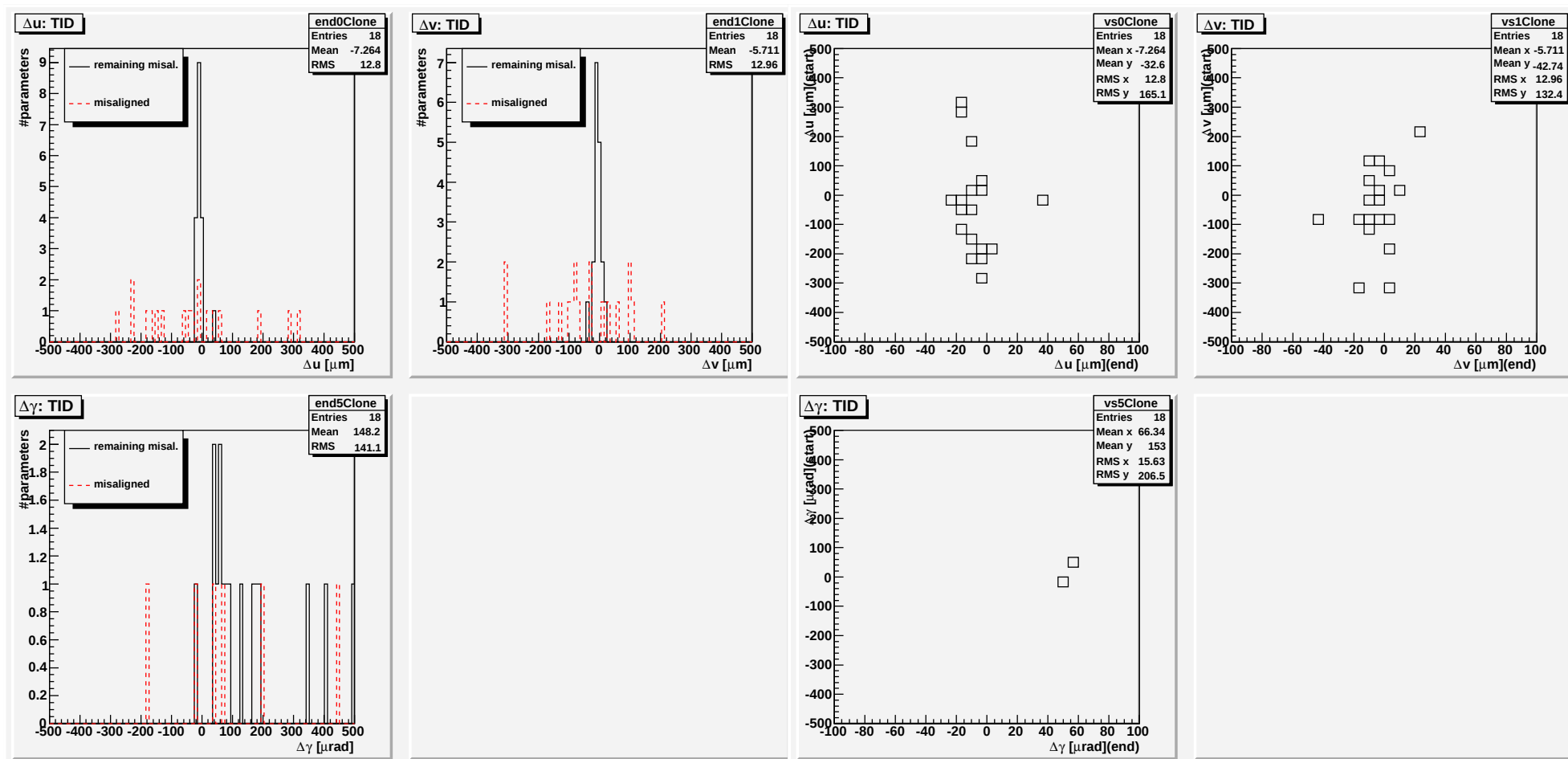
Alignment with Minimum Bias

- Based on 20X (CSA08) Monte Carlo
 - expected similar rate as Beam Halo... using 175k events
- Track collection: ALCARECOTkAlMinBias
- Track selection:
 - ptMin = 1.5
 - etaMin = -10. / etaMax = +10.
 - nHitMin = 8 / nHitMin2D = 2
 - chi2nMax = 50.
 - minMultiplicity = 1
- Nb. of selected tracks: ~302200

Alignment with MB: TEC results

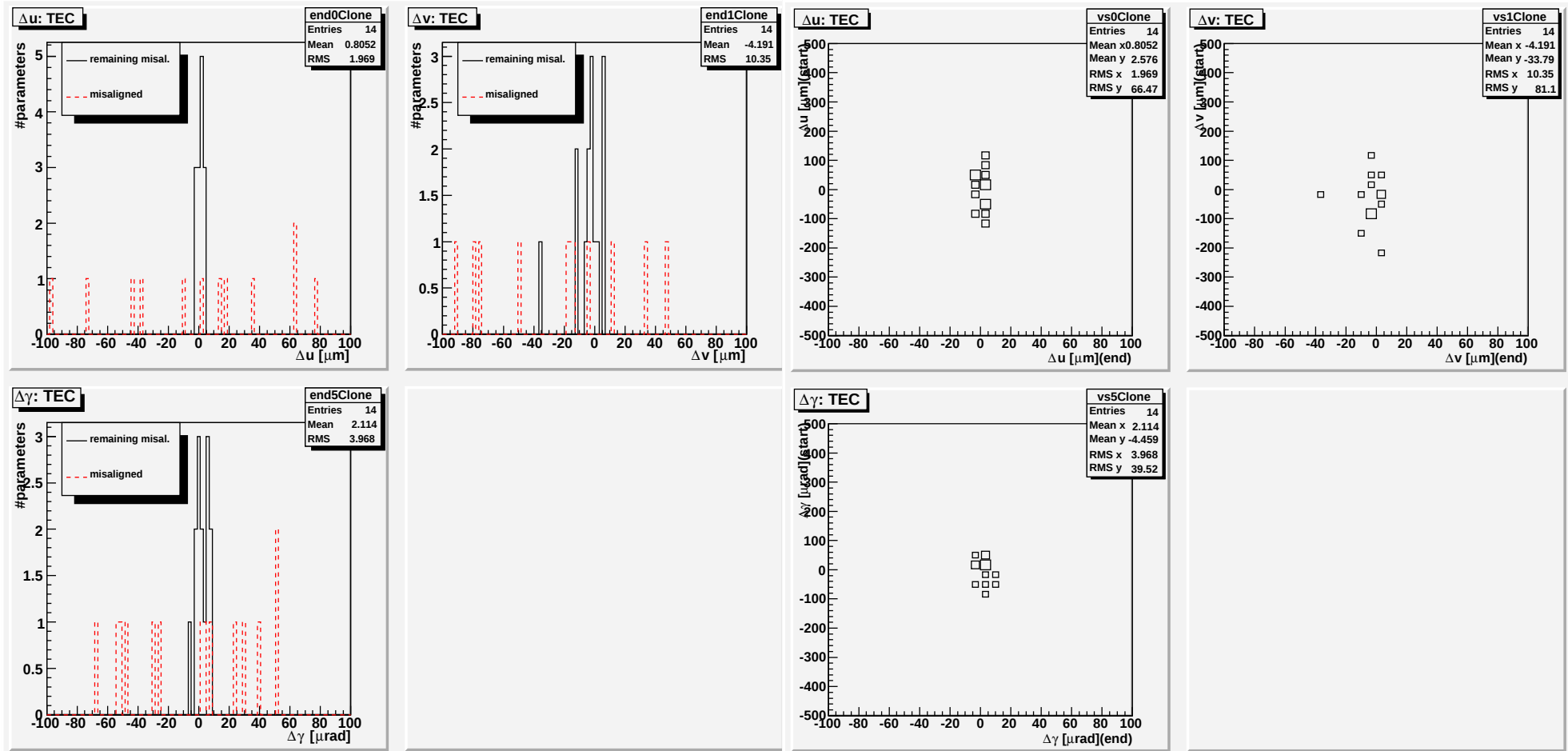


Alignment with MB: TID results

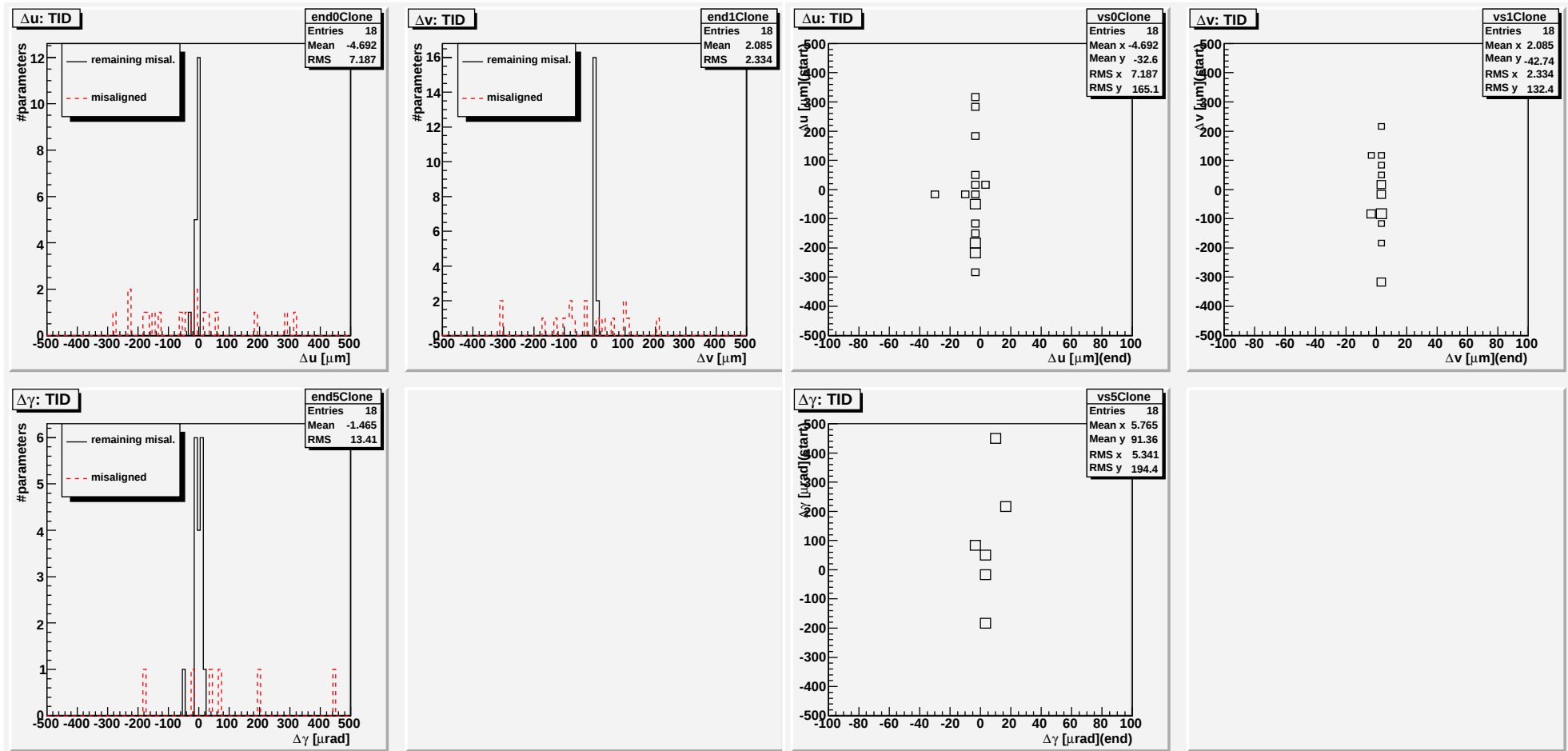


Alignment with Beam Halo + Minimum Bias

Alignment with BH+MB: TEC results



Alignment with BH+MB: TID results



Comparison of the results

	$\langle \Delta u \rangle$ TID	$\langle \Delta v \rangle$ TID	$\langle \Delta \gamma \rangle$ TID	$\langle \gamma \rangle$ TID	$\langle \Delta u \rangle$ TEC	$\langle \Delta v \rangle$ TEC	$\langle \Delta \gamma \rangle$ TEC
Starting	185	185	850	-	70	70	30
BH only	59	20	107	67	2	11	10
MB only	12	13	141	148	10	11	17
BH+MB	7	2	13	-	2	10	4

- For TID BH+MB results are much better than BH and MB only (especially for angular parameter)
- For TEC, results are dominated by BH but anyway the angular parameter benefits from combination with MB
- Combining BH+MB, there are no more outliers and no shifts in the mean of parameter residuals