

# WEEKLY ANALYSIS UPDATE

31 May 2024

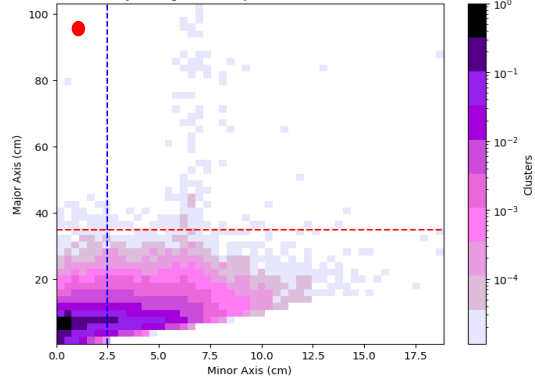
Samikshya Kar

# Outline

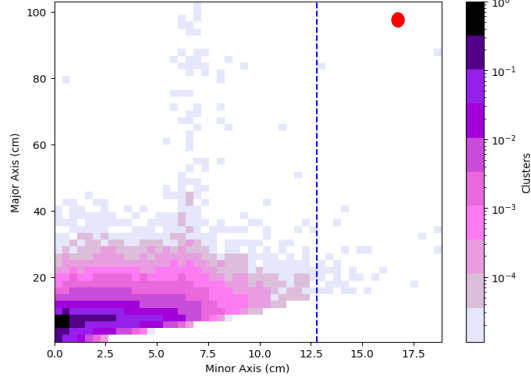
- Visualisation of different regions of the 2D major-minor axis plot with ADC integral values
- Initialisation of using a Trigger Record datafile using Dennis's script

# Visualisation of Clusters with ADC Values

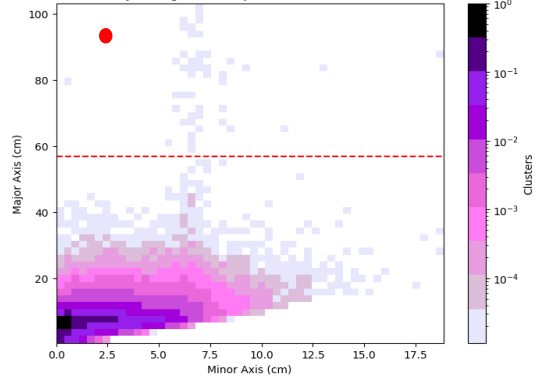
2D Density Histogram of Major and Minor Axes of Clusters



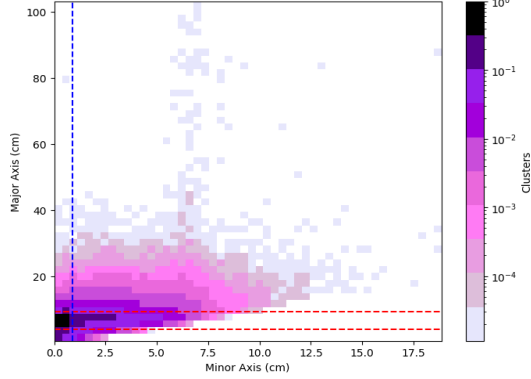
2D Density Histogram of Major and Minor Axes of Clusters



2D Density Histogram of Major and Minor Axes of Clusters



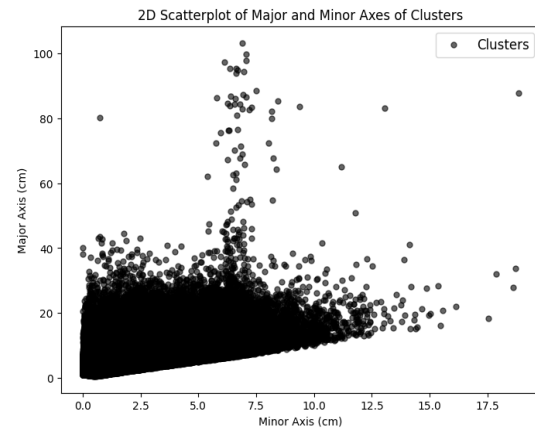
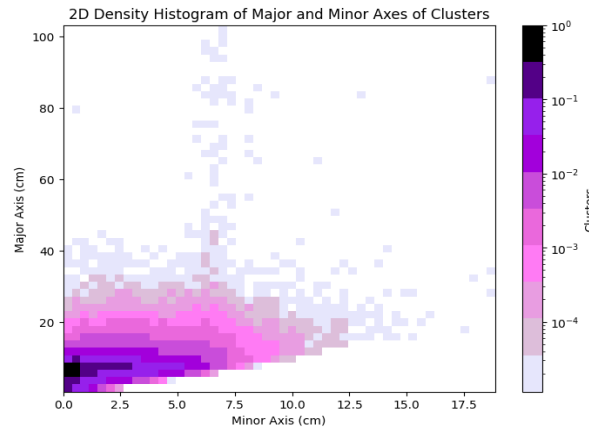
2D Density Histogram of Major and Minor Axes of Clusters



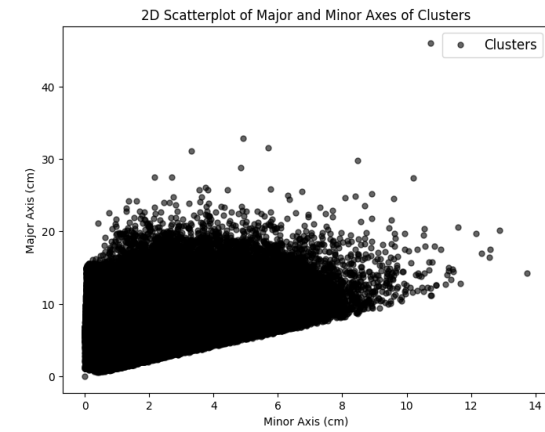
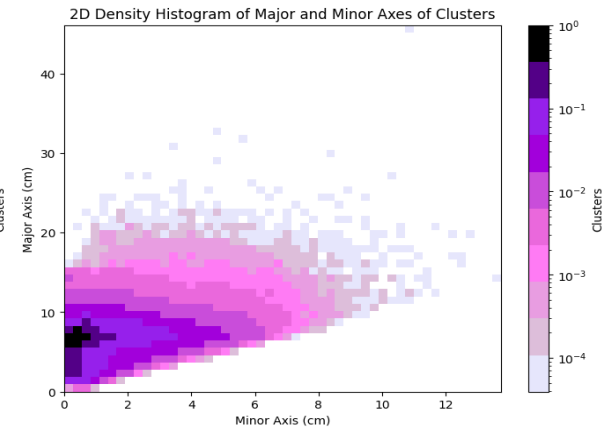
Note :  
Color- Absolute ADC integral values  
Size- Normalized ADC integral values

# Visualisation of Clusters in CRU

CRU 1 (Upper)



CRU 2 (Lower)



## Further Tasks

- Repeating the analysis on a Trigger Record files using `justintime`
- Run TPG algorithm on selected raw ADC data

**THANK YOU!**

# Visualisation of DBSCAN Functionality

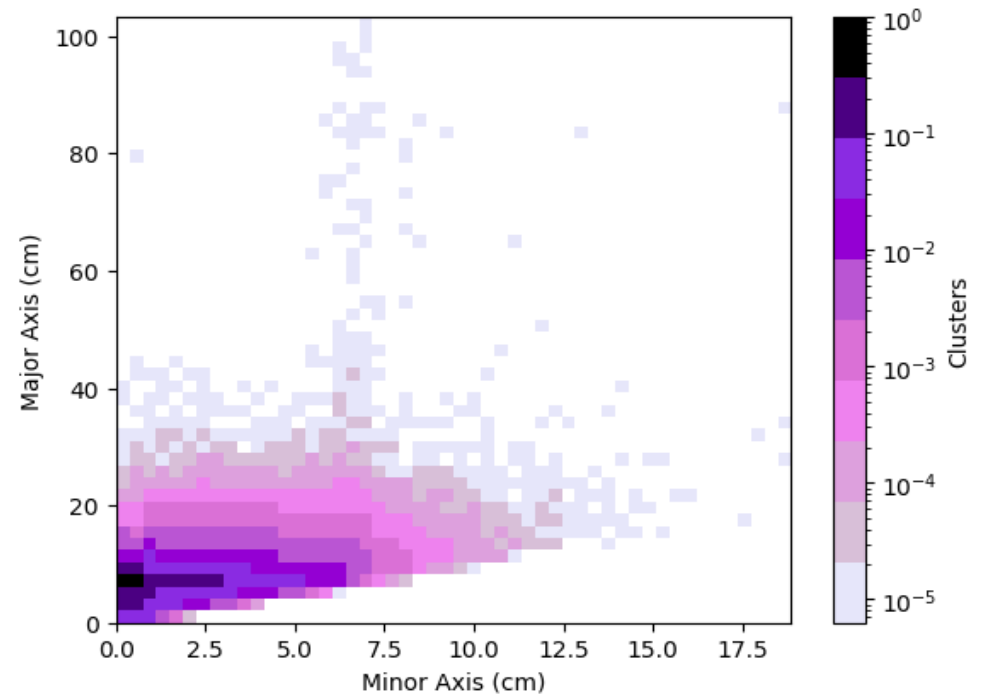
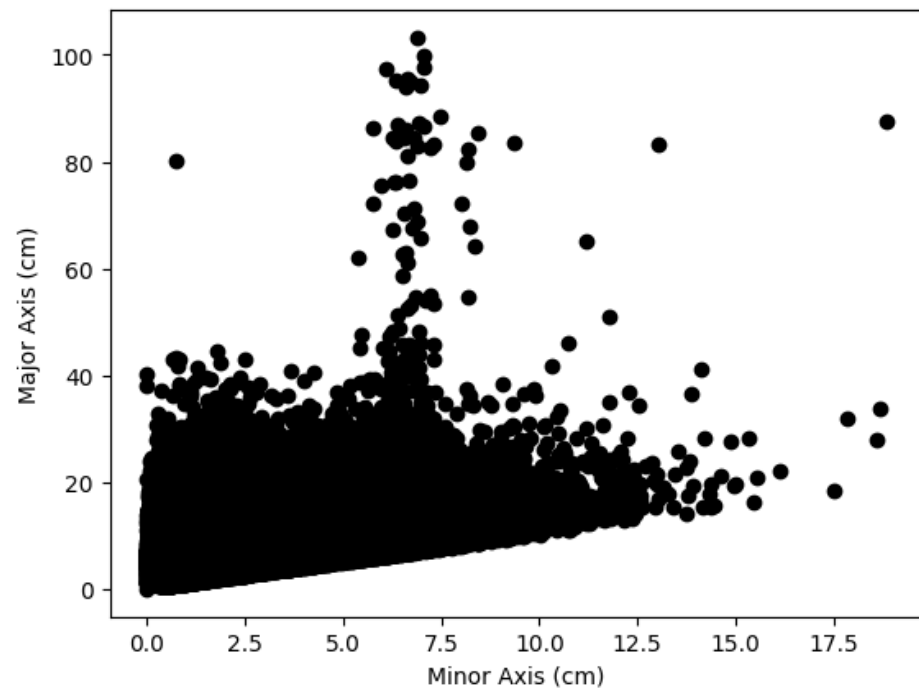
## STEPS:

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:

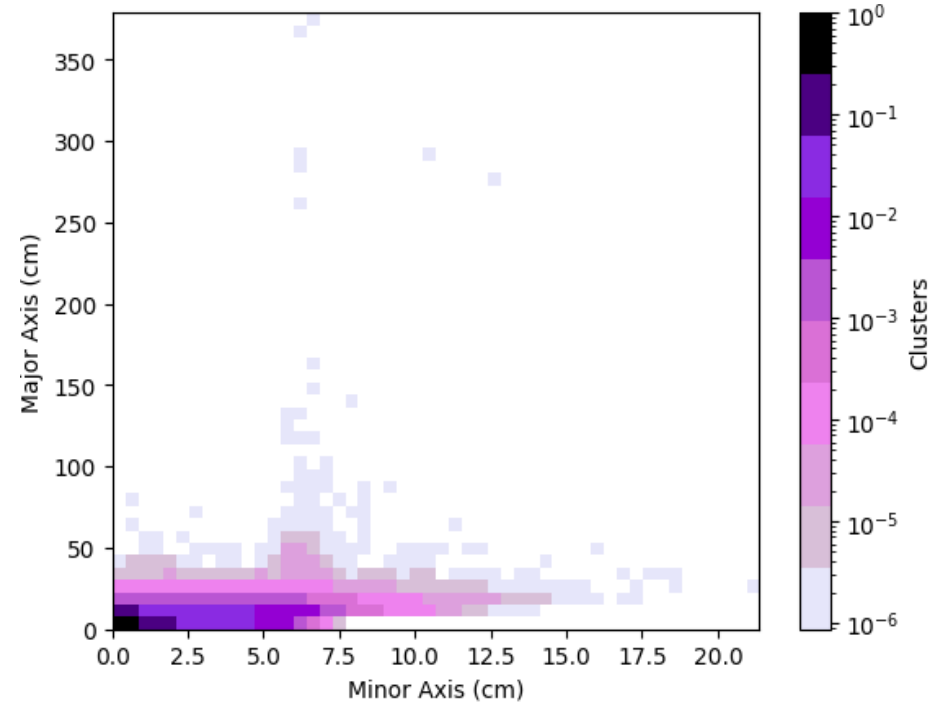
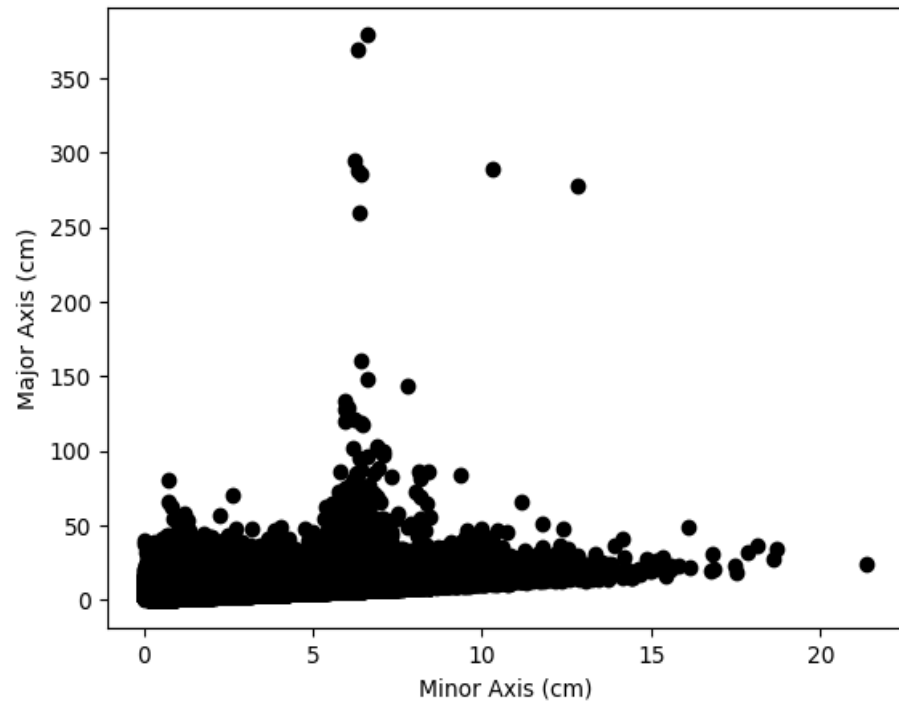
- As advised by Dennis, I compare the `time_max` and `time_min` (from DF2) of the cluster of interest to the maximum and minimum of the sliced range.
- The range I choose is not exclusive and contains multiple clusters.
- The interval length in y axis varies according to range. Need to bring it to a 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:  $\sim 10^{18}$
- 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