

ProtoDUNE-VD sim/reco meeting

August 23, 2024

# Calorimetry in the coldbox-VD with LArSoft - version study

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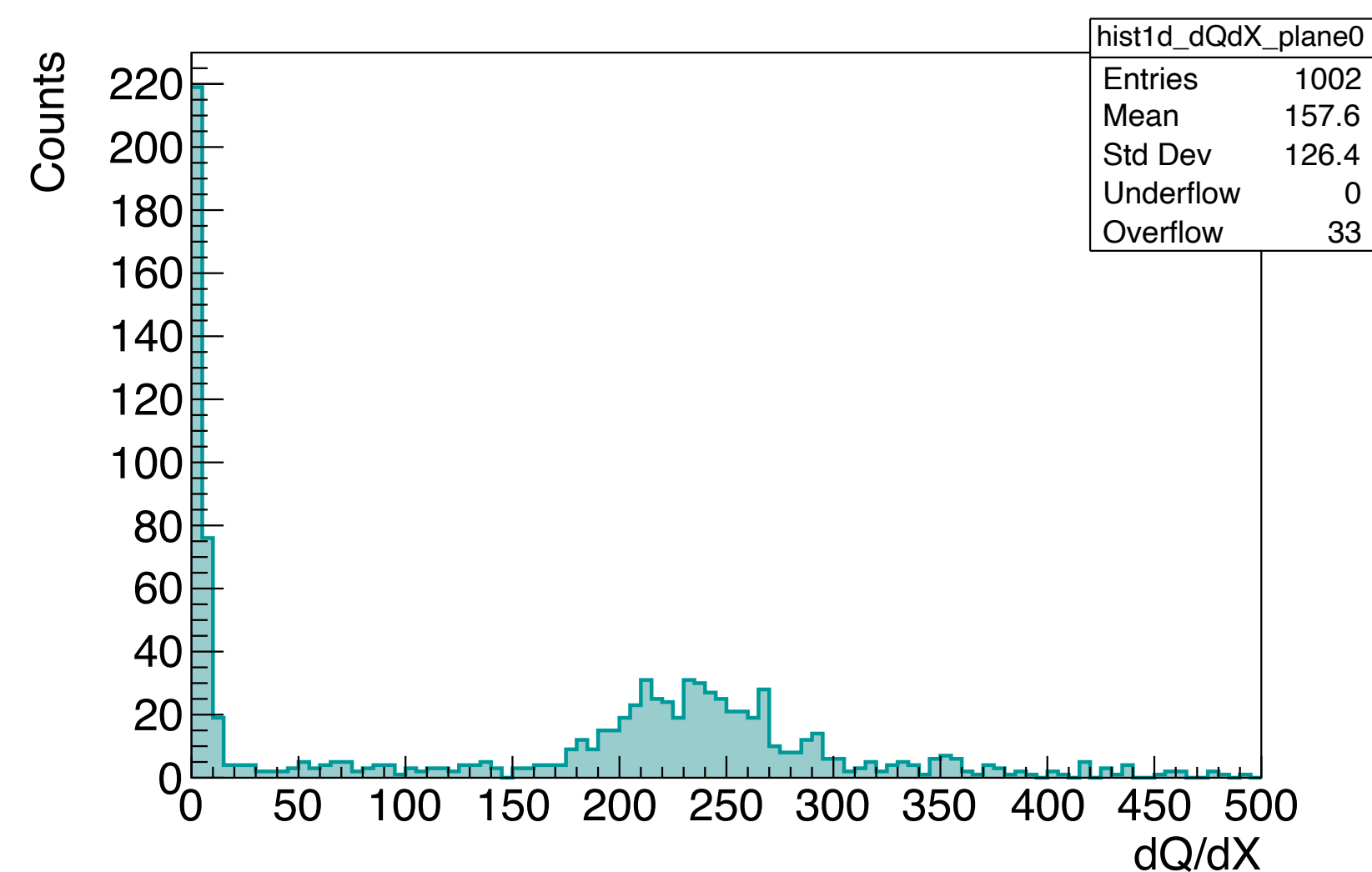
# Previous steps

## ◦ Previously shown:

- Study of  $dQ/dX$  and number of hits vs LArSoft version and option
- Using through-going tracks in CRP3 data (colbox top electronics), see details [here](#)
- Questions: effects of new reconstruction? Does low hit threshold pick up noise?

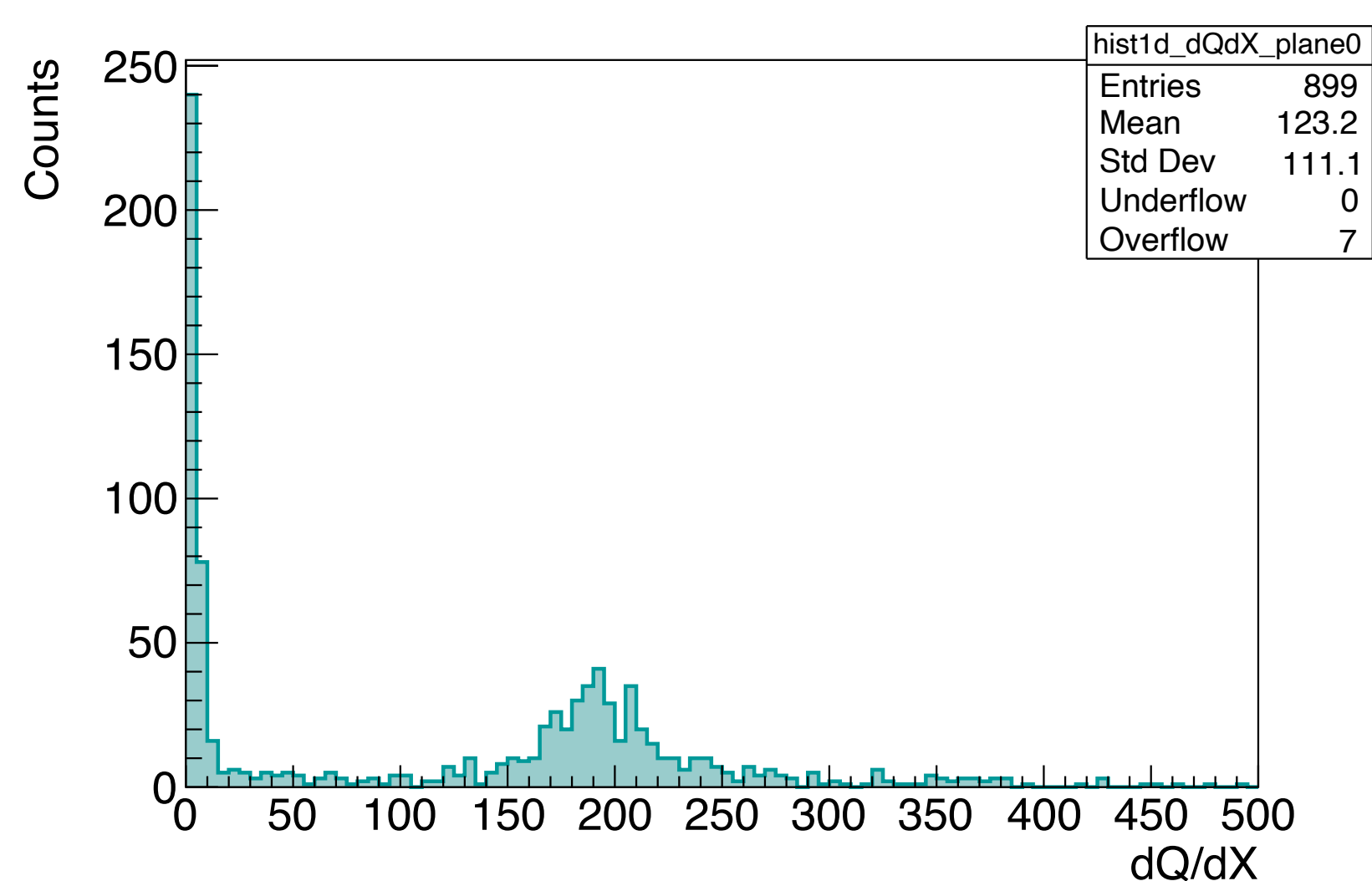
**v09\_72\_00d00**

**RoiThreshold: 1.0**



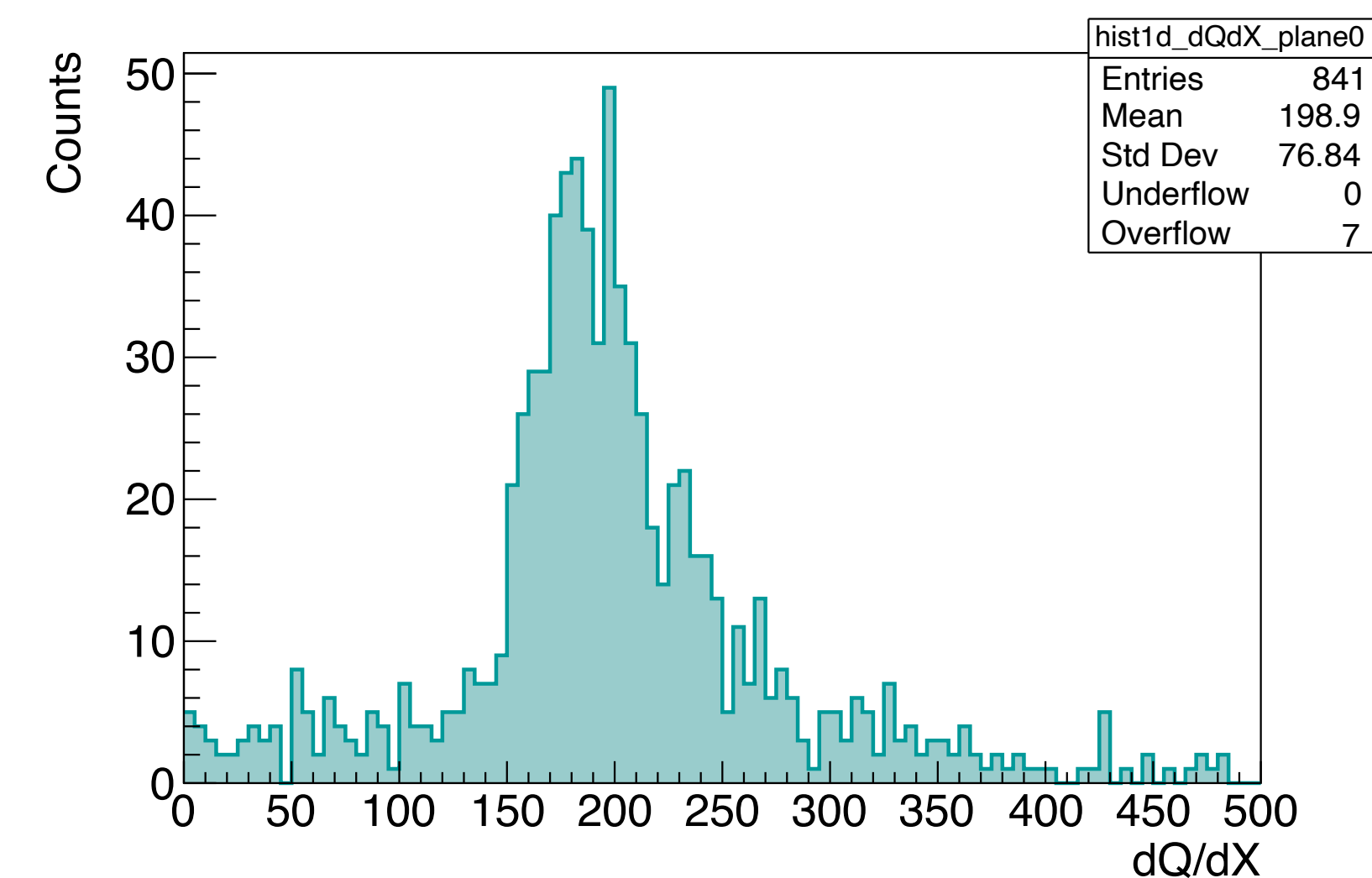
**v09\_90\_01d00**

**RoiThreshold: 1.0**

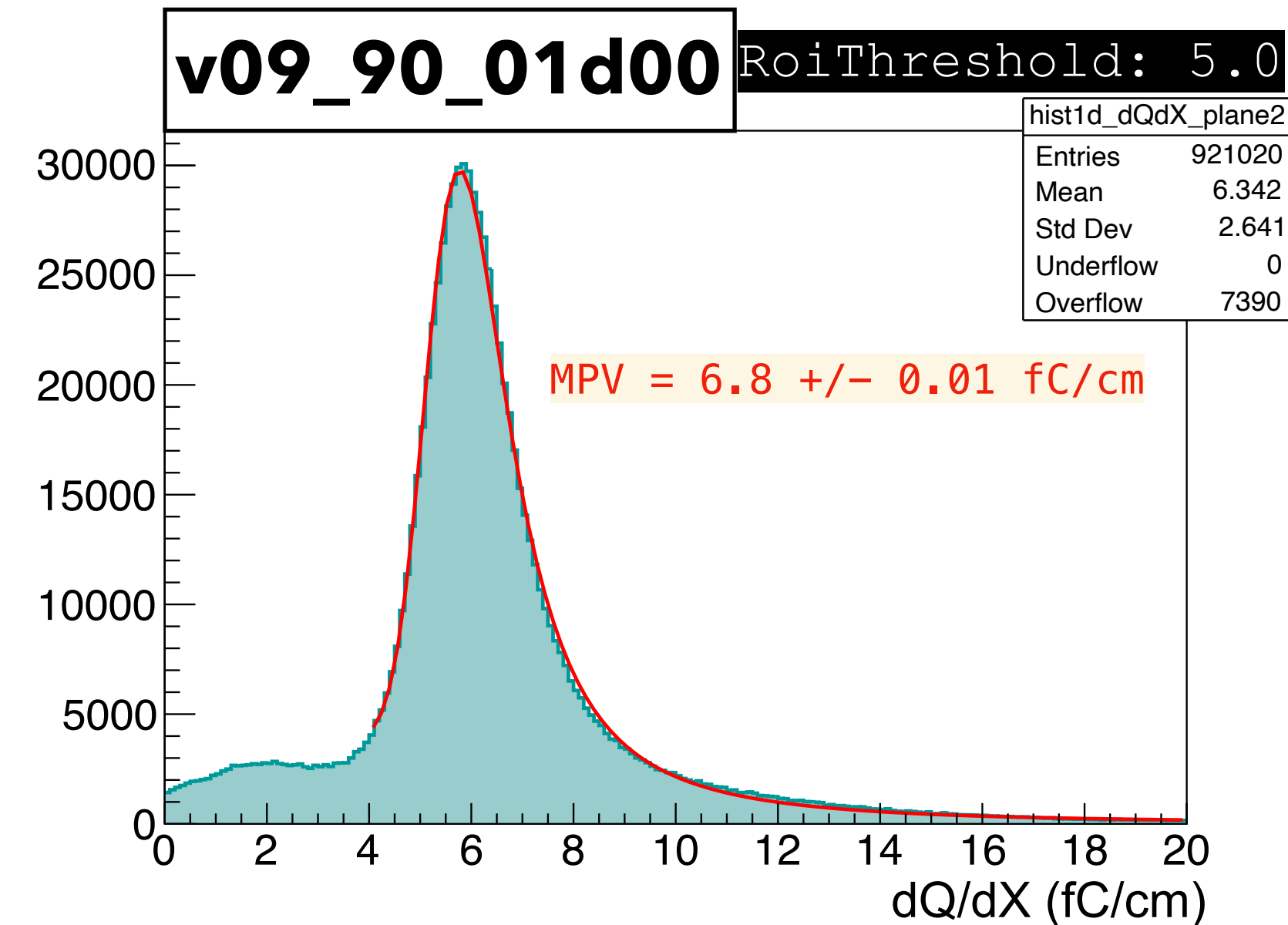
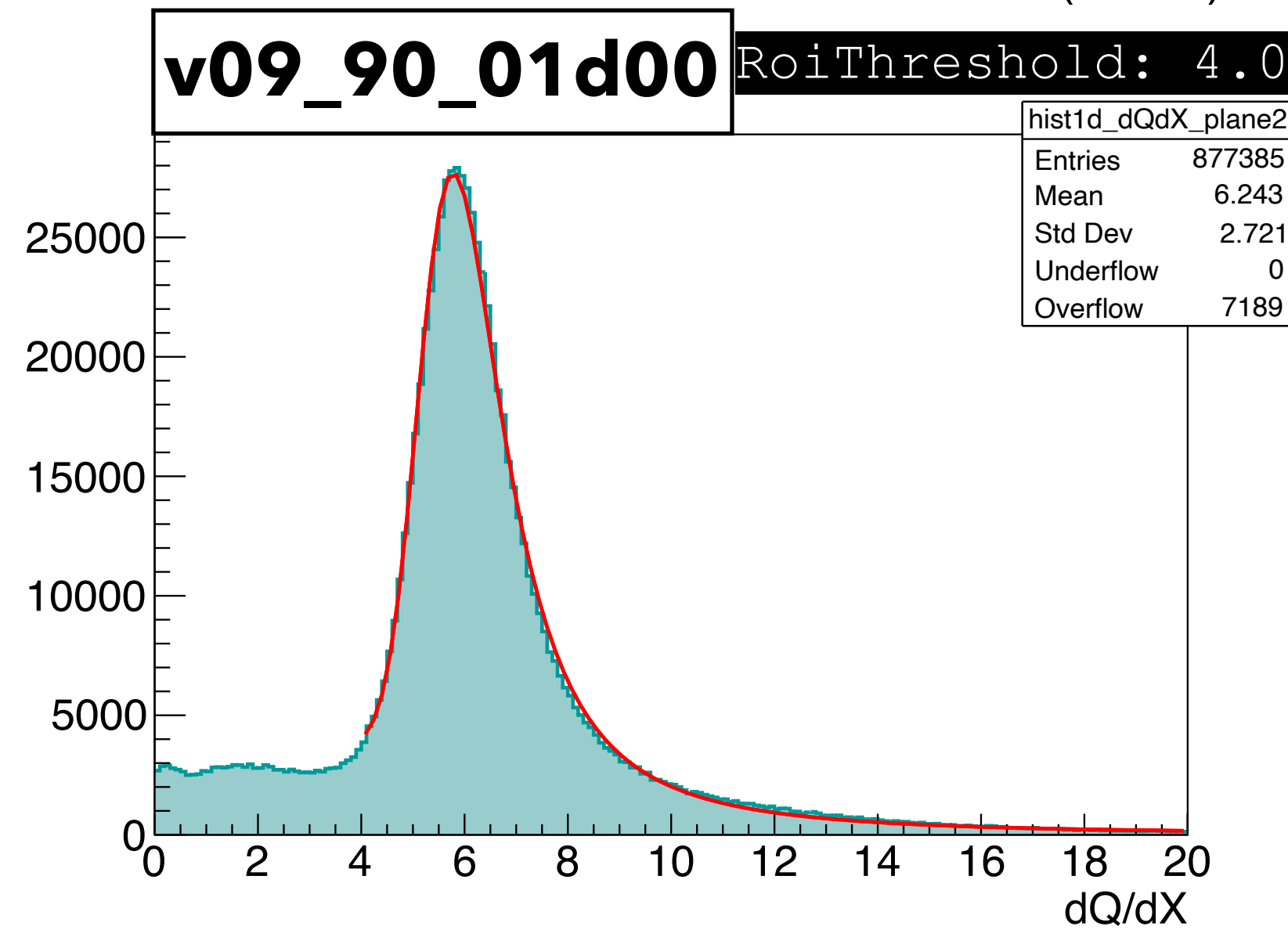
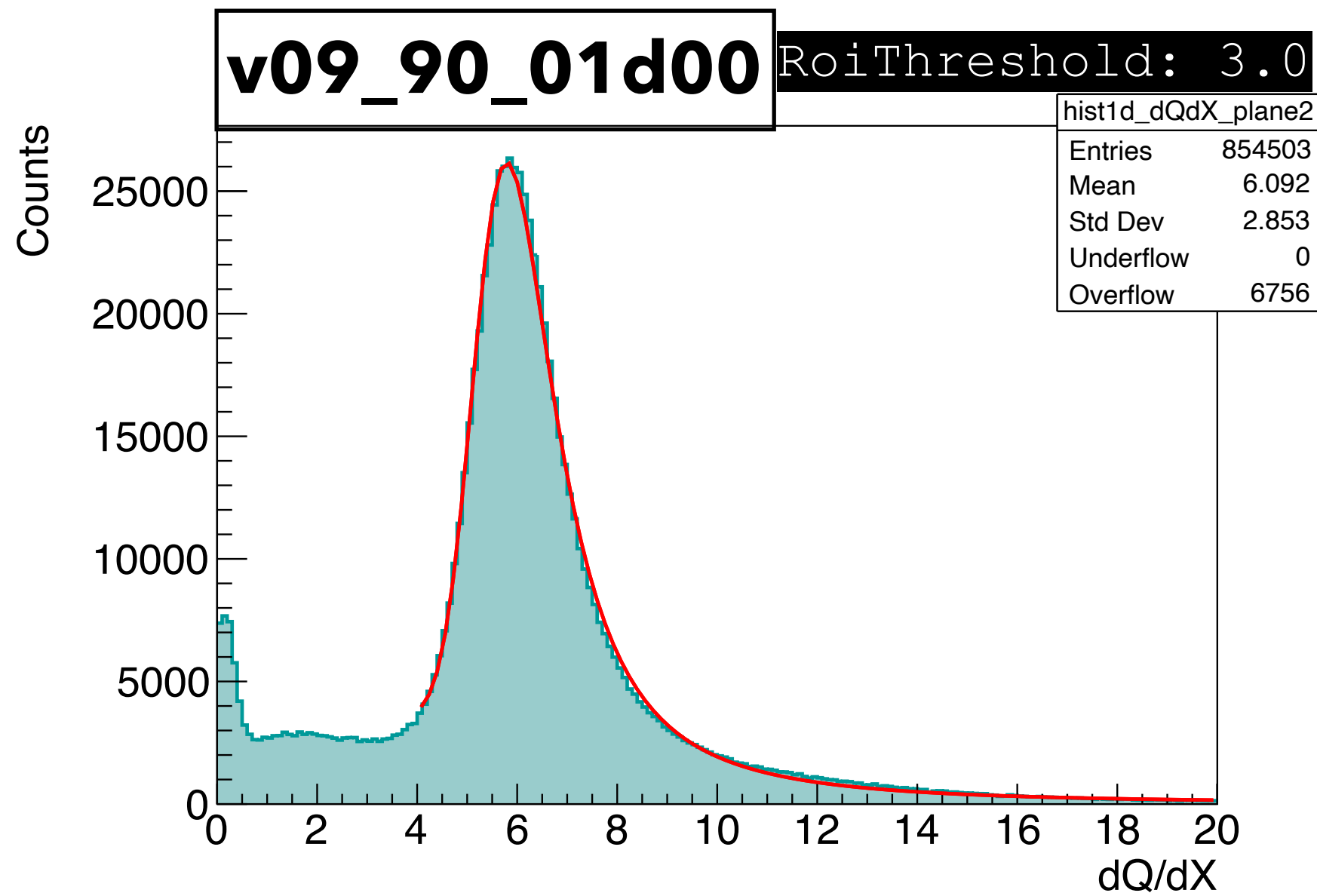
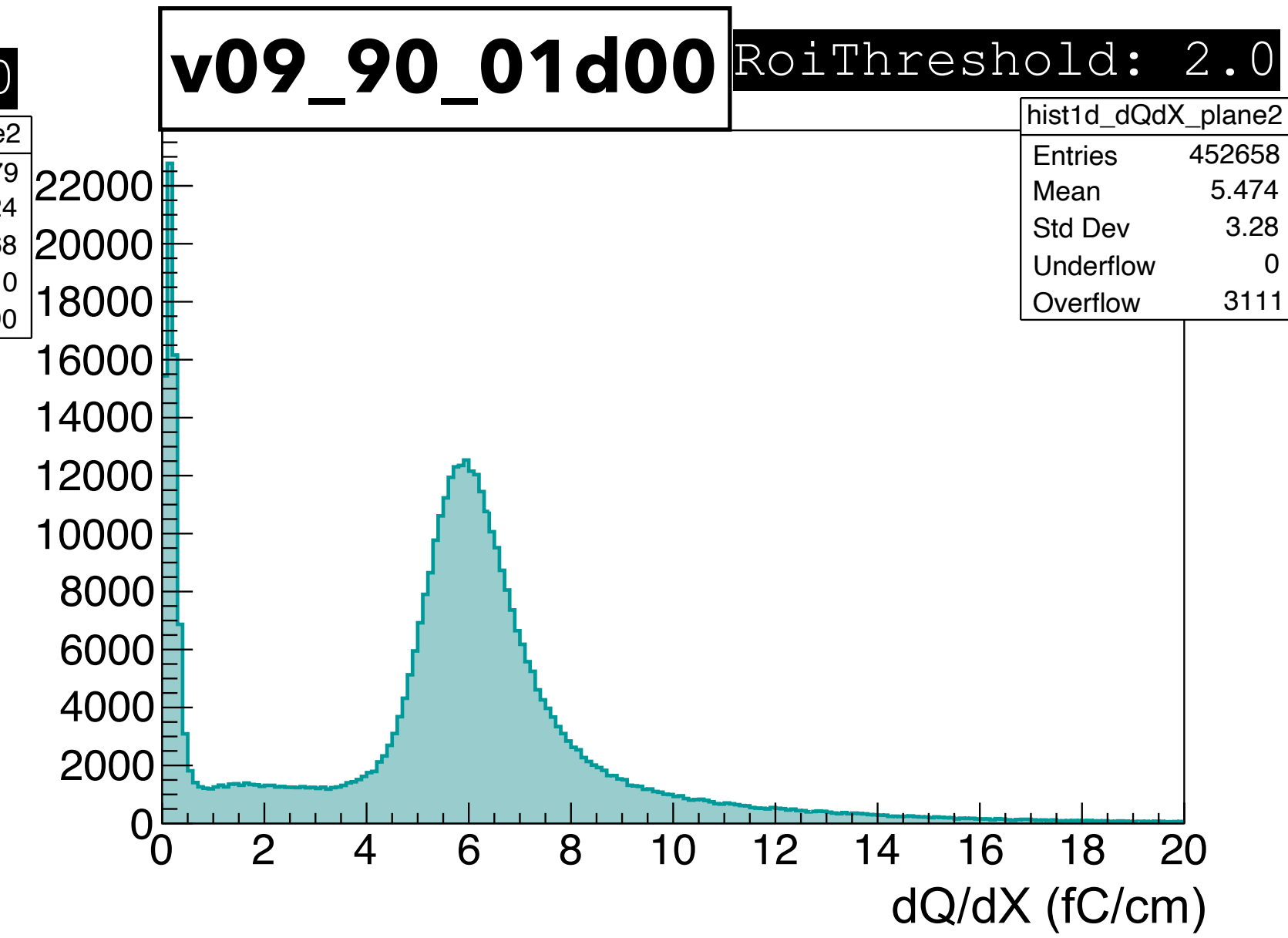
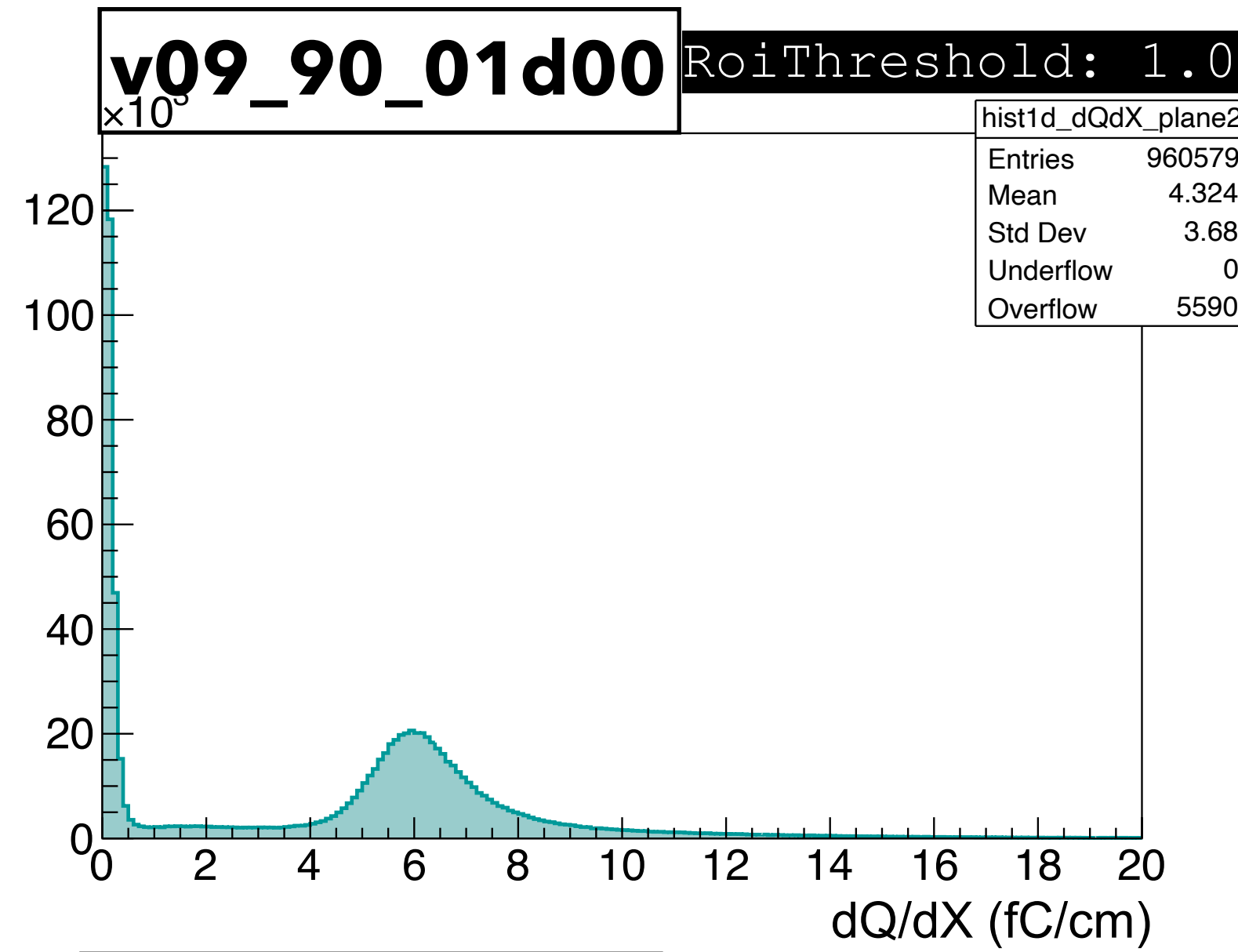
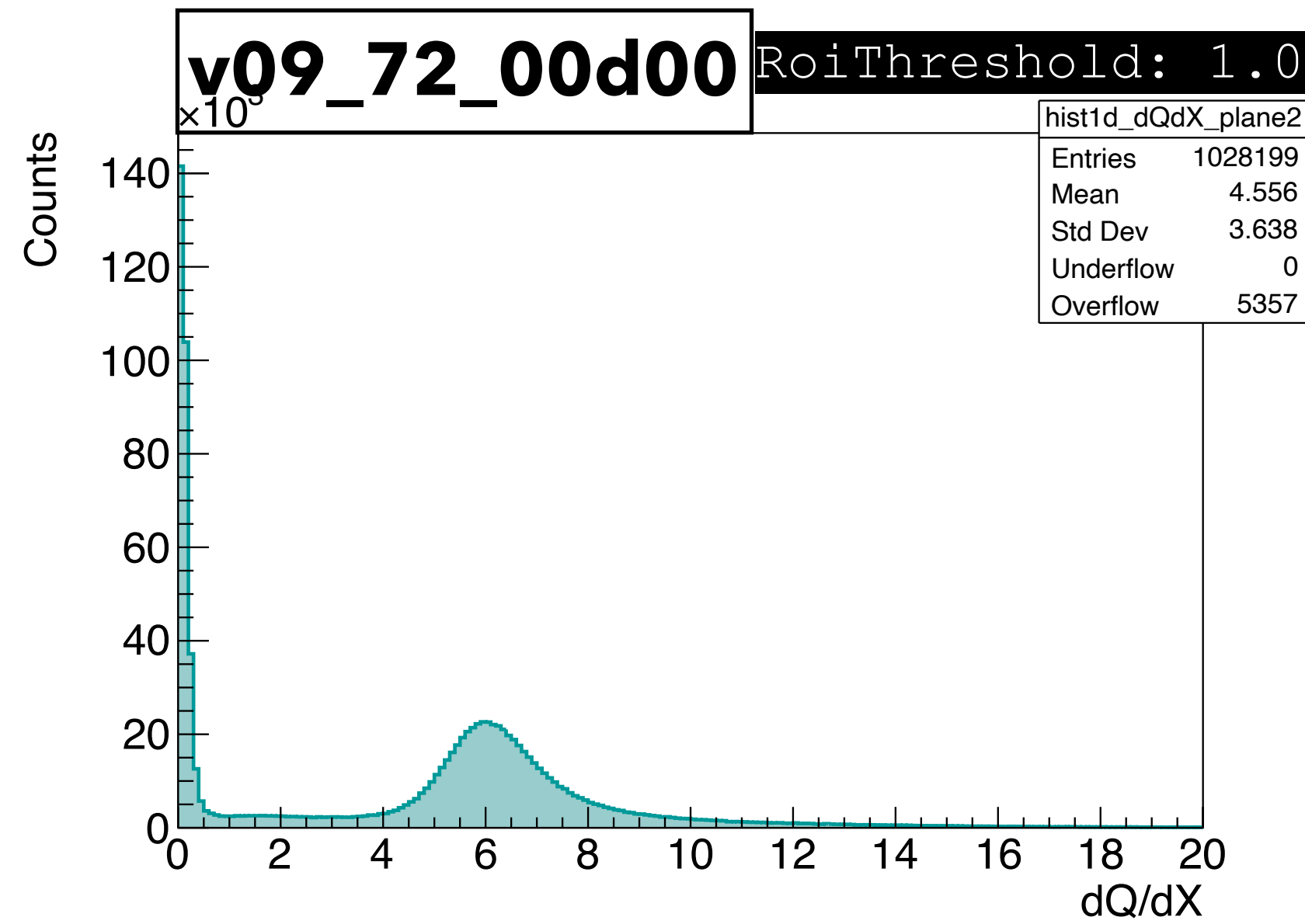


**v09\_90\_01d00**

**RoiThreshold: 5.0**



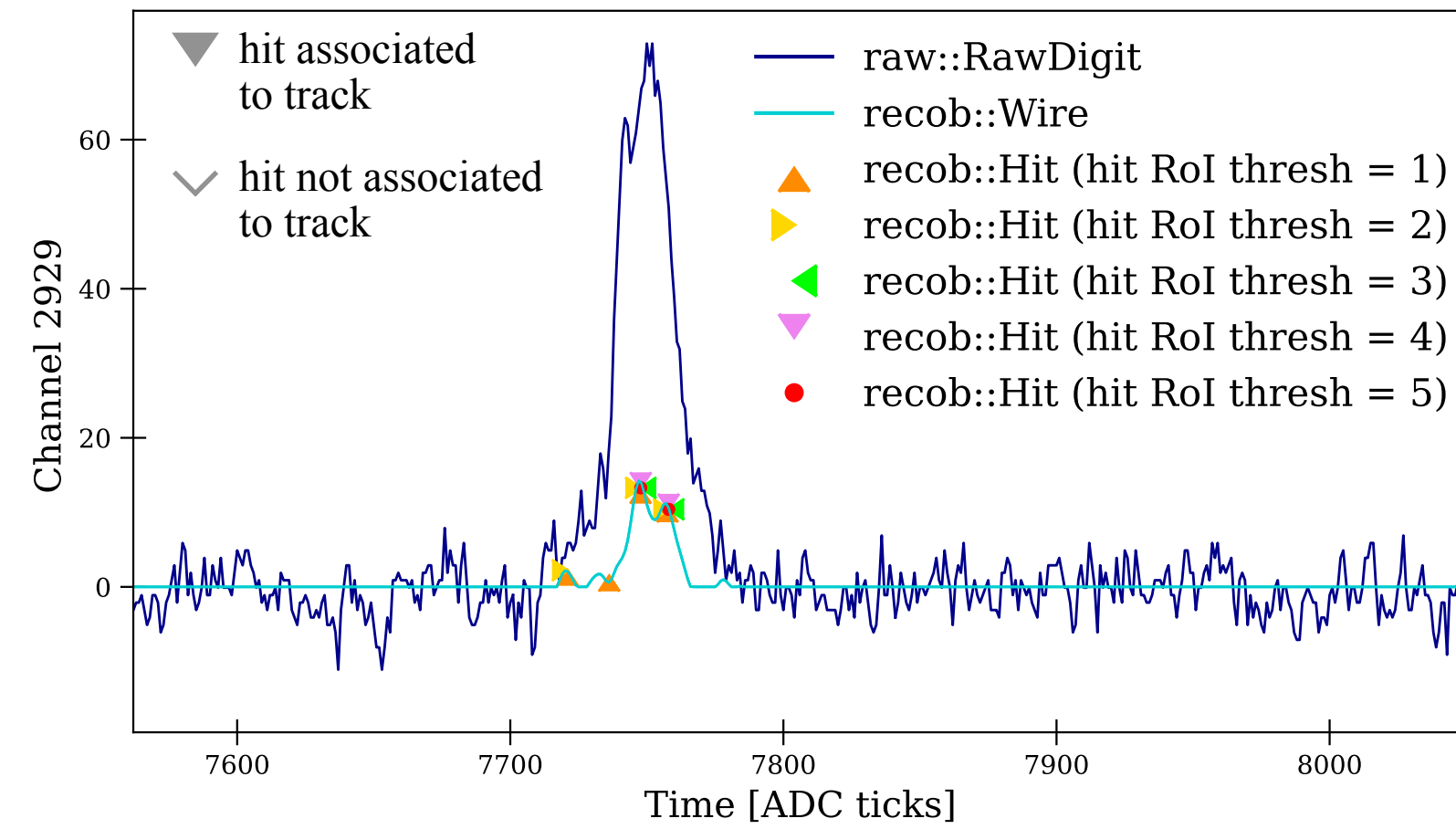
# dQ/dX vs LArSoft reconstruction options



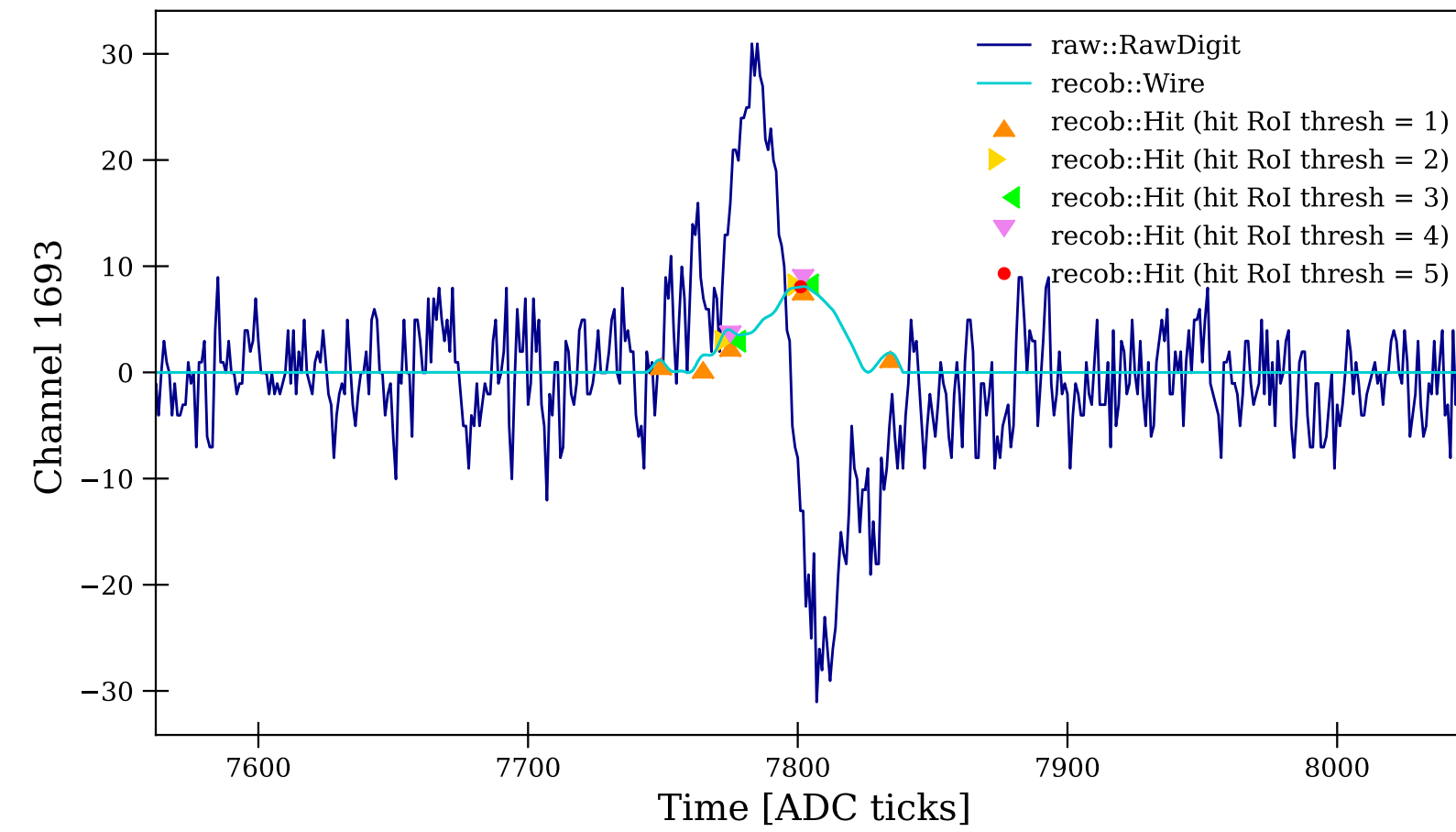
# Raw waveform and hits vs ROI threshold

- `CandidateHitsPlane[0,1,2].RoiThreshold = 1 - 5`

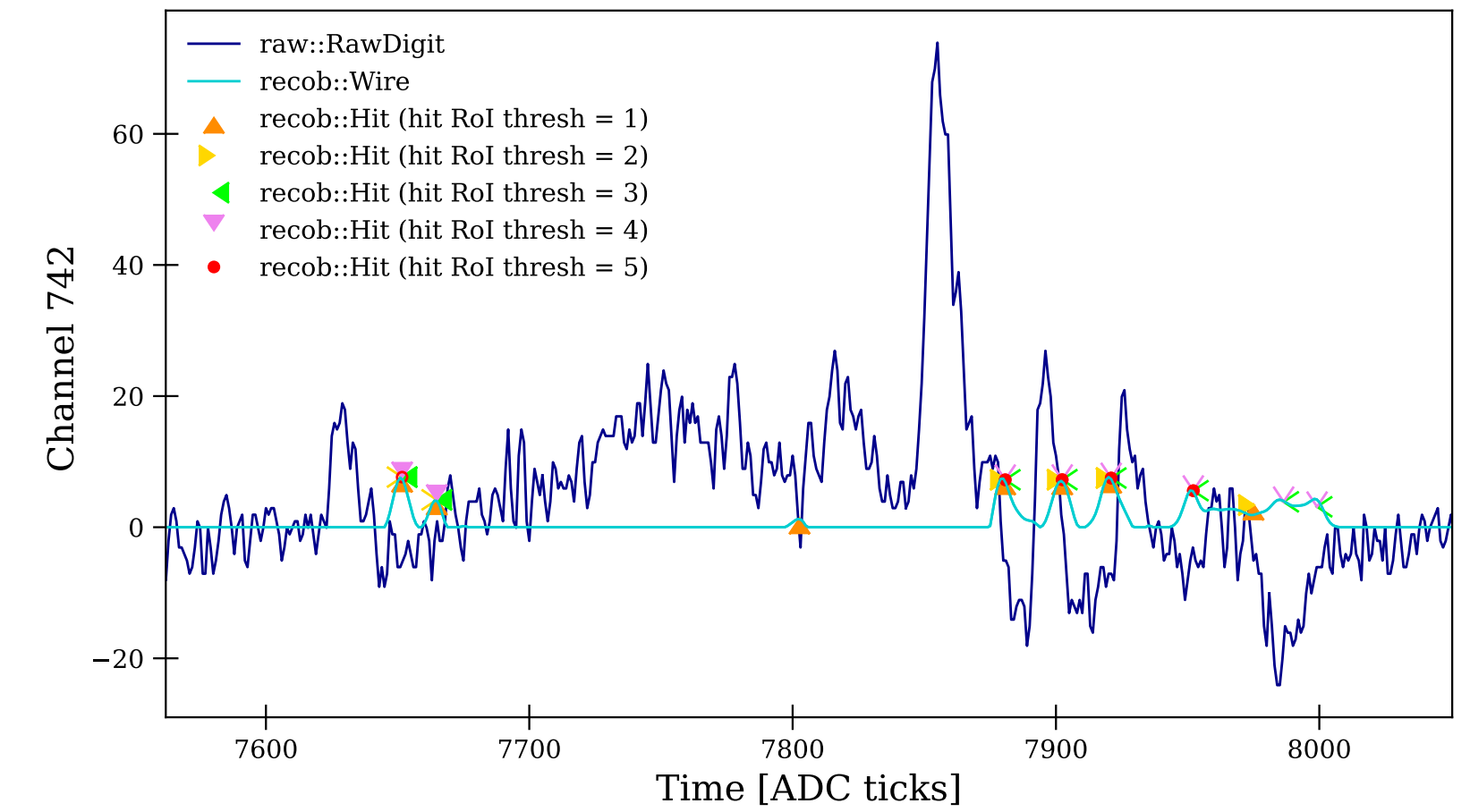
Event 2 - plane 2



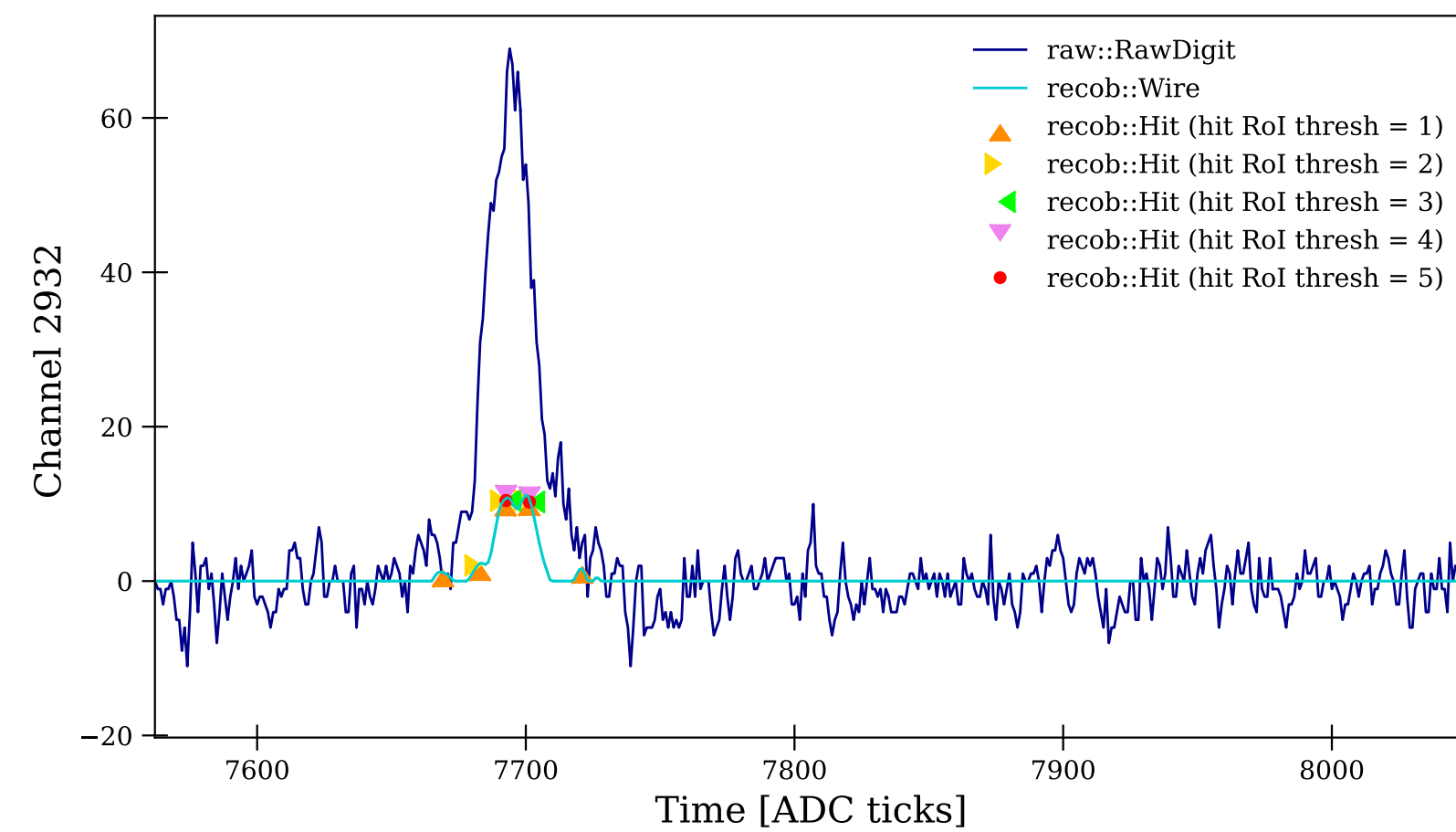
Event 2 - plane 1



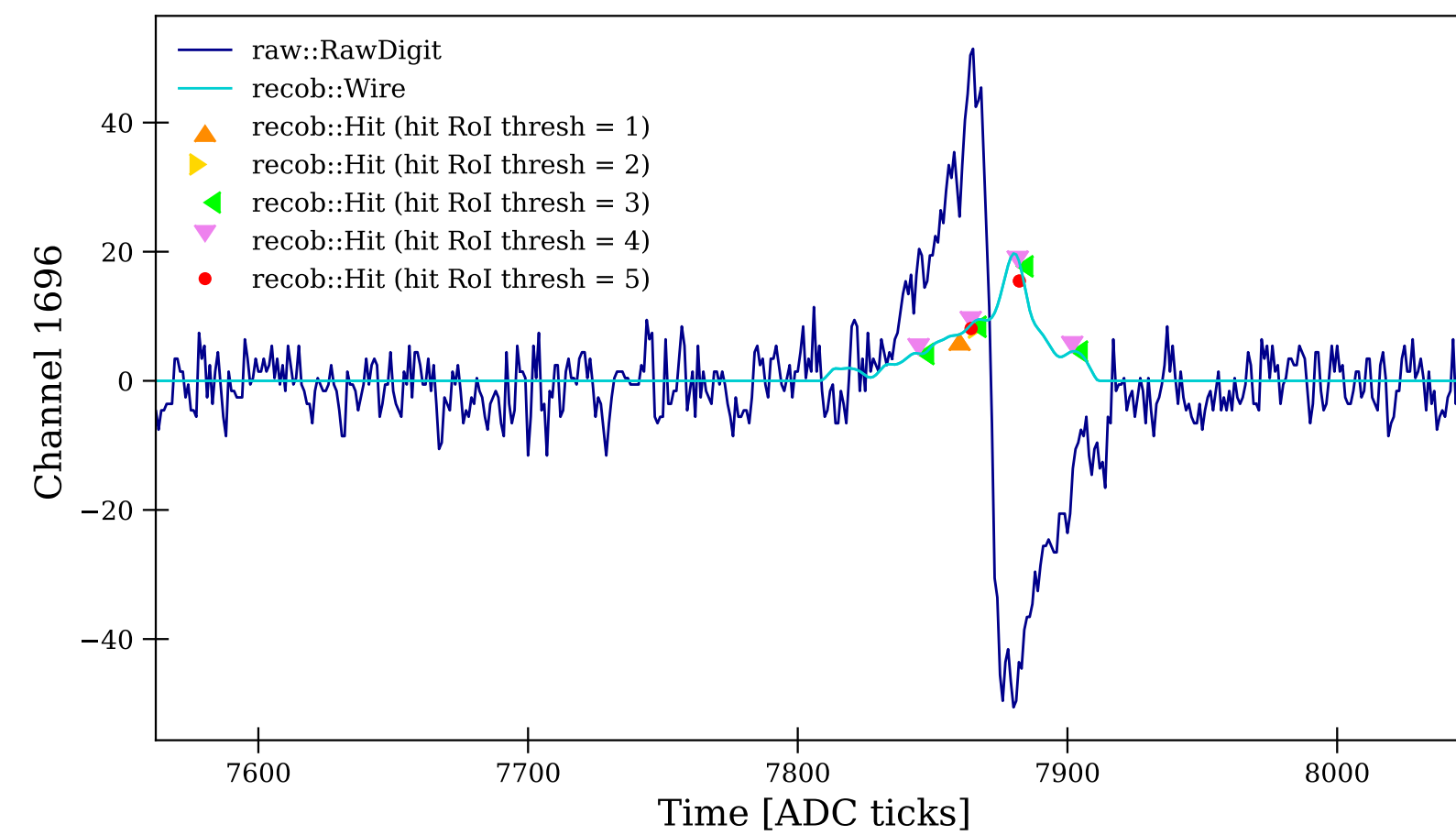
Event 2 - plane 0



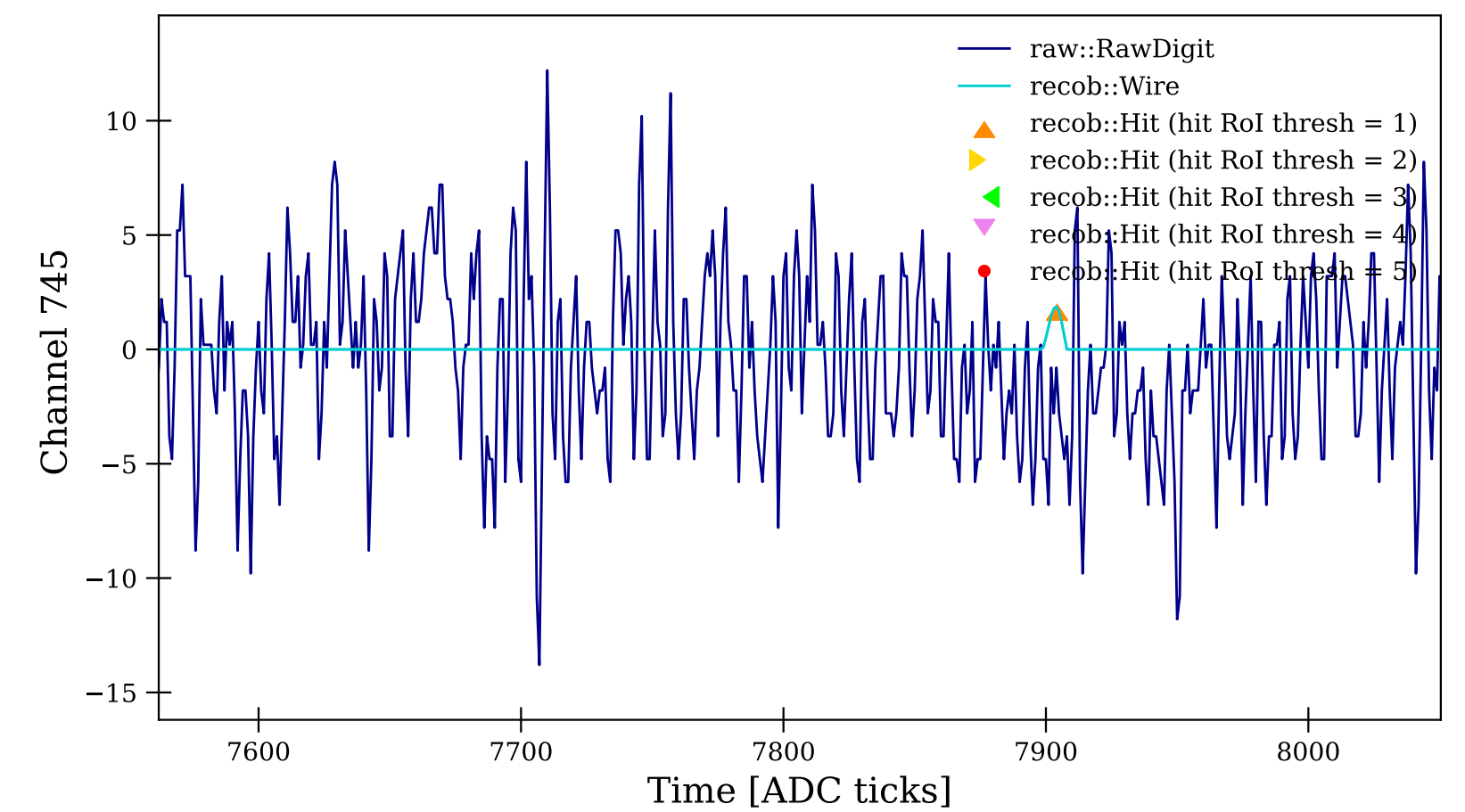
Event 2 - plane 2



Event 2 - plane 1



Event 2 - plane 0



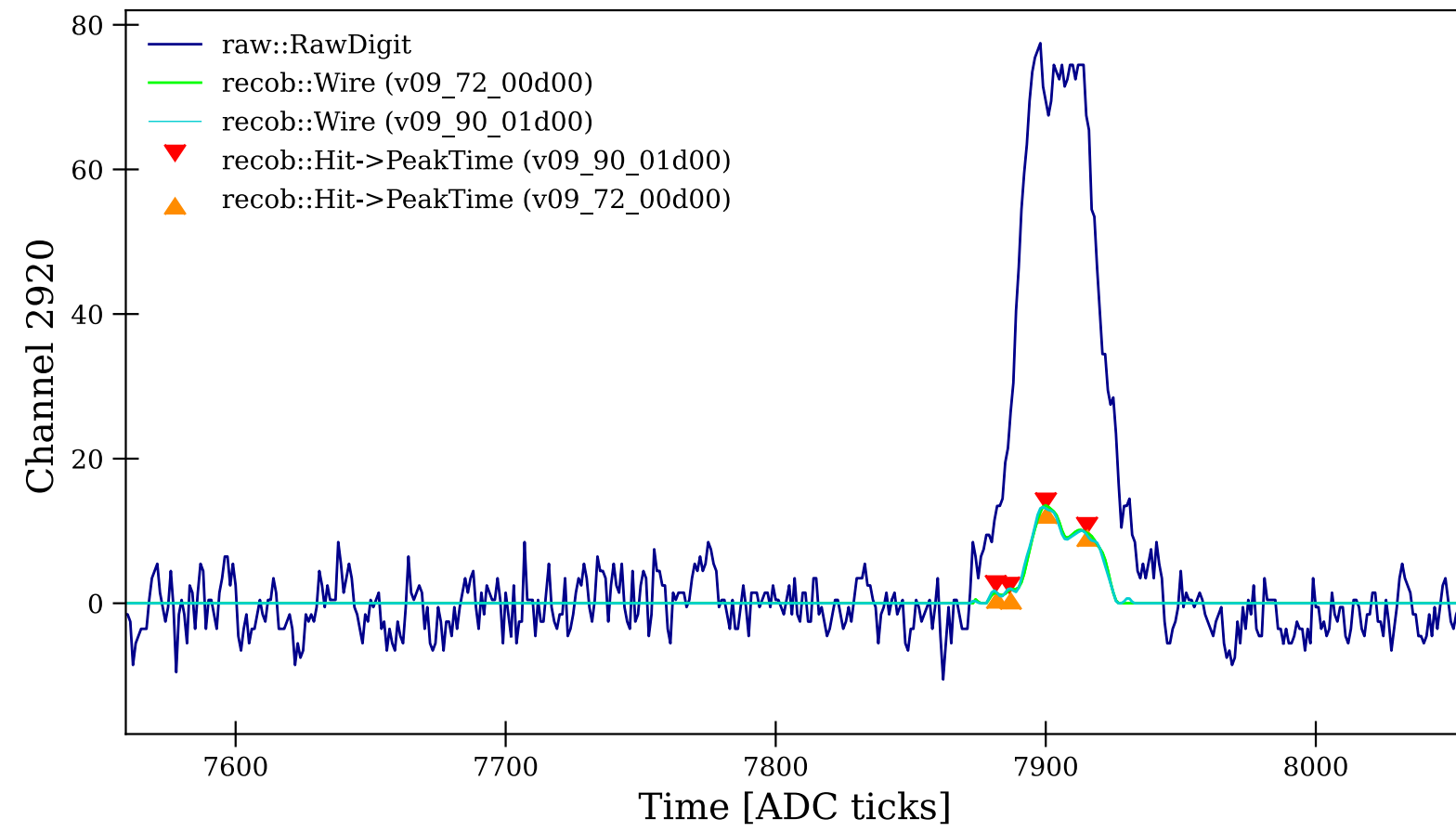


# Raw waveform and hits vs LArSoft version

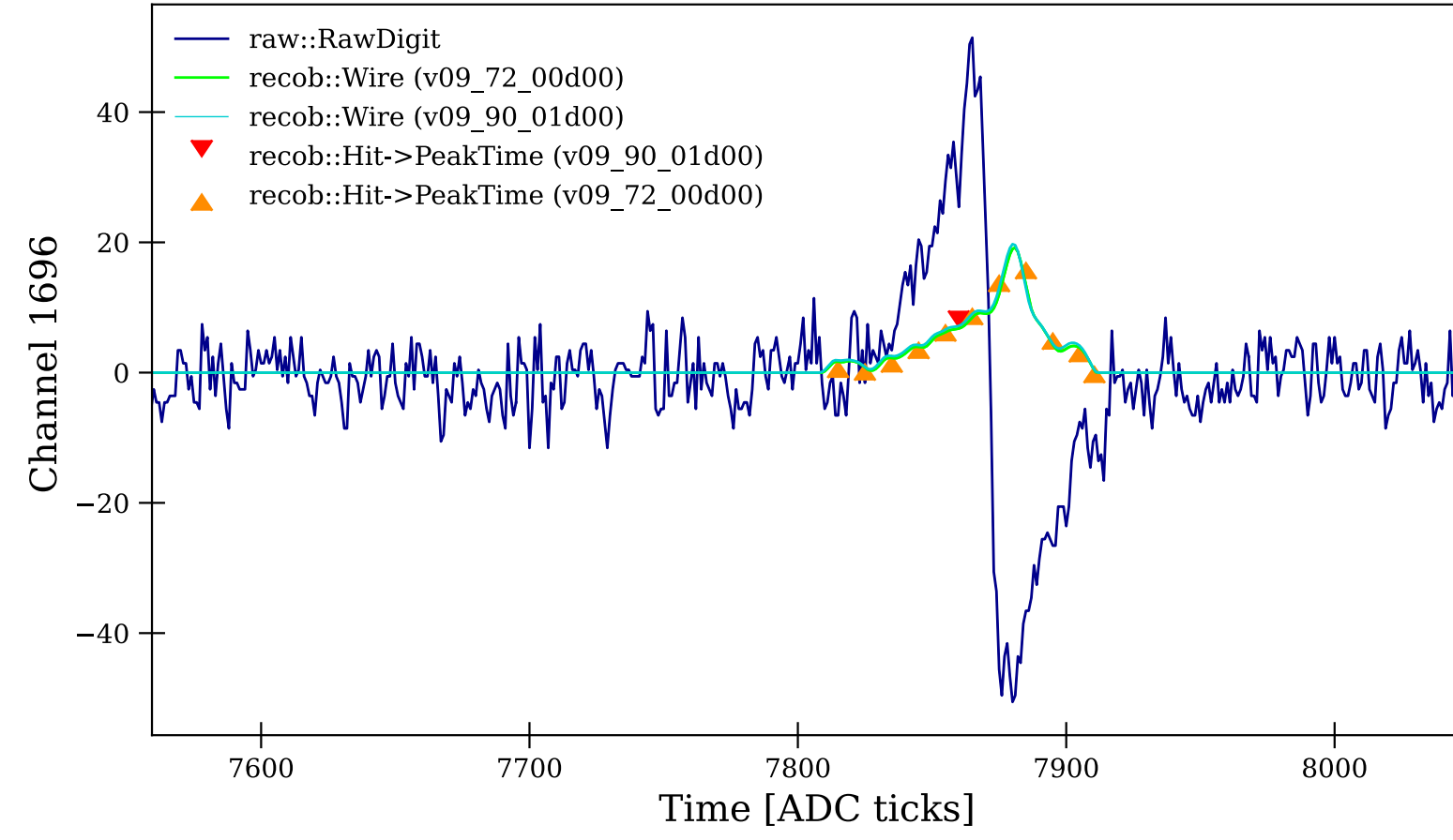
• crp2\_july22\_prod\_config: { gaushit: { **v09\_90\_01d00**  
 LongMaxHits: [1,1,1]  
 LongPulseWidth: [16,16,16] }

gaushit: { **v09\_72\_00d00**  
 LongMaxHits: [25,25,25]  
 LongPulseWidth: [10,10,10] }

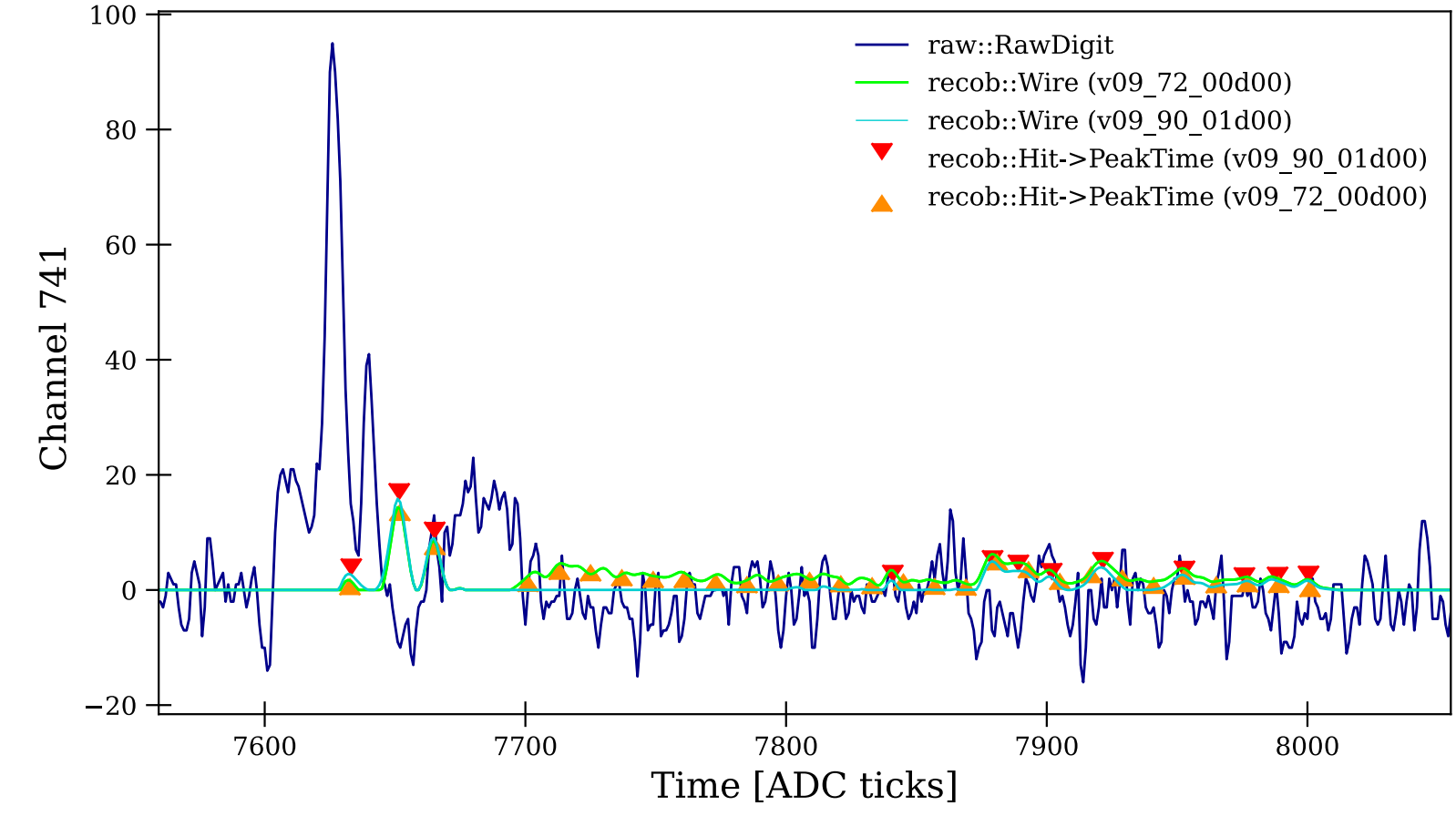
Event 2 - plane 2



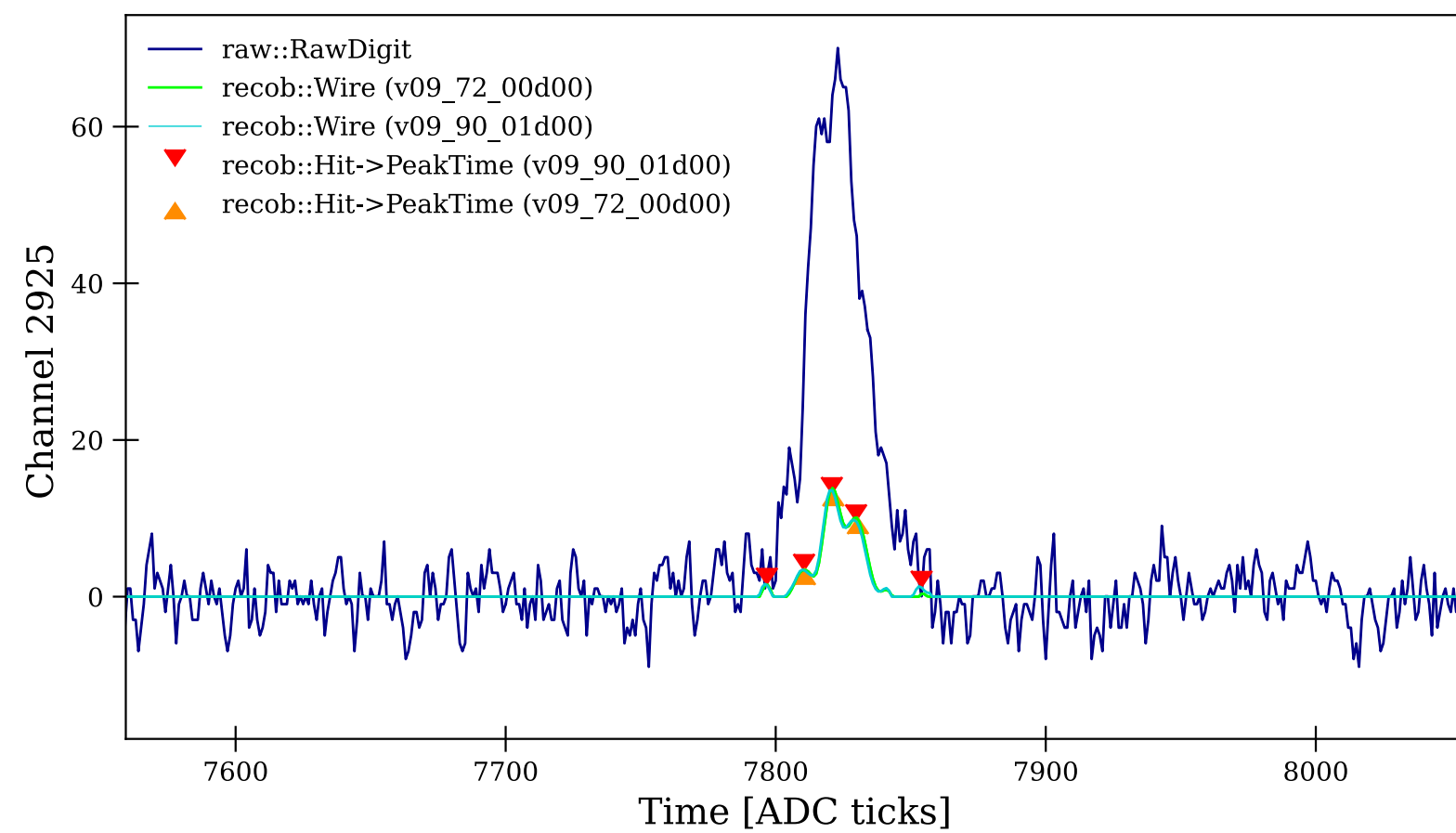
Event 2 - plane 1



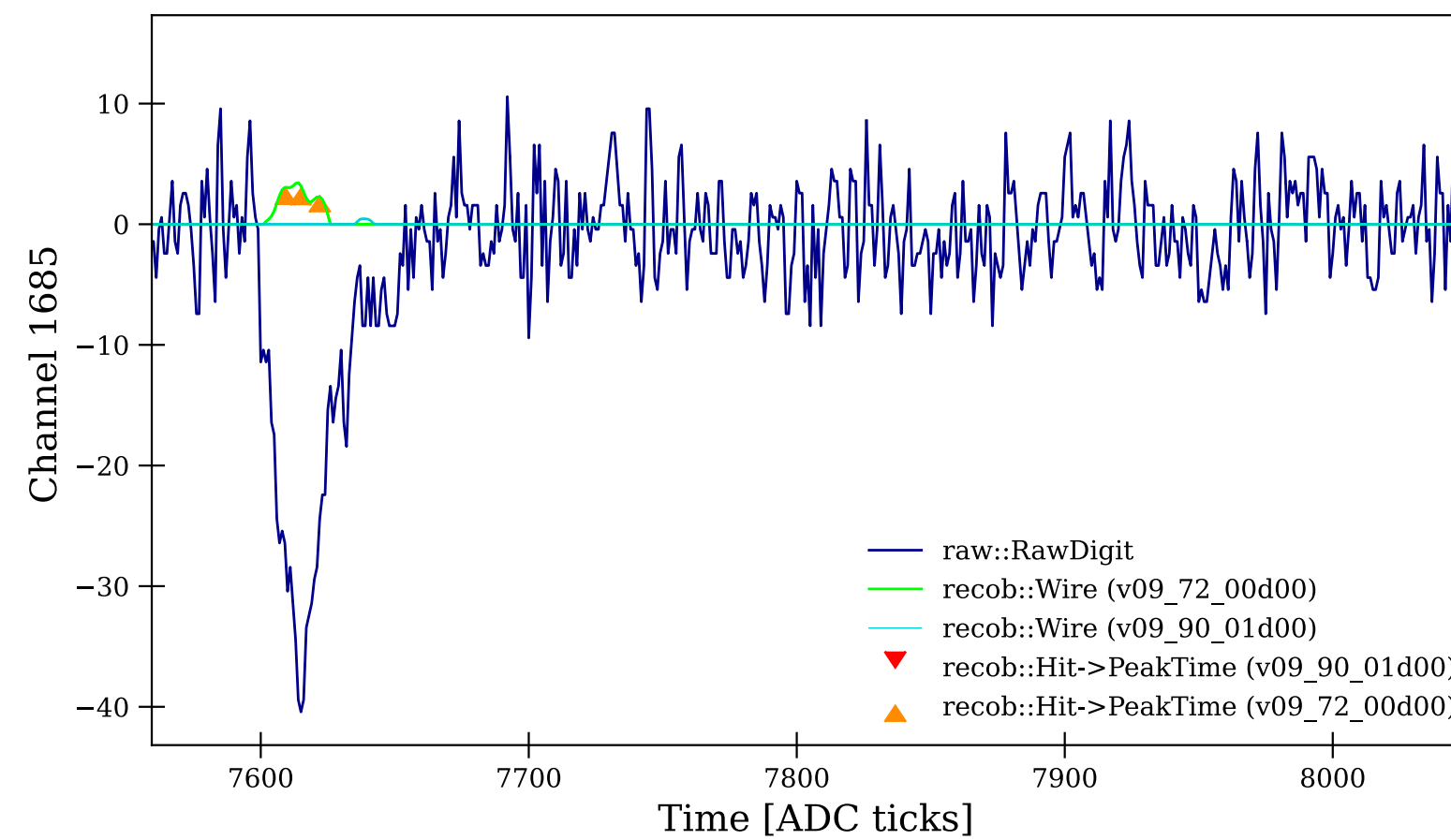
Event 2 - plane 0



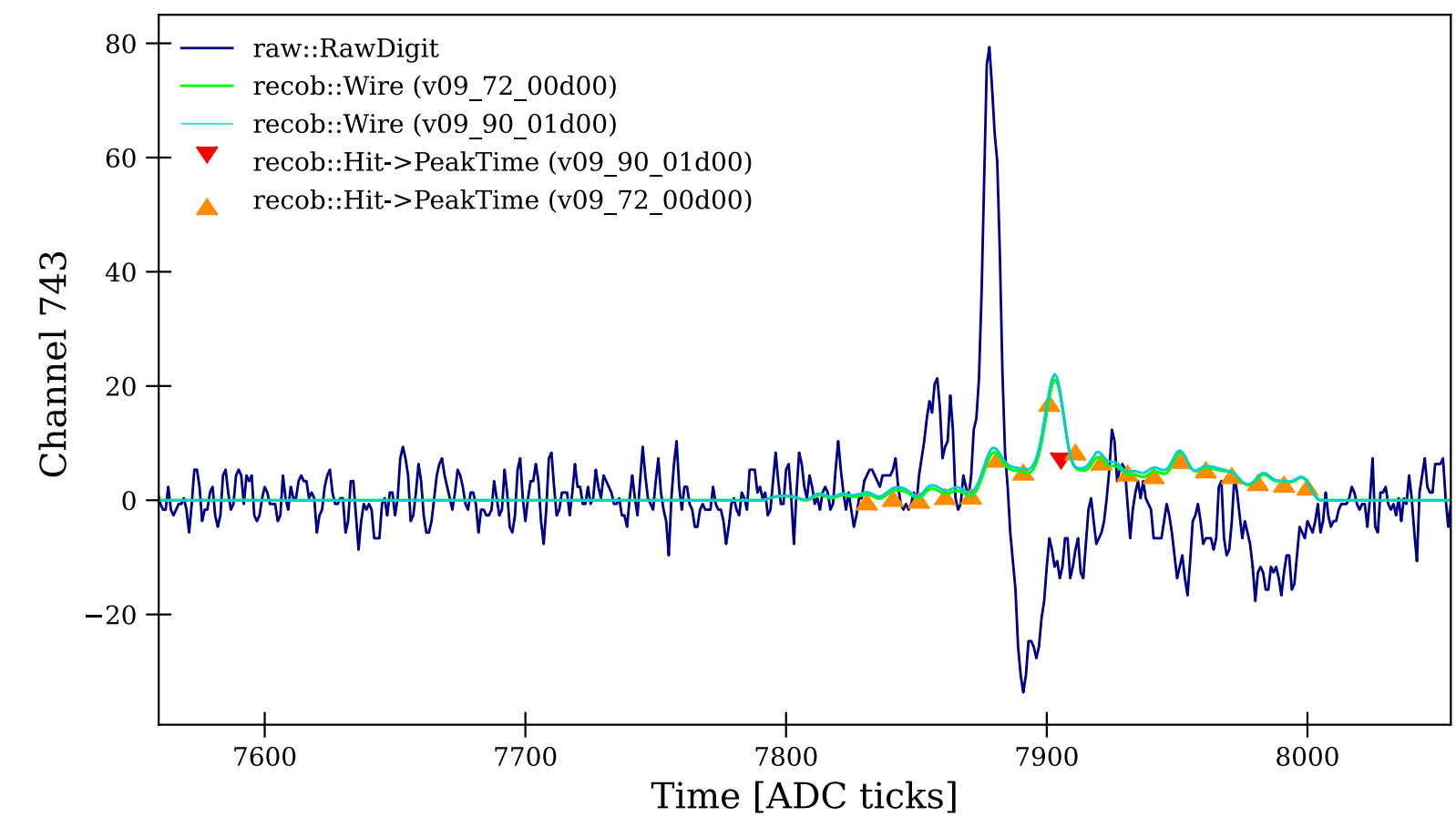
Event 2 - plane 2



Event 2 - plane 1



Event 2 - plane 0



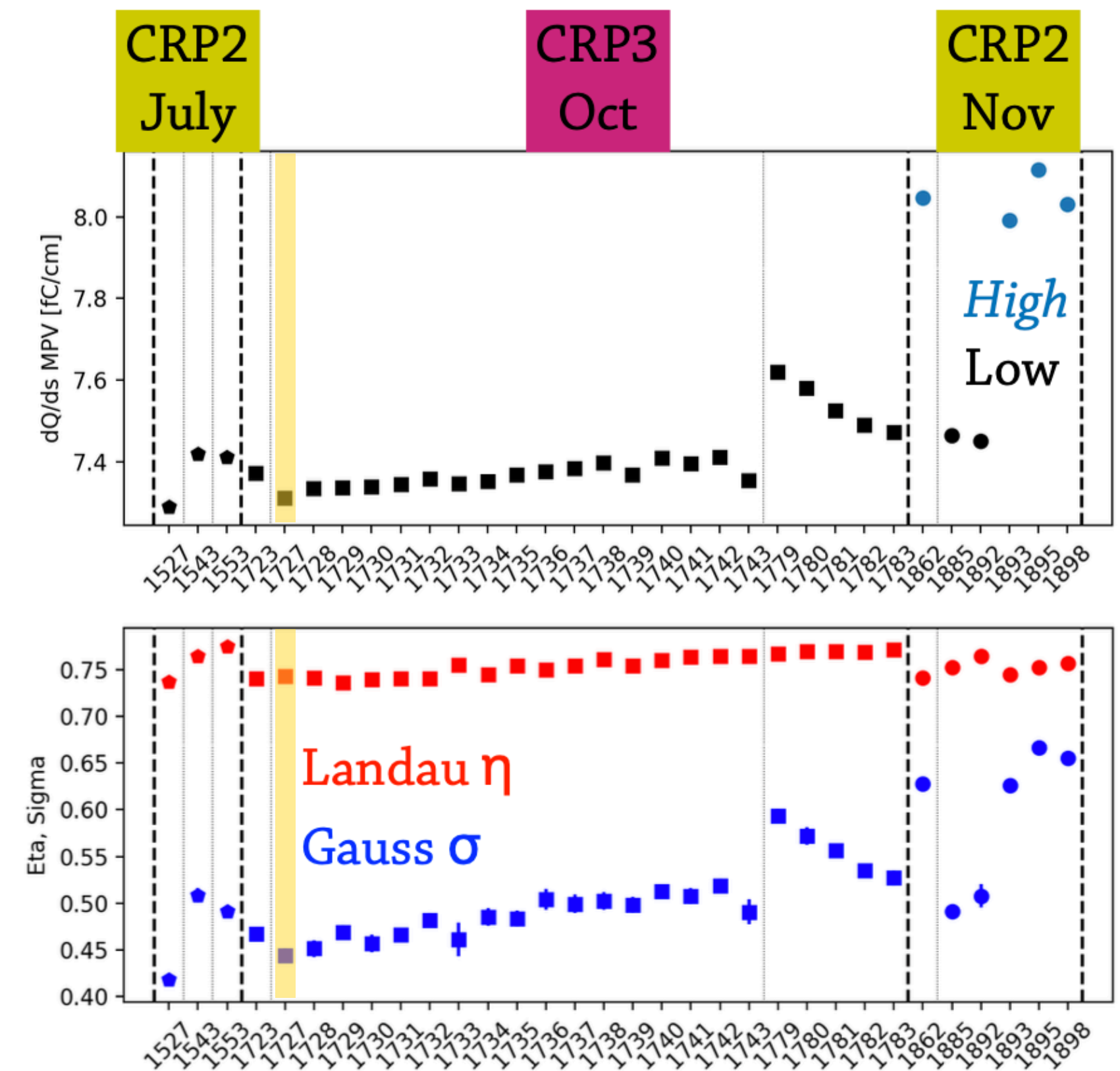
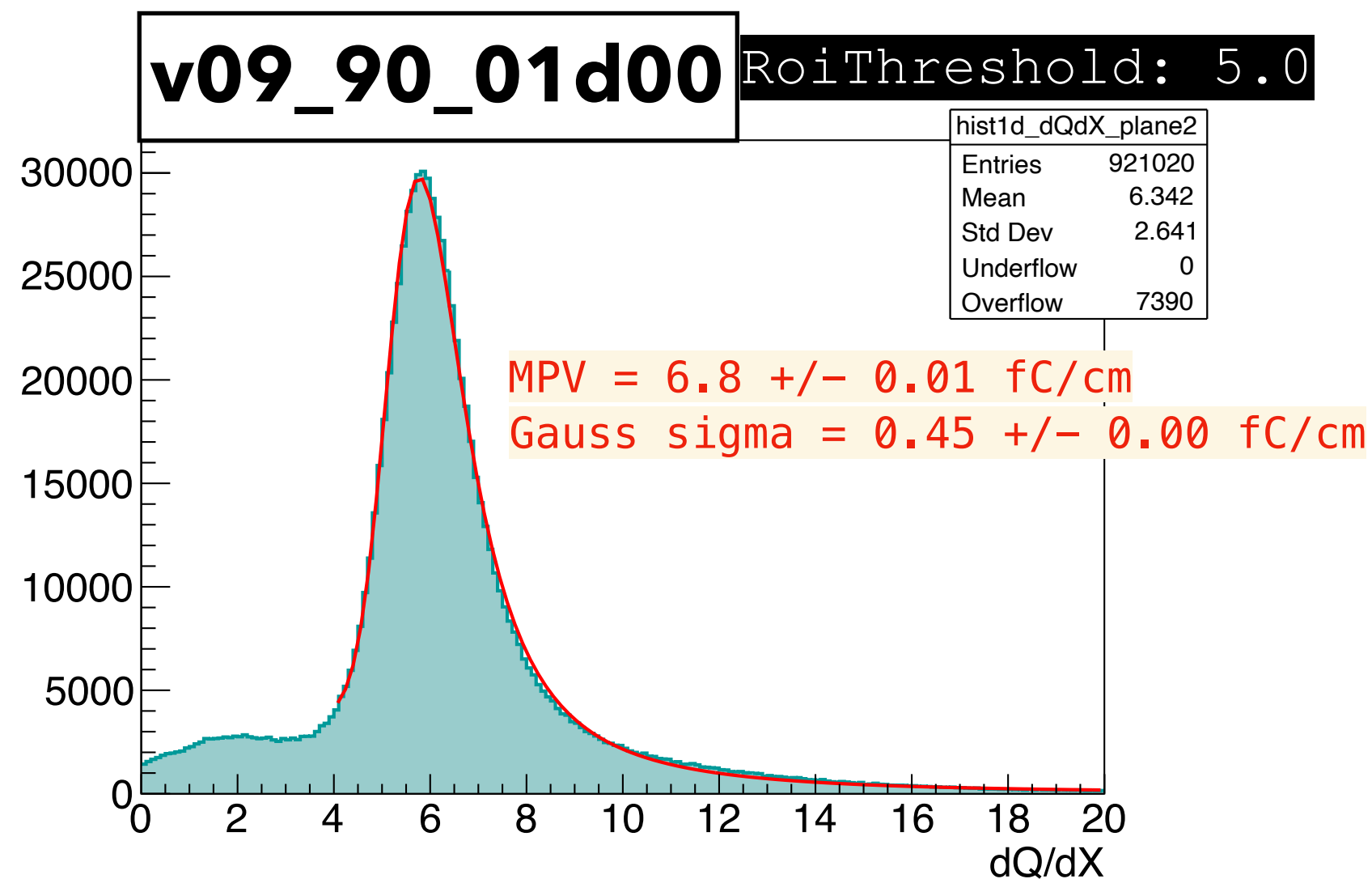
# Conclusion

## ○ Hit finder:

- Setting a hit ROI threshold less than 4 can lead to pick up noise
- More recent version of LArSoft pick up less hit in signal - do we miss some ?

## ○ Calorimetry:

- Smaller MPV than found with LARDON
- Width is similar



*LARDON by Laura Zambelli*