Variance of drift measurement

- Drift distance: d=d(t-s/βc) $\rightarrow$ MC: linear-time-to-distance relationship
- Assuming constant drift velocity: d=v*(t-s/βc)
- Variance in drift distance includes contributions due to variances in the path length s and the particle speed βc in addition to the time measurement from the wires:

$$\sigma^2(t_{drift}) = \sigma^2(t) + \sigma^2\left(\frac{s}{\beta c}\right)$$

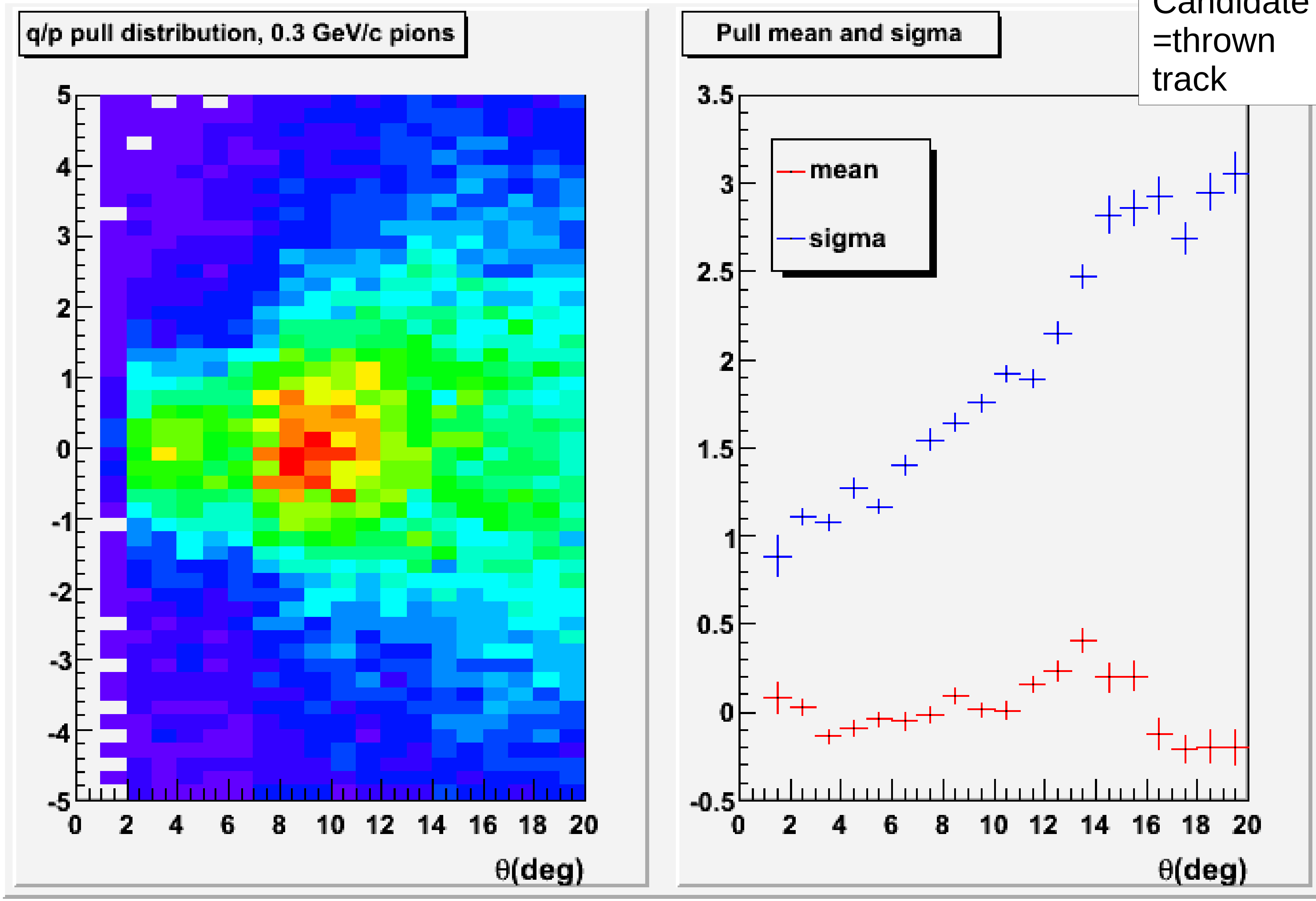
$$\sigma^2\left(\frac{s}{\beta c}\right) = \frac{1}{\beta^2 c^2}\left(\sigma^2(s) + \frac{s^2 m^4 \beta^4}{p^2}\sigma^2\left(\frac{q}{p}\right)\right)$$

- Next step: to verify that the errors are correct, compute pull distributions for the parameters (should be centered on zero with sigma=1.)

For example:

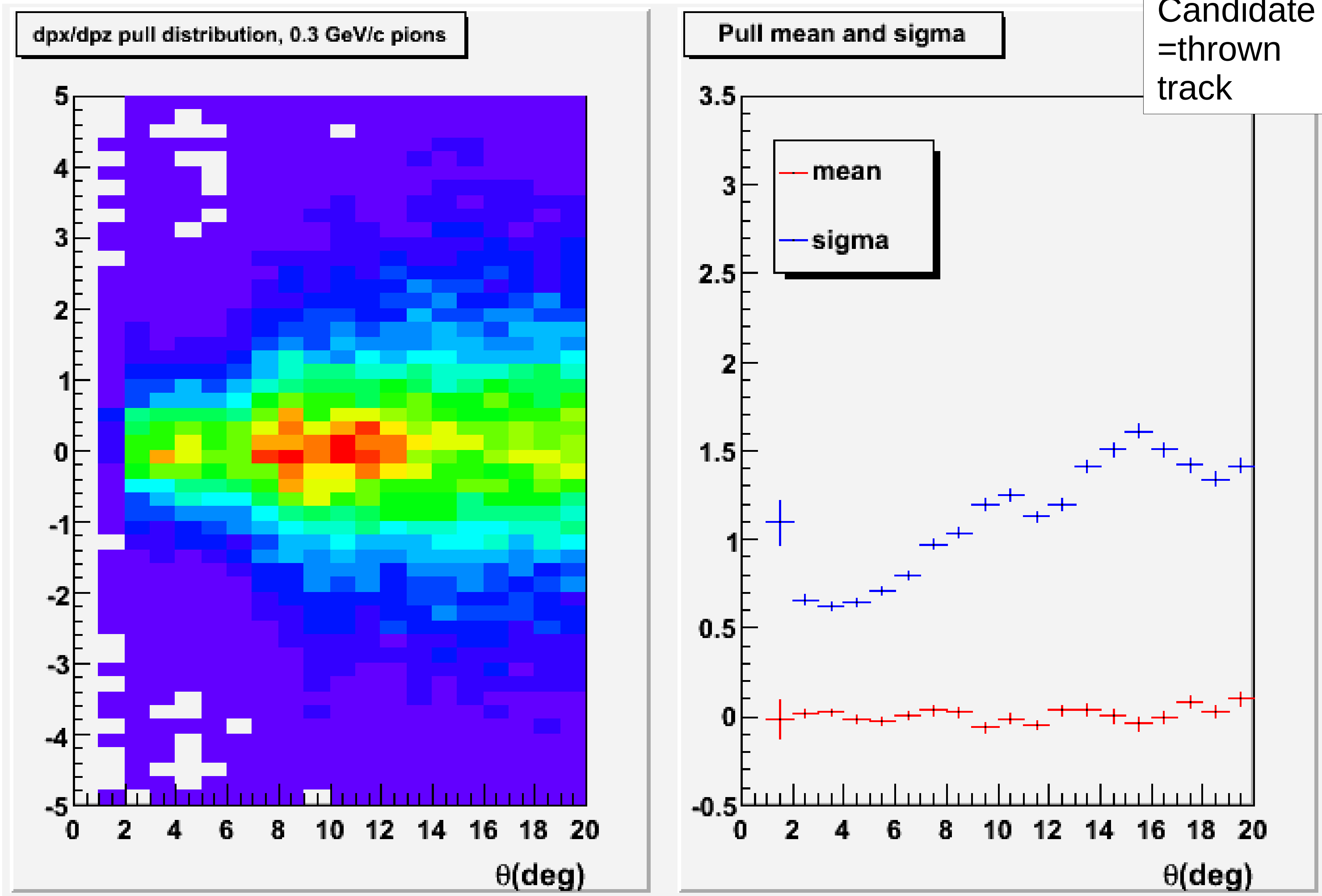
$$Pull(z) = \frac{z - z_{true}}{\sqrt{\sigma^2(z)}}$$

Pull distribution for q/p



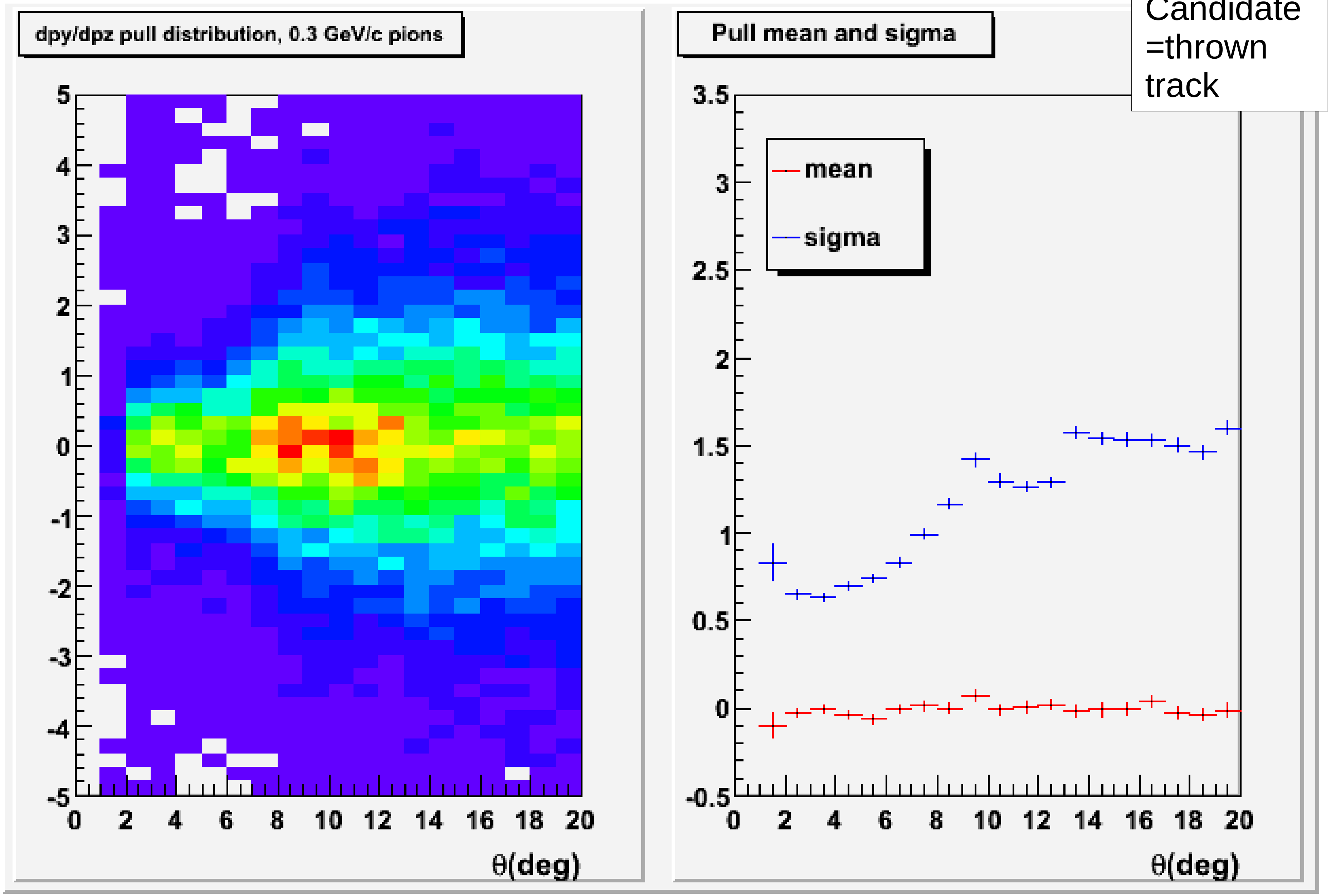
Candidate =thrown track

Pull distribution for direction tangent in x



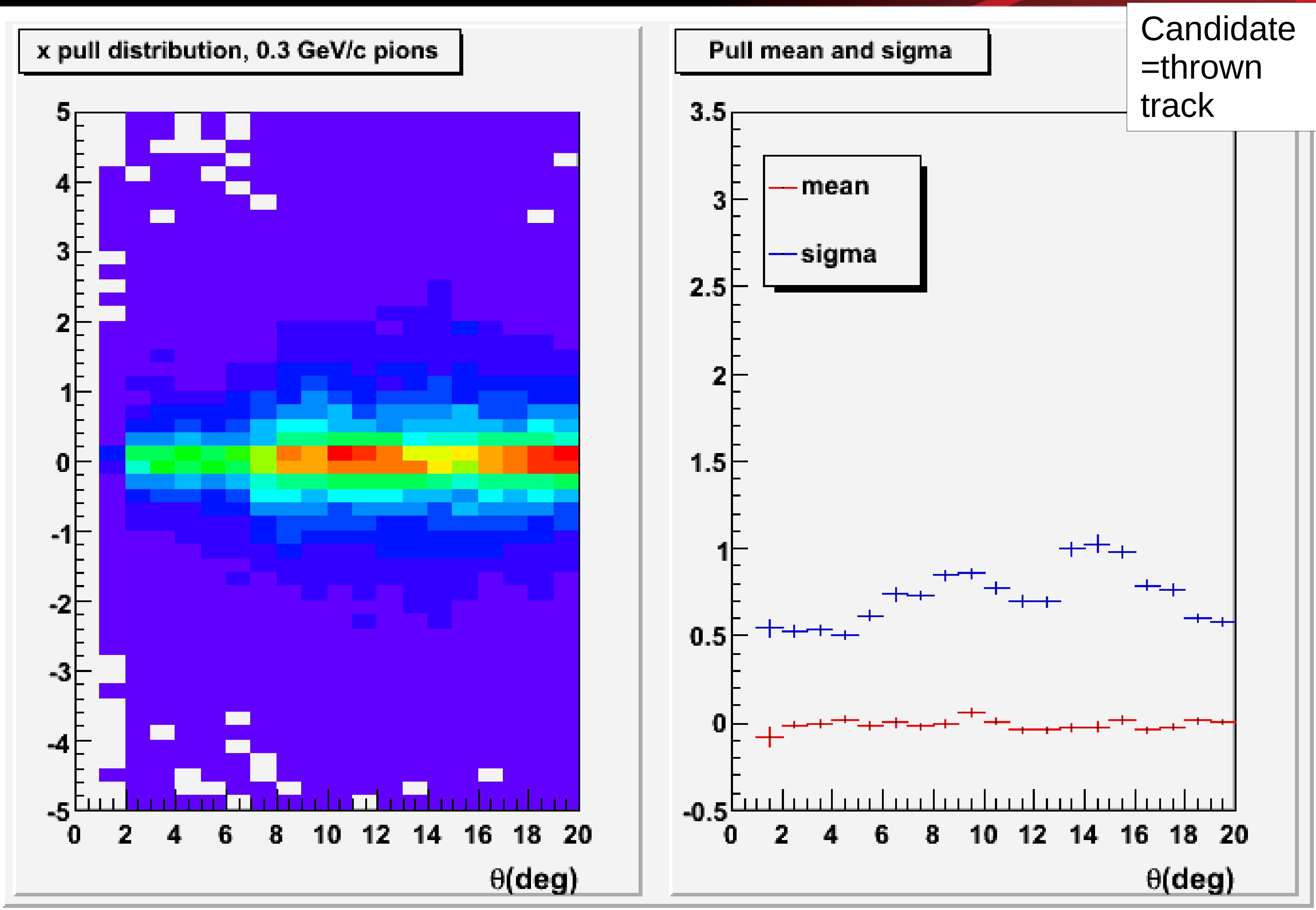
Candidate =thrown track

Pull distribution for direction tangent in y



Candidate =thrown track

Pull distribution for x



Pull distribution for y

Candidate =thrown track