

CDF Beamwidth measurement

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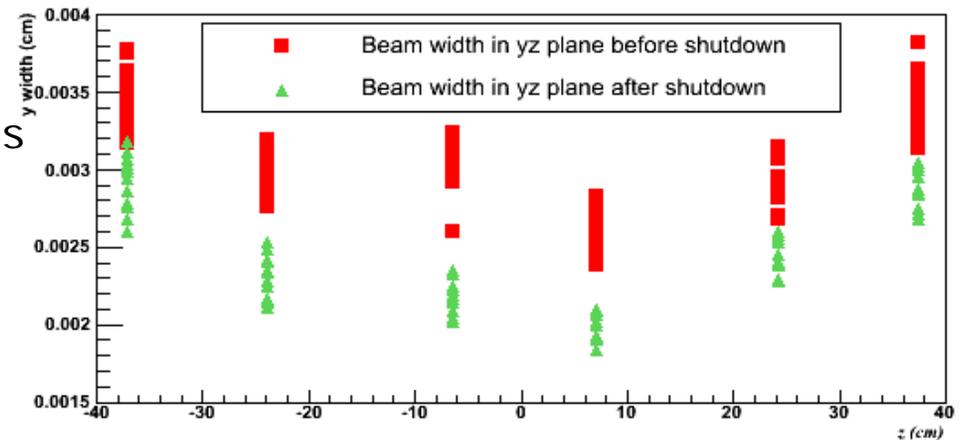
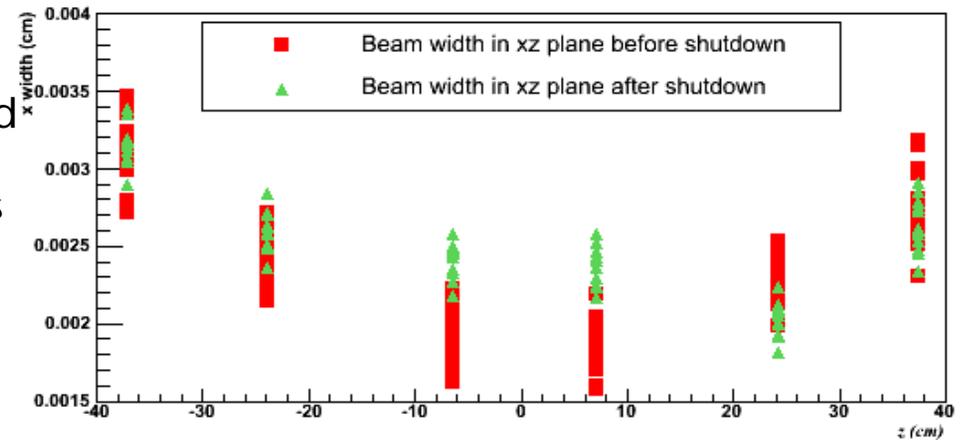
Outlook

- Review
- Recent work
- Offline vs online beam width
- History plots
- Online beam width study using MC
- Summary

Review

pre-shutdown vs.
post-shutdown

- ✘ We have two method.
 - ✘ Online: Use impact parameters of well-separated online track pair.
 - ✘ Offline: Use primary vertices in fully reconstructed data.
- ✘ In the previous meeting,
 - ✘ online beam width results were confusing
 - ✘ offline beam width result suffered from insufficient statistics
- ✘ **"Confusing"** =
 - ✘ Measured online beam widths in x are ~flat in post-shutdown data.
 - ✘ Beam width in y are lower down than before..



Recent Work

✘ Online:

- ✘ Reverted to old version of fitter.

 - ✘ "New": utilize multi-track events

 - ✘ "Old": simple – use just 2-track events

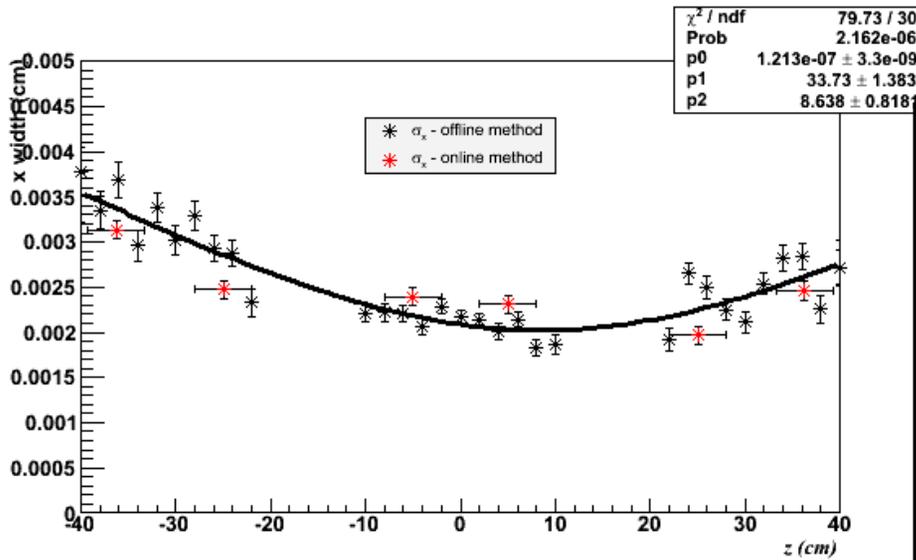
 - ✘ Goal: Try to see if "new" fitter caused weird behavior

- ✘ Studied track inputs

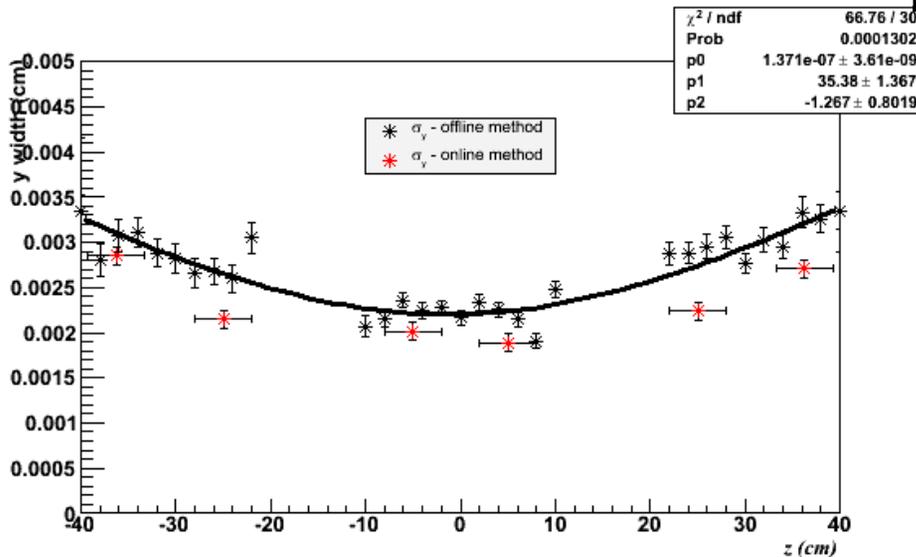
✘ Offline:

- ✘ Data now processed...statistics now available...have more believable results

Online vs. Offline store 4927 (2006.08.26)

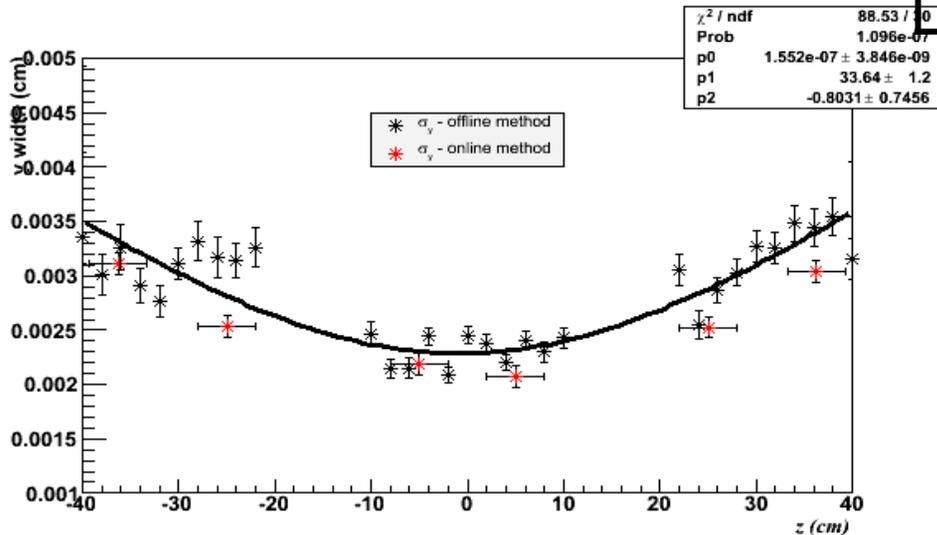
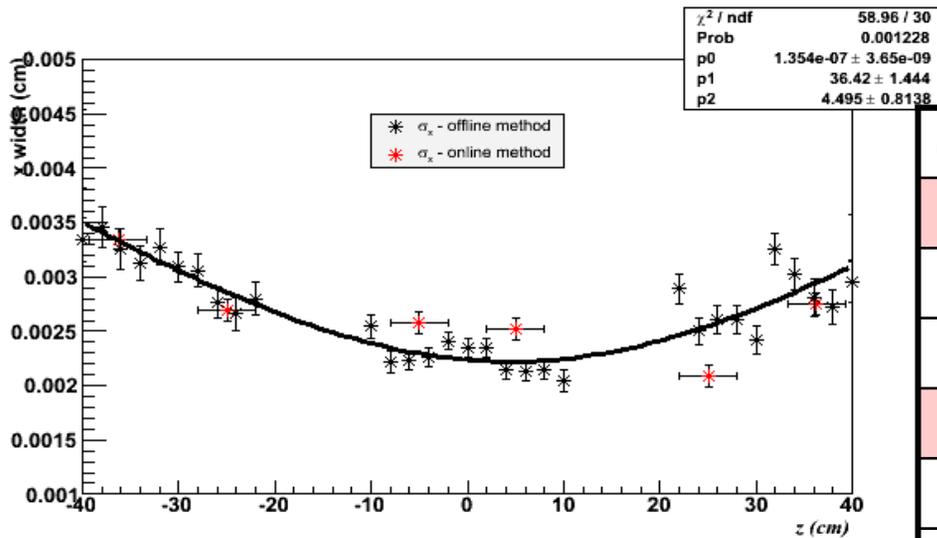


online		offline	
B_x	47.4 ± 6.1	B_x	33.7 ± 1.4
E_x	$0.94\text{e-}7 \pm 8\text{e-}9$	E_x	$1.21\text{e-}7 \pm 3\text{e-}9$
Z_x	12.63 ± 3.50	Z_x	8.64 ± 0.82
B_y	32.6 ± 4.3	B_y	35.4 ± 1.4
E_y	$1.00\text{e-}7 \pm 6\text{e-}9$	E_y	$1.37\text{e-}7 \pm 4\text{e-}9$
Z_y	0.37 ± 2.06	Z_y	-1.27 ± 0.80



- Used multi-tracks for beam width fit.
- See large beta*_x value!!

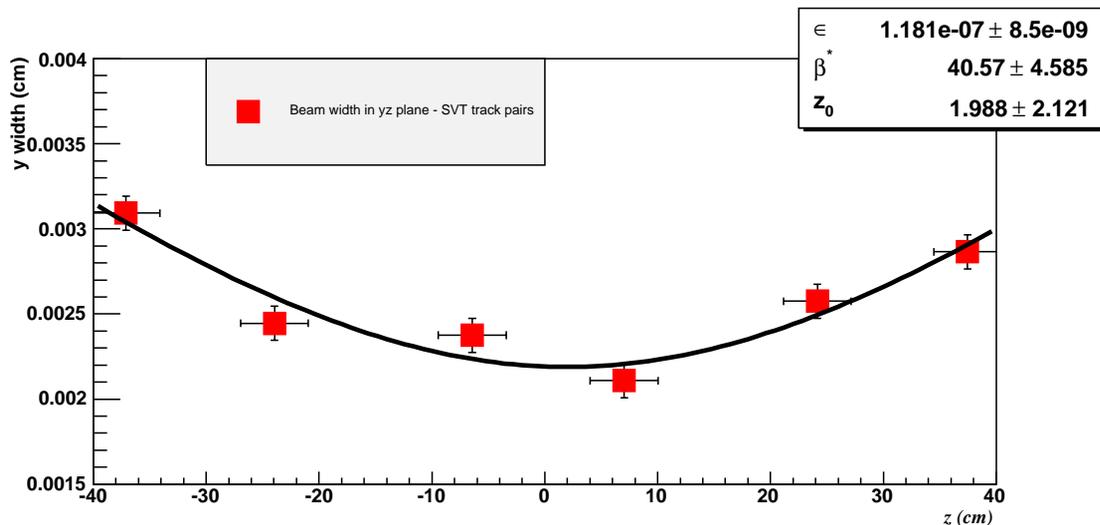
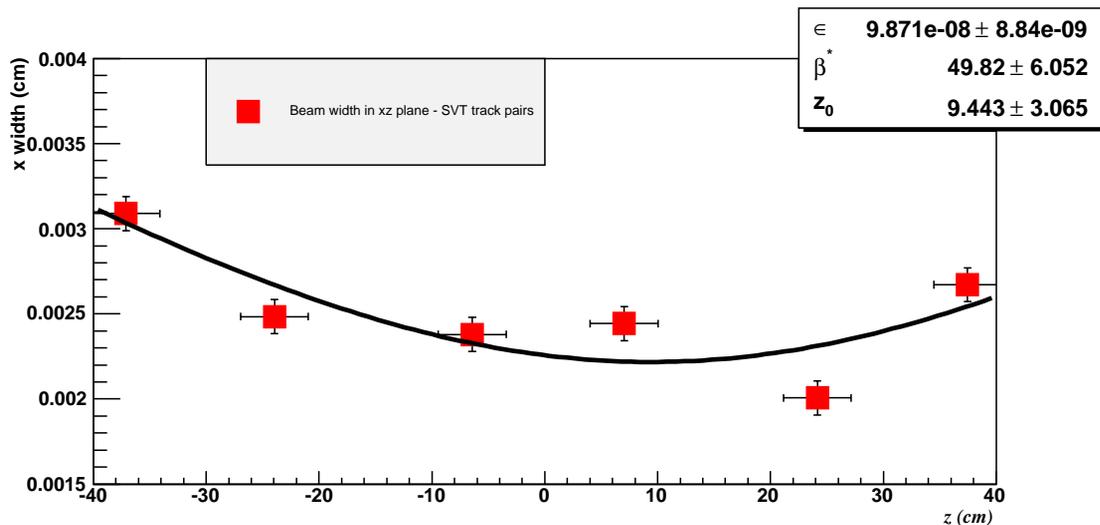
Online vs. Offline store 4847 (2006.07.21)



online		Offline	
B_x	46.2±5.4	B_x	36.4±1.4
E_x	1.12e-7±9e-9	E_x	1.36e-7±4e-9
Z_x	11.14±3.08	Z_x	4.50±0.81
B_y	32.7±4.1	B_y	33.6±1.2
E_y	1.26e-7±8e-9	E_y	1.55e-7±4e-9
Z_y	0.61±1.93	Z_y	-0.80±0.75

- Used two-track event for beam width fit.
- Large Beta*_x evident with "old" fitter, too
 - So "new" fitter not to blame

Recent online bw fit - Store 5063 (2006.11.11)

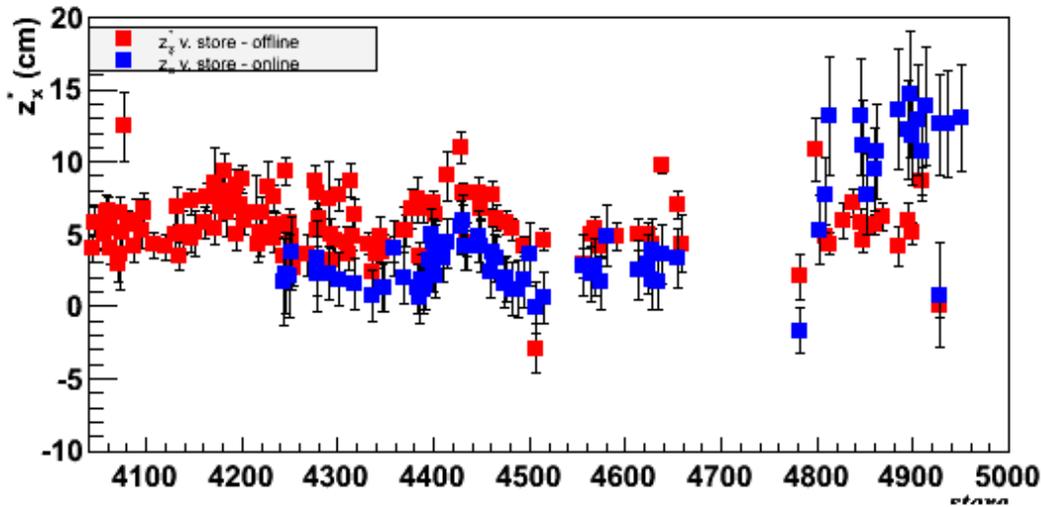


- Went back to old fit with two-tracks only events.

- The event selection (two-track vs multi-track) does not improve beam width shape in xz plane.

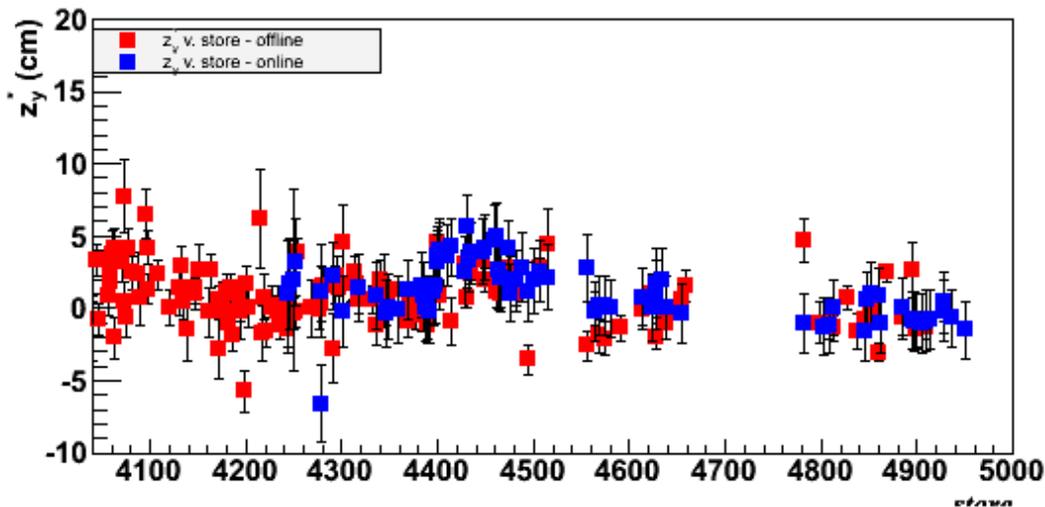
- Still measured beam width in xz plane persists flat in recent stores.

History – Z0

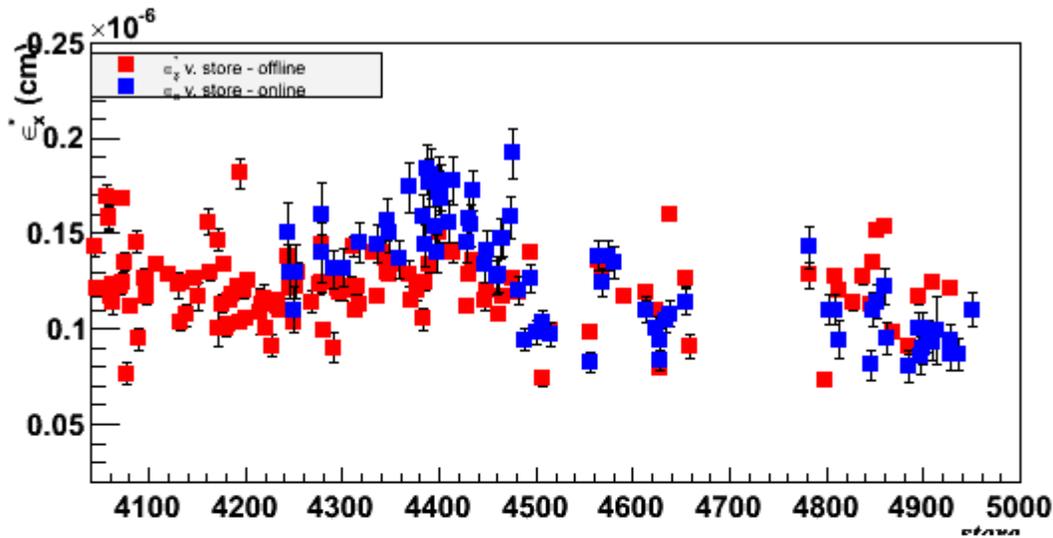


Offline Store up to ~4927
Online Store up to ~4950

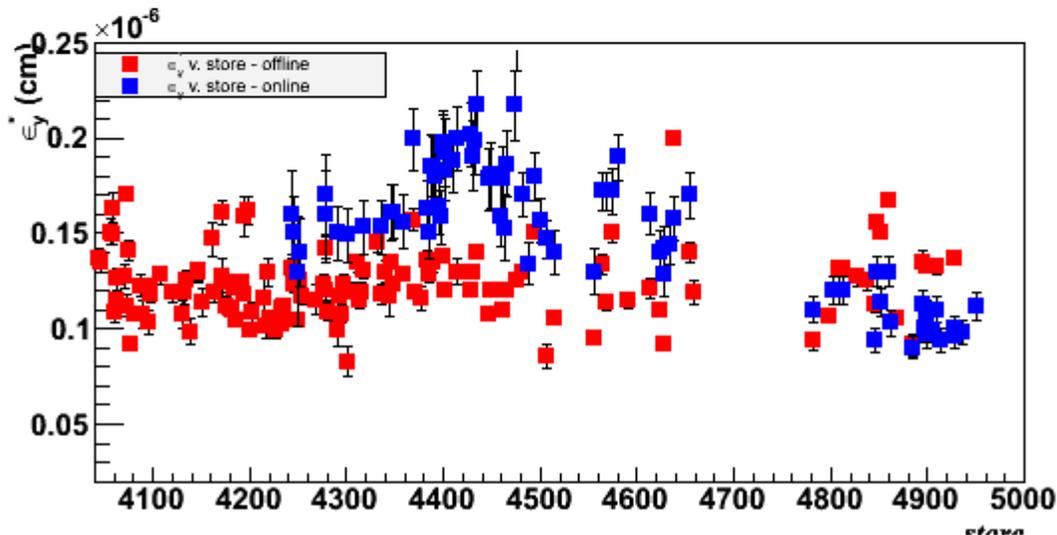
- Offline Z0 is still high in xz plane but consistent with pre-shutdown data.



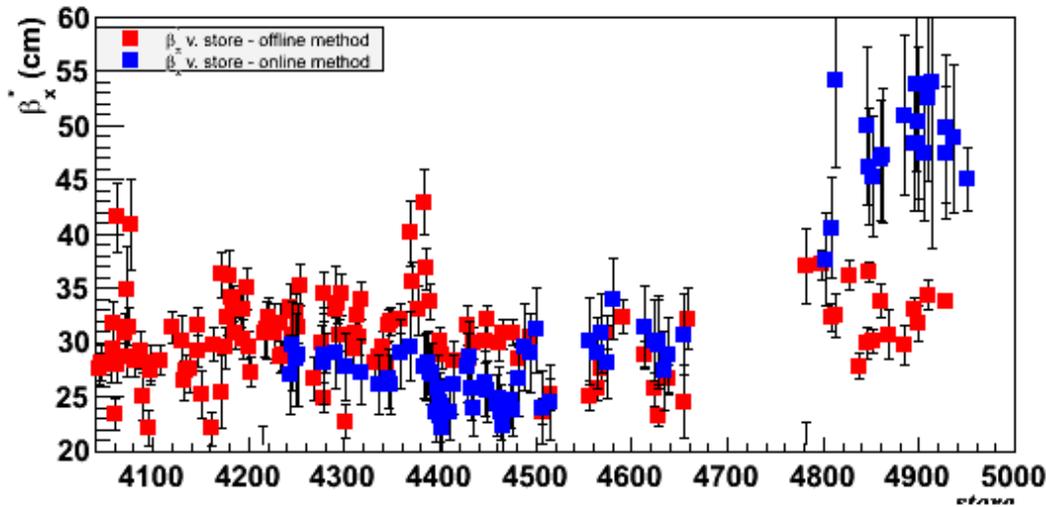
History - Emittance



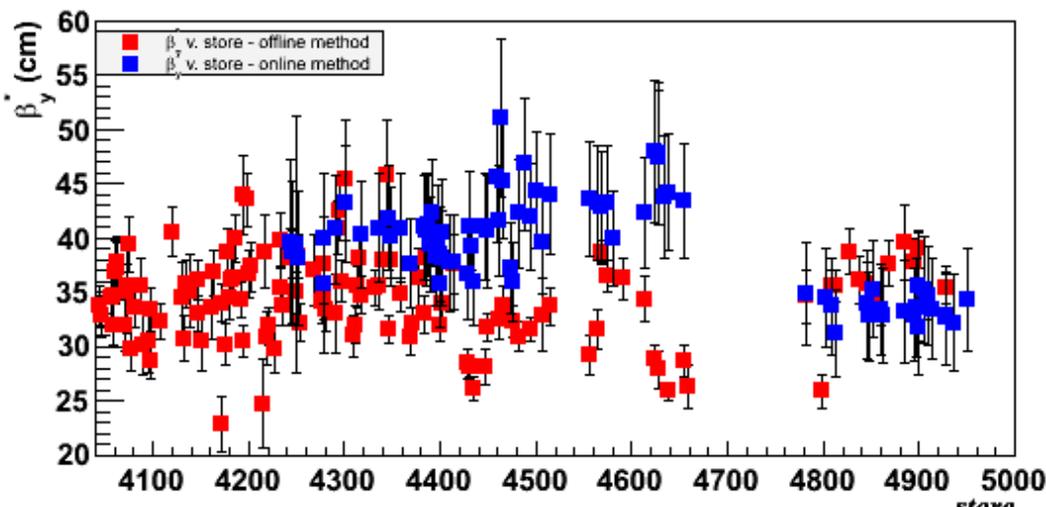
Offline Store up to ~ 4927
Online Store up to ~ 4950



History - Beta



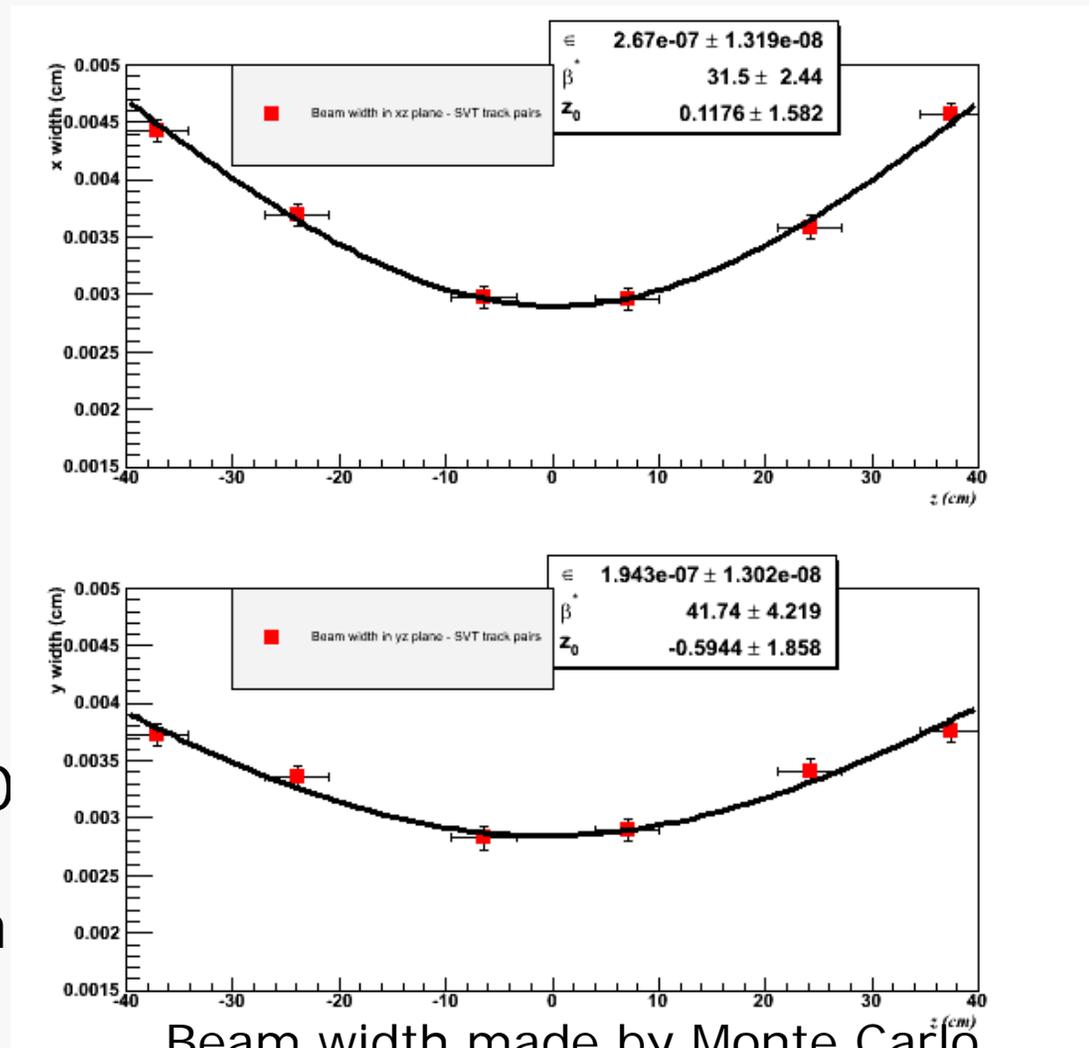
Offline Store up to ~4927
Online Store up to ~4950



- In the previous meeting, offline beam width measurements from a few runs were not consistent one another due to low stats. They are consistent and low around 33cm in xz plane and 36cm in yz plane.

Online beam study with Monte Carlo

- ✘ The online track information were extracted to reproduce beam width with Monte Carlo.
- ✘ Still some track information are not understood. Need more look.
- ✘ It is suspicious the way of correction of beam position and d_0
- ✘ MC have not reproduced flat beam width in x yet...but see it in y!

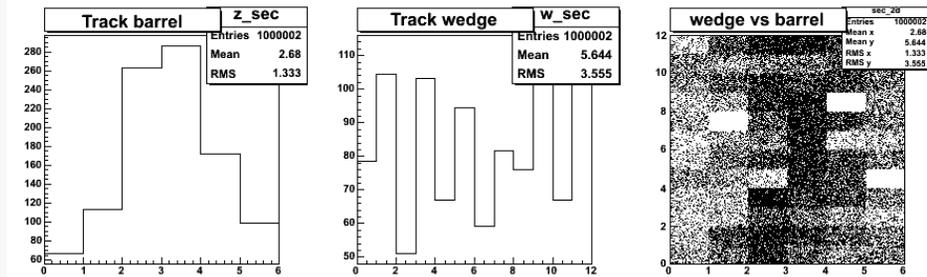
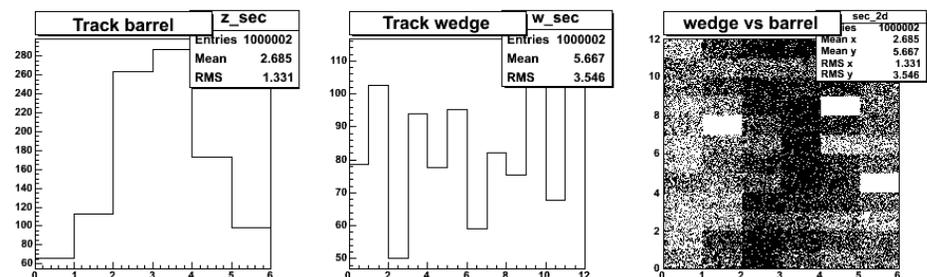
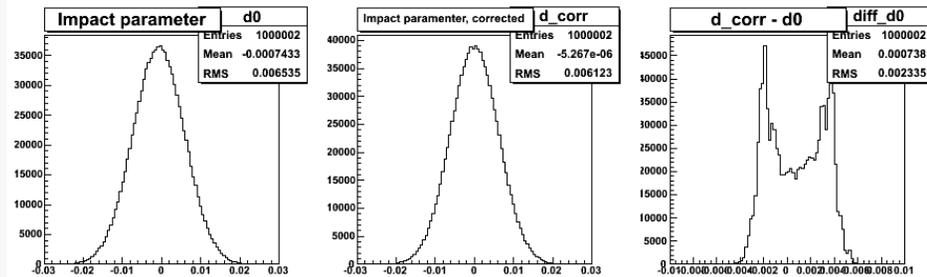
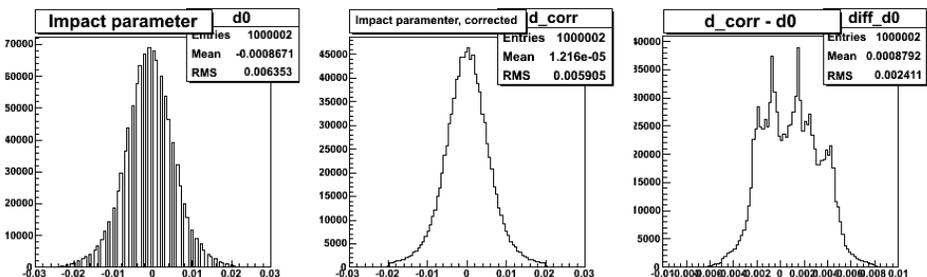
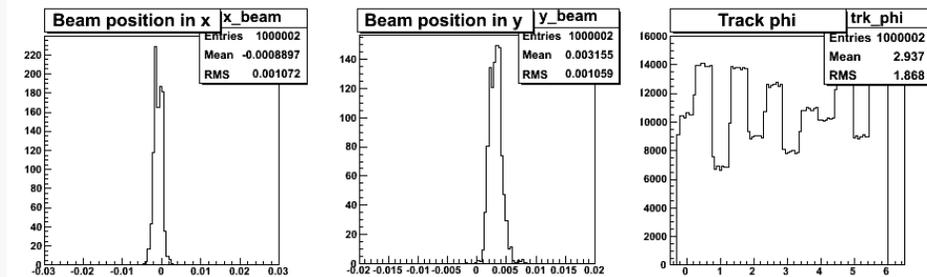
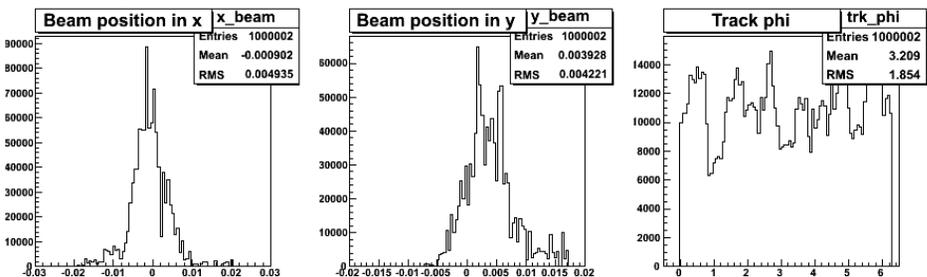


Beam width made by Monte Carlo in realistic track condition.

Online track information

data

Monte Carlo



Summary

- ✘ Offline beam width from post-shutdown data confirms that beam width parameters are consistent with those in pre-shutdown data.
- ✘ However the offline measured β^*_x is a little bit higher than before.
- ✘ Weird flat online beam width persists in either event selection (two-track/multi-track) in post-shutdown data.
- ✘ We don't fully understand what affects online beam width yet. The correction to d_0 is suspicious though.