

NP04 Ground Bounce Studies

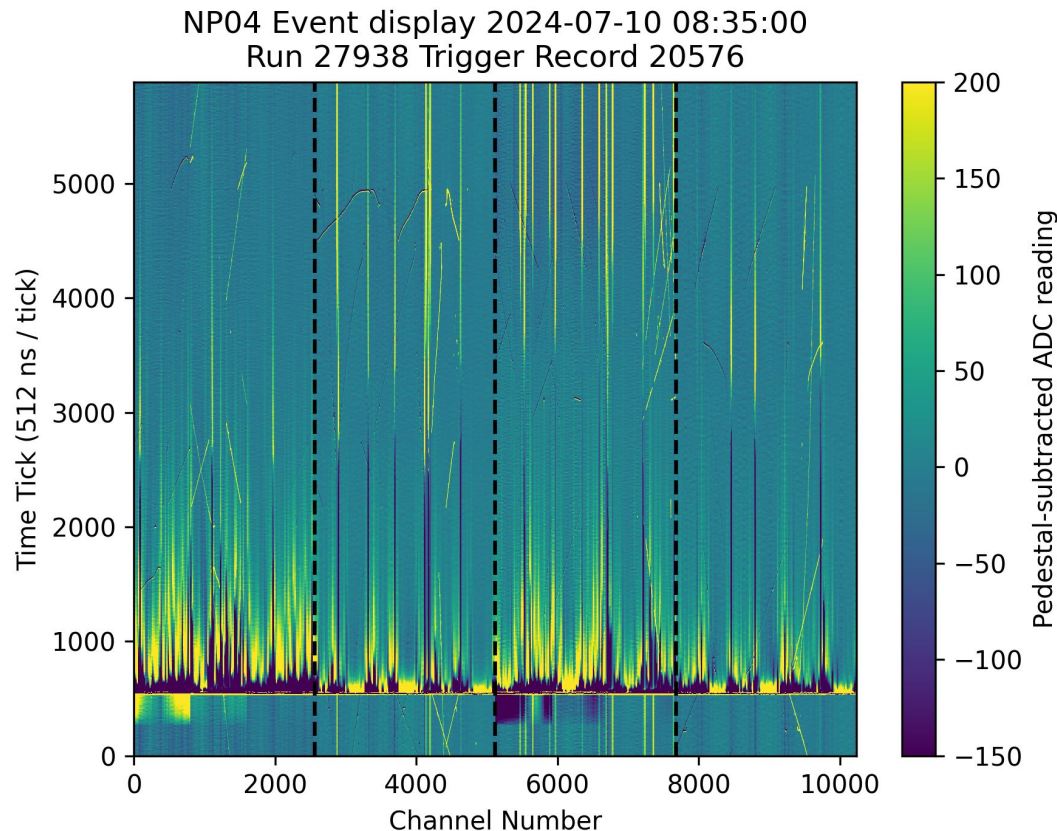
FD1-HD Technical Board Meeting 10/16/24

Roger Huang

Pre-Ground Bounce Feature

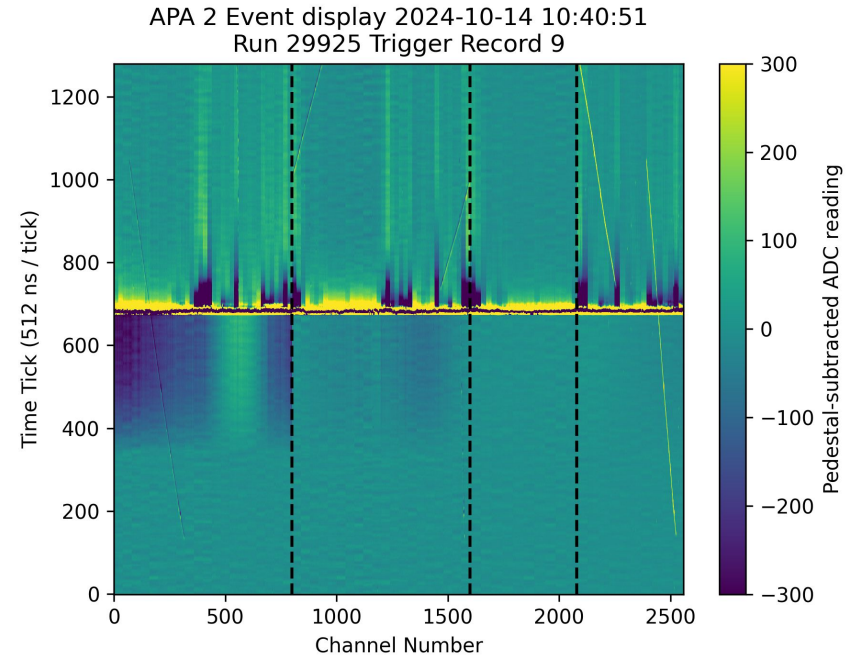
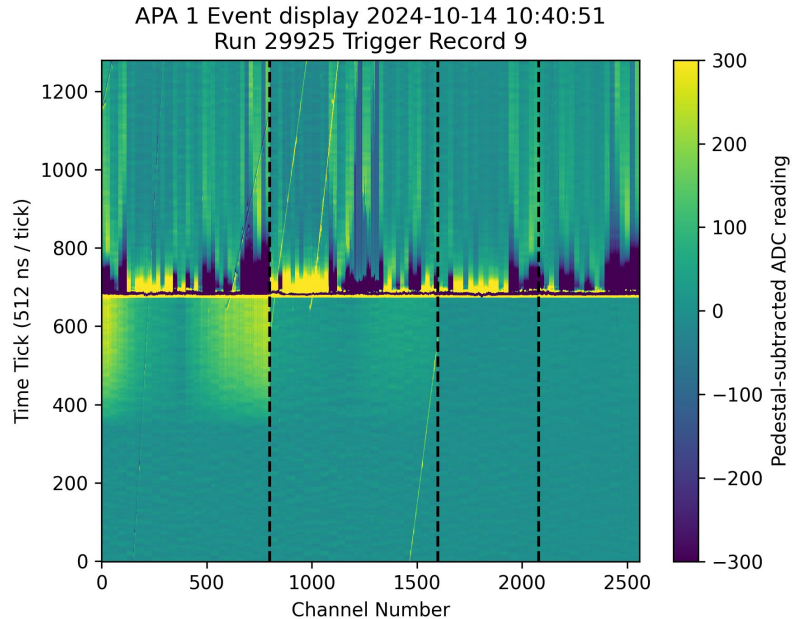
In the ground shake events, there's a consistent feature appearing ~ 100 us before the detector-wide event

- Positive-polarity signal in the APA 1 U channels
- Negative-polarity signal in the APA 2 U channels
- Nothing on APAs 3+4



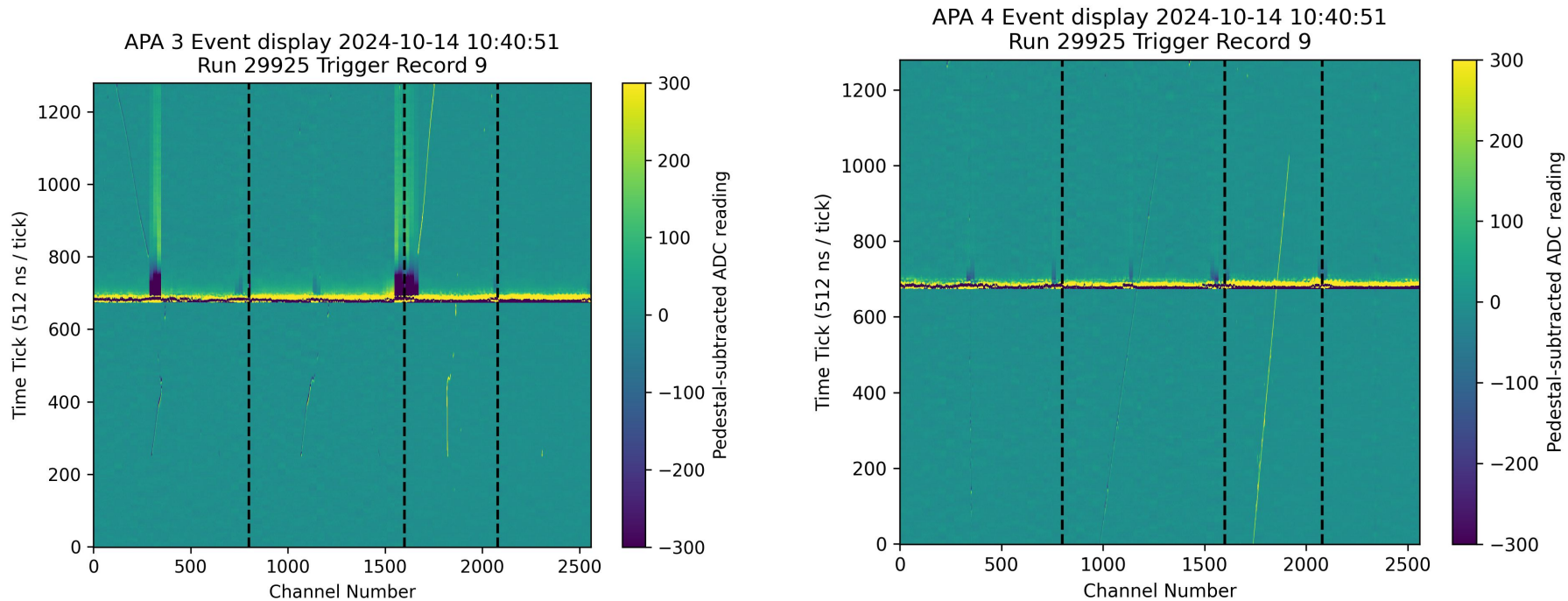
Ground Bounce Examples

- The intensity varies, but this feature is qualitatively the same in pretty much every ground shake event we see
- Can see a much fainter similar signal on the V planes as well



Ground Bounce Examples

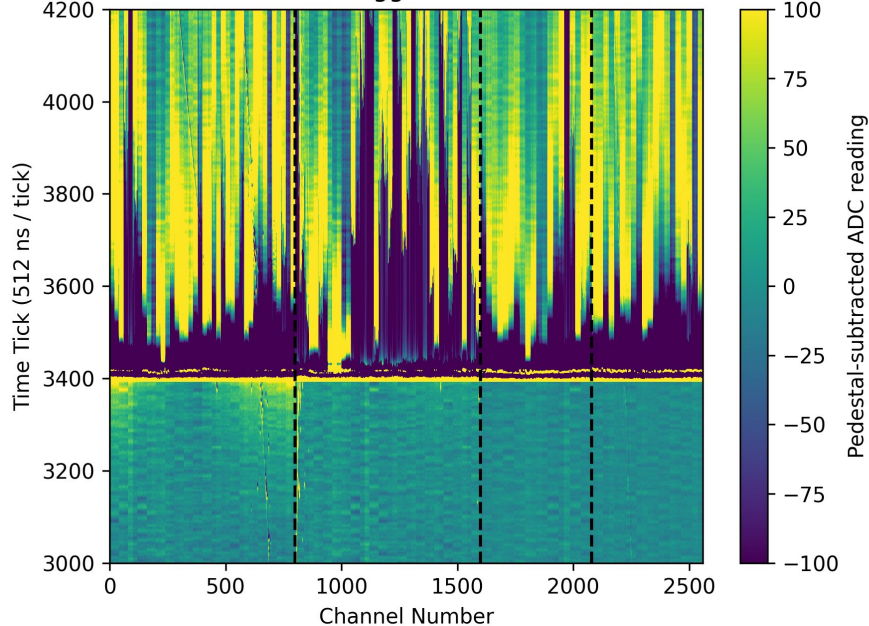
- APA 3+4 for the same event as the previous slide



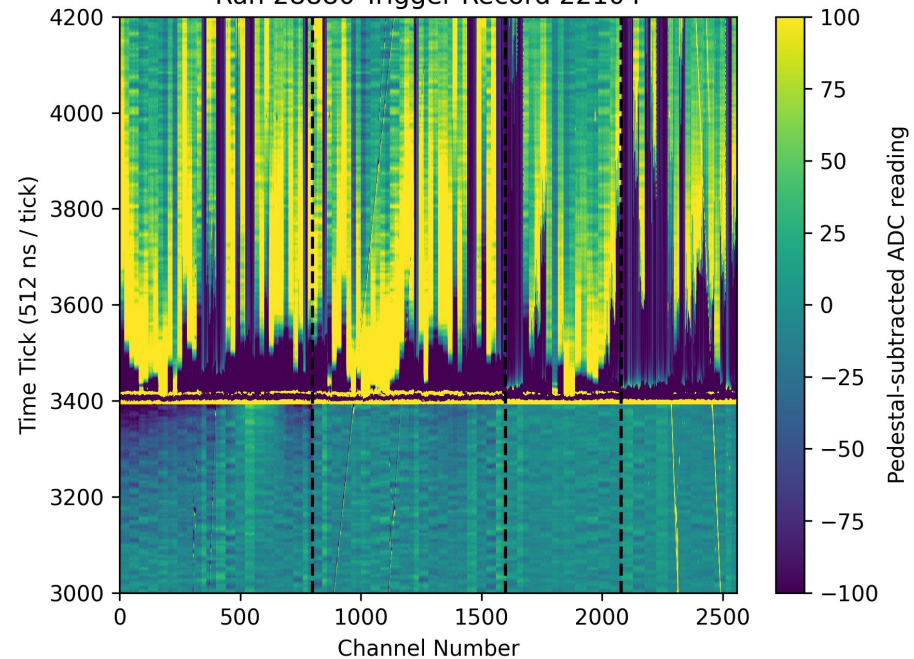
Ground Bounce Examples

- Example where the pre-ground-bounce signal is weaker, but still visible

APA 1 Event display 2024-08-23 15:27:18
Run 28880 Trigger Record 22104

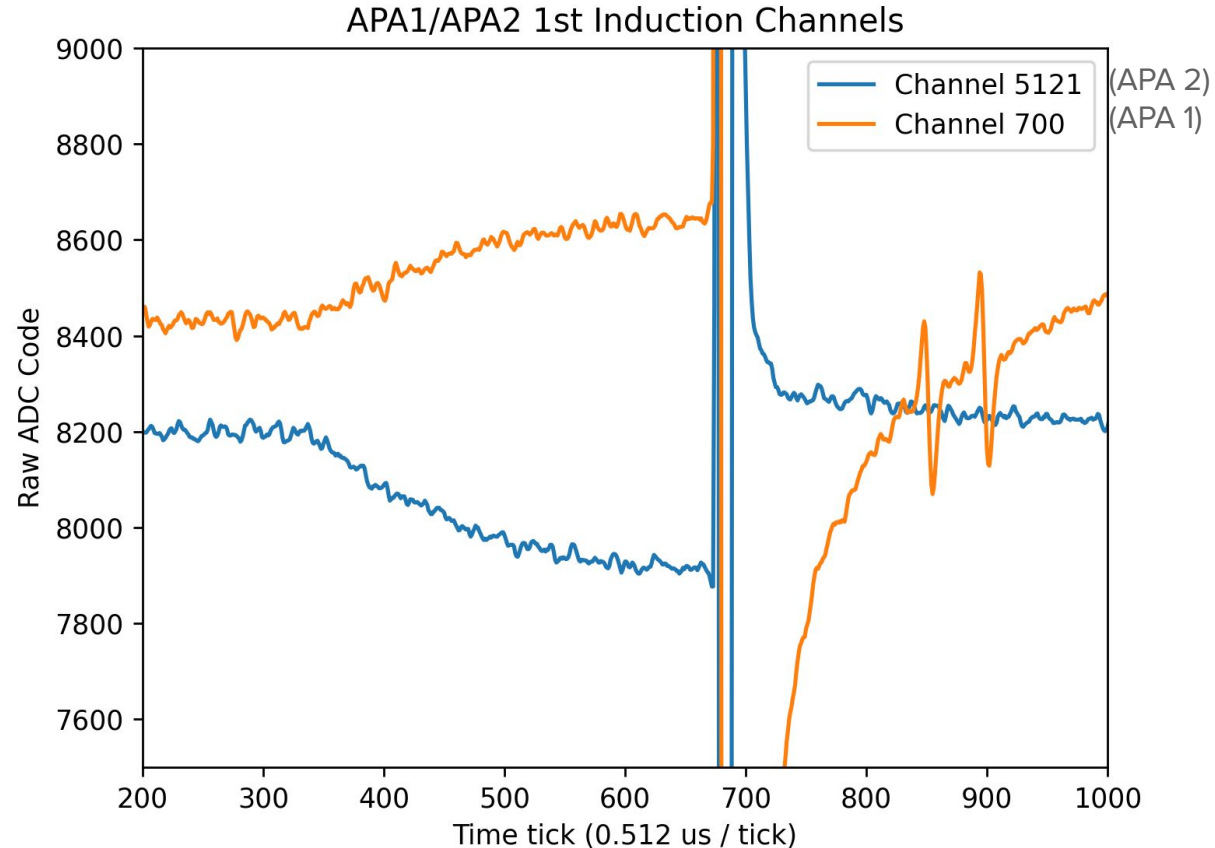


APA 2 Event display 2024-08-23 15:27:18
Run 28880 Trigger Record 22104



Ground Shake Waveforms

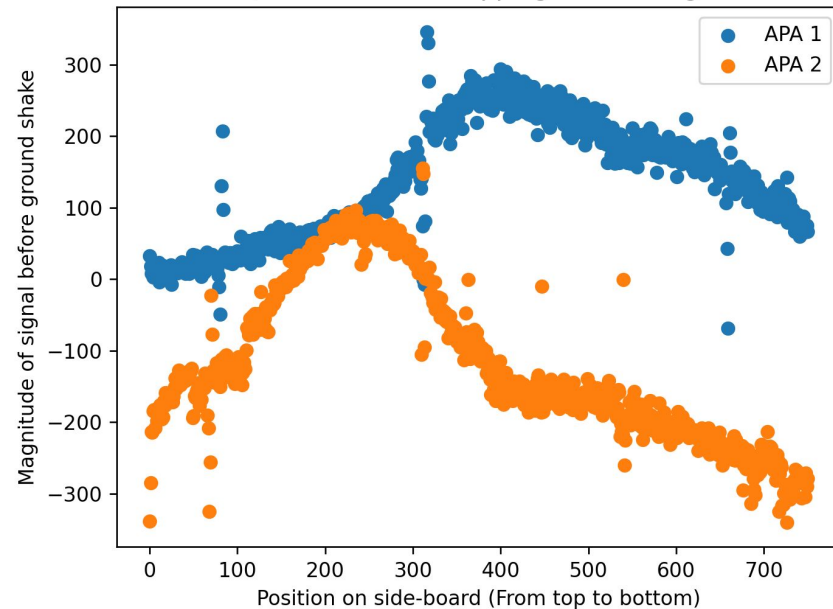
- Examples of the slow rise/drop in APA 1/2 U channel waveforms before the detector-wide ground shake



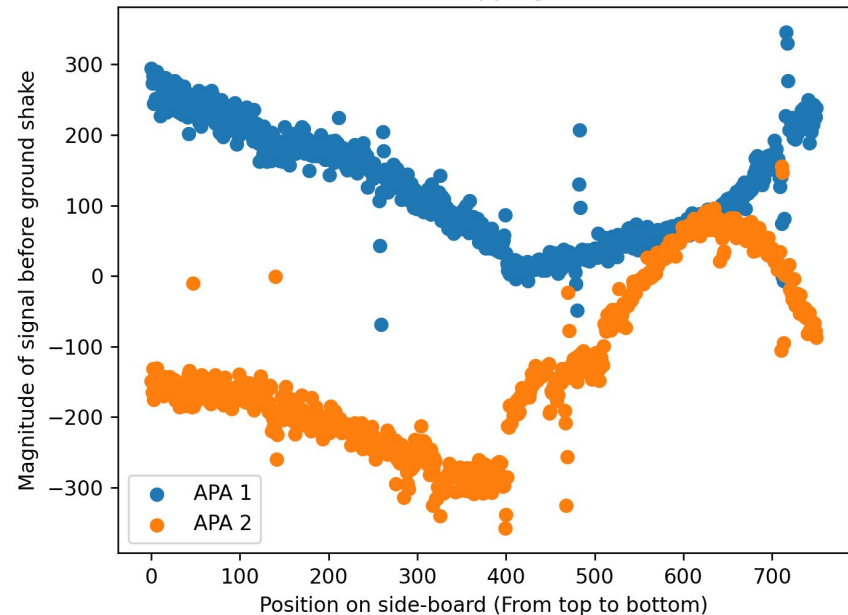
Positioning along side boards

- Plotting estimated magnitude of pre-ground-shake signal on the U wires, sorted by where they wrap around the side of the APAs

APA 1/2 U Channels Wrapping on field cage side



APA 1/2 U Channels Wrapping on APA-border side



Ground Shake Study Plans

Plan to try a few more things related to this:

- Turn off U bias in APA 1 and/or 2
 - Took this data today: no obvious difference at first glance, but will analyze further
- Use oscilloscope to directly read analog output of a channel in APA 1 or 2
 - Last time we did this, we only looked at APA 4
- Collect data with PDS again to look for a similar asymmetry
 - Took some data today, still to be analyzed