



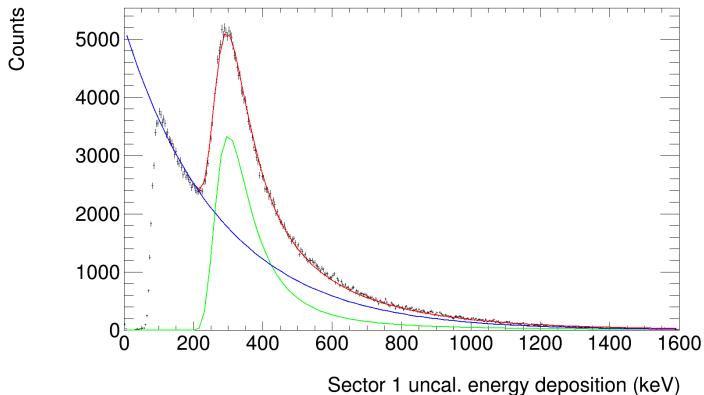
## TPOL update

Sebastian Cole

ASU

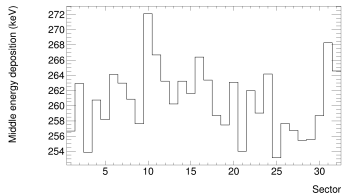
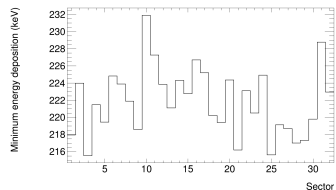
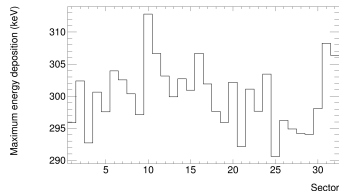
8/6/2018

# TPOL energy deposition fit



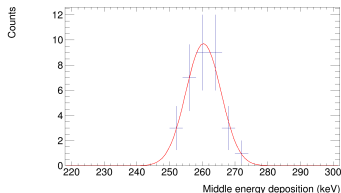
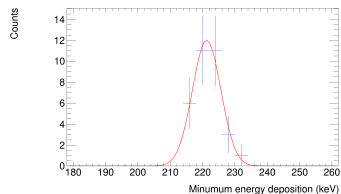
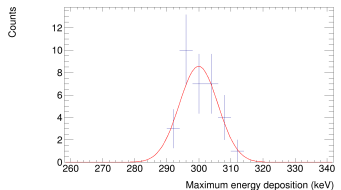
- Fit landau + expo.
- Fit seeded with landau fit from 230 to 500 keV. Fit seeded with expo from 800 to 1600 keV.
- Completed for each data set. Showing 2016 results here.

# Max, min, mid of fit



- Max, min, and midpoint energy.
- Sector 32 had a slightly different fit due to shape of the histogram.

# Sector alignment energy deposition

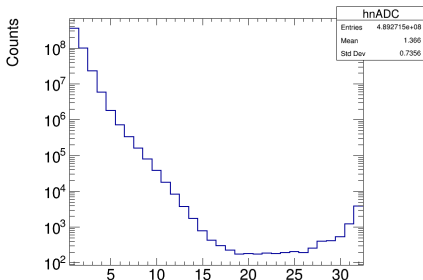
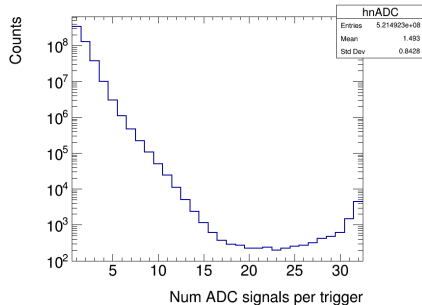
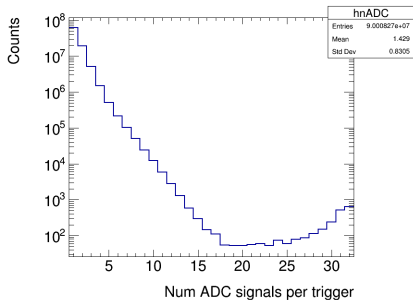


- Max center: 299.9(1.2) keV, sigma: 6.0(1.1) keV
- Min center: 221.2(0.9) keV, sigma: 4.4(0.9) keV
- Mid center: 260.3(1.1) keV, sigma: 5.4(0.9) keV
- Using the minimum to perform the sector alignment for the energy deposition.

- Still working on matching data to MC with this plugin. Running mcsmeas without smearing produced TPOL hits. Will smear from tree level to determine the correct sigma values for mcsmeas.
- Upon completion of smearing, will be finalizing the workflow and working on the systematics for final results.
- Data analysis flow: TPOL\_tree plugin (Extract wave forms) → Recon stage 1 (Fit waveforms) → Recon stage 2 (Calibrate EDep and time) → Recon stage 3 (Build phi distributions for fitting)
- MC analysis flow: TPOL\_MC plugin (Extract smeared objects) → Recon stage 2 (Plot EDep and time) → Recon stage 3 (Build phi distributions for fitting)

# From previous beam line July 23

# TPOL hits



- Top left: 2016, Bottom left: LI2017, Top right: HI2017
- Different view of the plot Sasha showed at the collaboration meeting.

- Began looking at the MC Richard produced.
- Initial work on the generated HDDM file with mcsmeas did nothing. Tracked down to DEventSourceHDDM needing to be updated with help of Justin and David.
- Added Extract\_TPOLHit and Extract\_TPOLTruthHit functions. Will commit the changes before the end of the day.
- MCSmeas now works with TPOL generated events.
- Wrote new plugin to use the TPOL hit object to correctly read the smeared HDDM. Our other plugin uses the raw waveforms.
- Need to update the tagger part of the TPOL\_MC plugin.



# MC smear parameters

- Spoke with Sean about how to change smearing parameters for TPOL in mcsmeas. Need to update the smearing functions and parameters.
- In the past, the TPOL time use a sigma of 4.4 ns with an added flat background.
- Energy deposition smearing has been updated to a double Gaussian. This was done in the response to review of the TPOL NIM paper where the original smearing was a single Gaussian with sigma 30 keV.
- Also using 0.08 MeV and 0.14 MeV readout thresholds in the TPOL smearer for 2016 and 2017 data, respectively. Calculated based on the baseline being approximately 100 and readout thresholds of 130 and 150 for TPOL data 2016 and 2017, respectively.
- I know we used 160 for a readout threshold at some point in 2017.
- Will use these past values as a starting point for matching.

- Working on the final parts of the TPOL\_MC plugin to properly handle the tagger.
- Need to finish the energy deposition corrections for alignment of sectors.
- Work on matching the MC to data.
- Extract analyzing powers for each set of LT fit analysis cuts.
- Determine systematics with the TPOL MC and data.