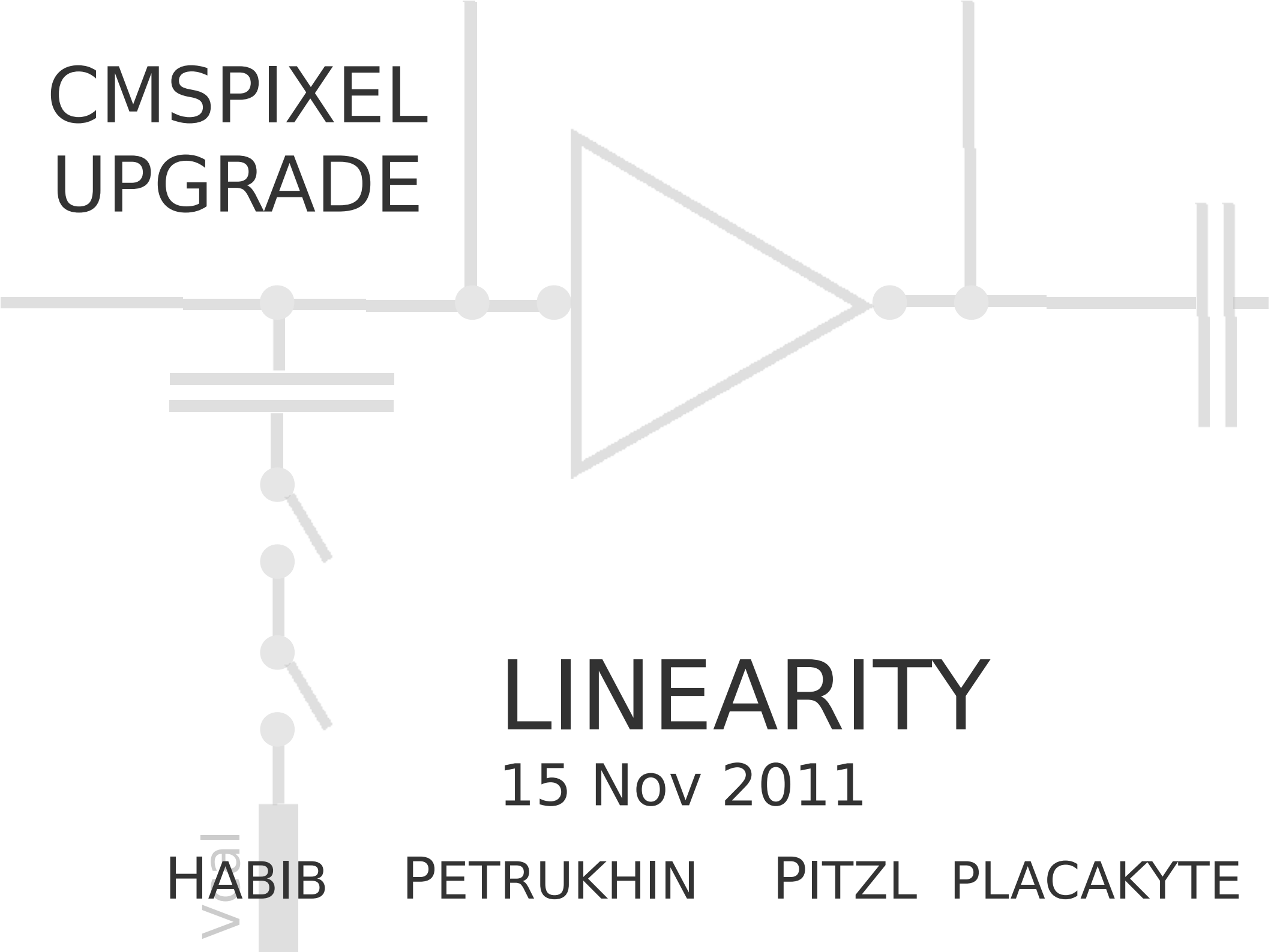
CMSPIXEL
UPGRADE

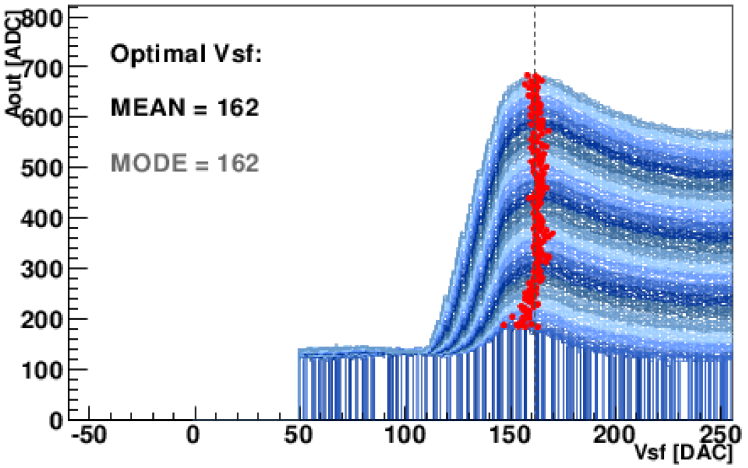
LINEARITY

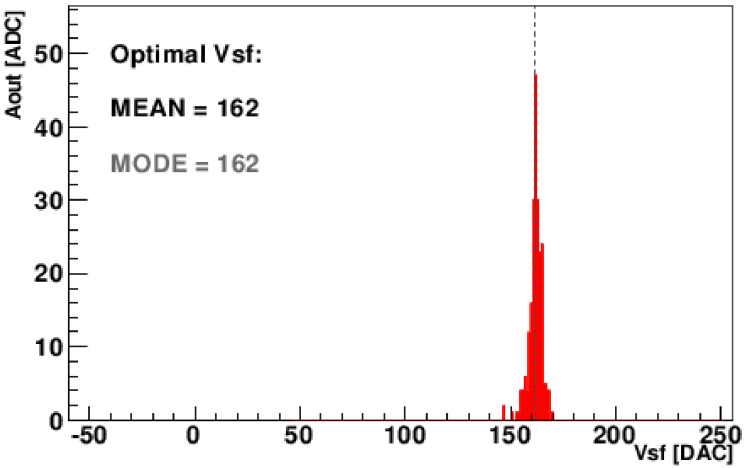
15 Nov 2011

HABIB PETRUKHIN PITZL PLACAKYTE

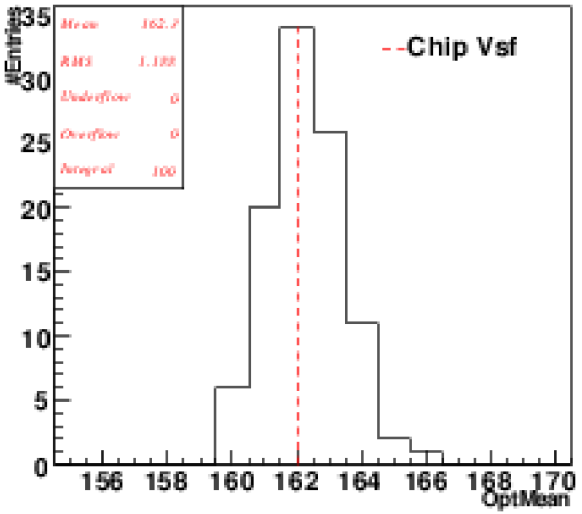


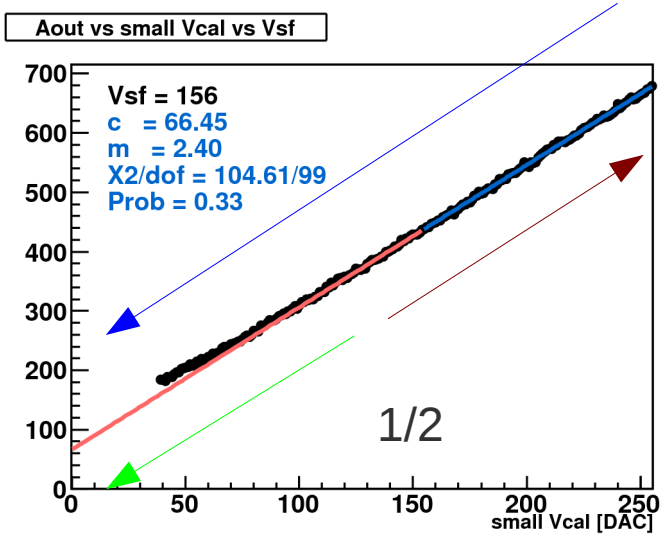
PIXEL

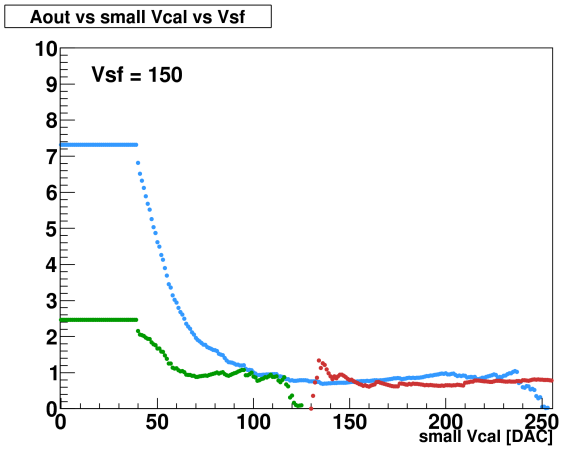

Optimal Vsf:
MEAN = 162
MODE = 162
Aout [ADC]
Vsf [DAC]


Optimal Vsf:
MEAN = 162
MODE = 162
Aout [ADC]
Vsf [DAC]

ROC

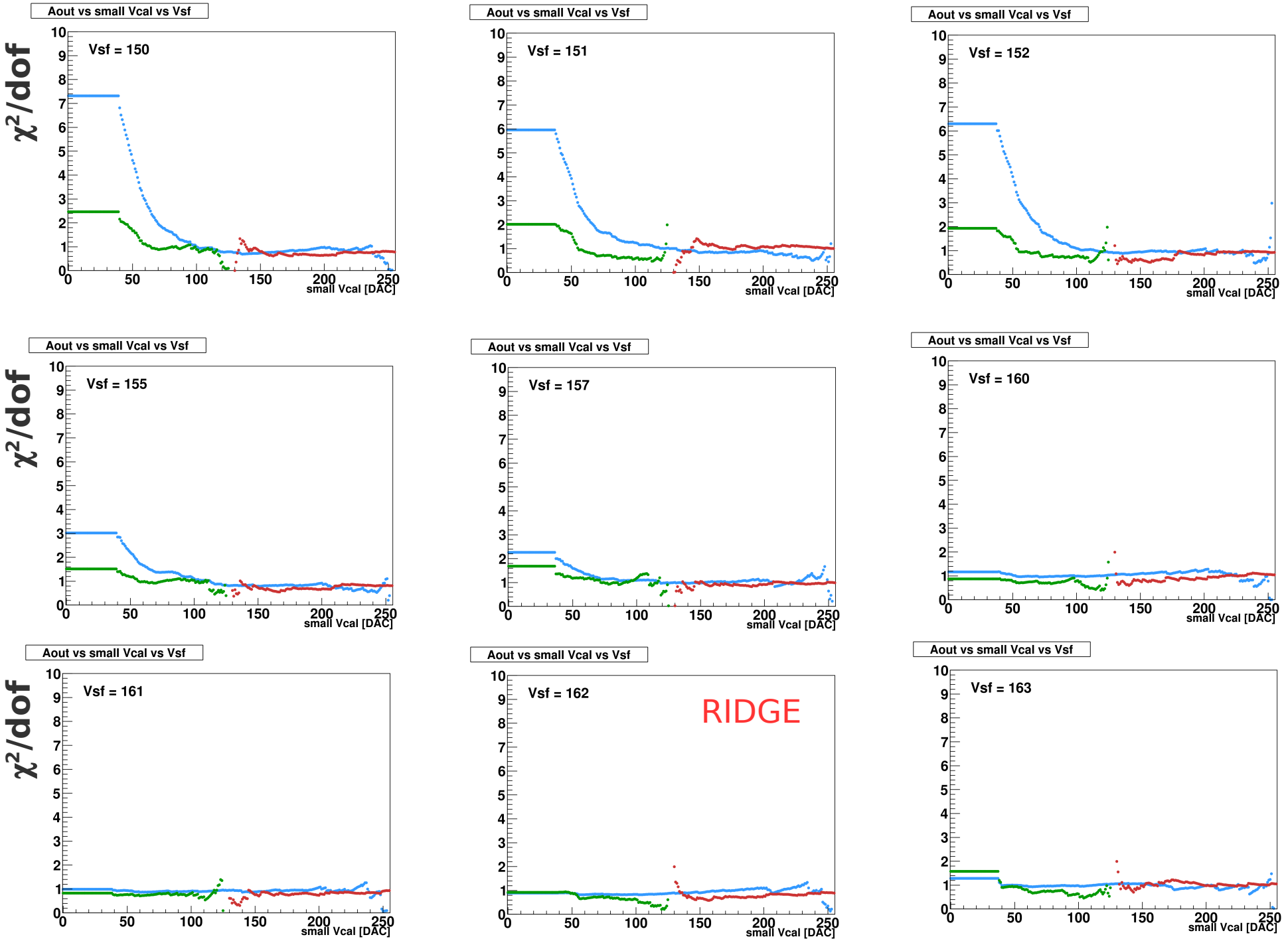

Chip Vsf
#Entries
OptMean


Aout vs small Vcal vs Vsf
Vsf = 156
c = 66.45
m = 2.40
X2/dof = 104.61/99
Prob = 0.33
1/2
small Vcal [DAC]


Aout vs small Vcal vs Vsf
Vsf = 150
small Vcal [DAC]

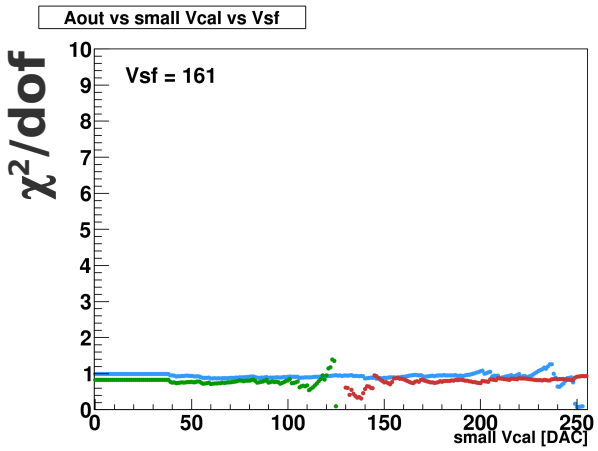
Goodness of fit (Vsf)

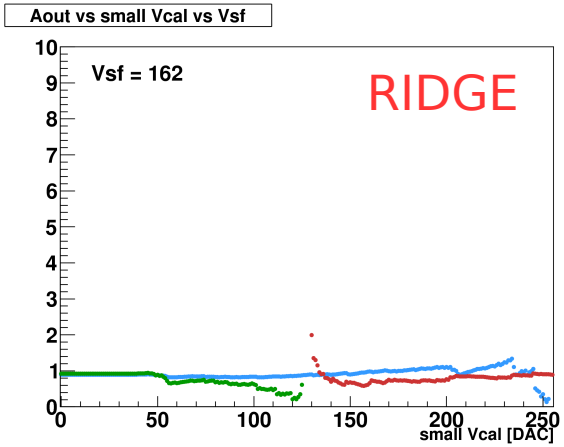
PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

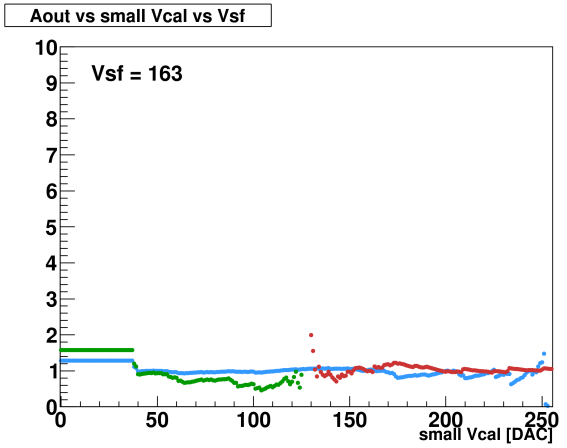


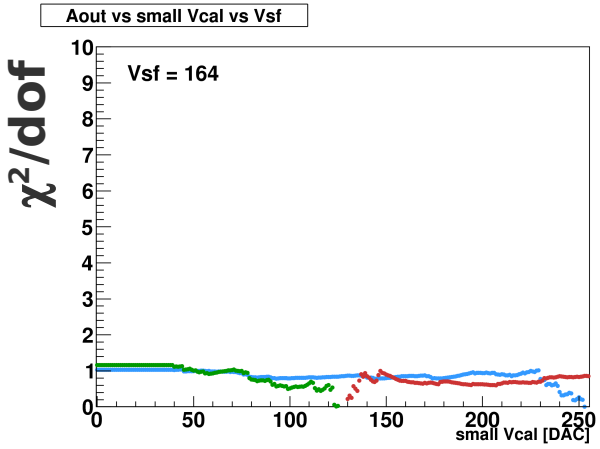
Goodness of fit (Vsf)

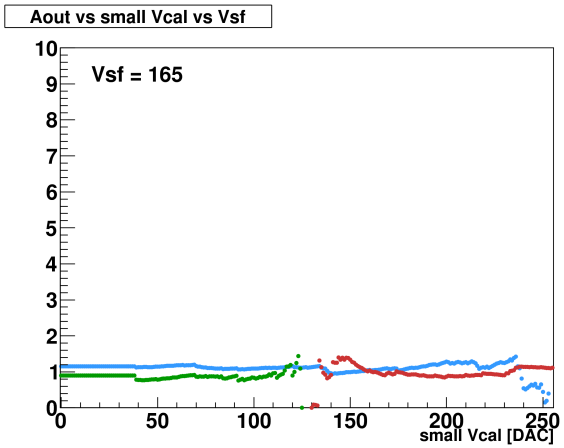
PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

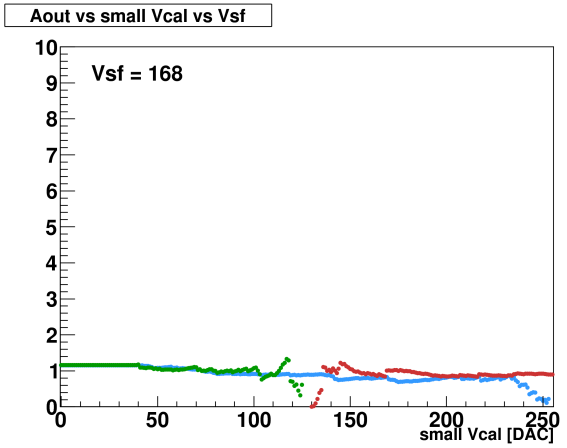


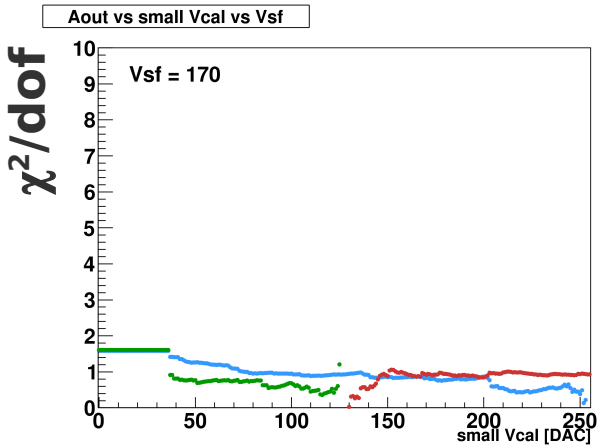


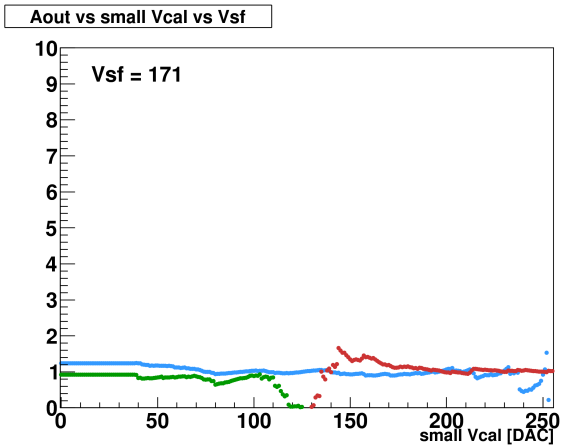


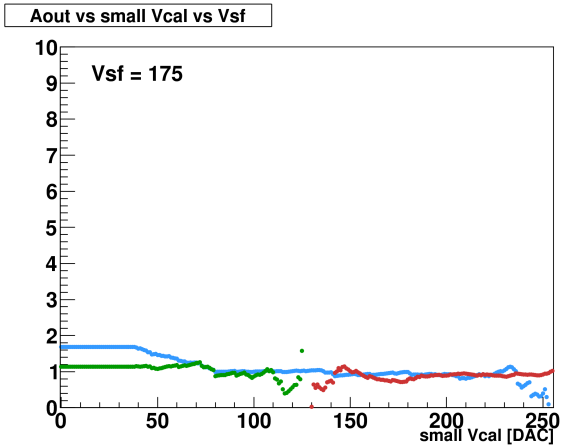






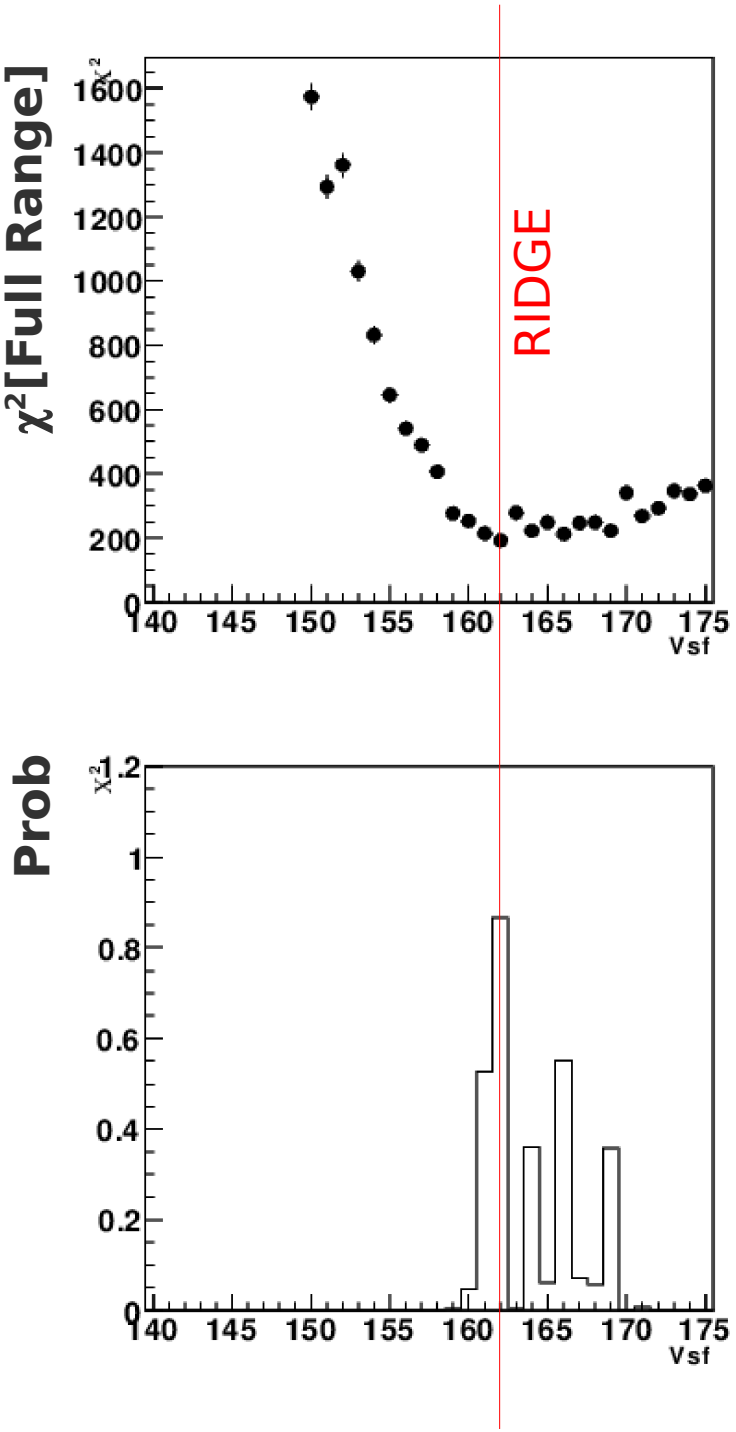






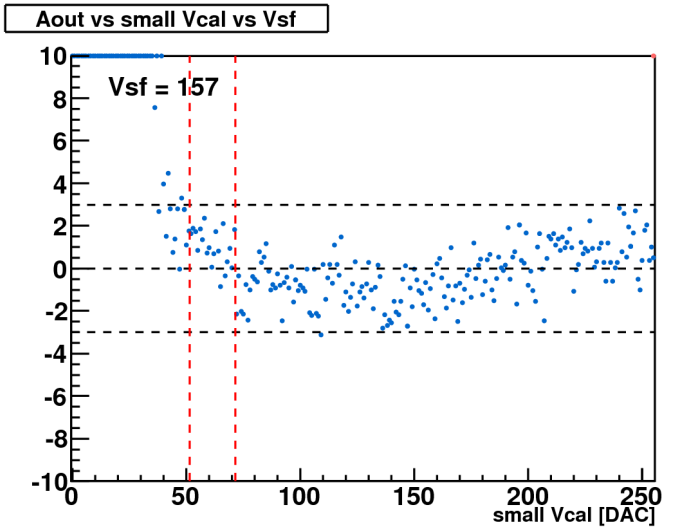
Goodness of fit (Vsf)

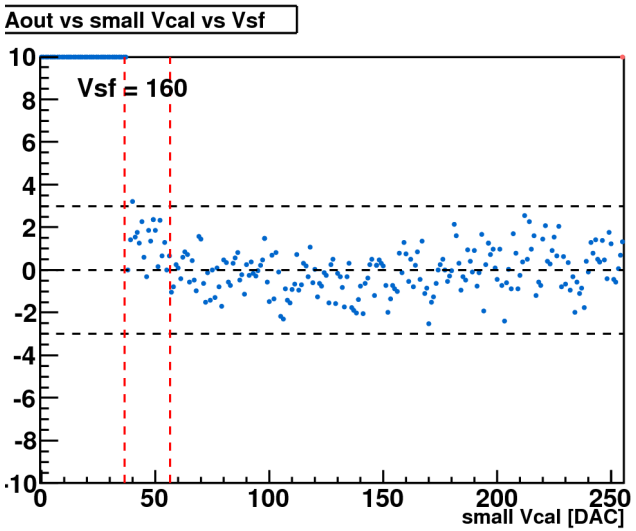
PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

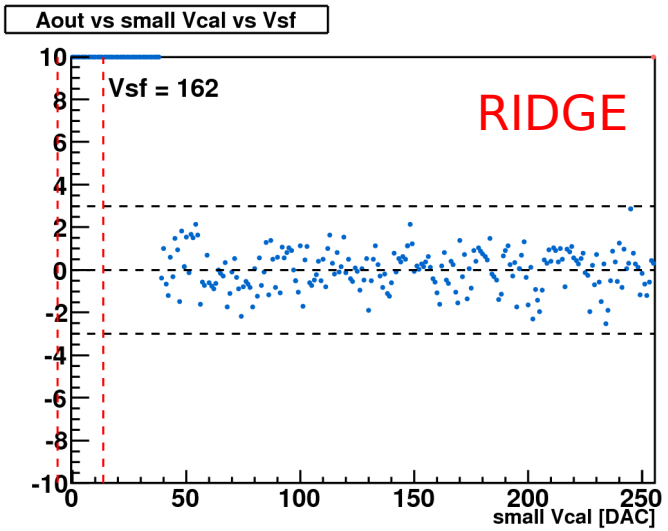


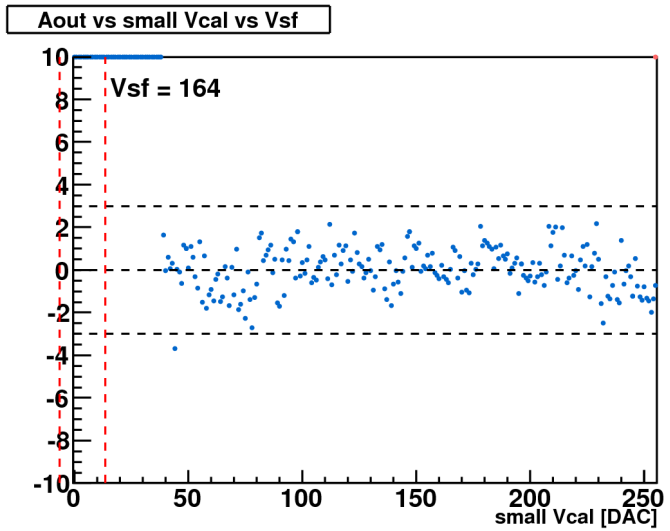
Pulls (Vcal)

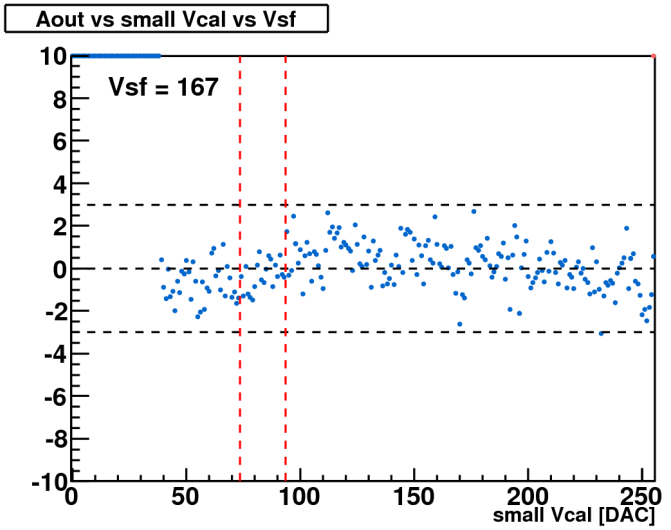
PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

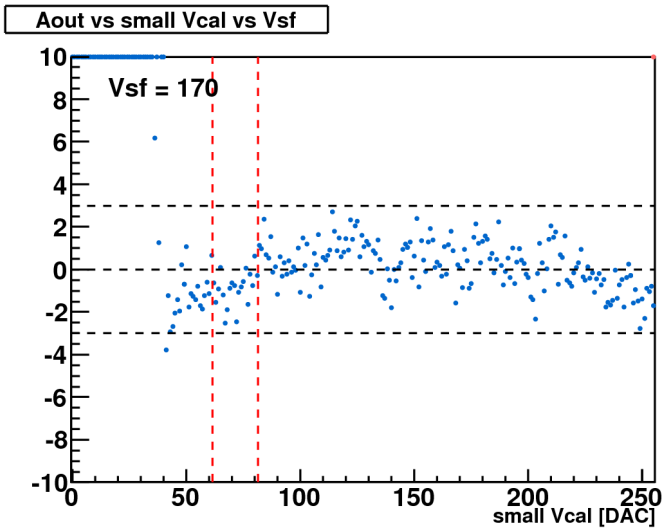






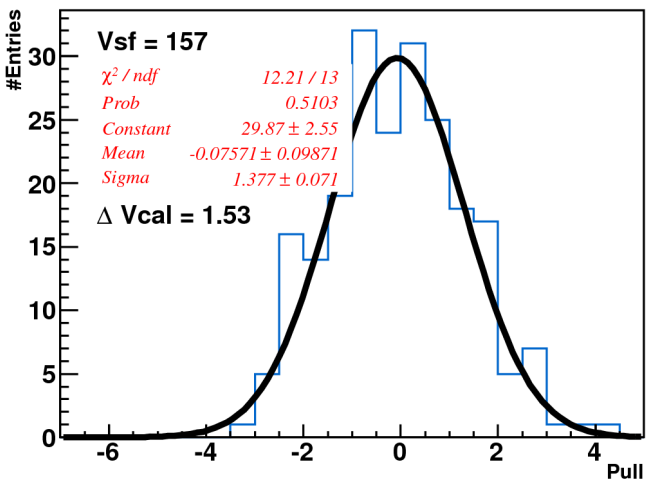


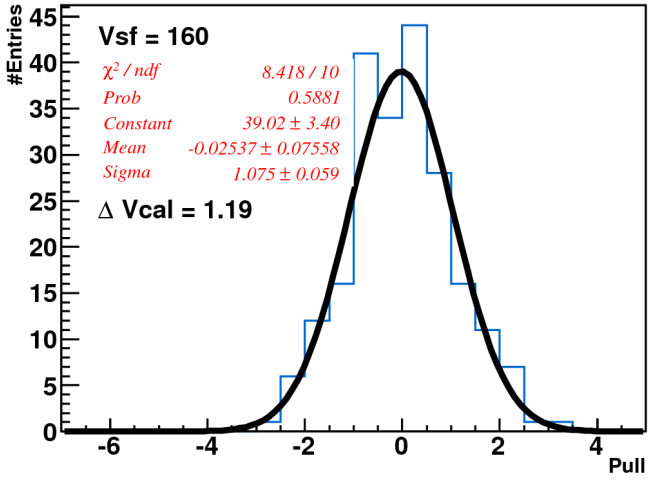


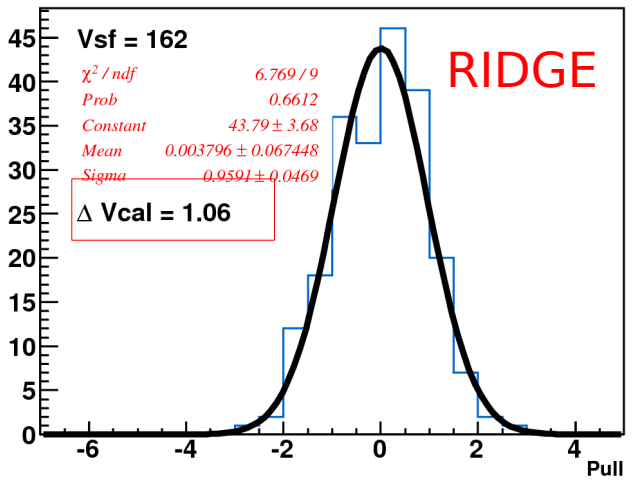


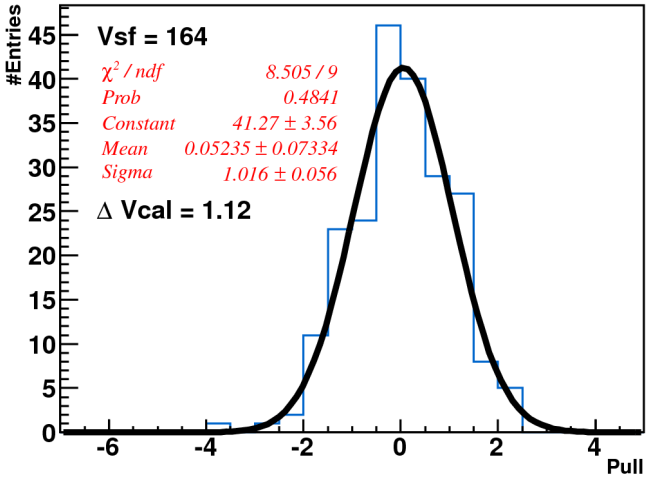
Pull Distribution & Noise

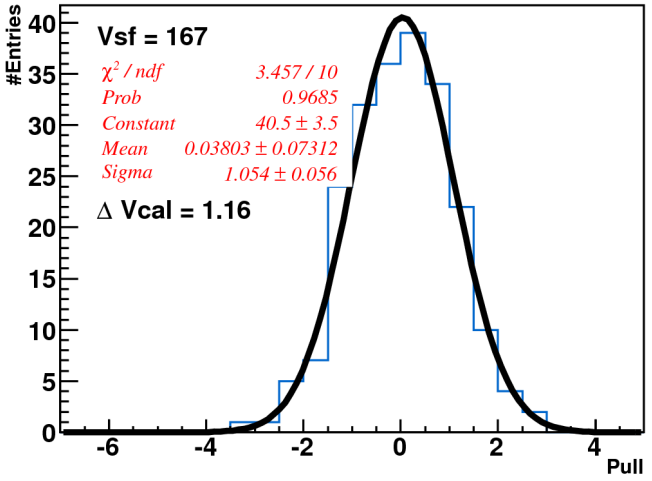
PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

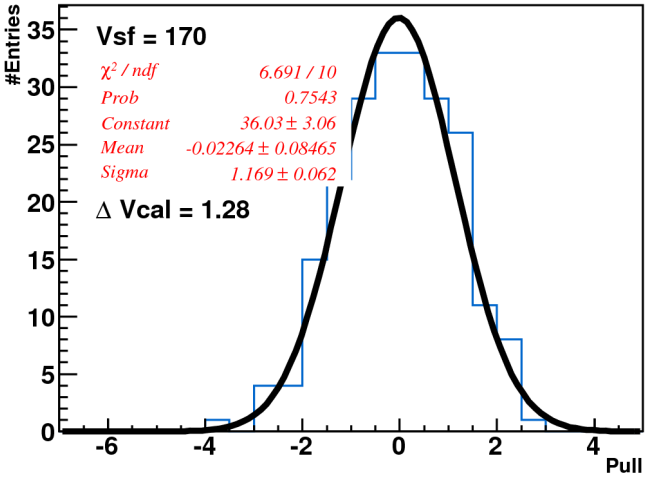












Width of Pull = 0.96

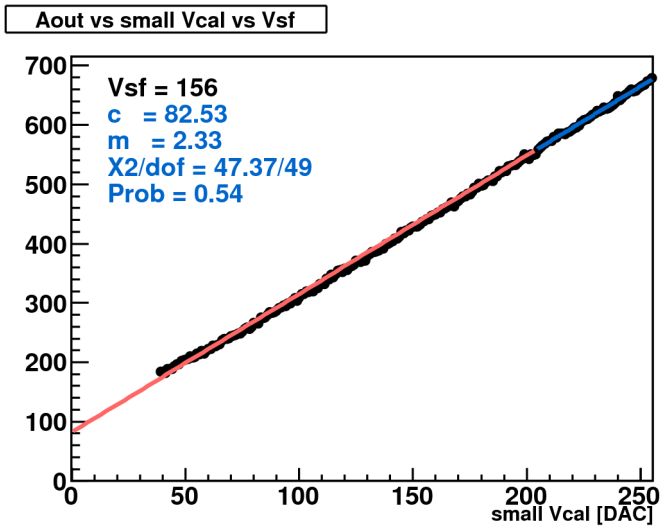
ΔAout = 2.6

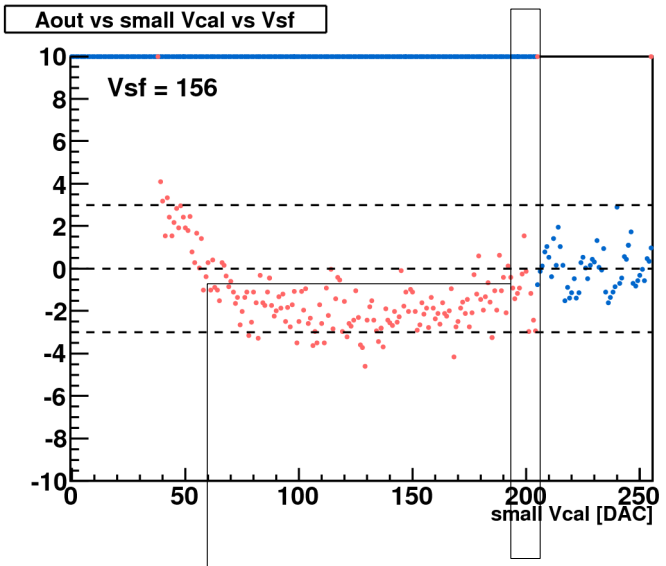
Noise = Width of Pull * ΔAout = 2.496

$\Delta Vcal|_{noise}$ = Noise/m = 2.496/2.36 = 1.06

Linearity Range

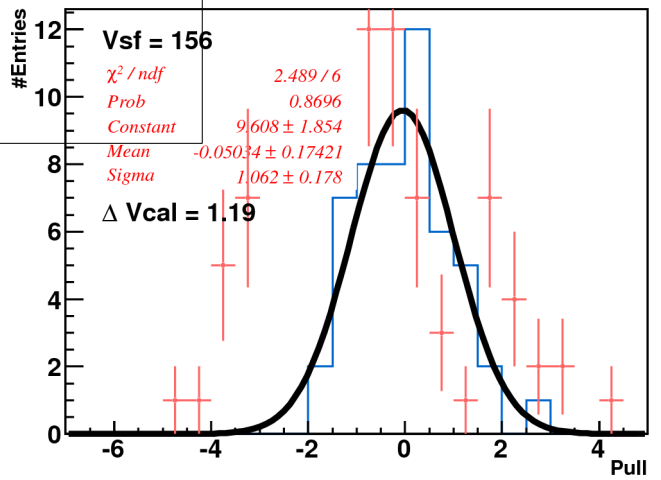
PIXEL: COL = 0 , ROW = 40 , RIDGE = 162





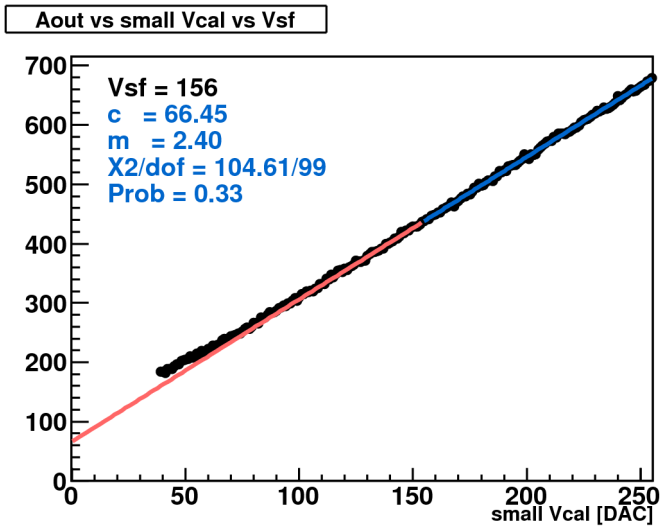
Check if next 15 entries have all the same sign

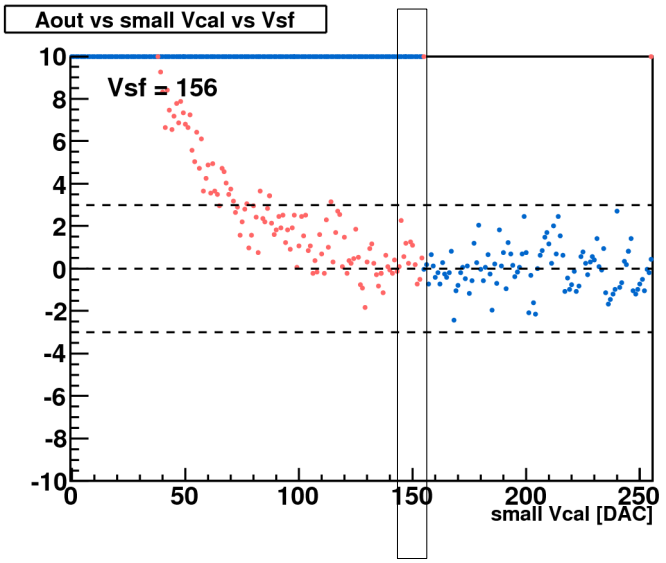
Prob = $1/2^{15} = 1/32000$

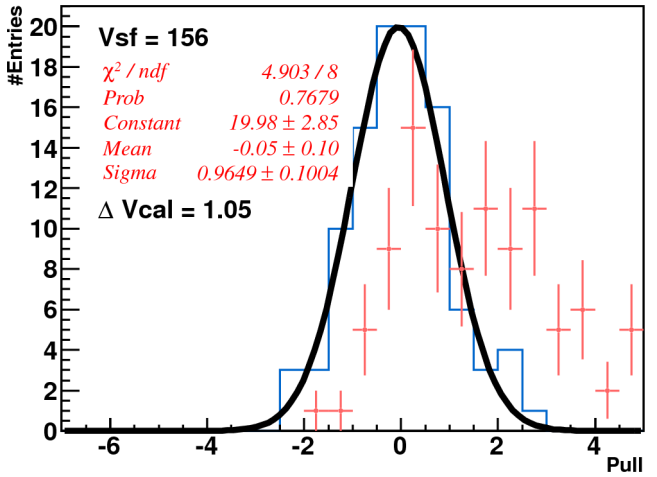


Linearity Range

PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

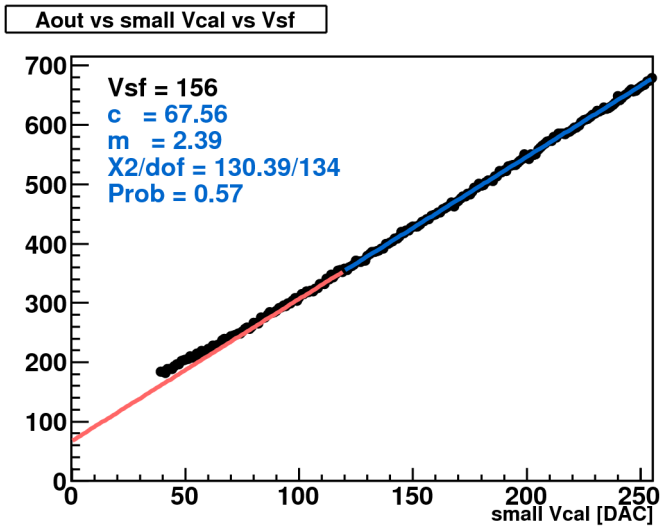


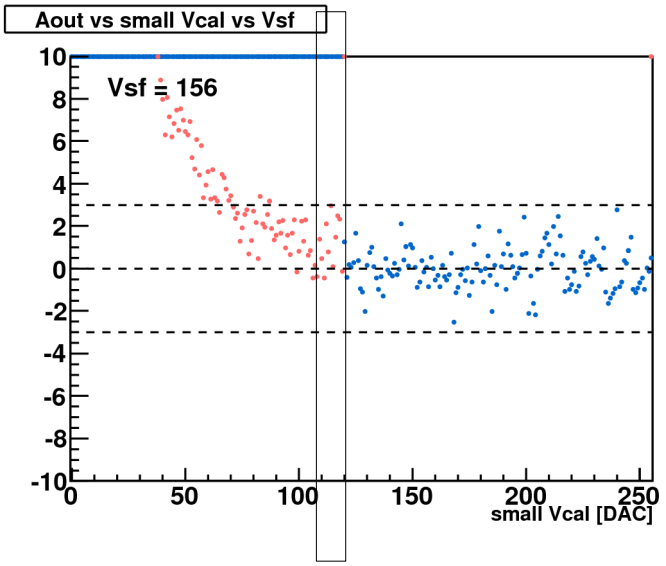


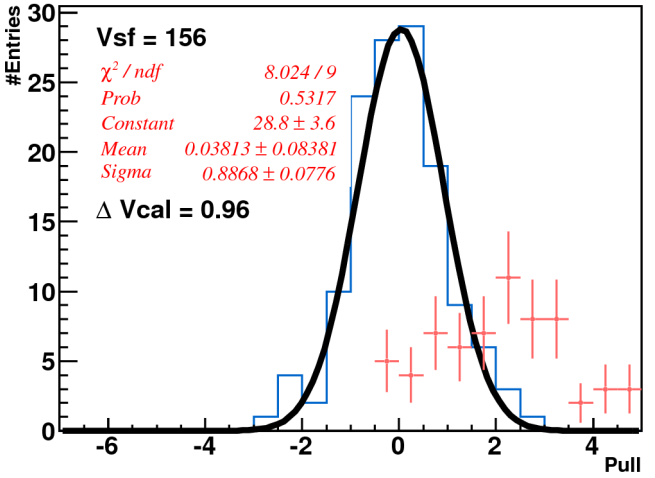


Linearity Range

PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

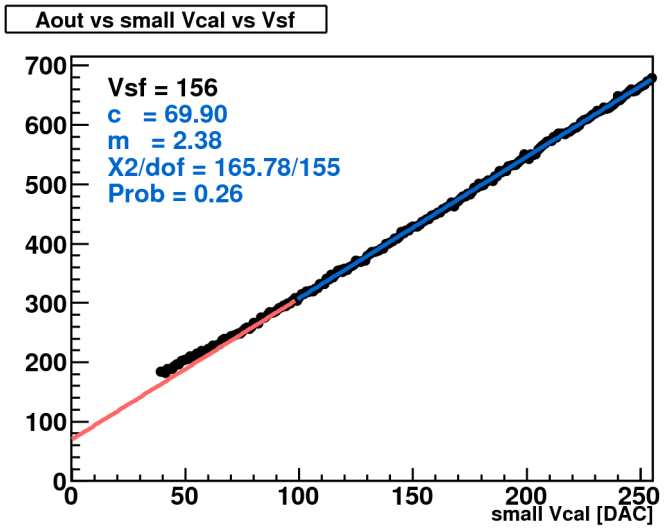


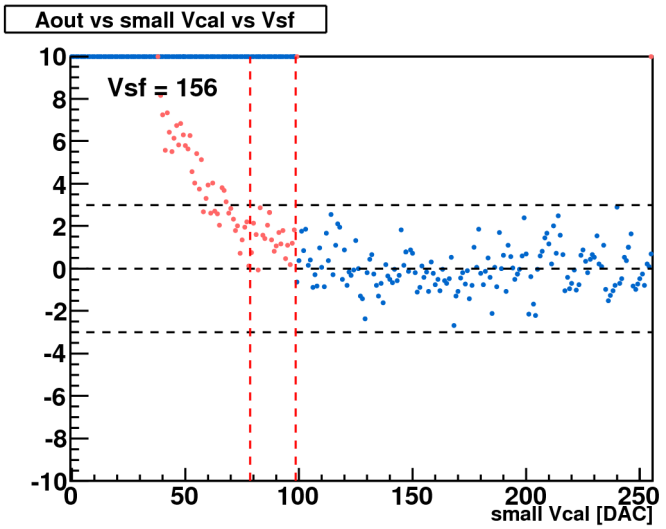




Linearity Range

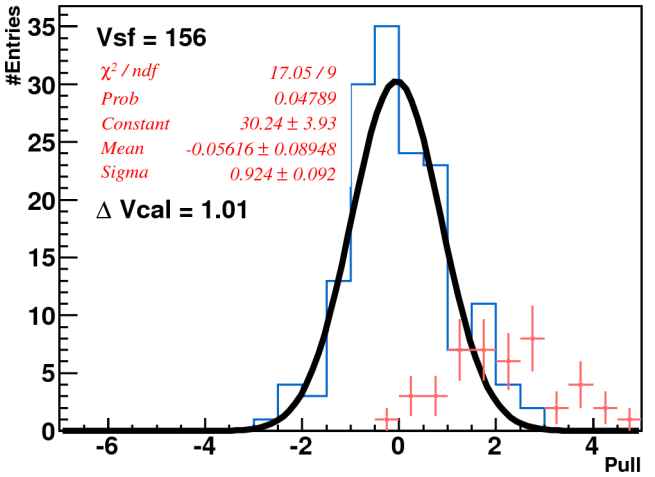
PIXEL: COL = 0 , ROW = 40 , RIDGE = 162





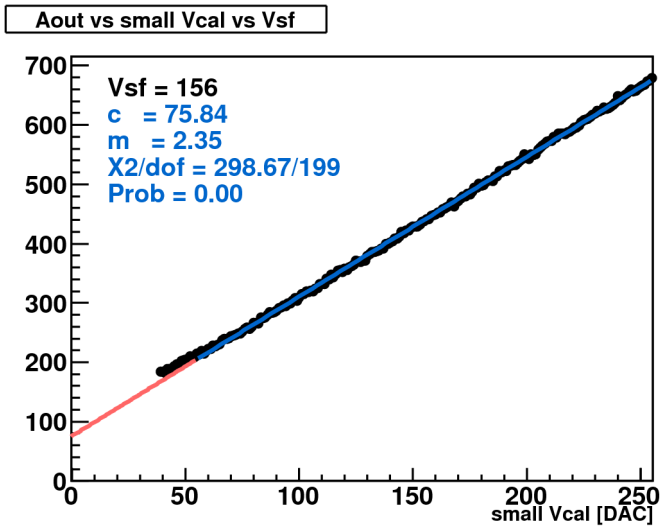
Linearity range found.

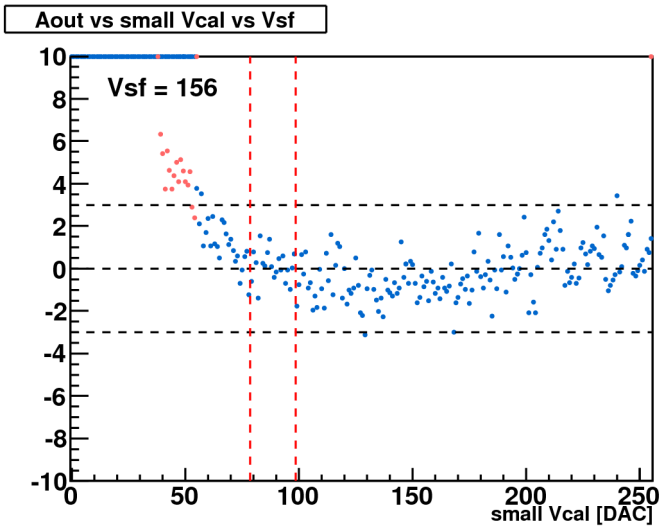
Number of good bins (NGB) = 157

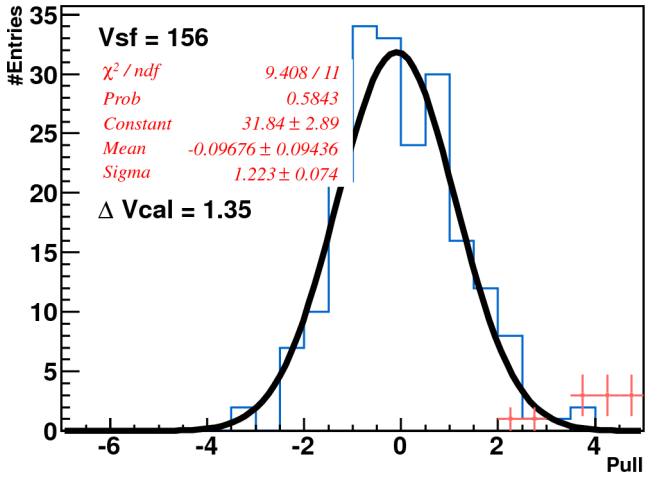


Linearity Range

PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

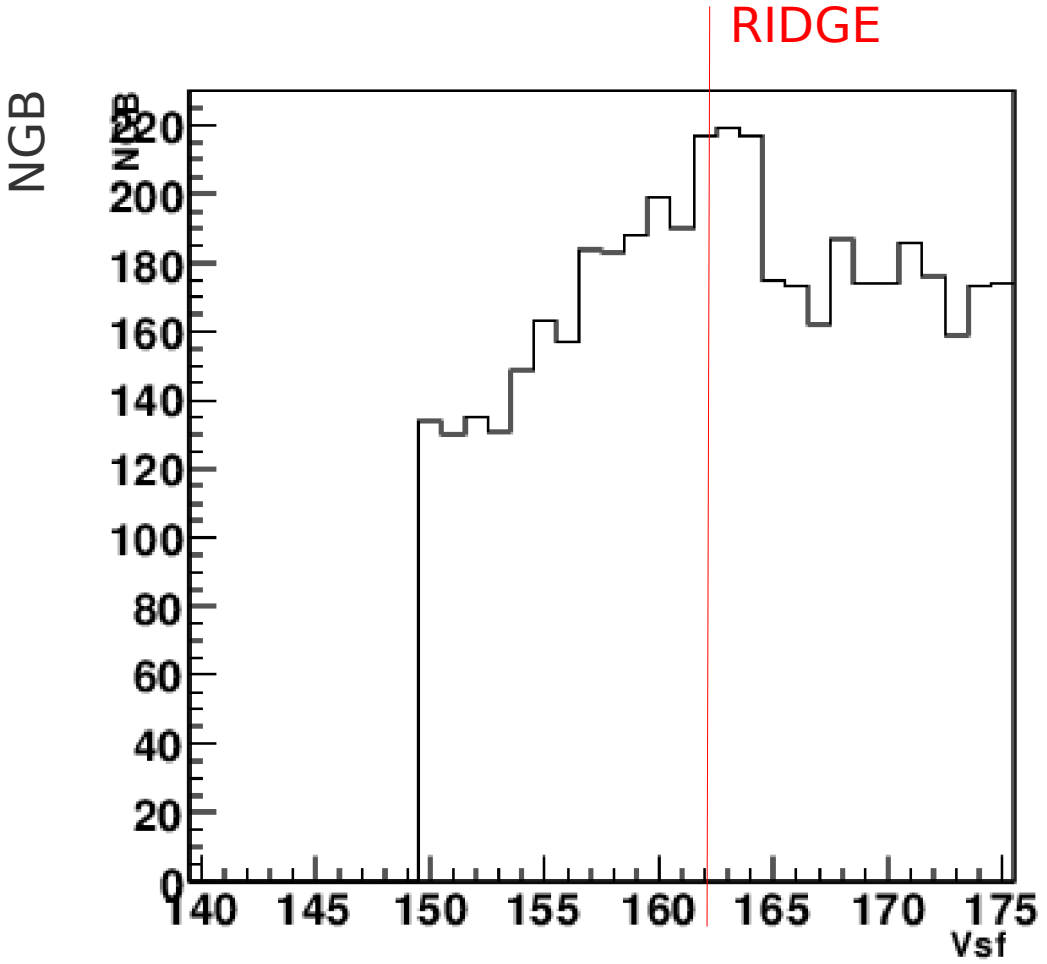






Linearity Range

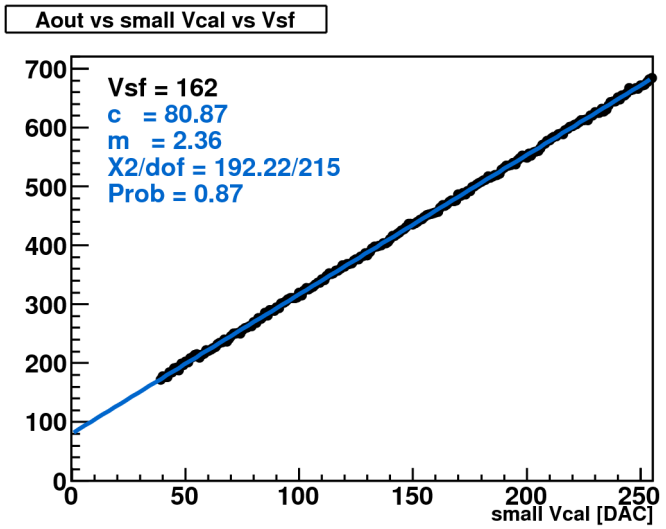
PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

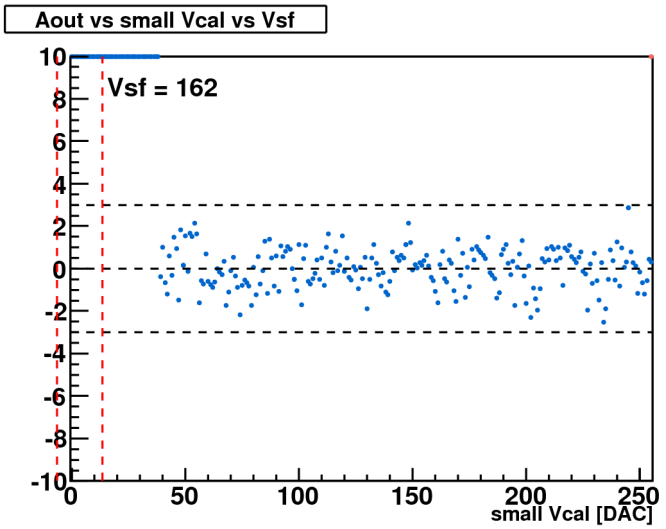


Full range of linearity near ridge. Decreases on either side.

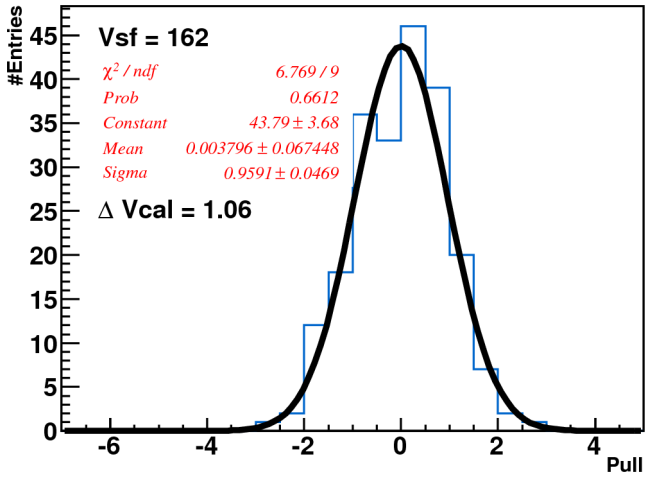
Linearity Range

PIXEL: COL = 0 , ROW = 40 , RIDGE = 162



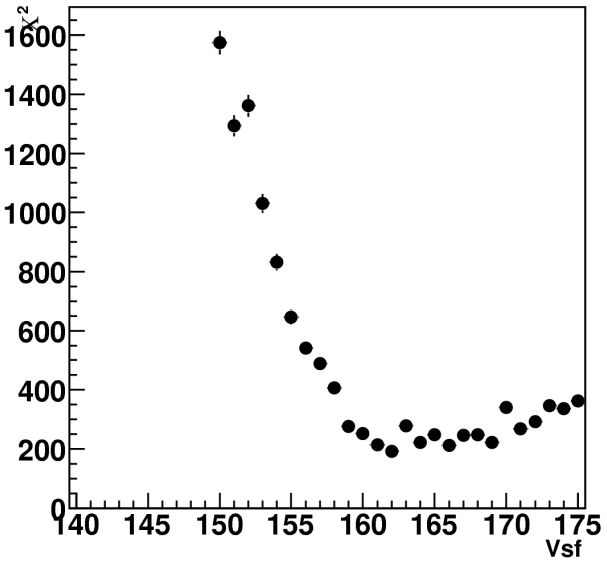


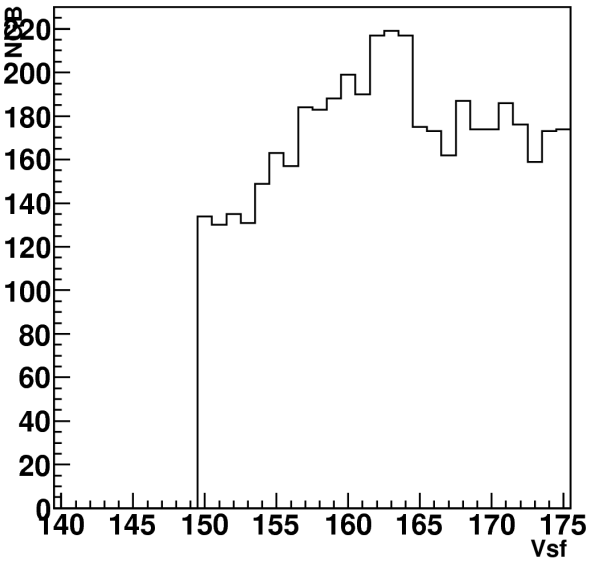
RIDGE

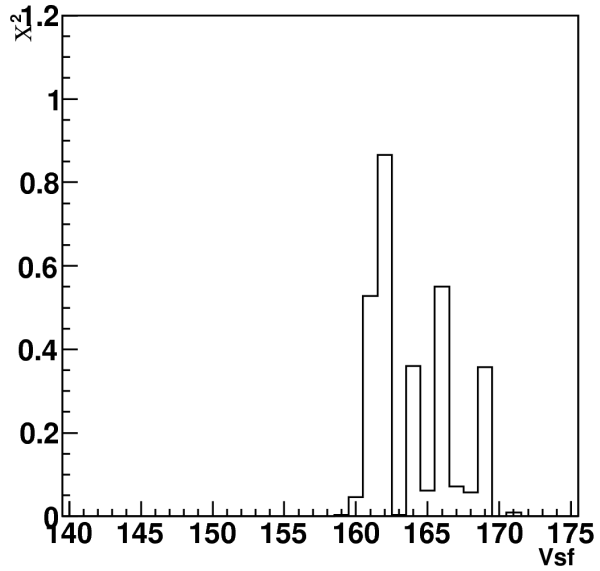


Linearity Range

PIXEL: COL = 0 , ROW = 40 , RIDGE = 162

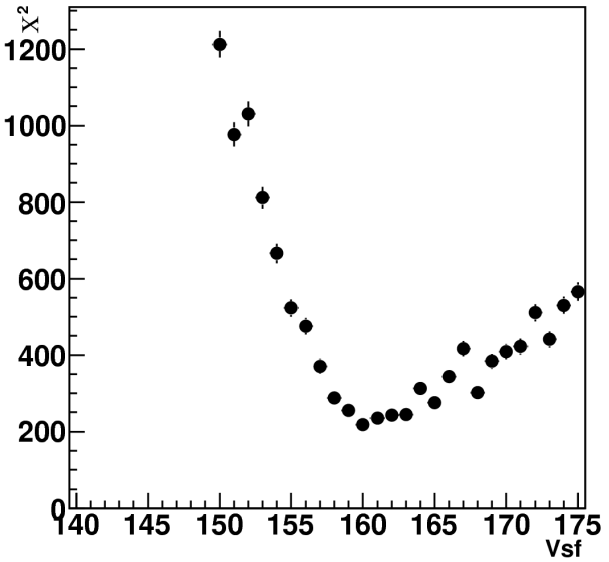


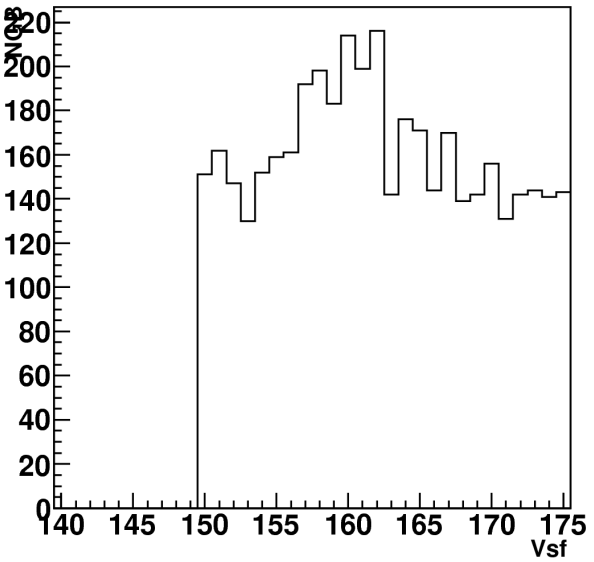


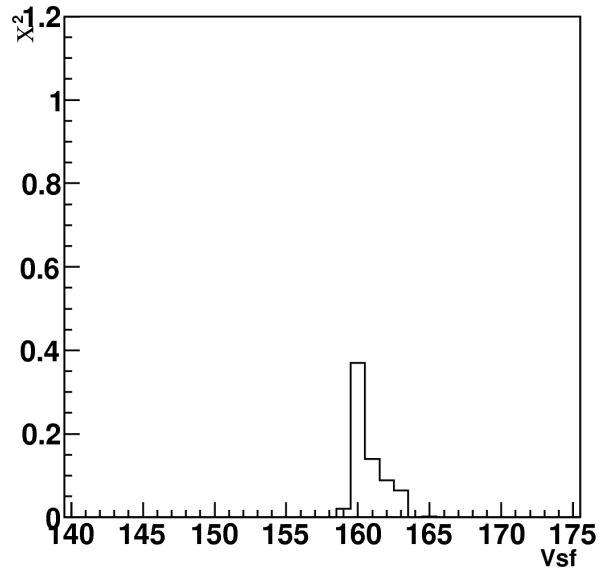


Linearity Range

PIXEL: COL = 40 , ROW = 40 , RIDGE = 162

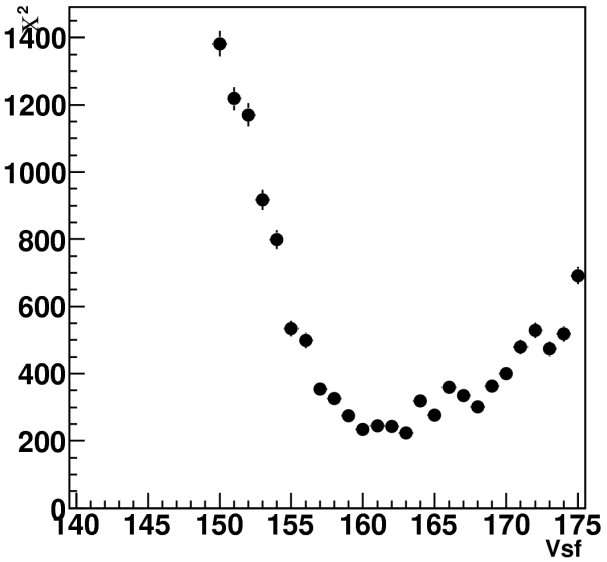


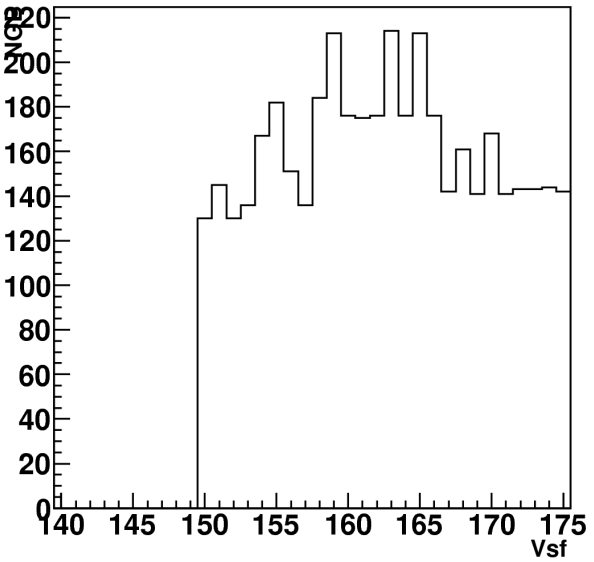


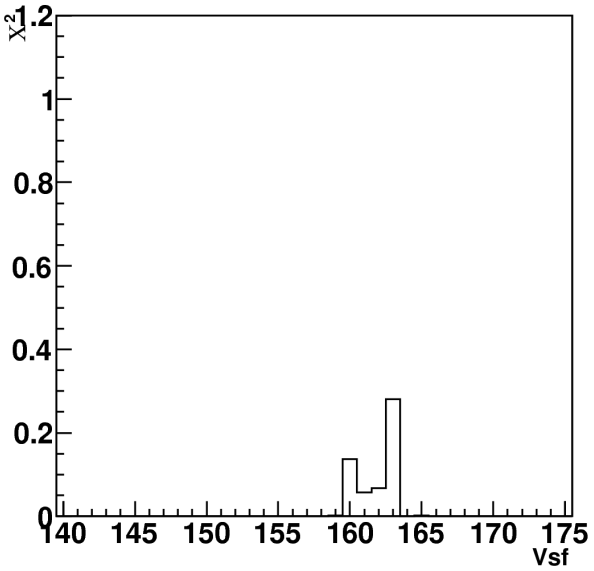


Linearity Range

PIXEL: COL = 25 , ROW = 56 , RIDGE = 165







Conclusions:

Linearity [Chi2 and Linear Range] is best At the ridge.

Expect uncorrelated error of 1 unit in Small Vcal due to noise.