

Study of Crosstalk at CalDet

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Fermilab Collaboration Meeting Dec 2002



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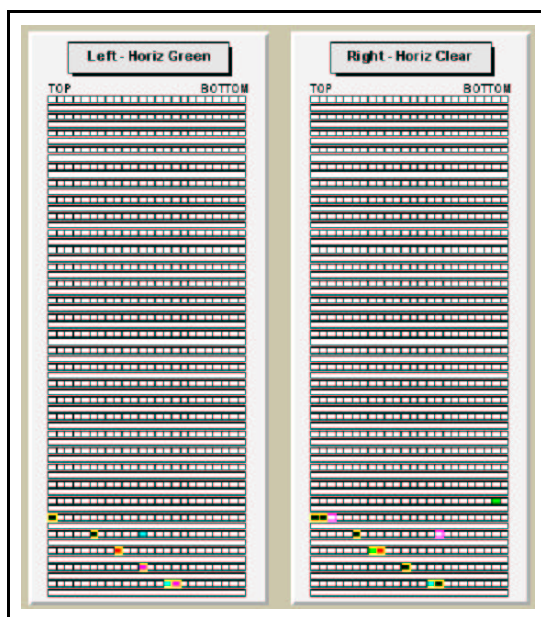
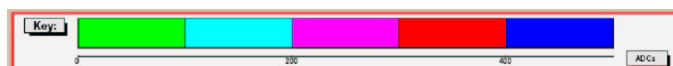


Overview

- **Why we need to remove crosstalk:** Crosstalk messes up our track finder.
- **Is it crosstalk or not?:** Sometimes it's difficult to determine for certain whether a hit is crosstalk or not.
- **Crosstalk hits from each pixel:** Plots made to compare each pixel
- **Light Output Change:** Average ADC decreases
- **Crosstalk ADC vs Hit ADC:** Correlations of Optical and Electrical Crosstalk
- **Quantity of Crosstalk:** About 1 crosstalk hit per 6 real hits
- **Next...**

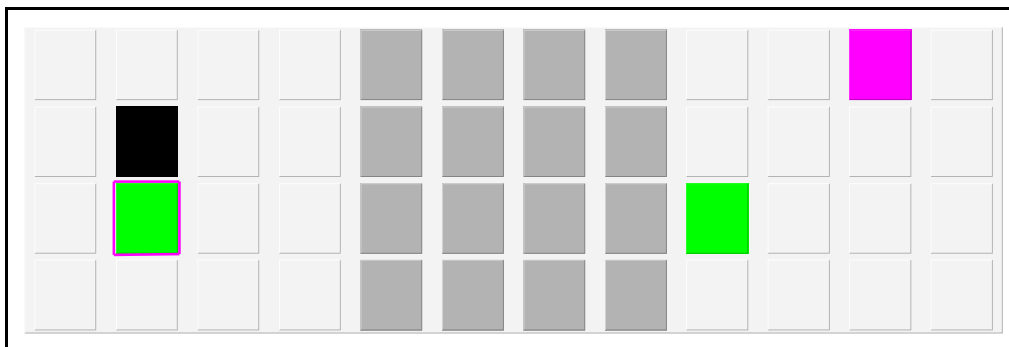
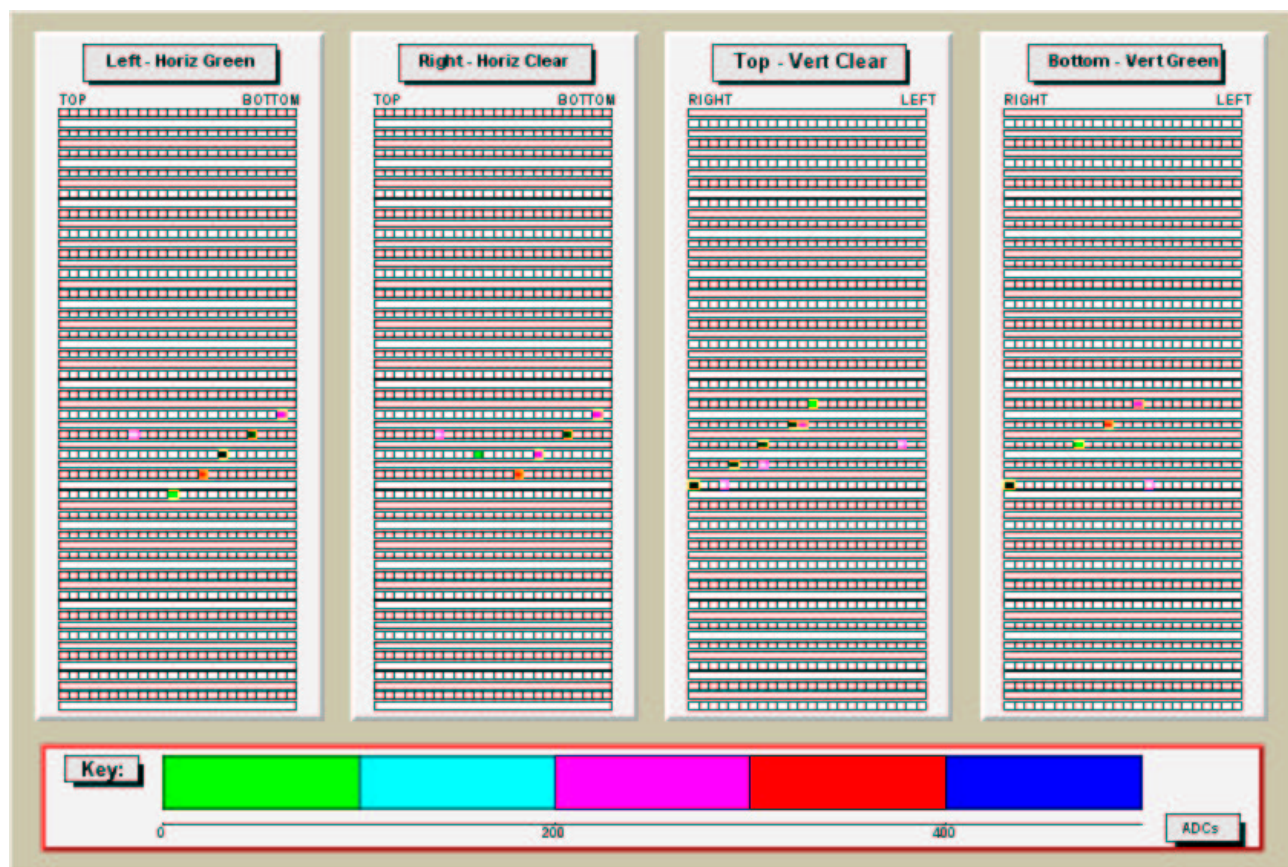


Why we need to remove crosstalk





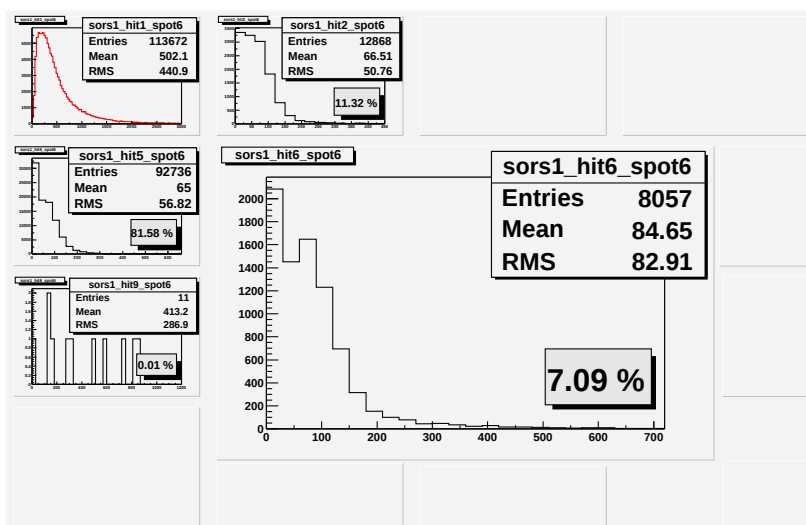
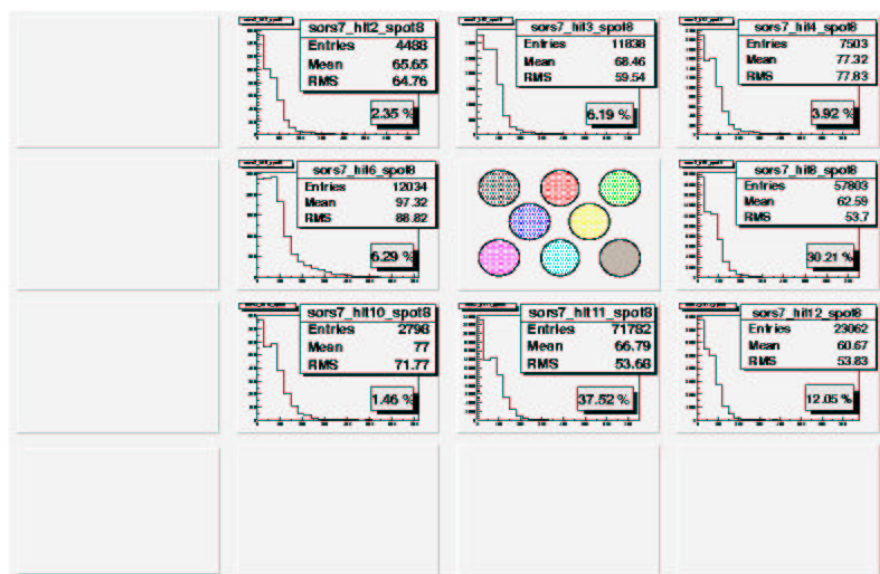
Is it crosstalk or not?



- Possible causes: Neutrons, Noise, Crosstalk to non-adjacent pixels(!)



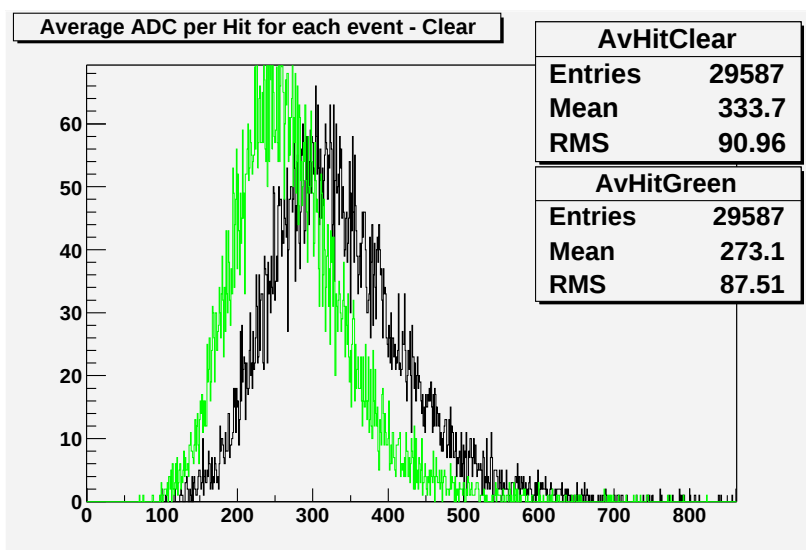
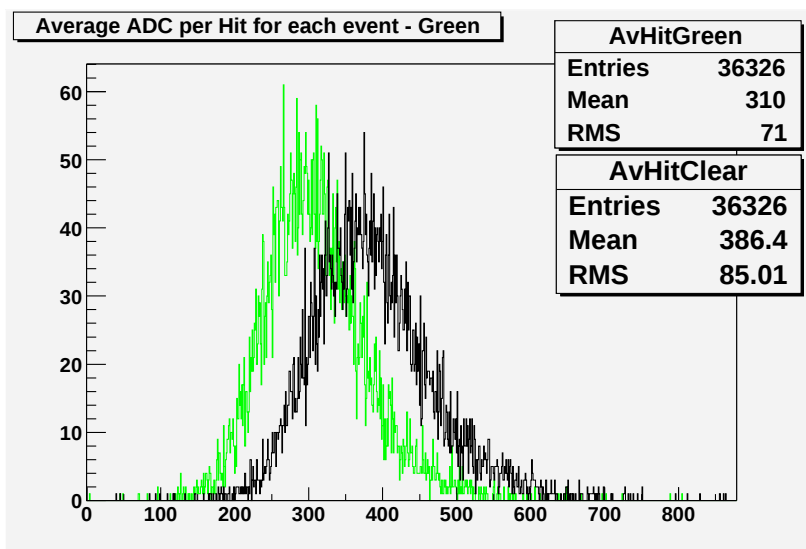
Crosstalkhits from each pixel (ACD's)



- Much more crosstalk in adjacent pixels than diagonal ones
- 1 photoelectron peak from optical crosstalk is visible



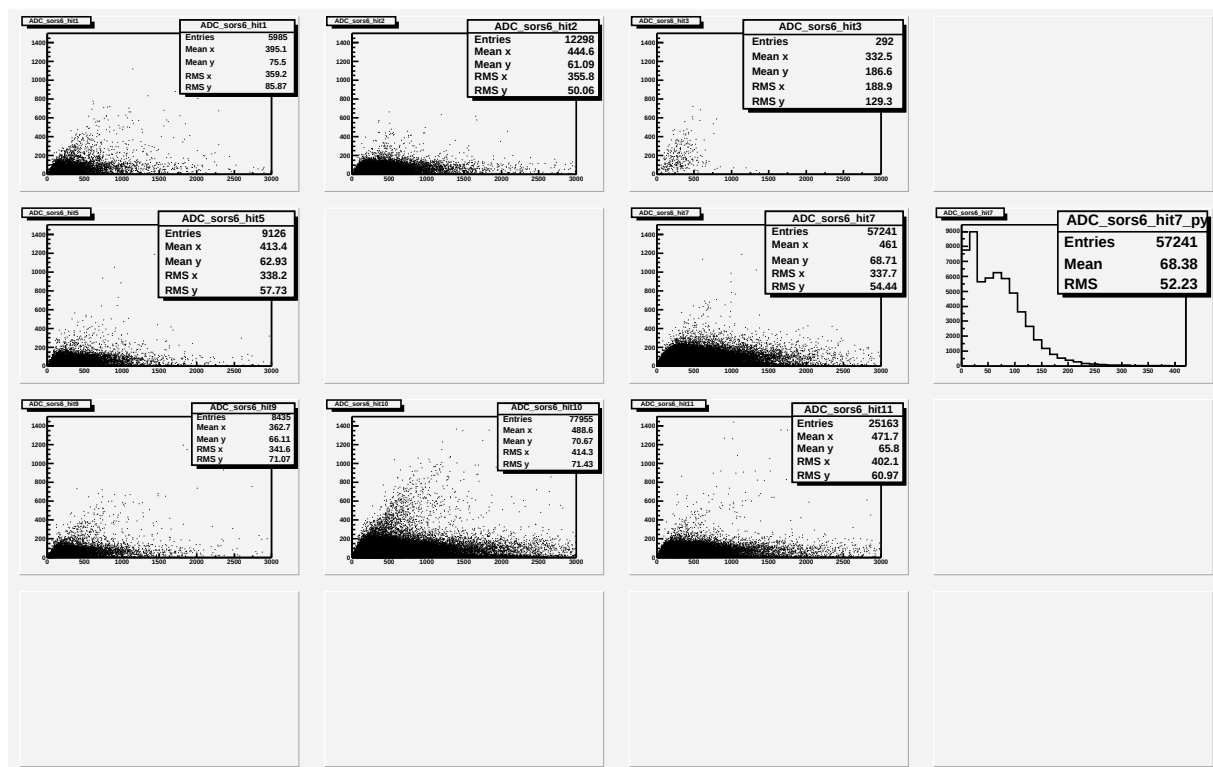
Light Output change



- Clear: 363.3 $\rightarrow$ 335.5 (10% decrease)
- Green: 310.1 $\rightarrow$ 273.1 (12% decrease)



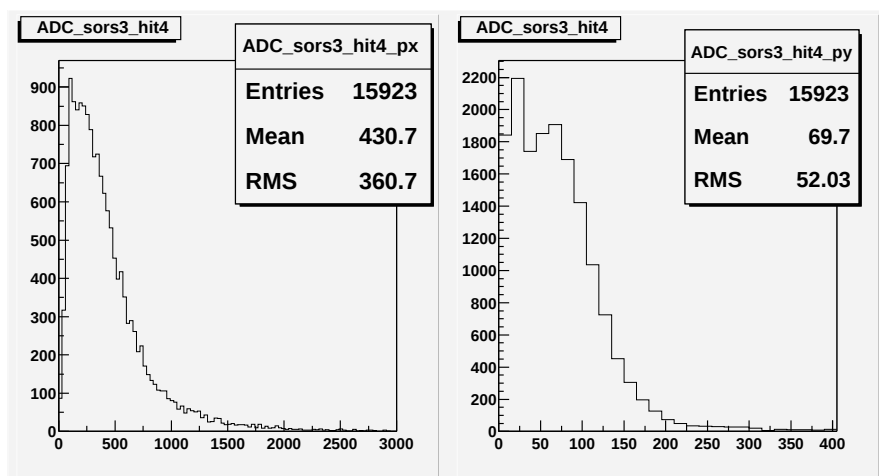
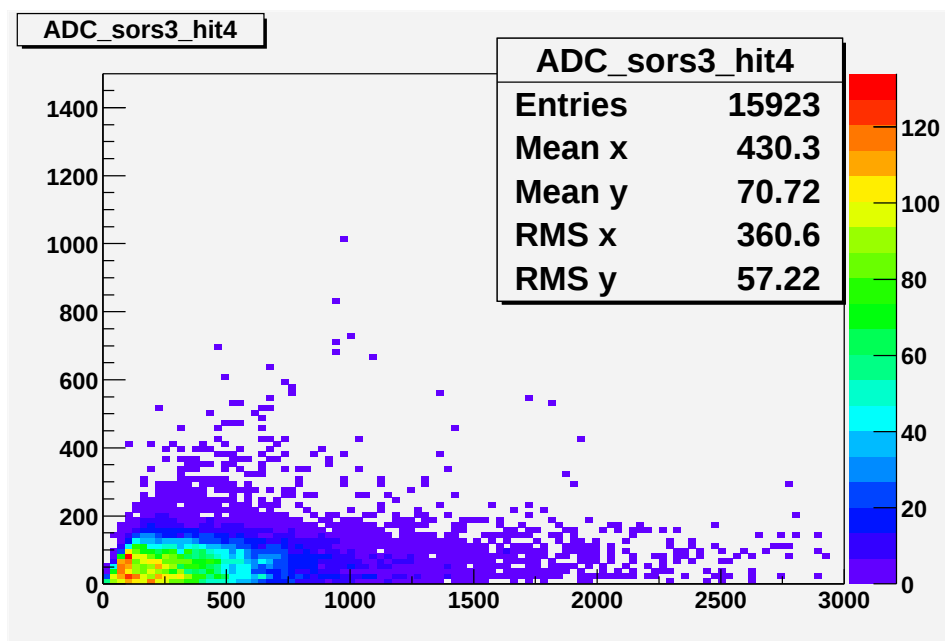
Crosstalk ADC vs Hit ADC



- Hits below 60 ADCs are Electrical Crosstalk
- No strong correlation between Hit ADC and Electrical Crosstalk ADC
- Some correlation of Optical and Hit ADC



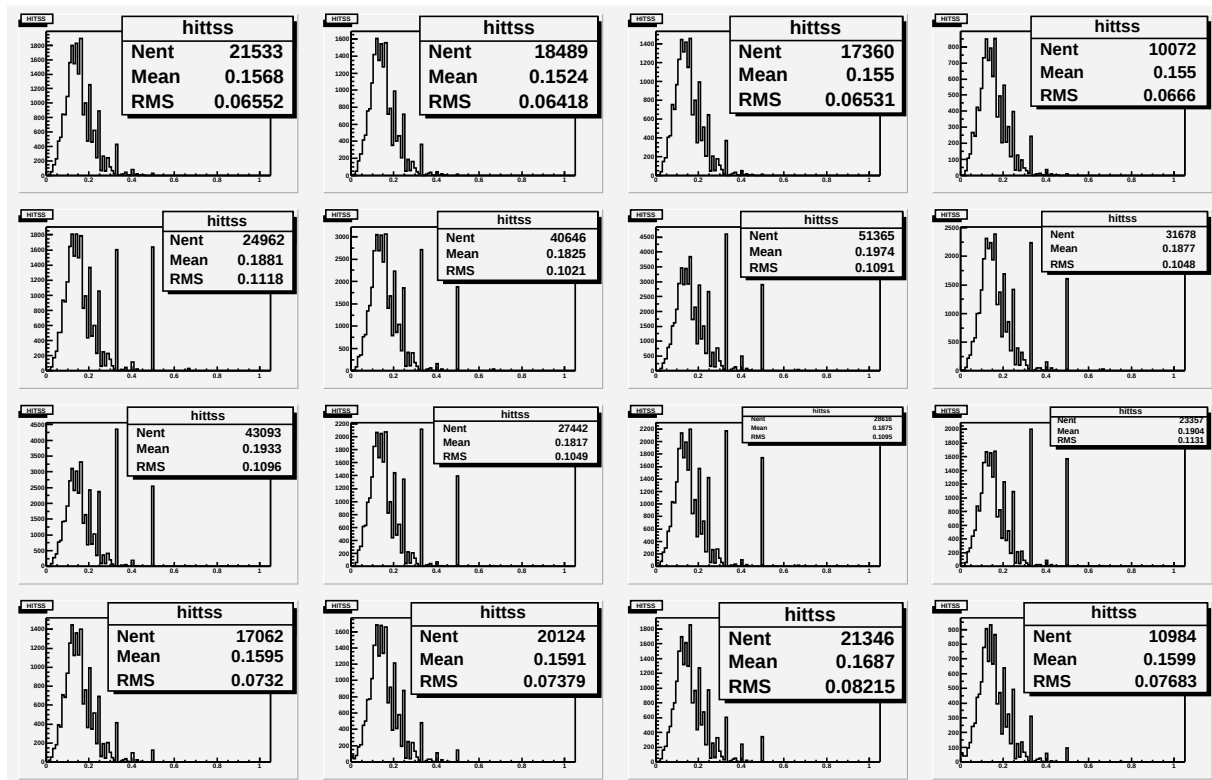
Crosstalk ADC vs Hit ADC



- Number weighted Crosstalk vs Hit ADC
- X and Y Projections - Can see 1 P.E. peak



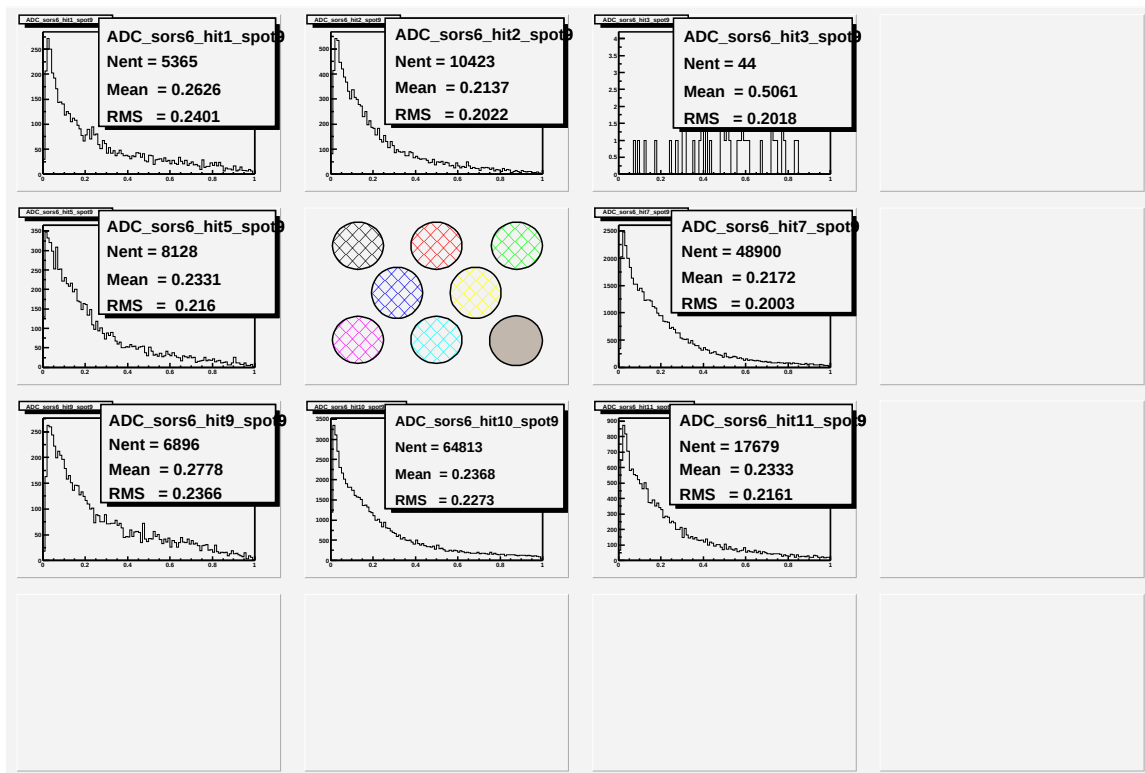
Quantity of Crosstalk



- Number of crosstalk hits compared to real hits
- Peaks at 0.25, 0.5
- Average is around 1 crosstalk hit per 6 real hits



Next...



- Check algorithm against Crosstalking Monte Carlo
- Look more closely at $\text{ADC}(\text{crosstalk})/\text{ADC}(\text{source})$
- Add option to 'fold' crosstalk back to original hit
- Use plots to select cut-off point for crosstalk
- Look to see how muon dE/dx changes as a result of crosstalk