



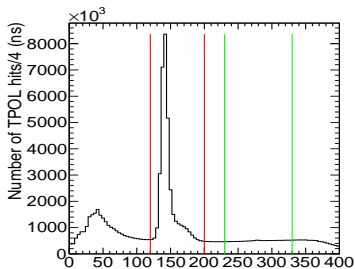
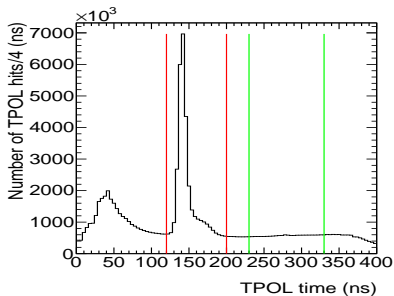
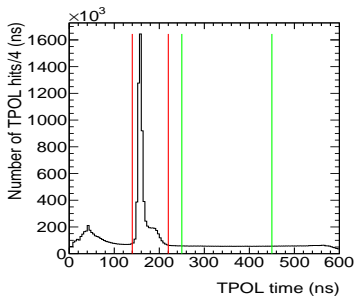
## TPOL update

Sebastian Cole

ASU

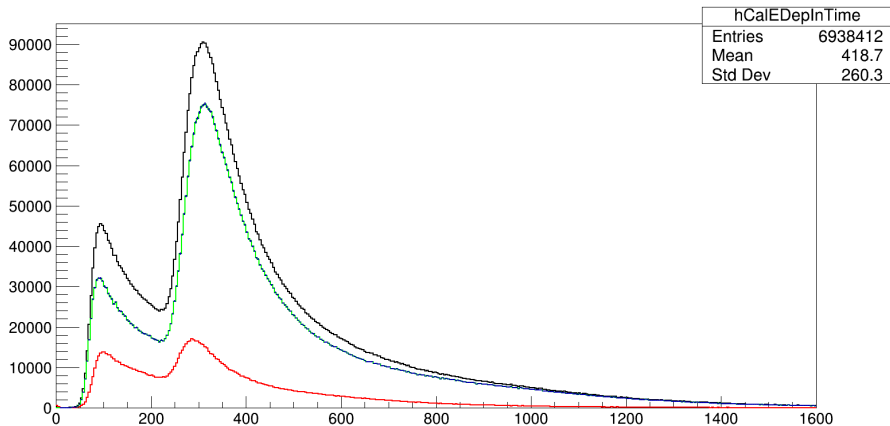
9/28/2018

# TPOL time selection



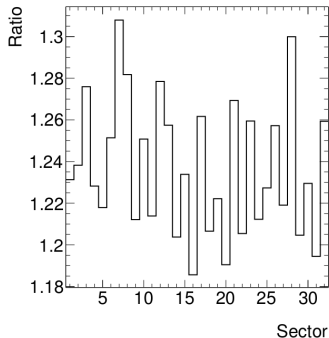
- Top left: 2016, Bottom left: LI 2017, Bottom right: HI2017
- Red shows in time selection, green out of time selection.
- Made in time selections more narrow and out of time selections wider.

# Energy deposition background subtraction



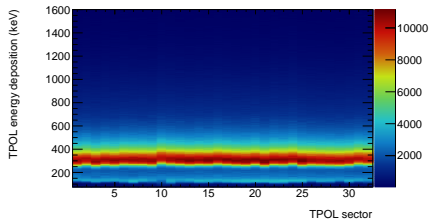
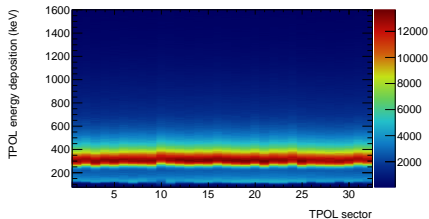
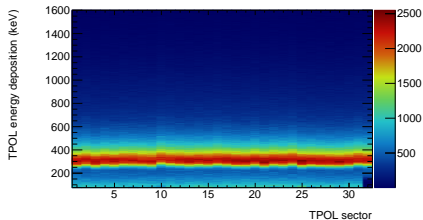
- Constructed using the in and out of time selection for HI2017 data.

# HI2017 ratio energy deposition peak between data and MC



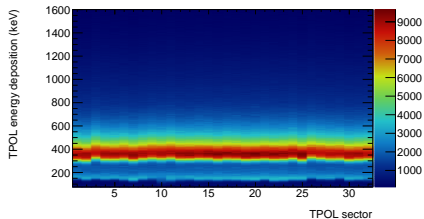
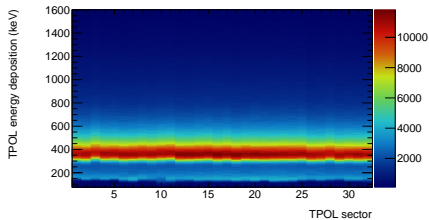
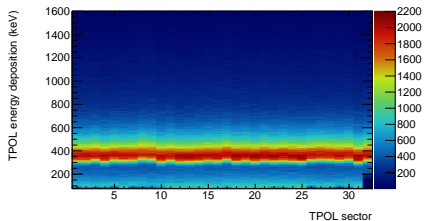
- Took ratio of the TPOL energy deposition found using the maximum bin between data and MC. Used to account for the amplification of the signal.
- This is an iterative sector by sector routine.
- Working on making this fitting routine for data and MC. Landau plus exponential fit needs some work.

# TPOL energy deposition before amplification correction



- Top left: 2016, Bottom left: LI 2017, Bottom right: HI2017

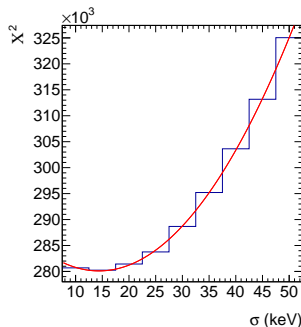
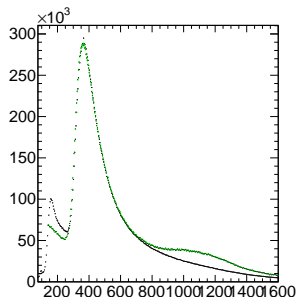
# TPOL energy deposition after amplification correction



- Top left: 2016, Bottom left: LI 2017, Bottom right: HI2017

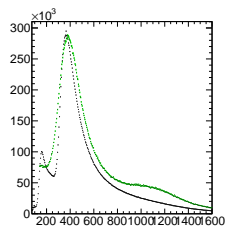
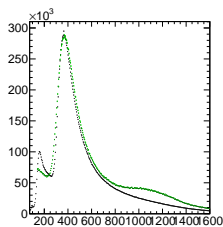
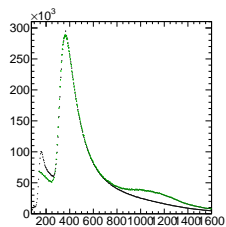
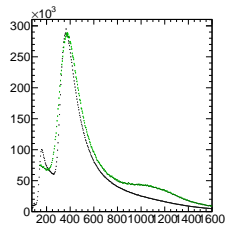
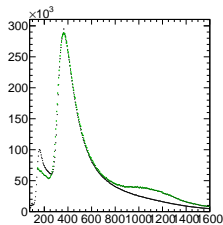
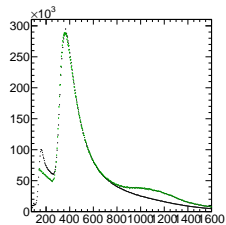
# Determining TPOL energy deposition resolution

- Smearing TPOL energy deposition from 10 keV to 50 keV and compared to calibrated data.
- Applied chi square test between data and mc TPOL energy deposition, scaled by the ratio of the peaks.
- Estimated to be 14.4 keV from second degree polynomial fit to chi square vs. smearing parameter. Left histogram shows comparison of TPOL energy deposition data (black) and mc (green).



# Resolution continued

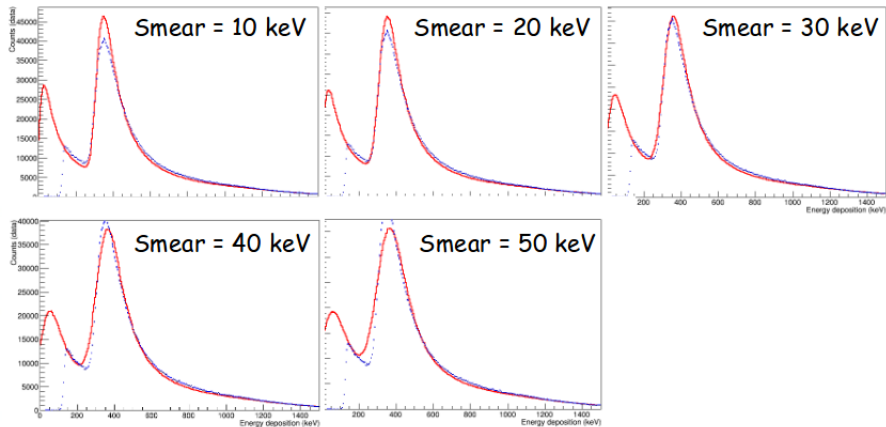
- HI2017 10, 20, 40 keV top, from left to right. 15, 30, 50 keV bottom, from left to right.





# Resolution in past

- Second degree polynomial fit results - HI2017: 14.4 keV, LI2017: 15.3 keV , 2016: 17.6 keV
- Previous results around 30 keV



- May need MC without electron-positron annihilation since not seen in data.
- May not see this enhancement due to larger amount of accidentals.
- Completing phi distribution with analyzing power determination for release.
- Difficulties using same code between data and MC.
- Using only cuts that can be applied in both data and MC. No more signal amplitude cuts due to different behavior between sectors.