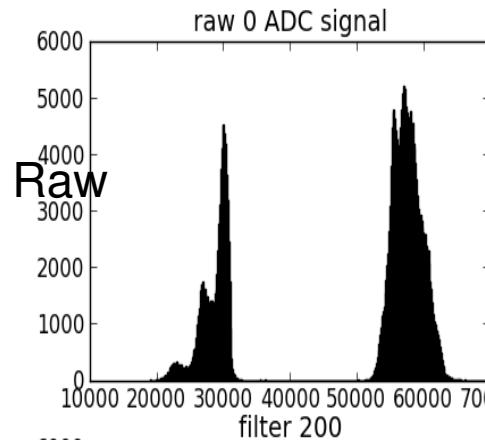


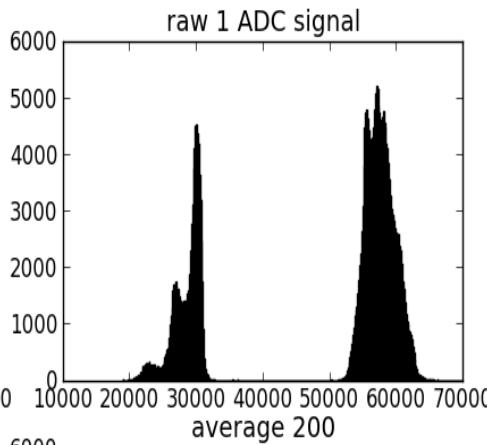
# BPM signal ave vs filter & BPM noise study

Pengjia Zhu  
7/3/2012

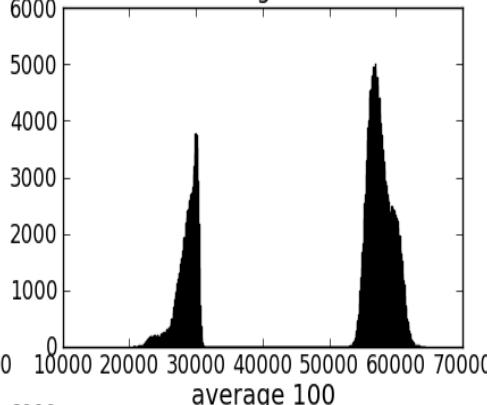
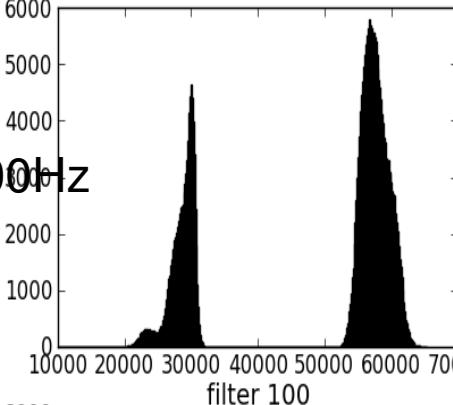
### Filtered raw signal



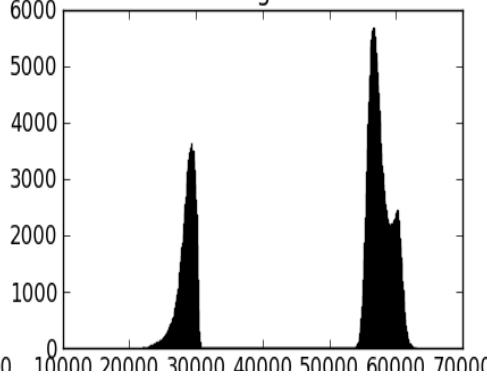
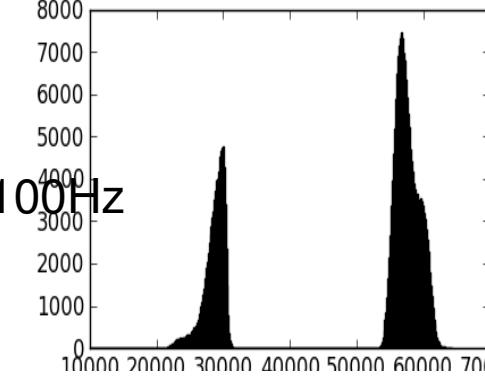
### averaged raw signal



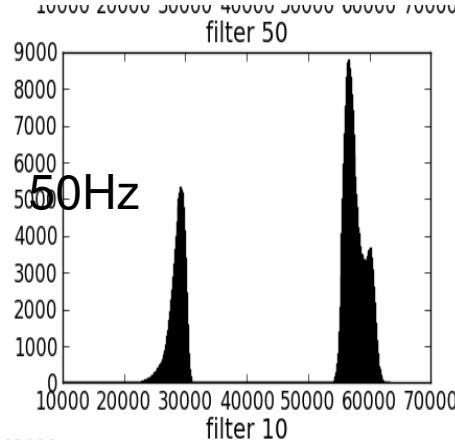
Raw  
200Hz



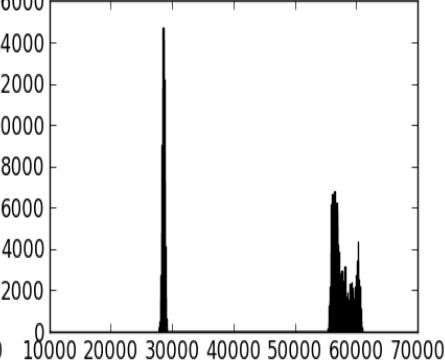
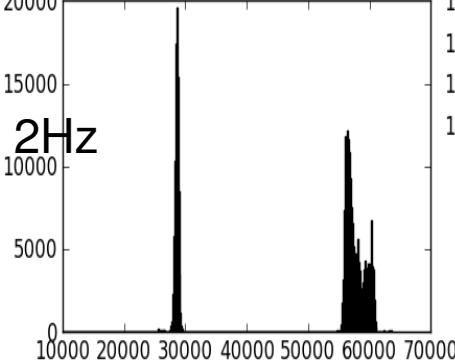
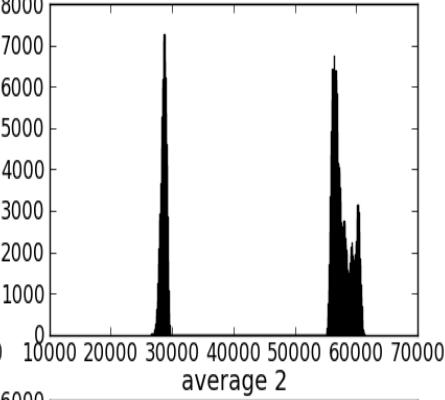
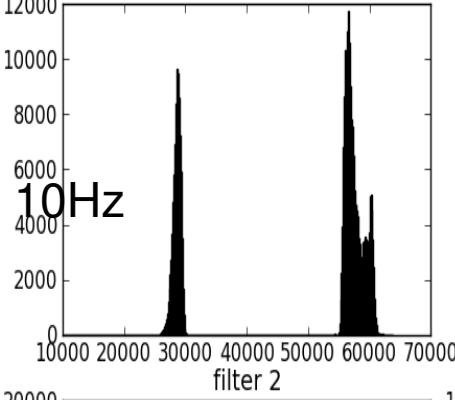
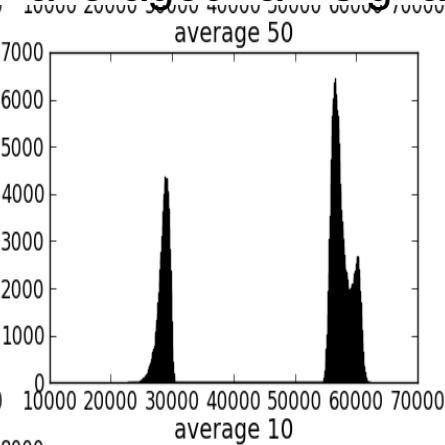
100Hz



### Filtered raw signal

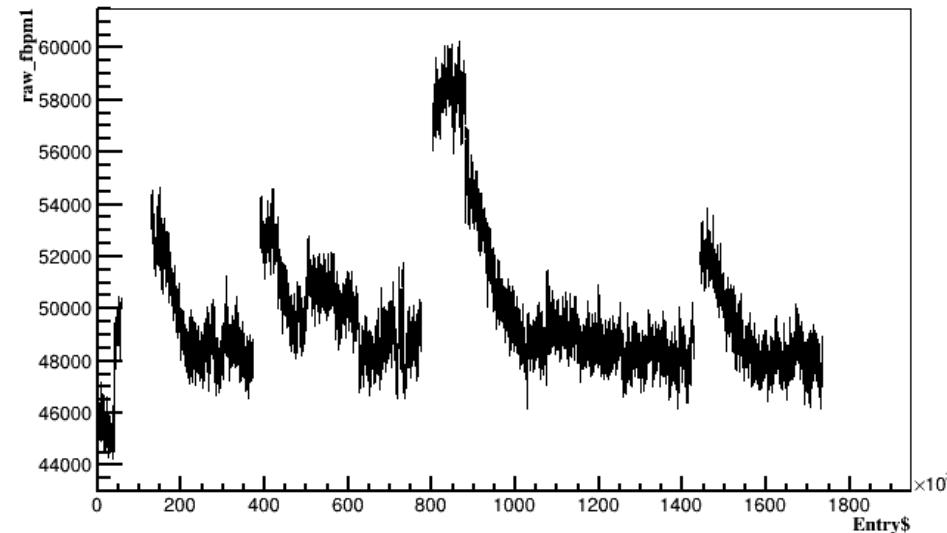


### averaged raw signal



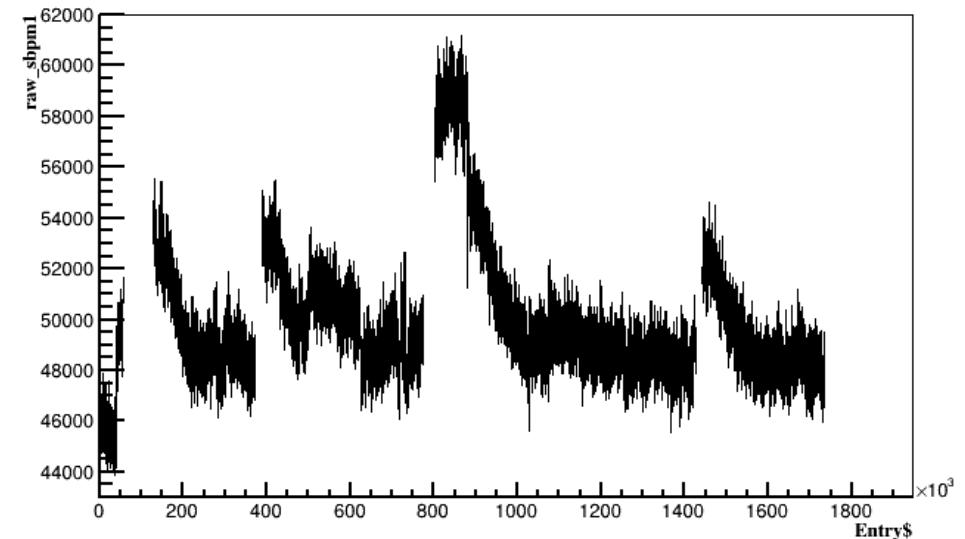
## 2Hz average

raw\_fbpm1:Entry\$ {raw\_bpmaavailable>0.5}

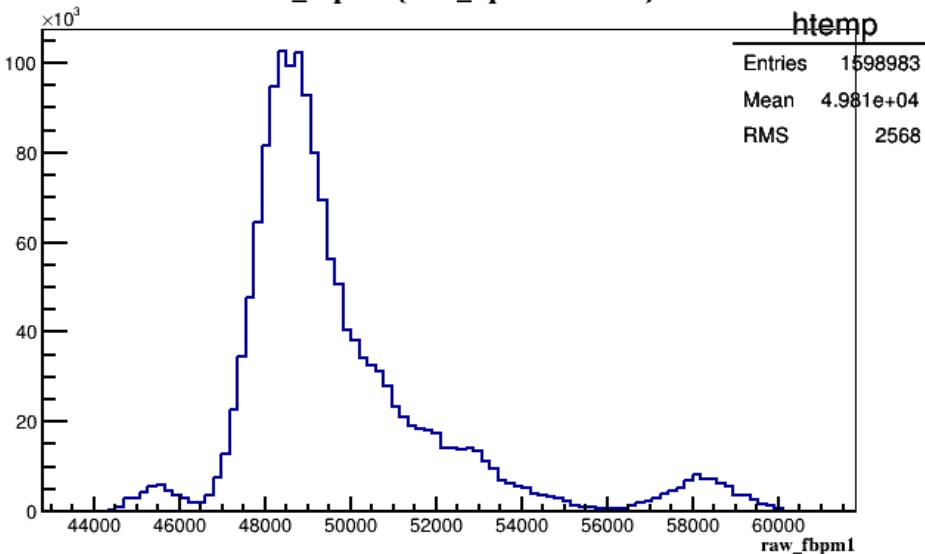


## 2Hz filter

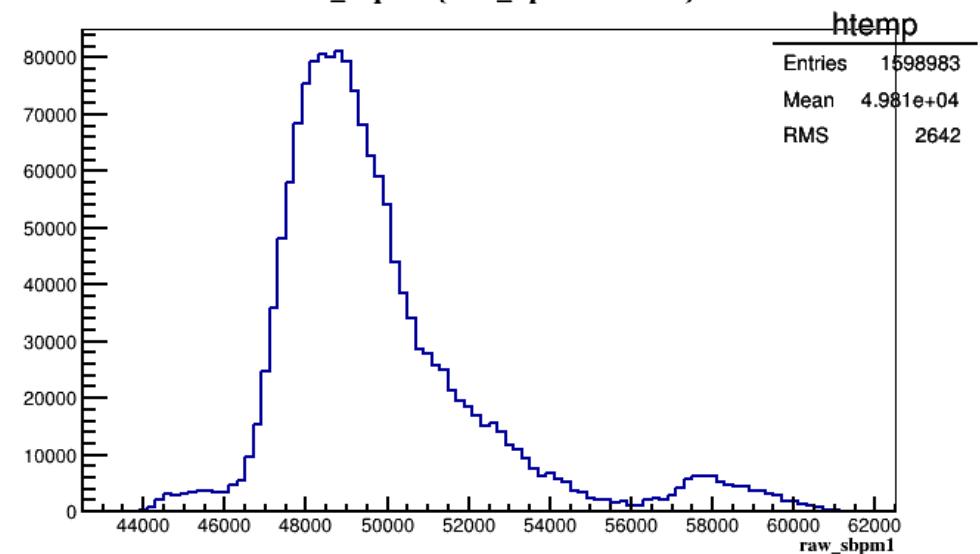
raw\_sbpm1:Entry\$ {raw\_bpmaavailable>0.5}



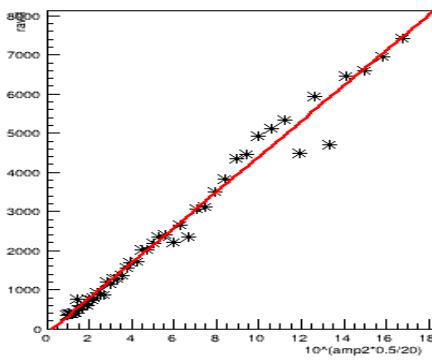
raw\_fbpm1 {raw\_bpmaavailable>0.5}



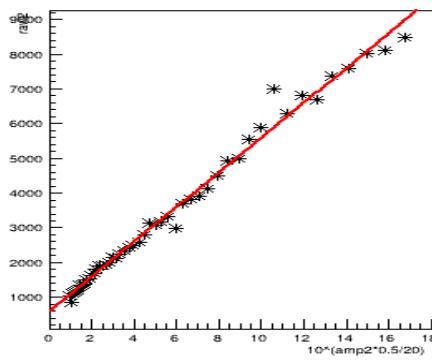
raw\_sbpm1 {raw\_bpmaavailable>0.5}



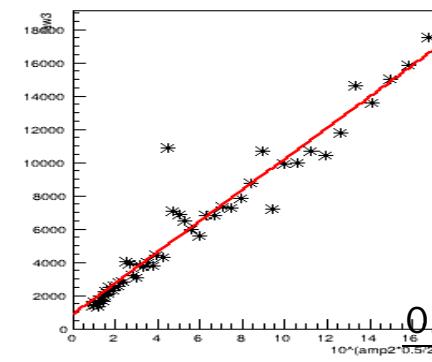
amp2 vs raw1



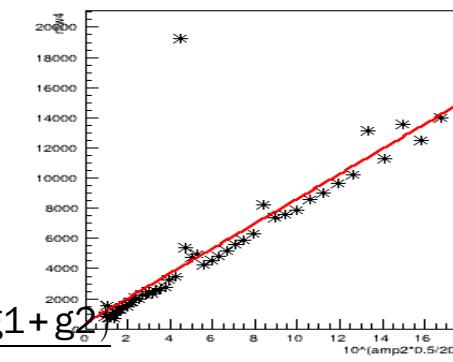
amp2 vs raw2



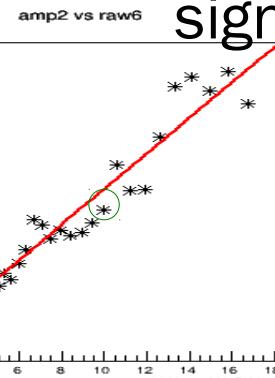
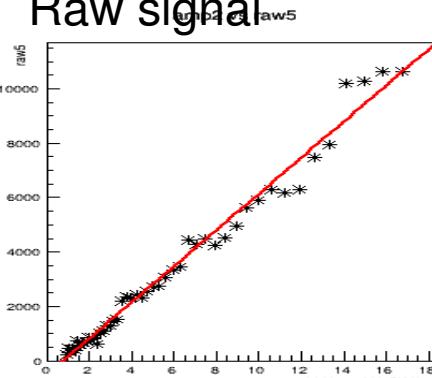
amp2 vs raw3



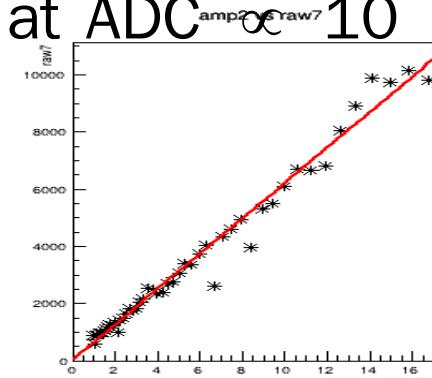
amp2 vs raw4



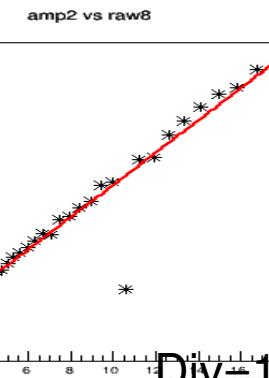
Raw signal



signal at ADC



20

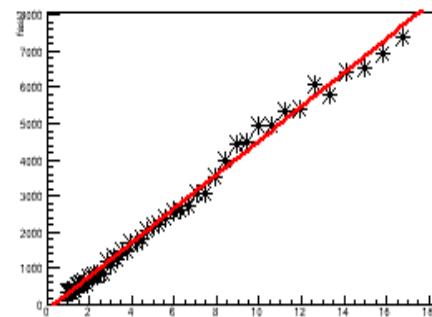


DIV=1

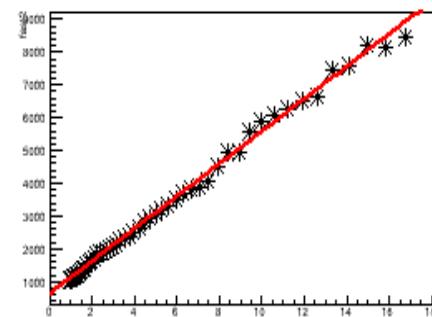
 $\text{amp}2 \propto \text{raw}$ 

10

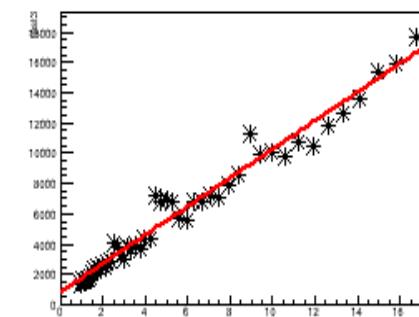
amp2 vs fast1



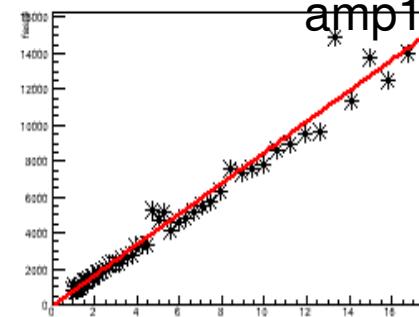
amp2 vs fast2



amp2 vs fast3



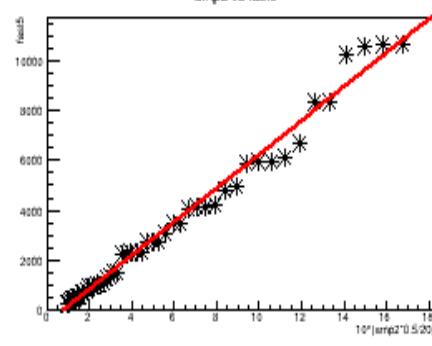
amp2 vs fast4



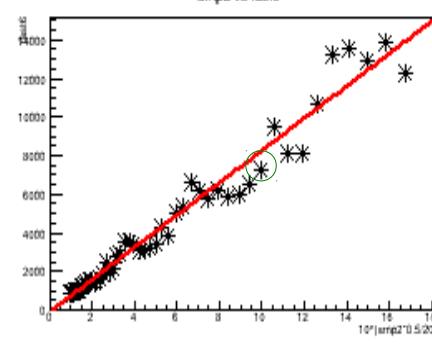
amp1 = 1

With 110Hz filter

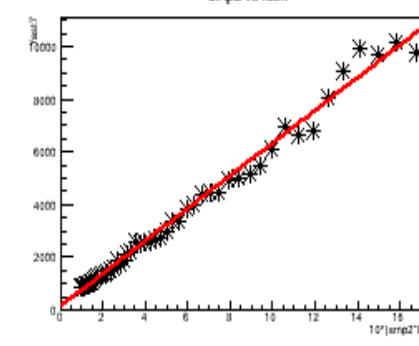
amp2 vs fast5



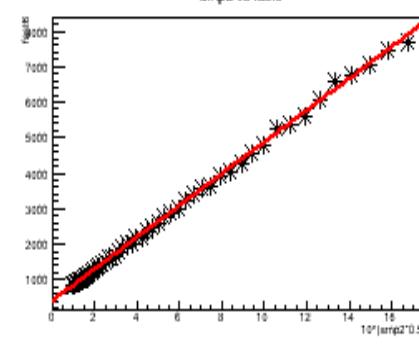
amp2 vs fast6



amp2 vs fast7

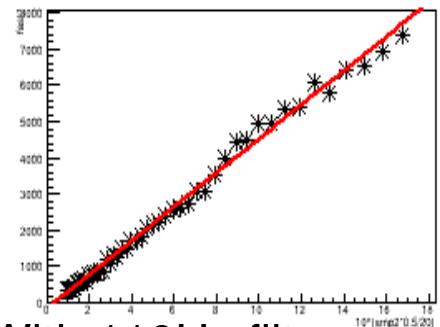


amp2 vs fast8

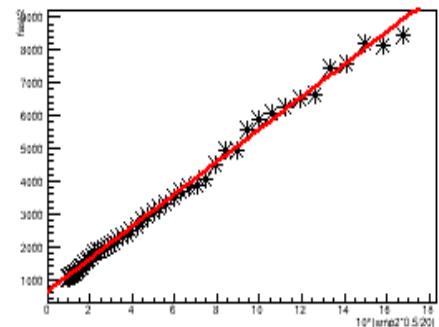


$$0.5*(g1+g2)$$

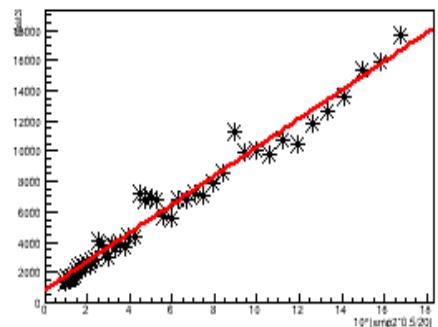
amp2 vs fast1



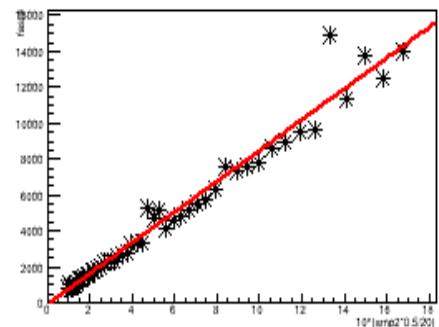
amp2 vs fast2



amp2 vs fast3

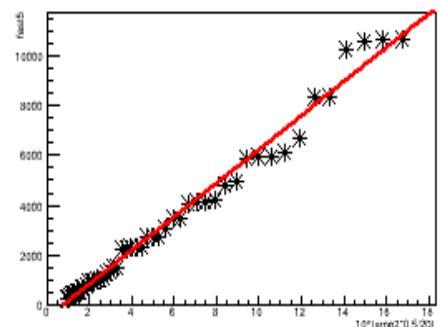


amp2 vs fast4

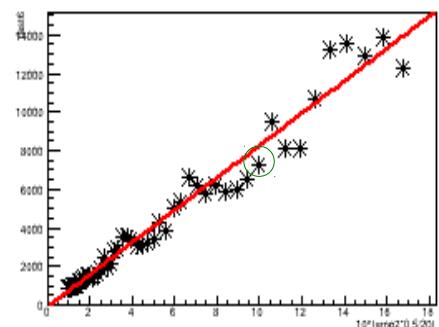


With 110Hz filter

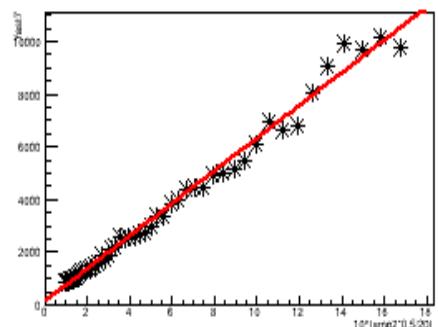
amp2 vs fast5



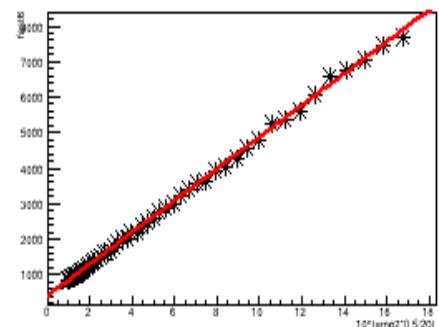
amp2 vs fast6



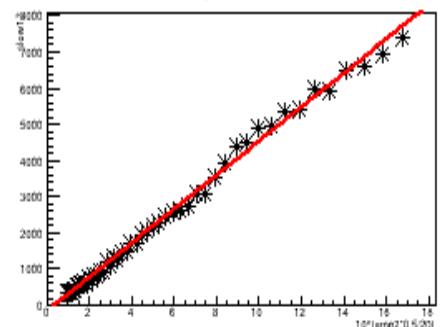
amp2 vs fast7



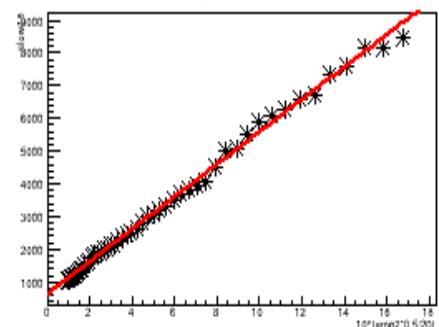
amp2 vs fast8



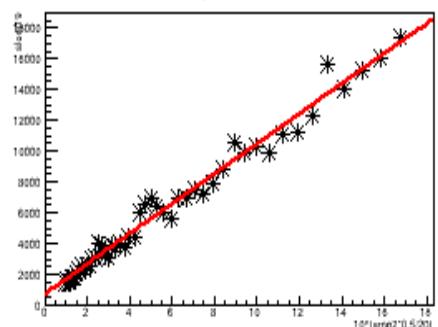
amp2 vs slow17



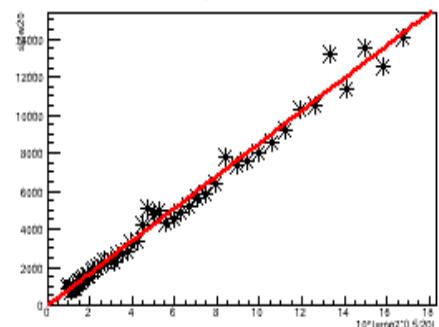
amp2 vs slow18



amp2 vs slow19

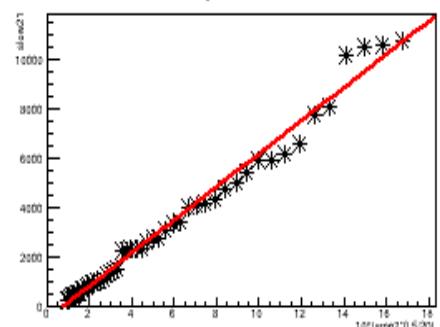


amp2 vs slow20

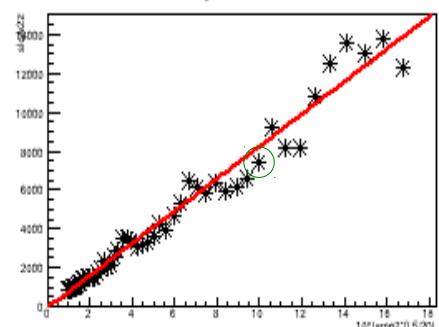


With 2Hz filter

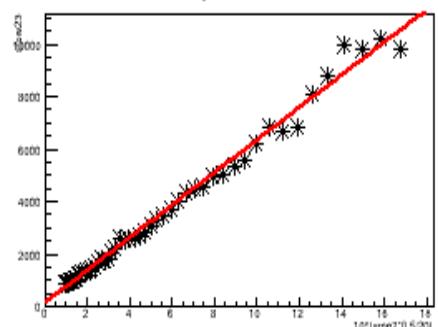
amp2 vs slow21



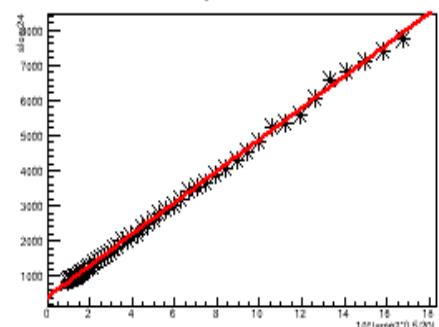
amp2 vs slow22

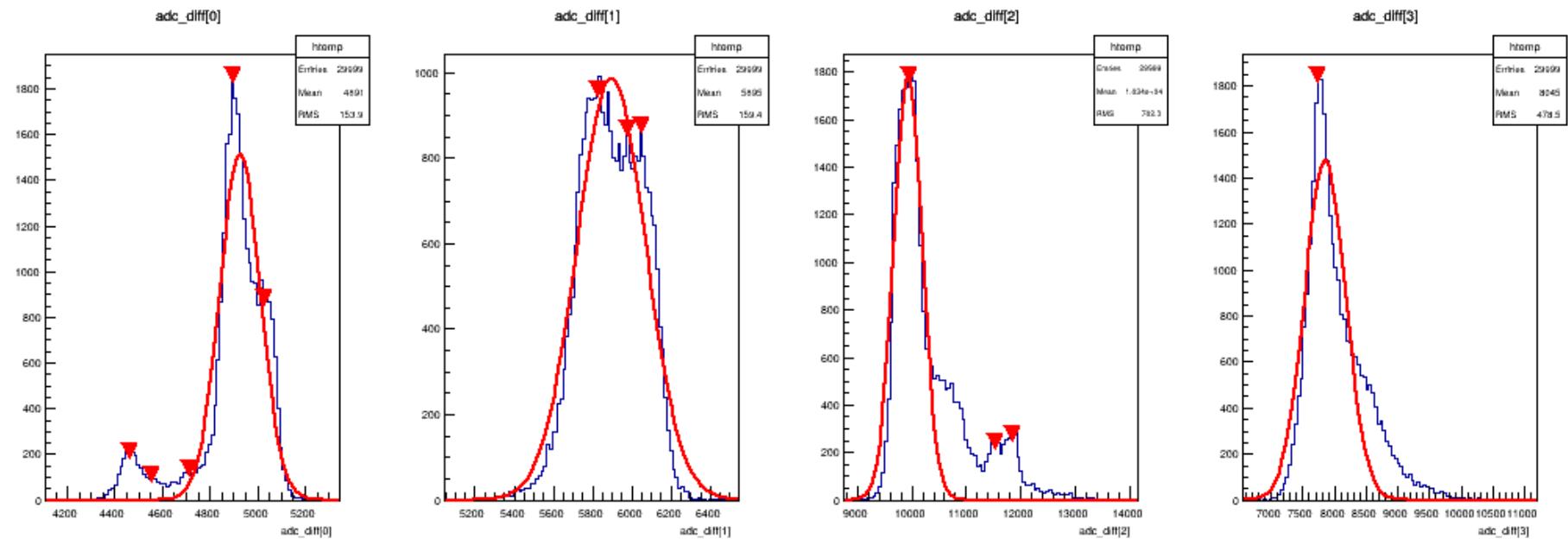


amp2 vs slow23

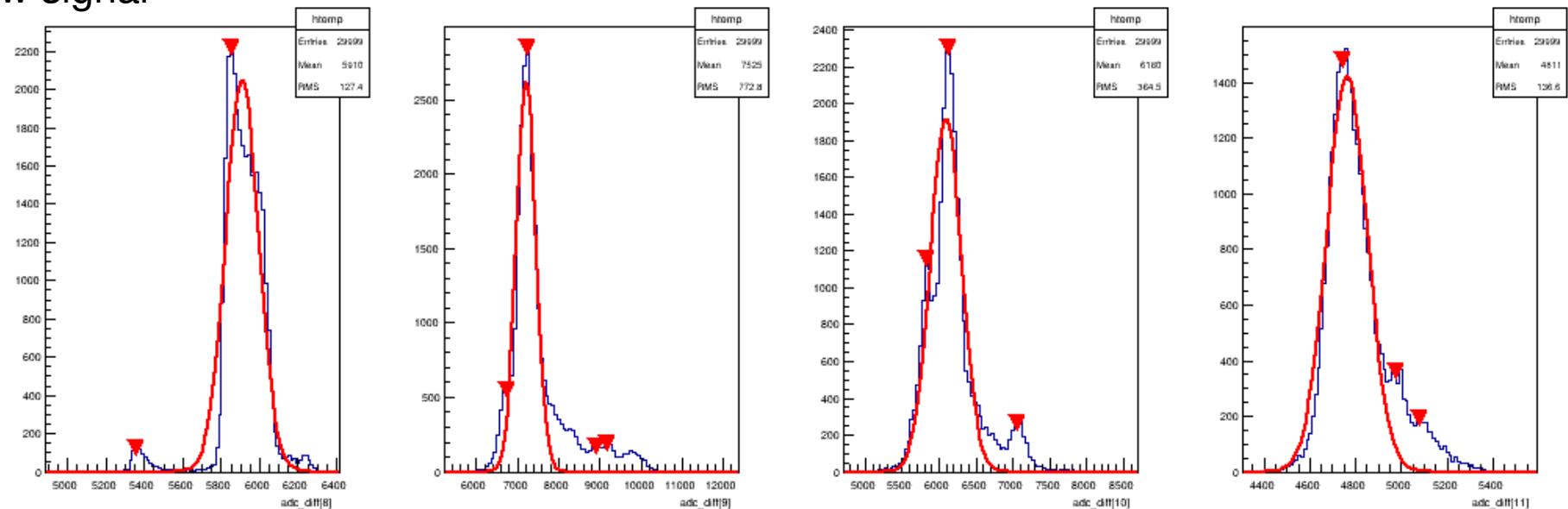


amp2 vs slow24

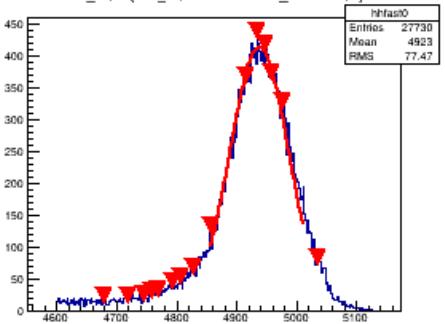




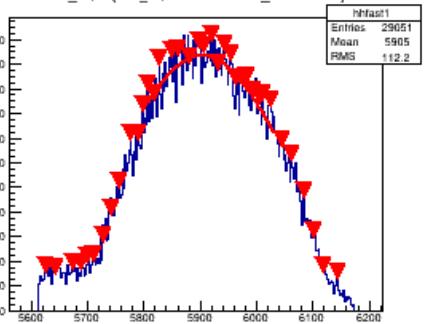
## Raw signal adc\_diff[8]



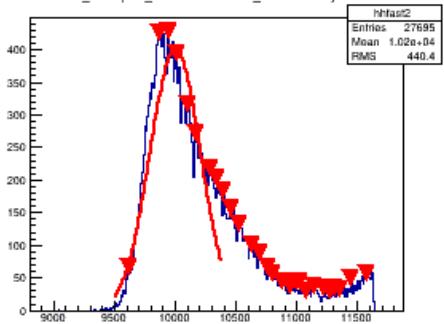
raw\_fast0 (raw\_fast0>4598&&raw\_fast0<5181)



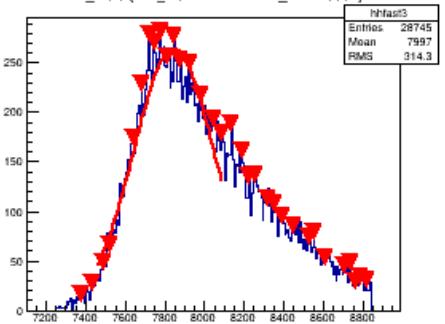
raw\_fast1 (raw\_fast1>5613&&raw\_fast1<6174)



raw\_fast2 (raw\_fast2>9044&&raw\_fast2<11629)

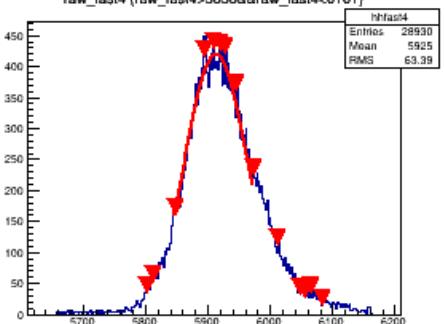


raw\_fast3 (raw\_fast3>7247&&raw\_fast3<8839)

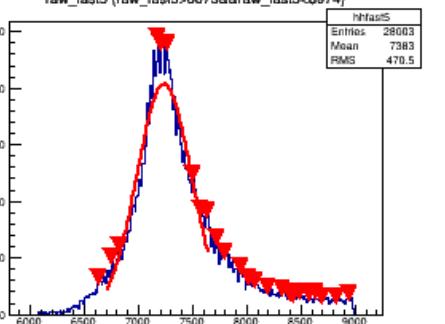


## 110Hz filter

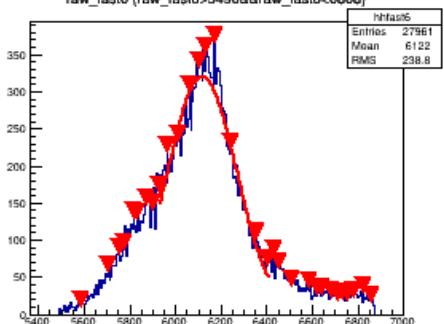
raw\_fast4 (raw\_fast4>5656&&raw\_fast4<6161)



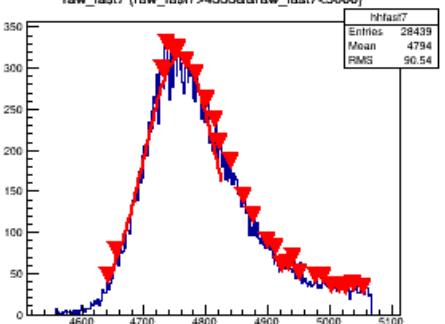
raw\_fast5 (raw\_fast5>6073&&raw\_fast5<8974)



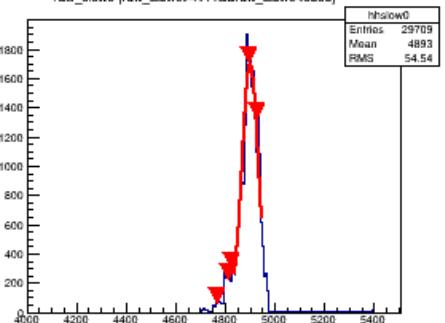
raw\_fast6 (raw\_fast6>5490&&raw\_fast6<6868)



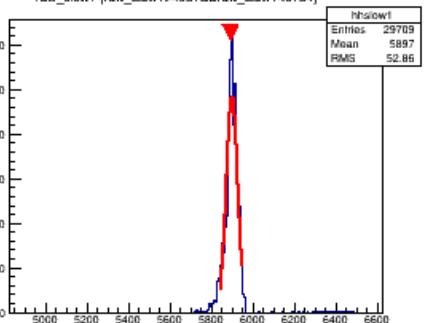
raw\_fast7 (raw\_fast7>4555&&raw\_fast7<5066)



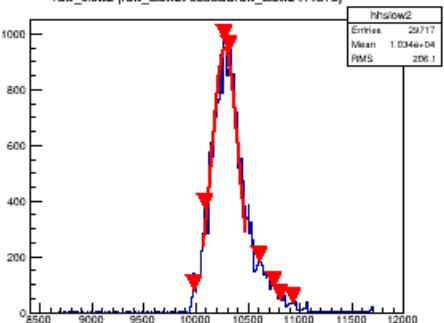
raw\_slow0 (raw\_slow0>4111&&raw\_slow0<5608)



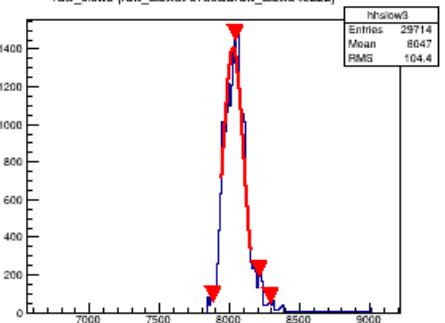
raw\_slow1 (raw\_slow1>4957&&raw\_slow1<6754)



raw\_slow2 (raw\_slow2>8655&&raw\_slow2<11879)

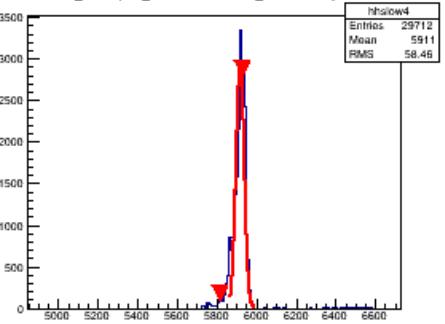


raw\_slow3 (raw\_slow3>8759&&raw\_slow3<9222)

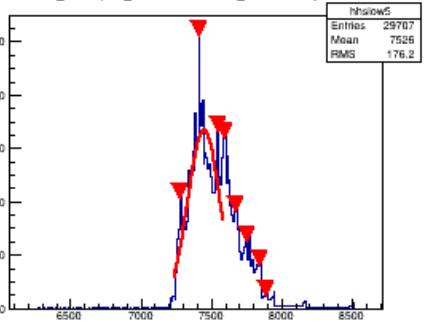


## 2Hz filter

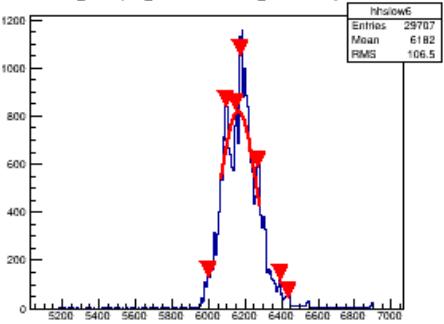
raw\_slow4 (raw\_slow4>4970&&raw\_slow4<8789)



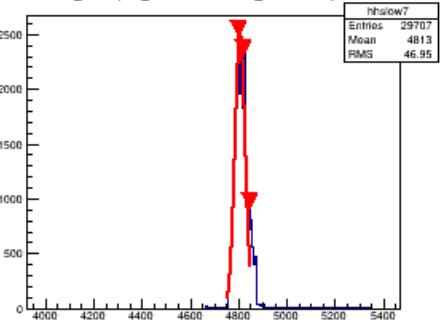
raw\_slow5 (raw\_slow5>6272&&raw\_slow5<8673)



raw\_slow6 (raw\_slow6>5174&&raw\_slow6<7102)



raw\_slow7 (raw\_slow7>4039&&raw\_slow7<5518)



bpm job remain

Mix raster related code back to beampackage

**Find a method to let current effect minimum**

Carefully calibrate bpm for all periods

Calibrate fast raster and slow raster

Technote & wikipage