

# Analysis of TestBeam2012

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*Junping Tian (KEK)*

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# hit charge investigation

- first run standard *PulseFinder* and *HitFinder* (no tracking)
- estimate the hit charge only using the central pad and hit position

$$\sigma_{\text{PRF}} = \sqrt{\sigma_0^2 + c_D^2 z} \quad \sigma_0 = 250\mu\text{m} \quad \begin{array}{l} c_D = 95\mu\text{m}/\sqrt{\text{cm}} \quad (B=1\text{T}) \\ c_D = 300\mu\text{m}/\sqrt{\text{cm}} \quad (B=0\text{T}) \end{array}$$

*fraction of the charge in the central pad*

$$F = \left| \int_{dY-w}^{dY+w} N(0, \sigma_{\text{PRF}}^2; x) dx \right|$$
$$= \frac{1}{2} \left( \text{Erf}\left(\frac{w - dY}{\sqrt{2}\sigma_{\text{PRF}}}\right) + \text{Erf}\left(\frac{w + dY}{\sqrt{2}\sigma_{\text{PRF}}}\right) \right)$$

*w: half of pad width*

*dY = Y(Hit) - Y(PadCenter)*

*Erf: error function*

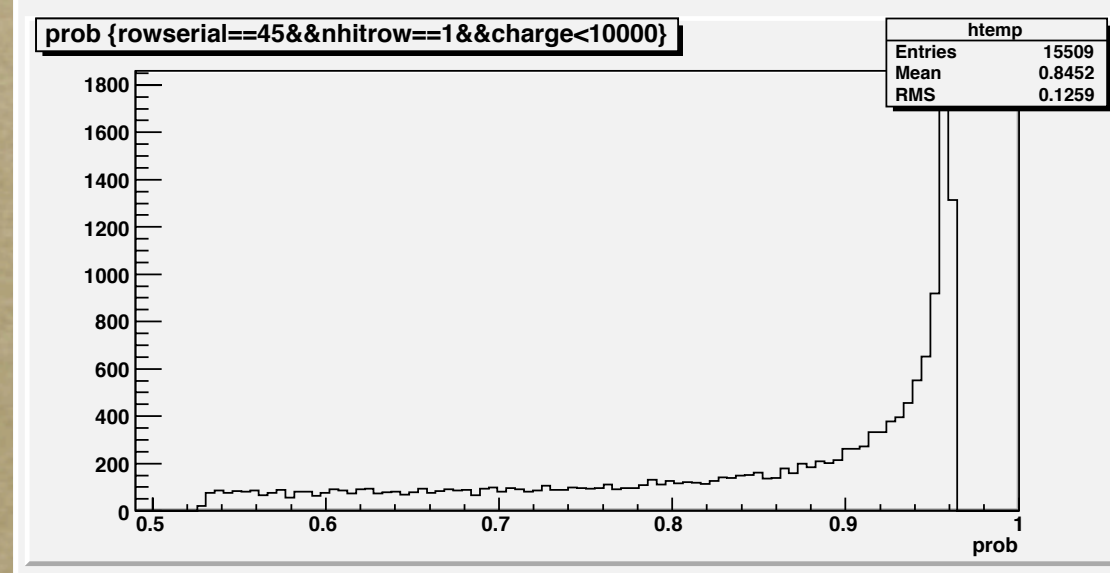
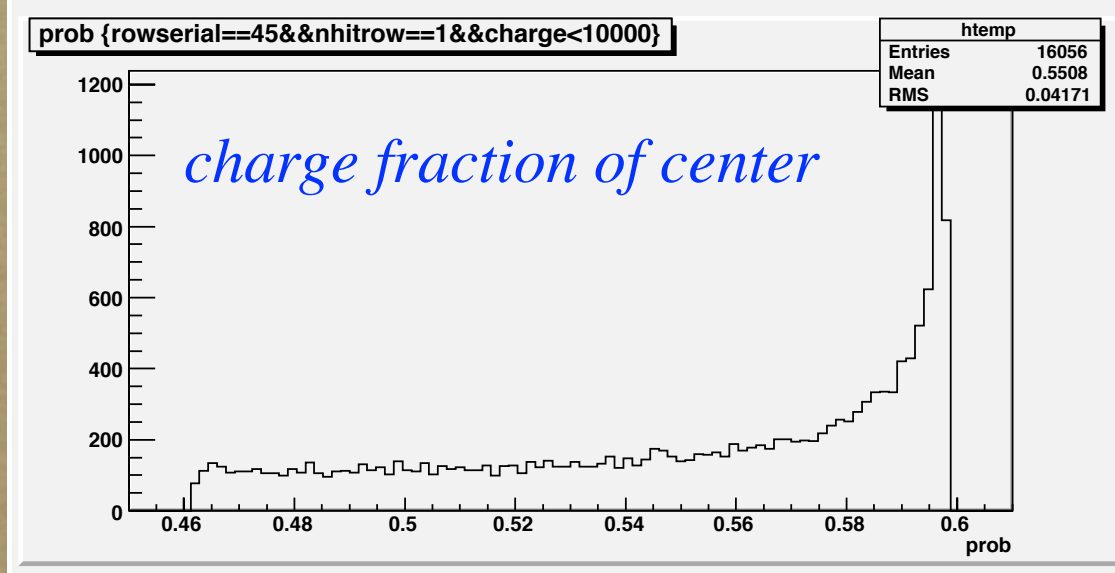
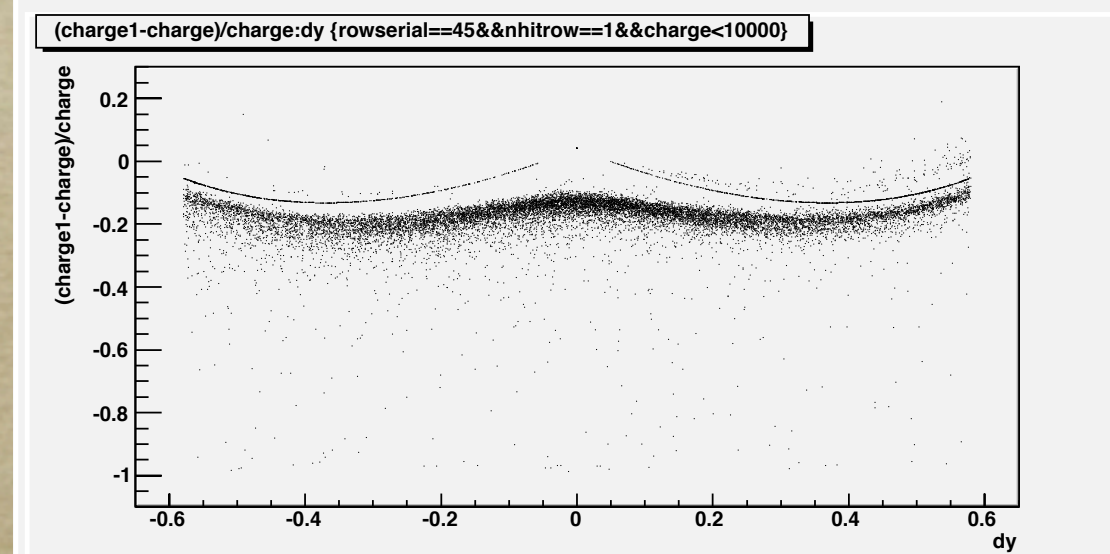
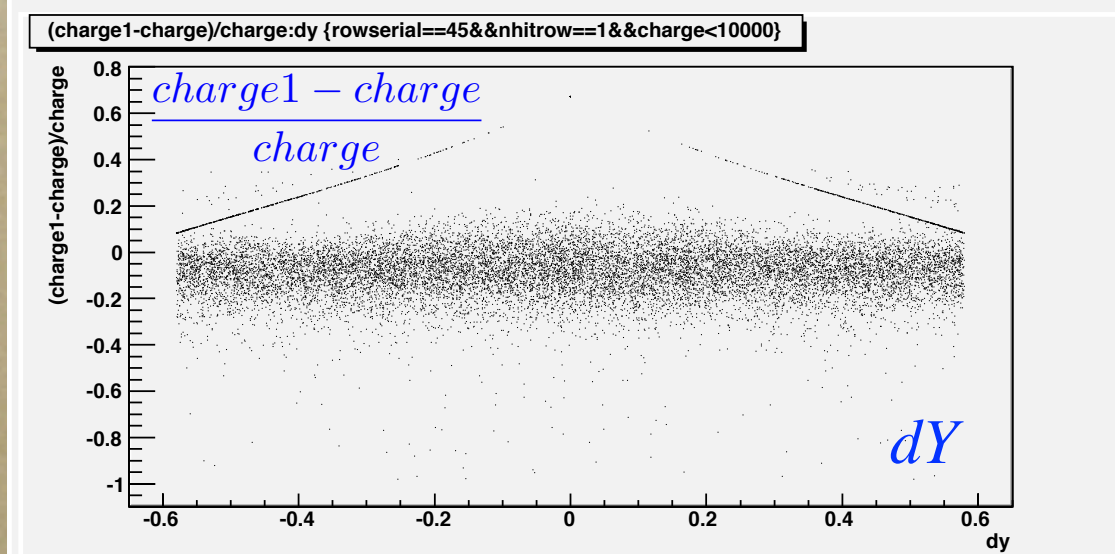
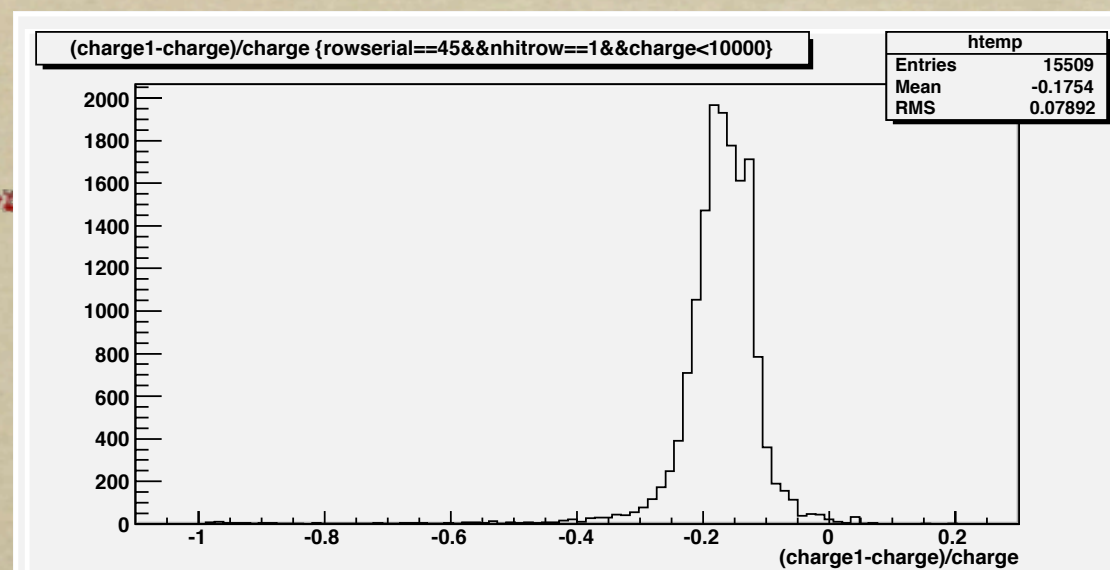
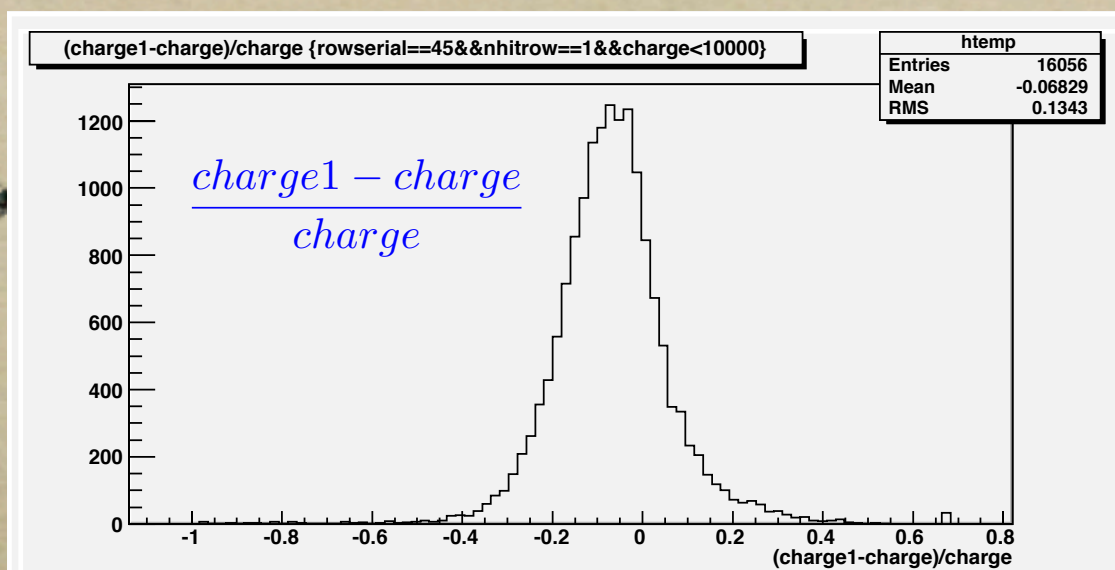
$$\text{Erf}(x) = \int_0^x \frac{2}{\sqrt{\pi}} e^{-t^2} dt$$



# fraction and difference with traditional charge (B=1T)

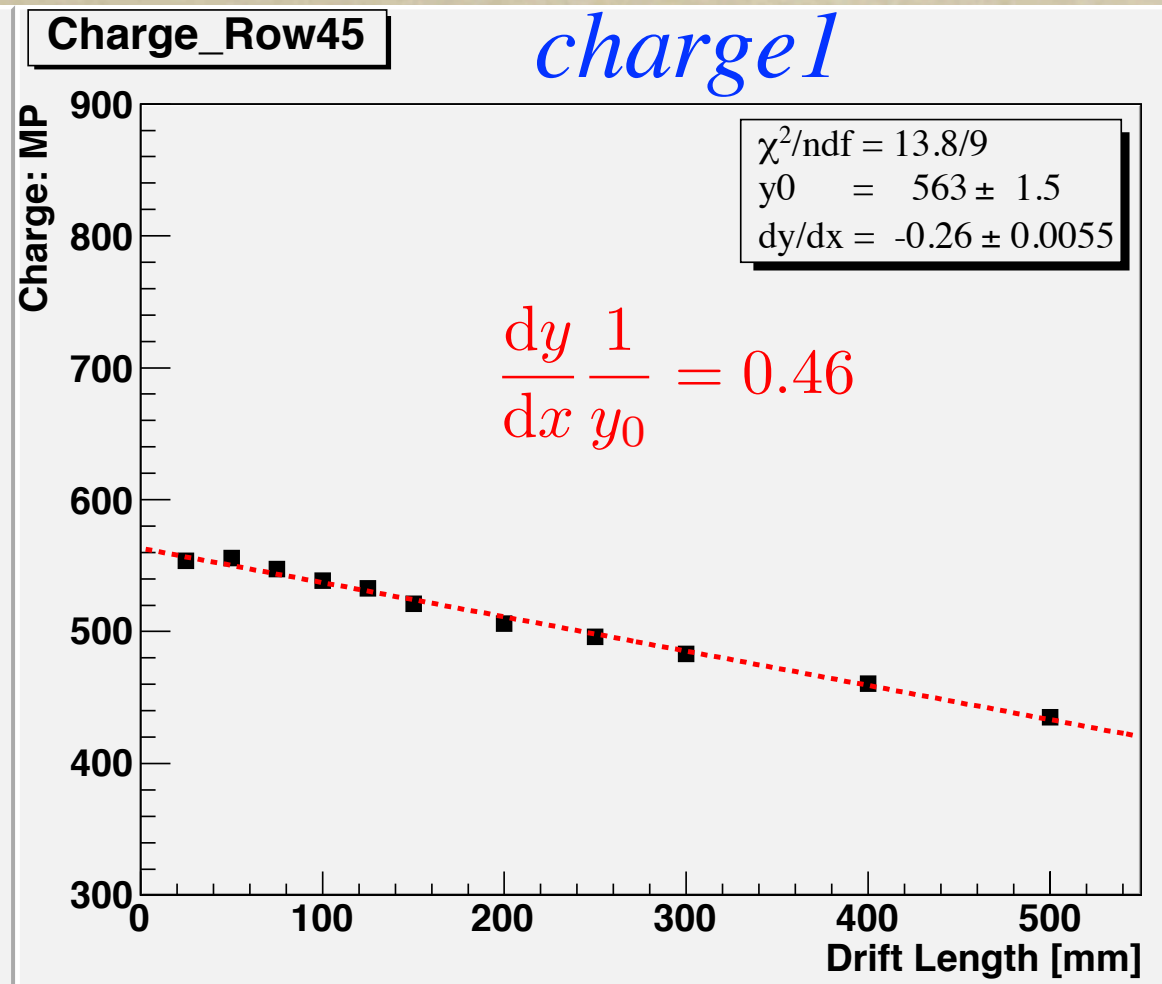
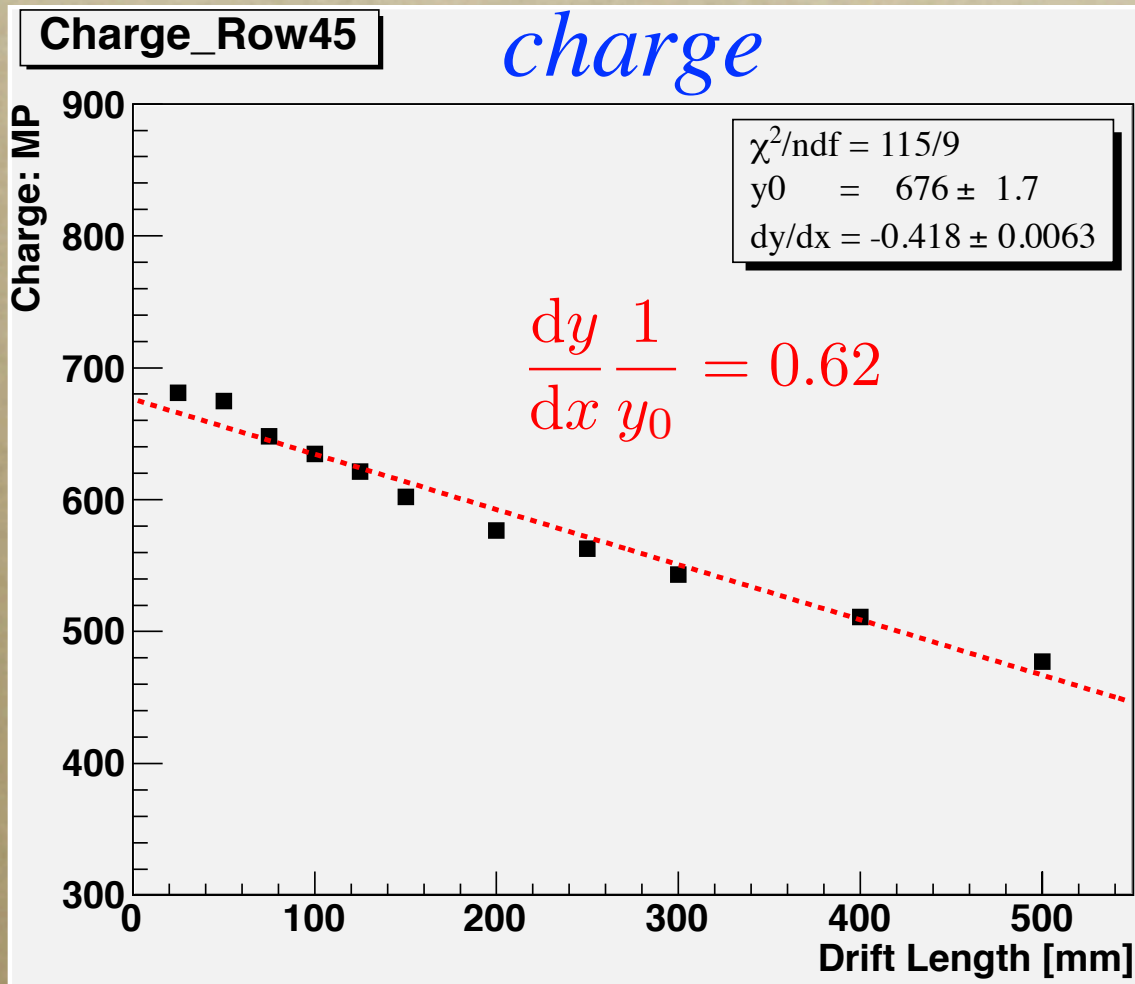
*Z=50cm*

*Z=2.5cm*





# charge by row (B=1T)

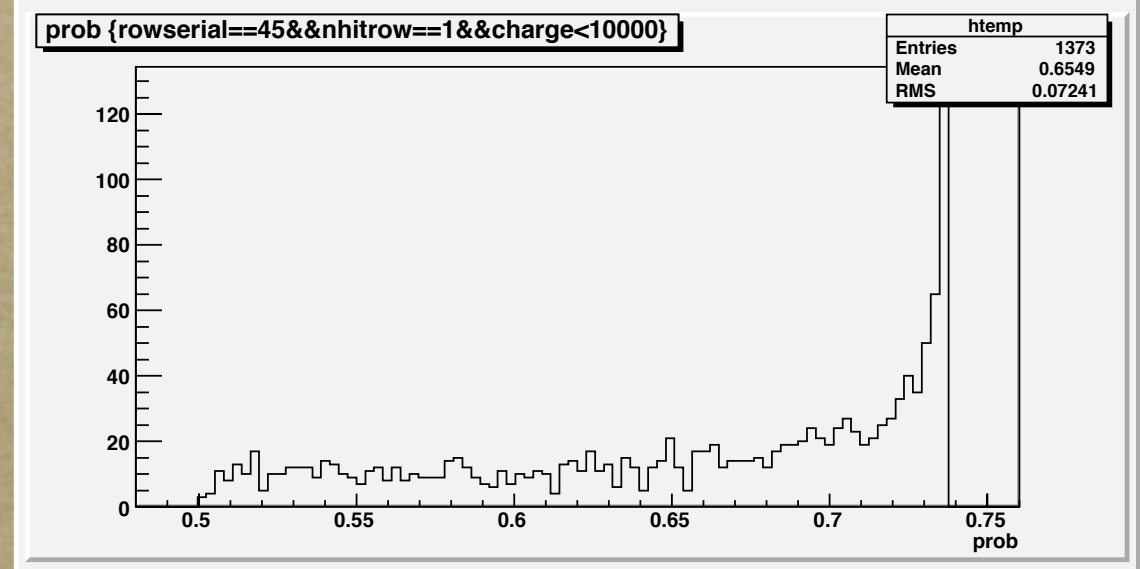
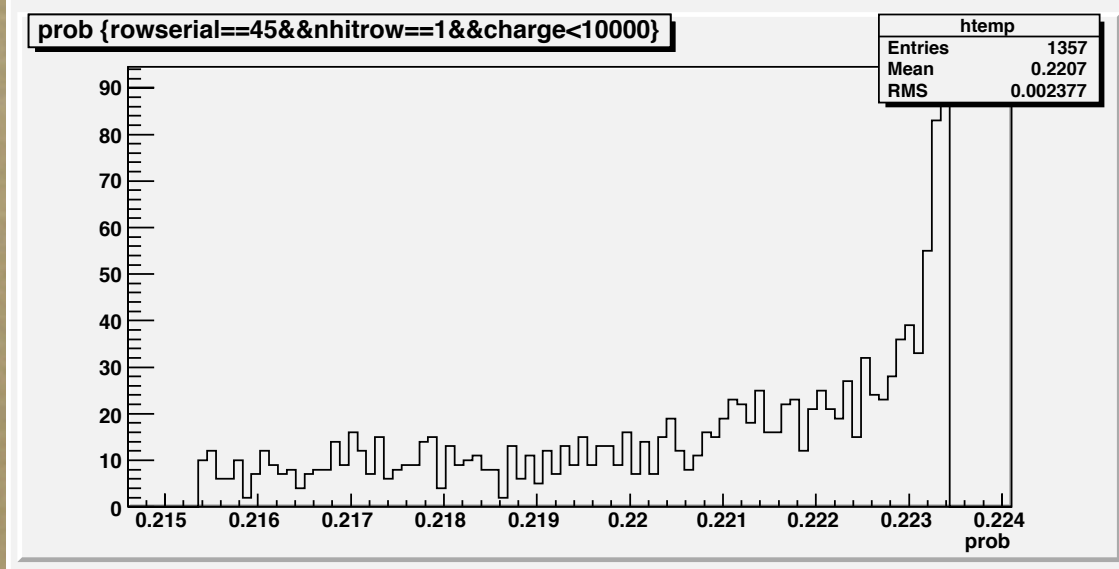
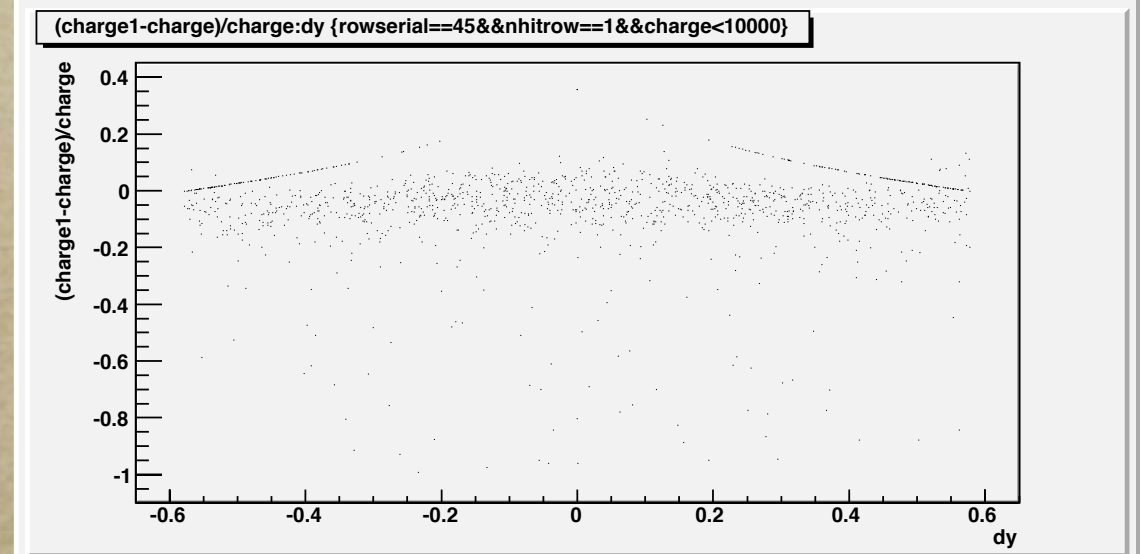
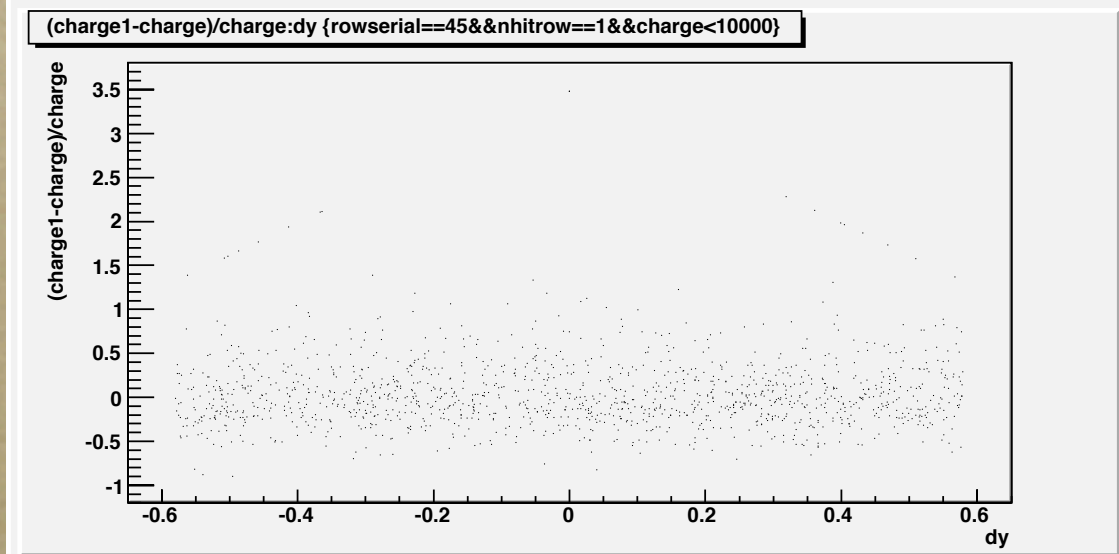
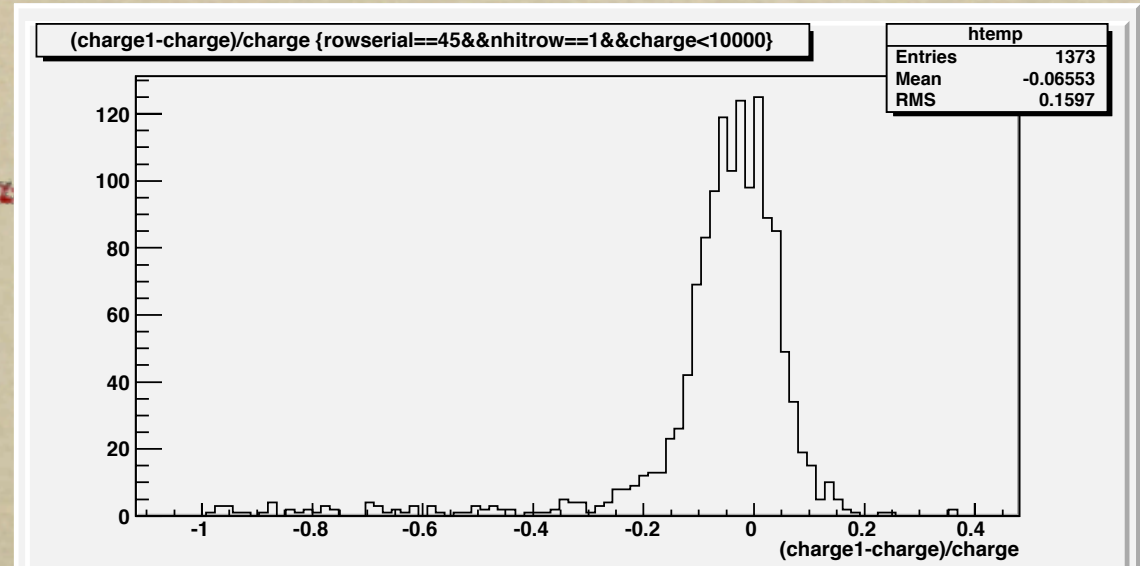
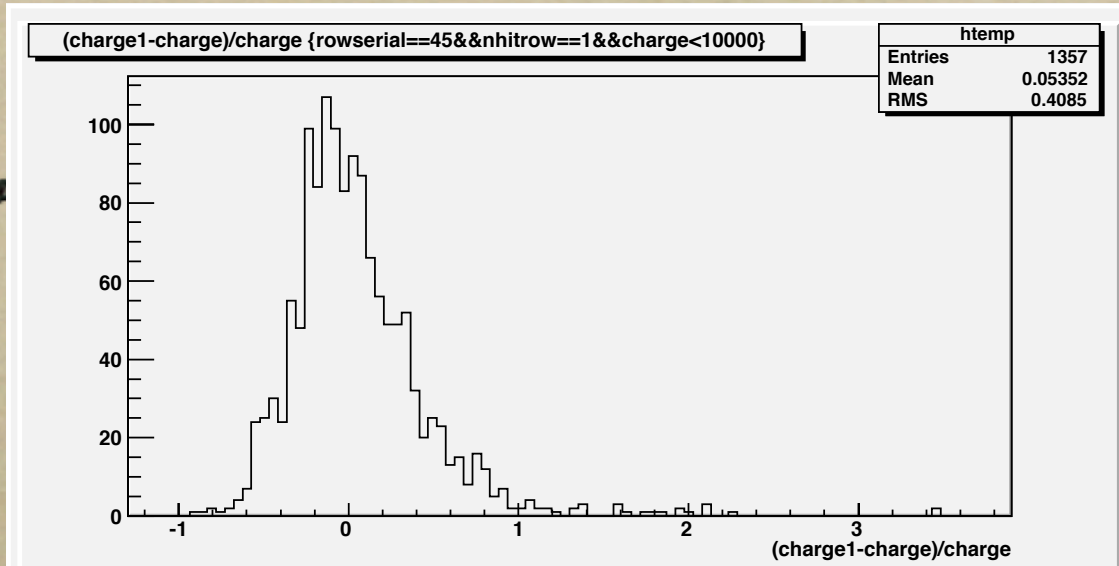




# B=0 (2000 events)

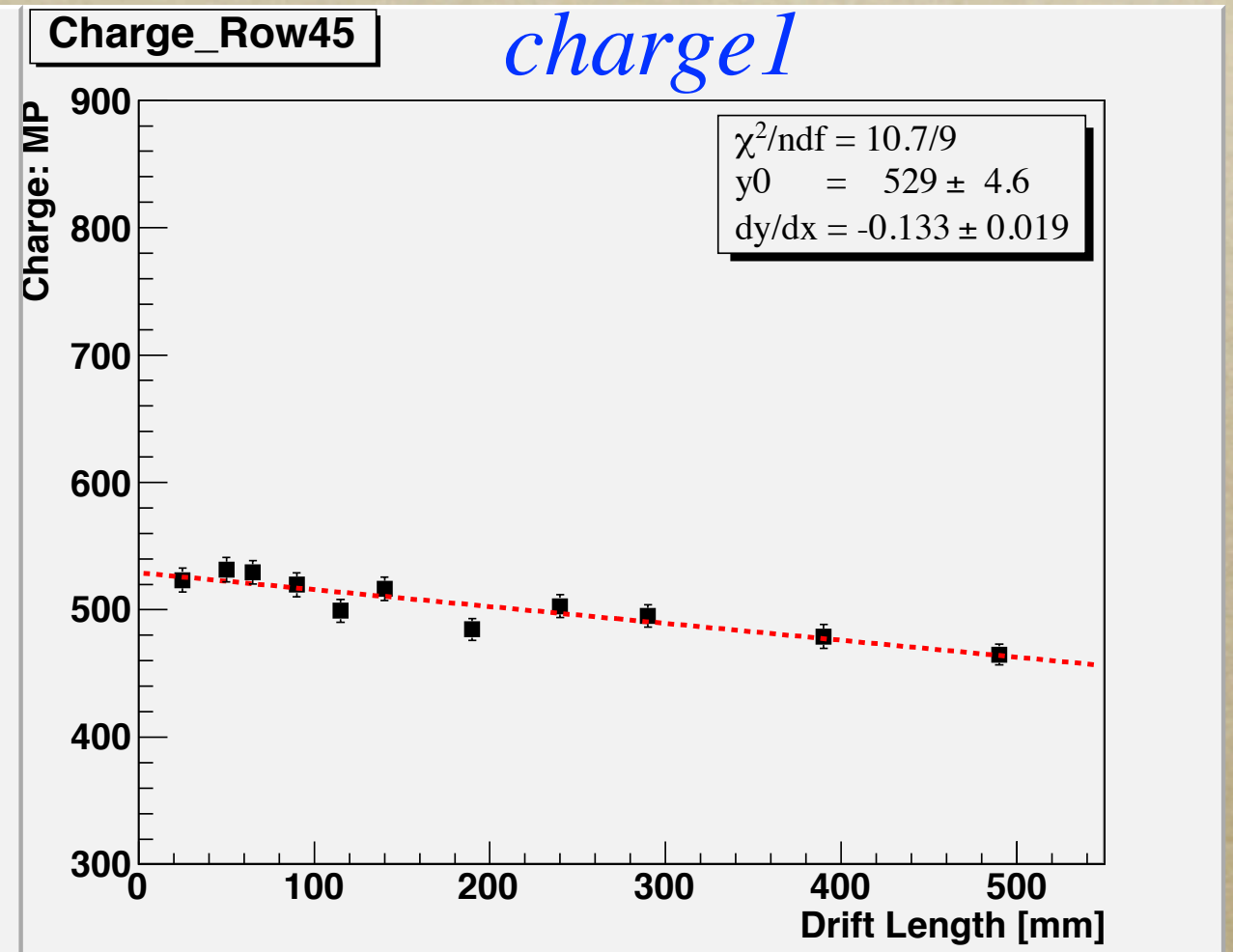
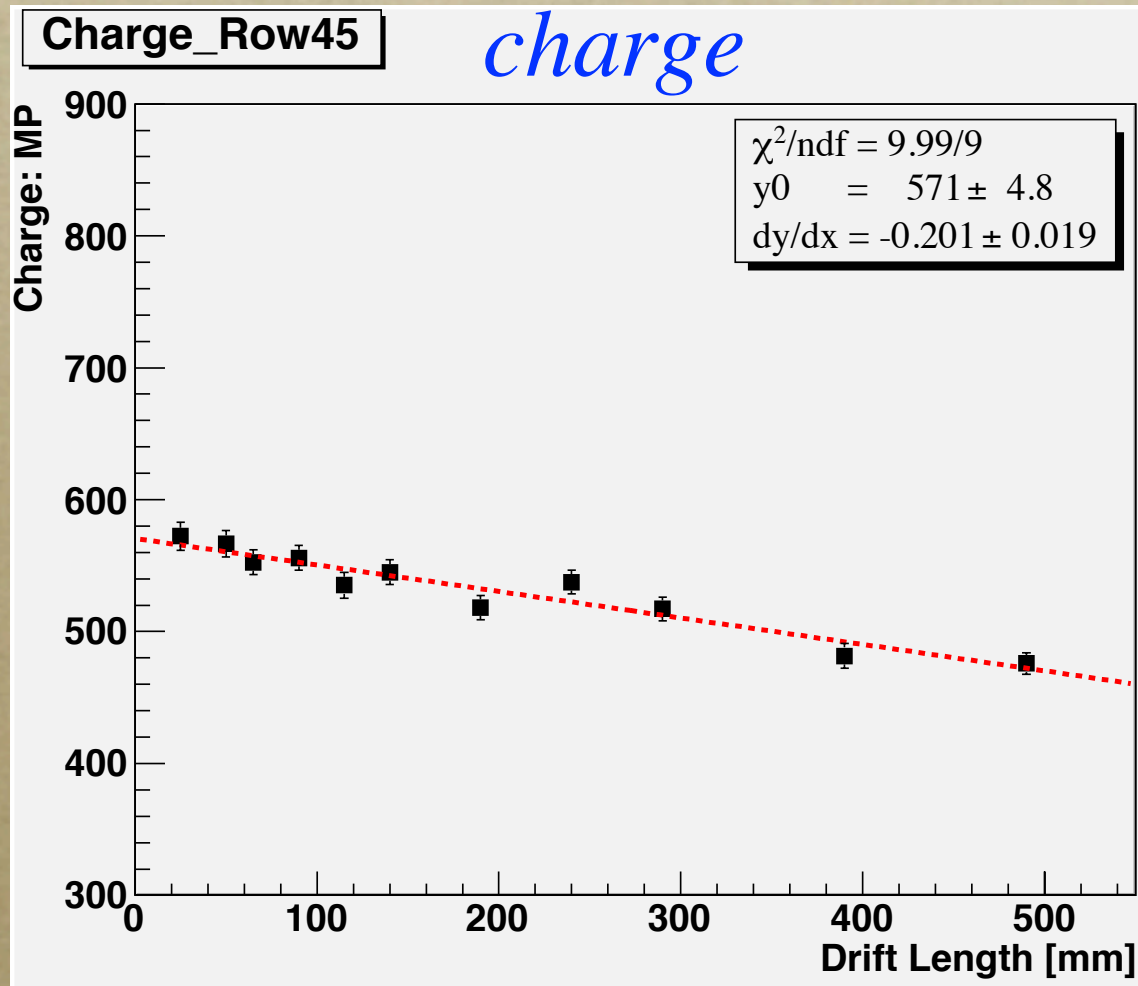
Z=50cm

Z=2.5cm





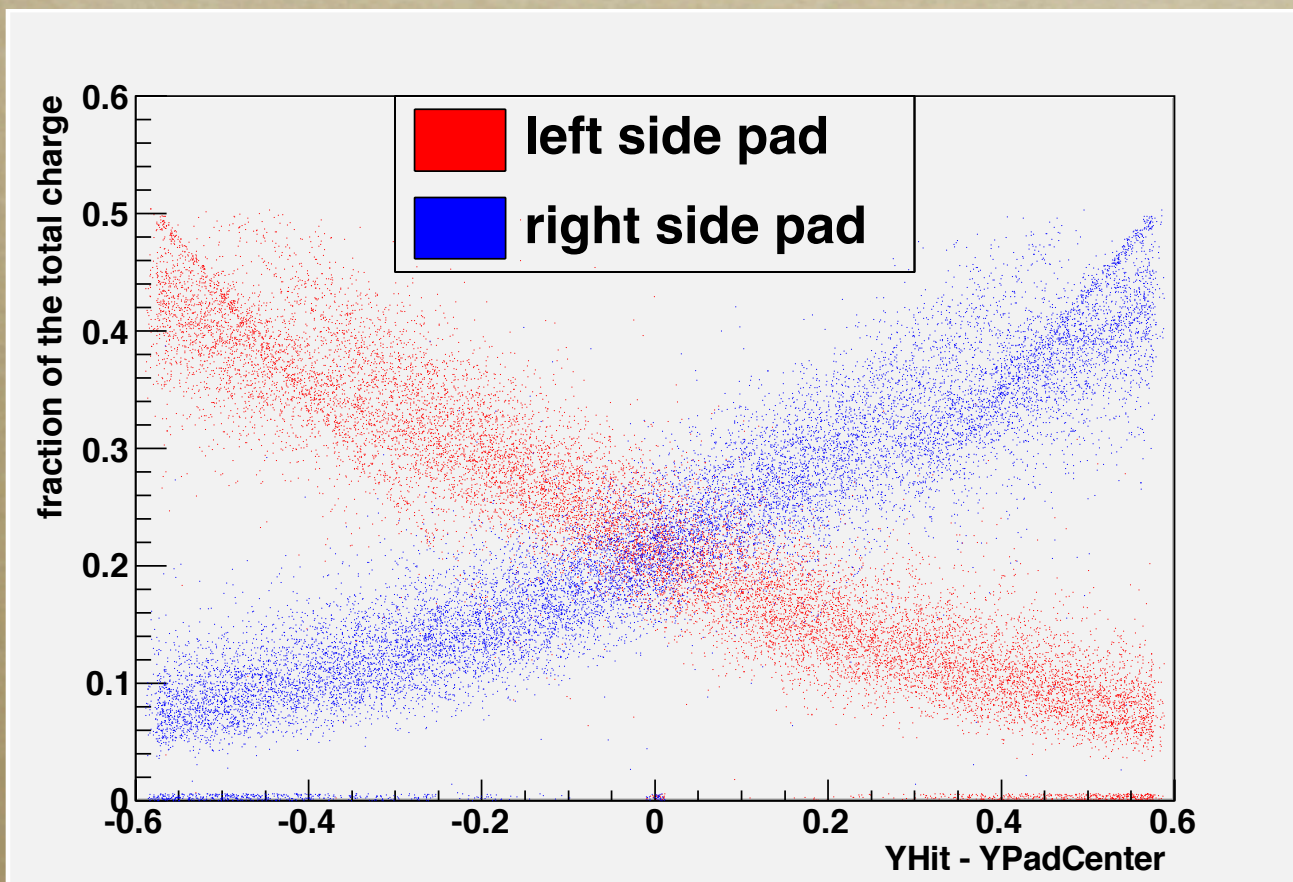
# charge by row (B=0)



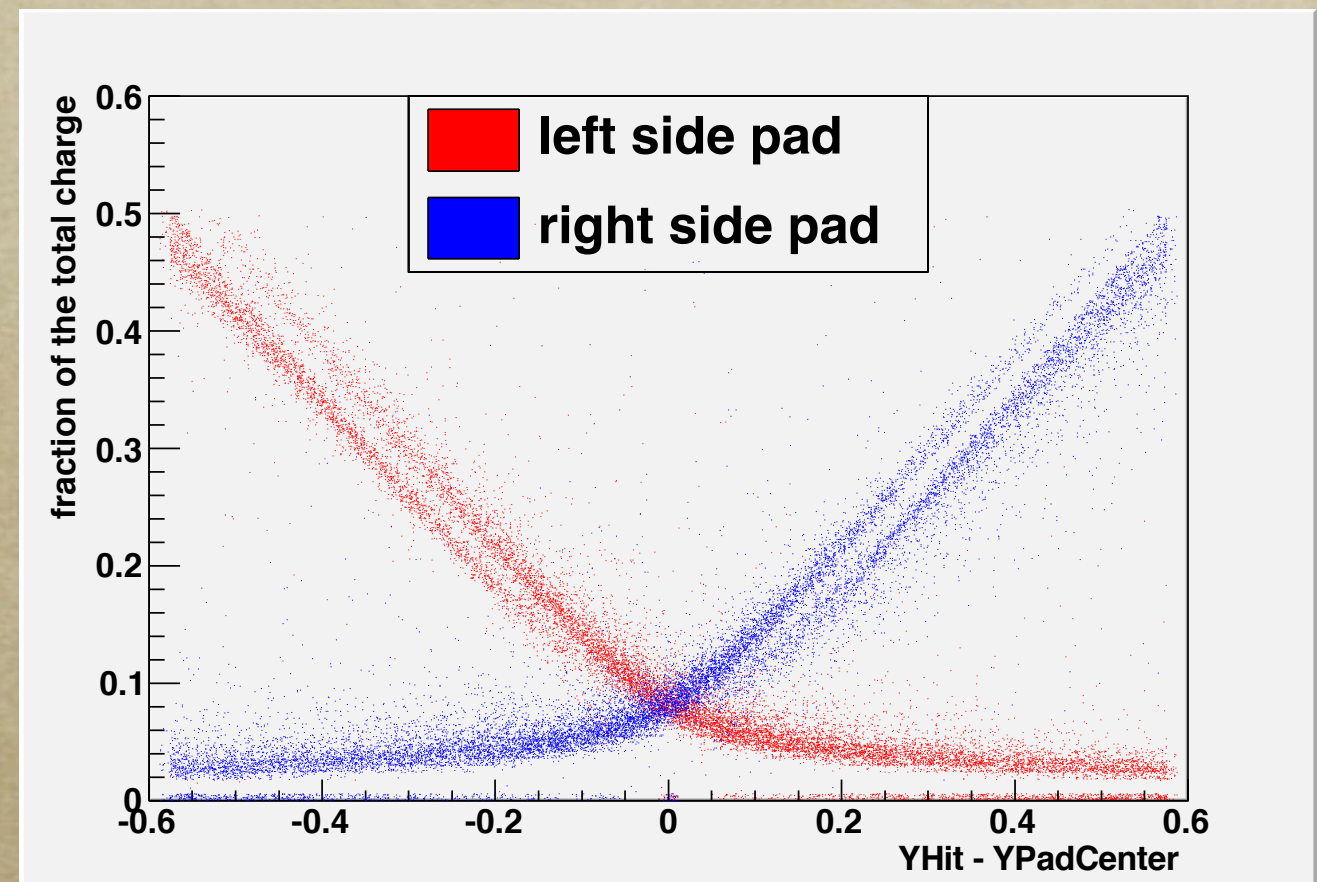


# charge on the side pad (B=1T)

*Z=50cm*



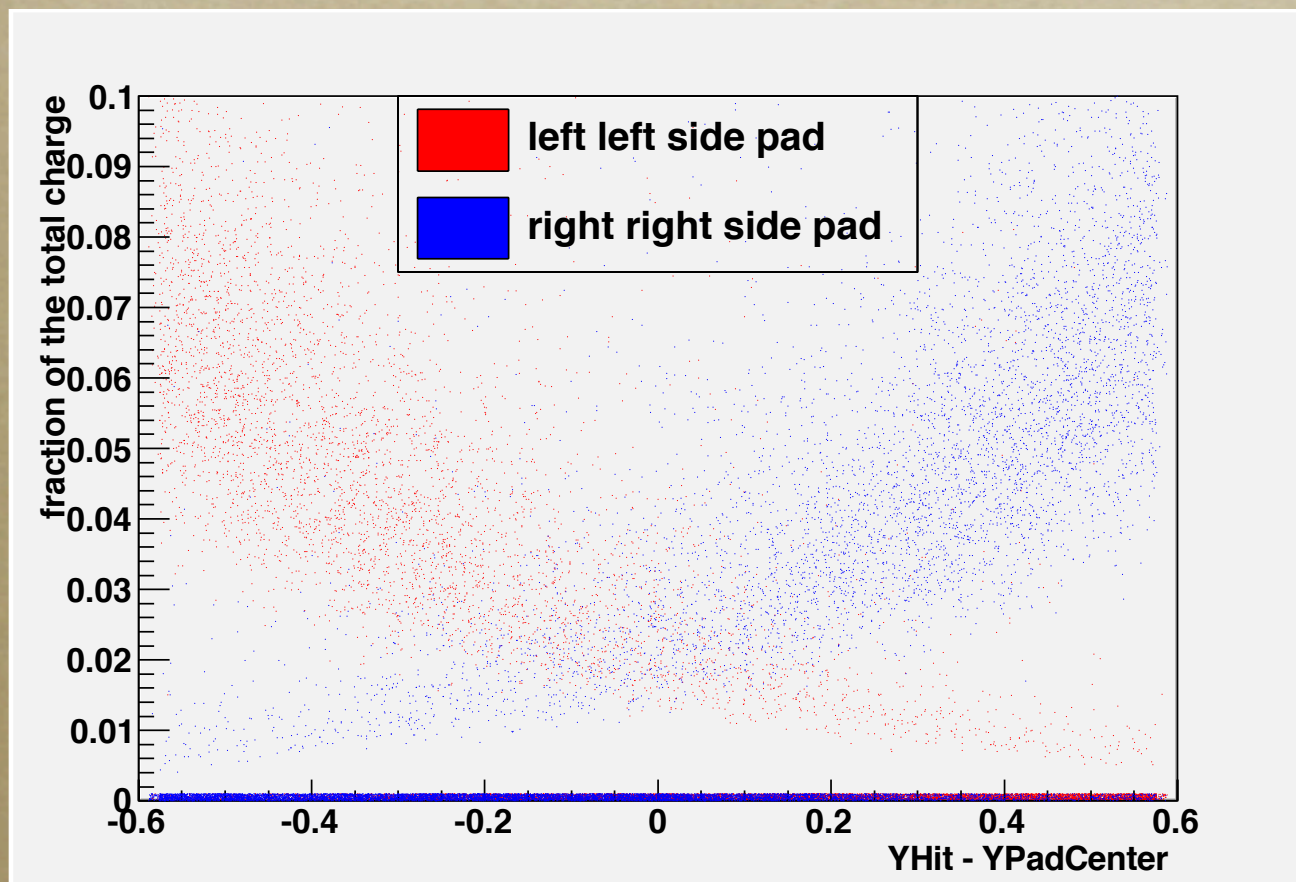
*Z=2.5cm*



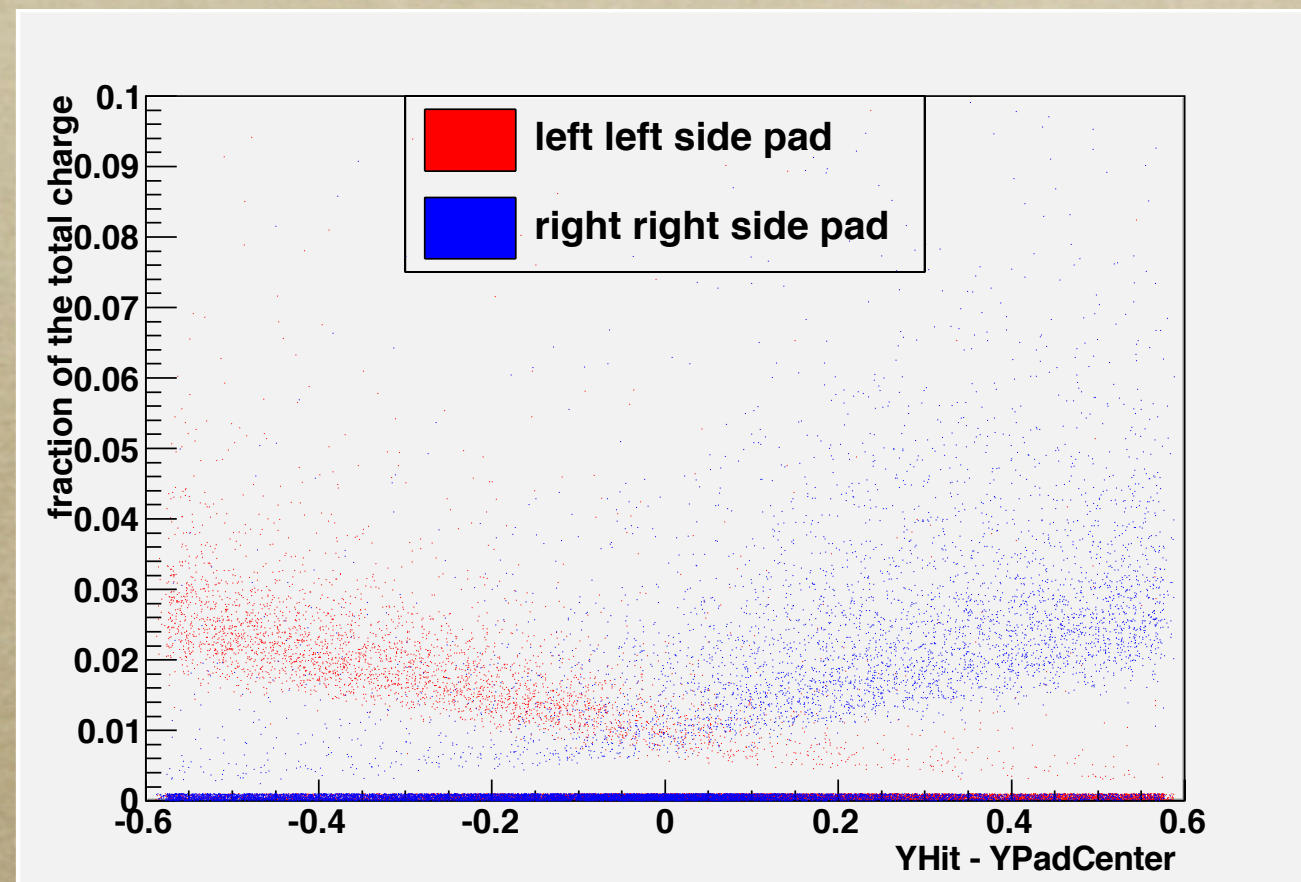


# charge on the side of side pad (B=1T)

*Z=50cm*



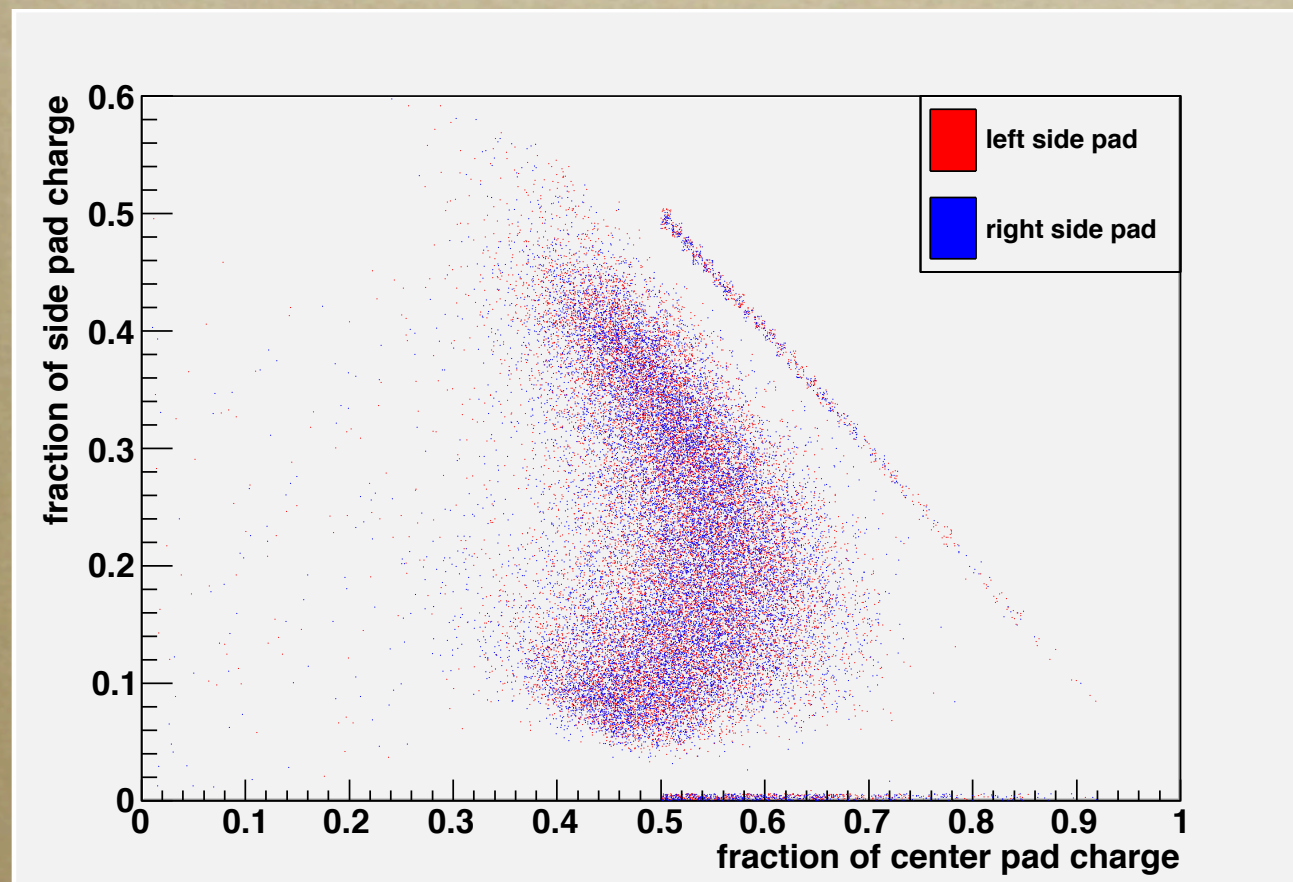
*Z=2.5cm*



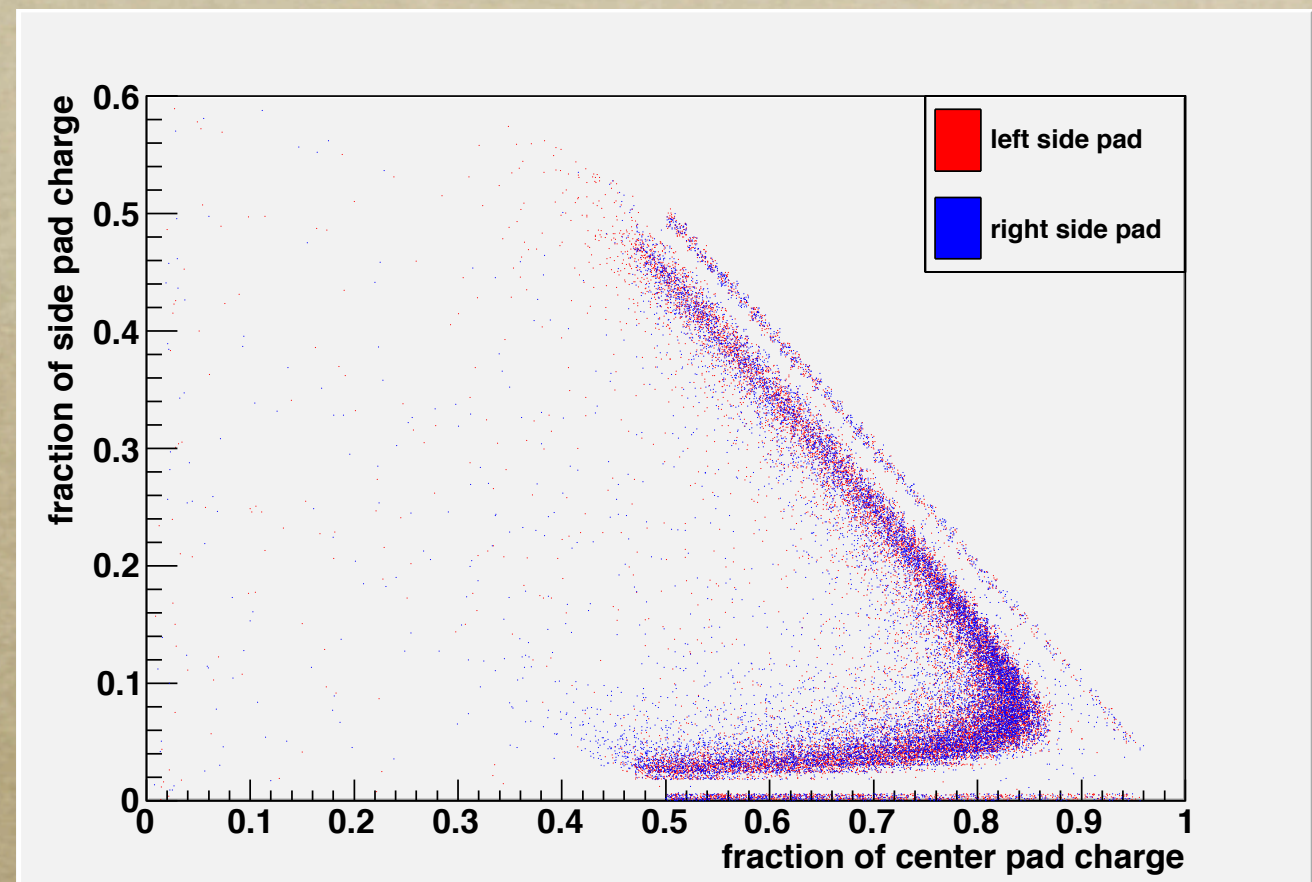


# charge on the side pad .vs. charge on the center (B=1T)

*Z=50cm*



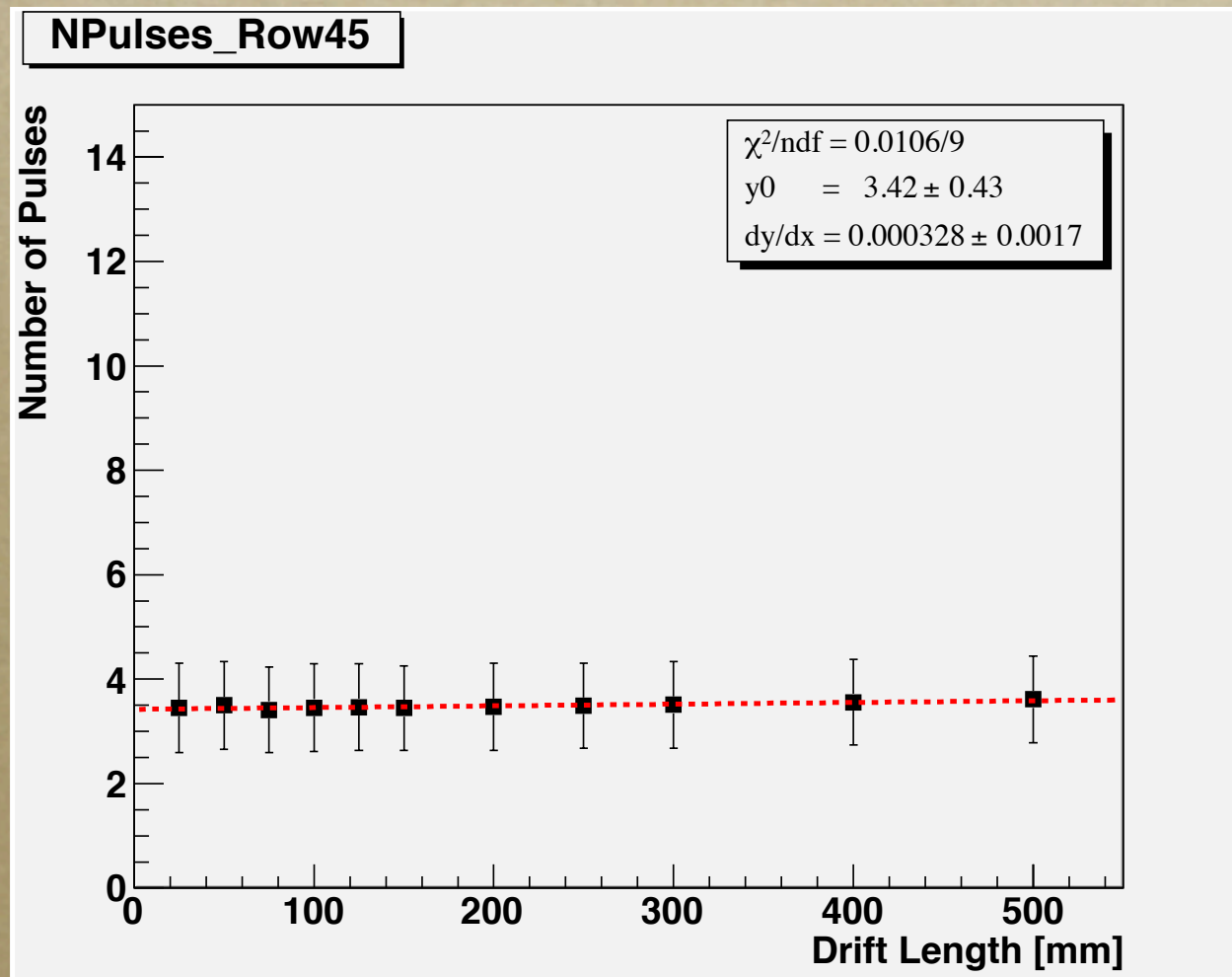
*Z=2.5cm*



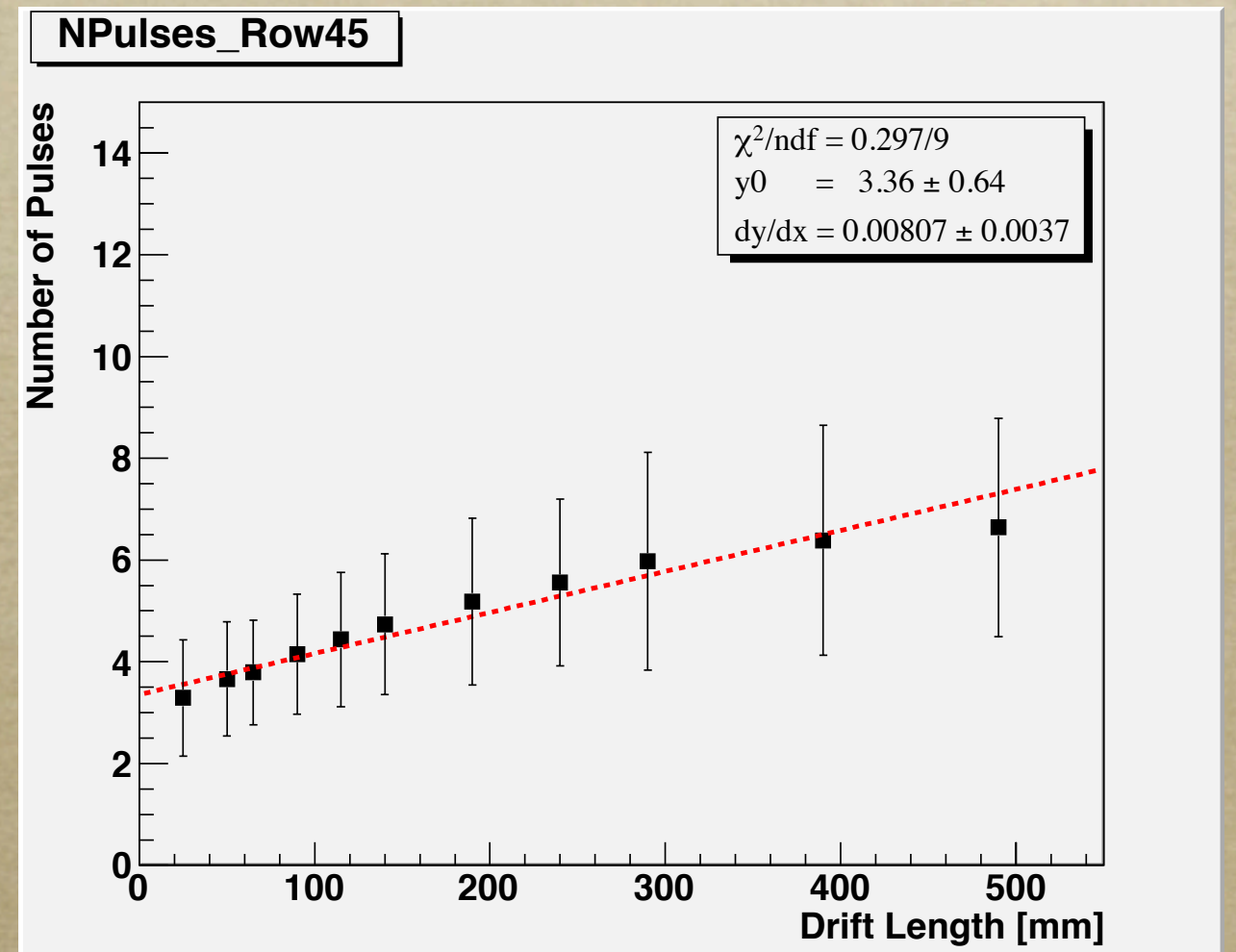


# Number of Pulses by Row

*B=1T*



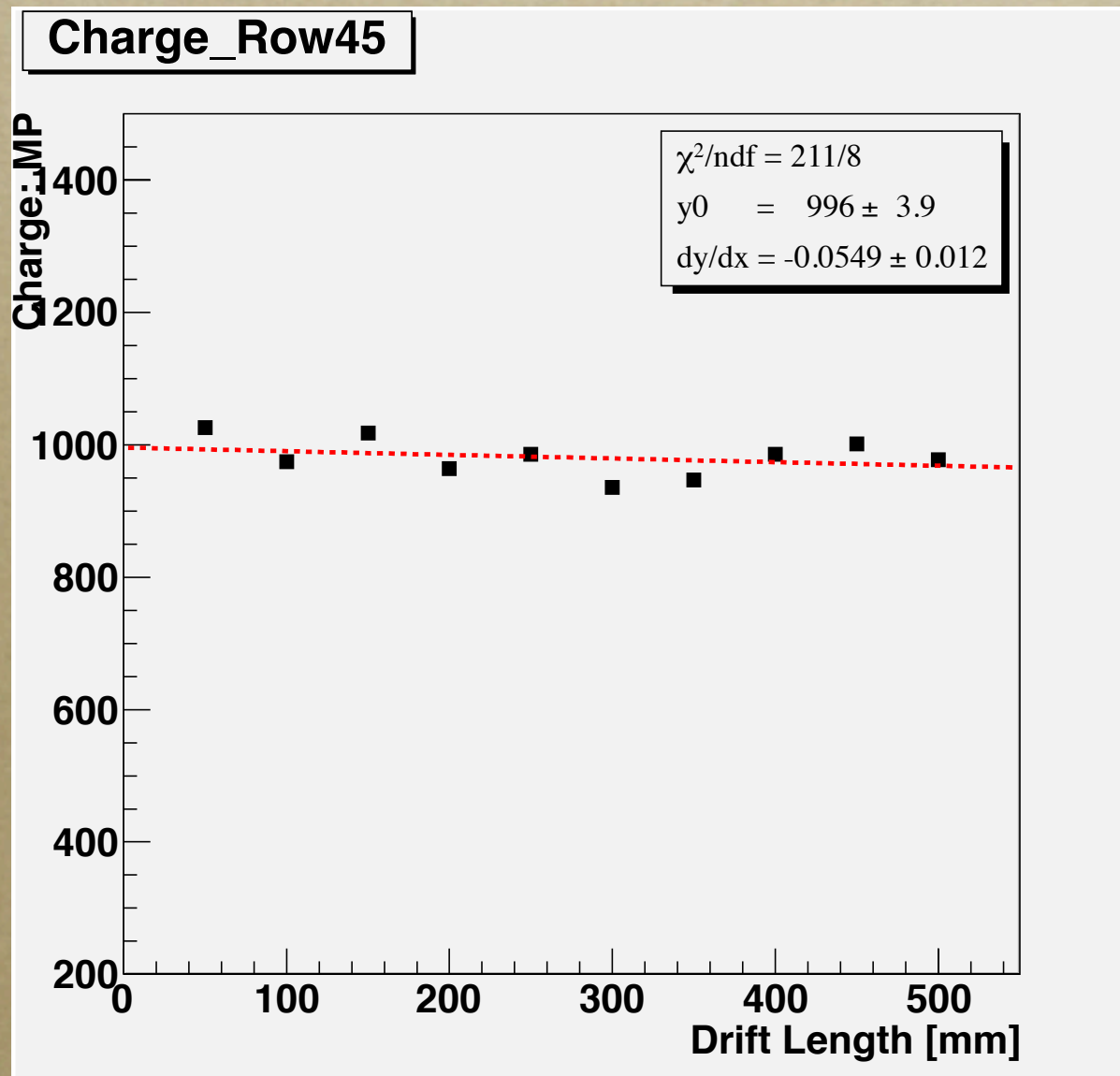
*B=0T*



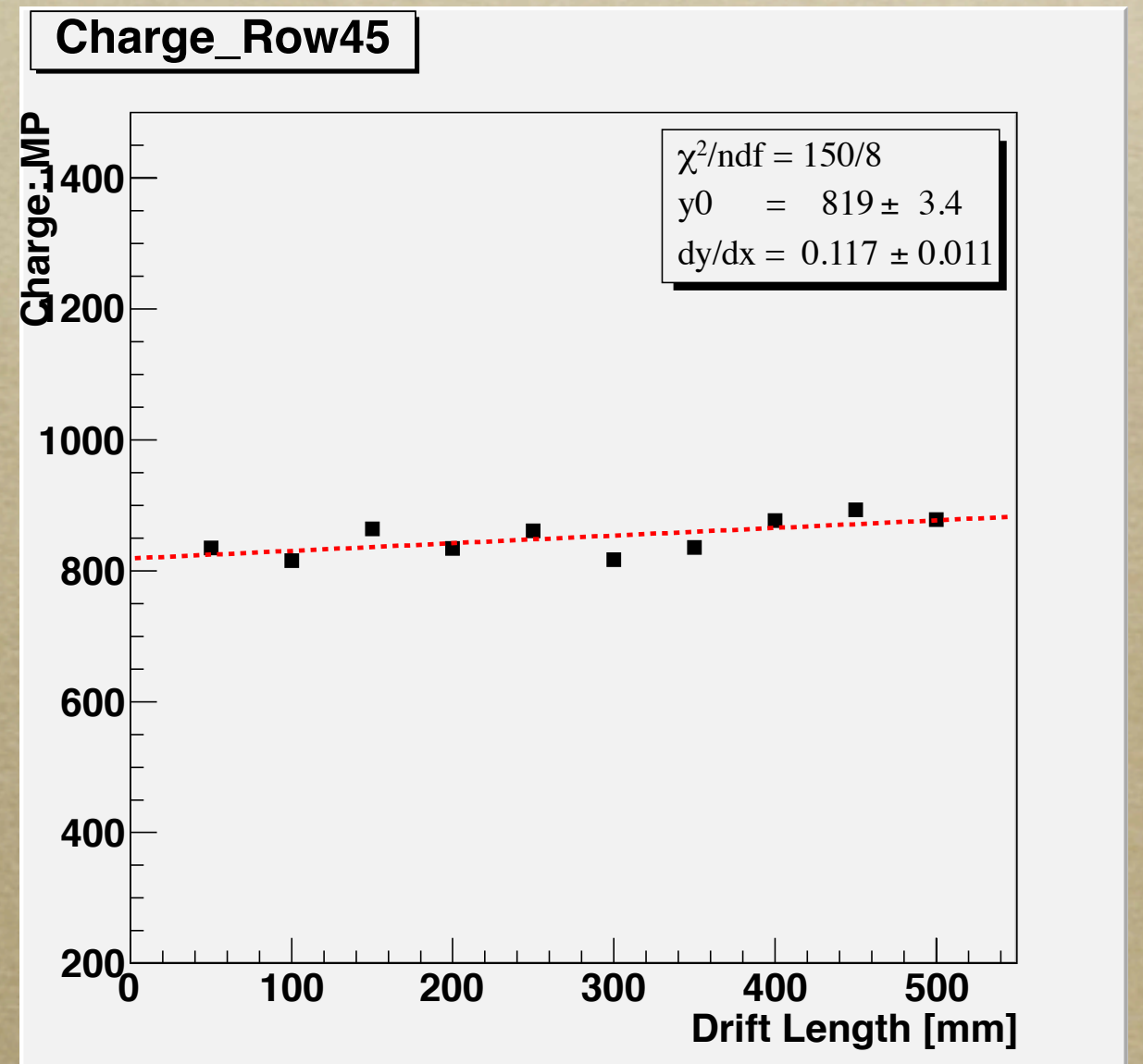


# Test Beam Data 2010

*Total Charge*



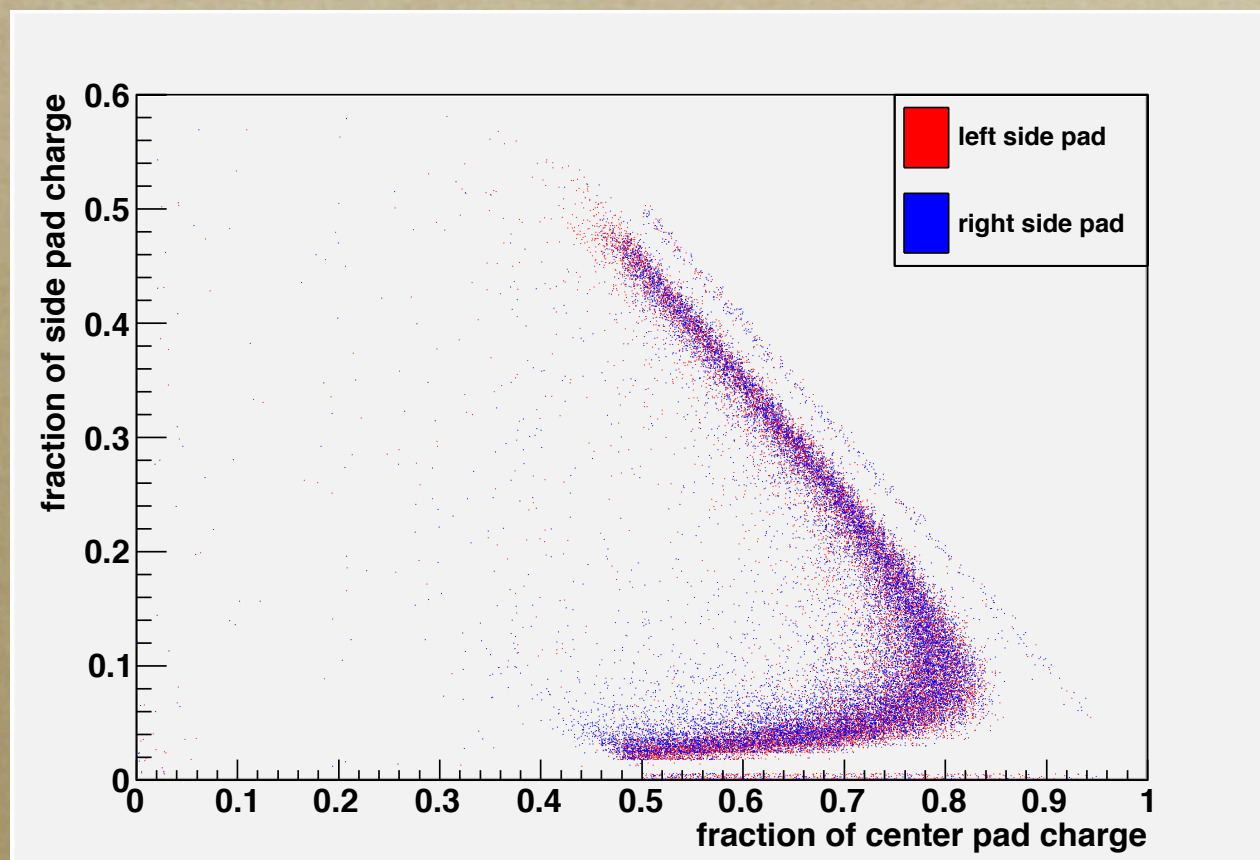
*Charge By Central Pad*



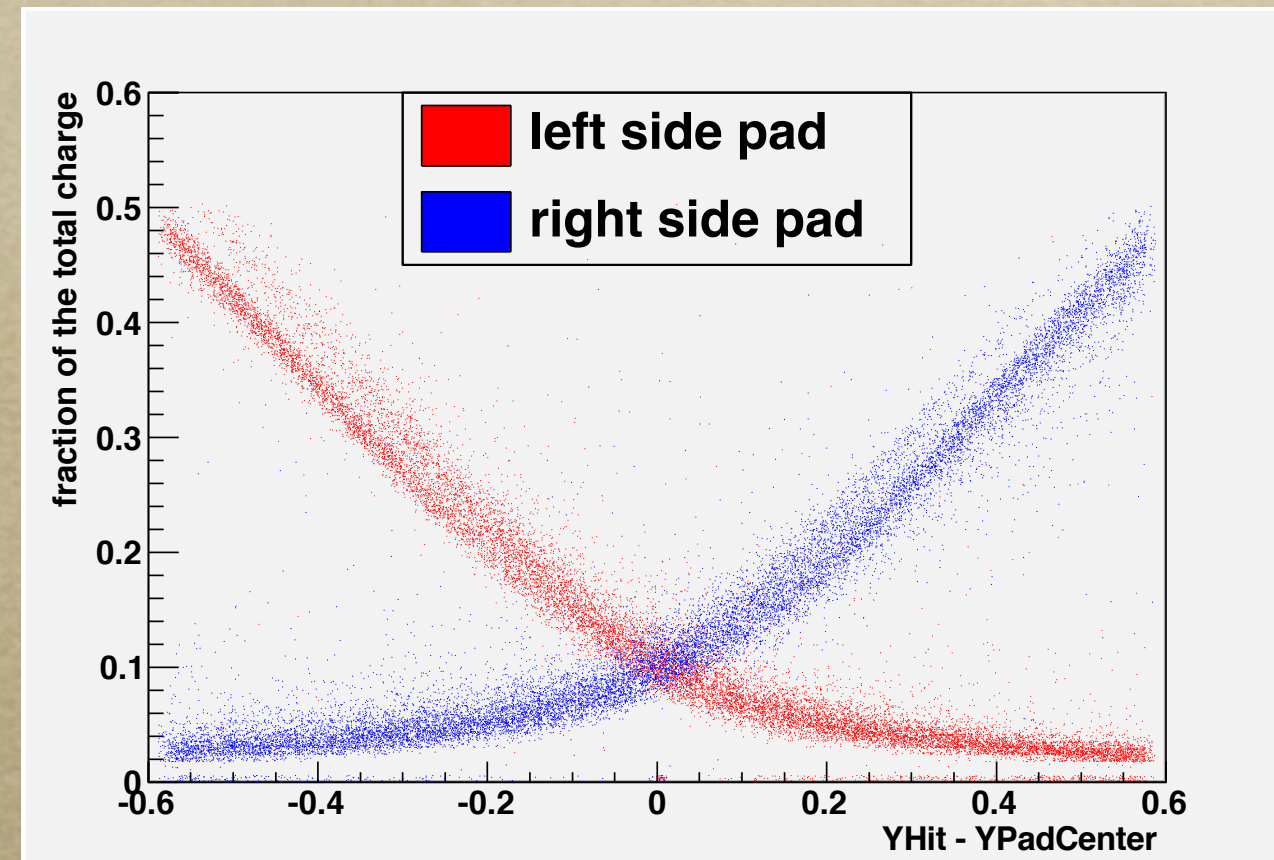


# Test Beam Data 2010

*Side Charge .vs. Central Charge*

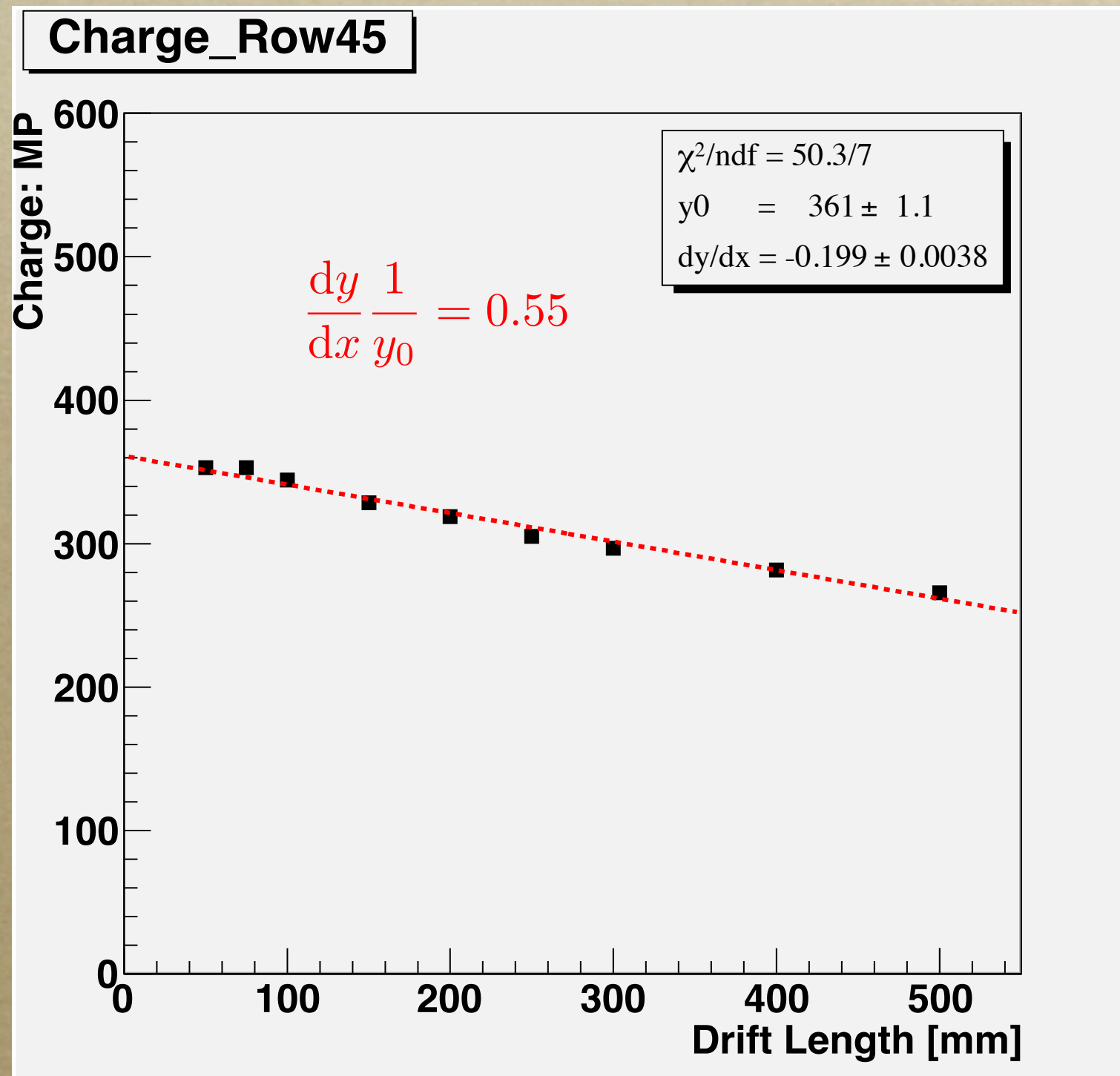


*Side Charge .vs. dY*



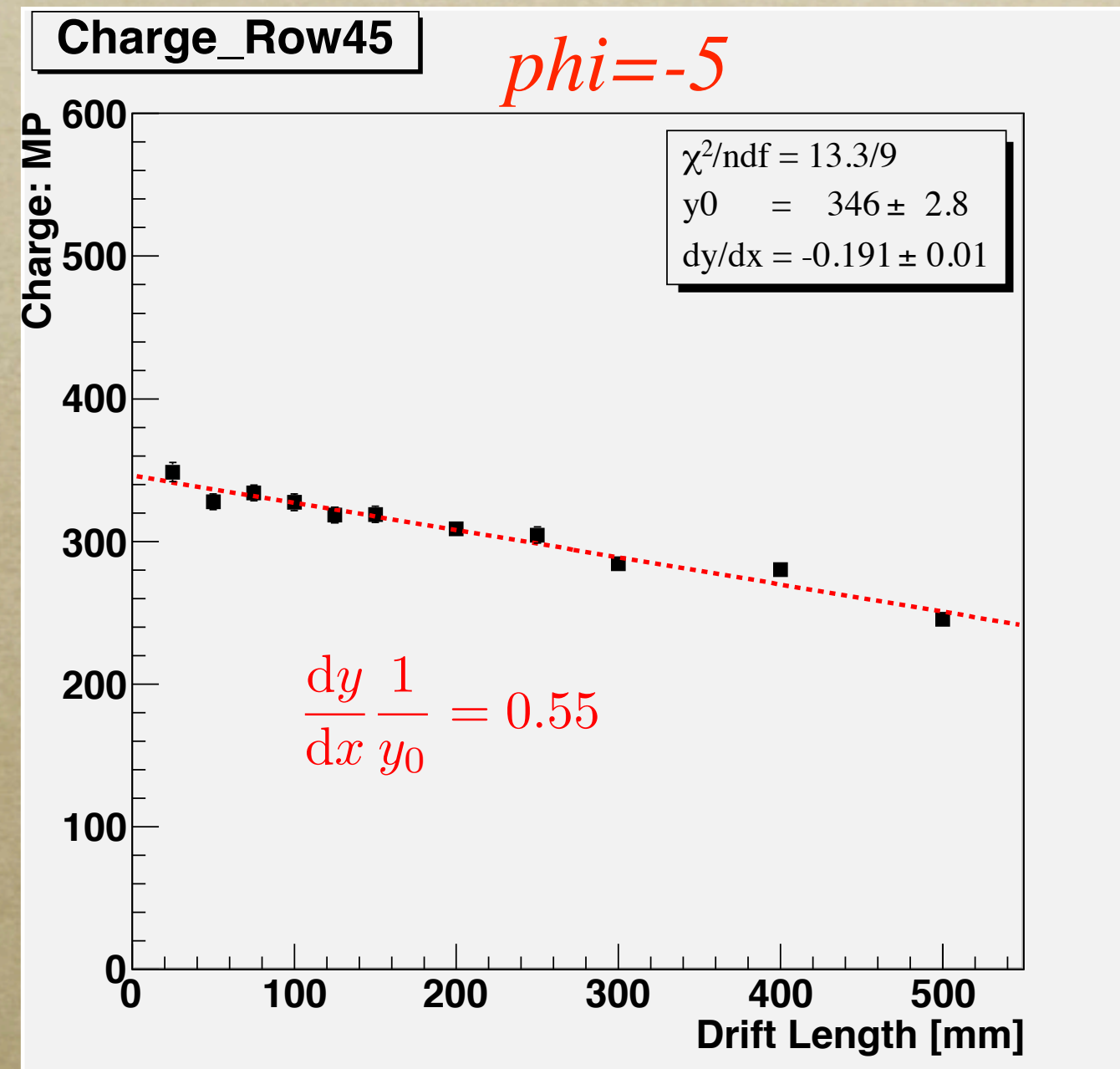
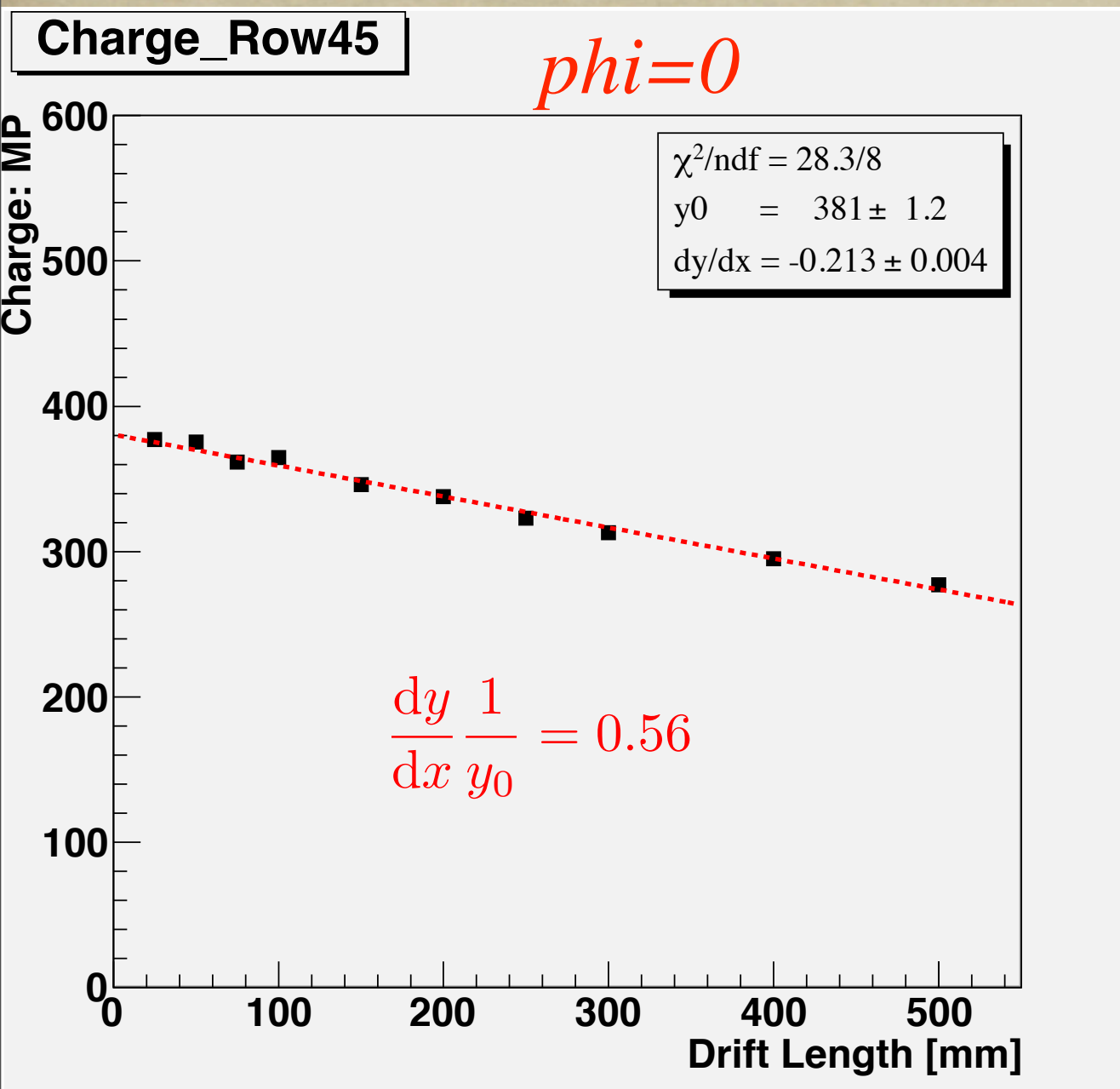


# Test Beam Data 2012: low gas flow



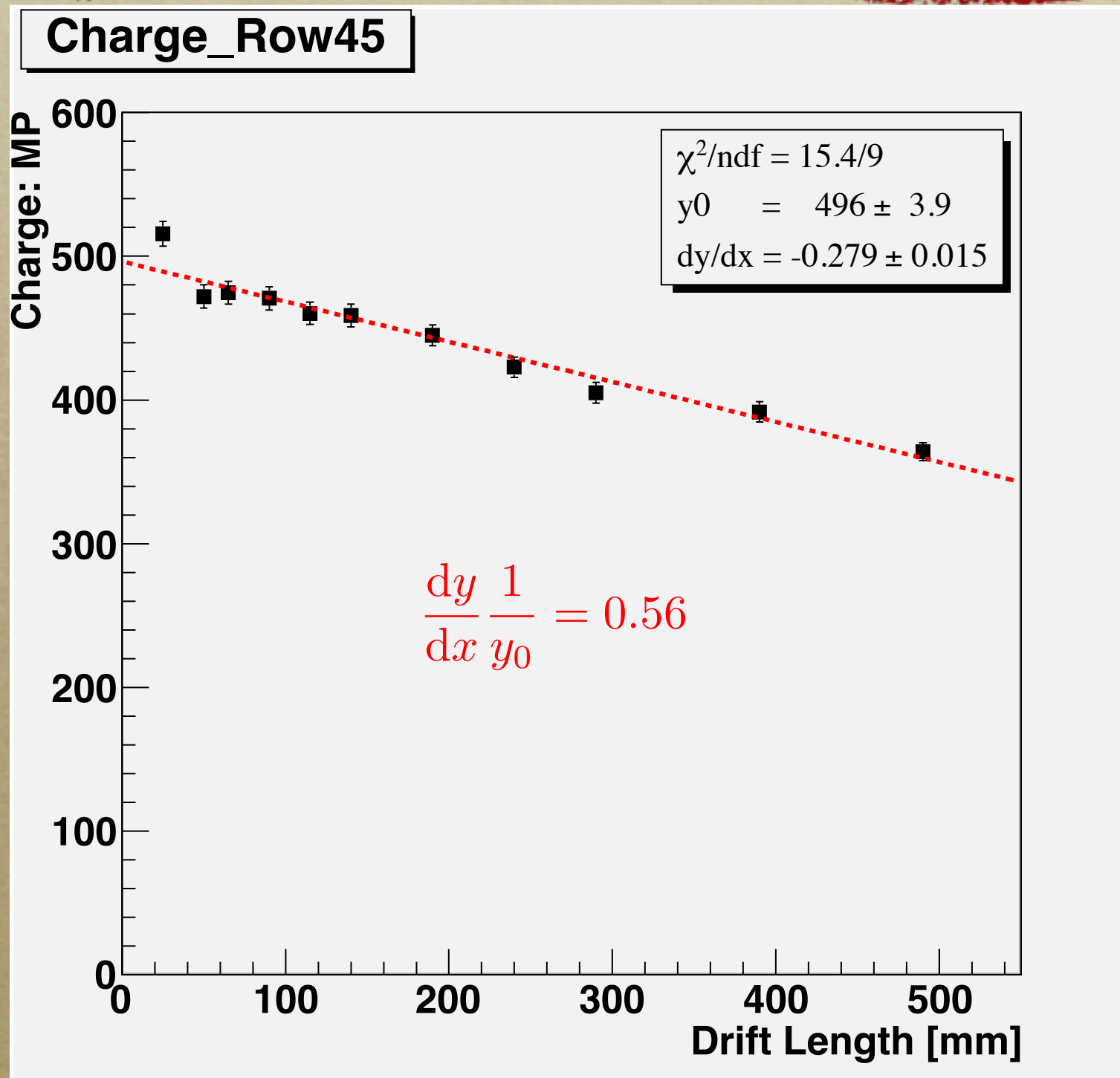


# Test Beam Data 2012: low gain (HV=340V)



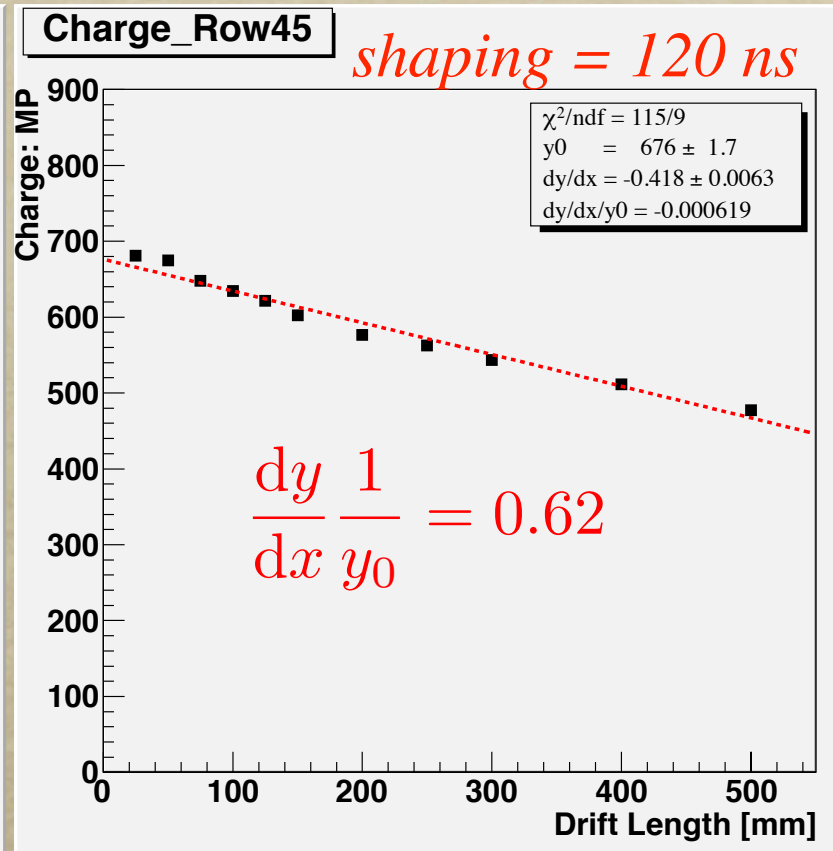
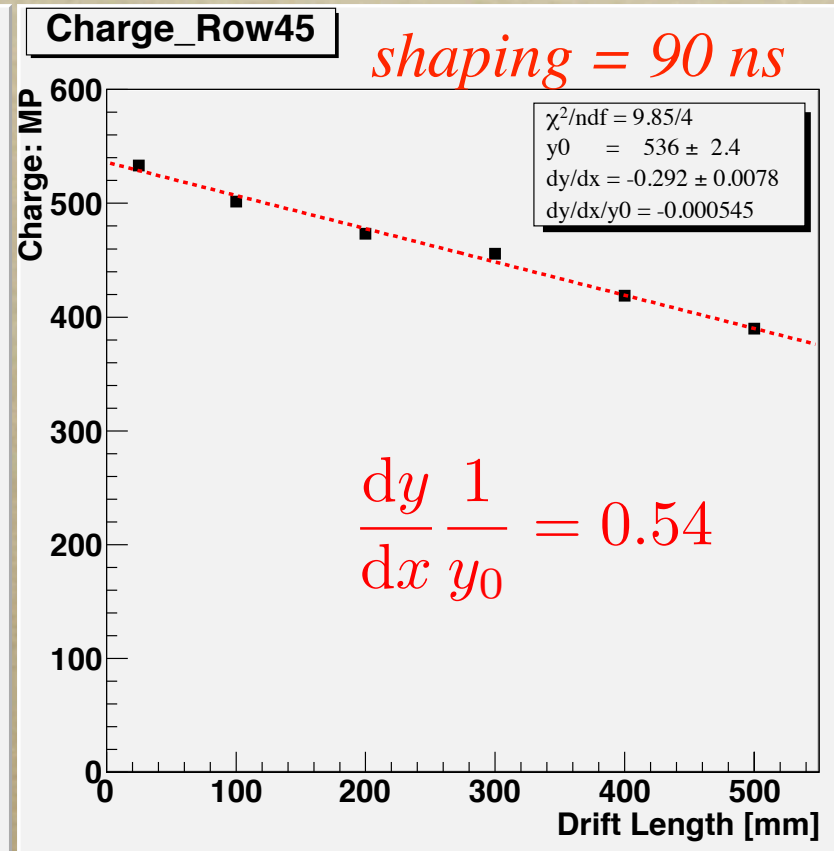
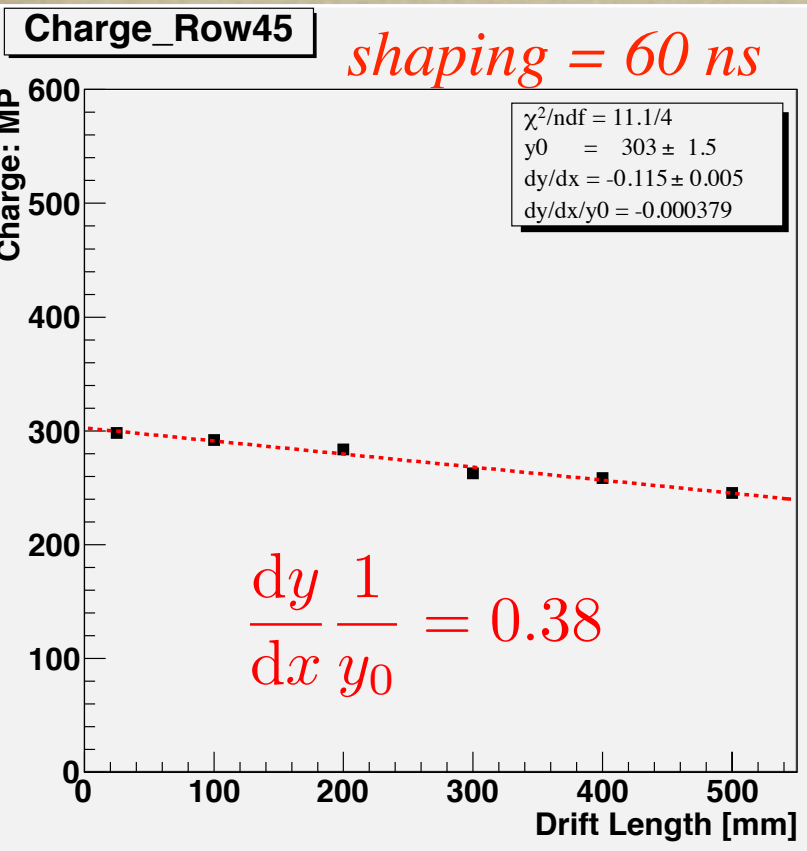
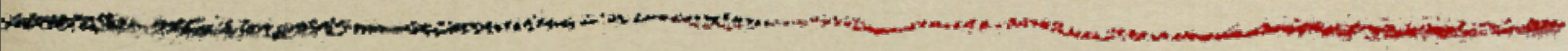


# Test Beam Data 2012: low gain (HV=350V)





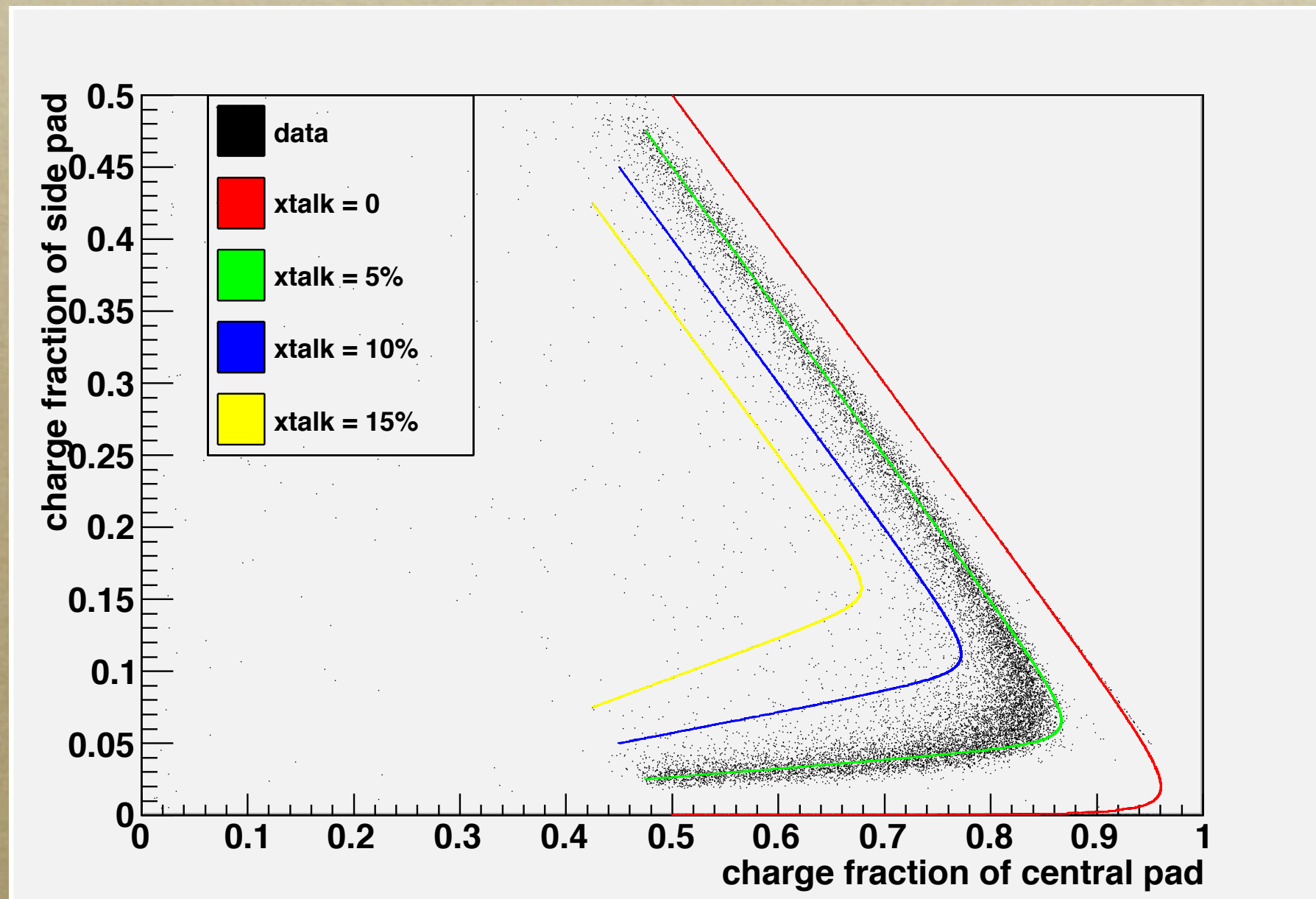
# Test Beam Data 2012: shaping time (HV=355V)





# toy MC of cross talk

*side pad*



*charge fraction of center pad*