CMS Pixel Upgrade

ROC Calibration Parameterization

April 20, 2012

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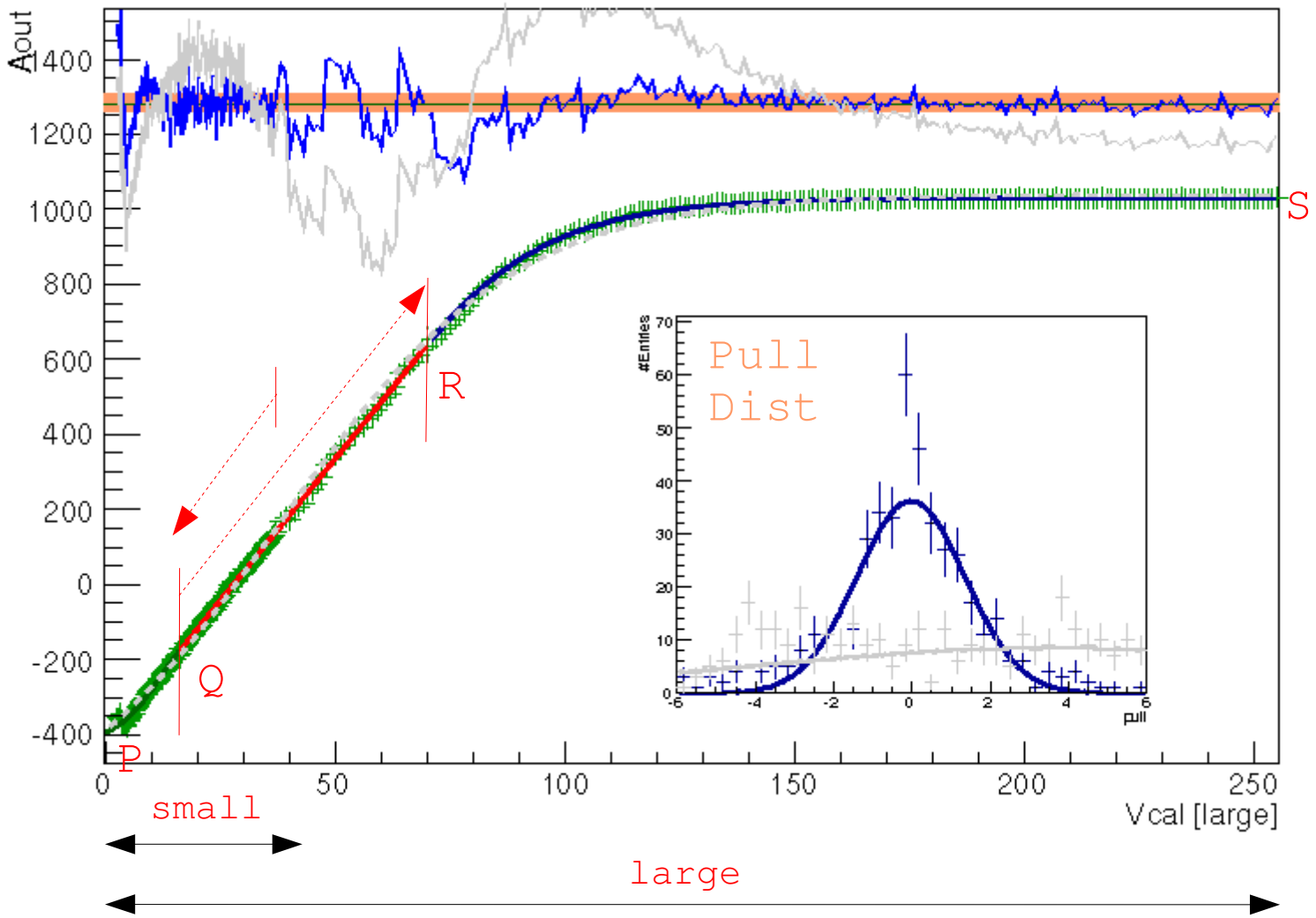
ROC Calibration Parameterization

- Piece Wise Continuous (PWC) Parameterization
- Using small Vcal
- Results

Piece Wise Continuous (PWC) Parameterization



Def. Pull
PWC Pull

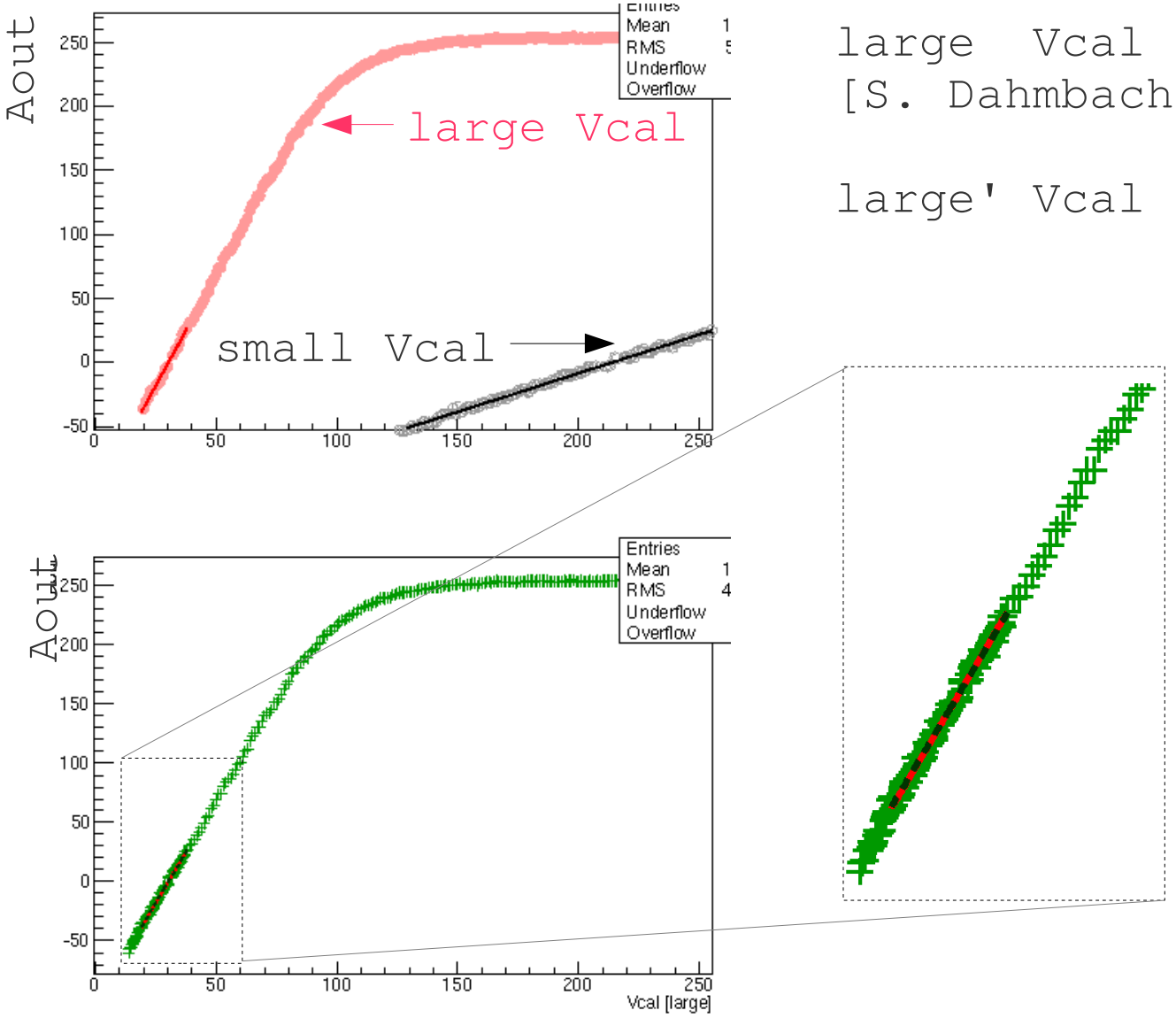
Ensure Continuity in
i) Aout
ii) gradient at transition points Q and R

+ Aout (Vcal)

--- Def. Fit : tanh(v; p0...p3) = p2 + p3.tanh(p0.v + p1)

--- PQ : tanh(v; p0,p1) , --- QR : p2v + p3 , --- RS : tanh(v; p4,p5)

Using small Vcal



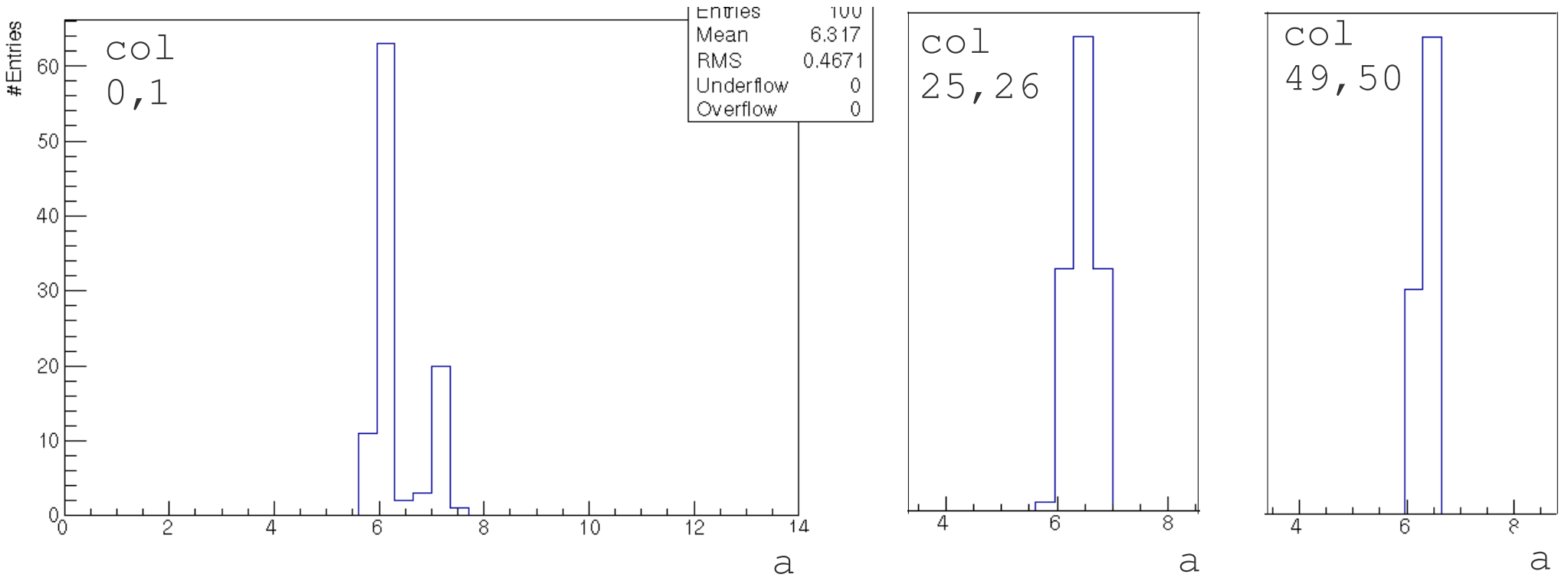
large Vcal = small Vcal/7
[S. Dahmbach Thesis]

large' Vcal = (small Vcal/a) + b

Fit to large Vcal

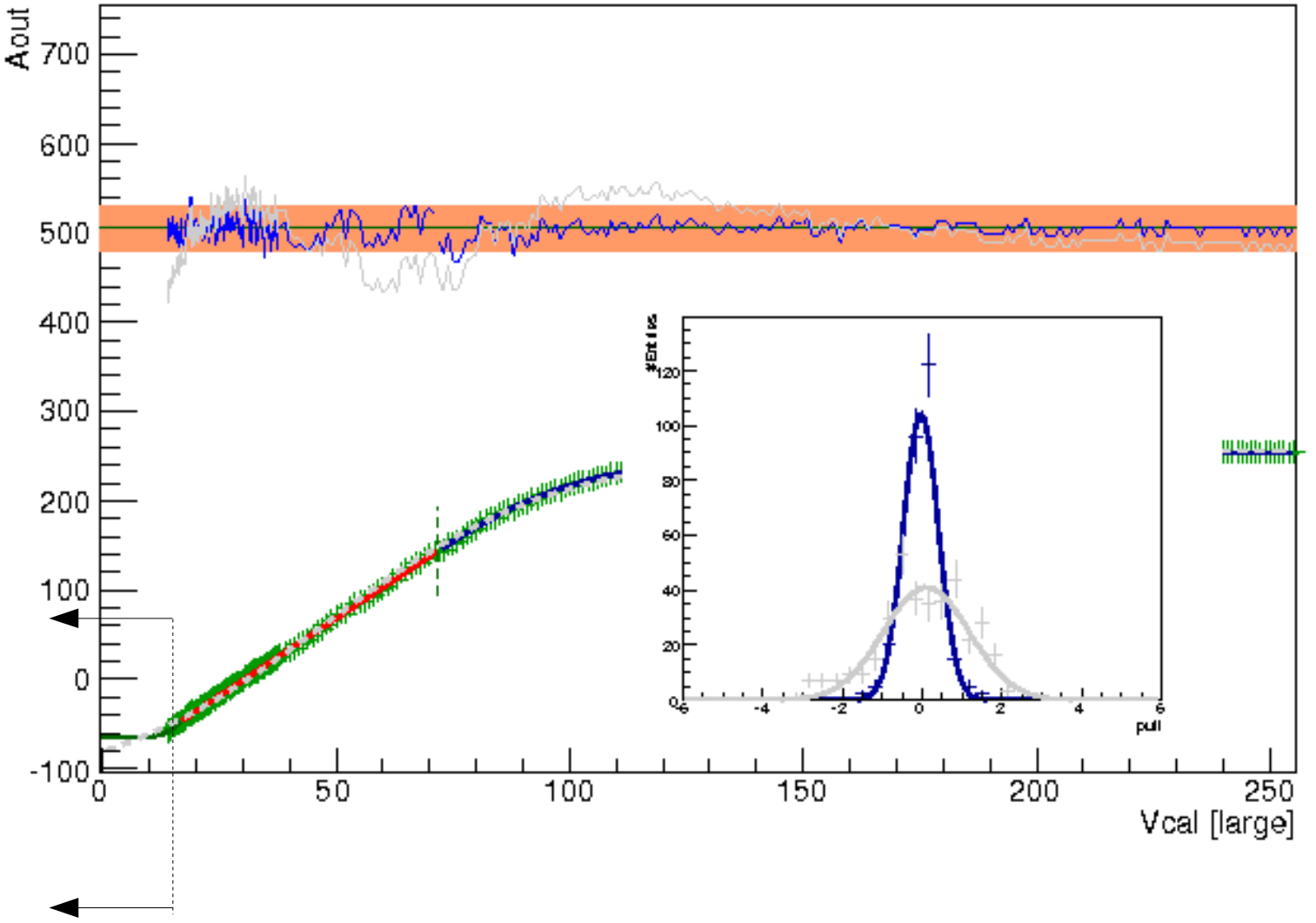
Fit to large' Vcal

Using small Vcal



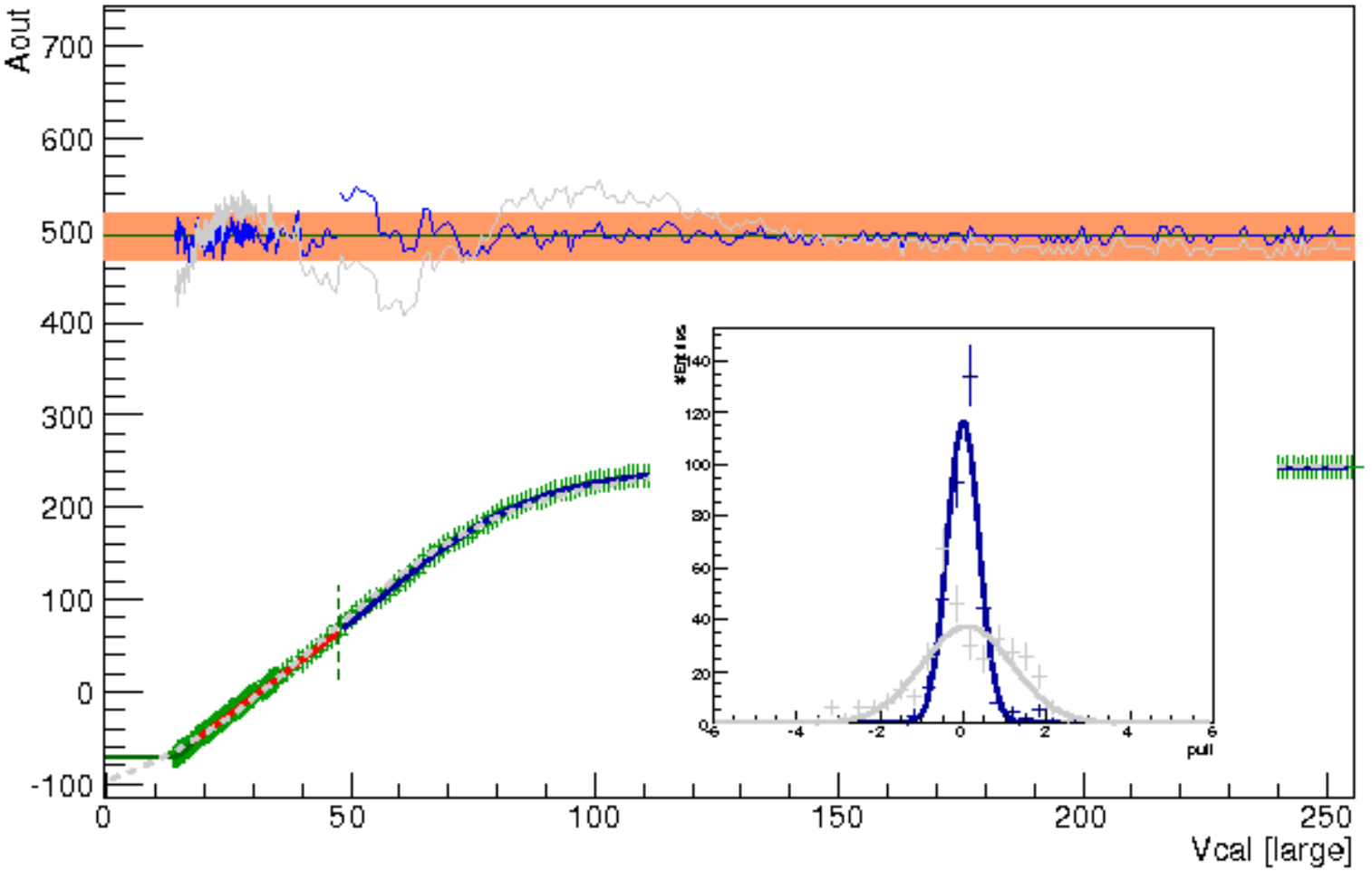
a ~ 6.5 ± 0.5 [compared to 7] and perhaps depends on pixel position

Results : Chip10 (used in 5 GeV test beam)

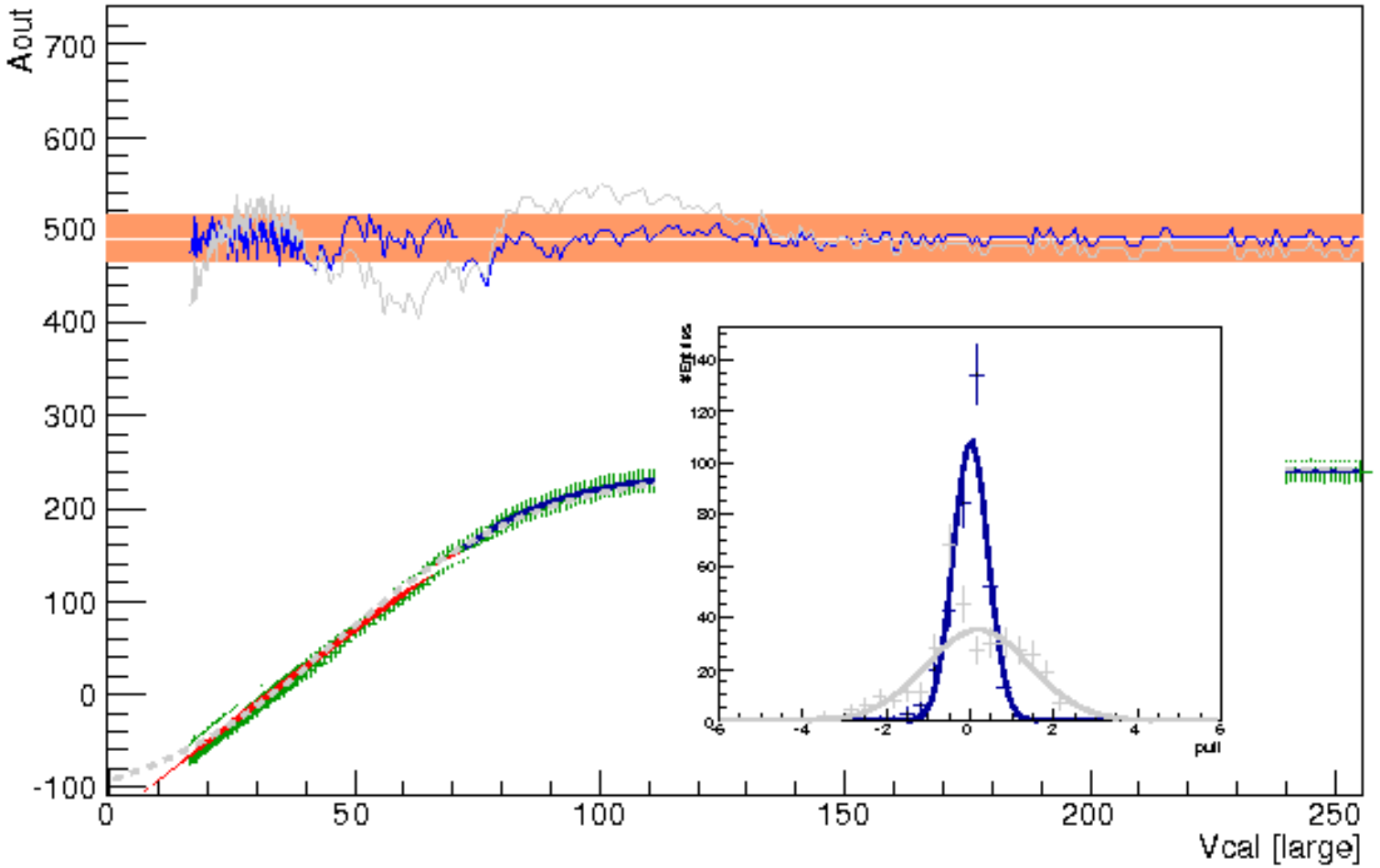


points removed due to threshold effects

Results : Chip10 (used in 5 GeV test beam)

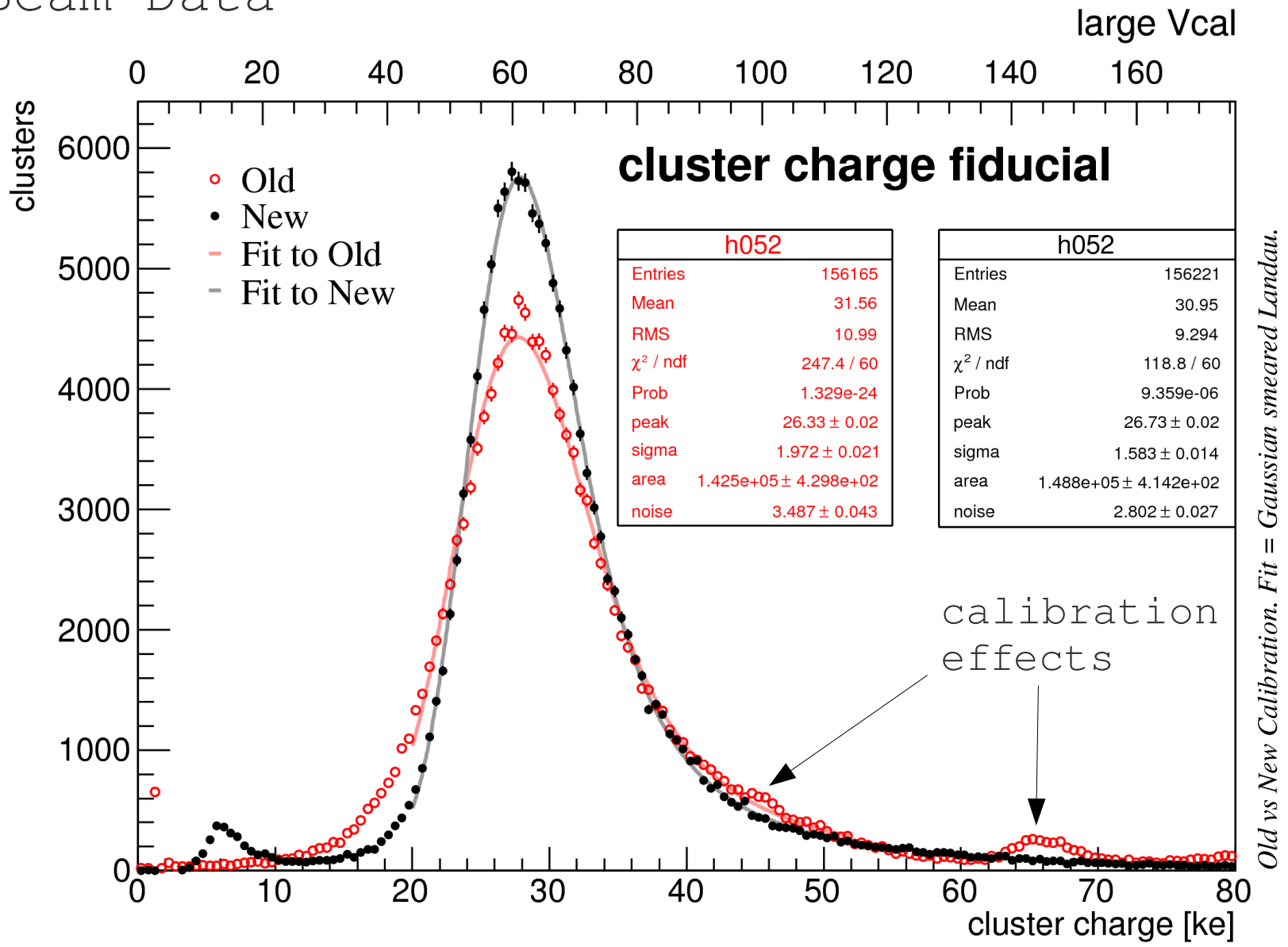


Results : Chip10 (used in 5 GeV test beam)



Results : Chip10 (used in 5 GeV test beam)

Test Beam Data



Chi-square improves with PWC parameterization.

Conclusions :

Using a Piece Wise Continuous (PWC) function (tanh + line + tanh) improves the calibration.

Thanks