

CDF beamwidth/beamposition Measurement

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How to Measure

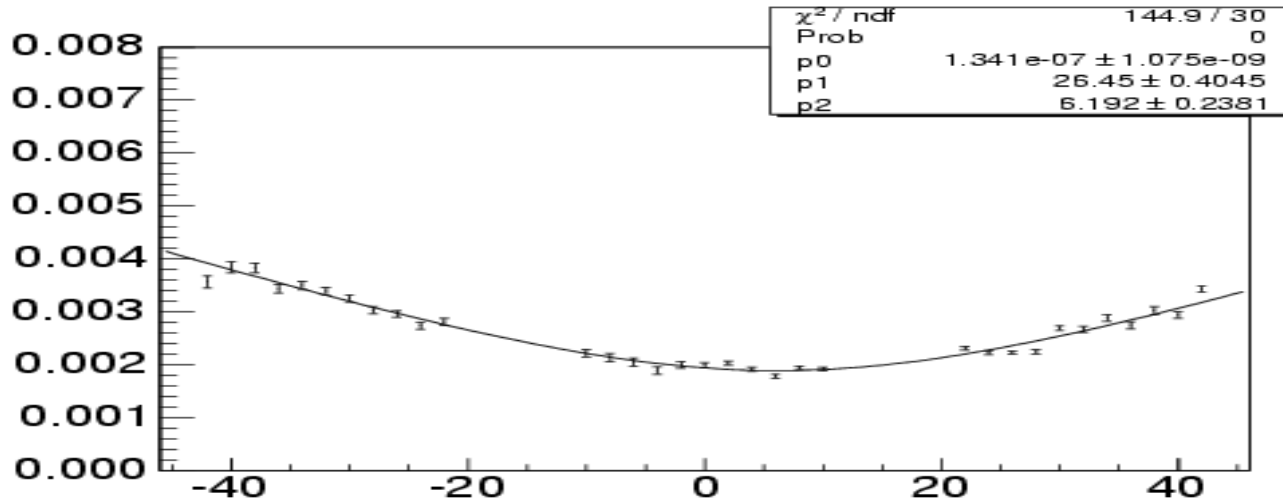
- With an assumption that beam line is consistent in localized z bin, it makes reasonable beam width fit.

$$\begin{aligned}\sigma_{\text{beam}} &= \text{sqrt}(\sigma_{\text{observed}}^2 - \kappa^2 \langle \sigma_{\text{pvtx}}^2 \rangle) \\ &= \text{sqrt}(\varepsilon(\beta^* + (z-z_0)^2/\beta^*))\end{aligned}$$

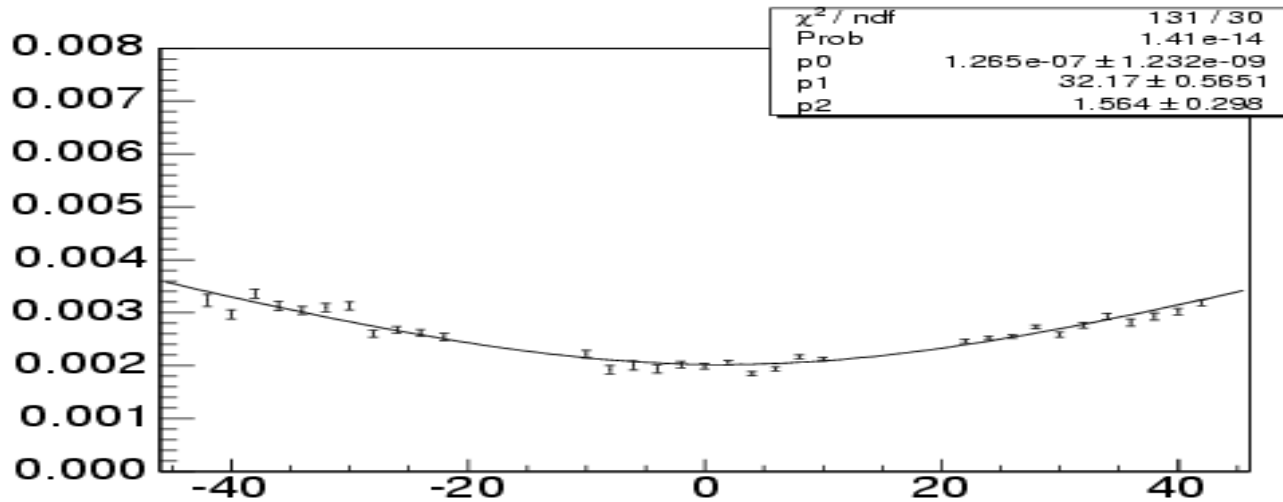
where $\kappa=1.5$ is a scale factor to the measurement uncertainty.

- Fit σ_{beam} vs. z distribution to extract ε , β^* , z_0

Example – store 6373



x
direction

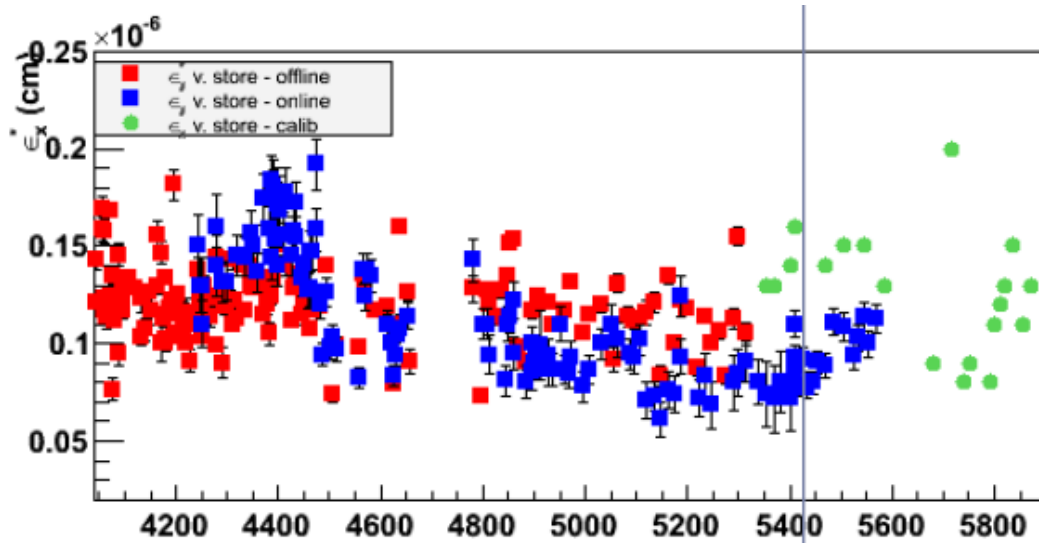


y
direction

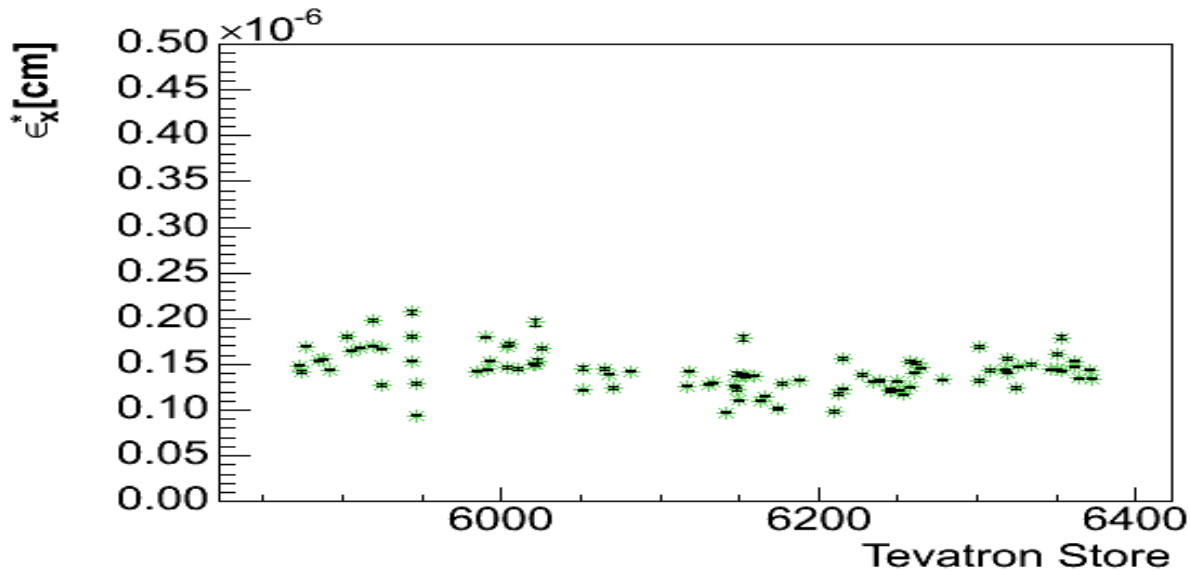
Requirements

- Store 5871 ~ 6378 (Feb beginning– Aug end)
- Run by run measurement with calibration data
- Choose stores with good SVX efficiency $> 85\%$
- For each store, choose run(s) longer than 10 hours

History of Emittance 1

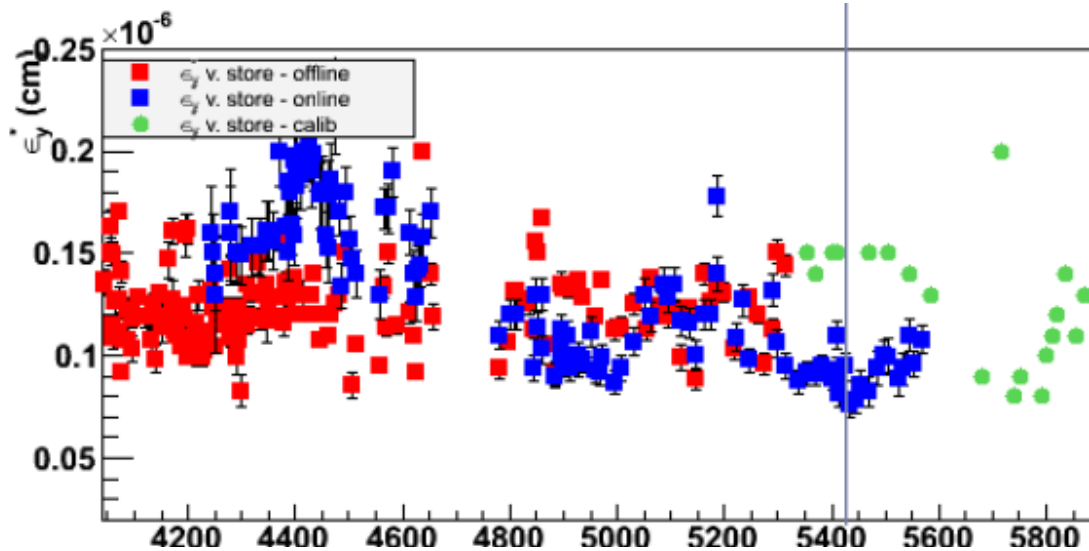


Previous CDF
measurement

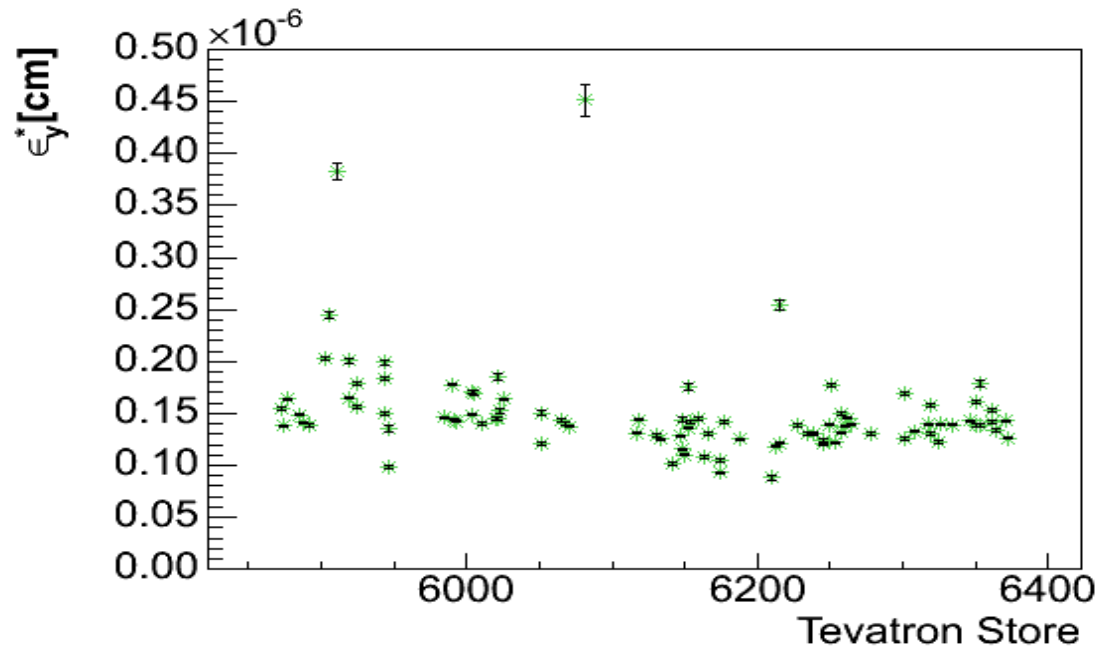


New CDF
measurement

History of Emittance 2

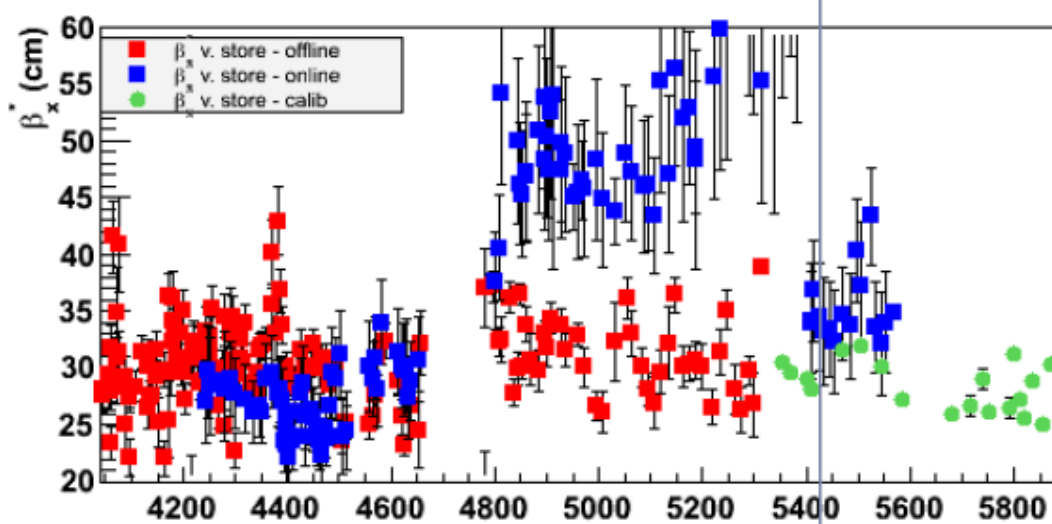


Previous CDF
measurement

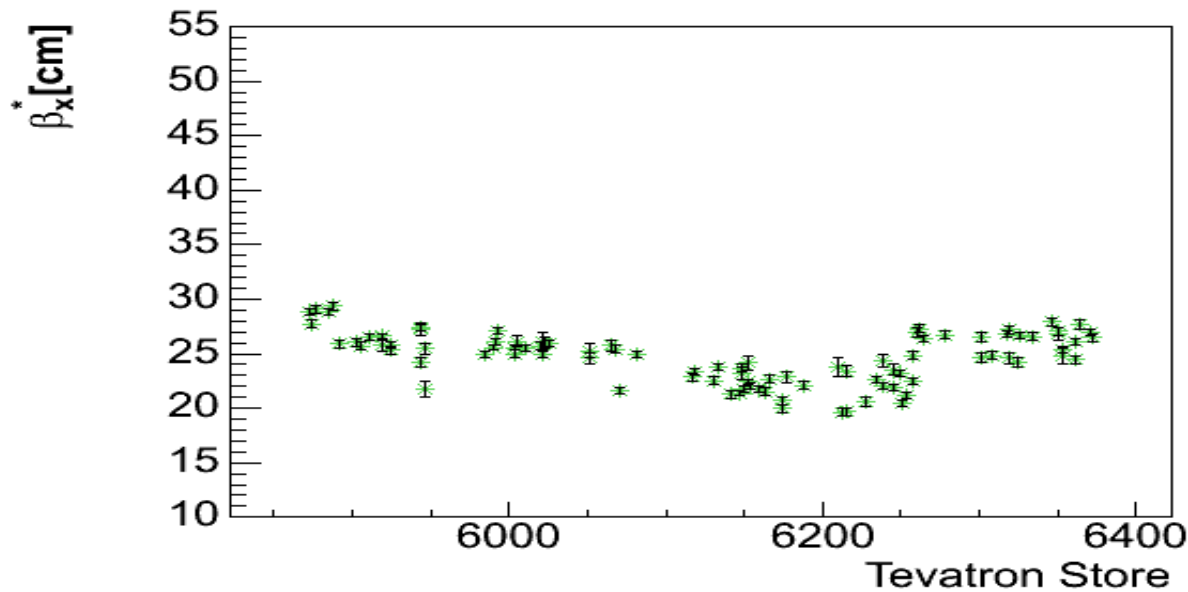


New CDF
measurement

History of $\beta^* 1$

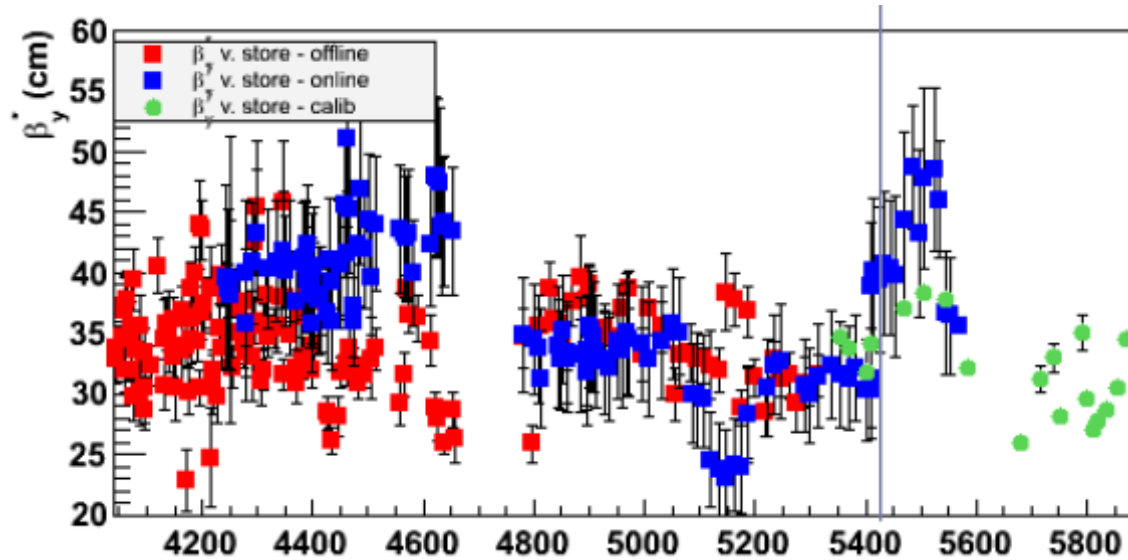


Previous CDF
measurement

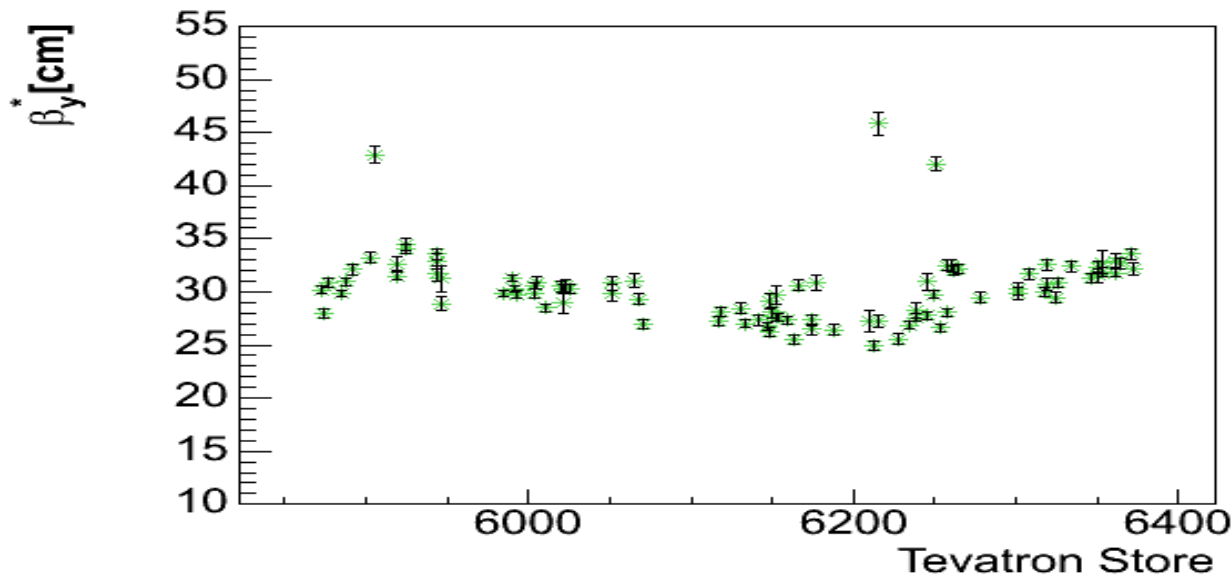


New CDF
measurement

History of $\beta^* 2$

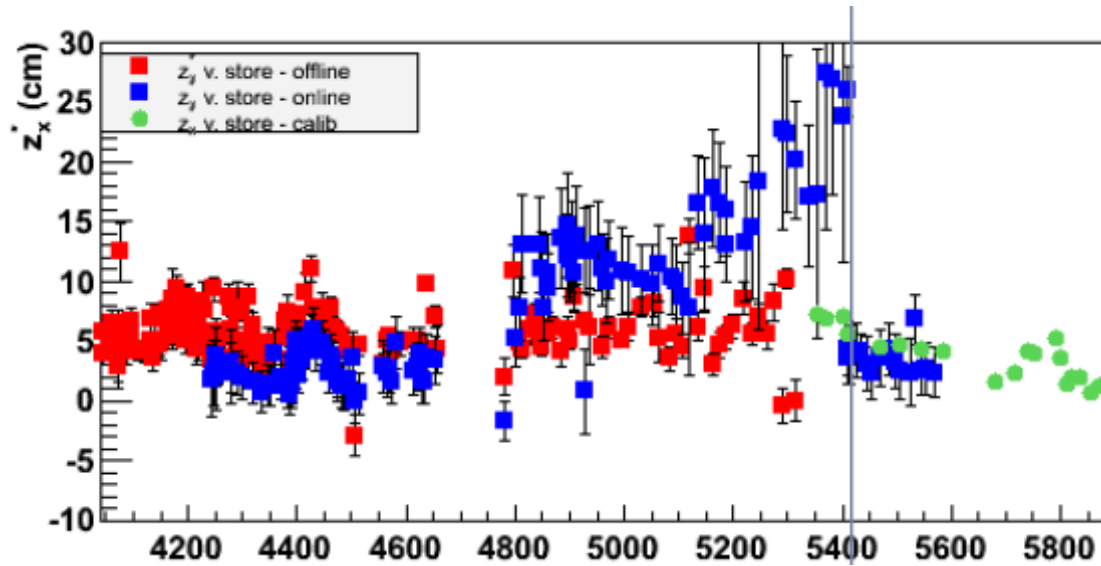


Previous CDF
measurement

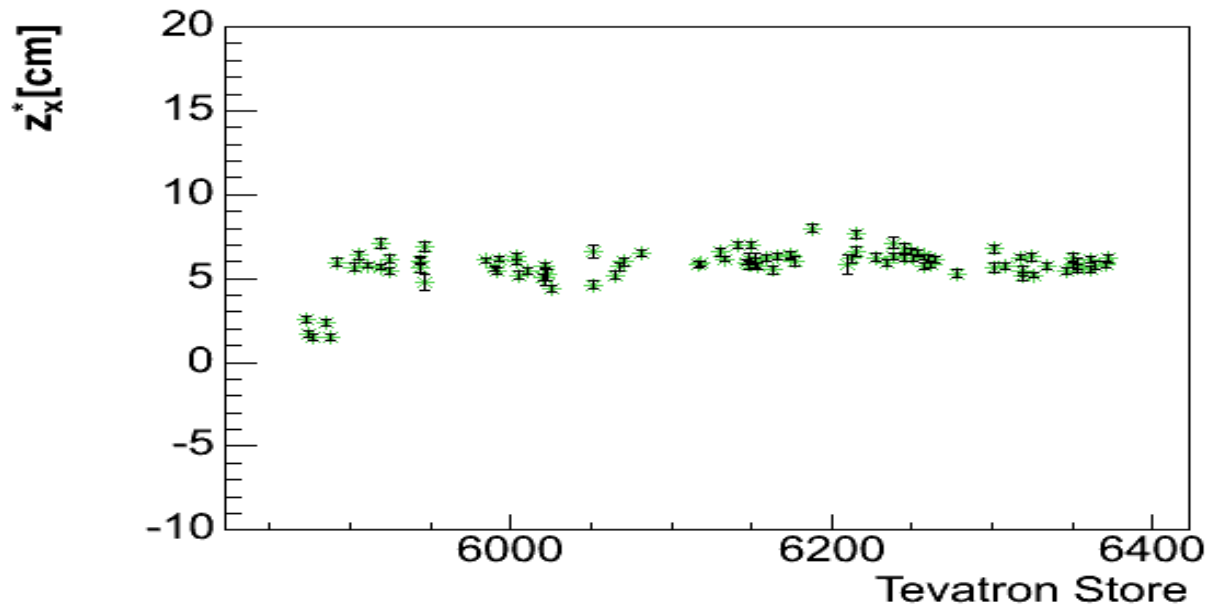


New CDF
measurement

History of Z0 1

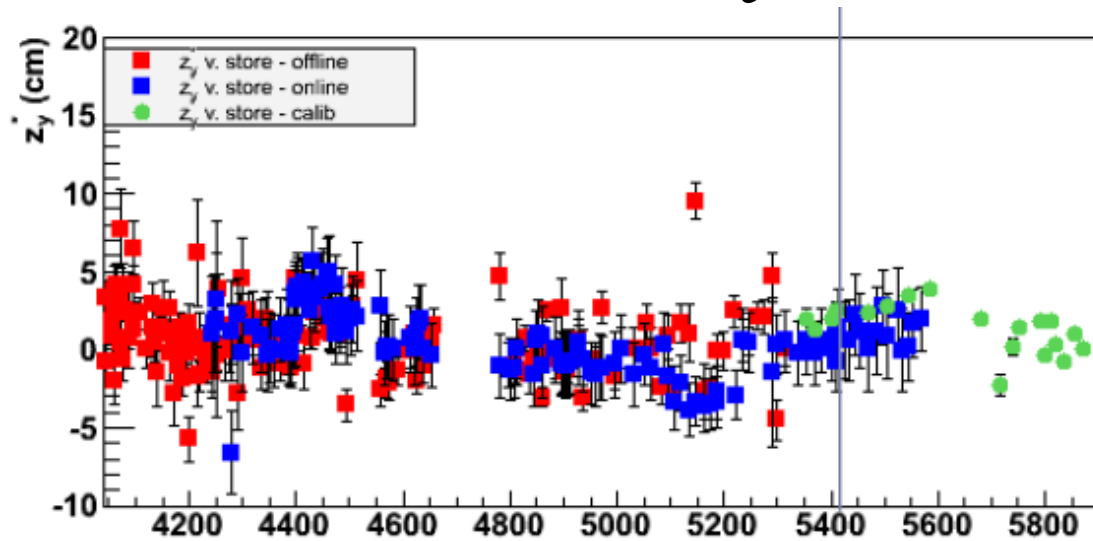


Previous CDF
measurement

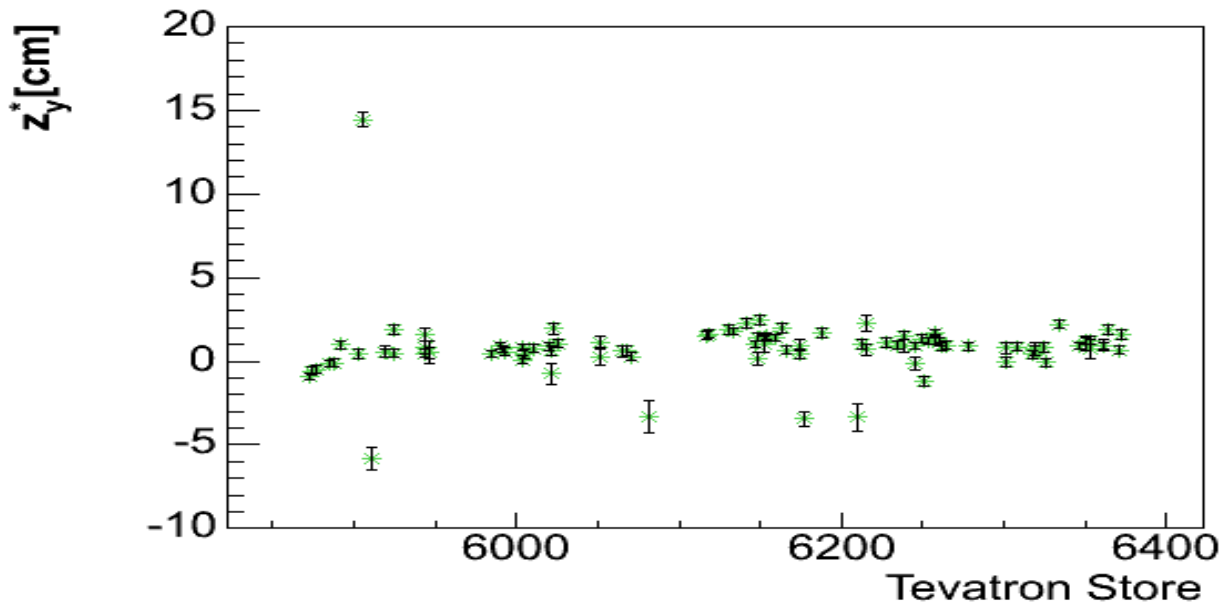


New CDF
measurement

History of Z0 2



Previous CDF
measurement



New CDF
measurement