

# WEEKLY ANALYSIS UPDATE

05 Nov 2024

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# Steps for Bismuth TP analysis

1. Raw data for APA 2 channels for run 026482 TR datafile
2. Analysis with more data:

```
channel_map = detchannelmaps.make_map("PD2HDChannelMap")

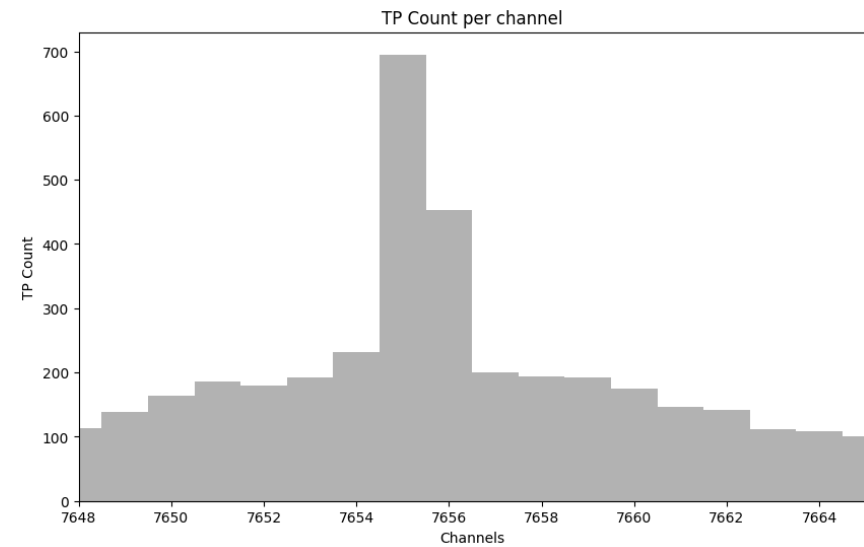
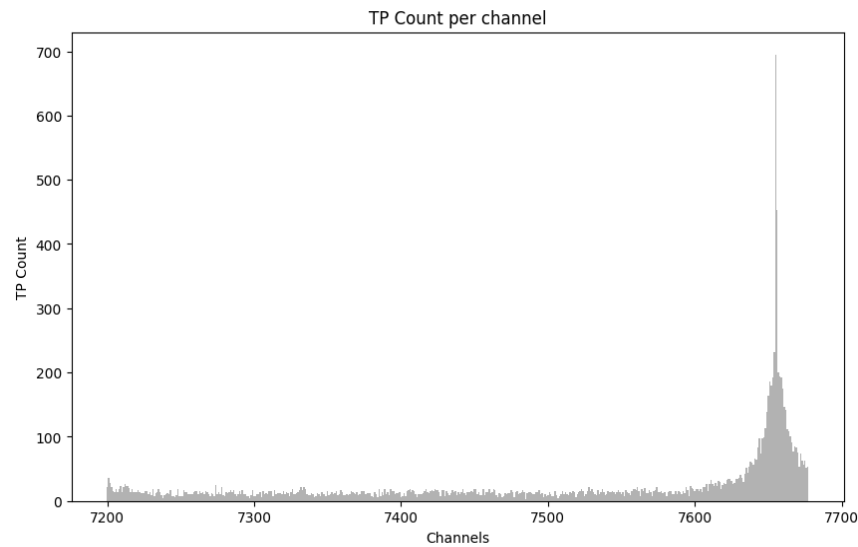
fp1 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0000_dataflow0_datawriter_0_20240528T145108.hdf5.copied"
fp2 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0002_dataflow0_datawriter_0_20240528T150028.hdf5"
fp3 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0003_dataflow0_datawriter_0_20240528T150508.hdf5"
fp4 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0004_dataflow0_datawriter_0_20240528T150948.hdf5"
fp5 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0005_dataflow0_datawriter_0_20240528T151428.hdf5"
fp6 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0008_dataflow0_datawriter_0_20240528T152828.hdf5"
fp7 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0009_dataflow0_datawriter_0_20240528T153308.hdf5"
fp8 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0011_dataflow0_datawriter_0_20240528T154228.hdf5"
fp9 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0012_dataflow0_datawriter_0_20240528T154708.hdf5"
fp10 = "/cephfs/dice/users/gj23442/protodune-data/hd-protodune/np04hd_raw_run026482_0017_dataflow0_datawriter_0_20240528T161028.hdf5"

# List of file paths
file_paths = [fp1, fp2, fp3, fp4, fp5, fp6, fp7, fp8, fp9, fp10]
```

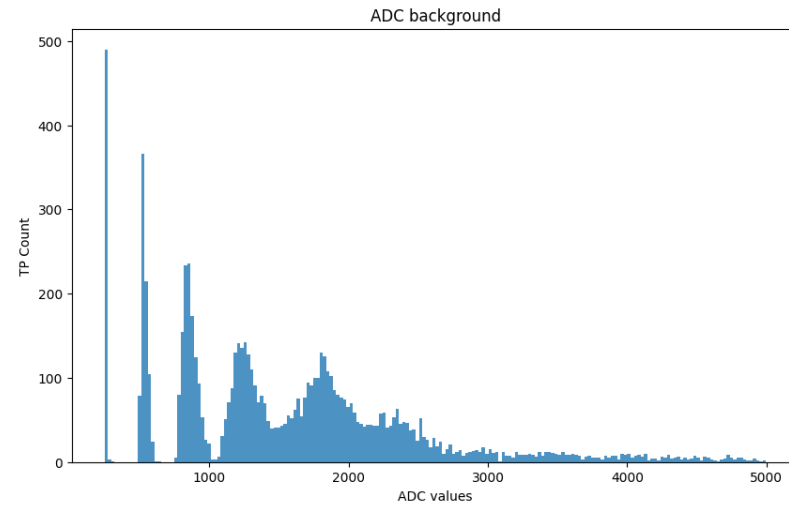
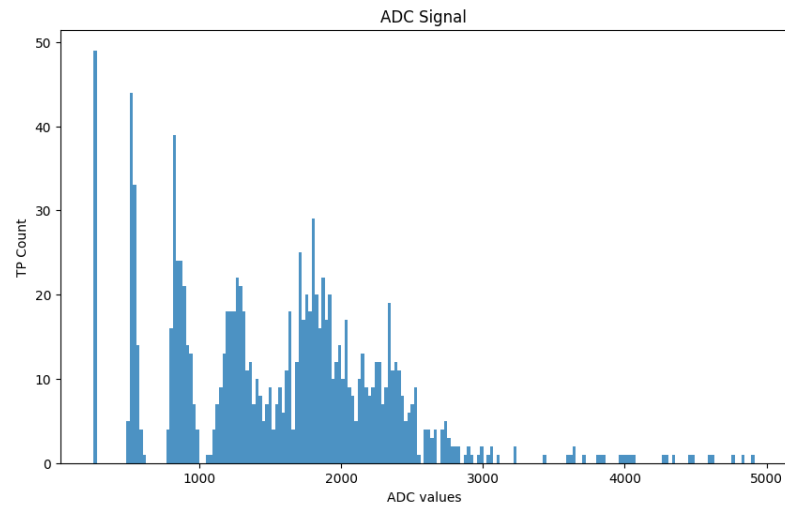
3. Set of Background TPs:
  1. Clustering to remove data from cosmics
  2. Zoom in on Bismuth active region
4. Plotting ADC value histogram for signal (Bismuth) and background region
5. To get only Bismuth TPs: Subtraction of the expected background TPs in the signal region to estimate only Bismuth TPs

# TP Count per Channel

- Datafile: run 026482 off beam data for APA 2
- Emulated Collection TPs
- Algorithm: Simple Threshold (=250)
- To try with actual TPs in TRs?

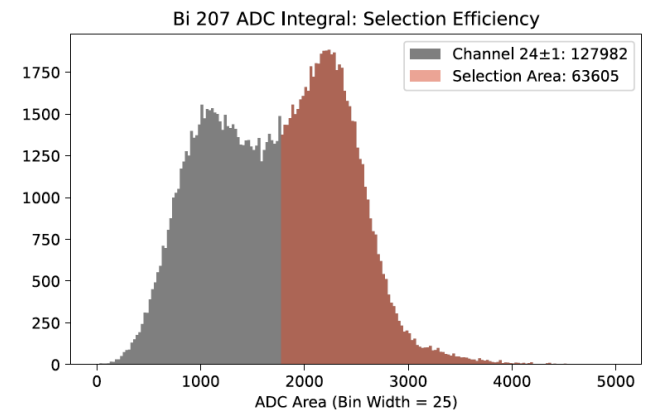


# TP ADC Histogram



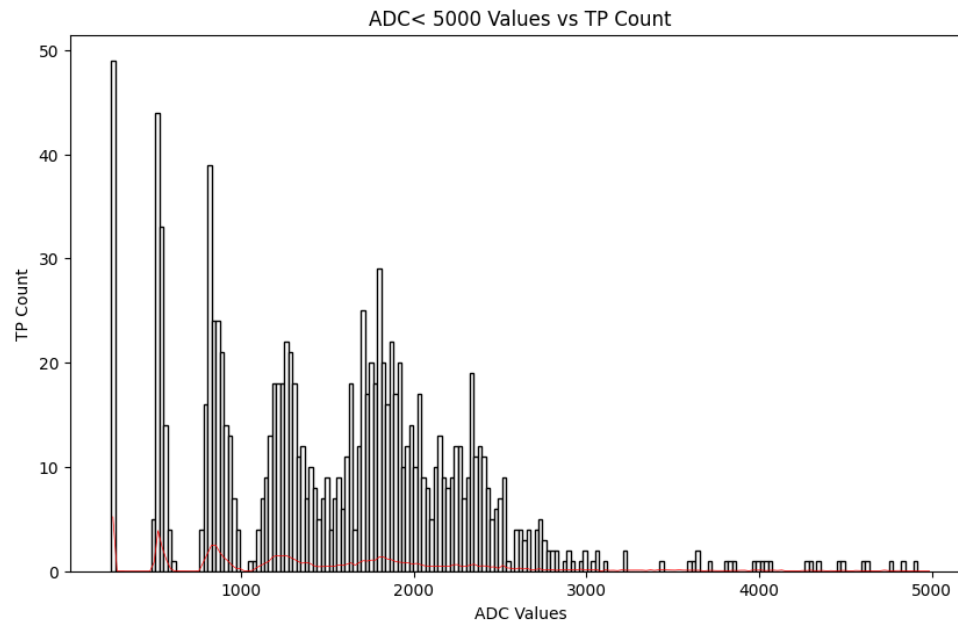
\*Bins = 200 to match Alex's plot

- ADC integral of TPs from APA 2
- Multiple high value peaks from previous background plot from unclustered TPs

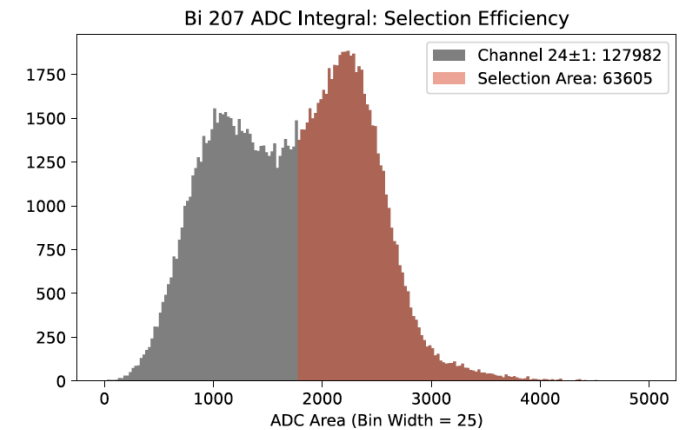


[Link](#) to Alex's presentation

# TP ADC Histogram



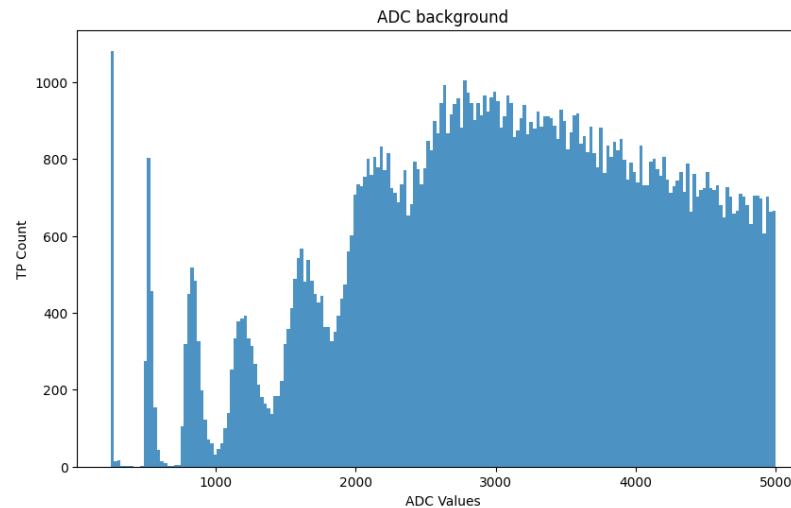
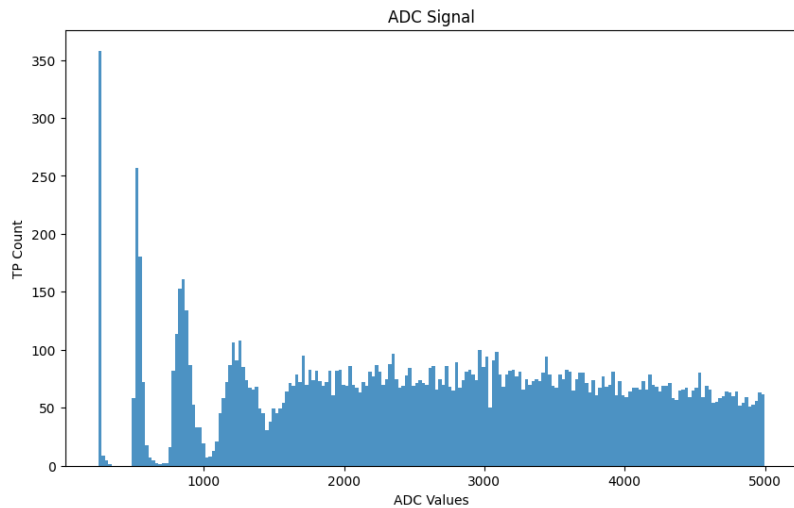
- ADC integral of TPs from APA 2
- Extrapolated background distribution to signal region through channel number:  $N_{\text{sig}}/N_{\text{bkg}}$



[Link](#) to Alex's presentation

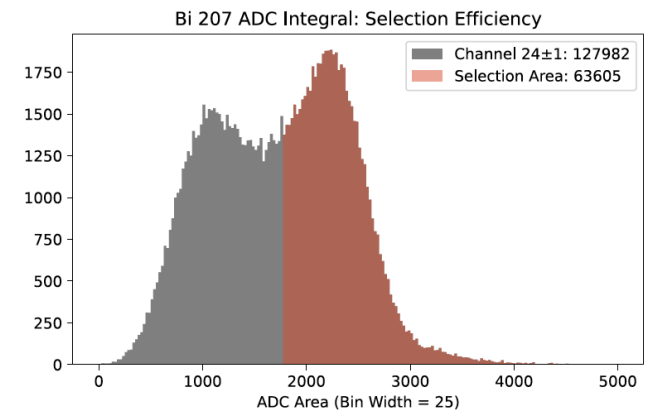
**THANK YOU!**

# TP ADC Histogram



\*Bins = 200 to match Alex's plot

- ADC integral of TPs from APA 2
- More background TPs in the taken ADC value range
- Subtraction results in negative values



[Link](#) to Alex's presentation