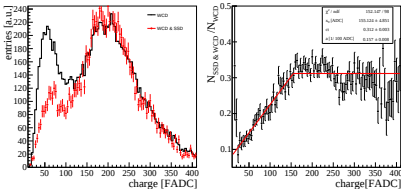


Using SSDs for the WCD calibration?

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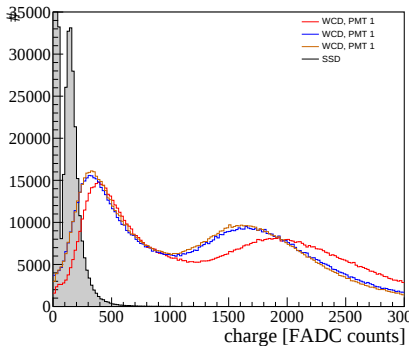
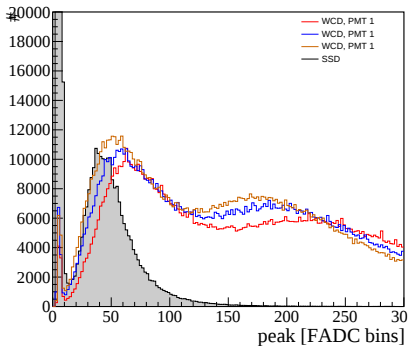
September 9, 2020



- Previous studies on simulation of the calibration histograms
- This talk: data and a proposal

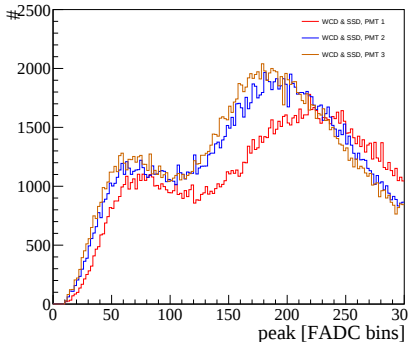
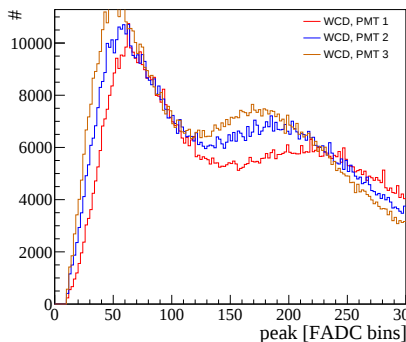
Input

- Data taken on station Trak (20) by Ricardo (very fast response)
- Individual values are available, not just the histograms
- More than 1,000,000 entries (including some noise)



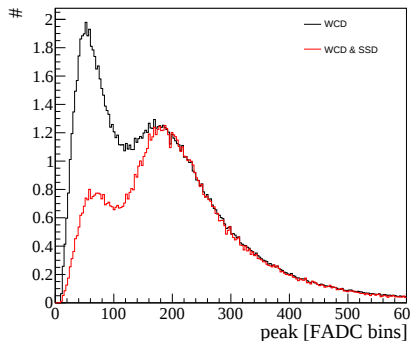
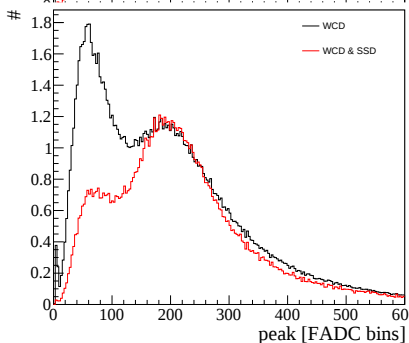
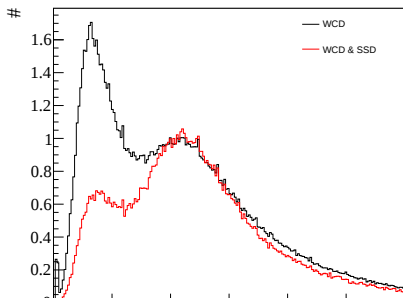
simple noise reduction: peak > 10

Output coincidences between the SSD and WCD



simple coincidence: $\text{peak}_{\text{SSD}} > 10$ and $\text{peak}_{\text{WCD}} > 10$

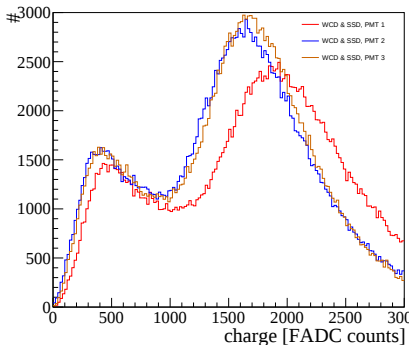
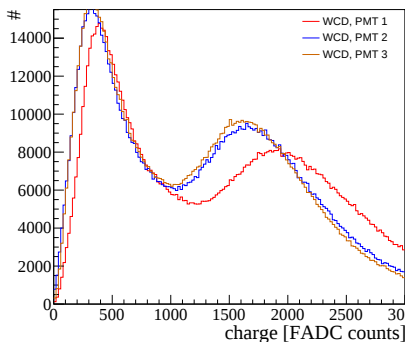
Output coincidences between the SSD and WCD



simple coincidence: $\text{peak}_{SSD} > 10$
and $\text{peak}_{WCD} > 10$

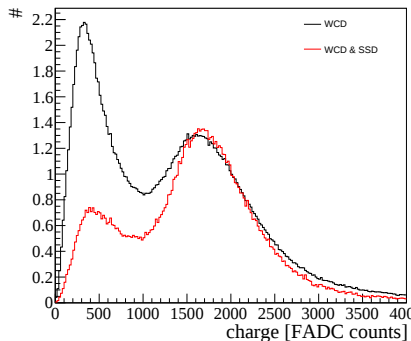
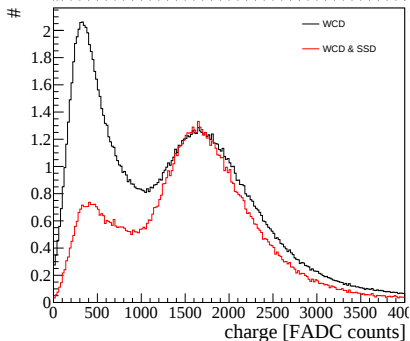
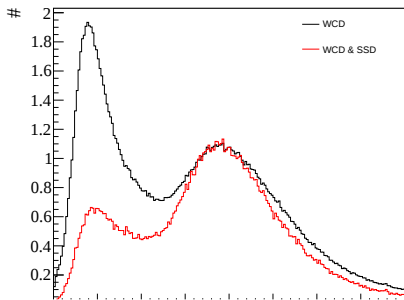
Requiring a coincidence we can
reconstruct the peak!

Output coincidences between the SSD and WCD



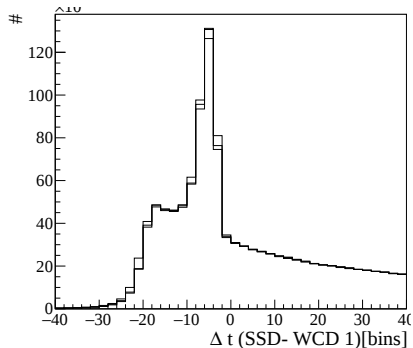
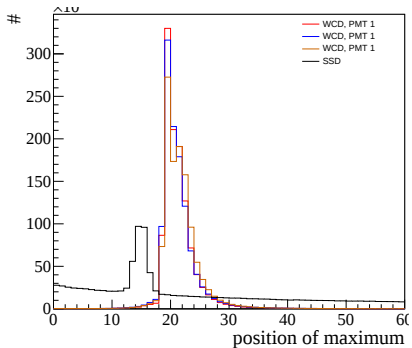
simple coincidence: $\text{peak}_{SSD} > 10$ and $\text{peak}_{WCD} > 10$

Output coincidences between the SSD and WCD



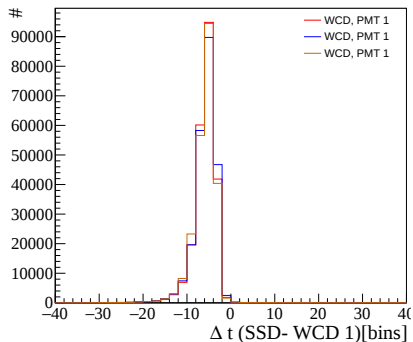
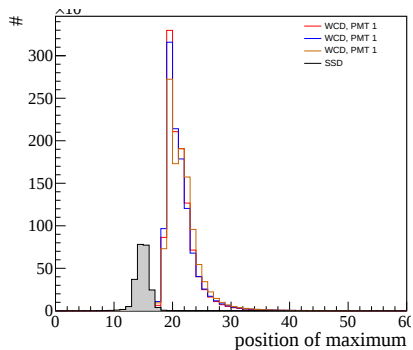
Requiring a coincidence the peak to valley ratio increases significantly!

No time coincidence required



simple condition: peak > 10 , average time difference 5.6 bins

No time coincidence required



simple condition: peak > 10 , average time difference 5.6 bins

Conclusions

- The muonic contribution in the calibration histograms for both the peak and charge are enhanced by using a coincidence with the SSD
- A very simple condition that the peak value in the SSD should be larger than 10 FADC counts suffices
- For the long term the decrease of the hump to valley ratio can be alleviated by this coincidence
- The coincidence is enabling a clear reconstruction of the peak and not just the integrated signal
- The more detailed information that the coincidence histograms carry is not fully investigated

Proposal for now: Implement the coincidence condition in more stations to be able to test on a larger sample

Proposal after tests: Store both the coincidence and standard histograms for future events