Week 5 Progress

6/29/22

Calorimeter Energy Sums
Pytorch

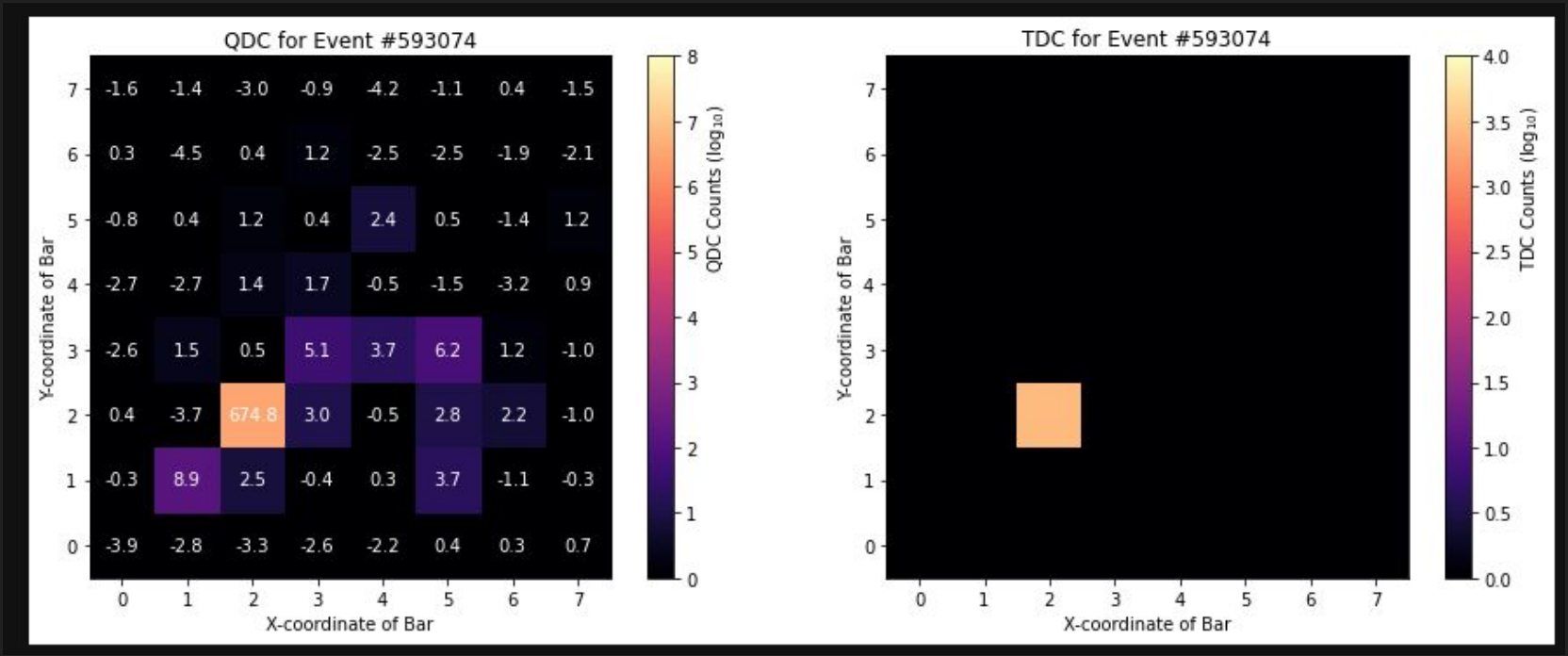
ZK

Outline

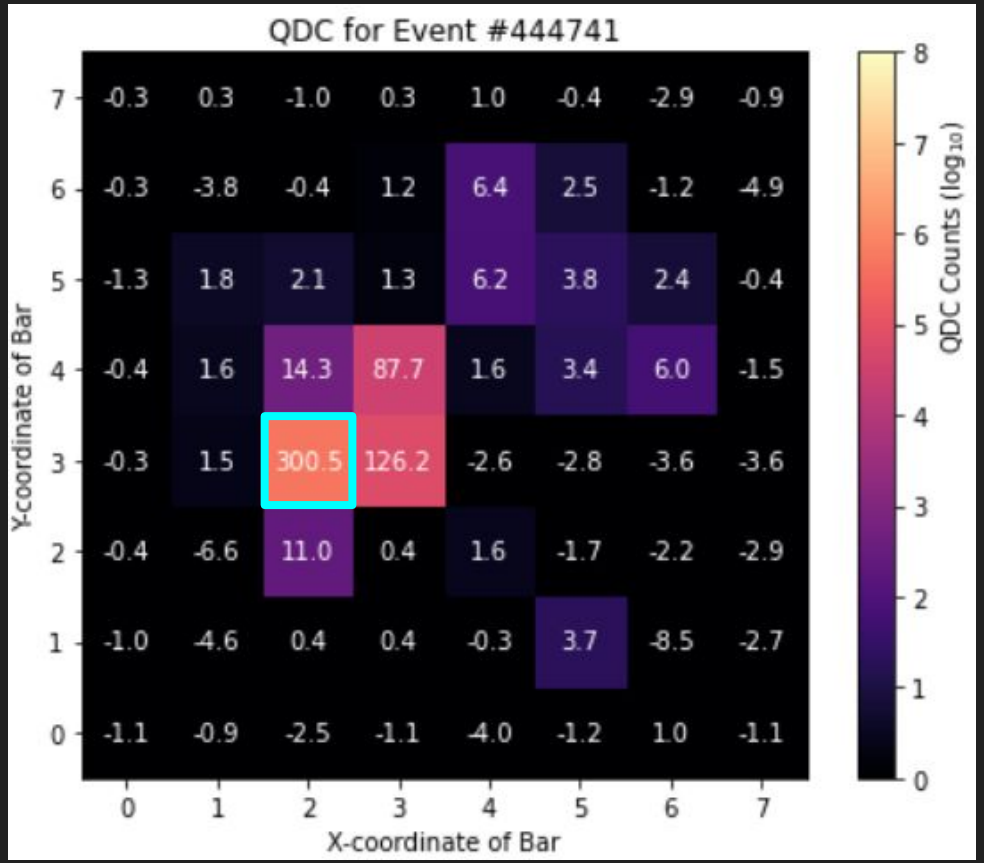
I. Simple Event Display (for QDC and TDC)
II. Old Energy Summing Method (v1: Nearest Neighbor)
    - Description
    - Weaknesses
III. New Energy Summing Method (v2: Outliers)
    - Description
IV. Comparing v1 and v2
V. PyTorch

I. Simple Event Display (QDC and TDC)

- Black = no hit
- Color scale: *log 10*
- Numerical QDC values: *raw*



II. Old Energy Sum Method (Nearest Neighbor)



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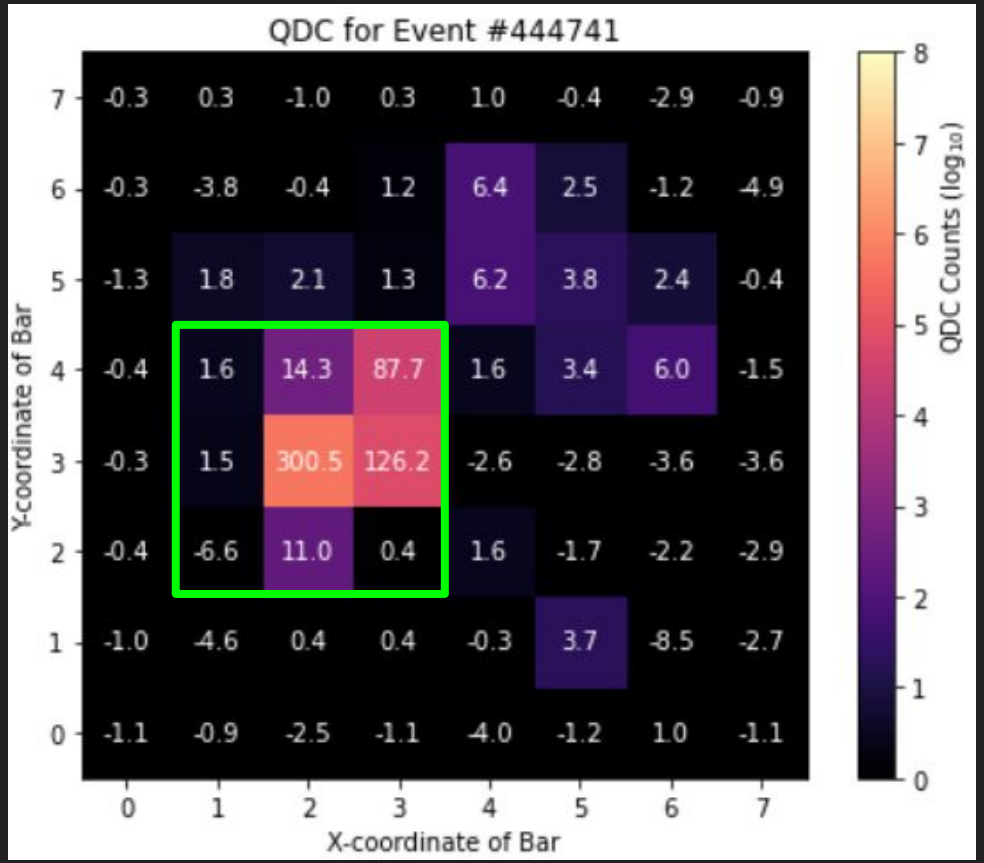

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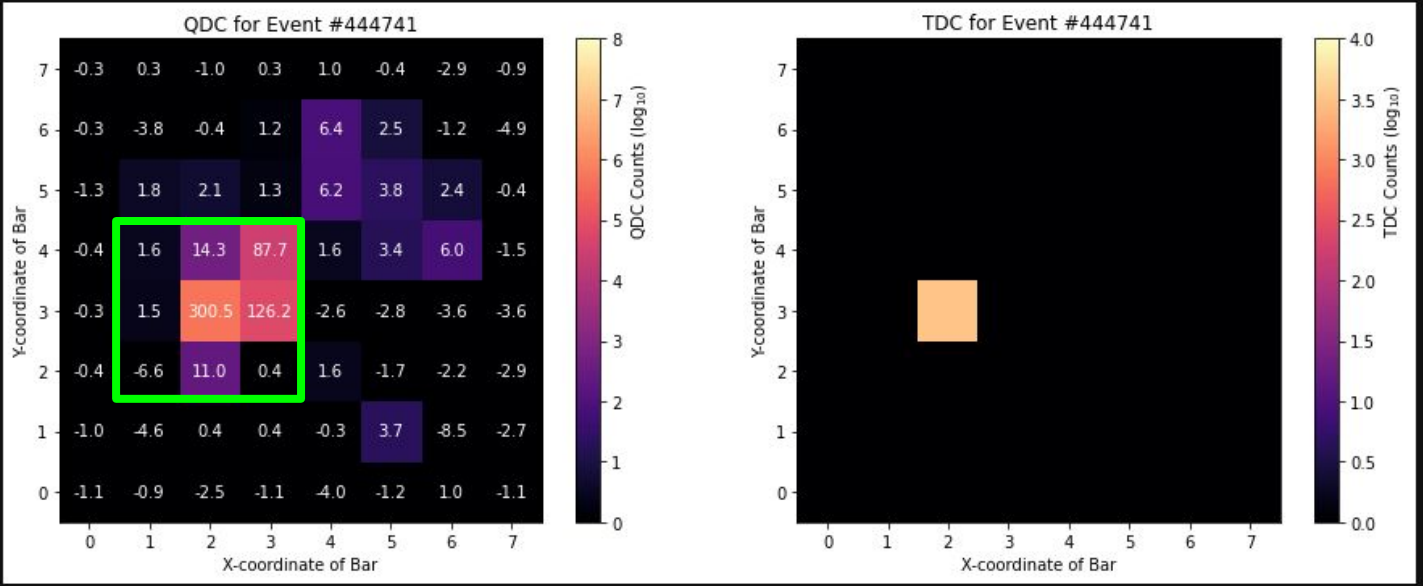


```
543.25            = Sum of nonzero QDC values in 8 bars surrounding max bar.
300.49 @ (2,3)    = Max QDC value and coordinate of bar.

55.31%            = Percent of energy sum deposited into central bar.
78.55%            = Percent of energy sum deposited into central bar + 2nd highest QDC bar.

92.01%            = Percent of total energy captured by energy sum.
```

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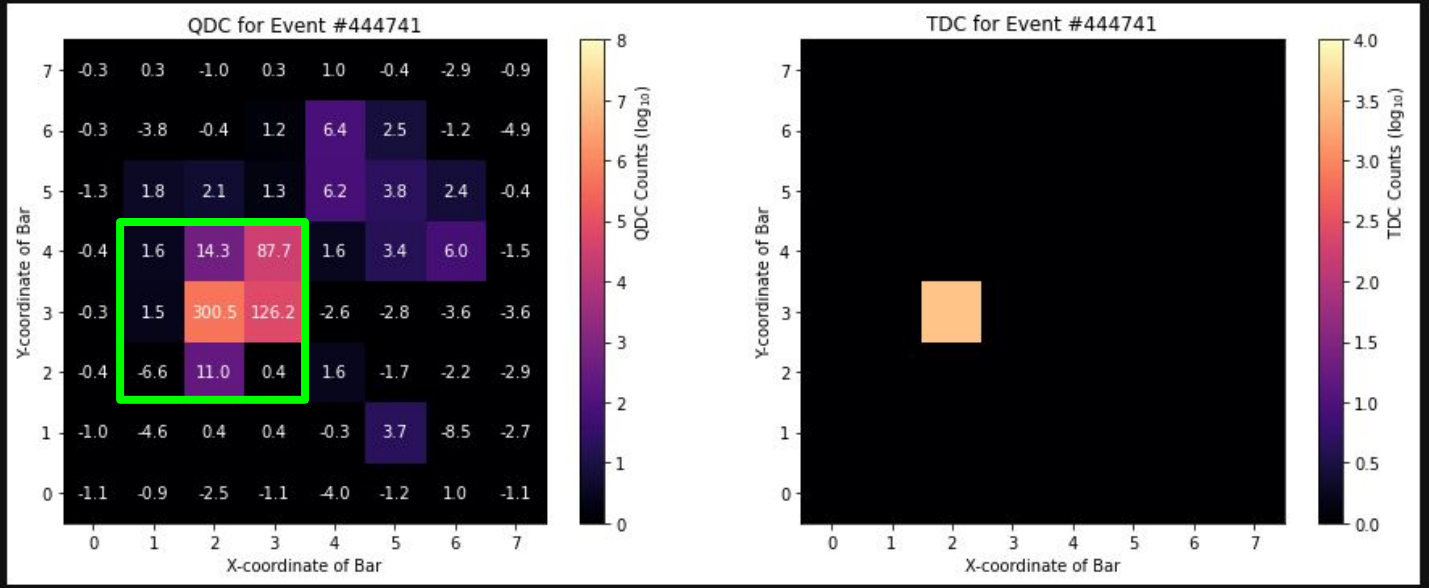


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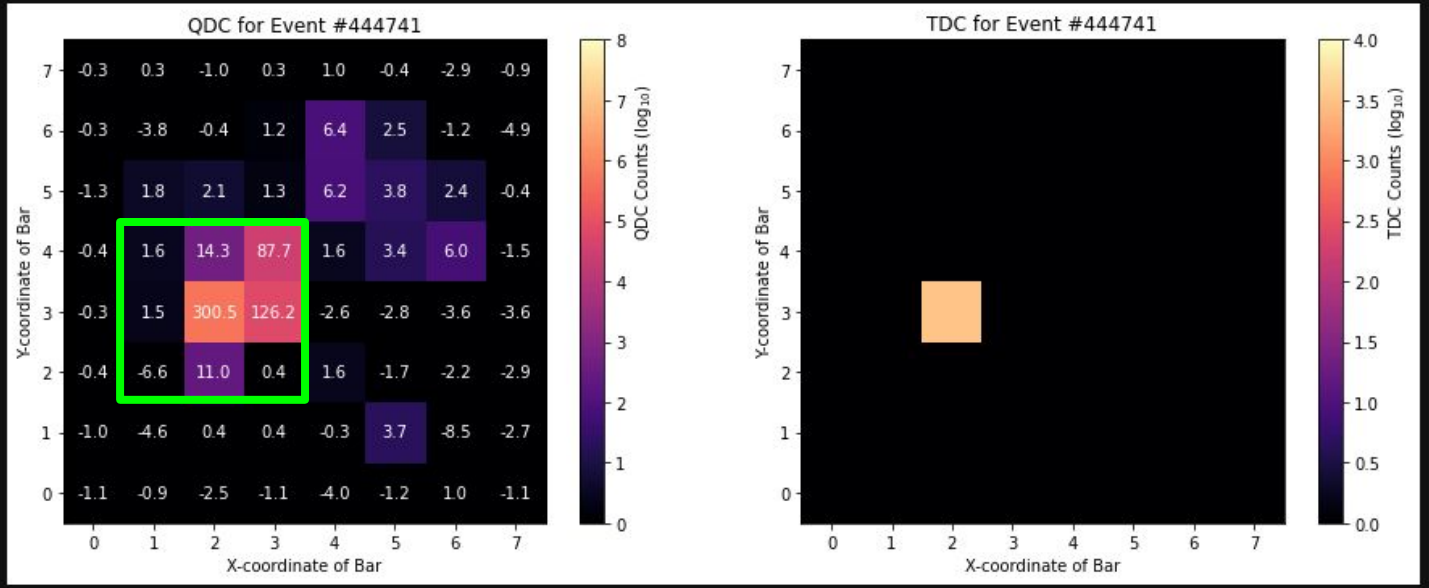

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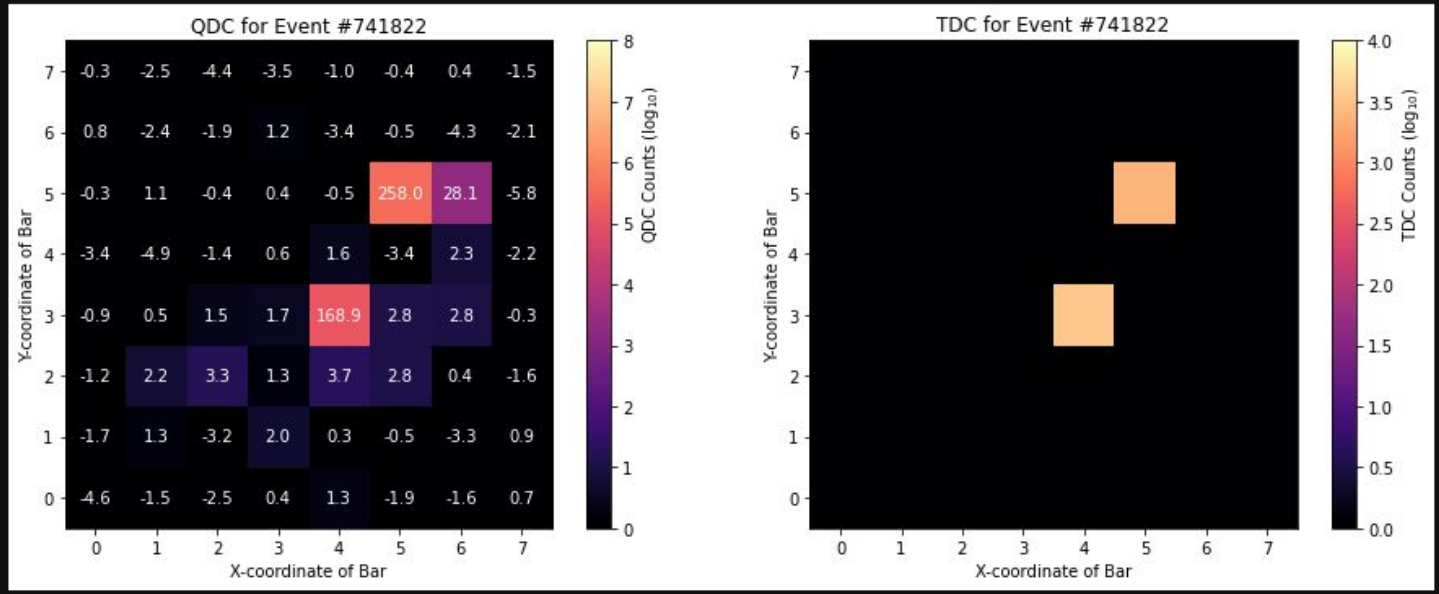
II. Old Energy Sum Method (Nearest Neighbor)

inaccurate




```
290.04            = Sum of nonzero QDC values in 8 bars surrounding max bar.
258.00 @ (5,5)    = Max QDC value and coordinate of bar.

88.95%            = Percent of energy sum deposited into central bar.
98.64%            = Percent of energy sum deposited into central bar + 2nd highest QDC bar.

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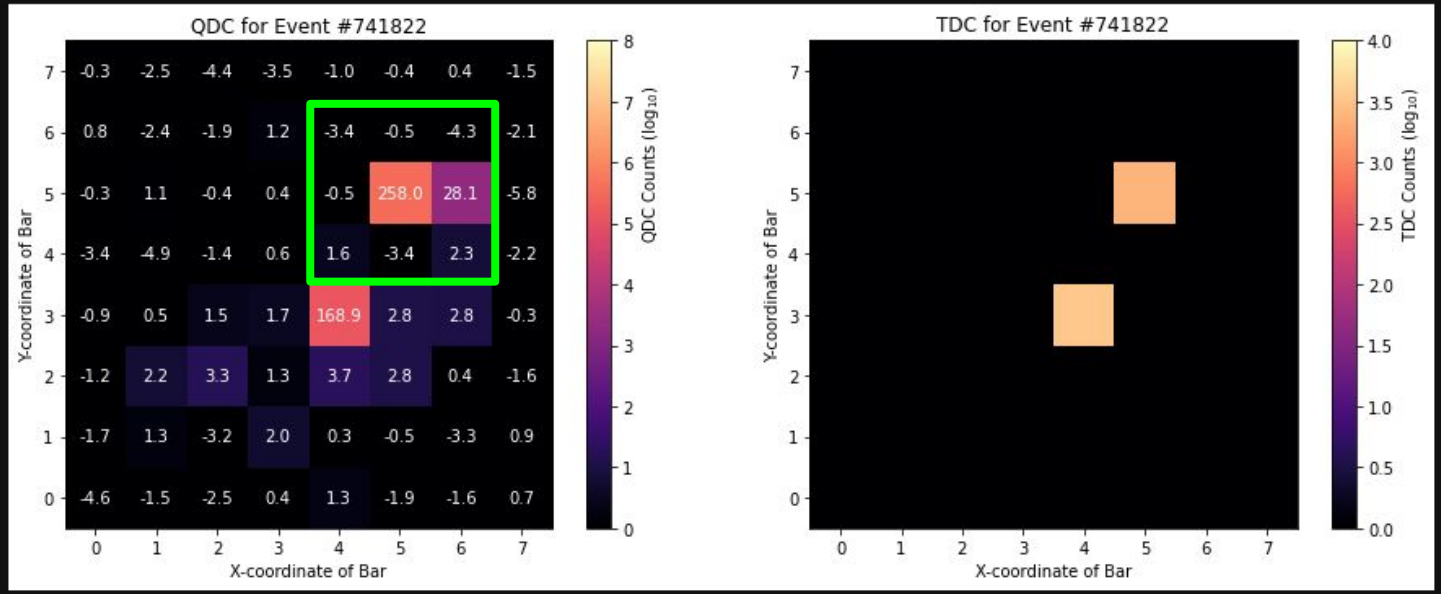


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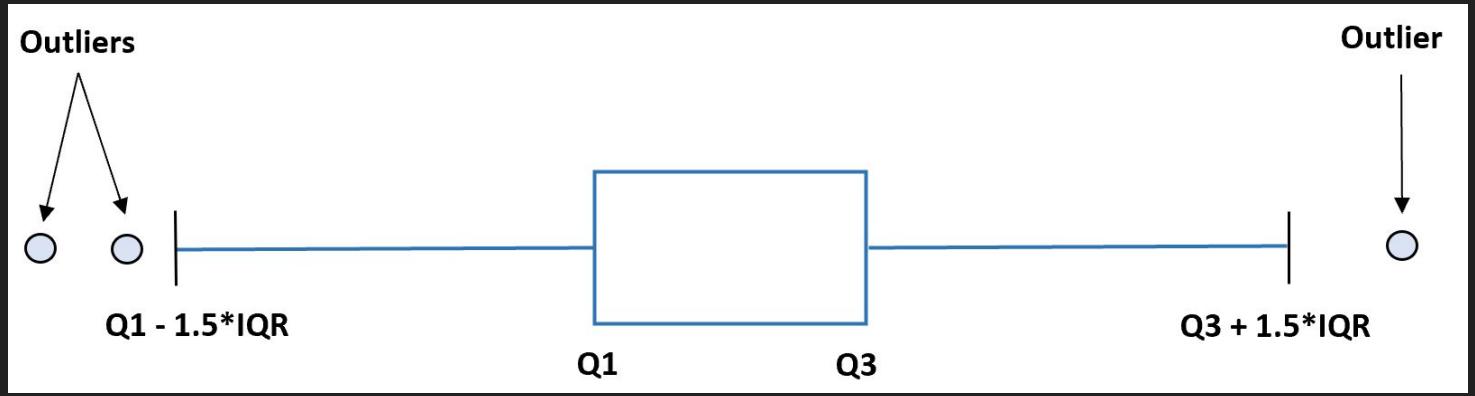

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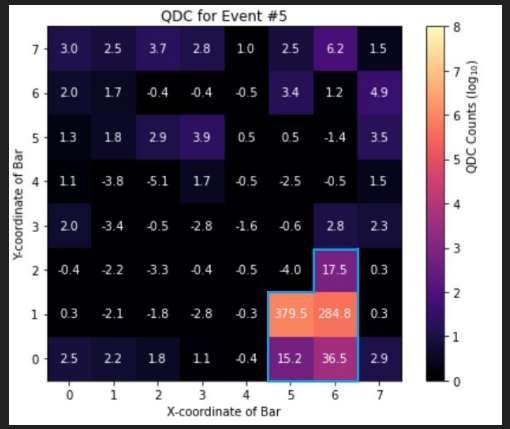

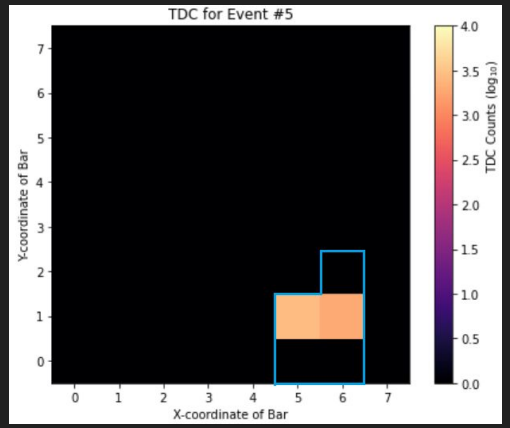

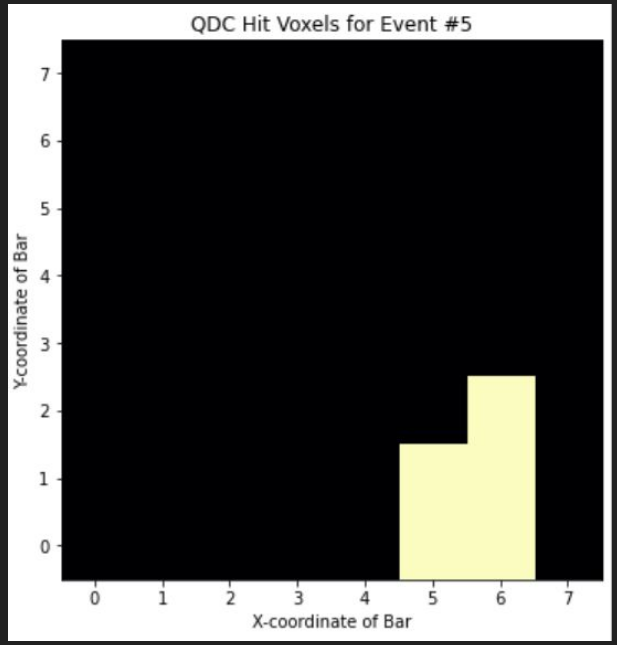

Good: clusters

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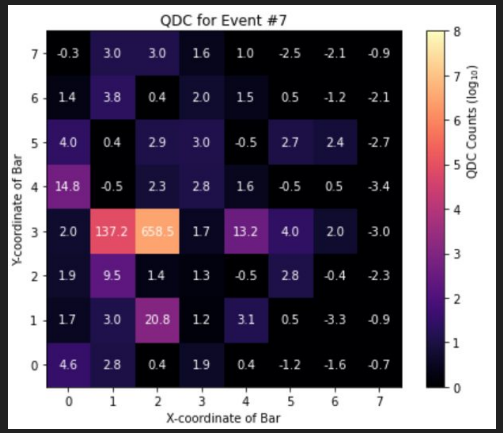

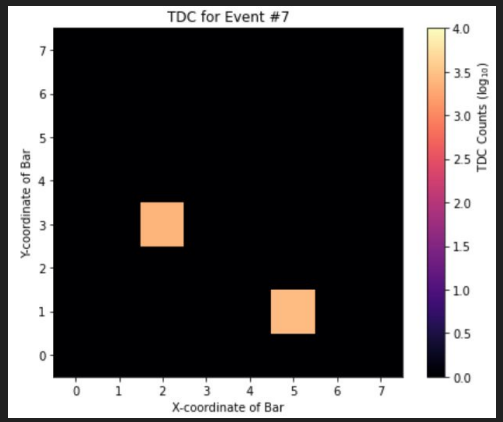

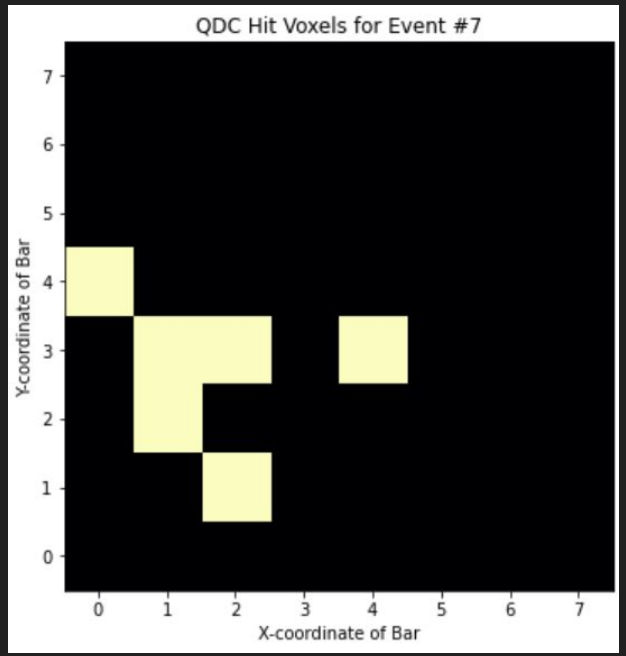

Good: complex shower shapes

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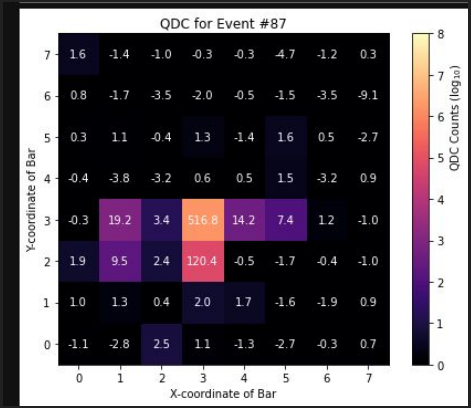

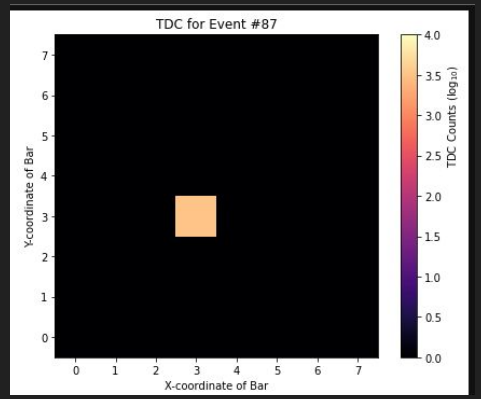

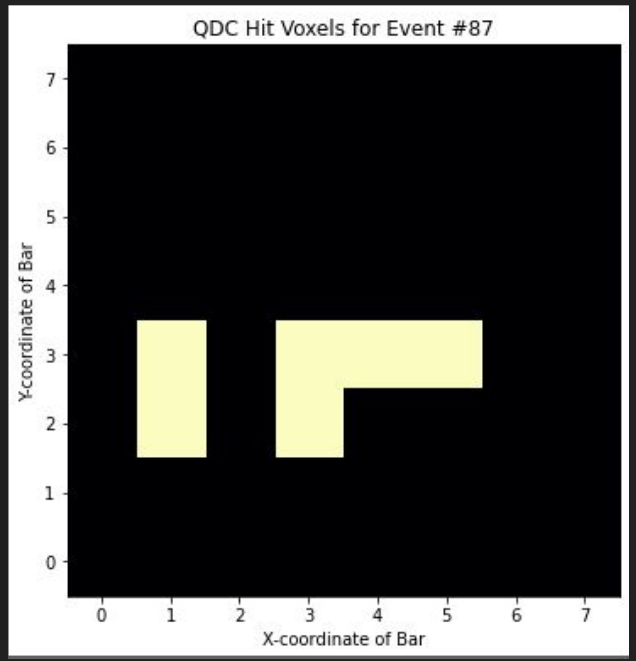

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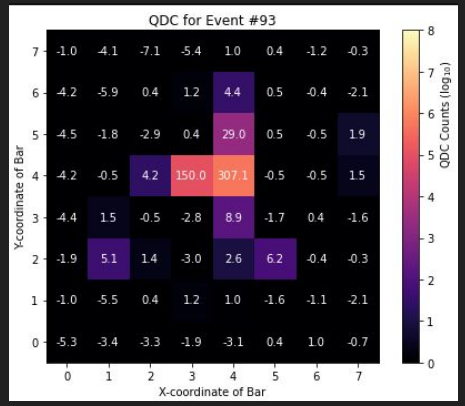

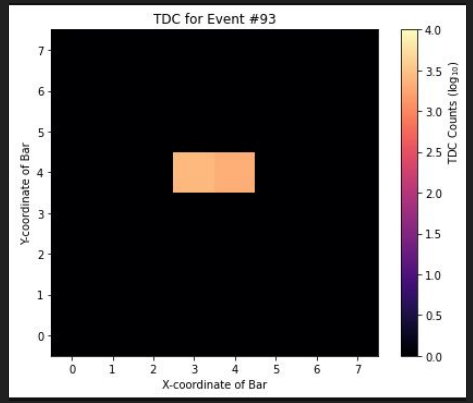

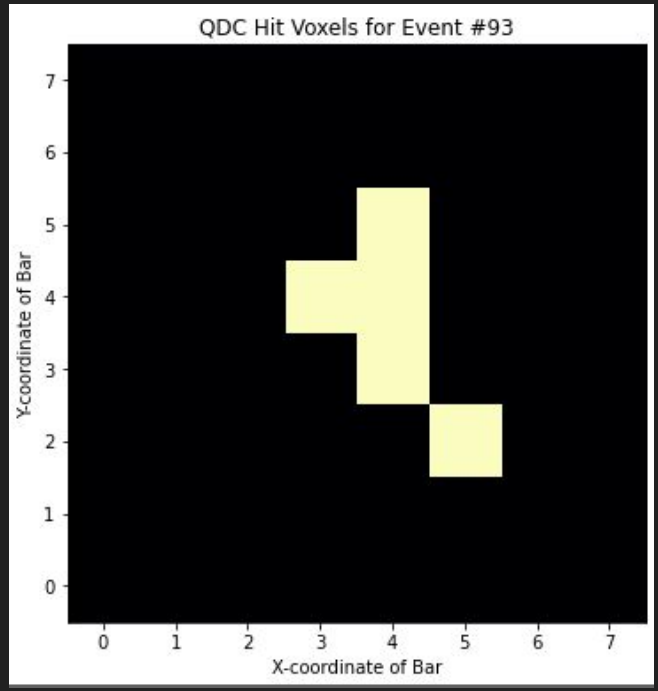

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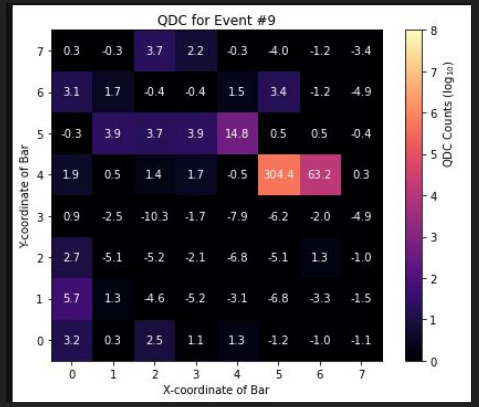

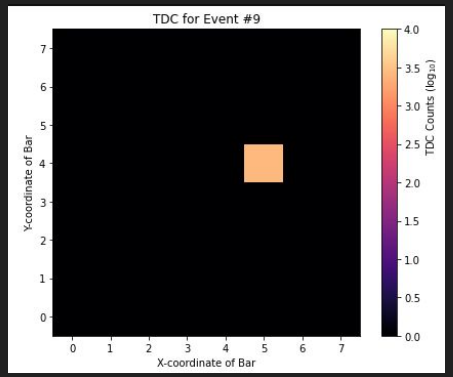

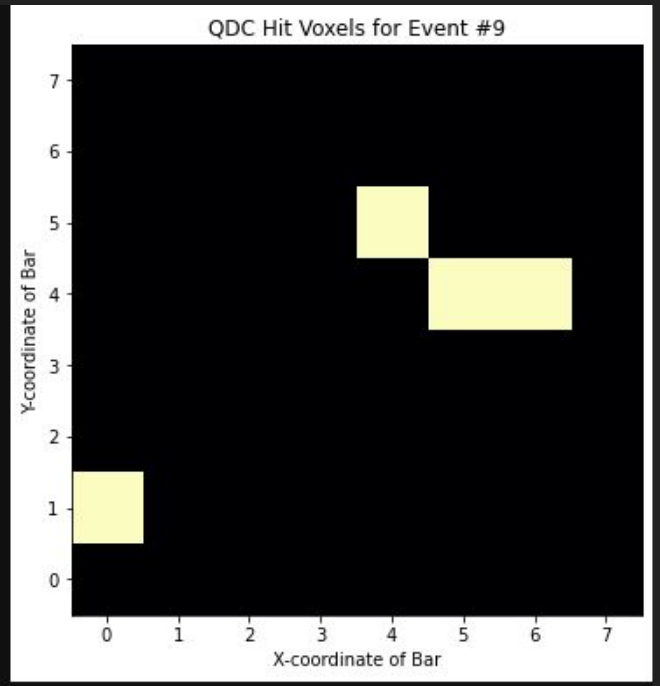

Bad: far-out outliers

IV. Comparing v1 and v2

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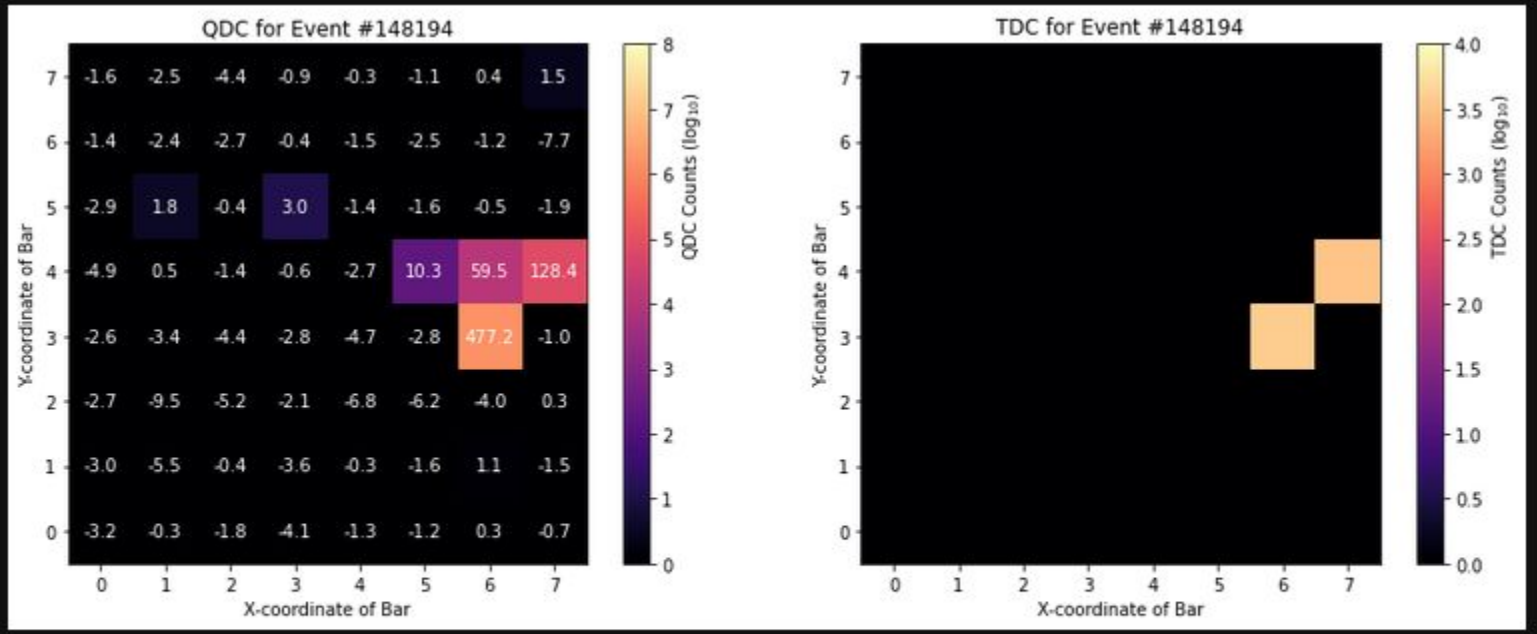
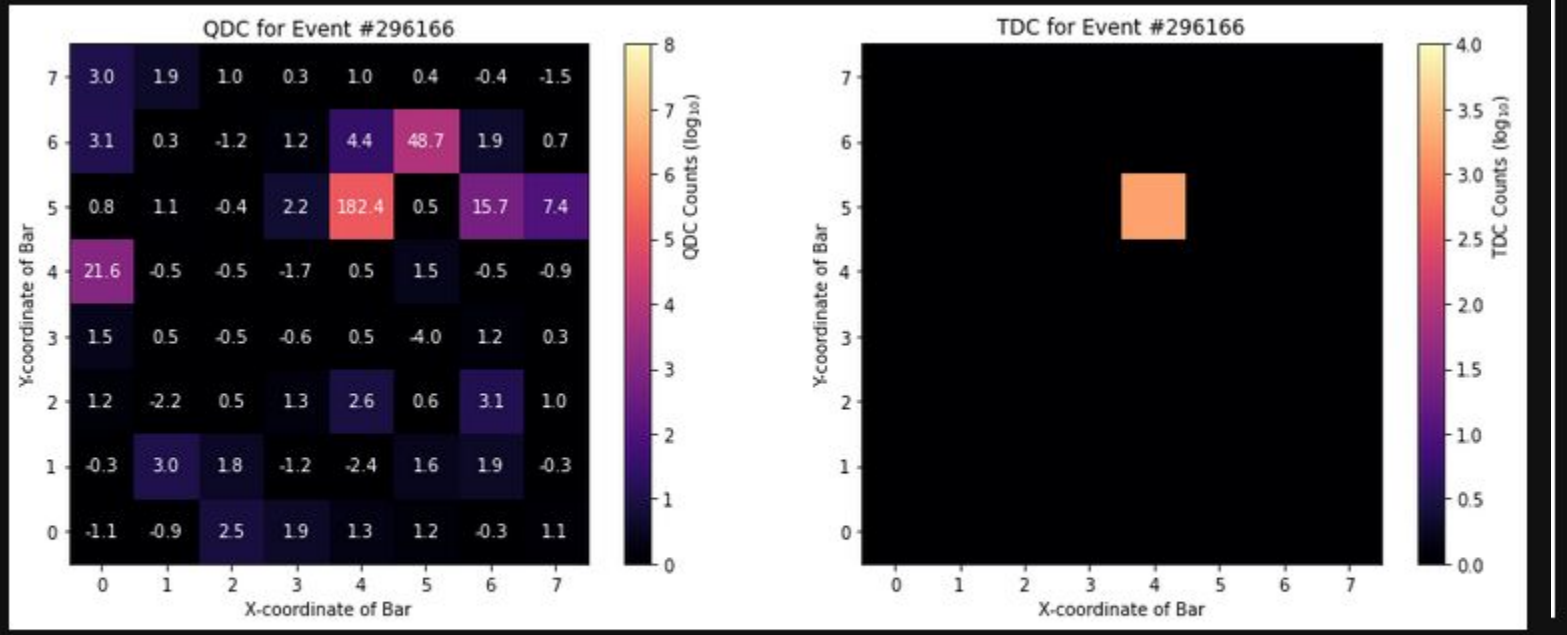



```
Esum1   =  675.74
Esum2   =  675.42
% Diff  =  0.05%
```

IV. Comparing v1 and v2




```
Esum1   =  241.44
Esum2   =  275.83
% Diff  =  -12.47%
```

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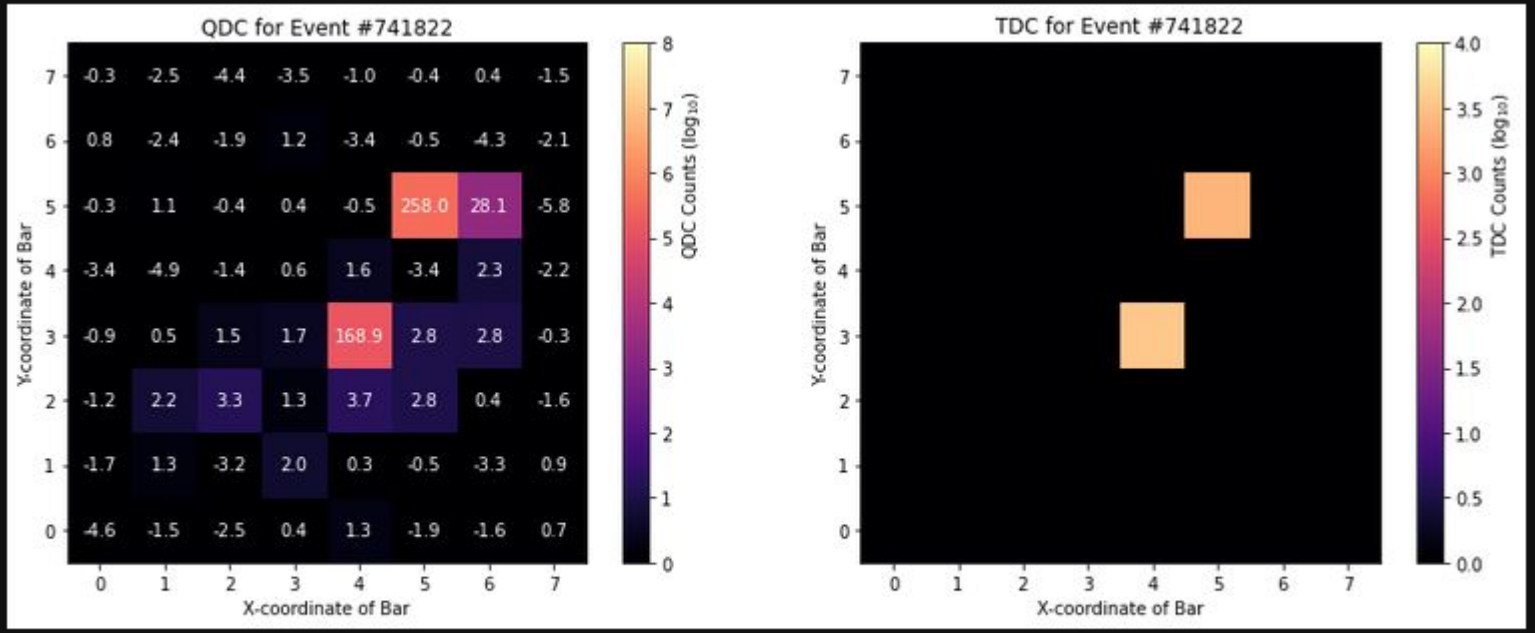


```
Esum1   =  290.04
Esum2   =  455.04
% Diff  =  -36.26%
```

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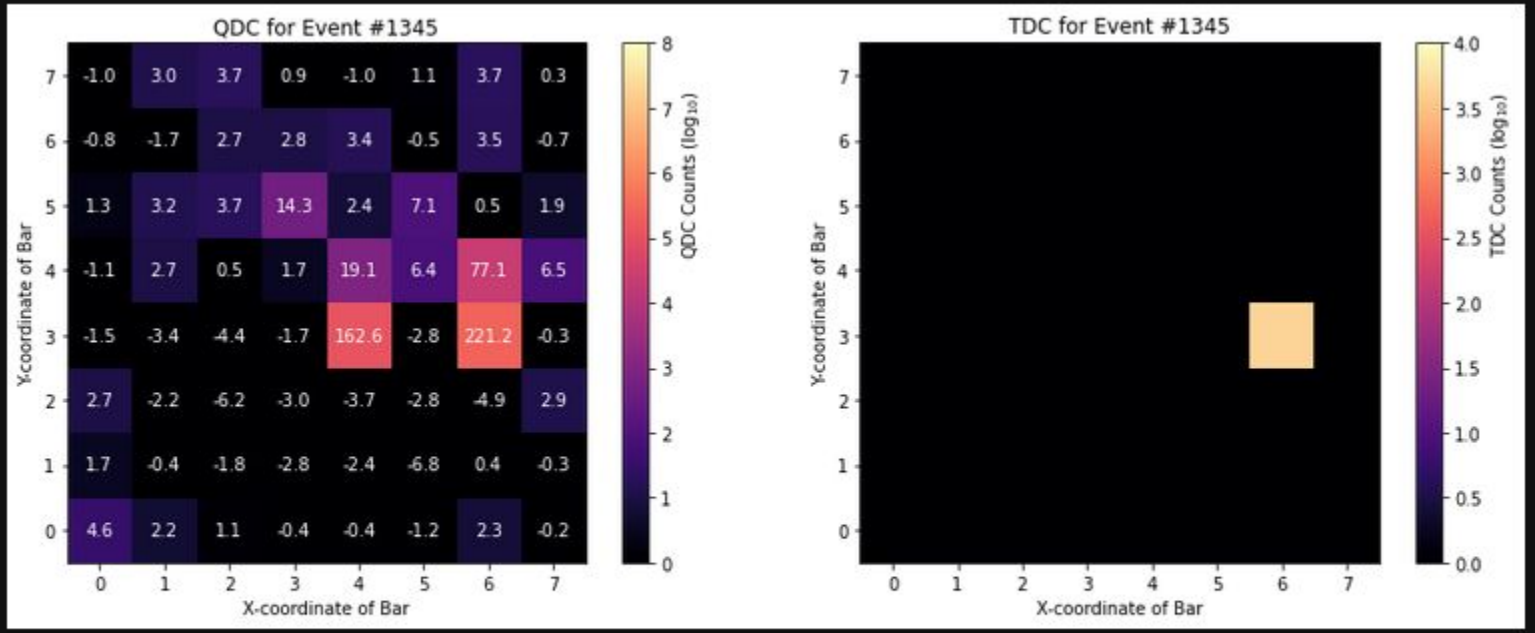
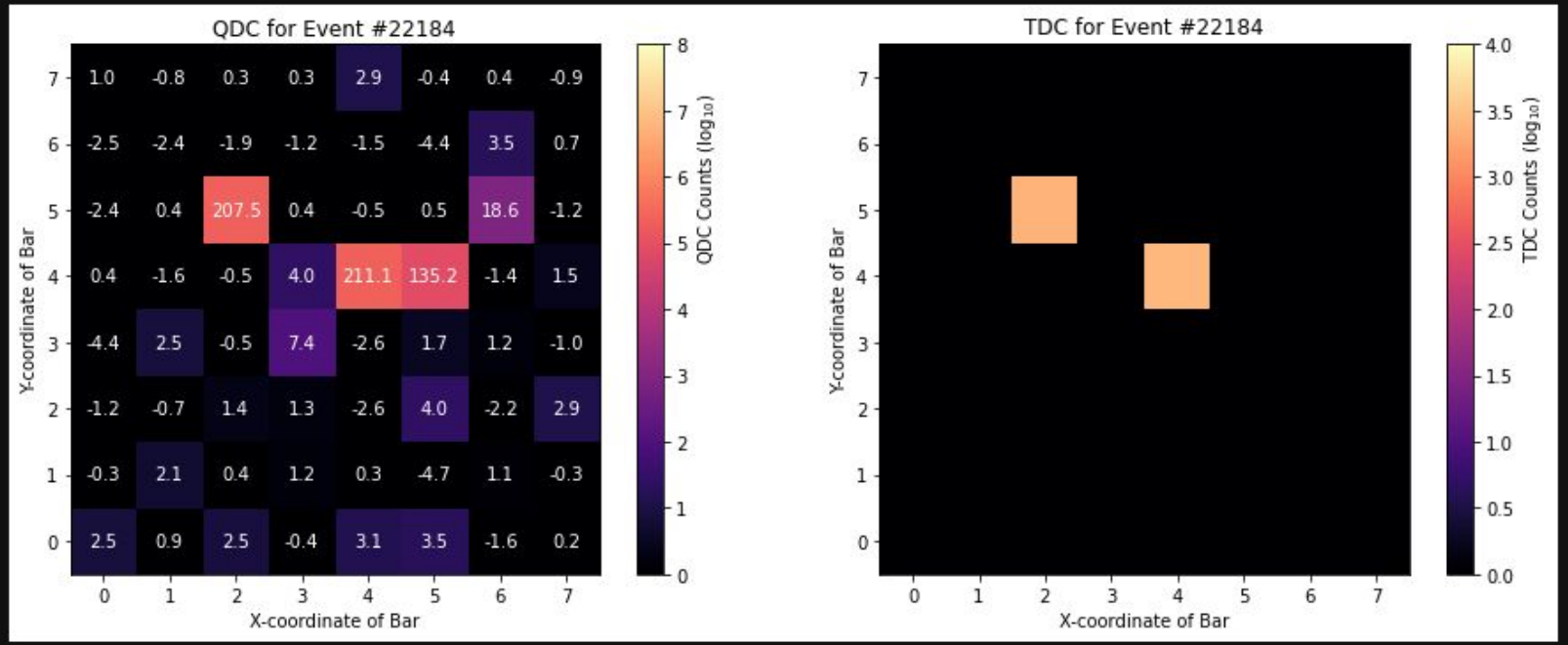



```
Esum1   =  314.07
Esum2   =  494.35
% Diff  =  -36.47%
```

IV. Comparing v1 and v2




```
Esum1   =  360.34
Esum2   =  579.80
% Diff  =  -37.85%
```