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VERTEX FINDING UPDATE

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REVIEW OF RECONSTRUCTION CHAIN

Time Clustering

Voxelization

Spacial Clustering

Track Fitting

Vertex Finding

OVERVIEW

Current Vertex Finding Algorithm

Vertex Finding Using Time

Differences in Outcomes

Possible Causes for Differences Between Methods

CURRENT VERTEX FINDING

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- Once a linear track is selected from the set of events the vertex finding simply assumes that the most upstream voxel is the vertex of the interaction
- The most upstream voxels time is used to calculate energy and its position is used in the extinction profile
- *Errors in the vertex would greatly effect both these distributions

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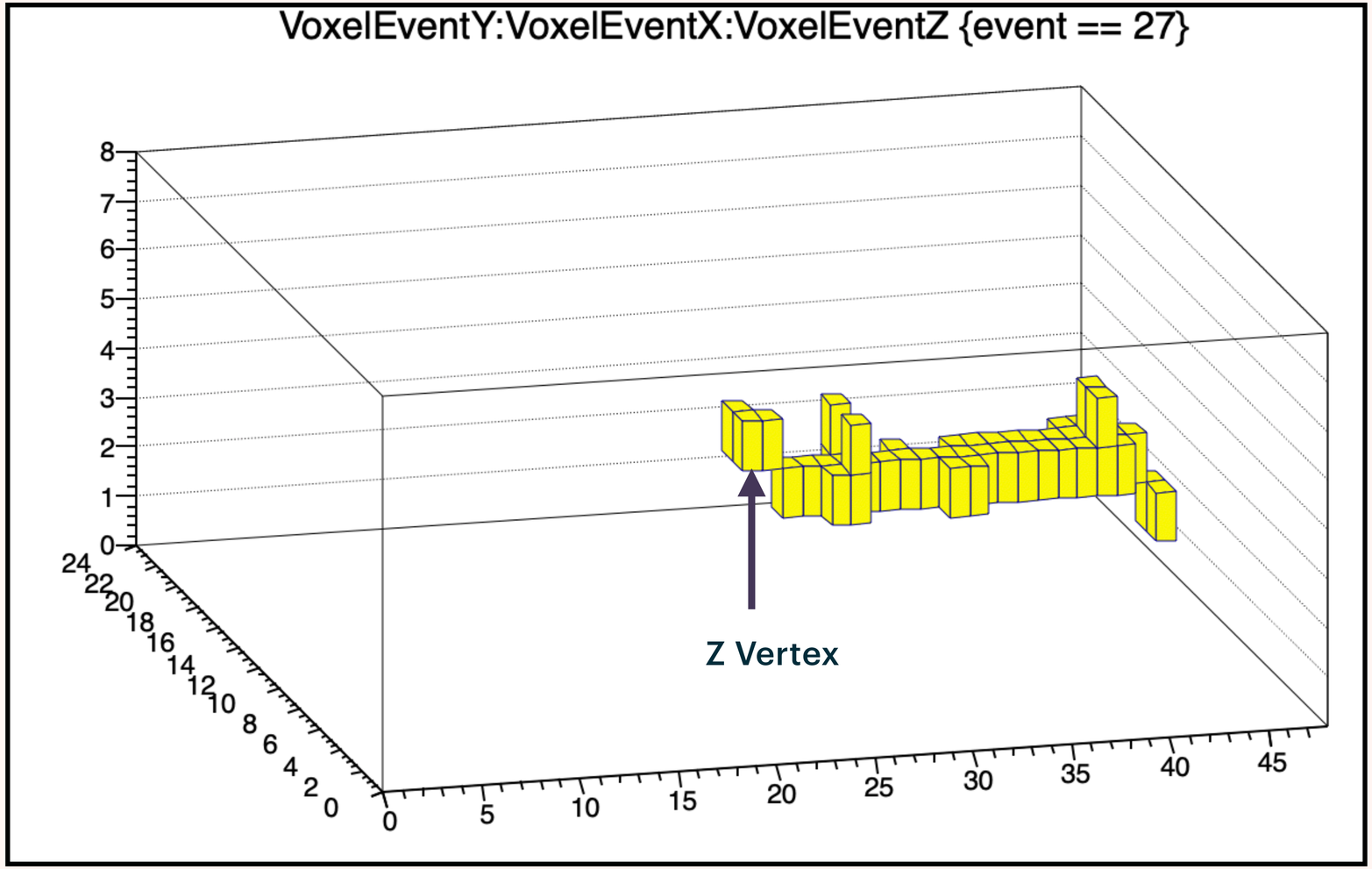

VERTEX FINDING USING TIME

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- Once a linear track is selected from the set of events the voxels with the earliest time in the XZ view are grouped
- The most upstream voxels from this set of earliest voxels is used as the interaction vertex
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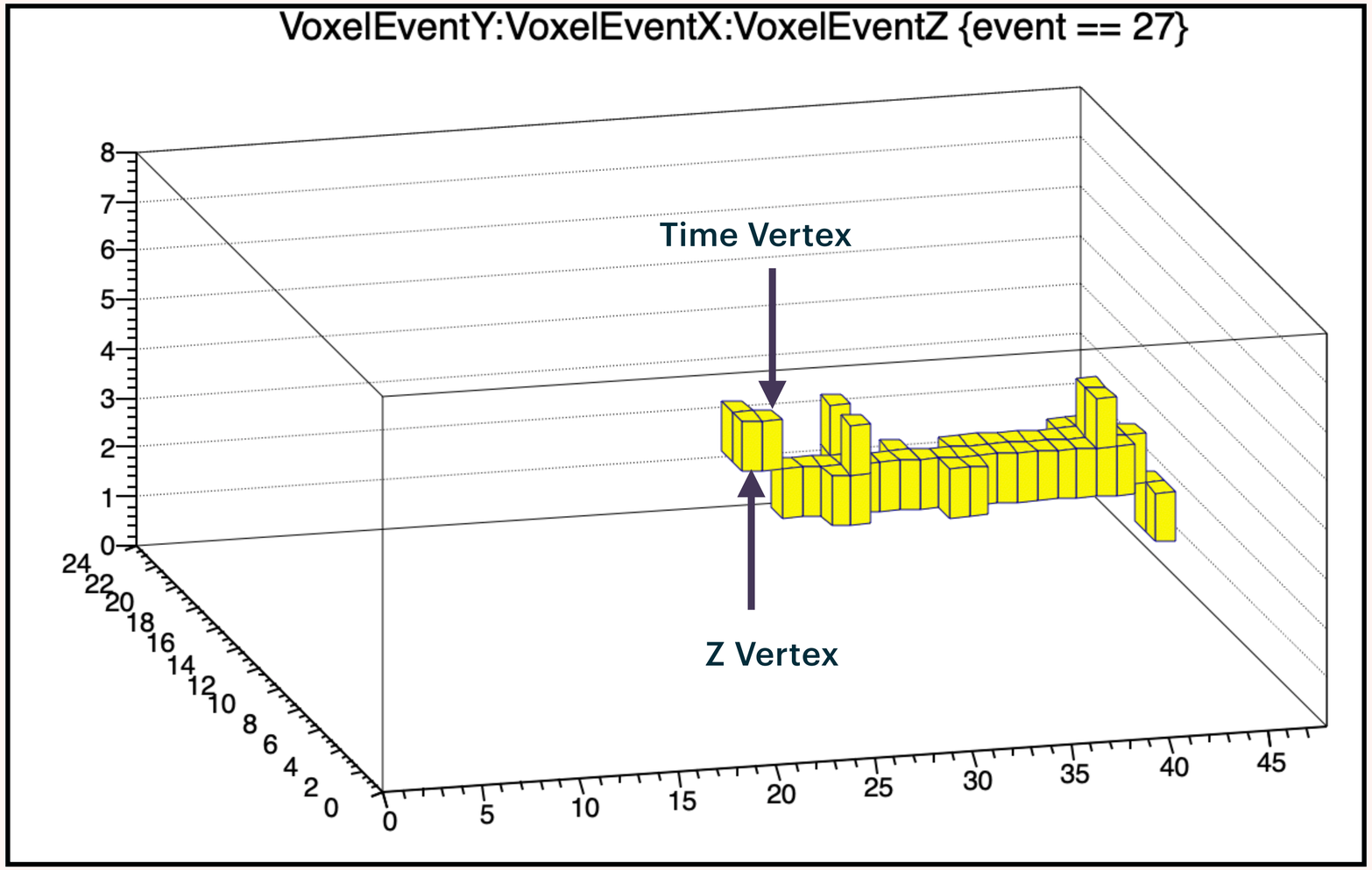
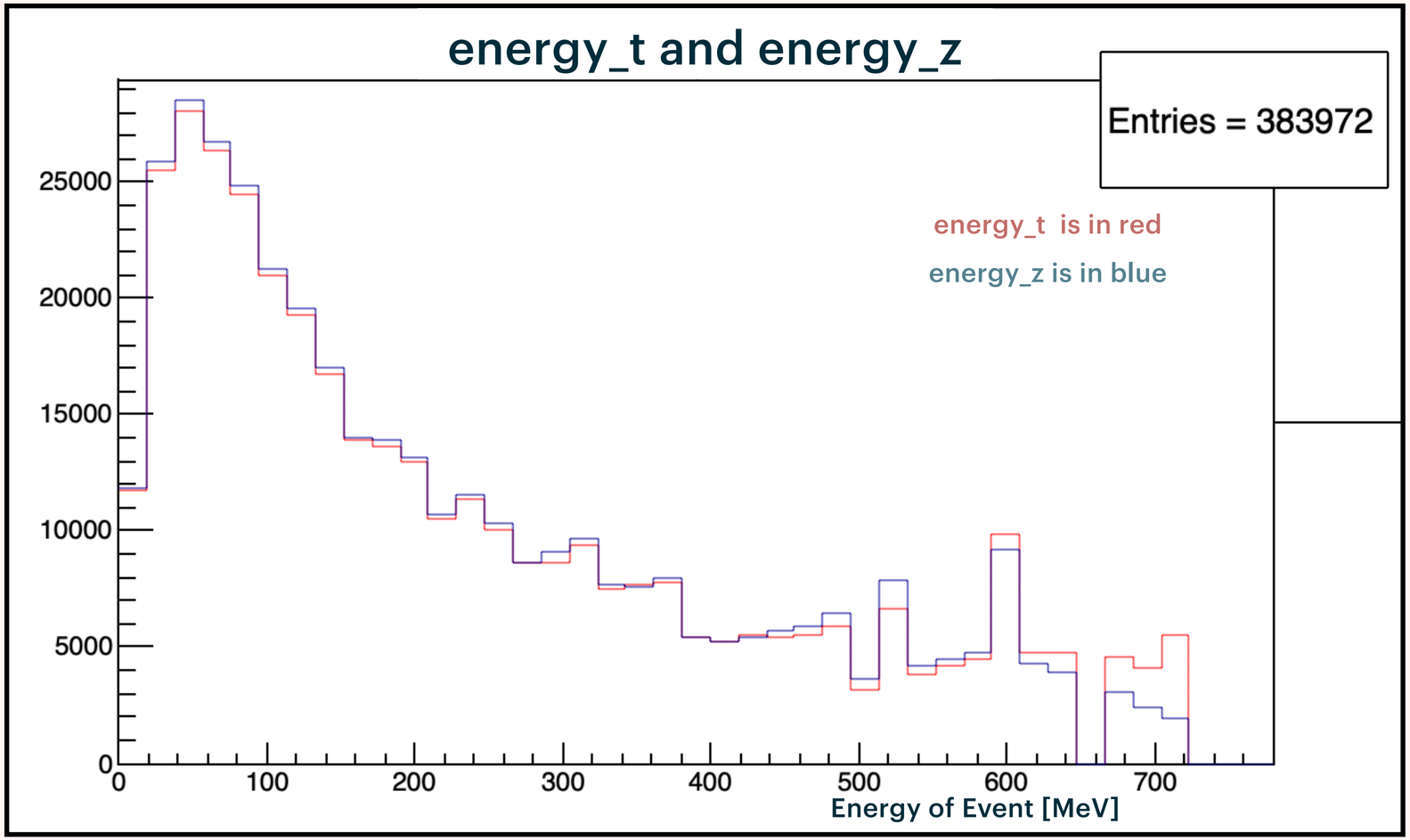


DIFFERENCES IN OUTCOMES

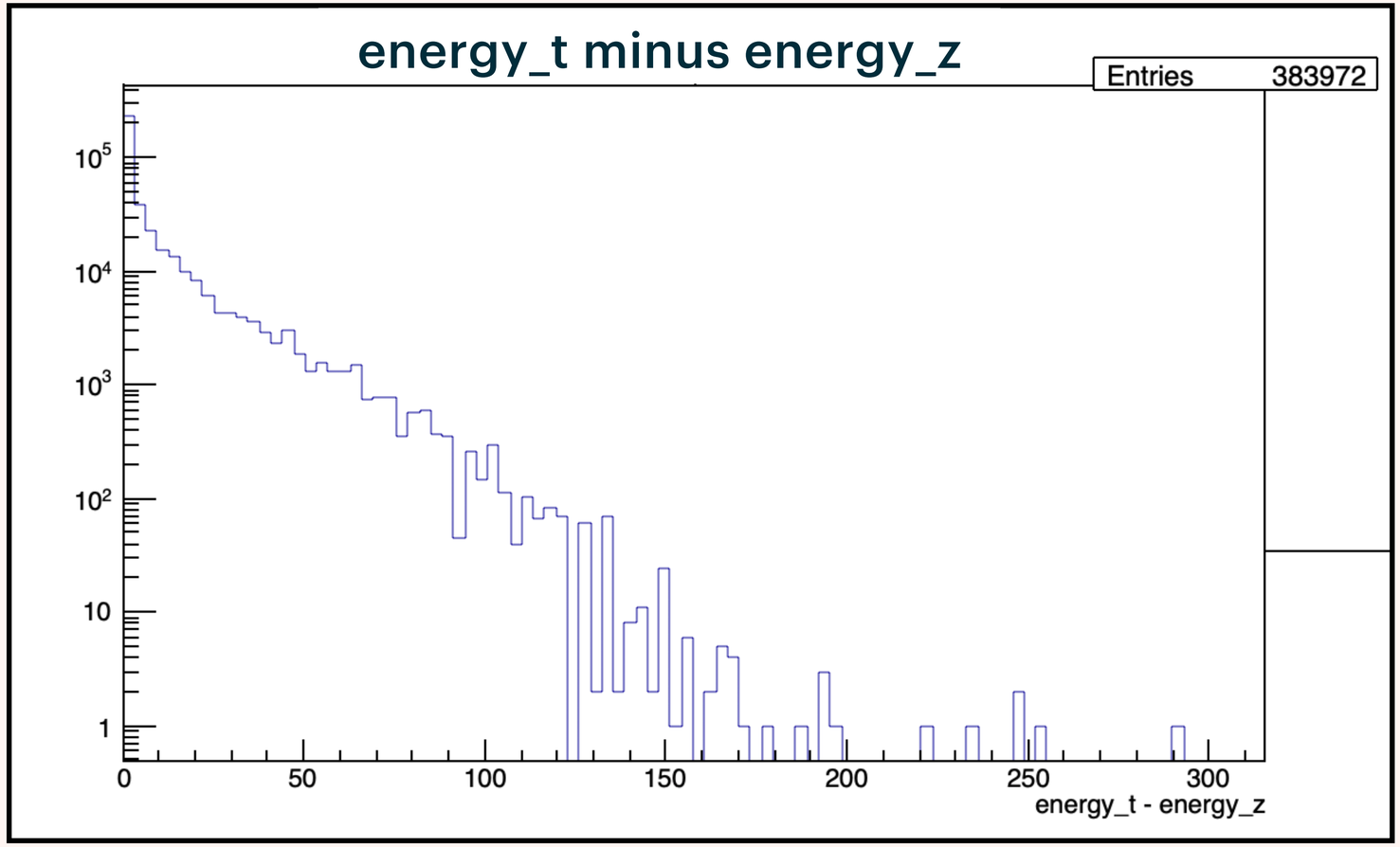
ENERGY FOR BOTH METHODS

- **energy_t : the energy calculated from the time vertex**
- **energy_z : the energy calculated from the z vertex**



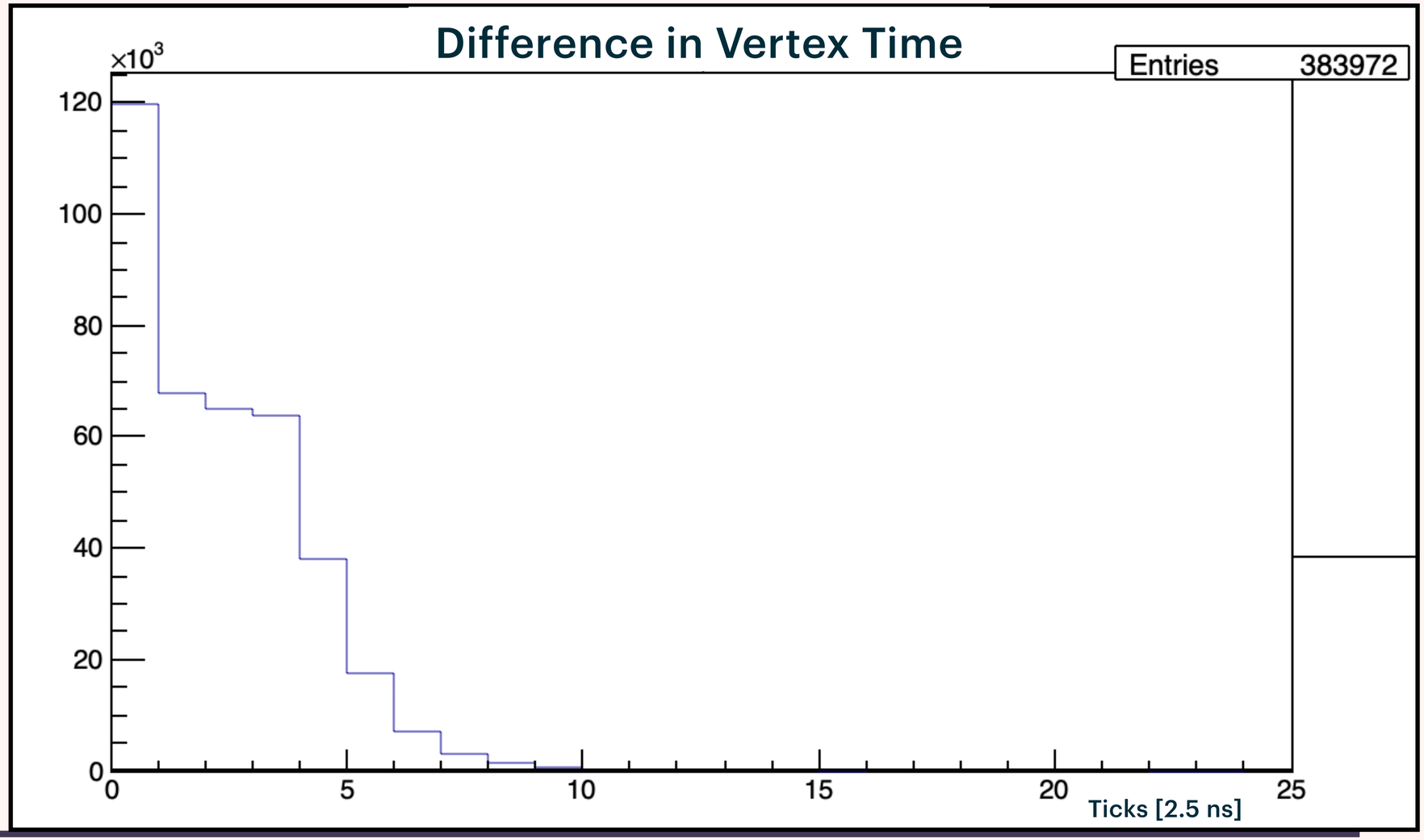
DIFFERENCE IN ENERGY

- The difference in energy is quite large which would indicate a large time difference
- However it depends on the time the event happened in the MP because 1 tick varies in energy depending on time in the MP



DIFFERENCE IN TIME

- The difference in time is moderate and could be coming from adjacent cubes
- This would also indicate the large differences in energy are coming from events early in the micropulse



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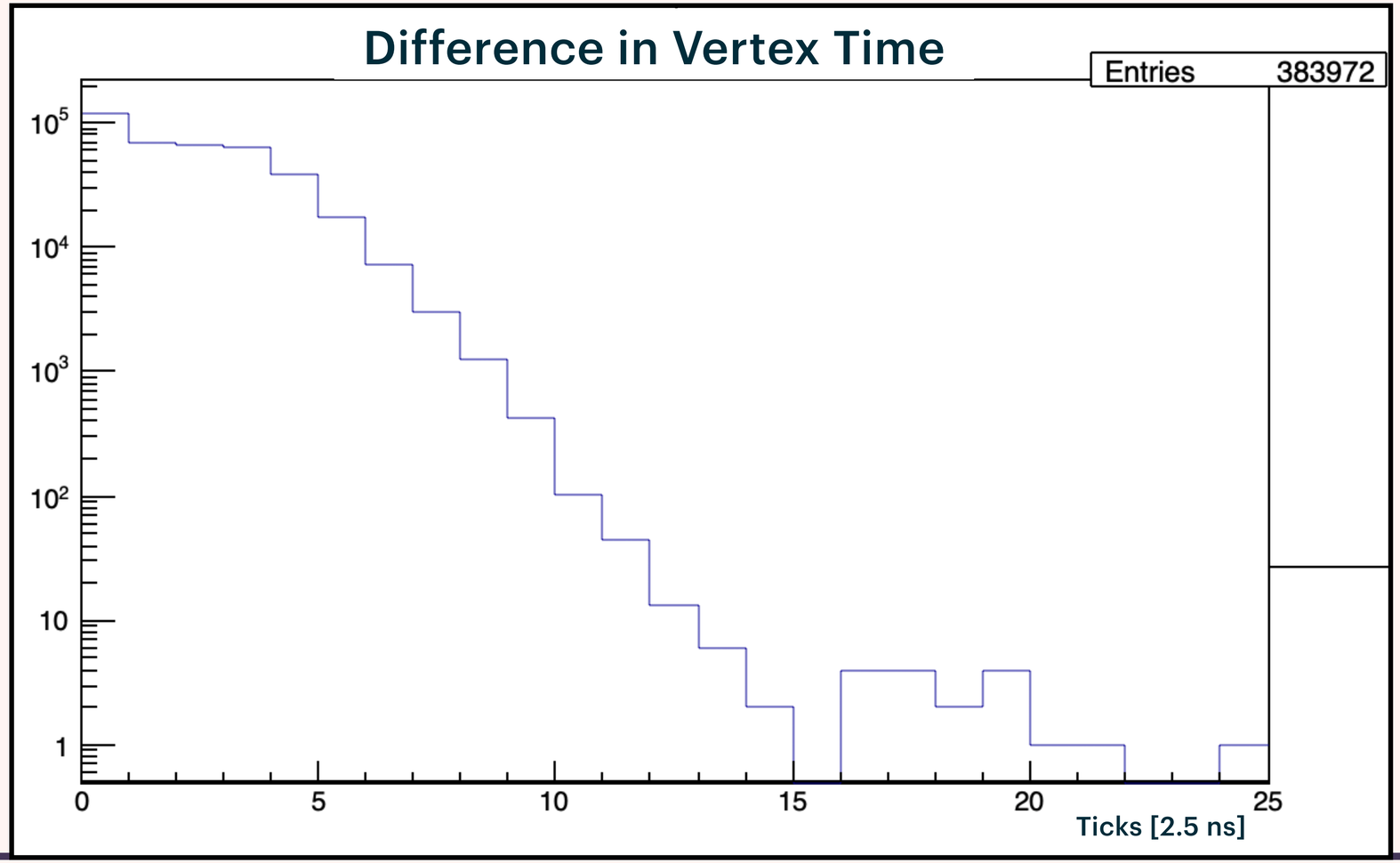
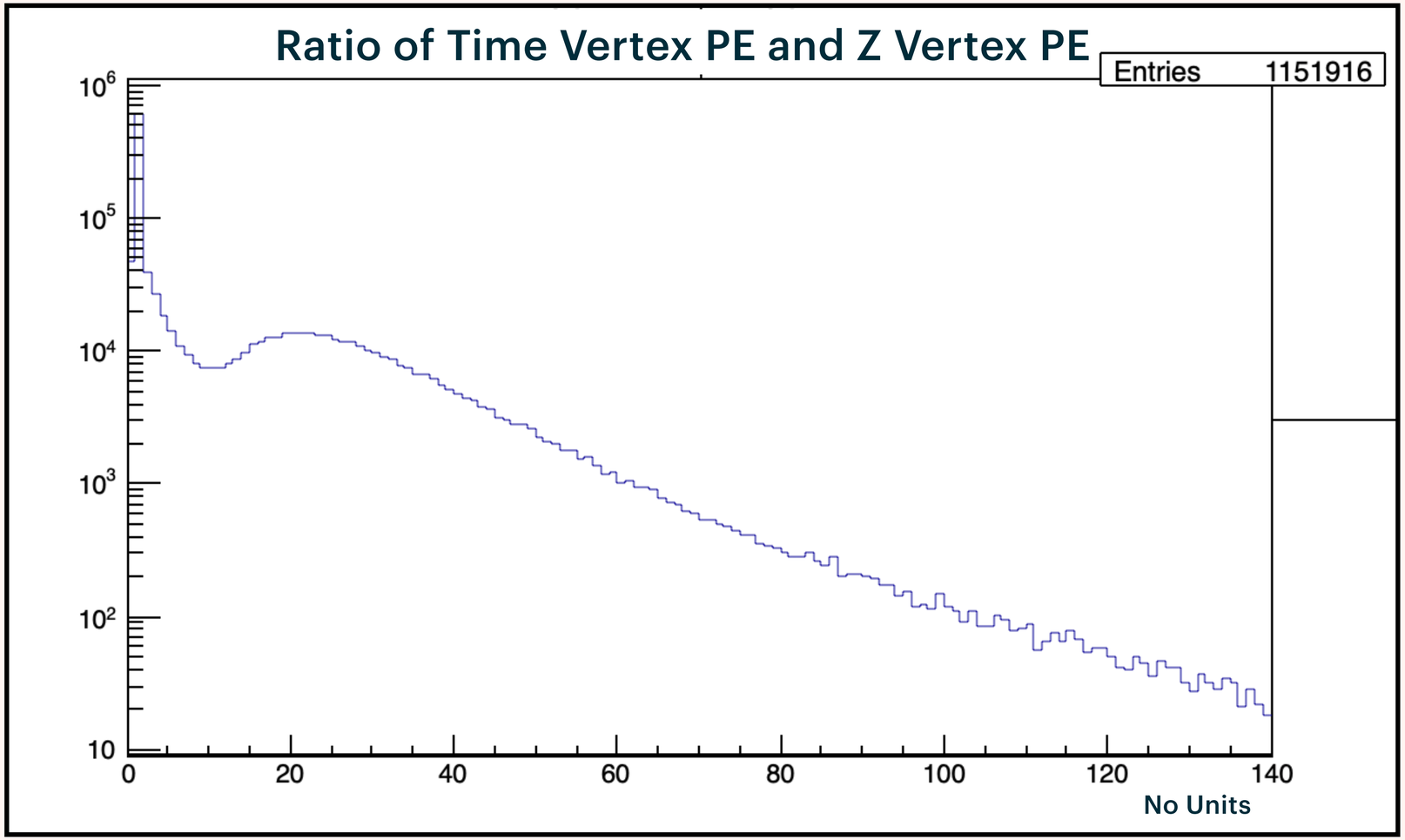


POSSIBLE CAUSES OF DIFFERENCE BETWEEN METHODS

POSSIBLE CAUSES

- A possible cause for the most upstream voxel to not be the interaction vertex is cross talk.
- Since cross talk has a significant delay in time from beam hits this would also explain why the time differences can get so large.



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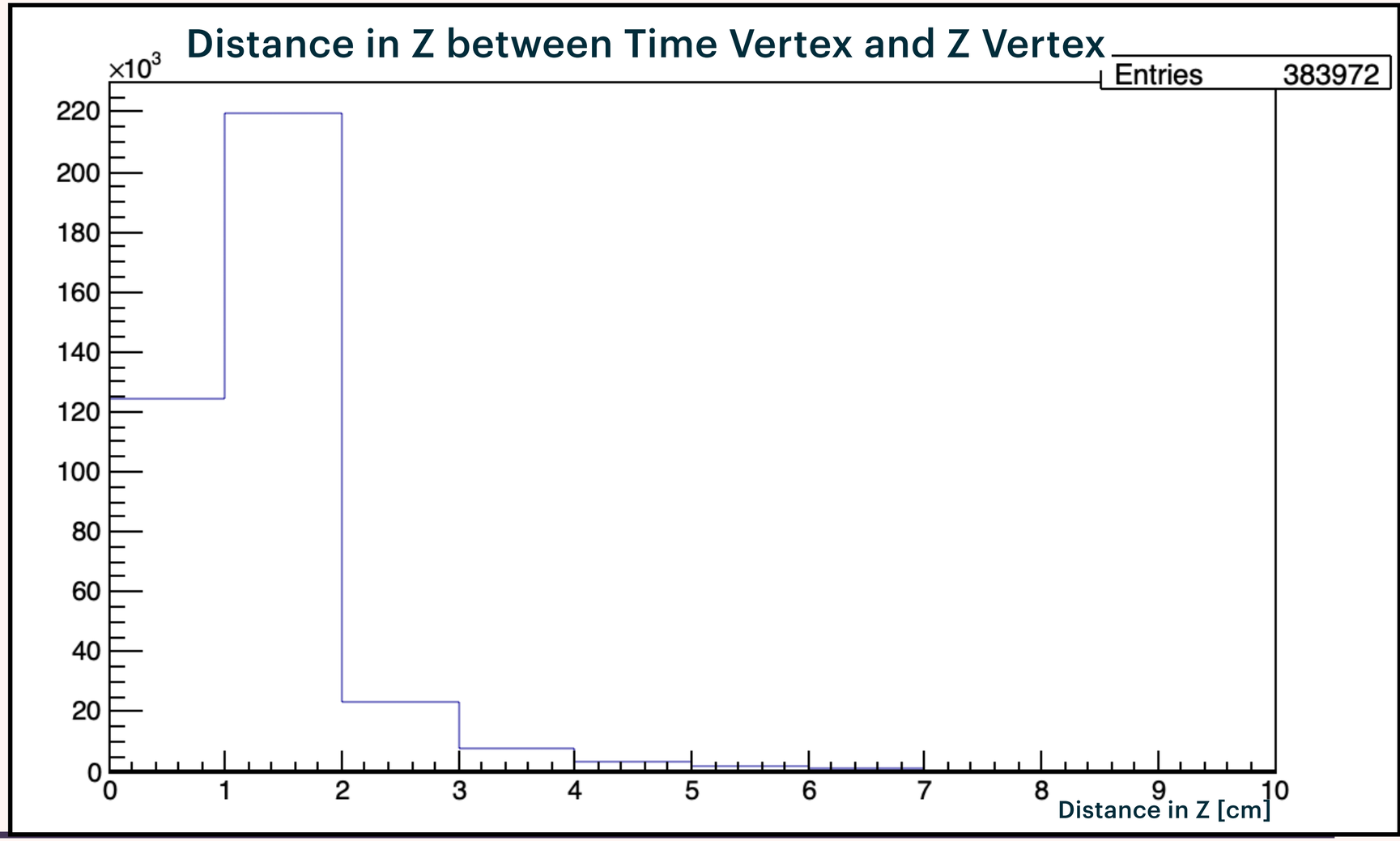

SUMMARY

- The difference between the time vertex and the z vertex is mostly because the z vertex is cross talk
- We should consider updates to the vertex finding

BACKUP

- **PE ratio of the time vertex pe and the z vertex pe.**
- **With a selection for events with a distance of 1cm in the z direction**
- **The first peak is peaked at 1**