# WEEKLY ANALYSIS UPDATE

07 June 2024

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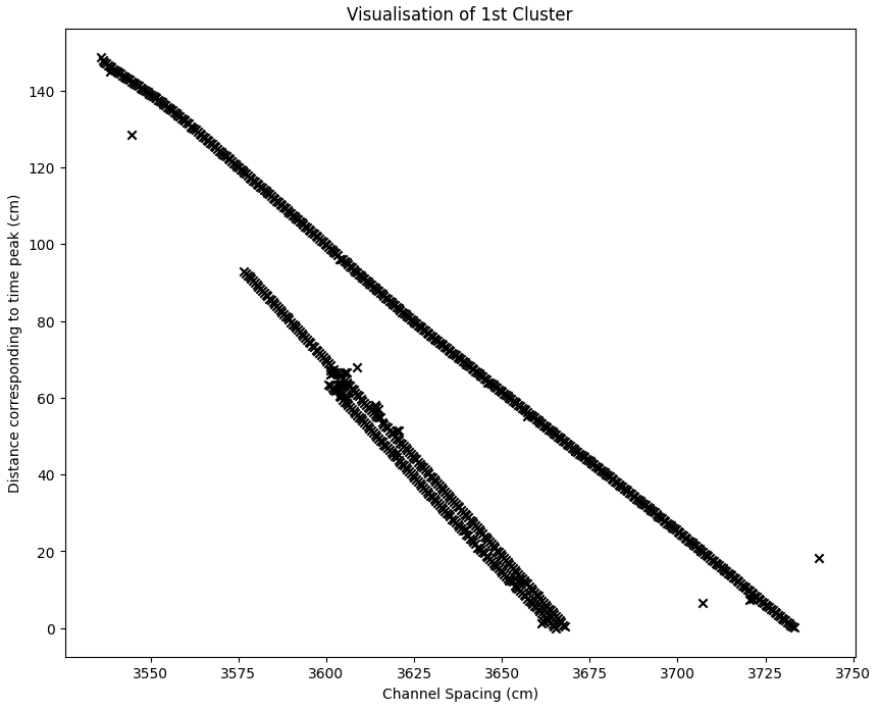
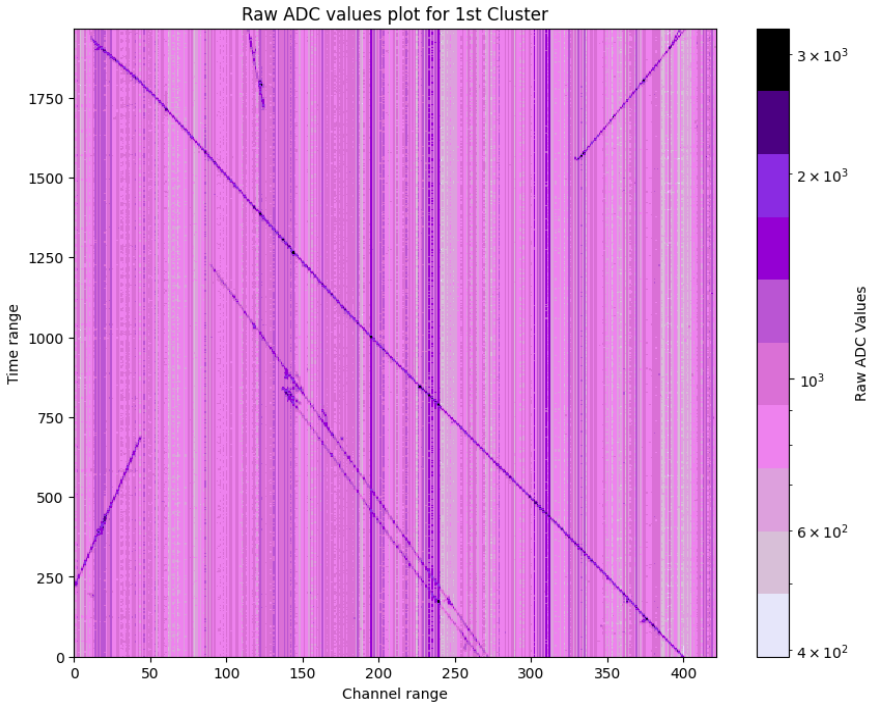
# Outline

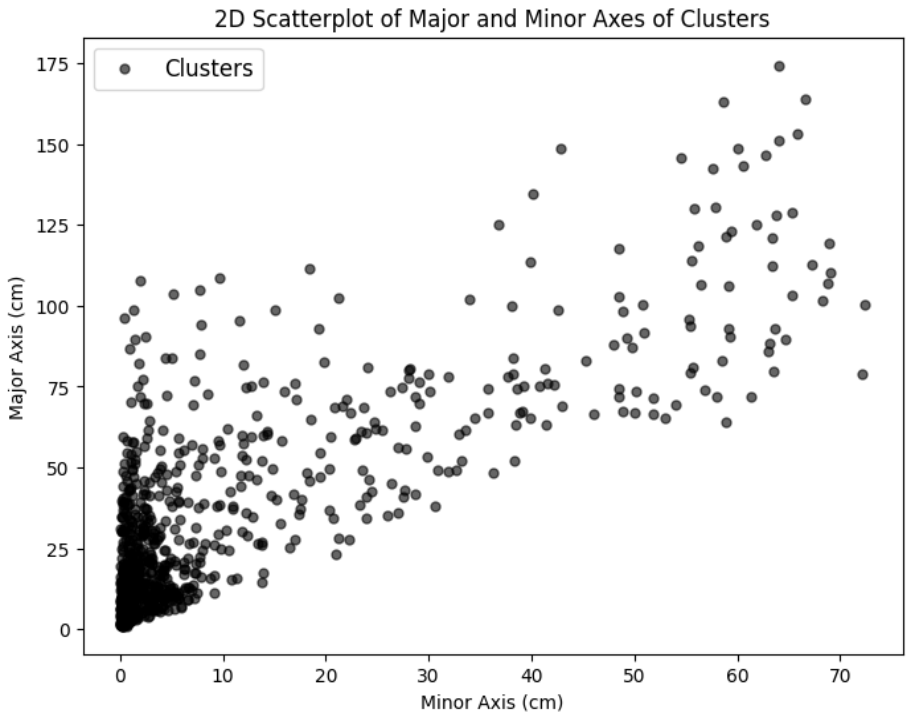
- Switch to working with Trigger Record (Datafile: np04hd_raw_run026482_0000_dataflow0_datawriter_0_20240528T145108.hdf5.copied)
- Code from Dennis: Plotting the Raw ADC data for the region around the cluster
- Repetition of the previous analysis with TR

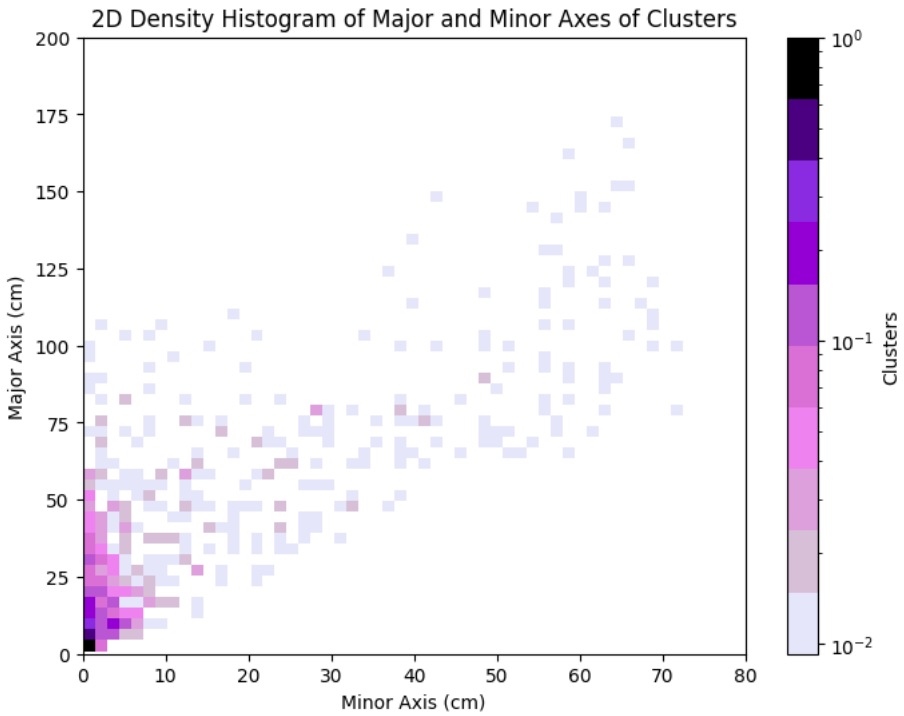
# Visualisation of Clusters with Raw ADC data



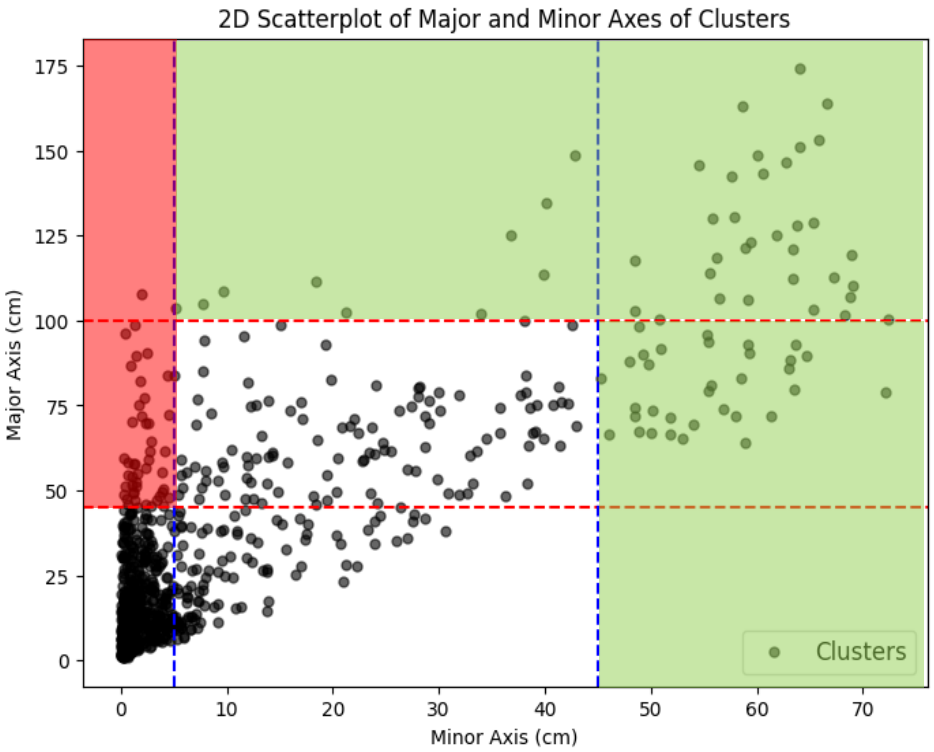



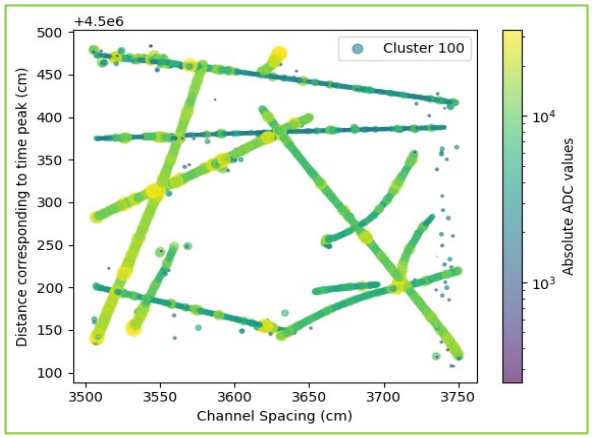
# Visualisation of Clusters for PD2HD

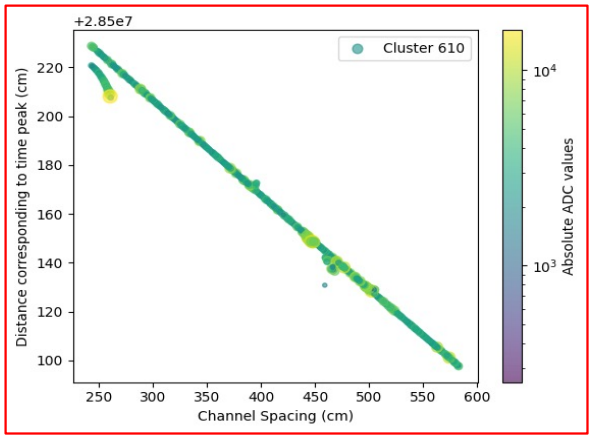


# Visualisation of Clusters for PD2HD



# Further Tasks

- Select the Interesting clusters along with the Raw data
- Run TPG algorithm on selected raw ADC data

THANK YOU!

# Visualisation of DBSCAN Functionality

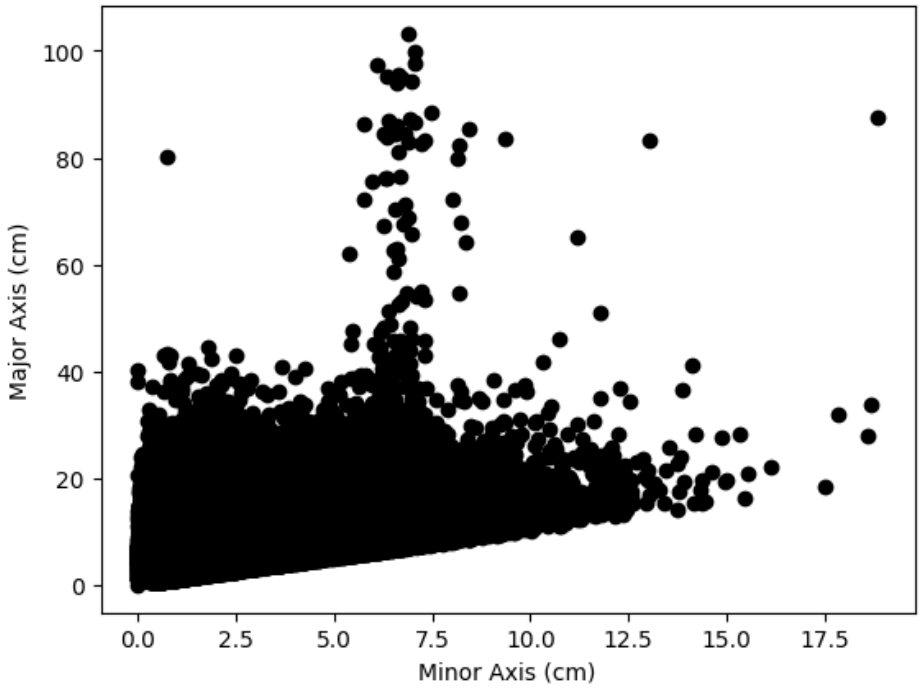
STEPS:

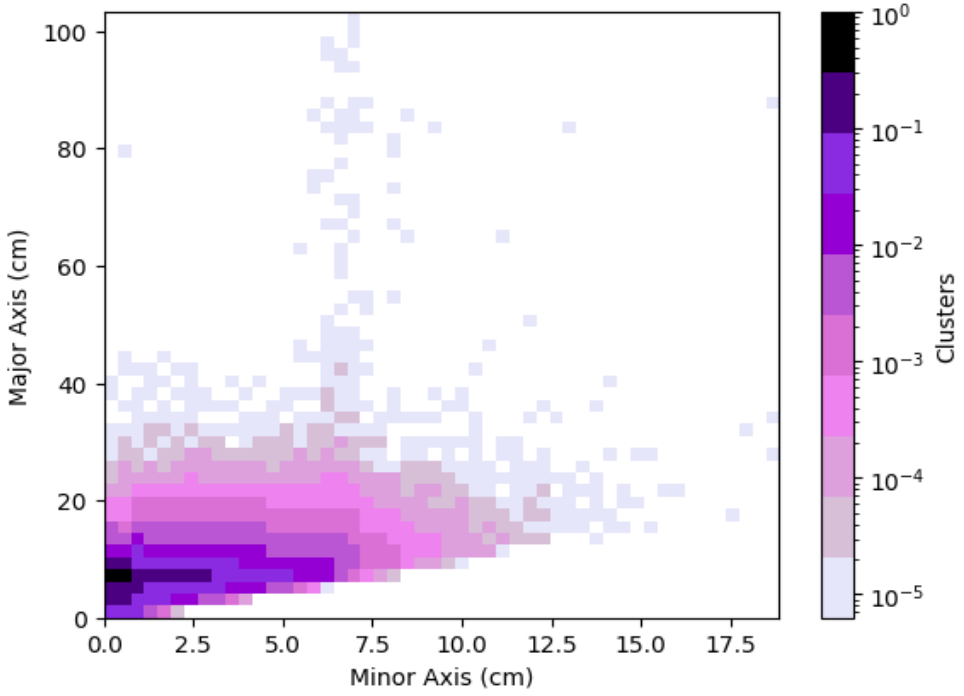
1. Dataframe (DF1) from JIT → TPs in increasing order with IDs and other properties
2. Clustering and Clustered Dataframe (DF2)
3. DF2 → TP IDs of a Cluster of interest
4. DF1 → Channel ‘c’ and Time_peak ‘t’ (Note: Length of these arrays = Total number of TPs in the datafile)
5. The ‘c’ and ‘t’ sliced according to the range of TP IDs from step 3
6. Example: For TP IDs of a cluster : [3,5,7,9], I will do c[:10] and t[:10]
7. Again the ‘c’ and ‘t’ are sliced into clusters (done using Dennis’s code) → Cluster of interest
8. Example: Channel ‘c’ now: [[channel info of TPs in cluster 1],[cluster 2], …] (‘t’ similarly). If Cluster 1, I will simply pick out c[1] and t[1]
9. The data from Step 6 and 8 → Plotted with different markers

NOTE:

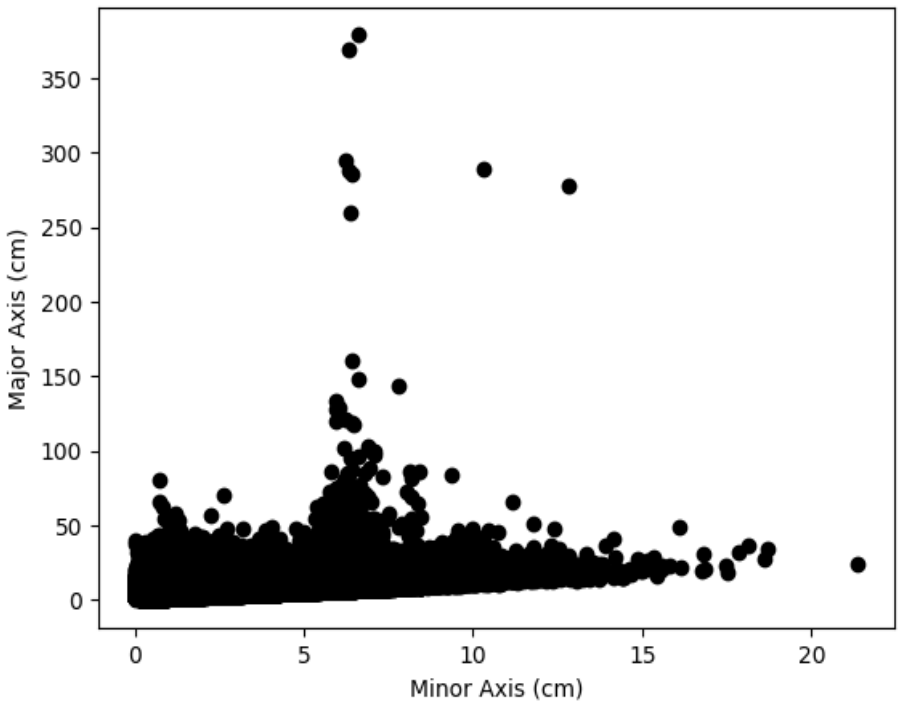
- As advised by Dennis, I compare the time_max and time_min (from DF2) of the cluster of interest to the maximum and minimum of the sliced range.
- The range I choose is not exclusive and contains multiple clusters.
- The interval length in y axis varies according to range. Need to bring it to a fixed scale.

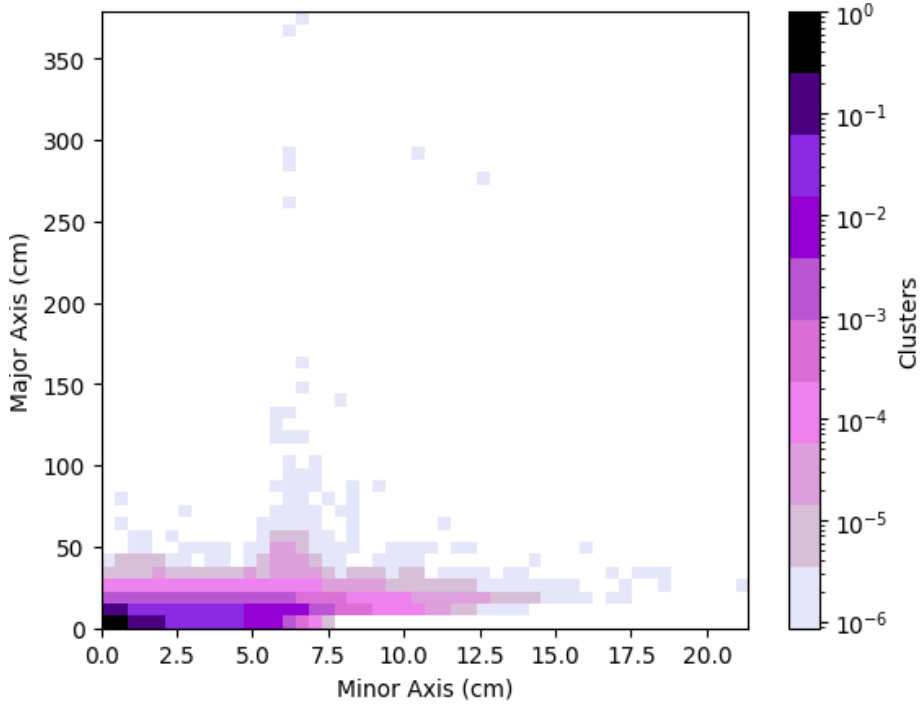
# For only Collection Plane



# For TP-stream file



# Outline

- Dennis's `Cluster_Finder` using `DBSCan` to perform Clustering on Trigger Primitives
- Clustering parameter: Channel number and Time peak of the TPs
- Normalisation of the two parameters:
  - Channel range: 0 - 3071
  - Time range: ~ $10^{18}$
- Values used for Normalisation:
  - Tick = 16e-9 s
  - Drift velocity = 150000 cm/s (?)
  - CRP Channel space = 0.51 cm
- Visualisation of the minor axes (depicts channel number) and major axes (depicts time peak)

STEPS :

- Read the fragment using `trgtools.TPReader`
- Perform the clustering using `cluster_finder.db_cluster_tps`
- Creating an array that contains the clusters as its elements with the clusters in array formats having the TP indices within them using `cluster_finder.create_clusters_array`
- Getting the corresponding time peak and channel number values for each clustered TP using the `cluster_finder.make_ak_slicer`
- Making a similar array as the third step for Channel and Time peak and plotting them