



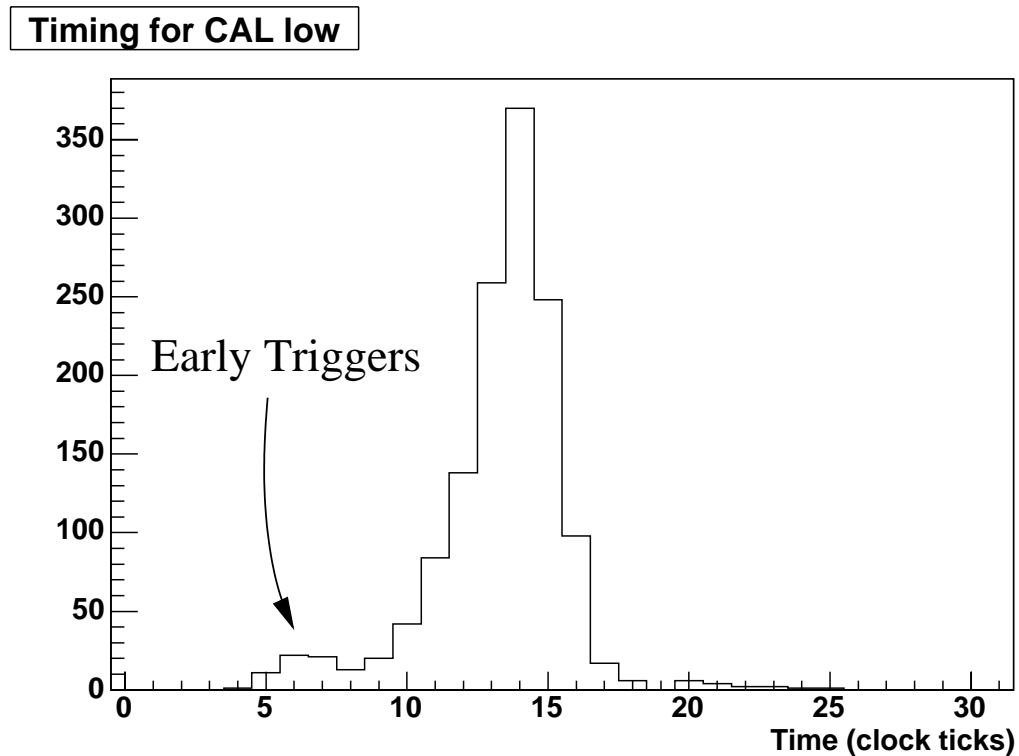
Early Calorimeter Triggers

6 July 2005

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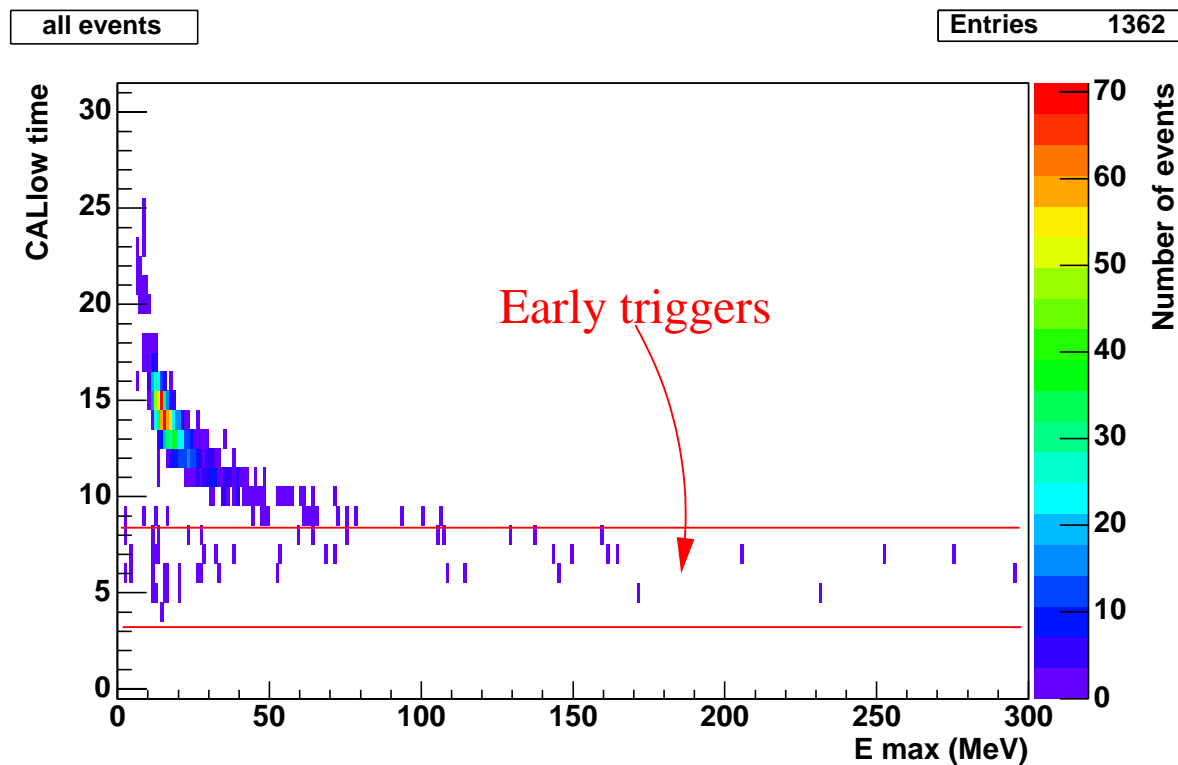
Introduction

- Calorimeters timing plots show a population of early triggers.
- These early triggers widen the timing range of the CAL considerably.



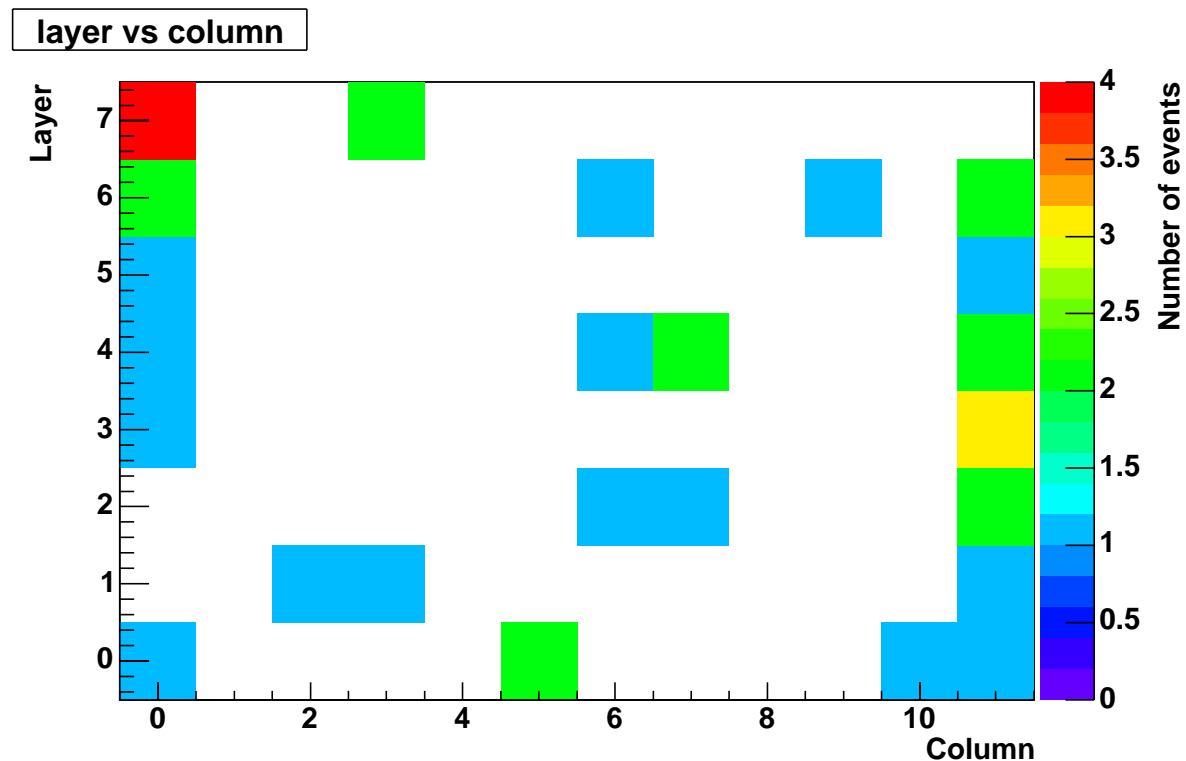
Introduction

- As shown by Su Dong at the last meeting, the maximum crystal energy measured in early events spans the entire energy range.
- For high energy crystals it is unclear if they extend the regular distribution or if they are early triggers \Rightarrow Focus on low energy events below 50 MeV.



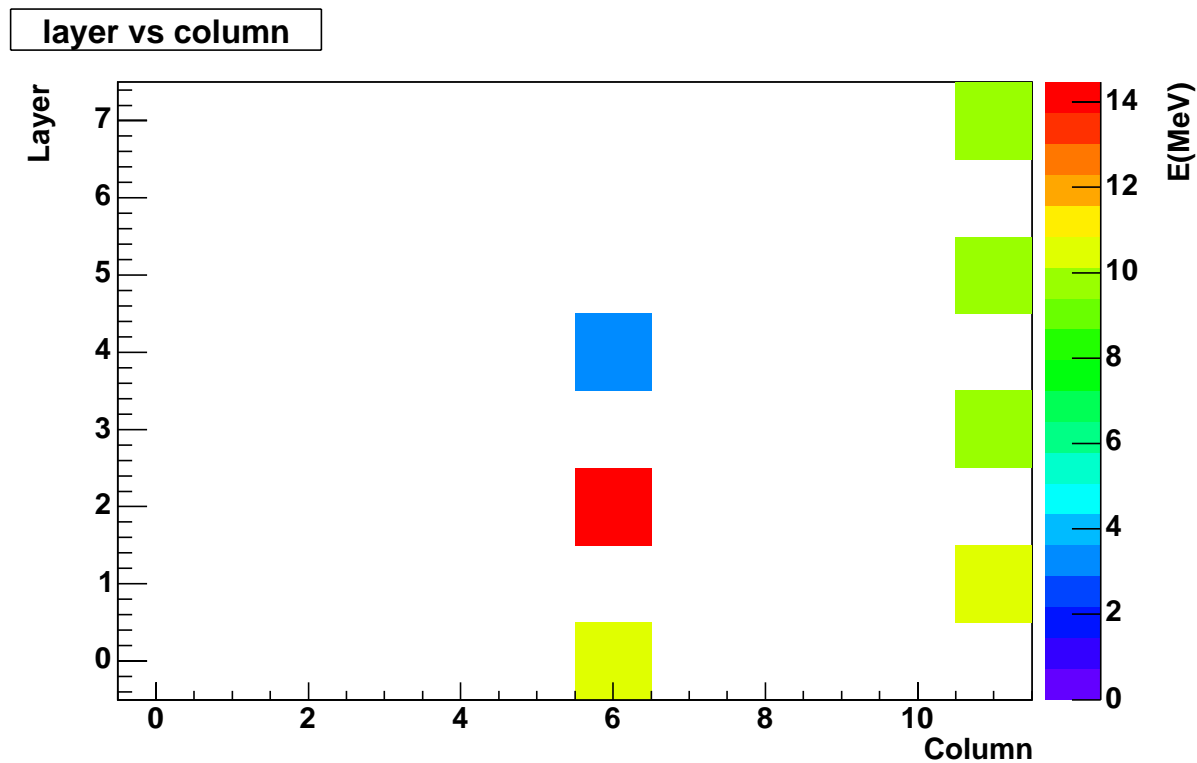
Maximum Crystal Position

- Map of maximum energy crystals for all events below 50 MeV and a conditions arrival time below 9
- Crystals at the end of each layer are clearly favored
- The effect is the same on all calorimeters in the grid



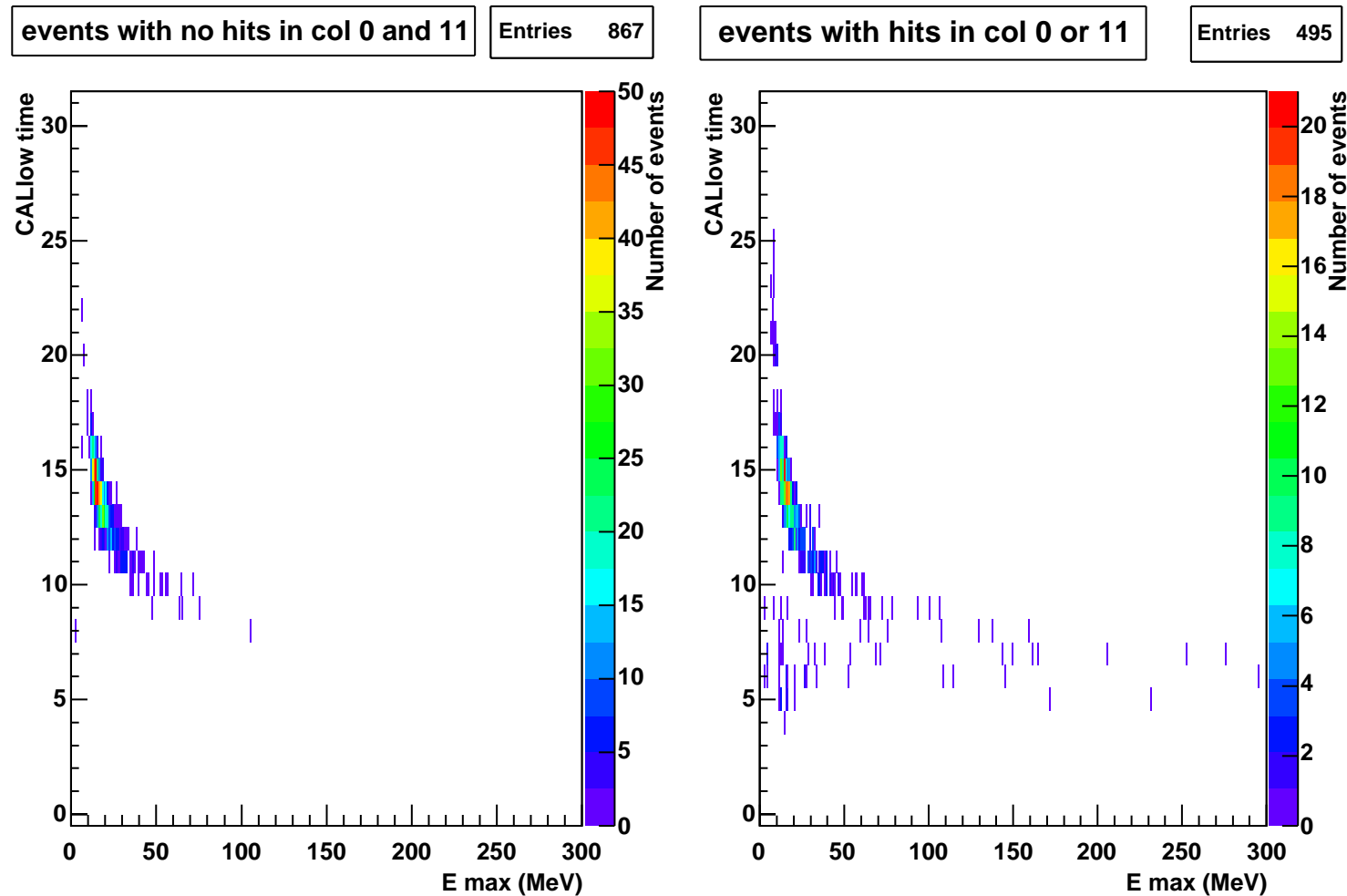
Typical Early Event

- Typically, these events have proper tracks going through the CAL
- The tracks include crystals in column 0 or 11
- In the plot, rows alternate between x and y layers



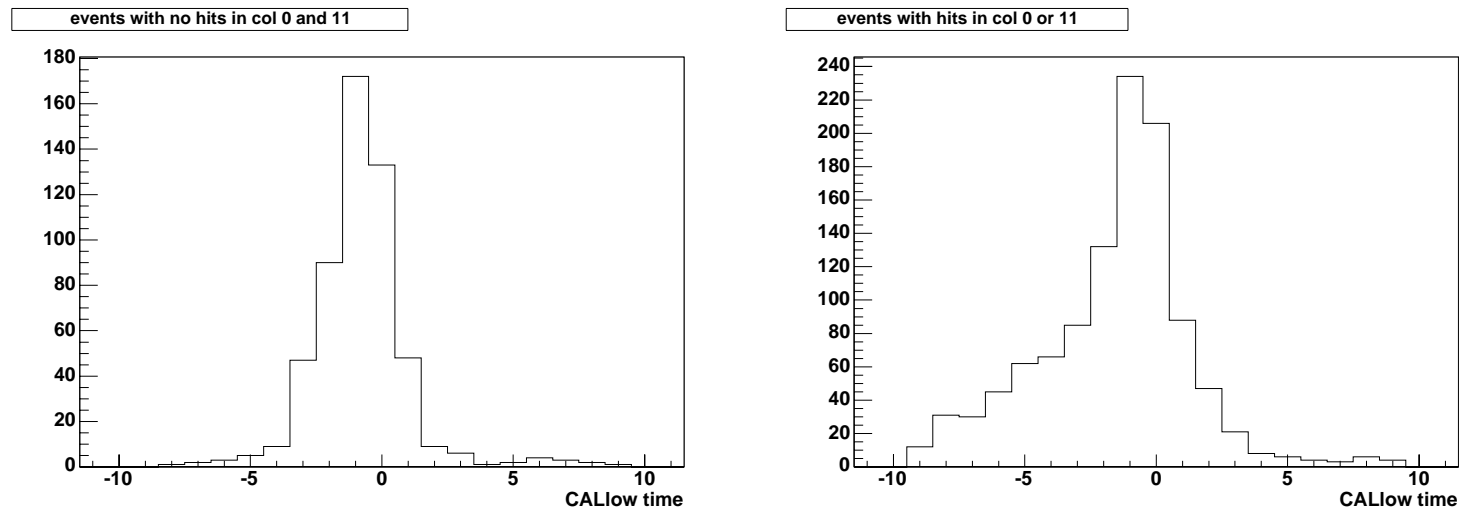
Position cut

- Separate events with hits in column 0 and 11
- Redo max crystal energy vs. time plot for both cases



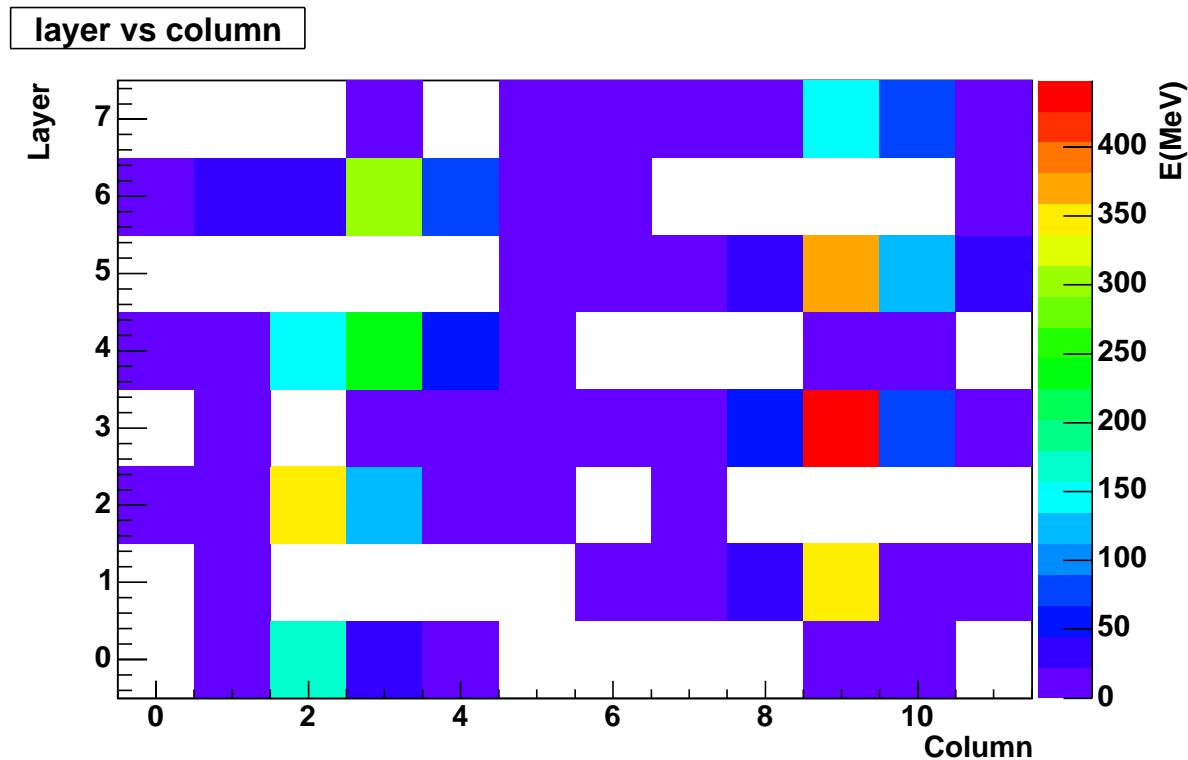
Position cut

- One-dimensional plot with (left) cut and removed events (right)
- This run was taken with a diagonally positioned muon telescope which enhances the effect



Position cut

- The cut on column 0 and 11 removes virtually all events with early timing while leaving the bulk of the events
- Still, many events have hits in col 0 and 11 but no early timing
- High energy events (like the one shown below) almost always have hits in 0 and 11 because of the large size of those events.



Conclusions

- The early triggers are almost exclusively caused by hits in column 0 and 11
- This has to be some electrical issue (shielding/grounding)
- As usual, the effect was observed with muon thresholds, it is unknown if the effect still occurs at higher thresholds.
- We will run an STR (special test request) to do a scan of the thresholds to investigate retriggering which will also help us to understand this issue.