

TDC Alignment for Pair Spectrometer

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Outline:

1. The procedure of TDC alignment for pair spectrometer.
2. Show alignment results for one Pi^0 production run(#64704)
3. Conclusion and Work for the next step

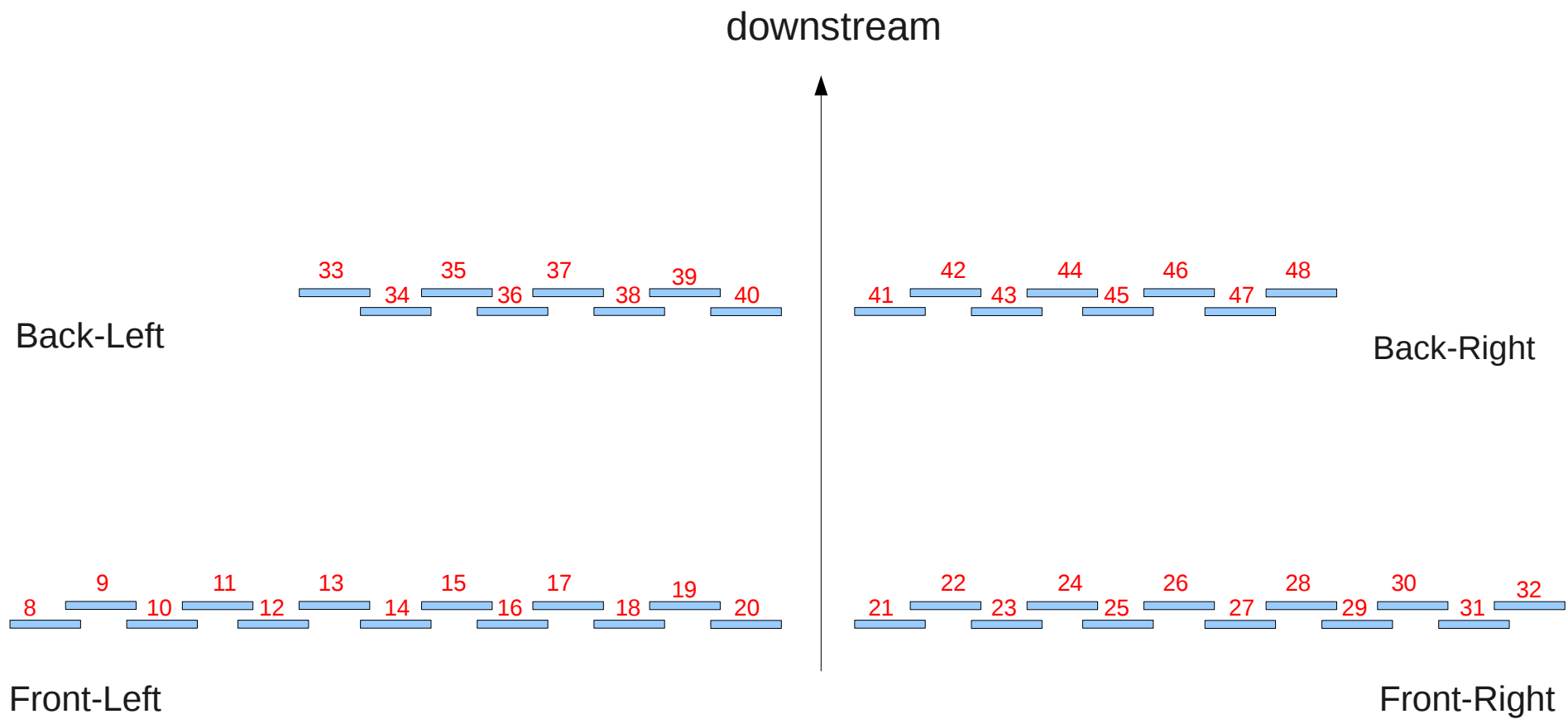


Figure 1: Layout of the pair spectrometer.

Note: The numbers in the figure are detector's physical id. For pair spectrometer, the id is from 8. For the front part, the id #8 to #12 and #29 to #32 don't have the back counters to correspond.

- The procedure of TDC alignment:

Step 1: For each arm, align TDC between two adjacent counters for each row.

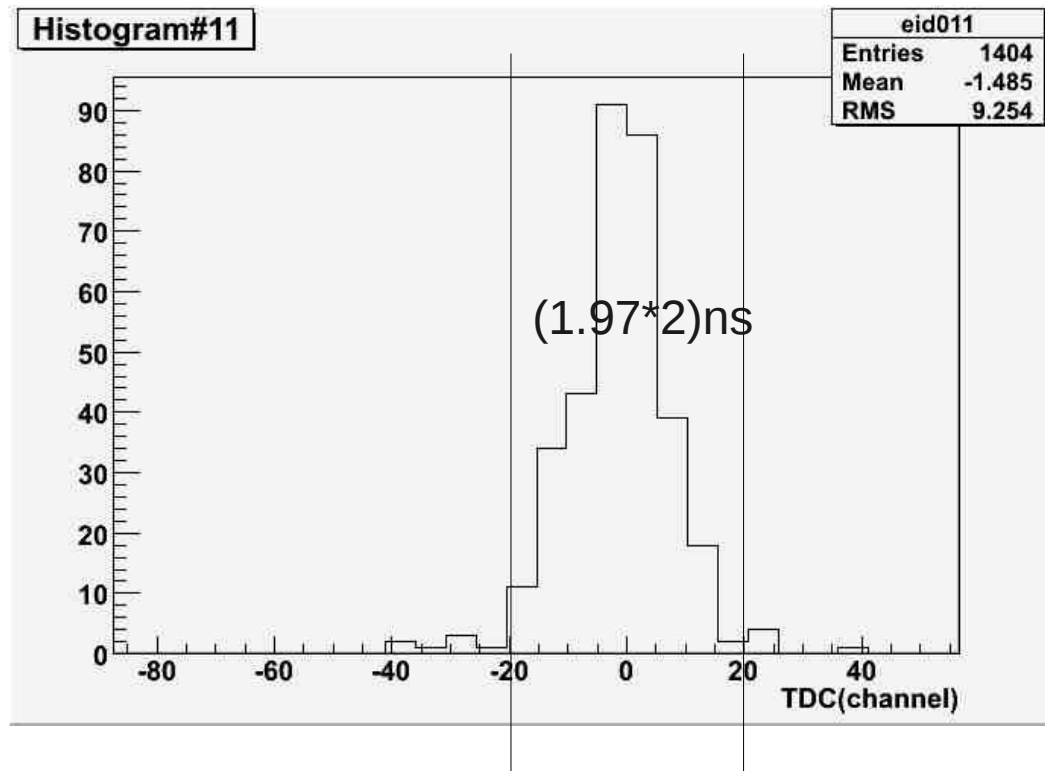
Step 2: For each arm, align TDC between front and back rows by combining 8 counters of each row together.

Step 3: TDC alignment between two arms

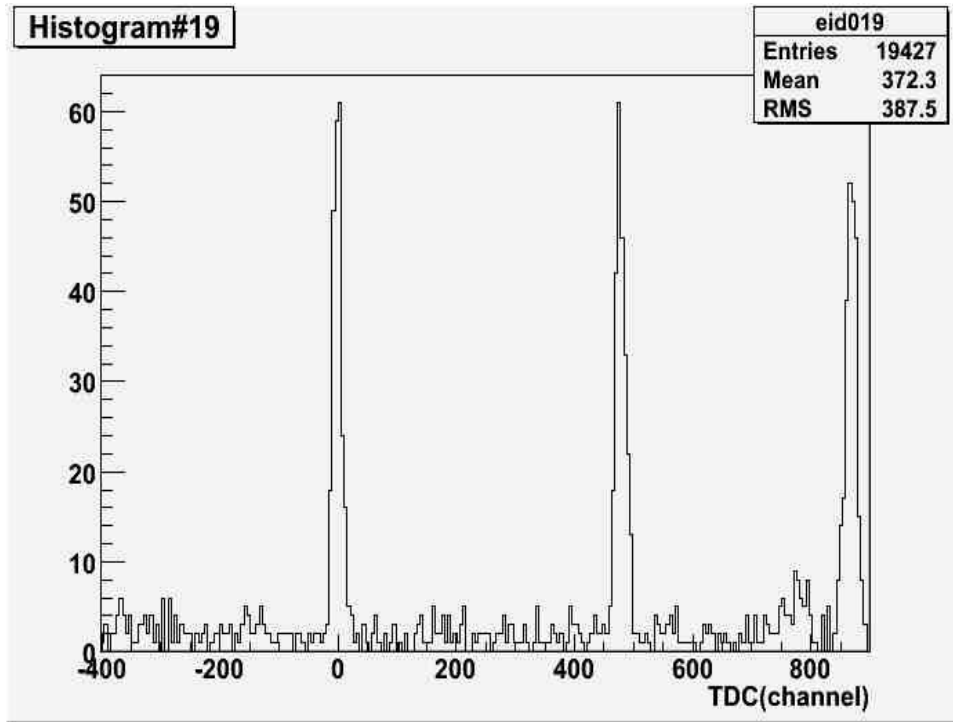
Note: For PS tdc alignment, I only use the PS trigger(no HyCal and LMS trigger) to analyze data.

- Alignment results for one production run (#64704)
 1. Alignment for two overlapping counters:

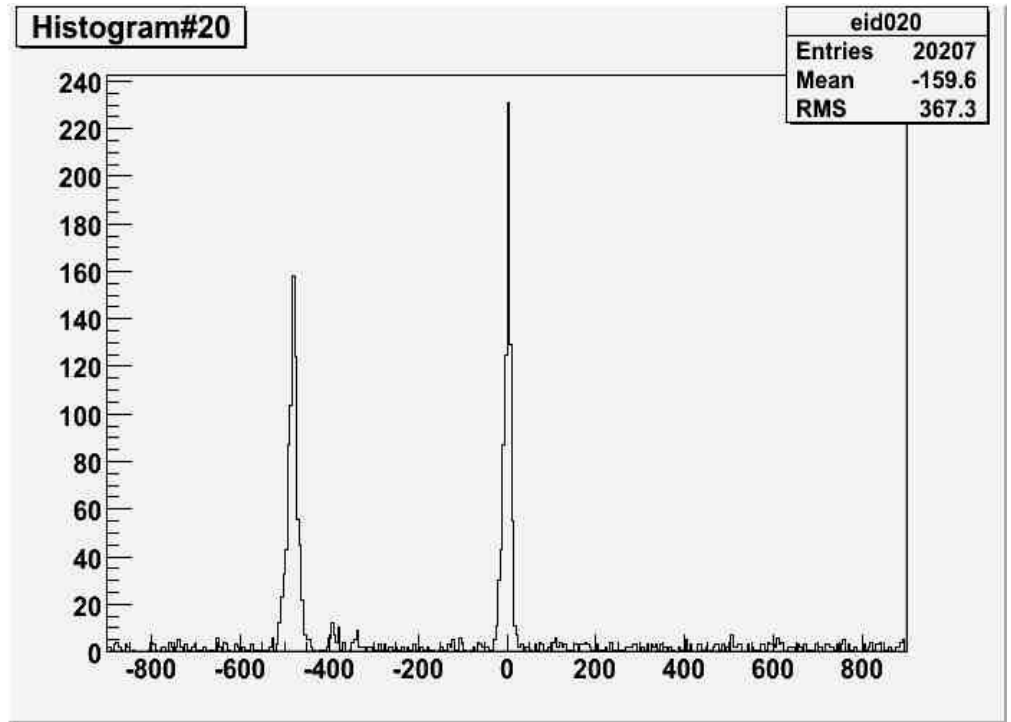
Time difference between PS id#10 and id#11



Time difference between PS id#18 and id#19

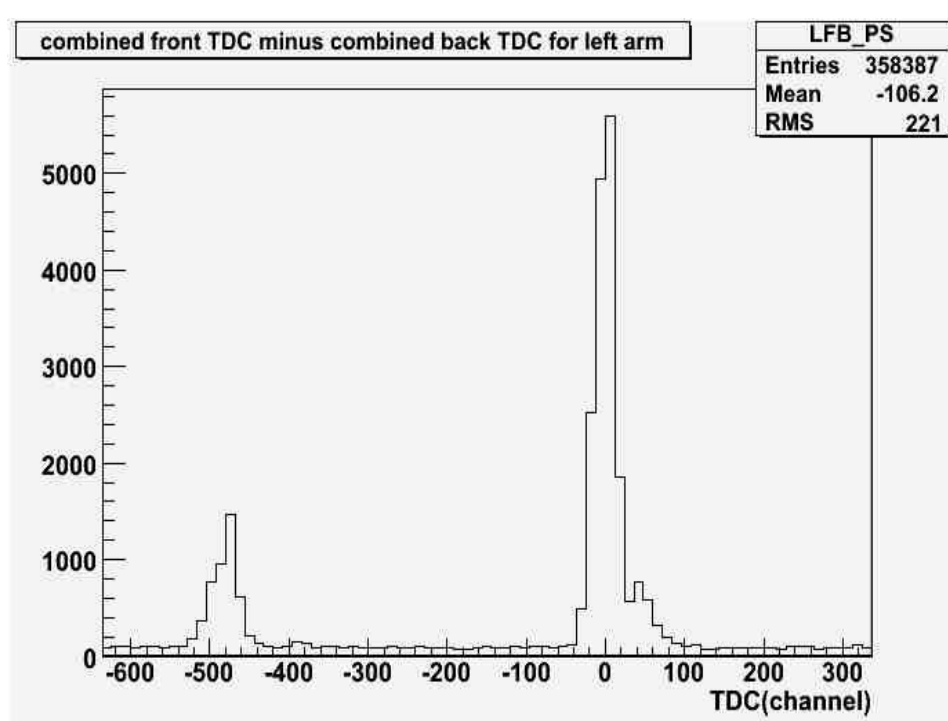


Time difference between PS id#19 and id#20

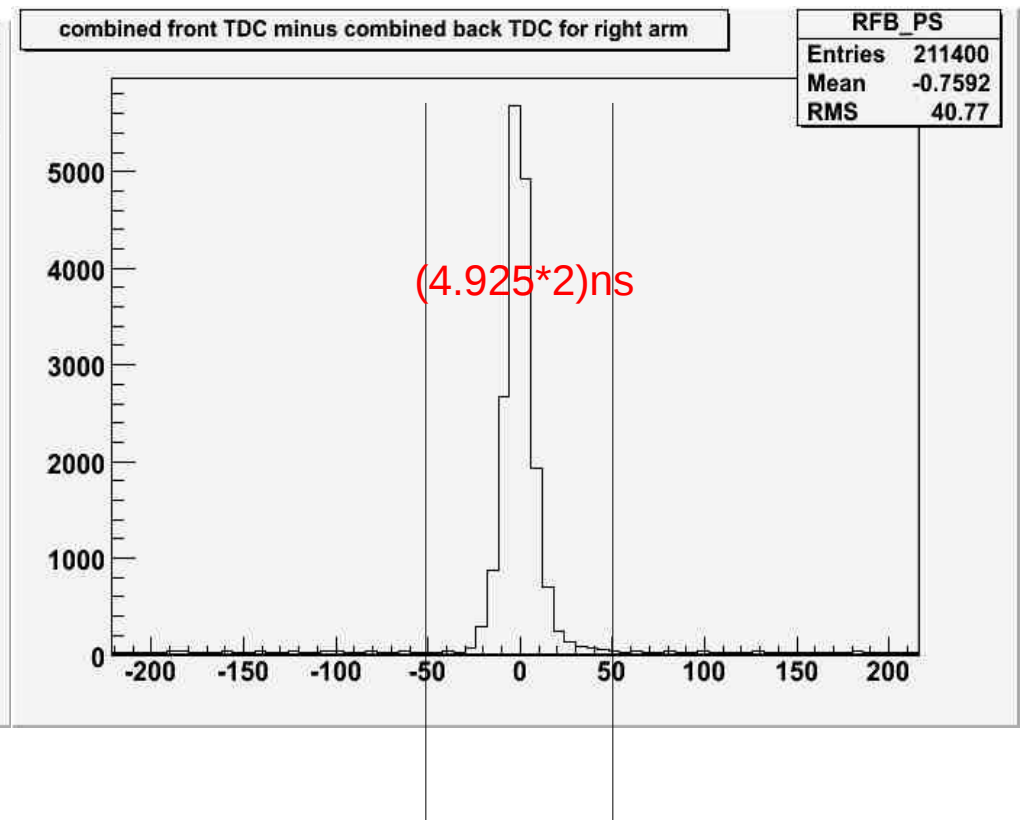


2) Alignment between Front counters and Back counters for each arm

Time difference between Front and Back counters for left arm

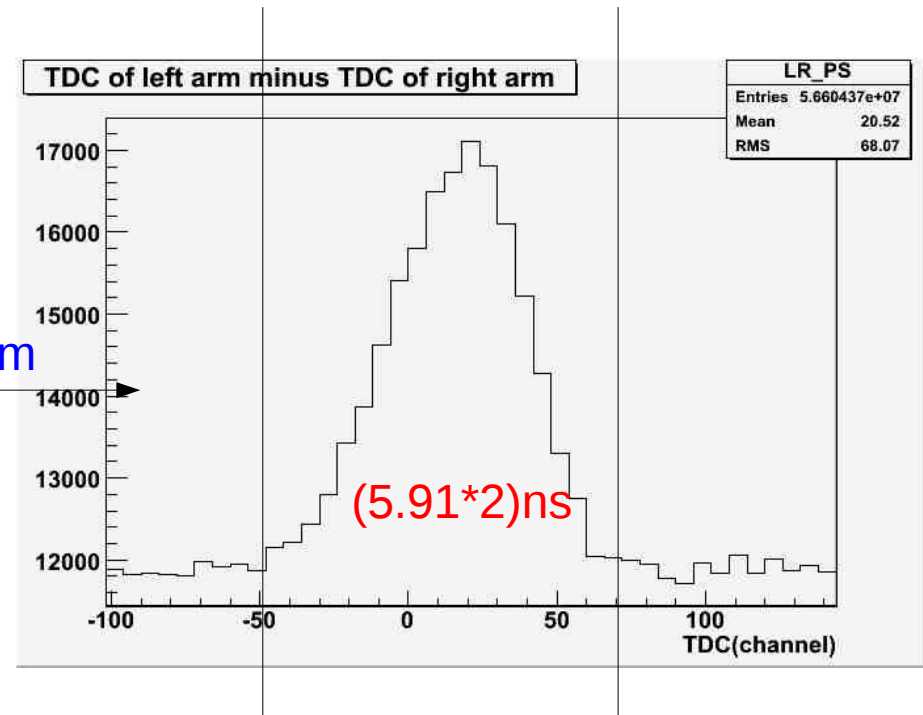
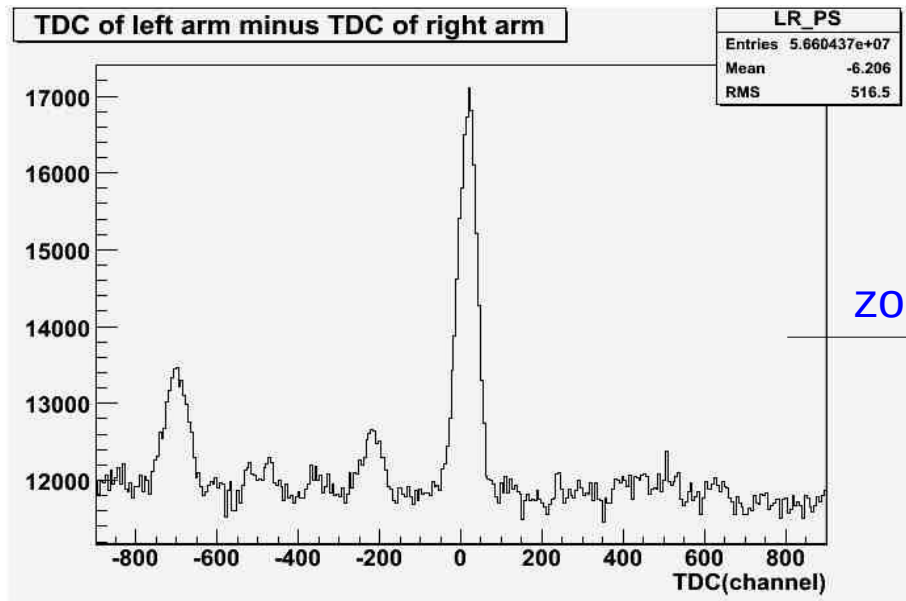


Time difference between Front and Back counters for right arm



3) Alignment between two arms

Time difference between right and left arm



- Note:1) The small peaks on the left side of coincidence signal are caused by counter id#19
2) The resolution of coincidence is bad

- *Conclusion*

- 1) There are more than one peak for time difference between id#18 and #19, and between id#19 and #20.
- 2) Time resolution of coincidence signal between two arms is bad

- *Next step:*

- 1) Figure out which peak is right for alignment between id#18 and id#19, alignment between id#19 and id#20
- 2) Figure out why the time resolution is bad for alignment between two arm.
- 3) Getting relative tagging ratio for one production run which is closed TAC run
- 4) Create alignment offset tables for pair spectrometer