

# Stave6 Local Flatness

Shuaiyan

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# Surface Plate scanning for stave 7

- Each module area (98mm) was scanned 15 times separately, not together with each scan.
- Do linear fit separately for 13 modules, then subtract them with the surface plate data for getting linear stage & camera data.

# First Method: select median

Eliminate the points with rms larger than 15  $\mu\text{m}$ . These points are neither used for calculating plane or distance.

Divide  $98 \times 220$  pixel area into  $5 \times 5$  &  $3 \times 5$  pixel areas. In each small area, find the median height which will be used for calculating plane. The maximum number of points for calculating plane is 880.

Each small area contributes median height except for module 1 since 24 areas have fewer than five rms < 15  $\mu\text{m}$  points.

Below is the fitting results for each module.(odd numbered slides)

The blank area in the distance plot indicates the point either having a rms > 15 or below the stave surface. Three blue dots indicate the points used for calculating plane.

Negative distance plot gives the location where the plane is below the stave surface and height differences.

# Second Method: select average

Use the built in function “Lowpassfilter” to eliminate the noise height. Use the filtered data as stave surfae.

Divide  $98*220$  pixel area into  $5*5$  &  $3*5$  pixel areas. In each small area, neglect the points with a difference larger than  $40\mu\text{m}$  compared to averaged value, then use the averaged value to represent the height for this area.

If the available points in any area is fewer than 30% , the entire area will be rejected.

The rejected areas for each module is around 25.

The maximum number of points for calculating plane is 880.

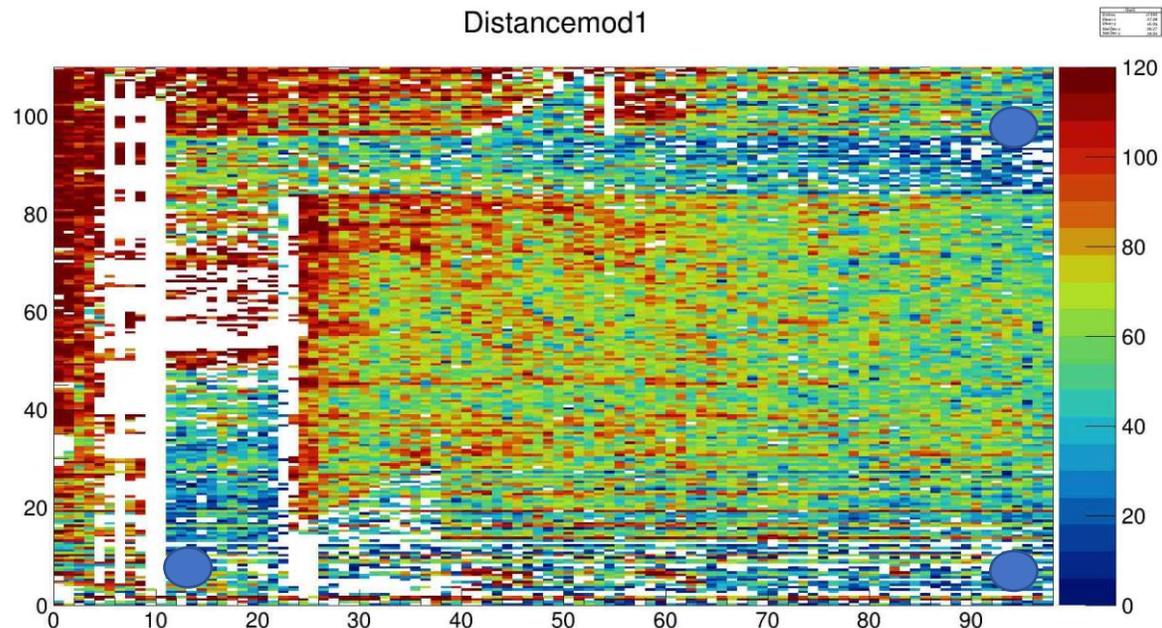
The neglected points and rejected areas are not used for calculating the plane, but they are included in calculating distance.

Below is the fitting results for each module.(even numbered slides)

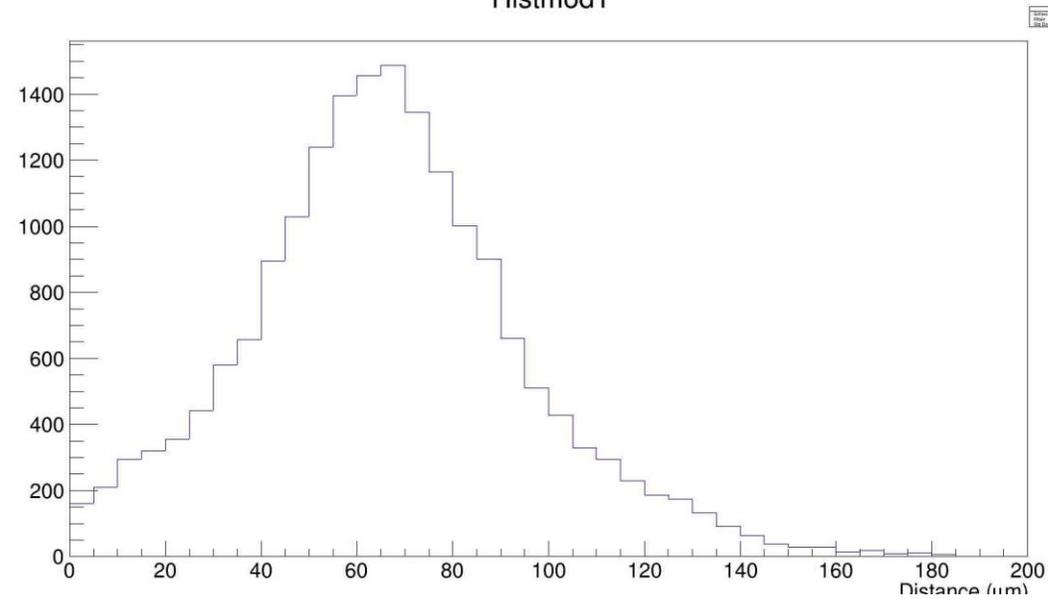
The blank area in the distance plot indicates the points below the stave surface. Three blue dots indicate the points used for calculating plane.

Negative distance plot gives the location where the plane is below the stave surface and height differences.

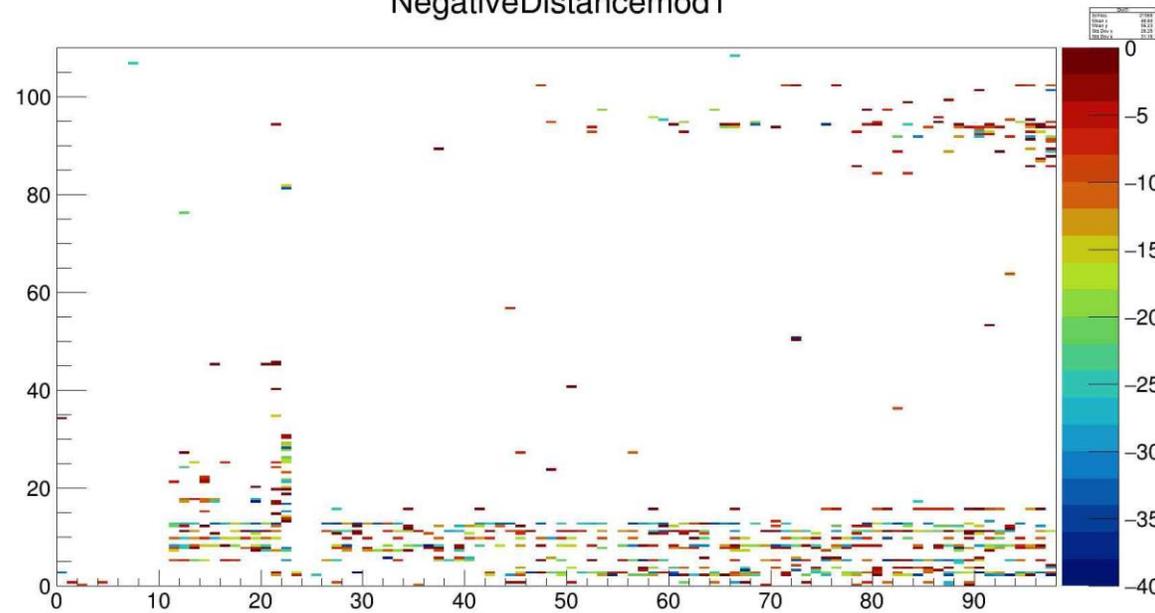
Distancemod1



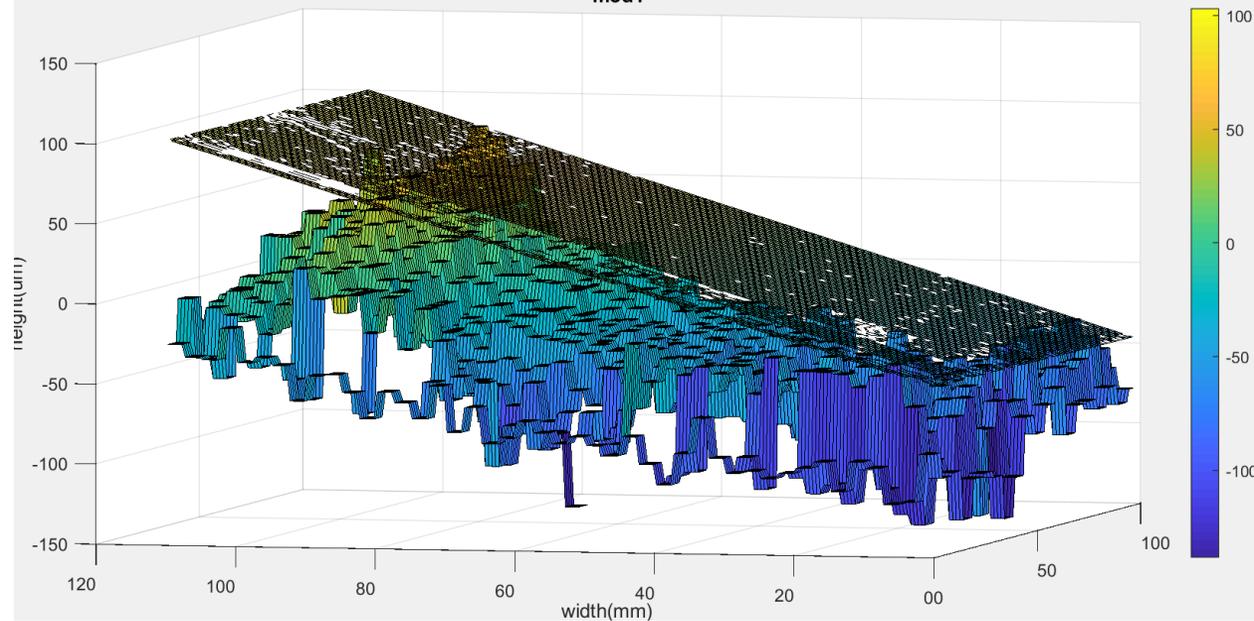
Histmod1



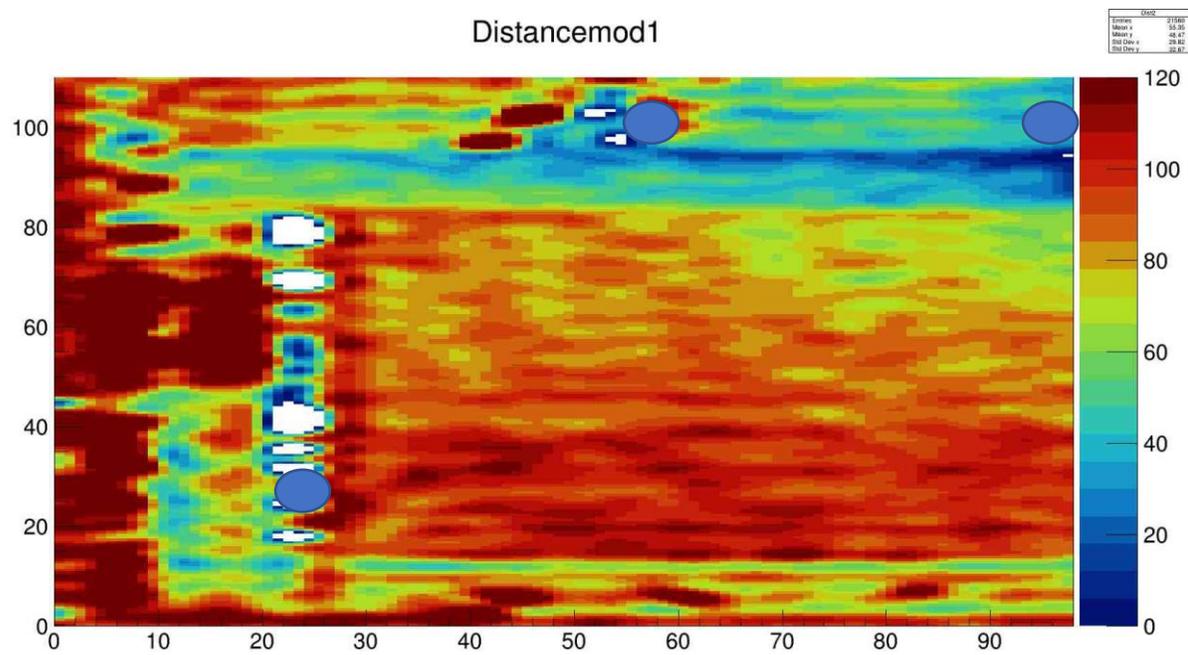
NegativeDistancemod1



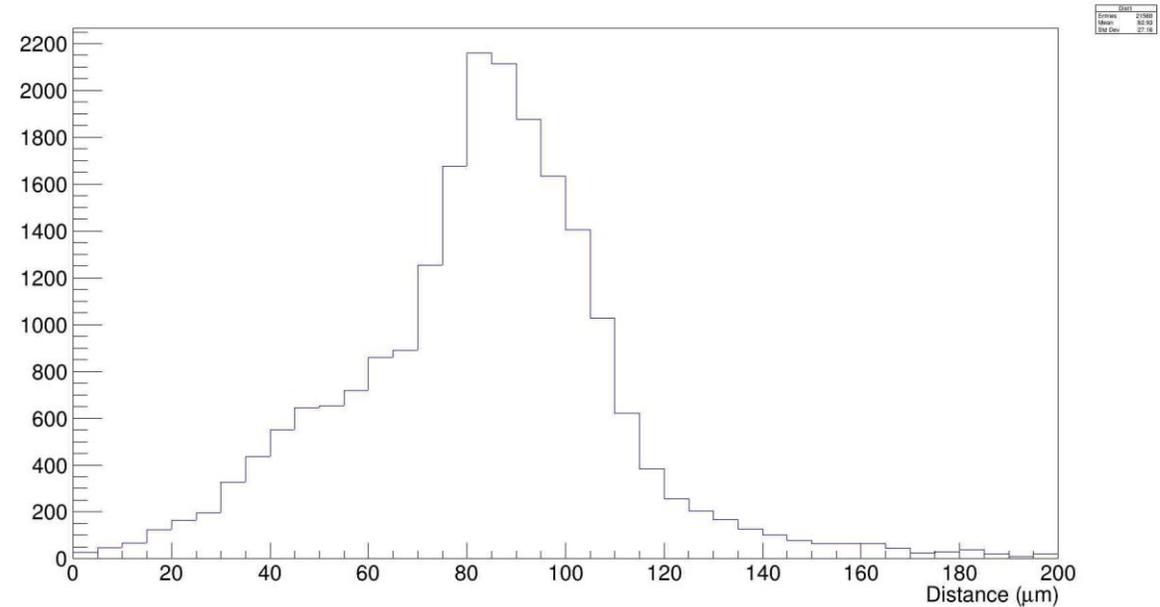
mod1



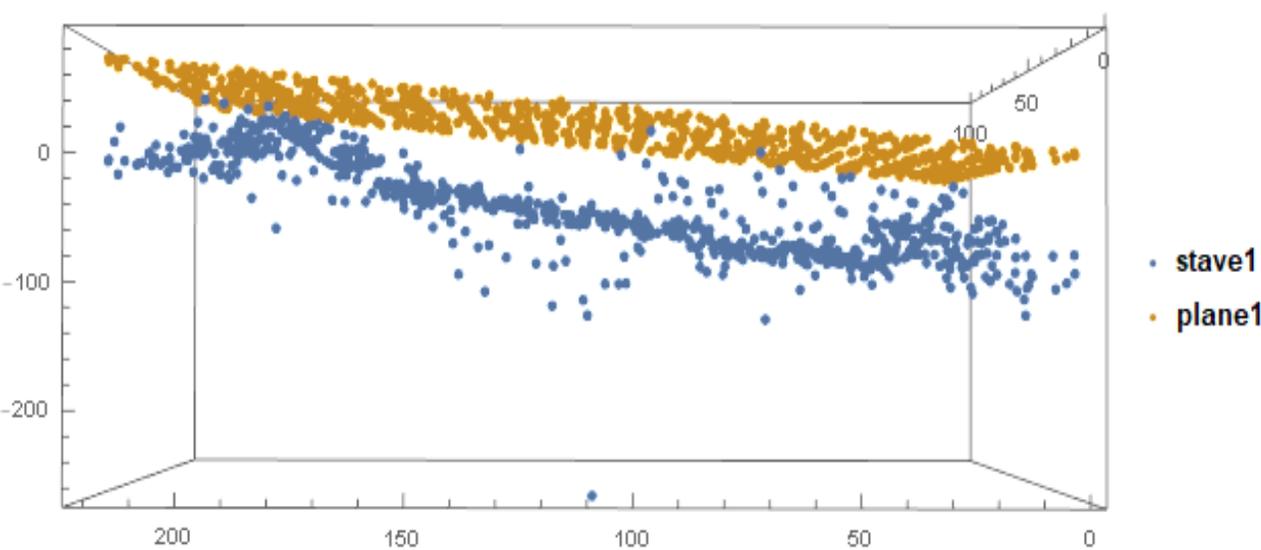
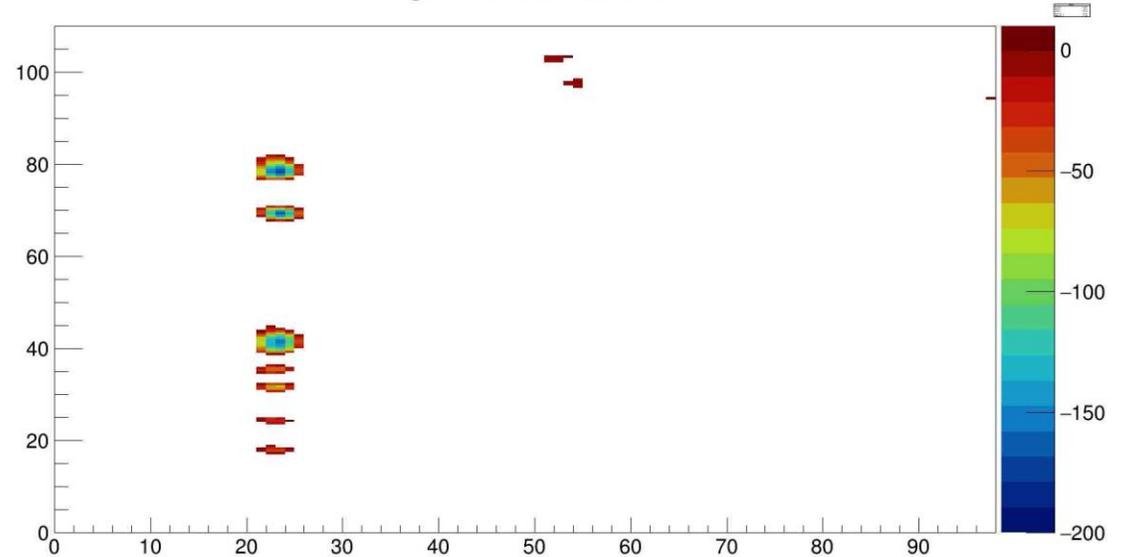
### Distancemod1



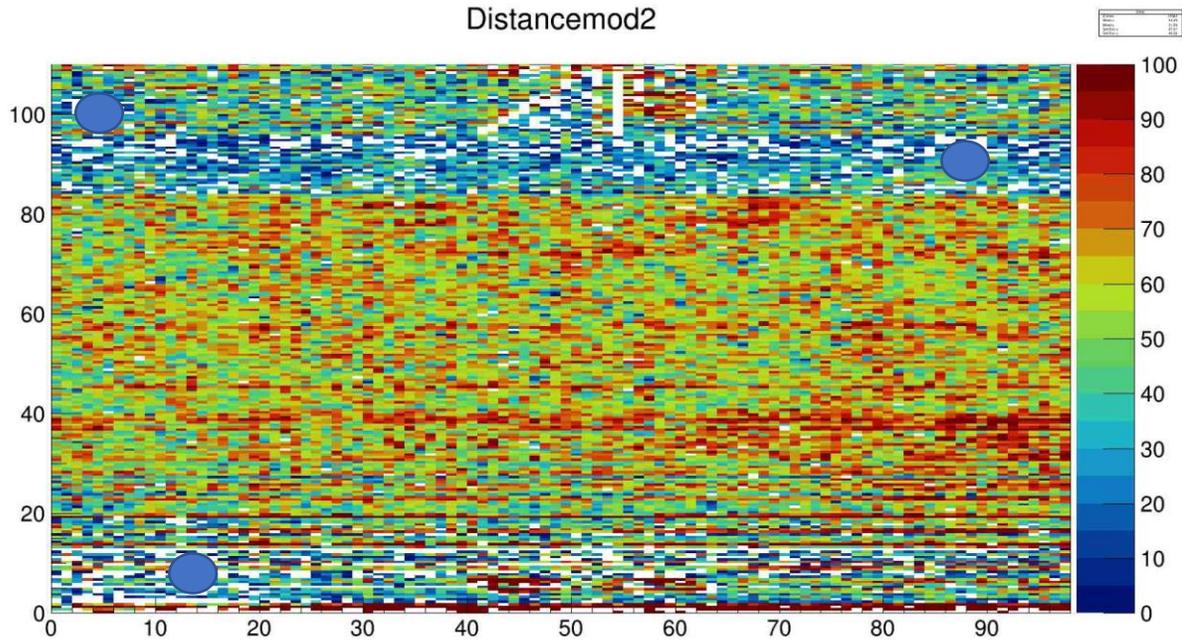
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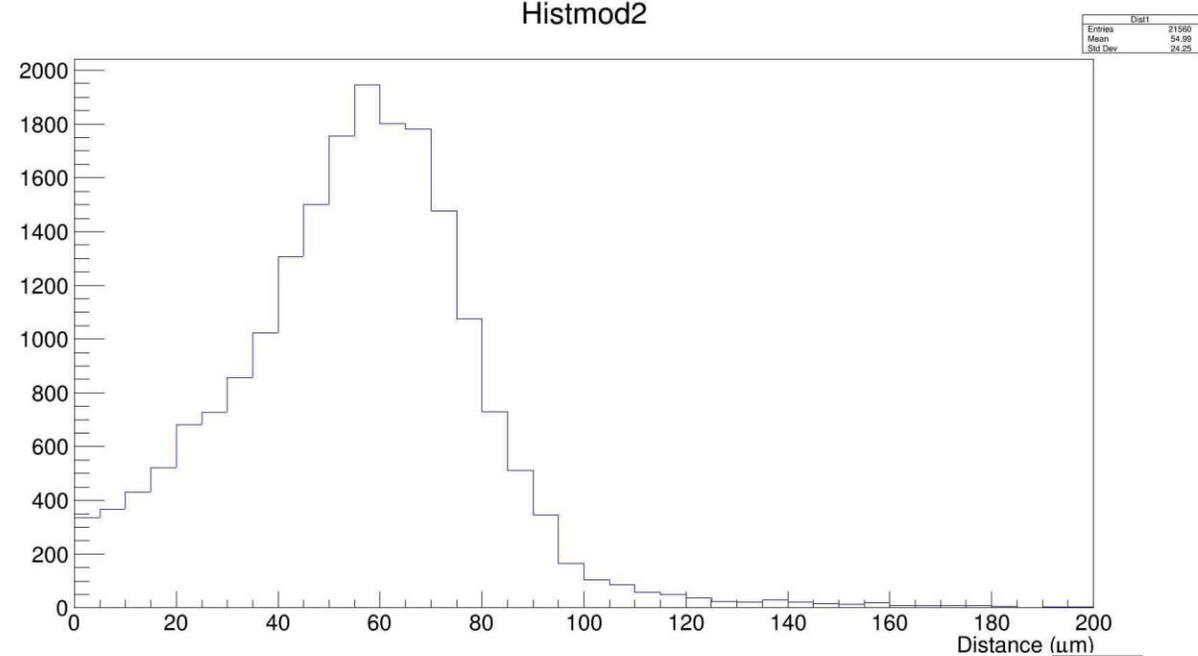
### NegativeDistancemod1



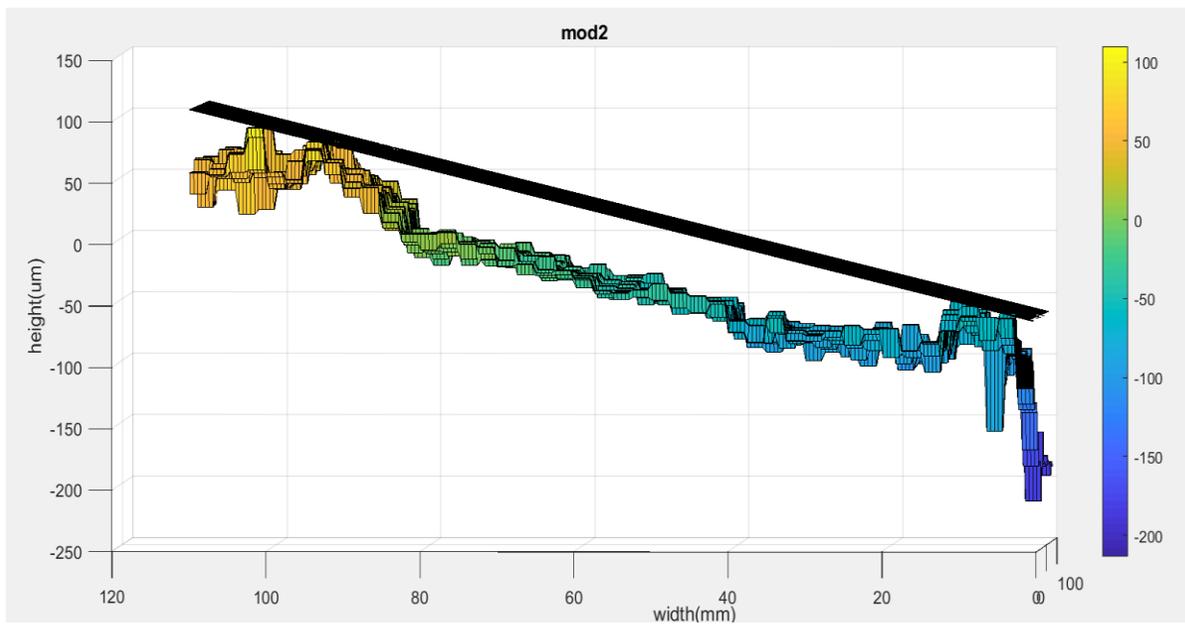
Distancemod2



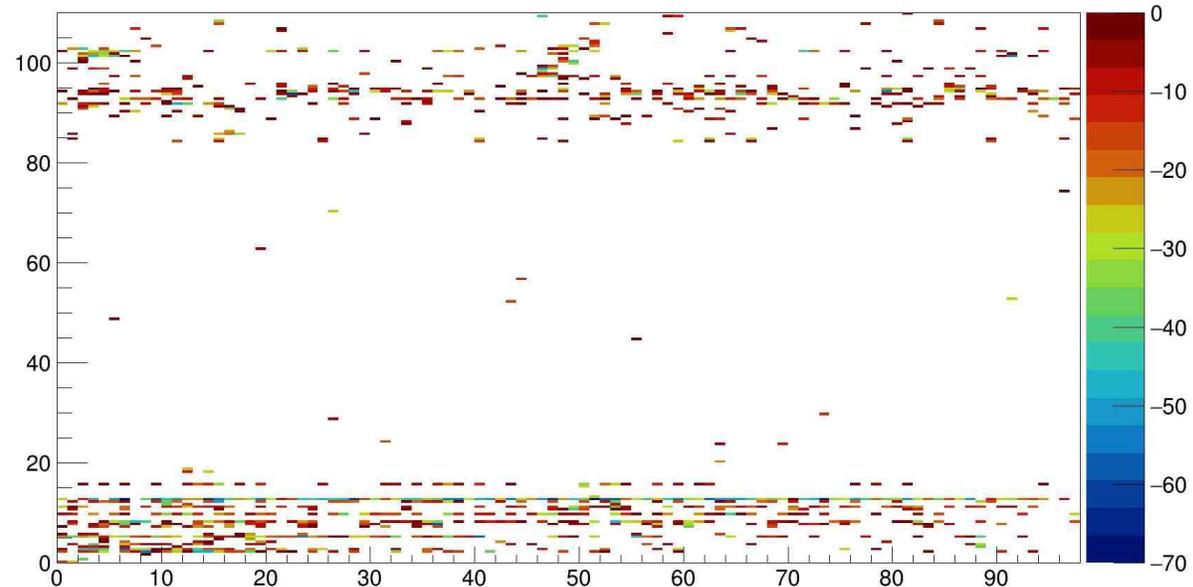
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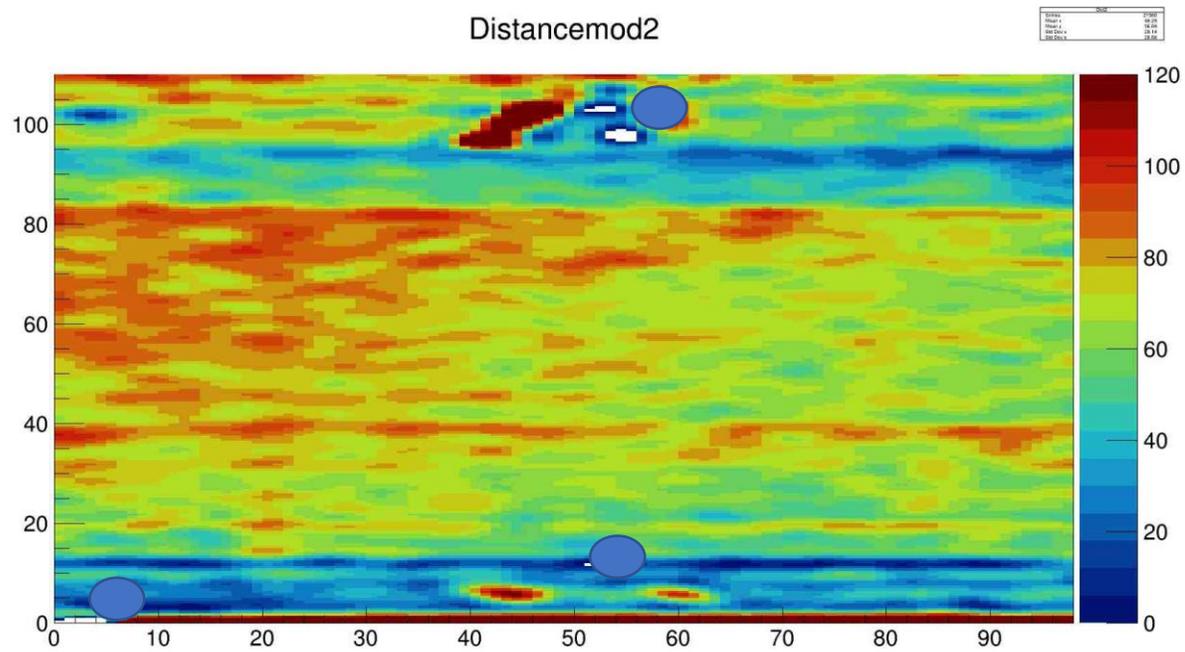
mod2



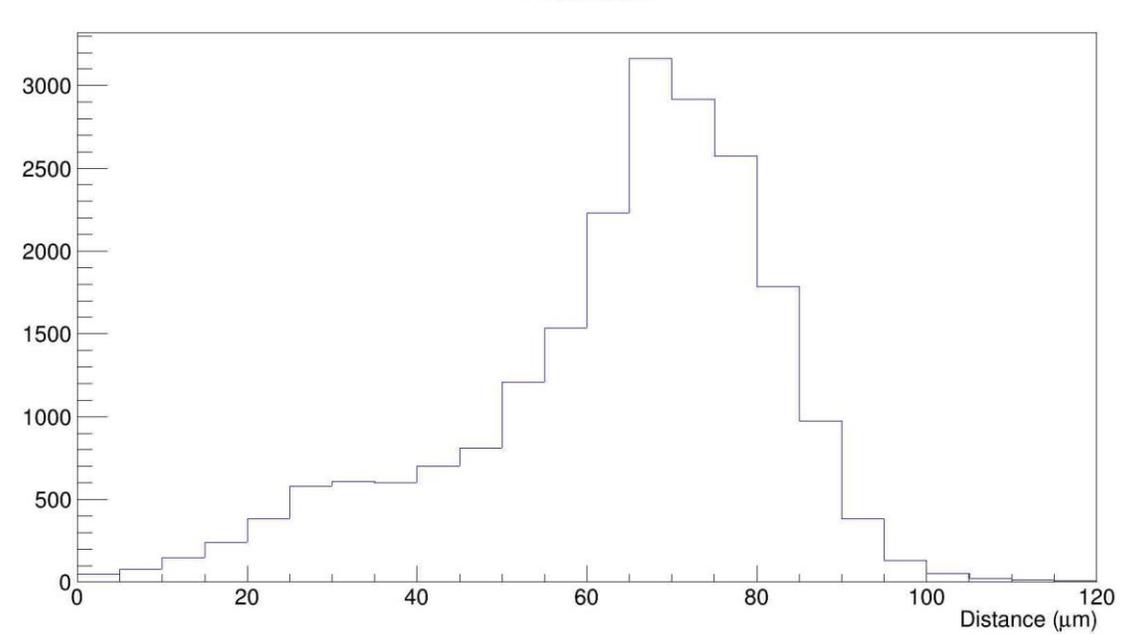
NegativeDistancemod2



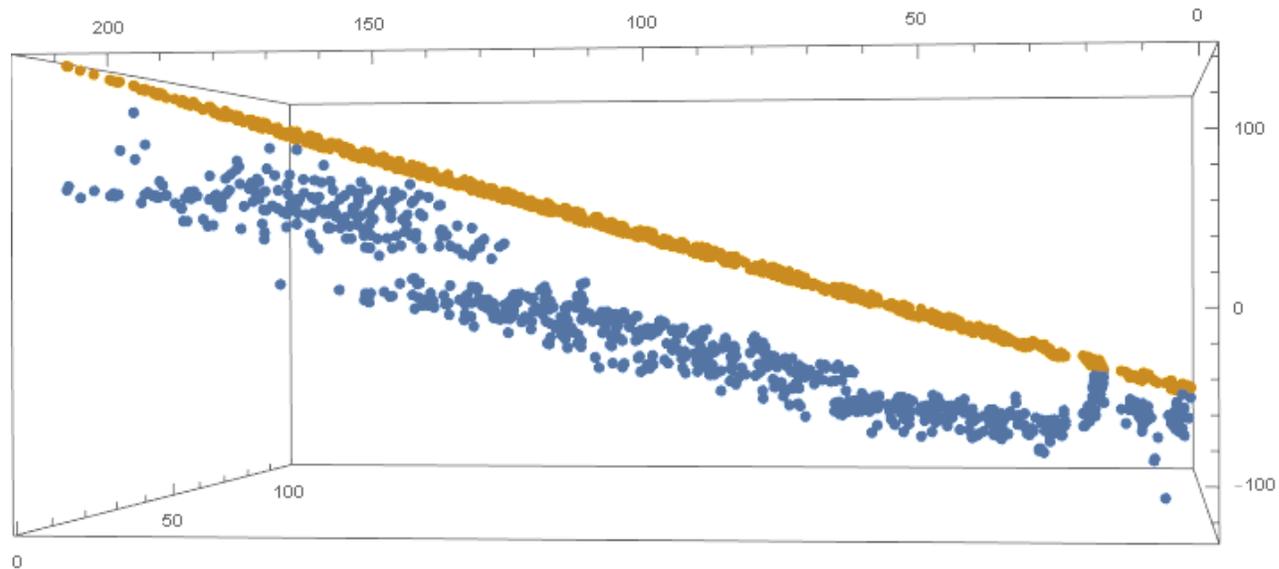
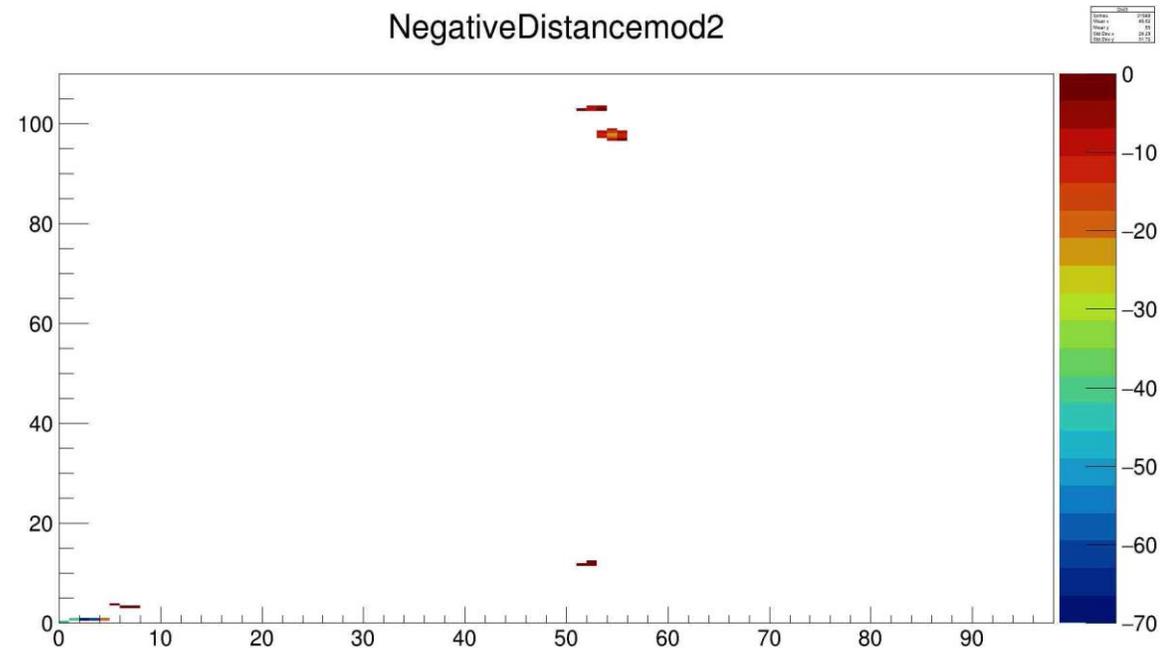
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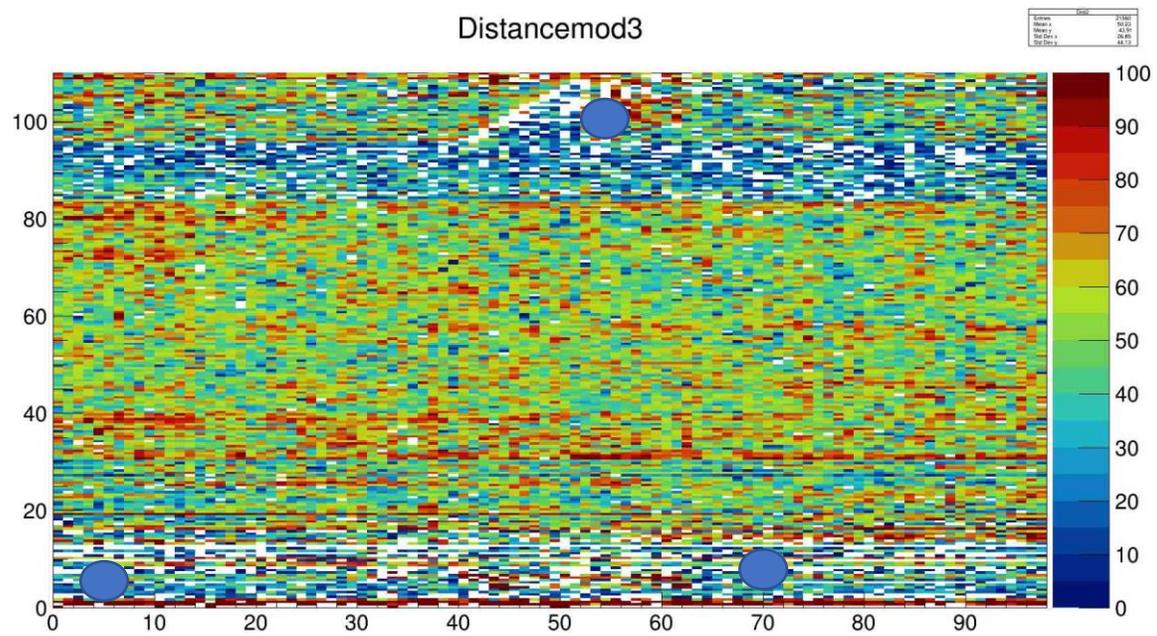
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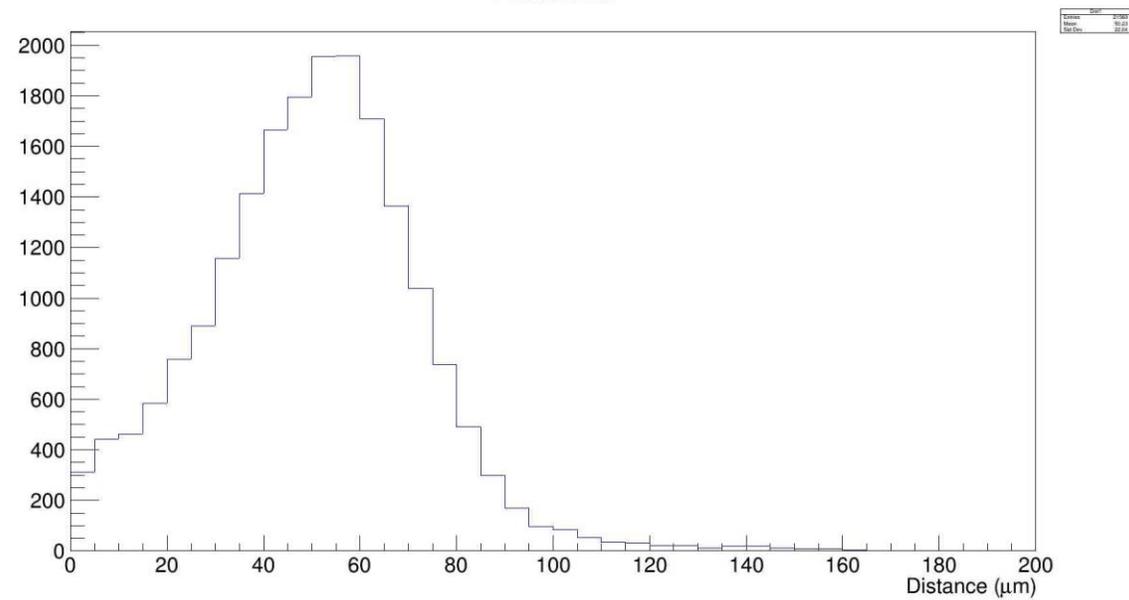
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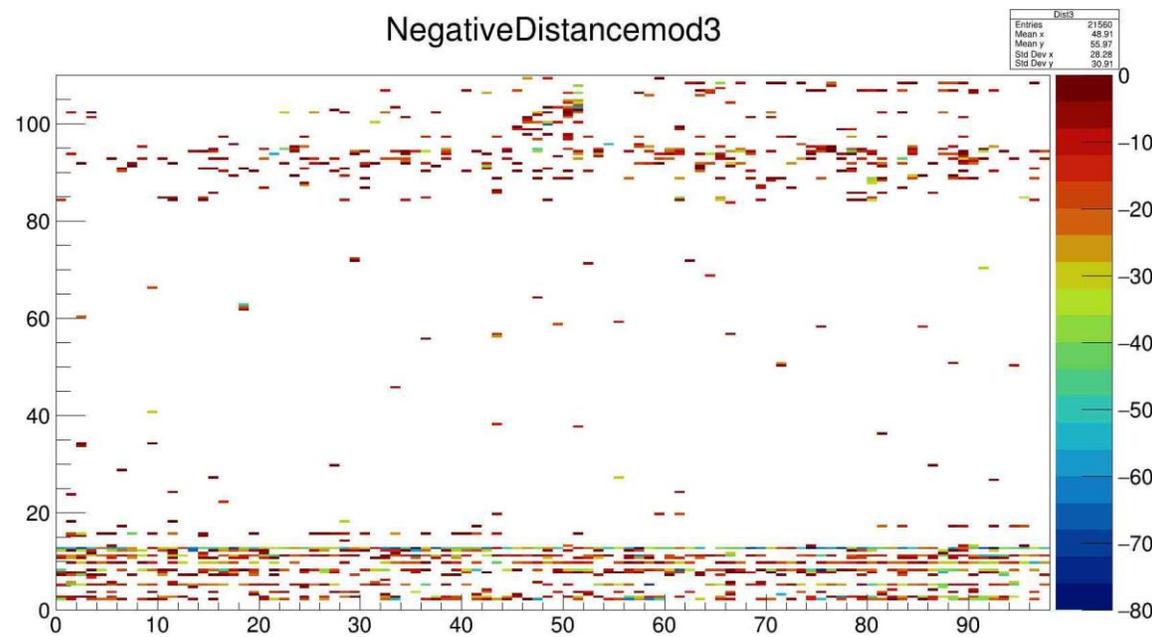
Distancemod3



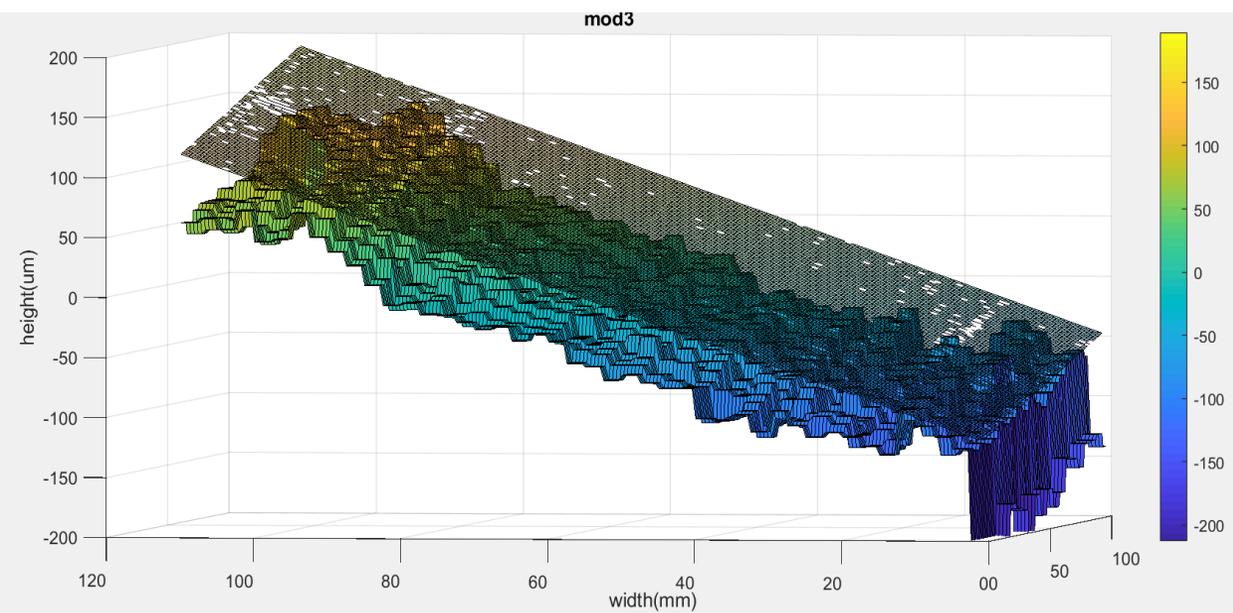
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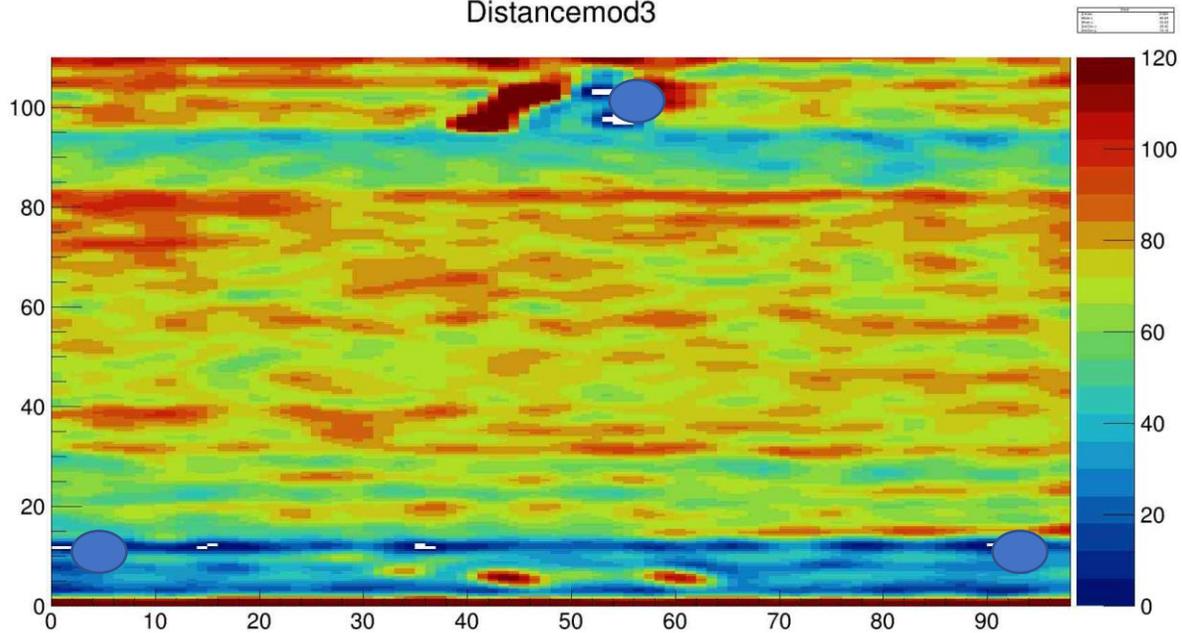
NegativeDistancemod3



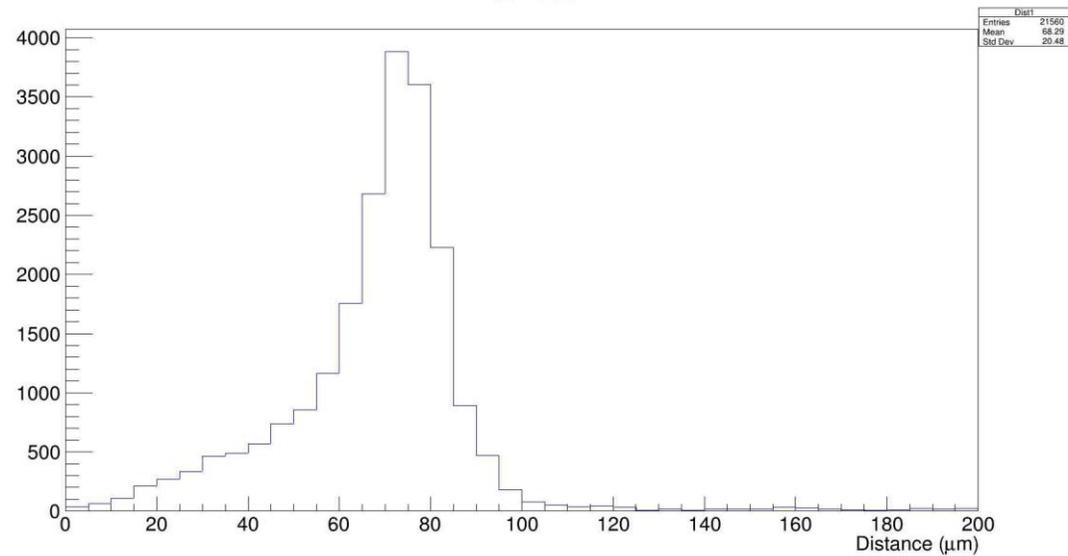
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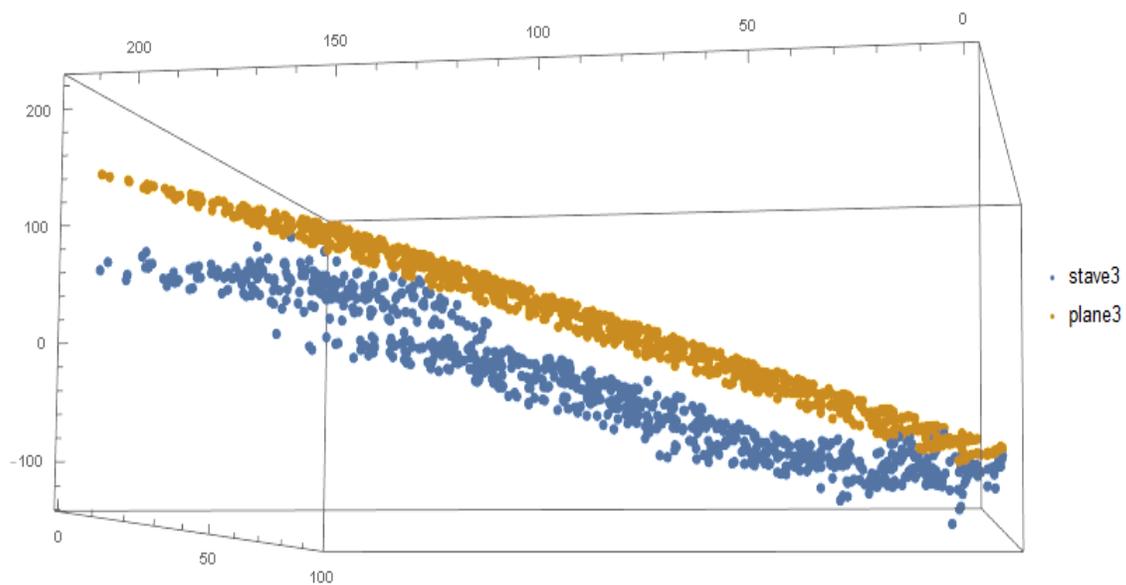
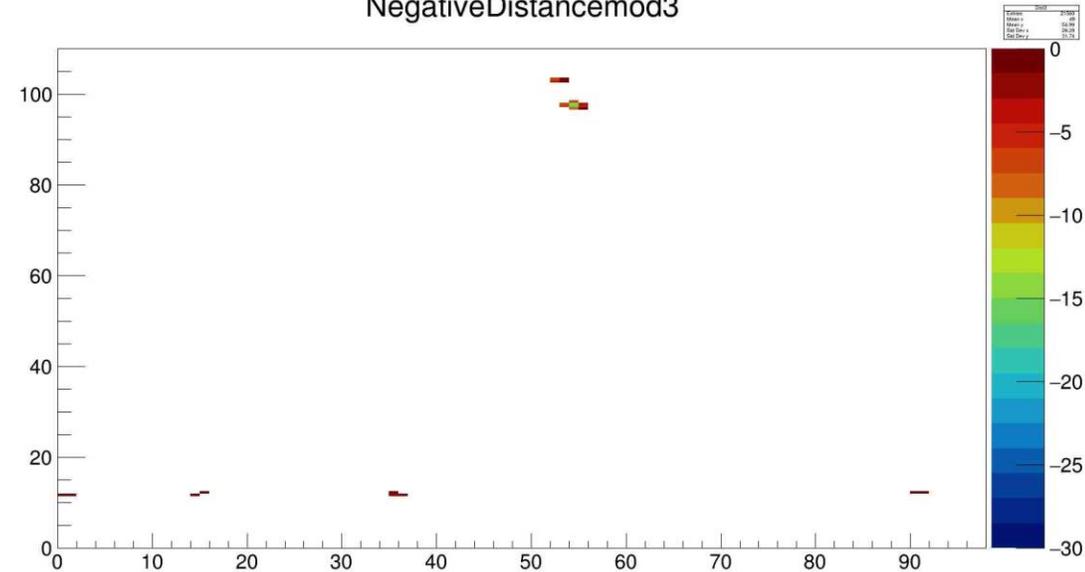
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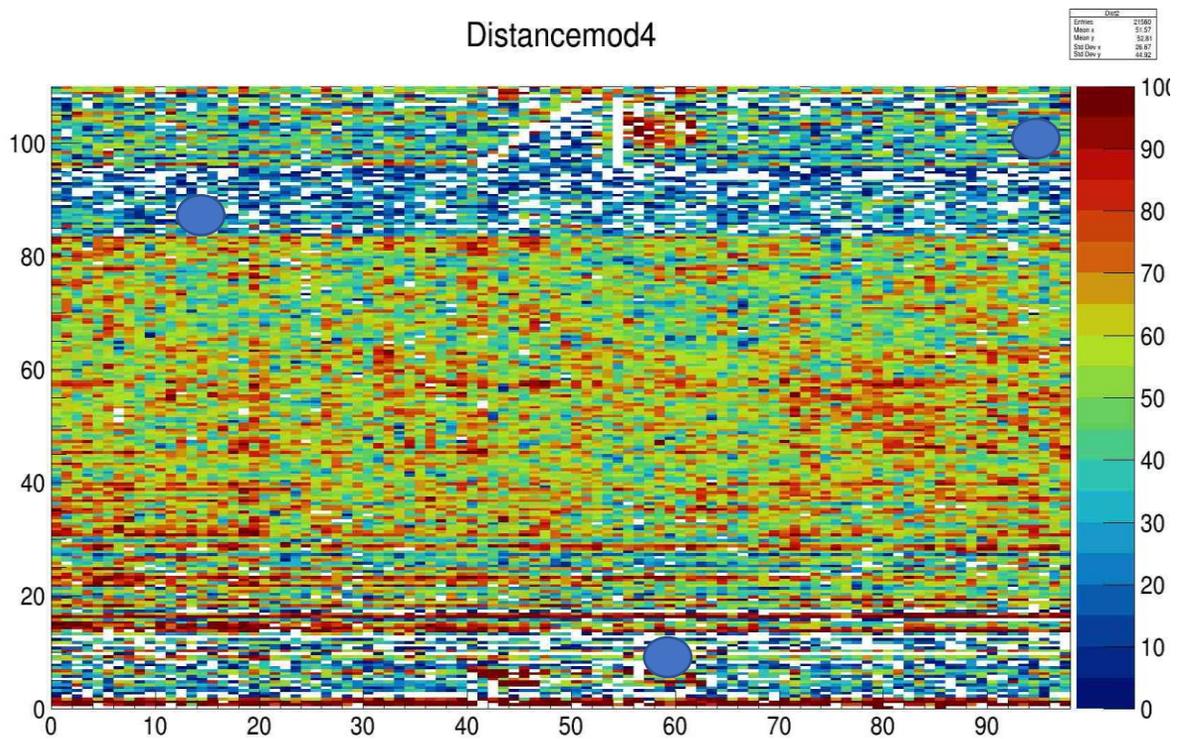
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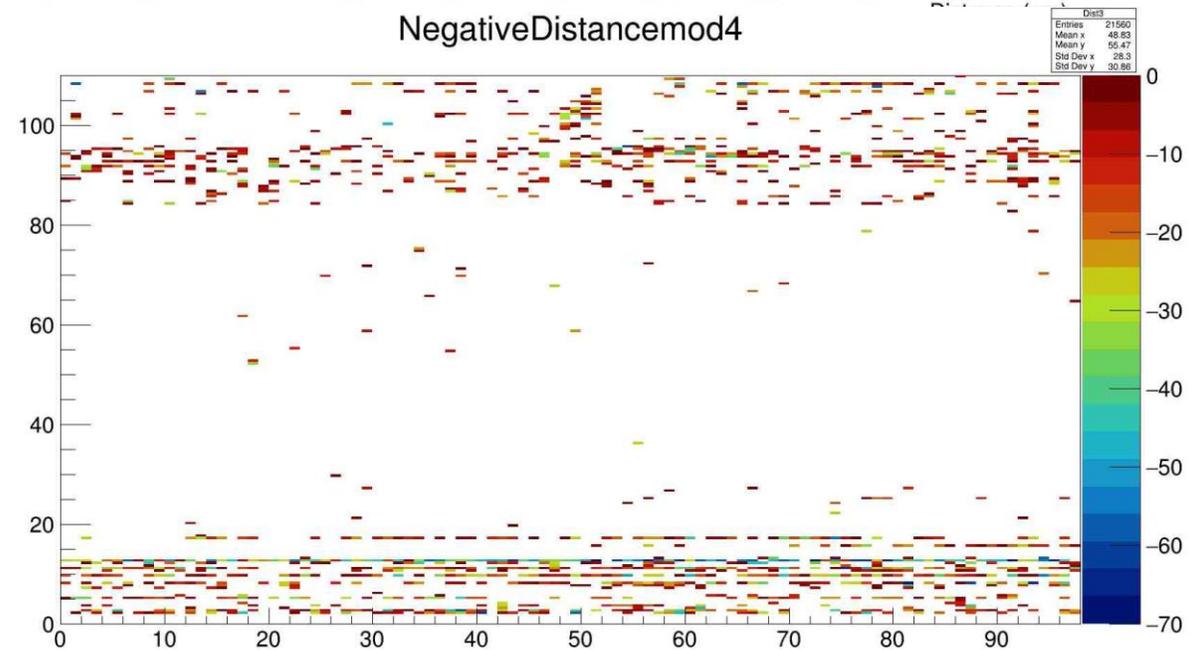
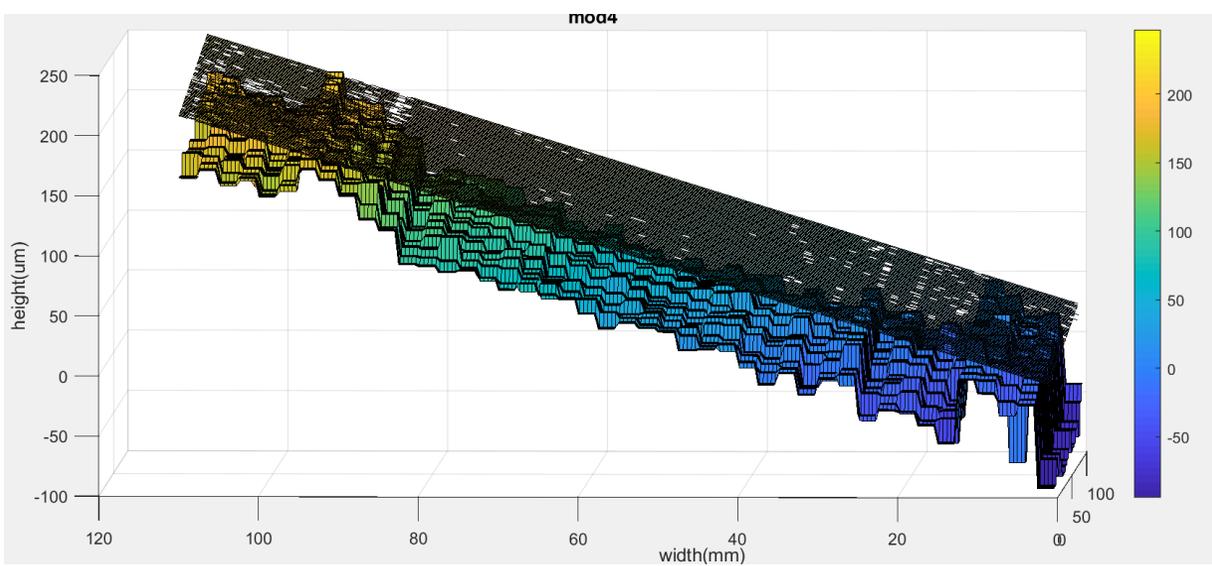
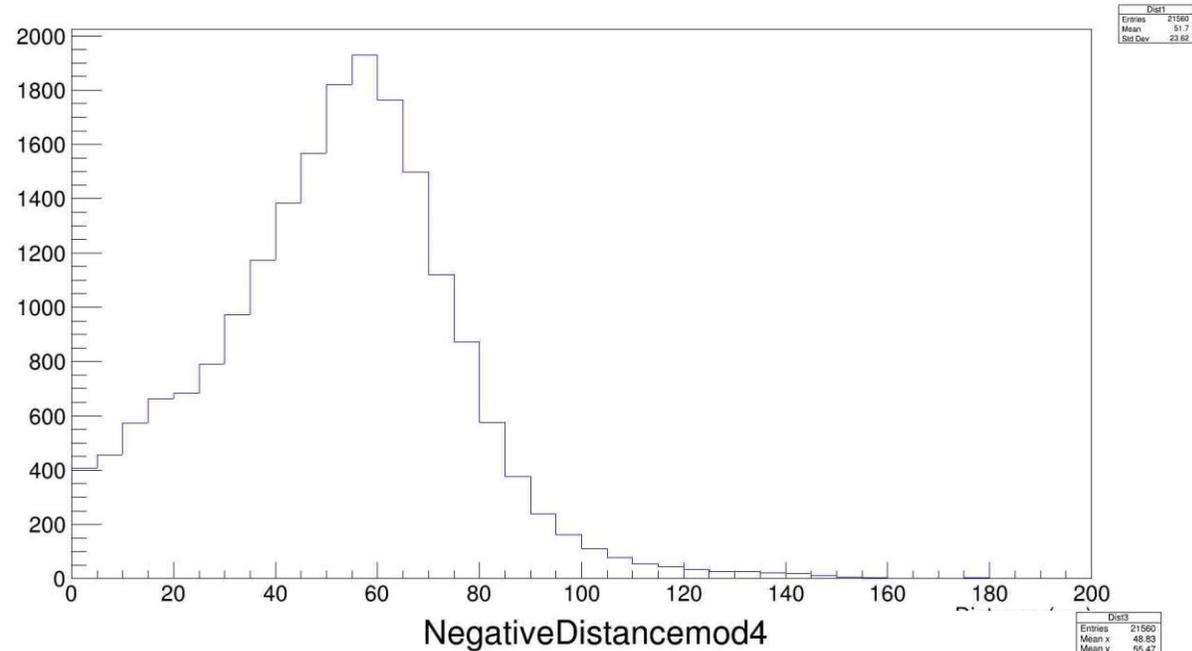
NegativeDistancemod3



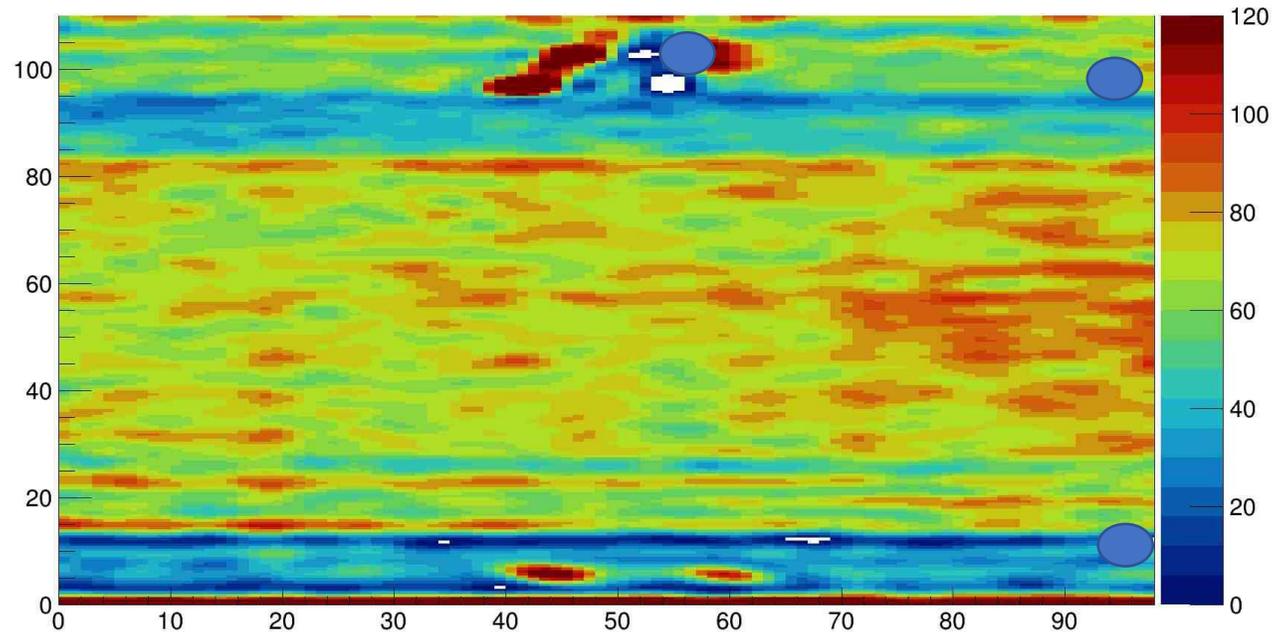
Distancemod4



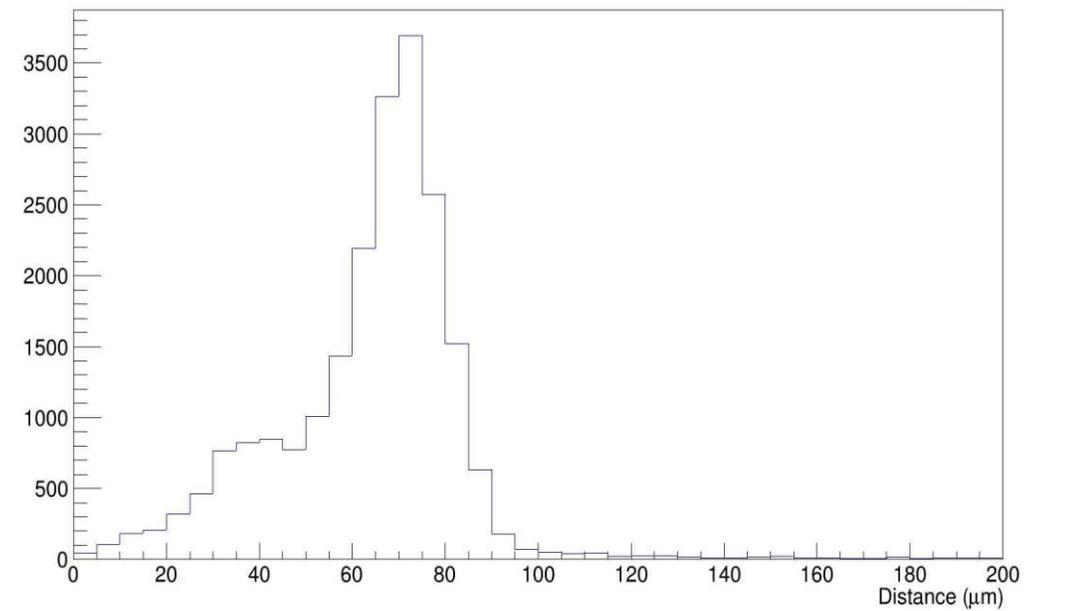
Histmod4



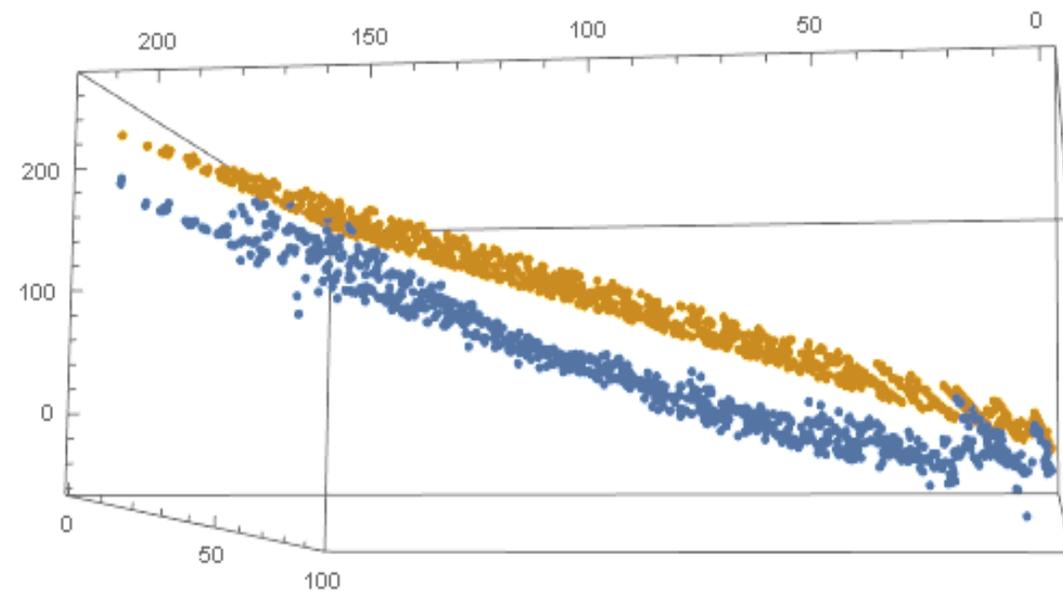
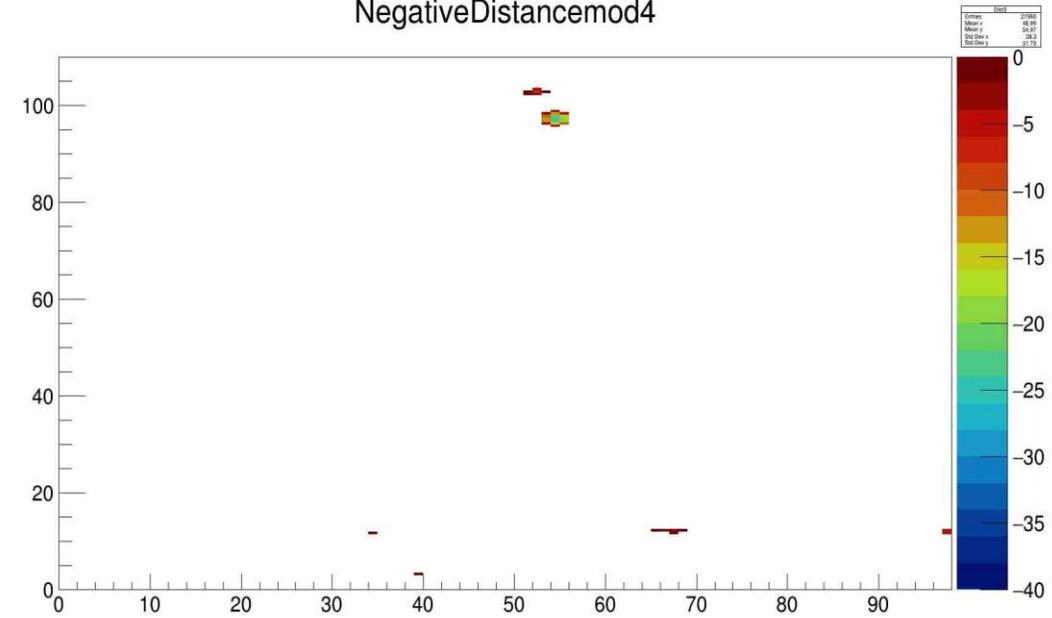
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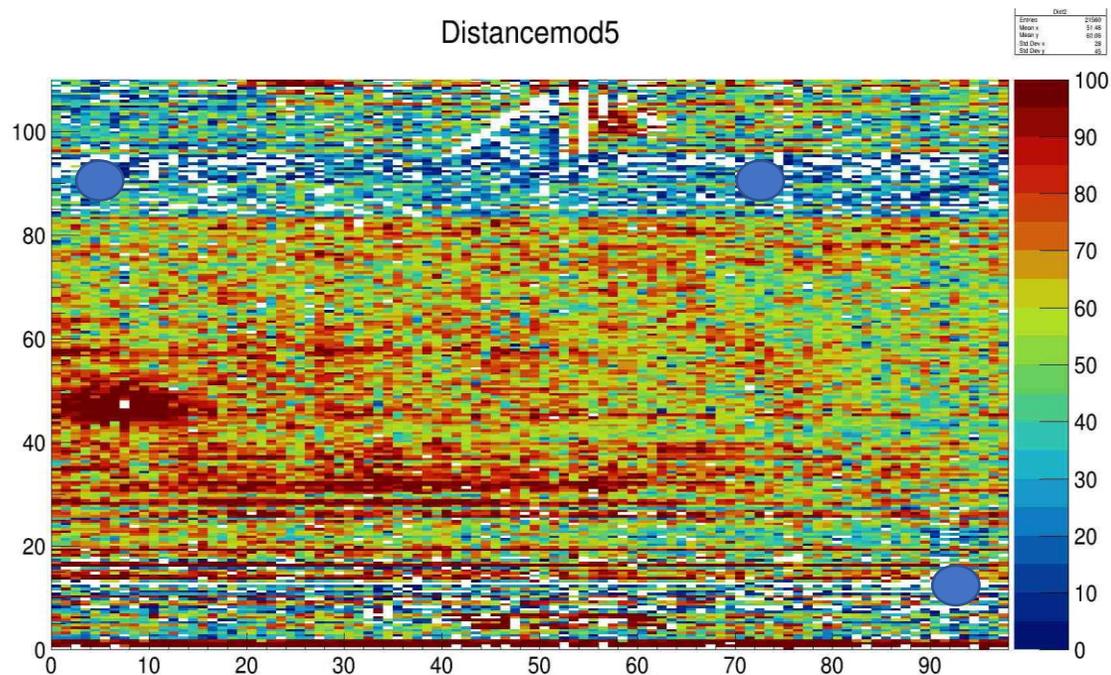
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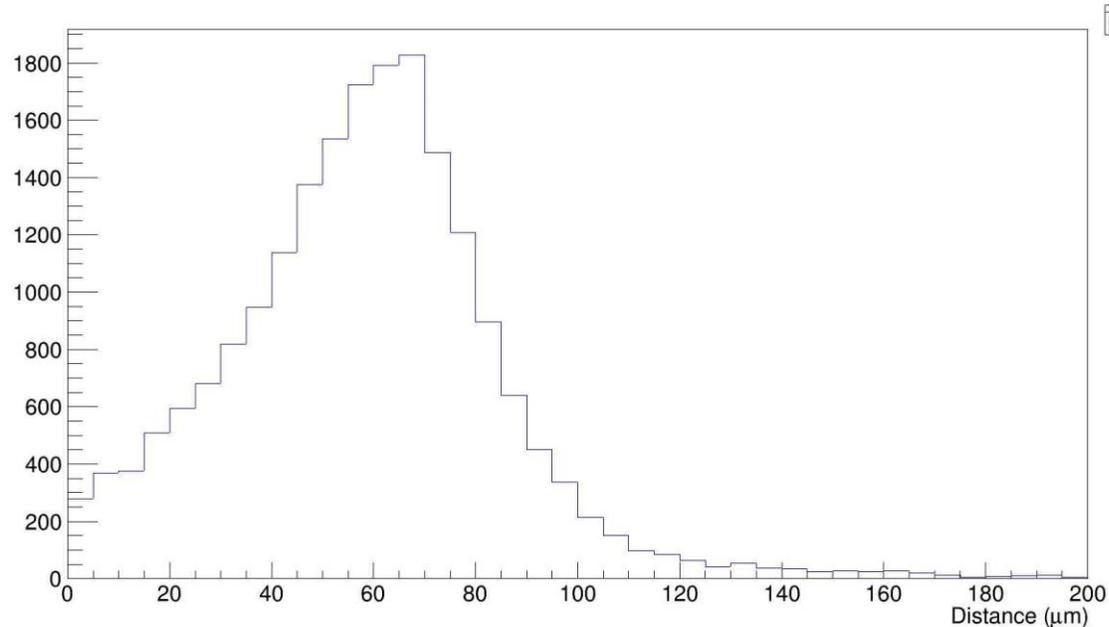
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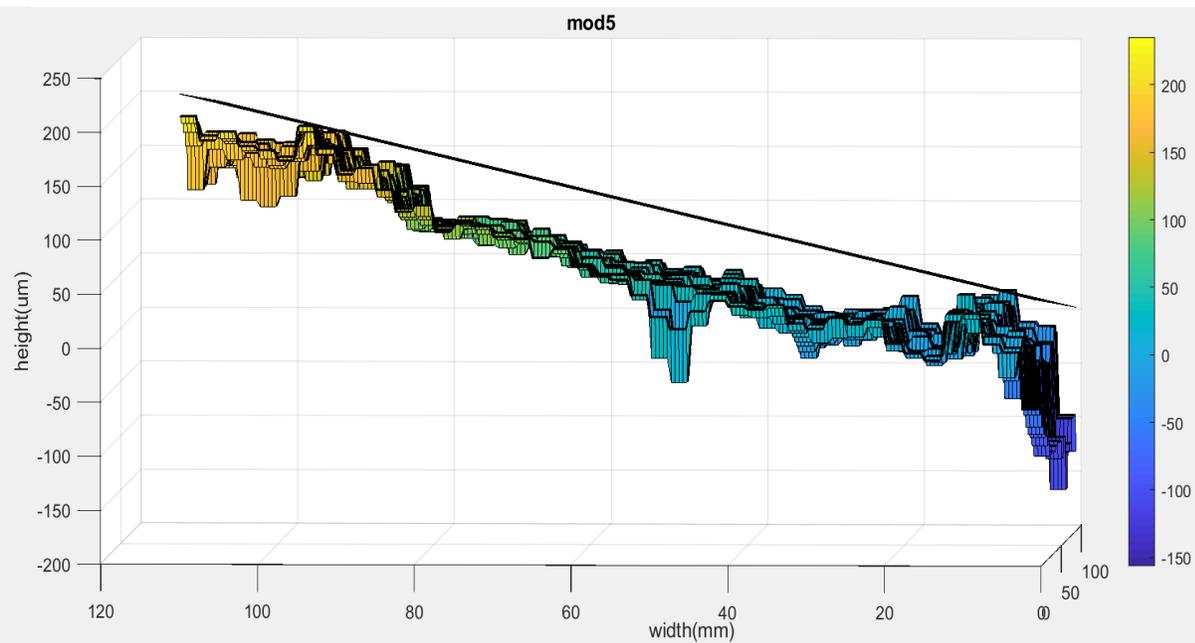
Distancemod5



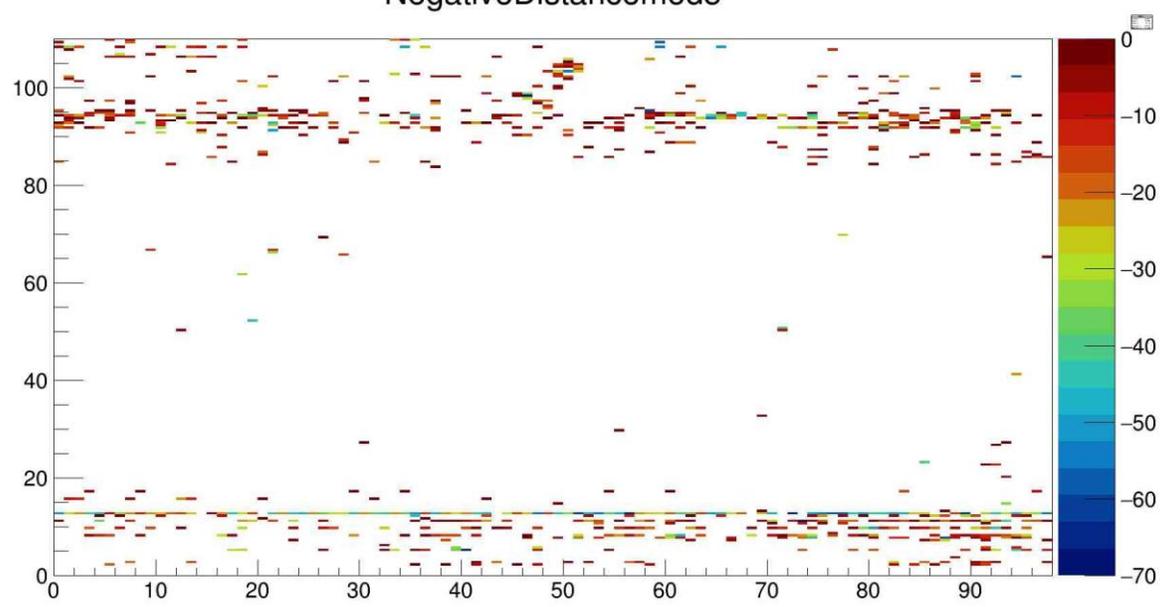
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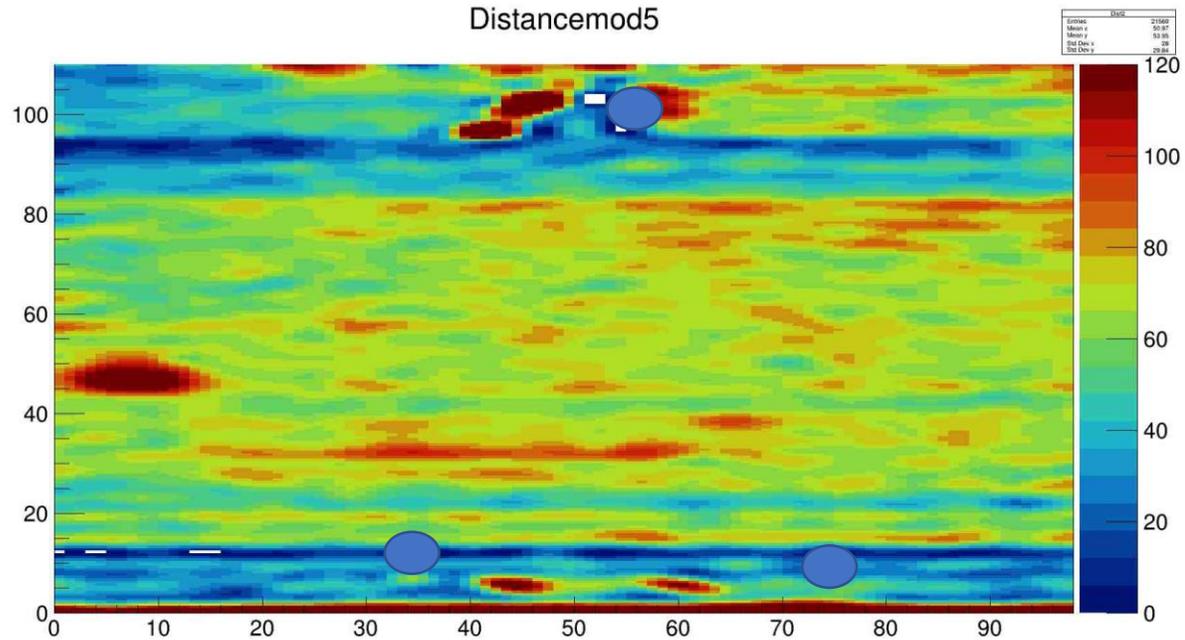
mod5



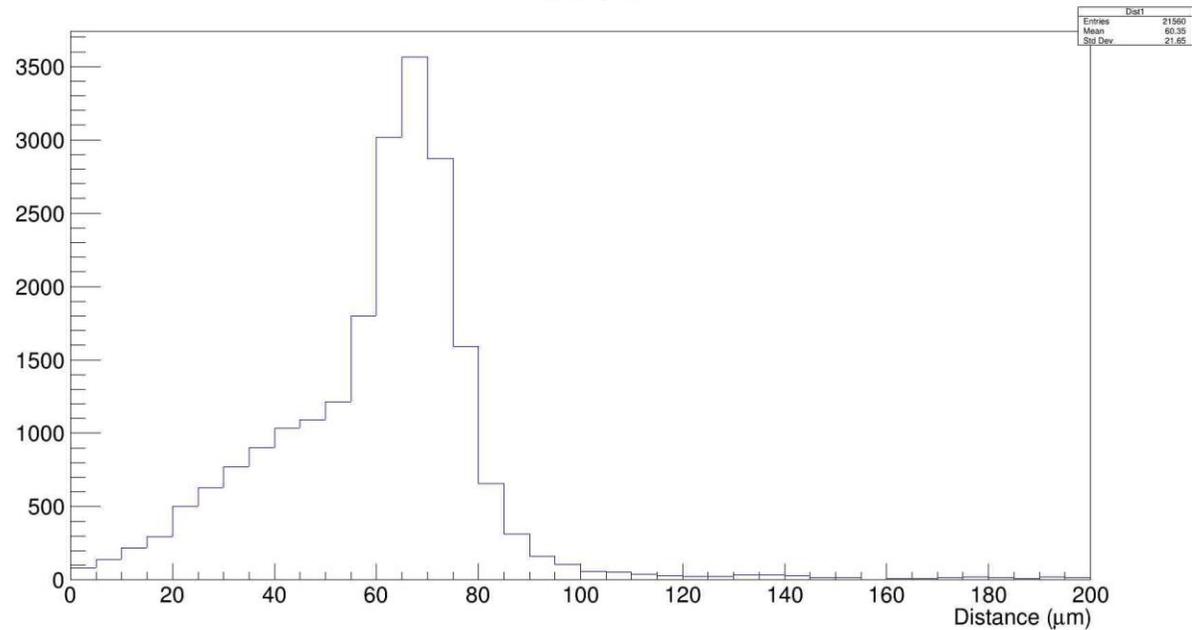
NegativeDistancemod5



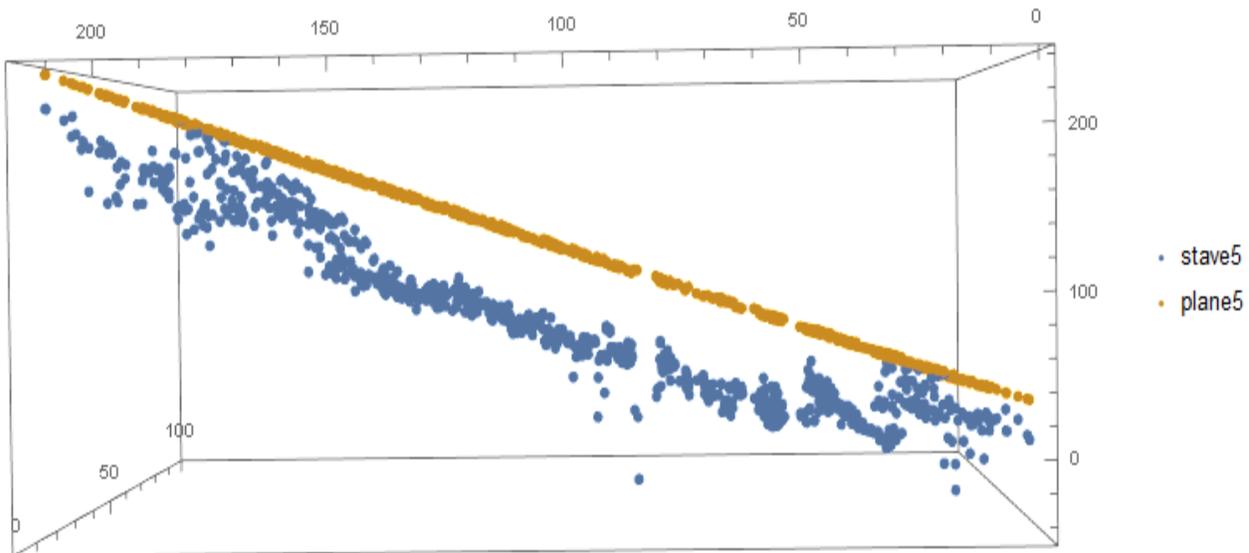
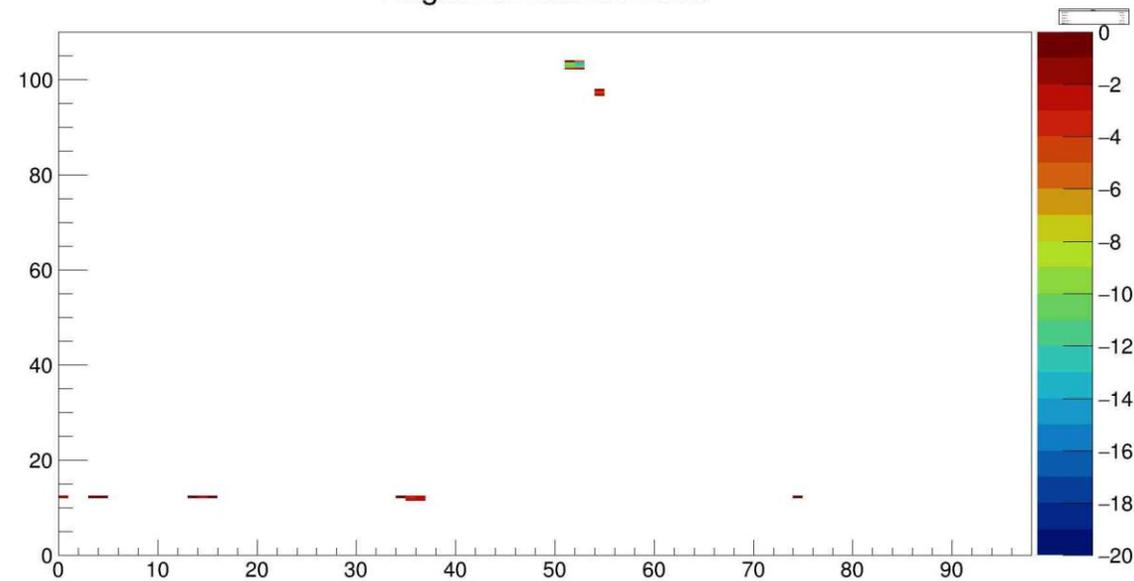
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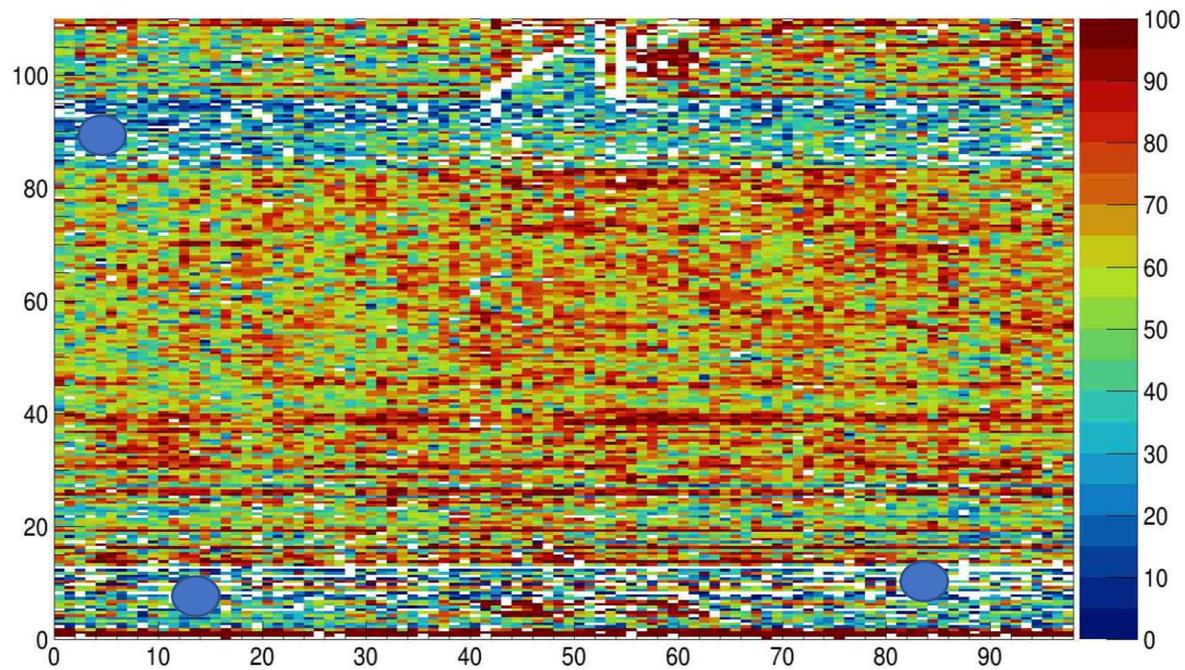
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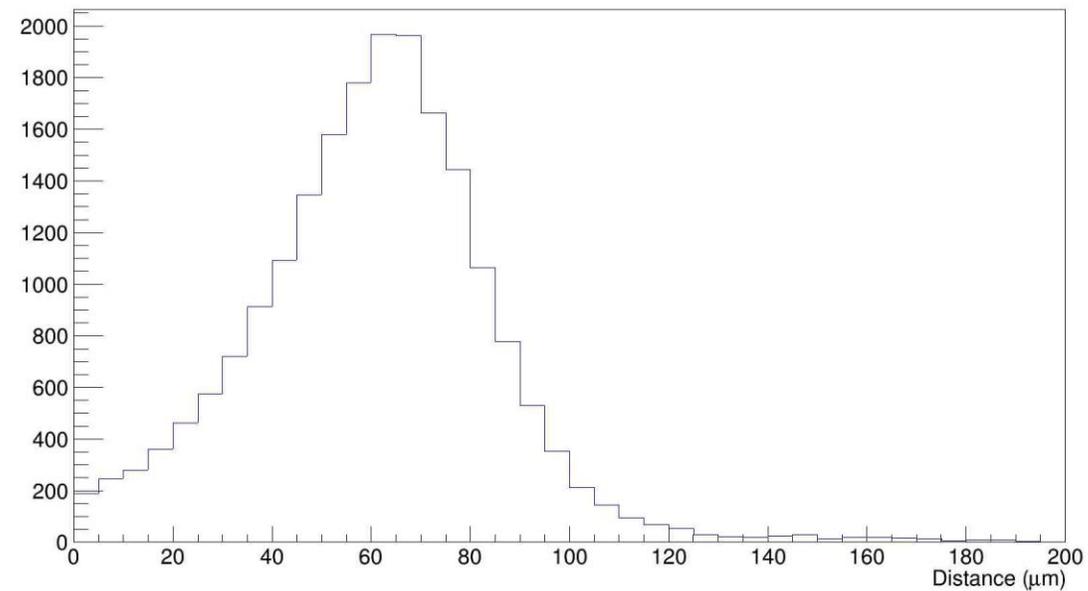
### NegativeDistancemod5



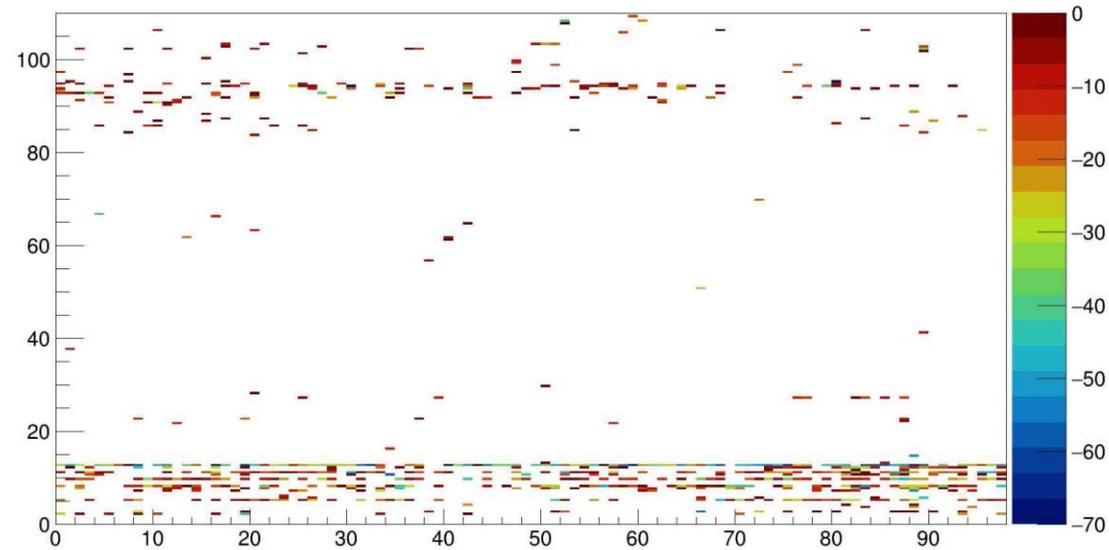
Distancemod6



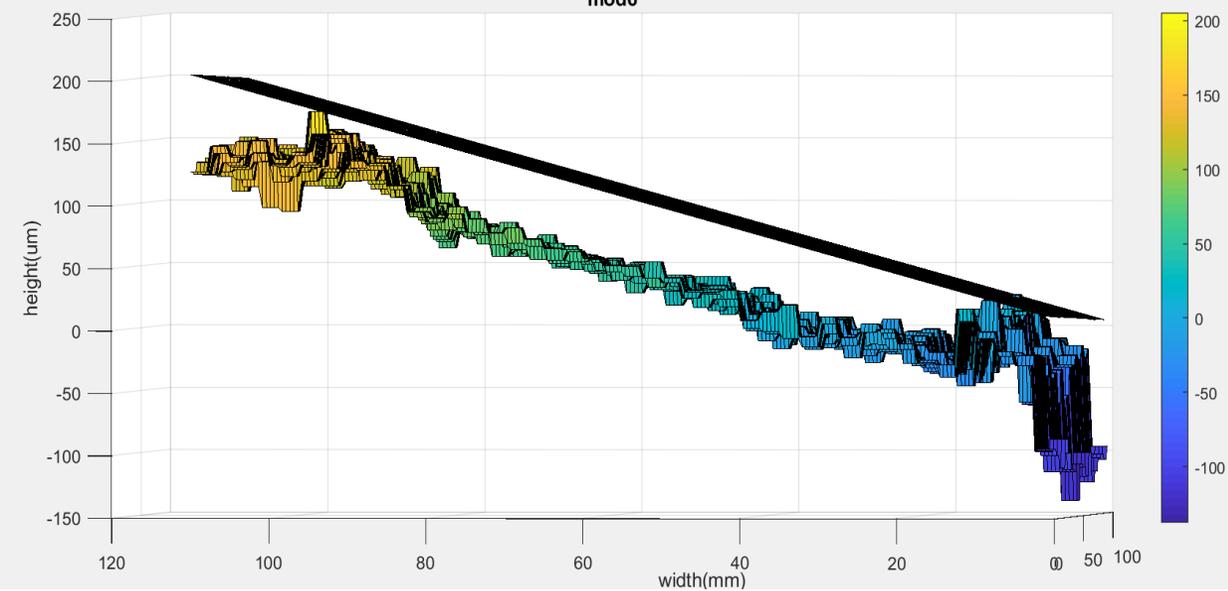
Histmod6



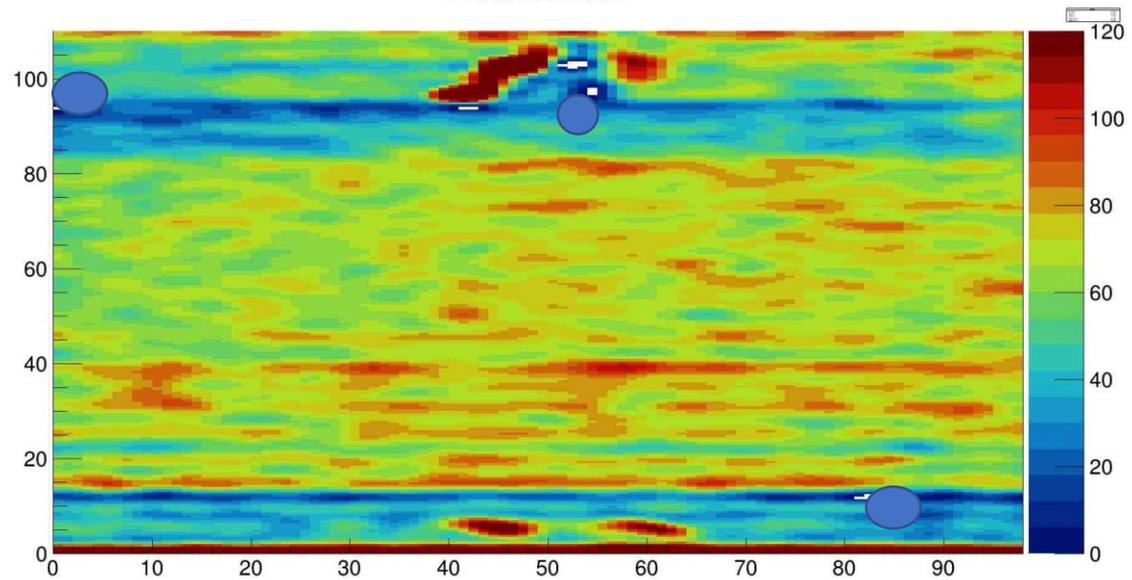
NegativeDistancemod6



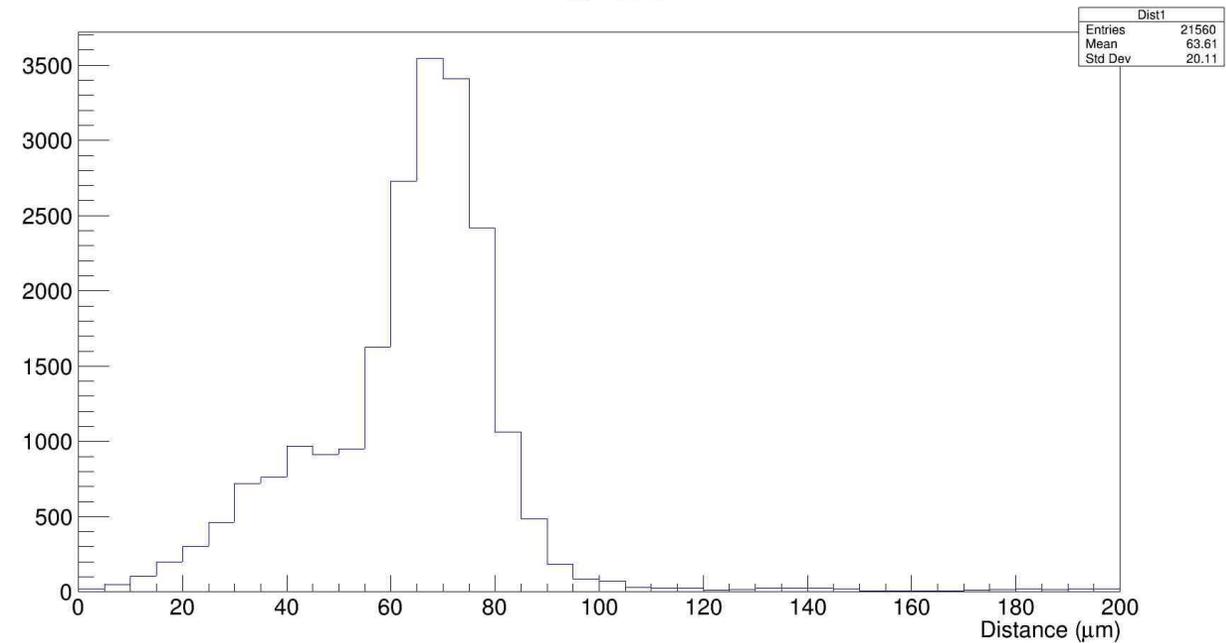
mod6



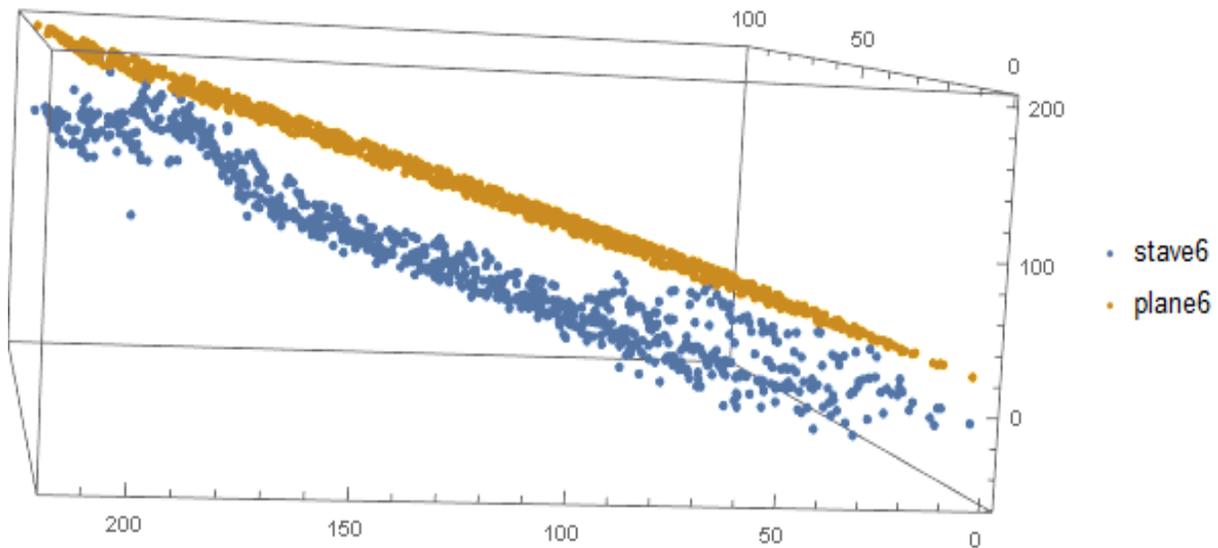
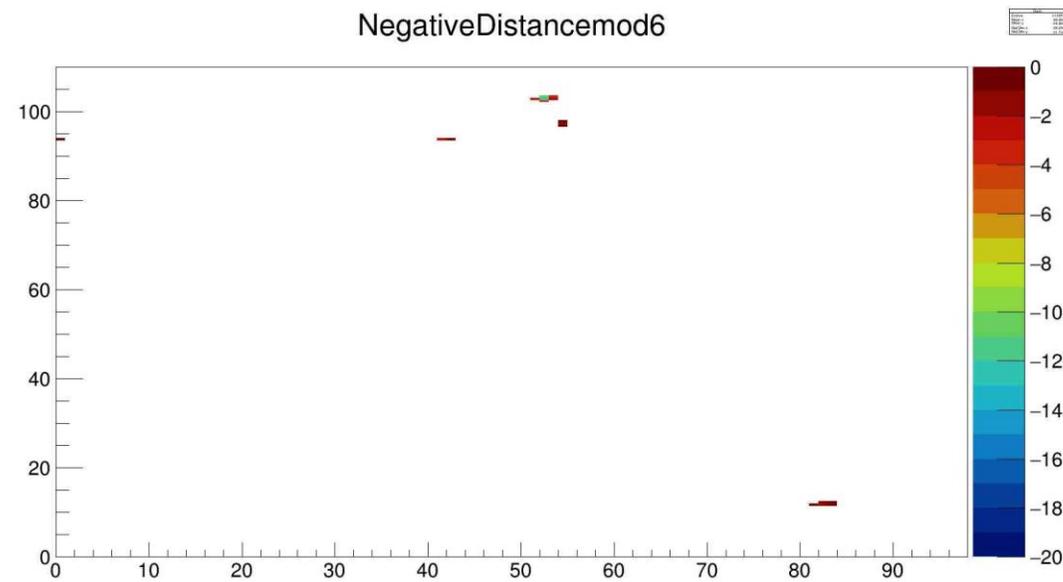
Distancemod6



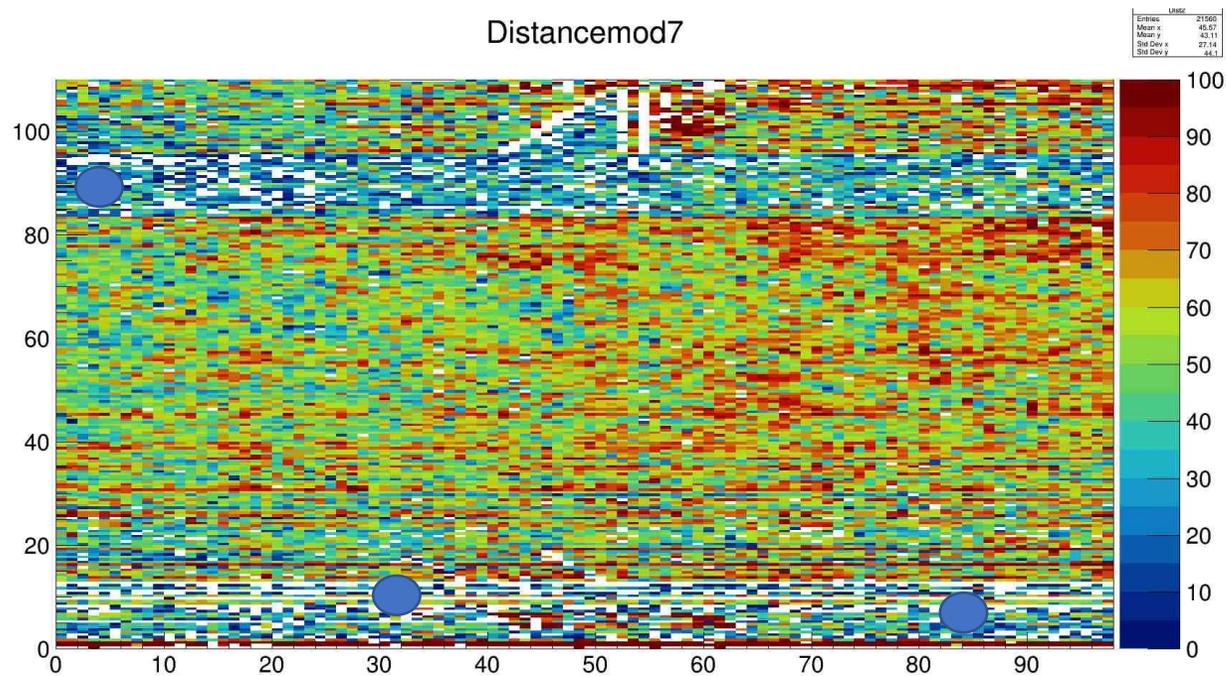
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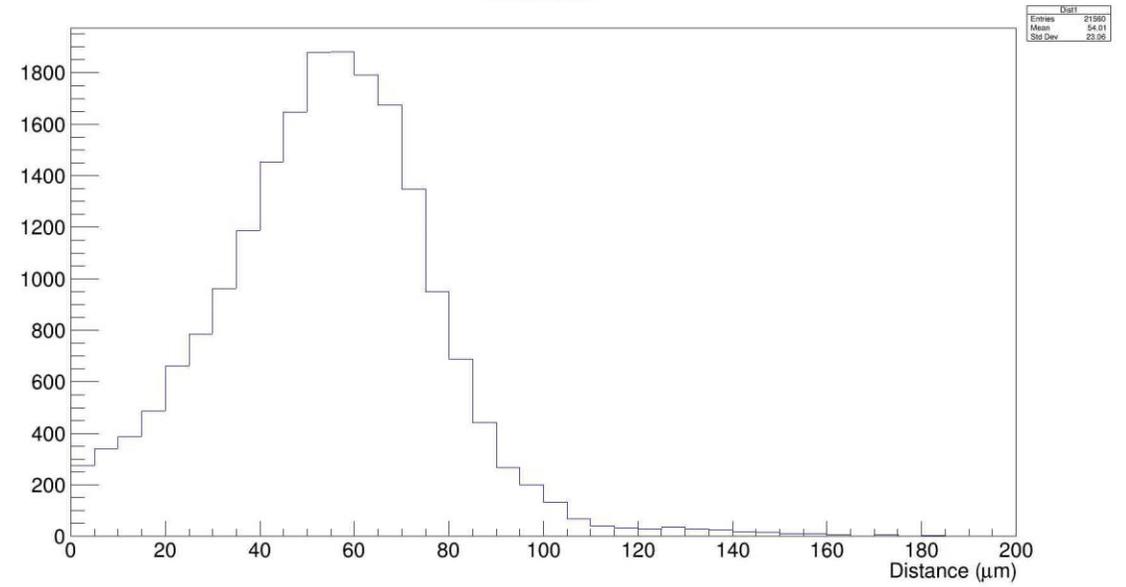
NegativeDistancemod6



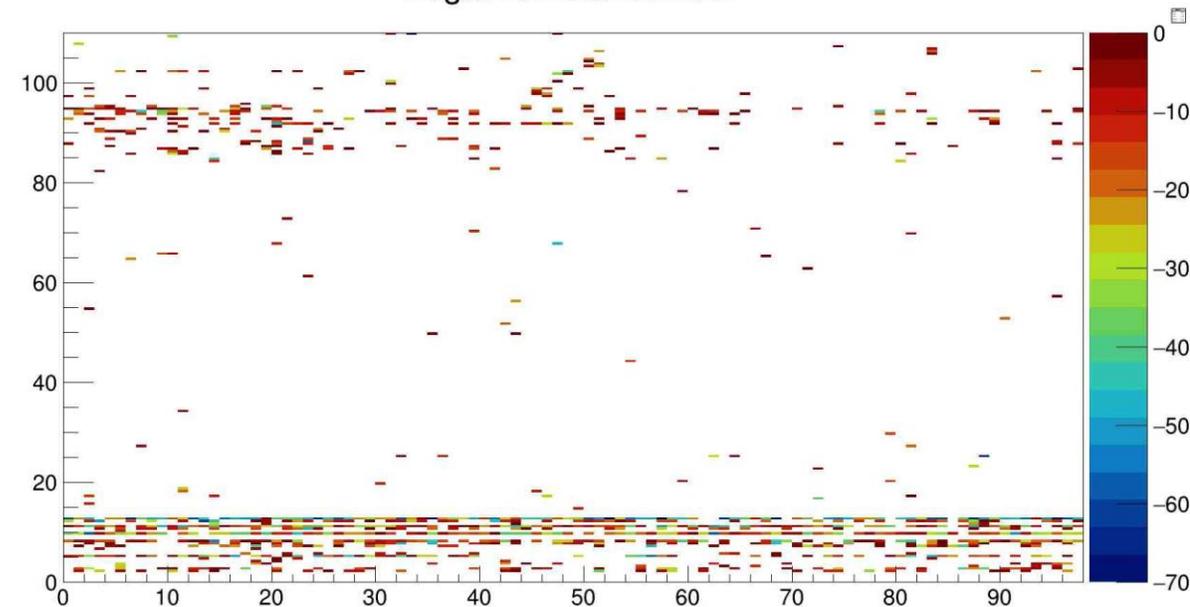
### Distancemod7



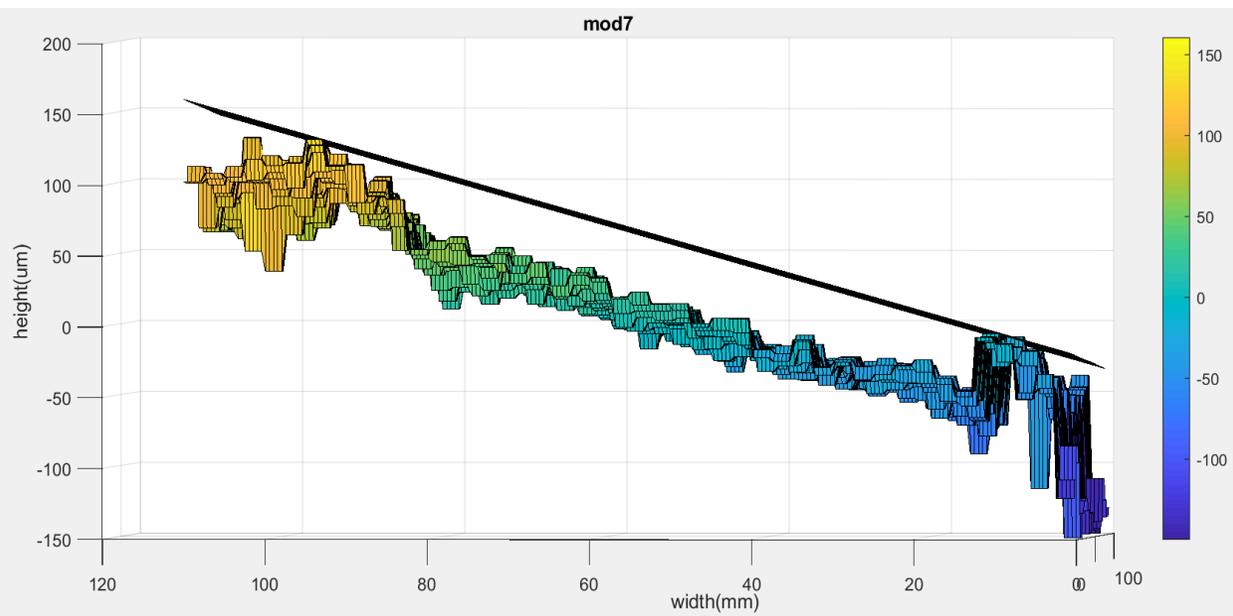
### Histmod7



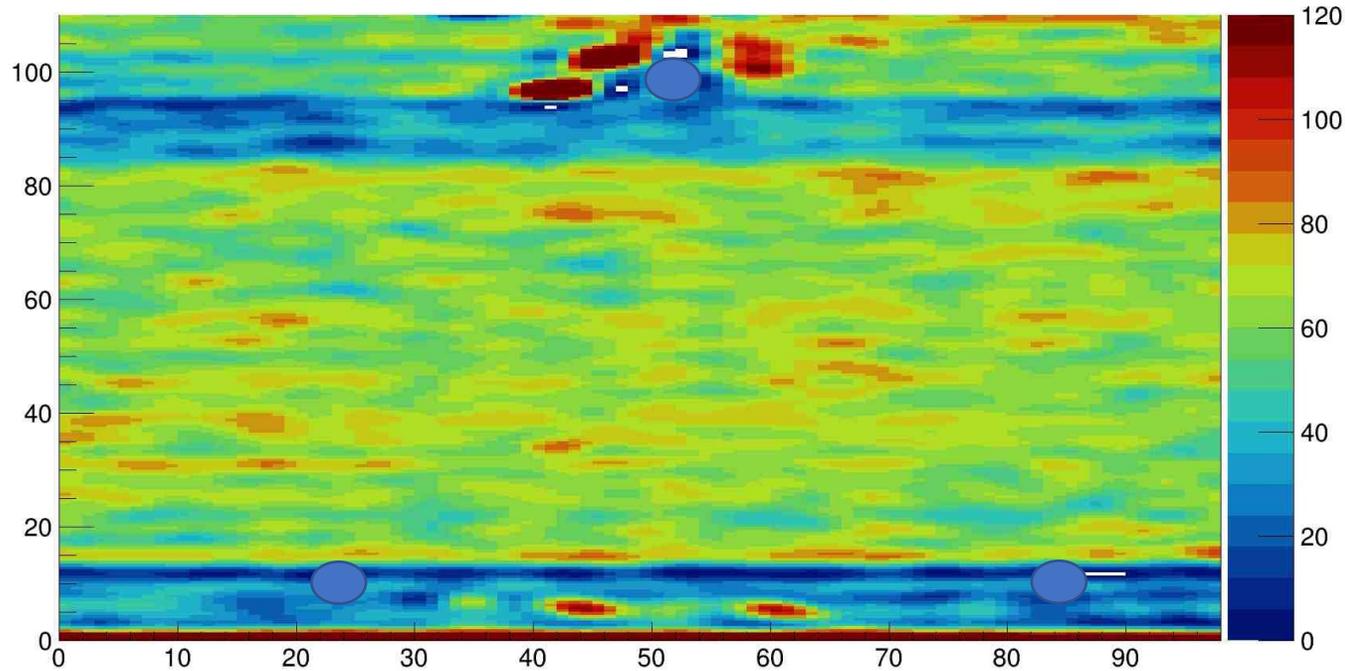
### NegativeDistancemod7



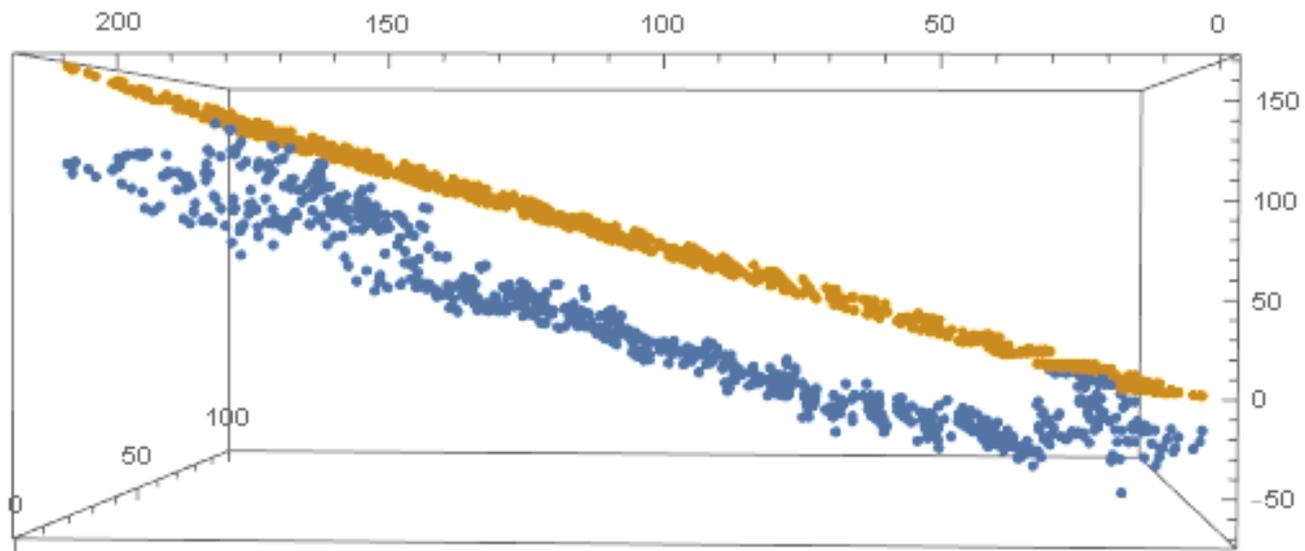
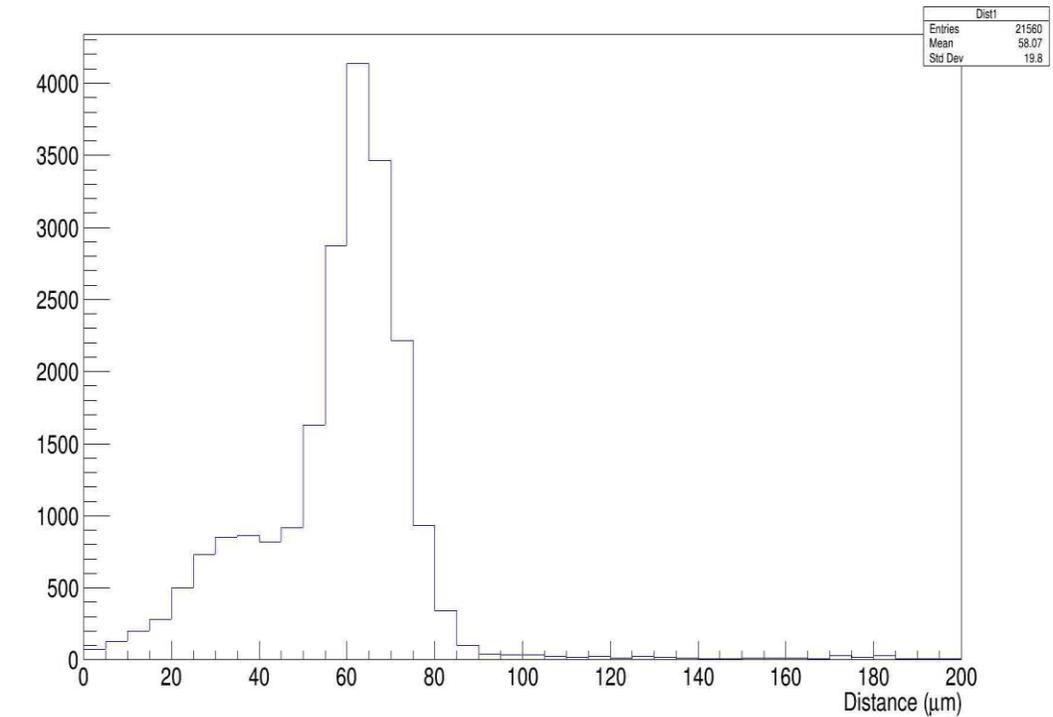
### mod7



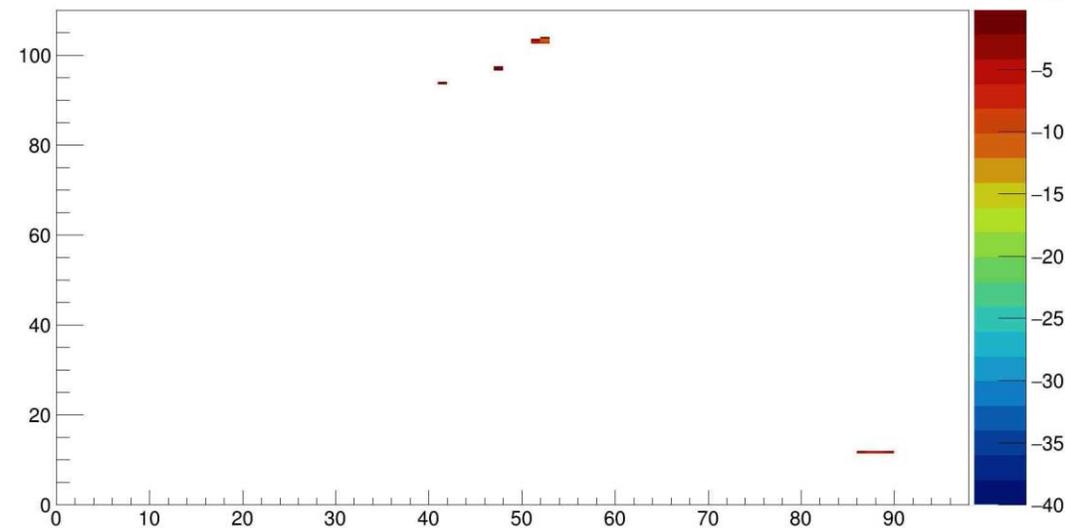
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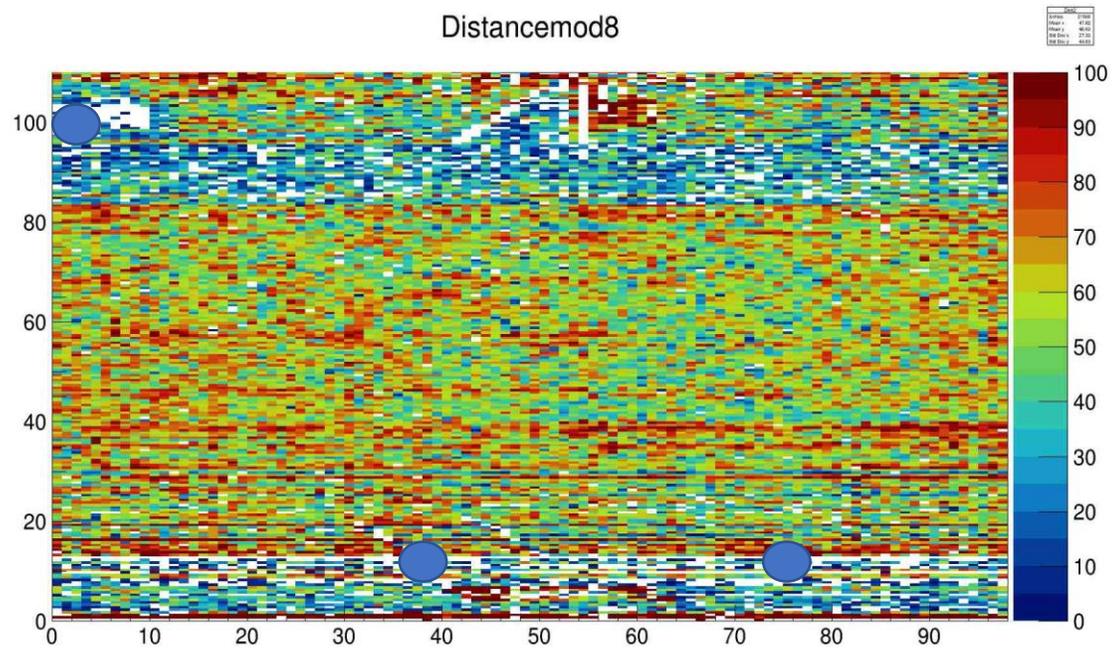
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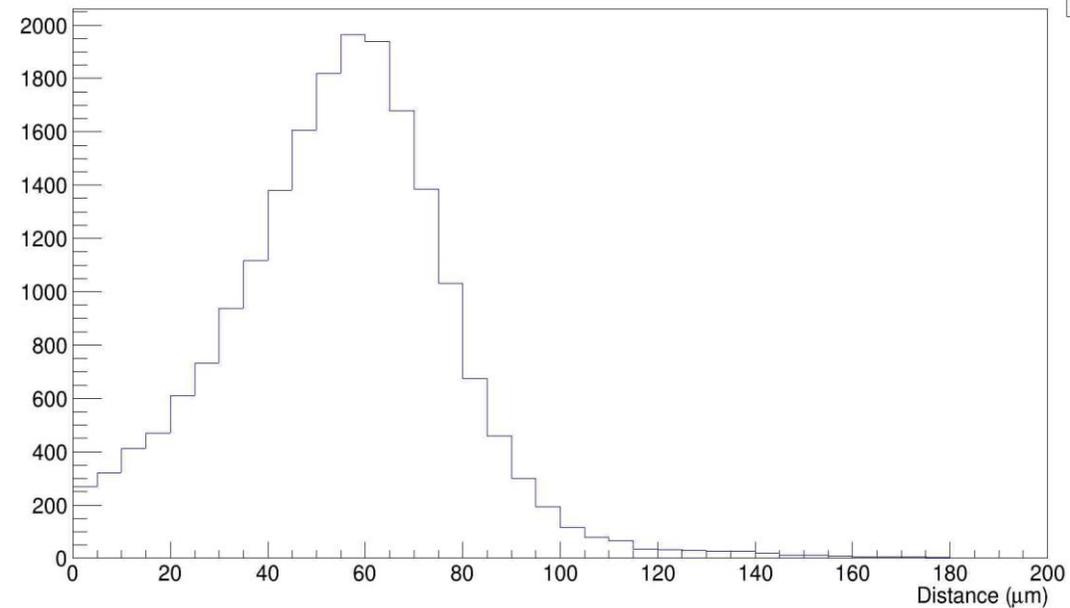
### NegativeDistancemod7



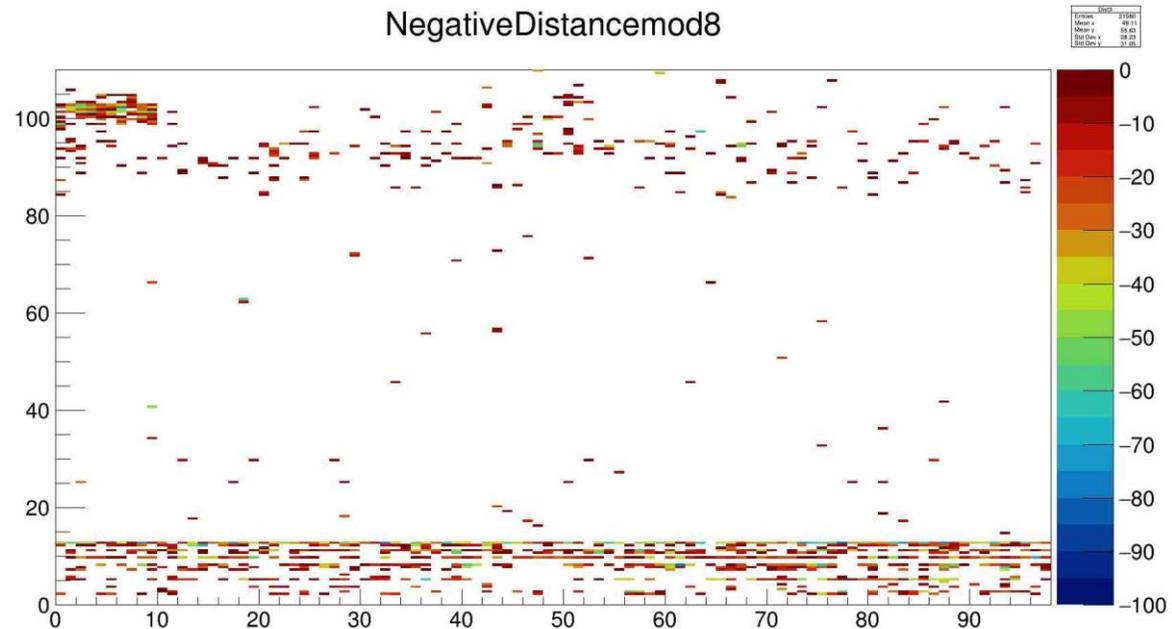
Distancemod8



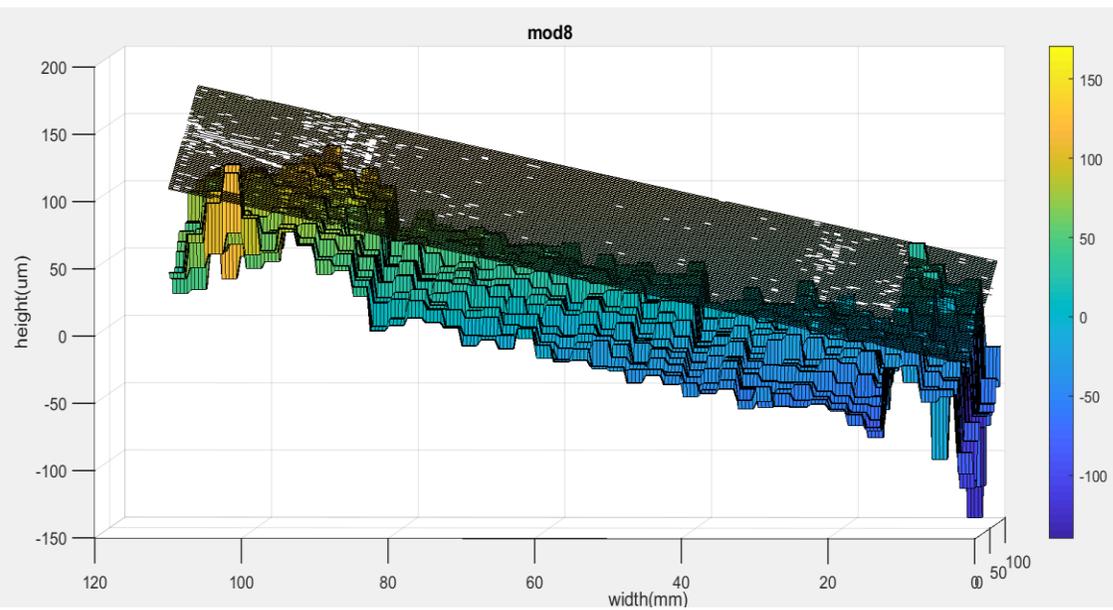
Histmod8

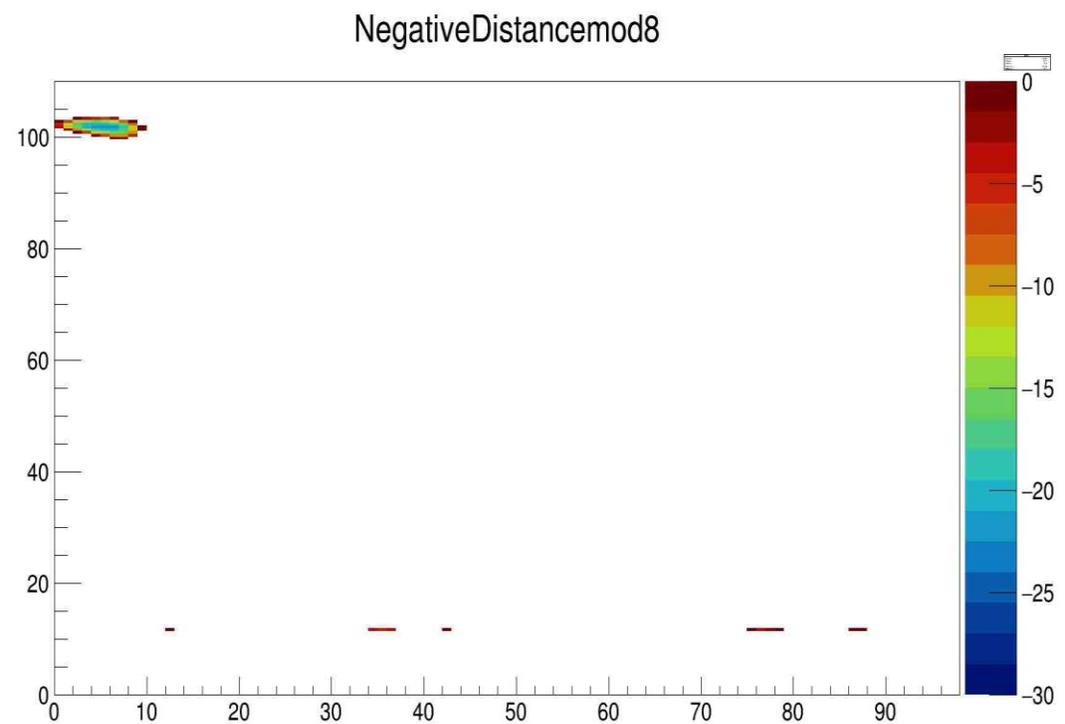
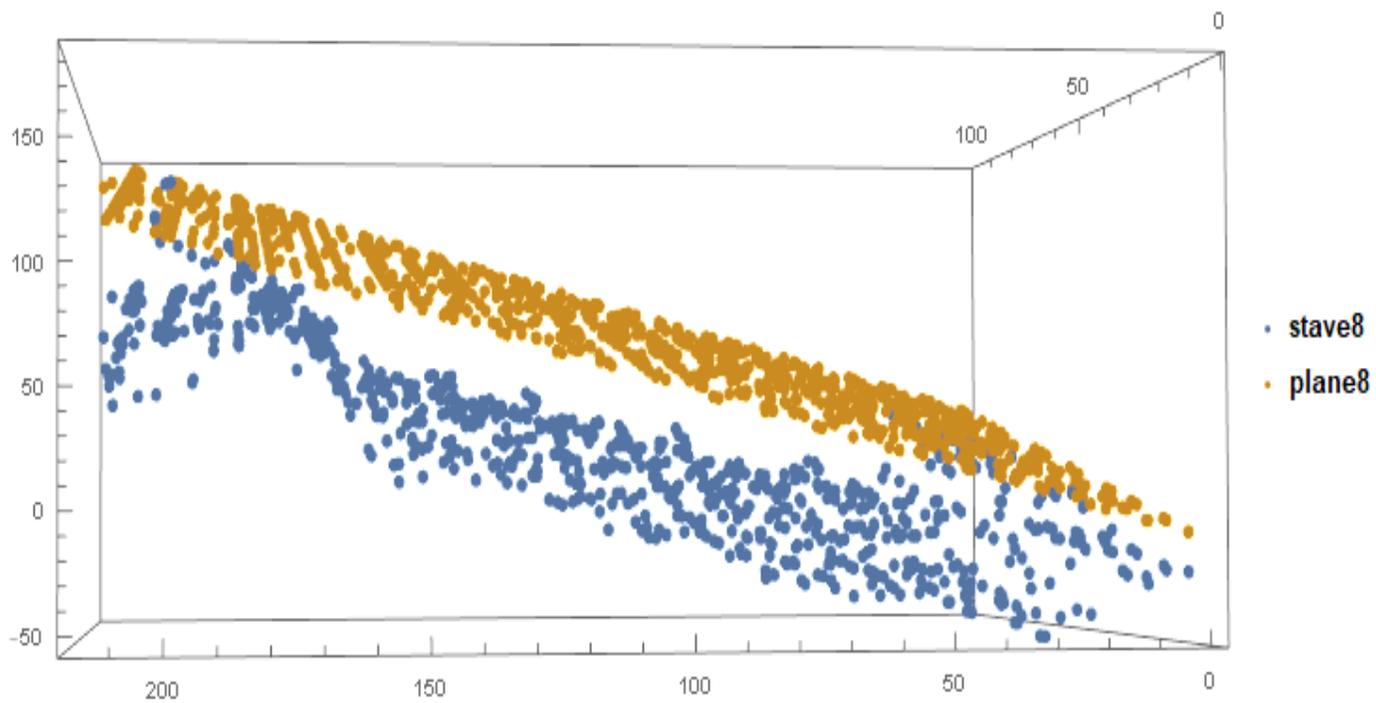
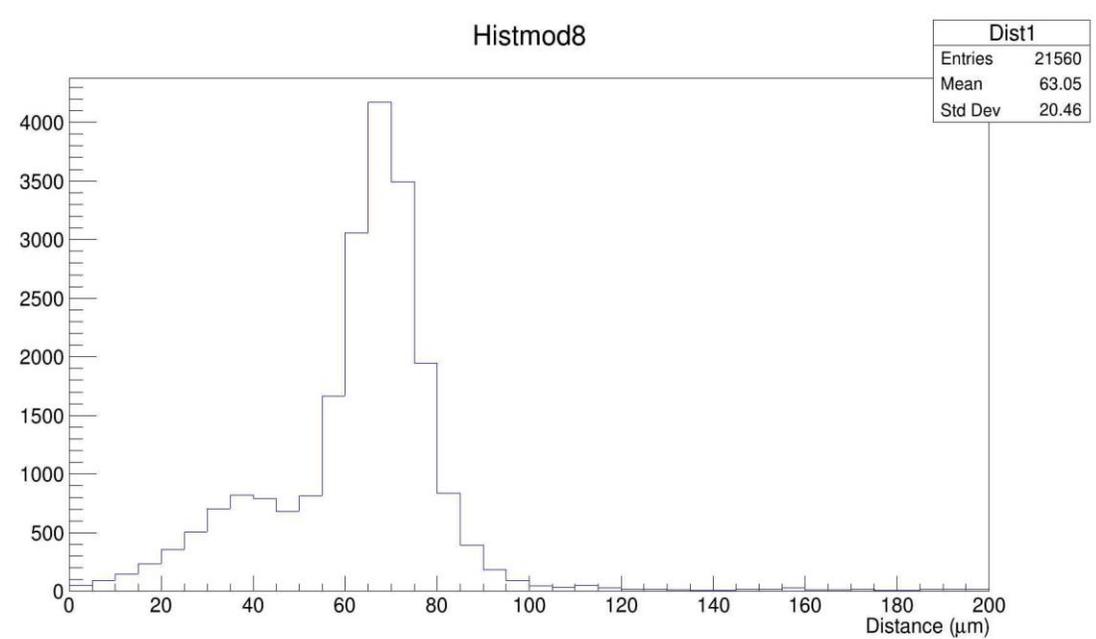
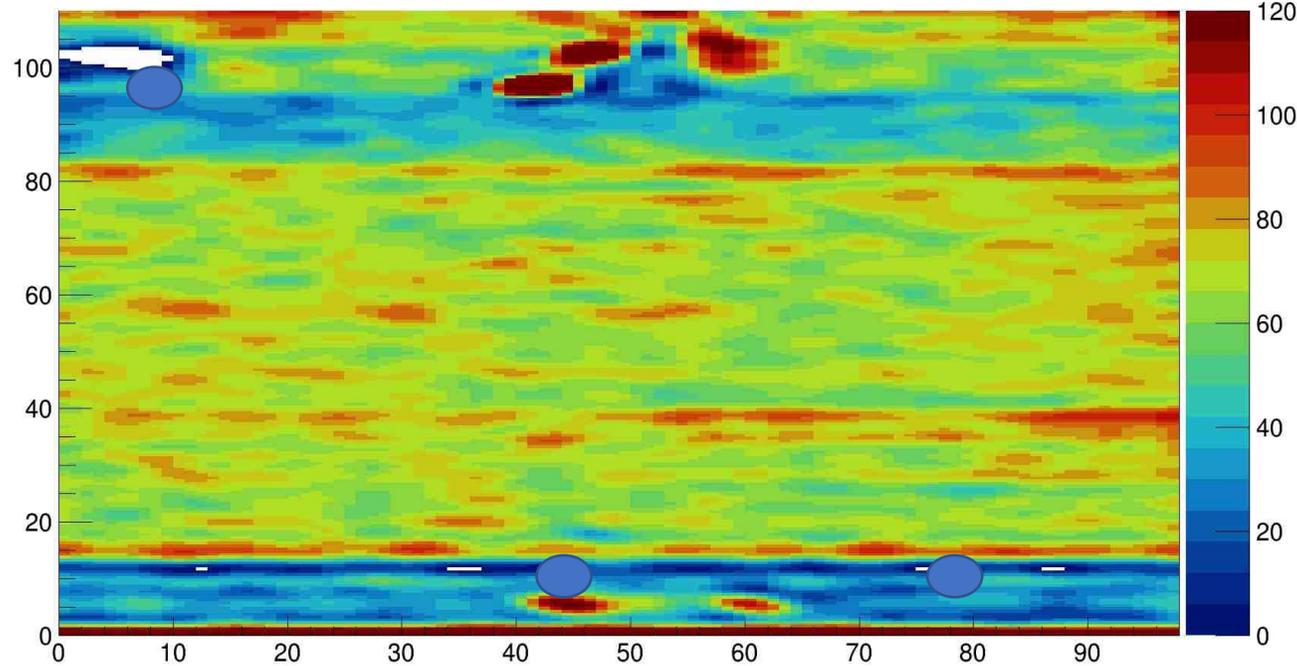


NegativeDistancemod8

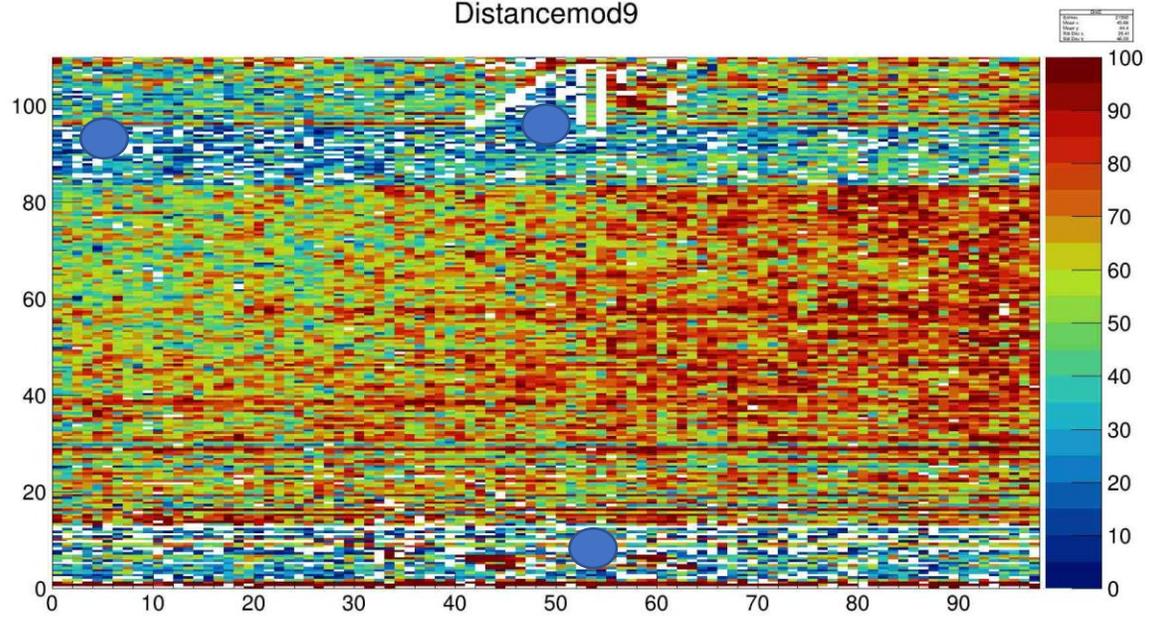


mod8

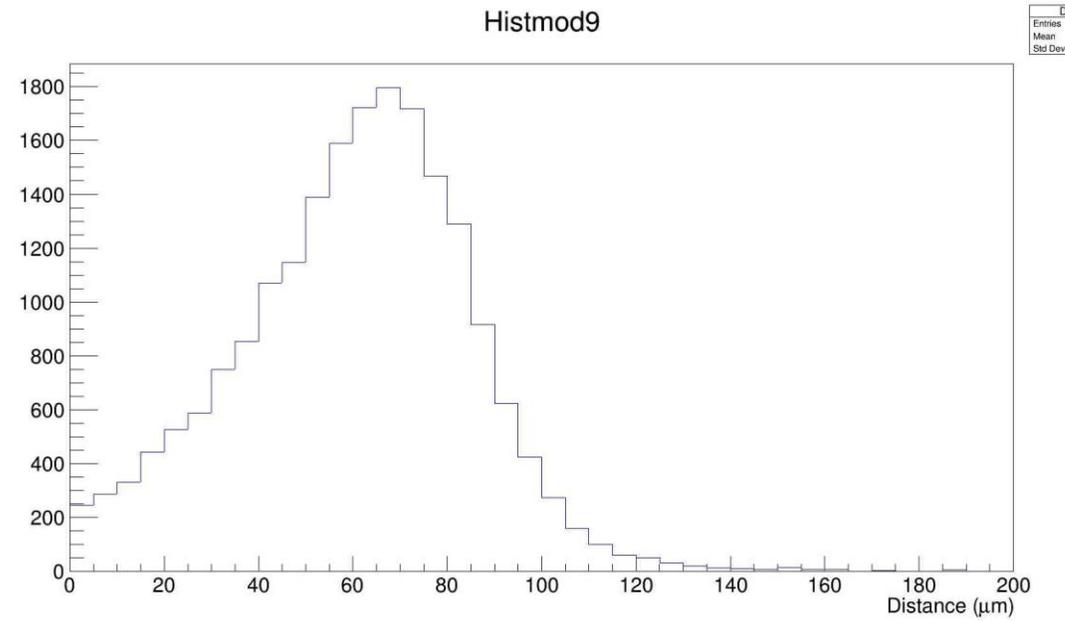




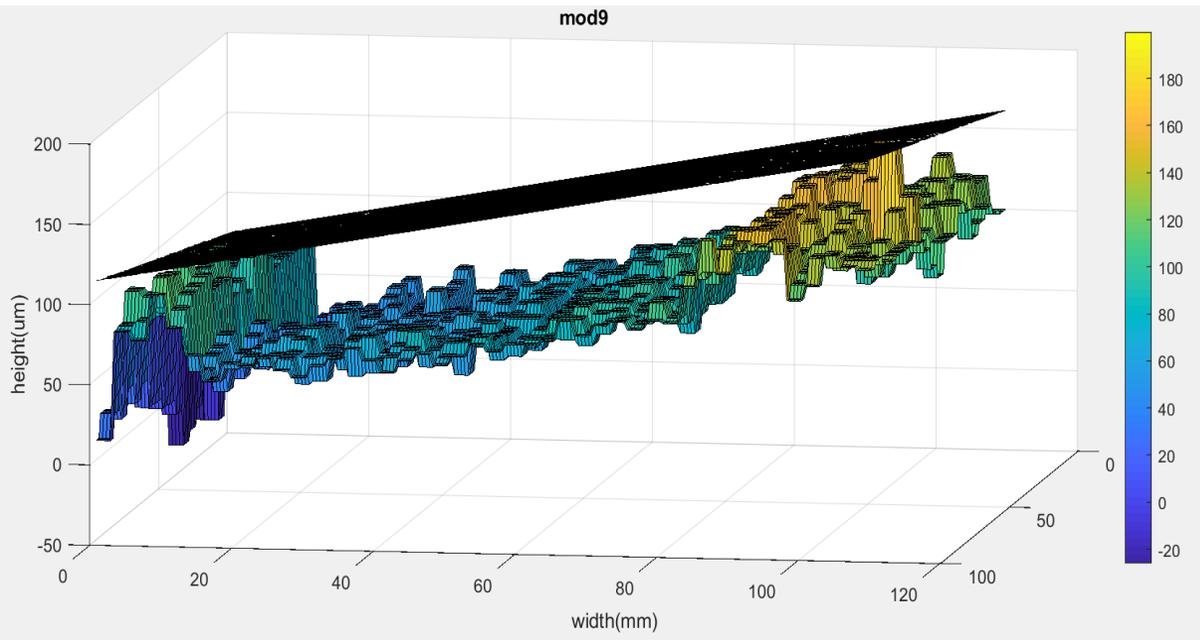
Distancemod9



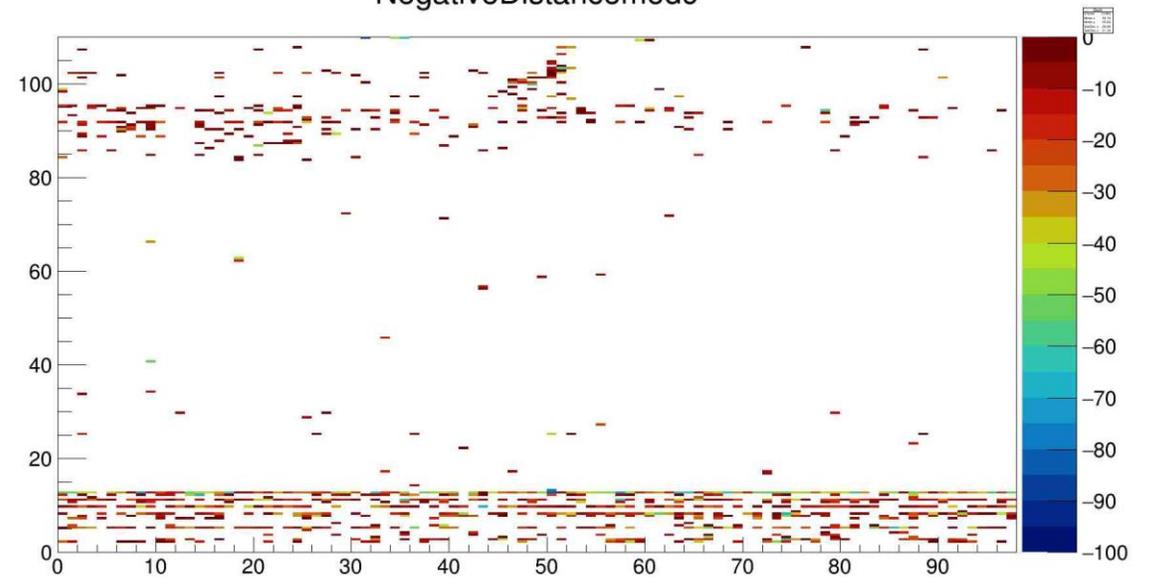
Histmod9



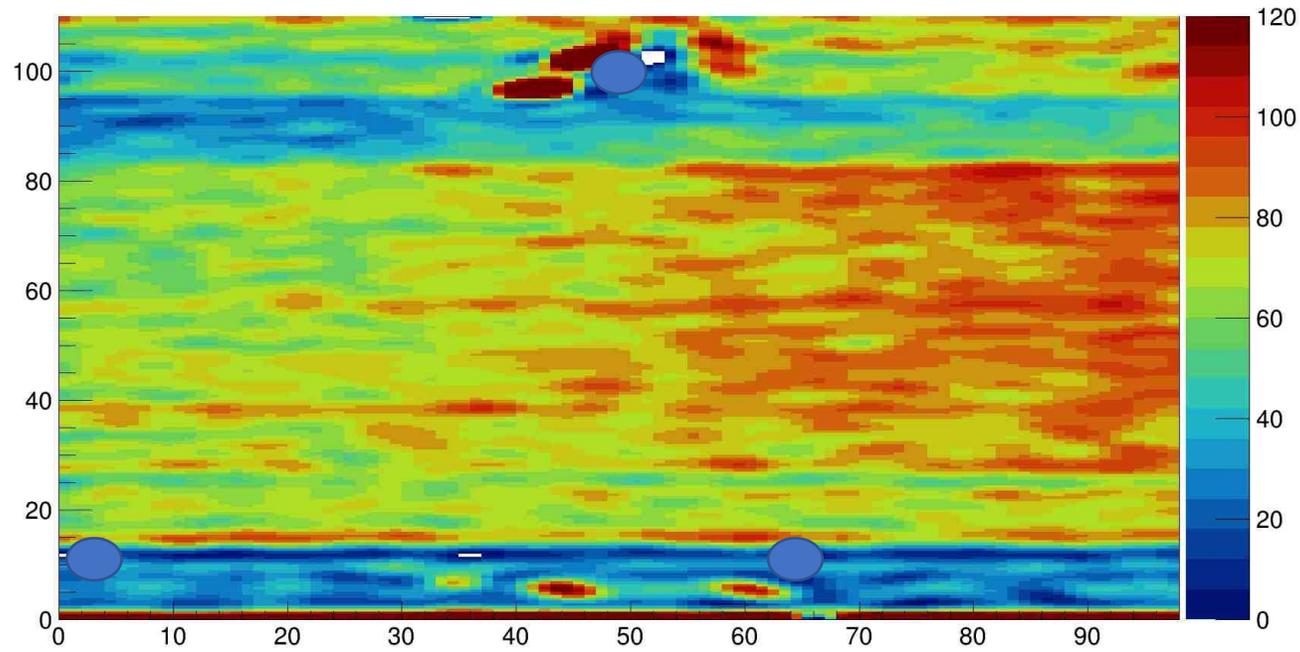
mod9



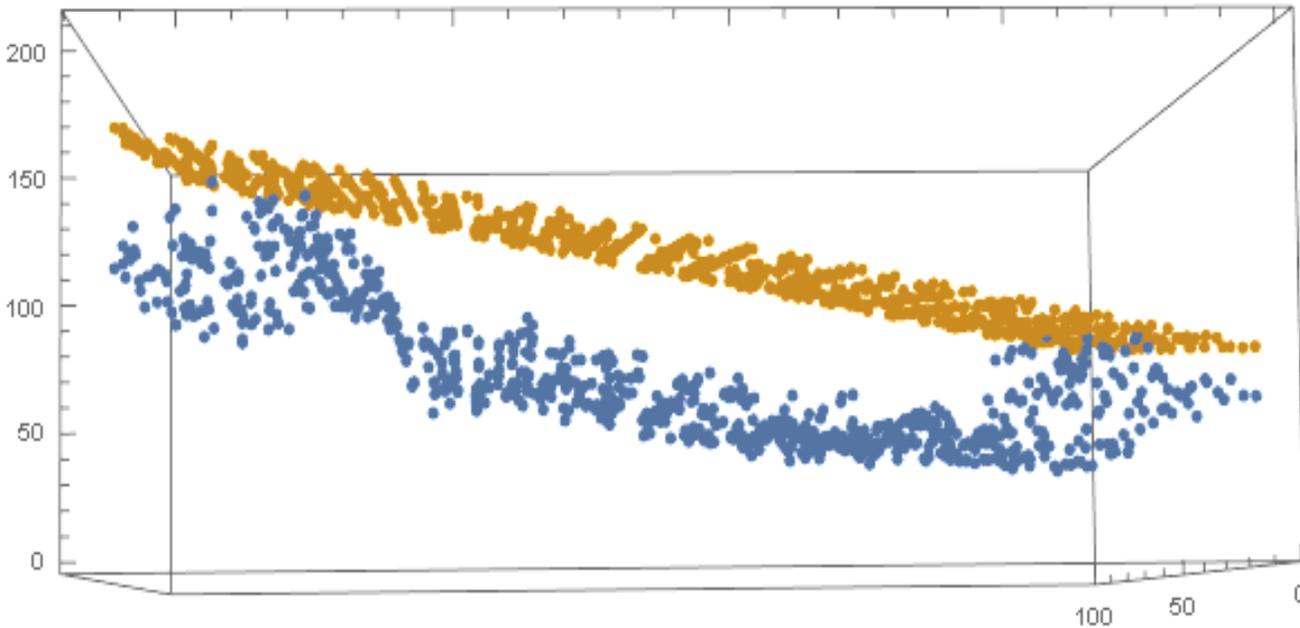
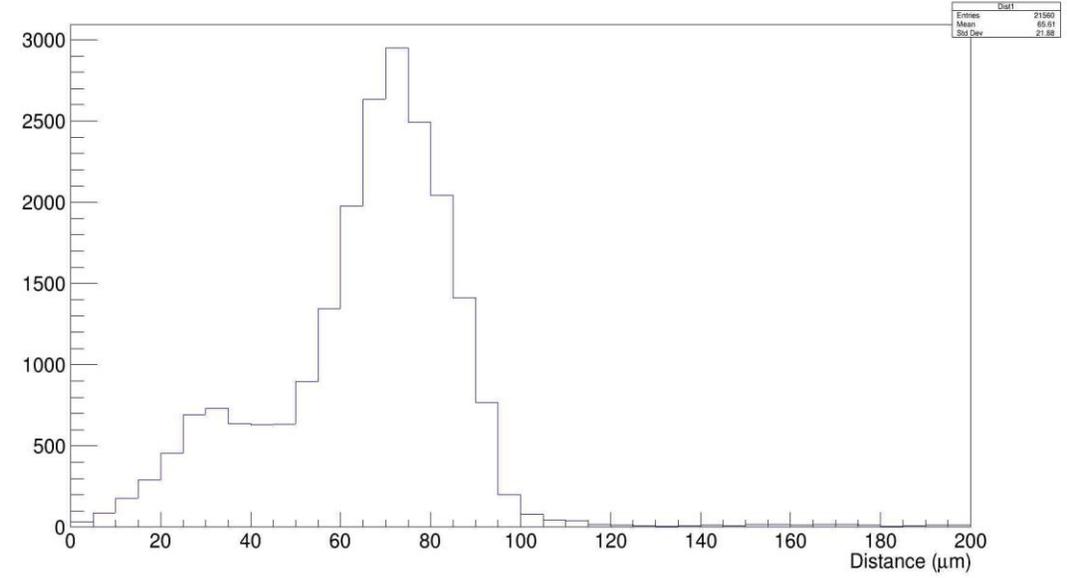
NegativeDistancemod9



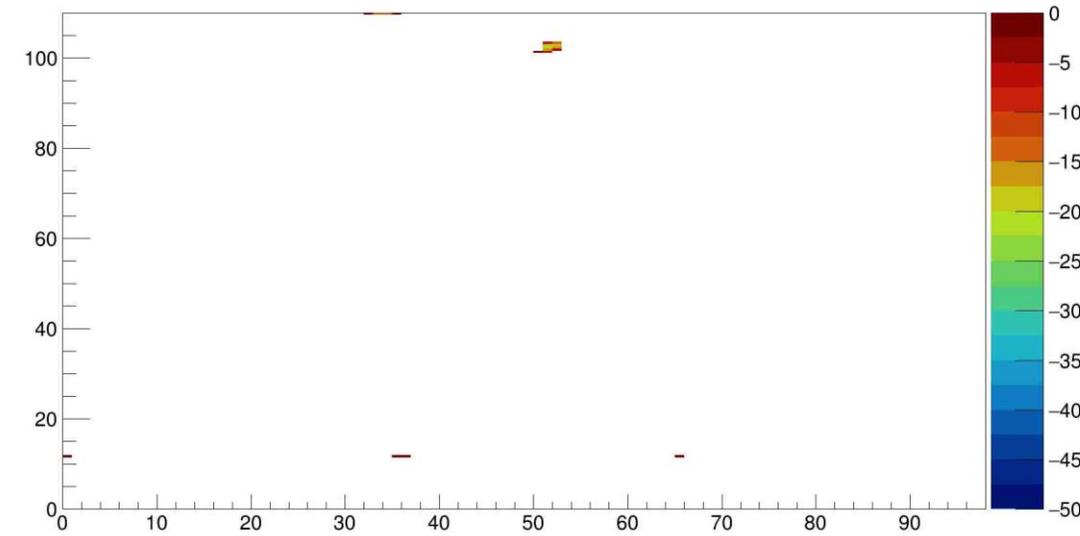
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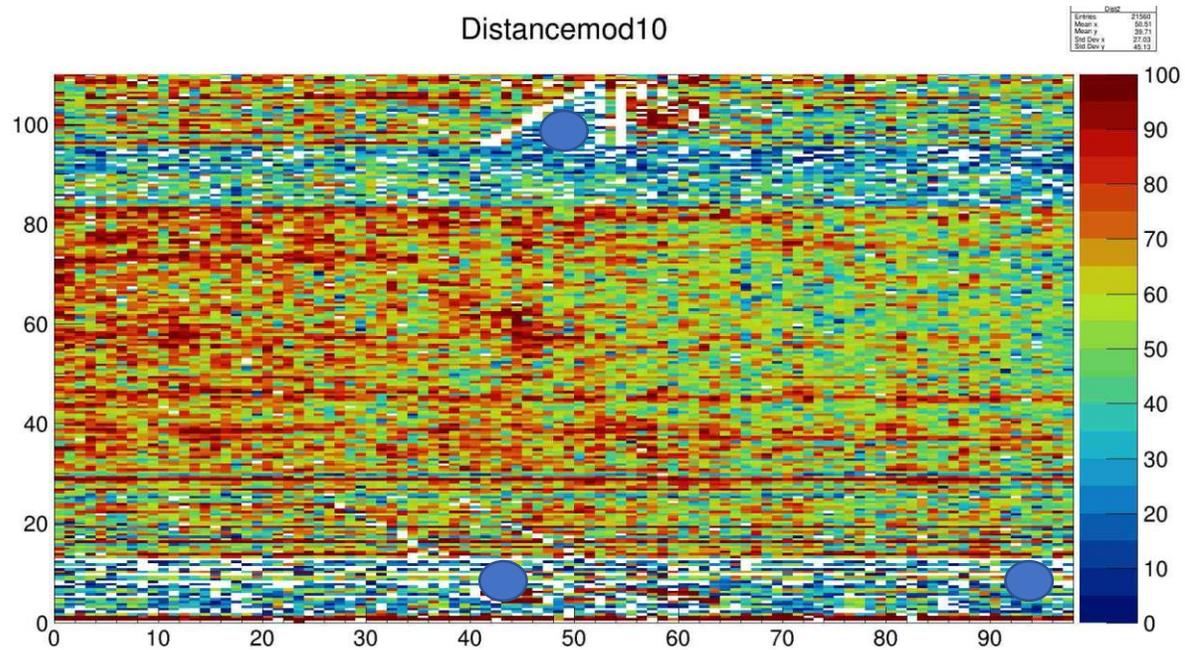
### Histmod9



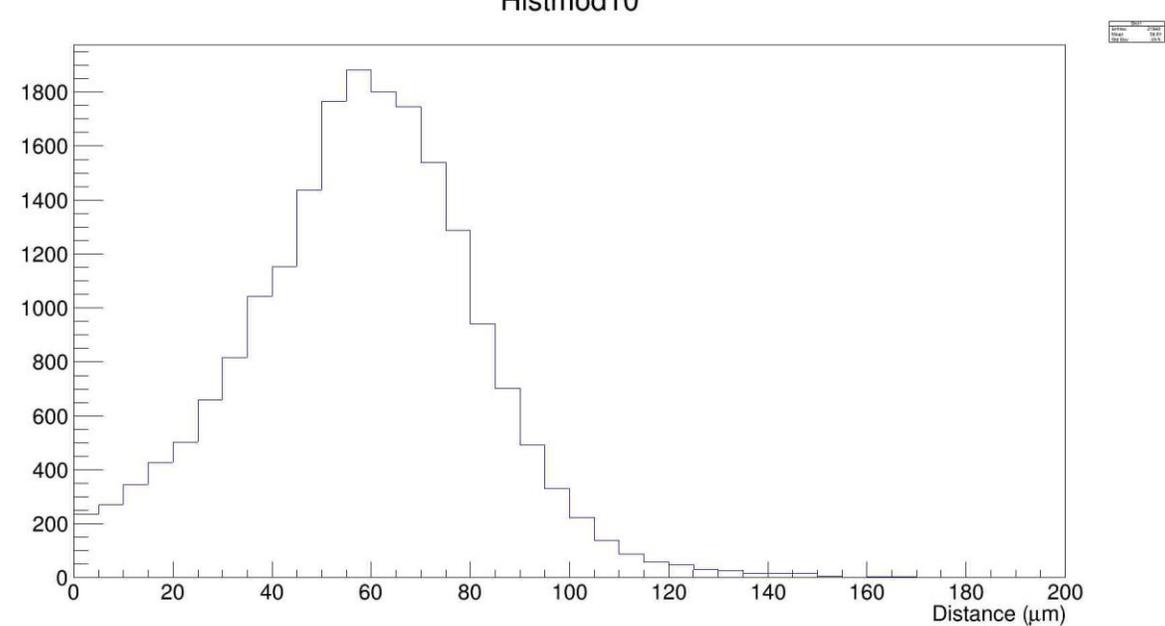
### NegativeDistancemod9



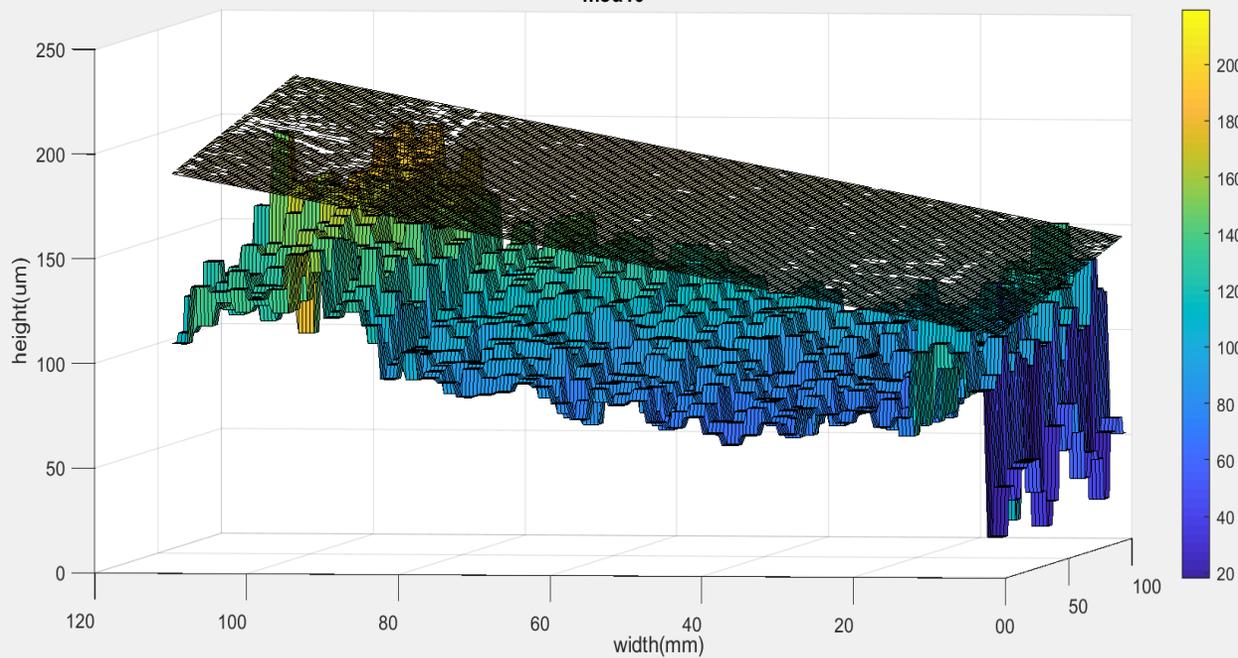
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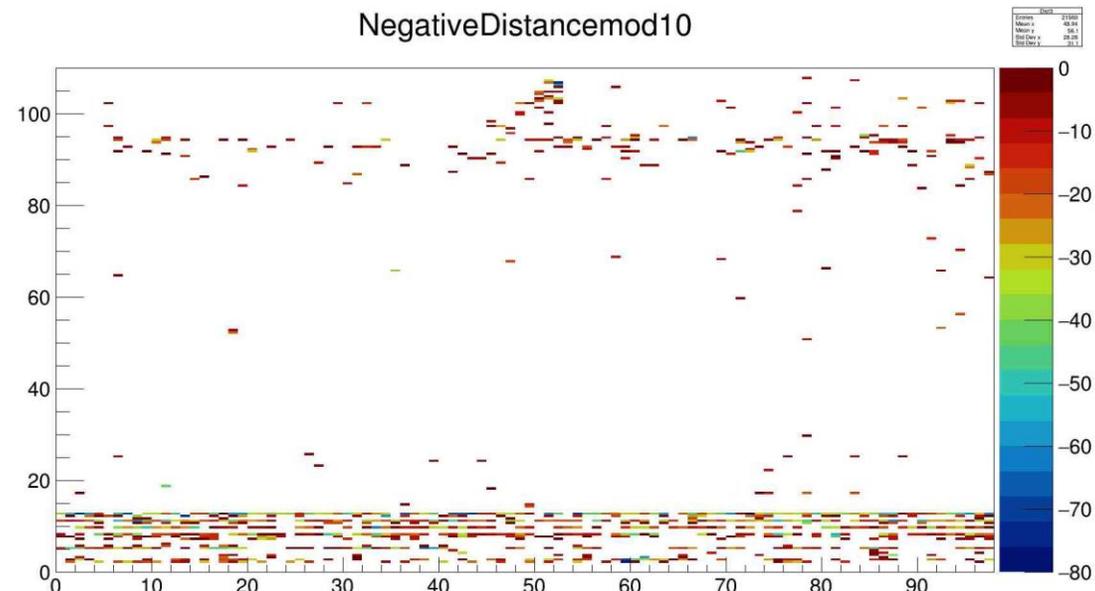
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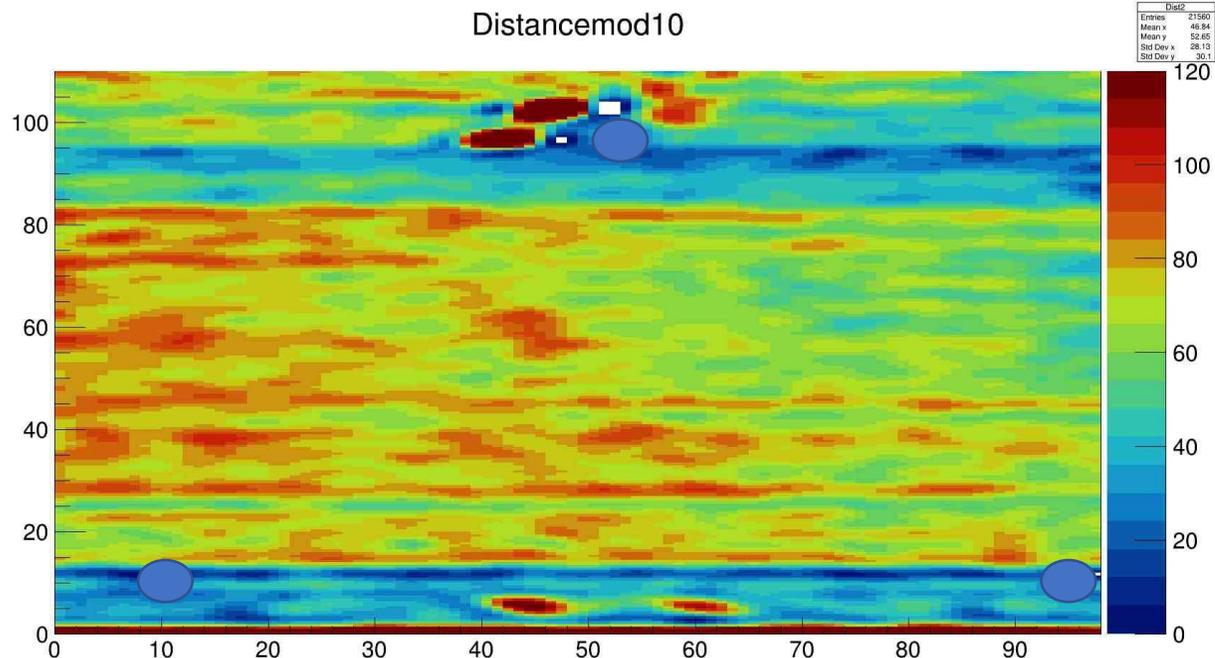
### mod10



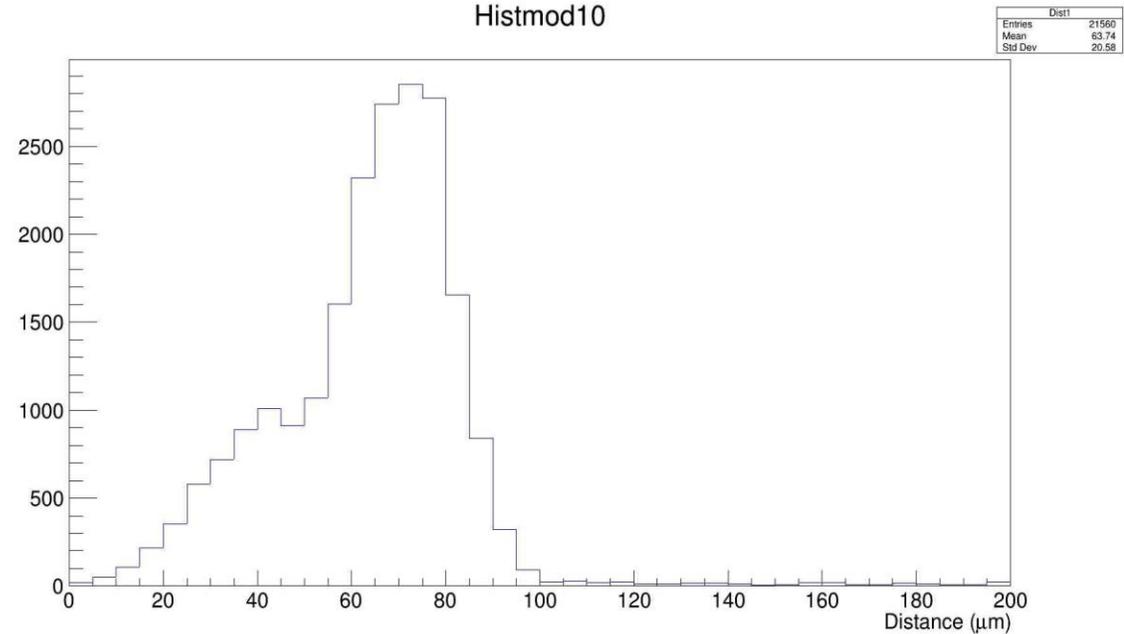
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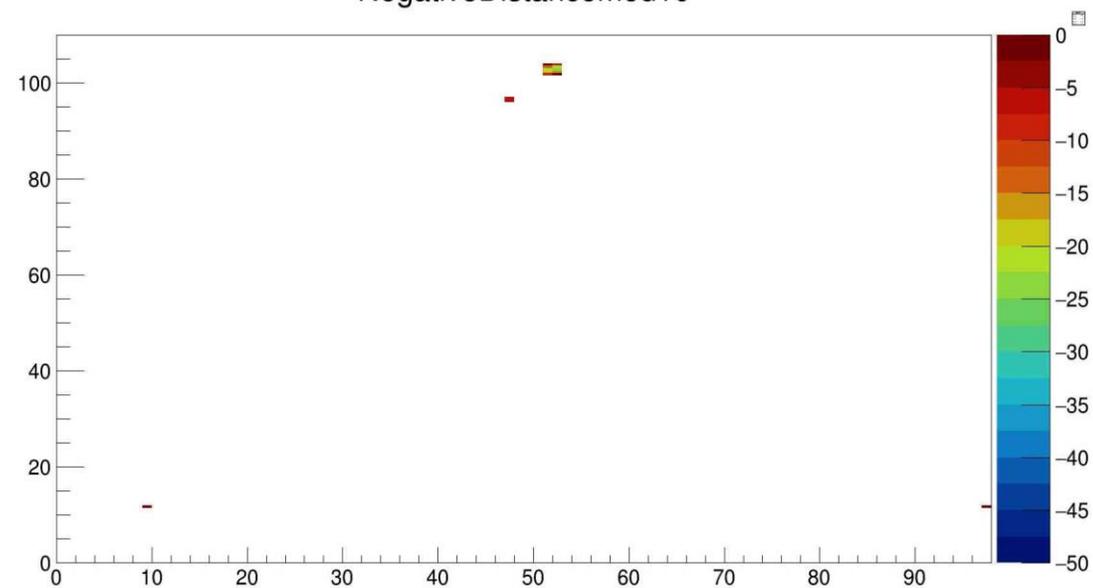
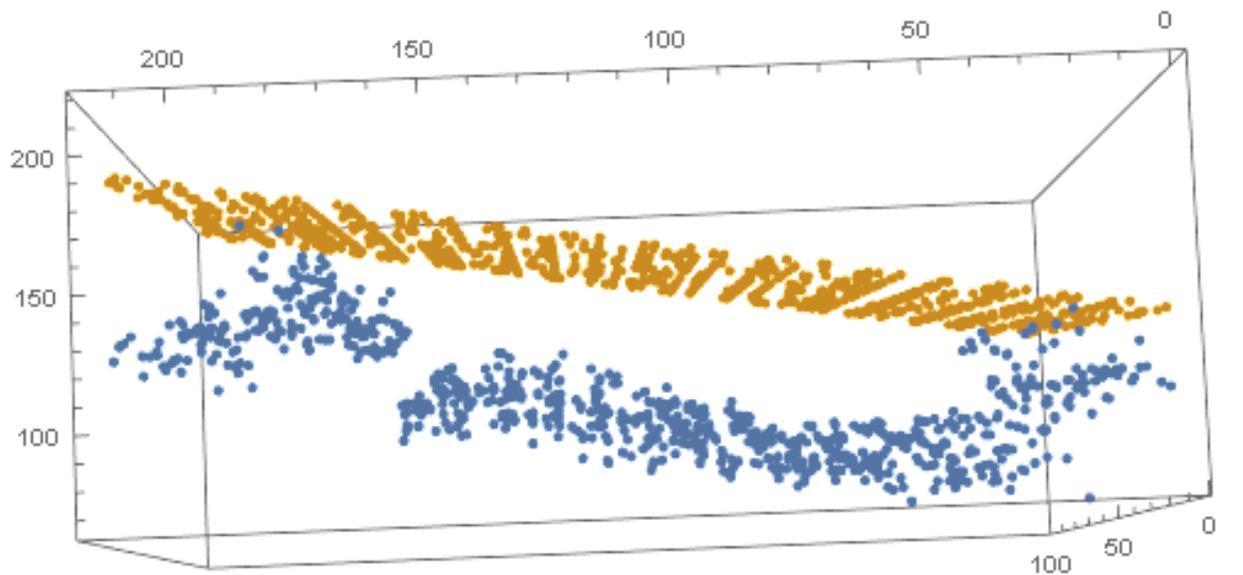
Distancemod10



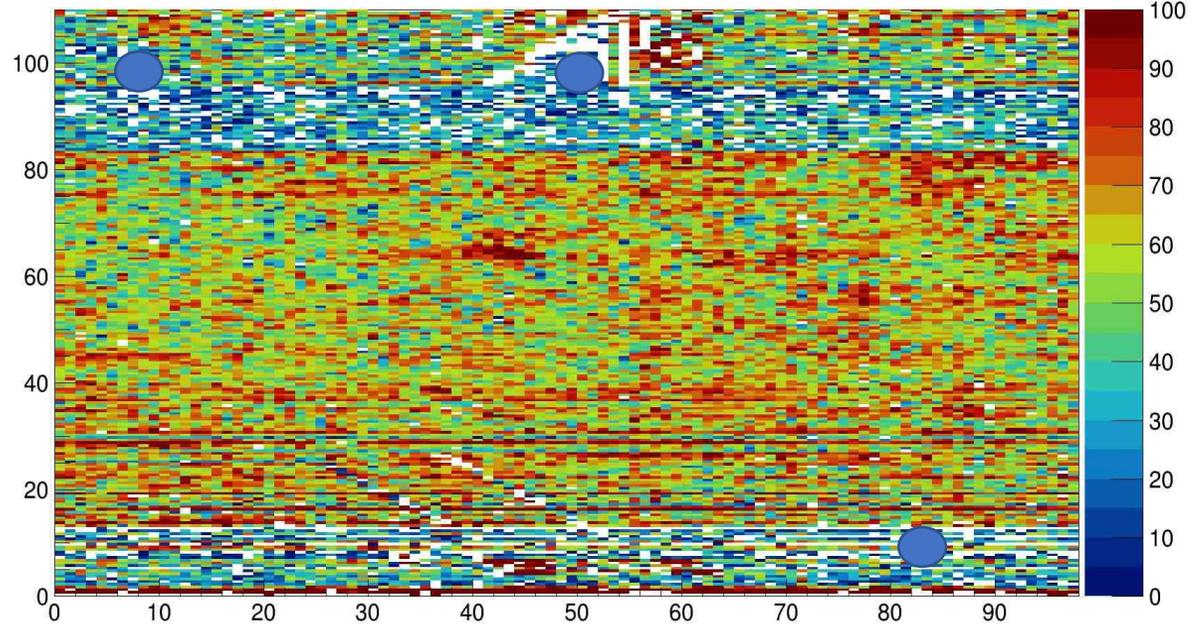
Histmod10



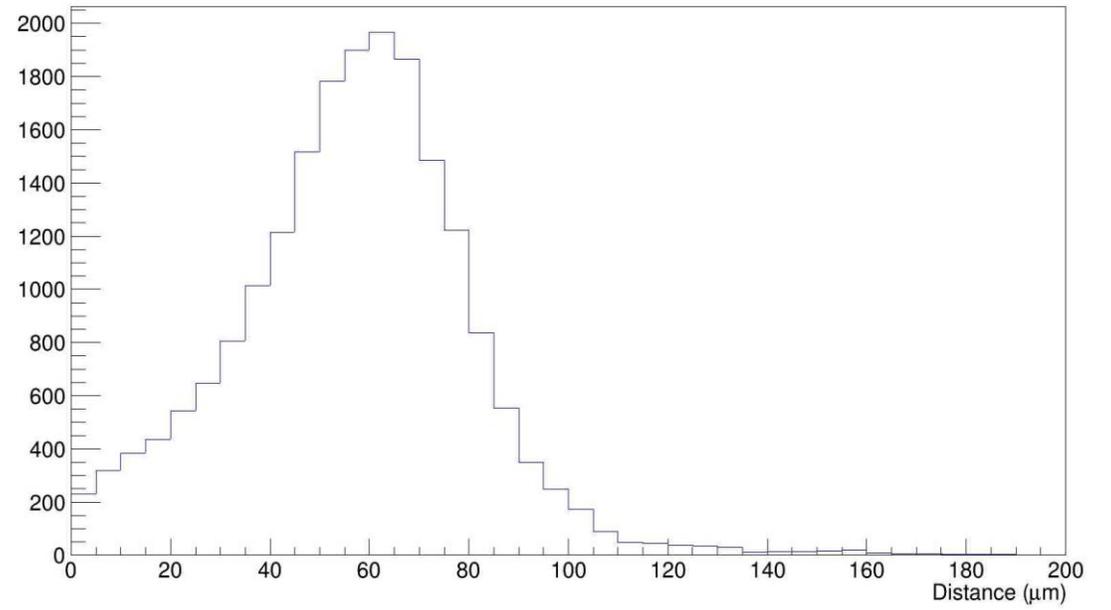
NegativeDistancemod10



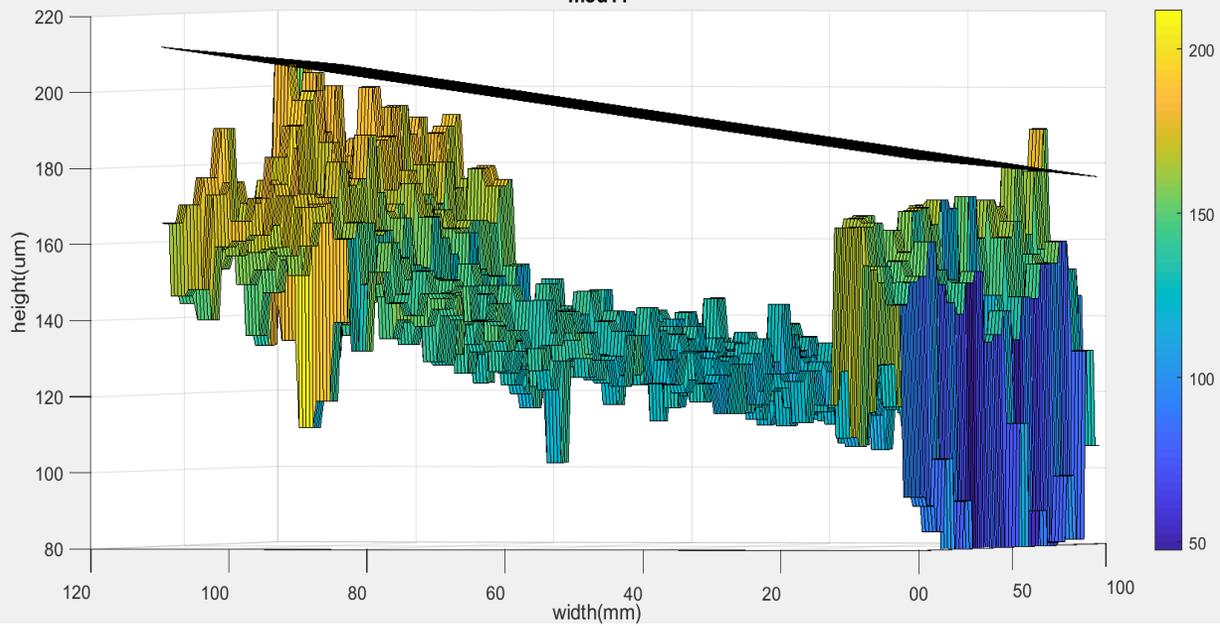
Distancemod11



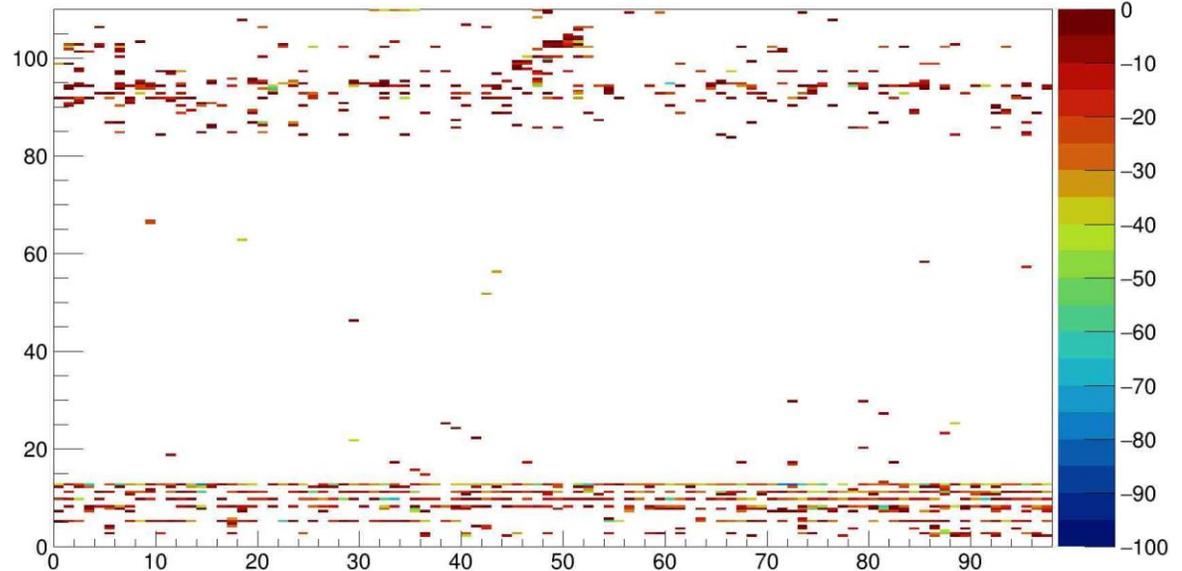
Histmod11



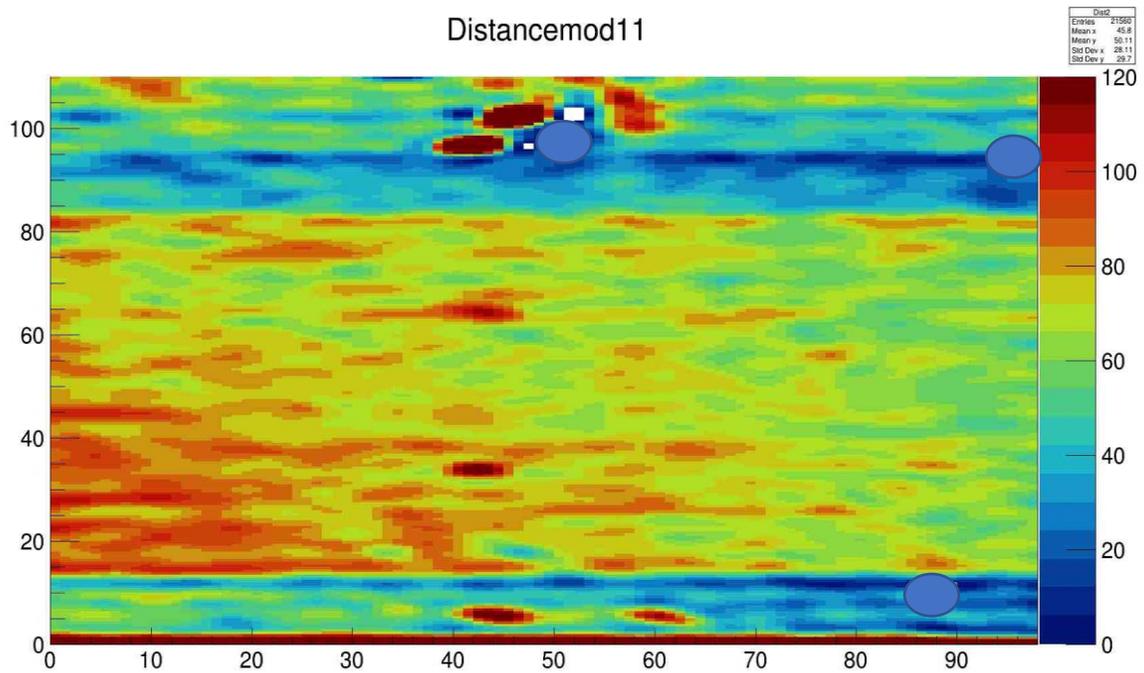
mod11



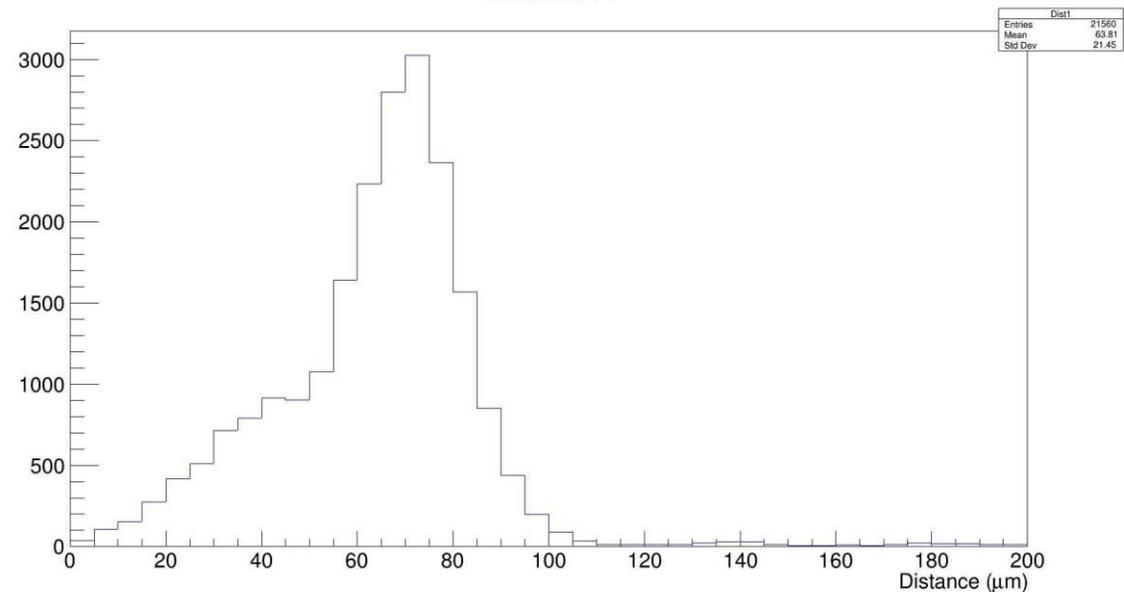
NegativeDistancemod11



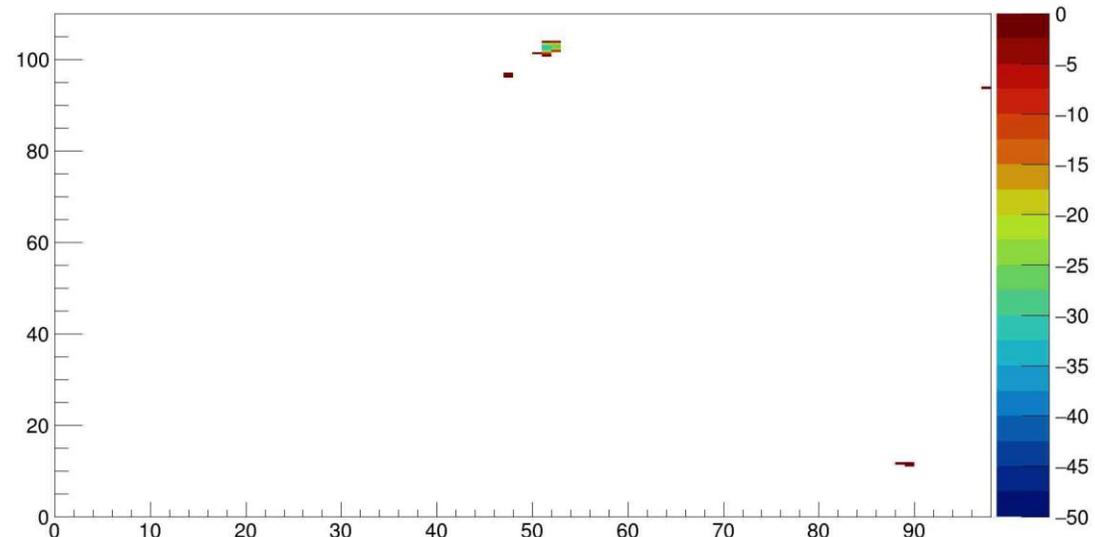
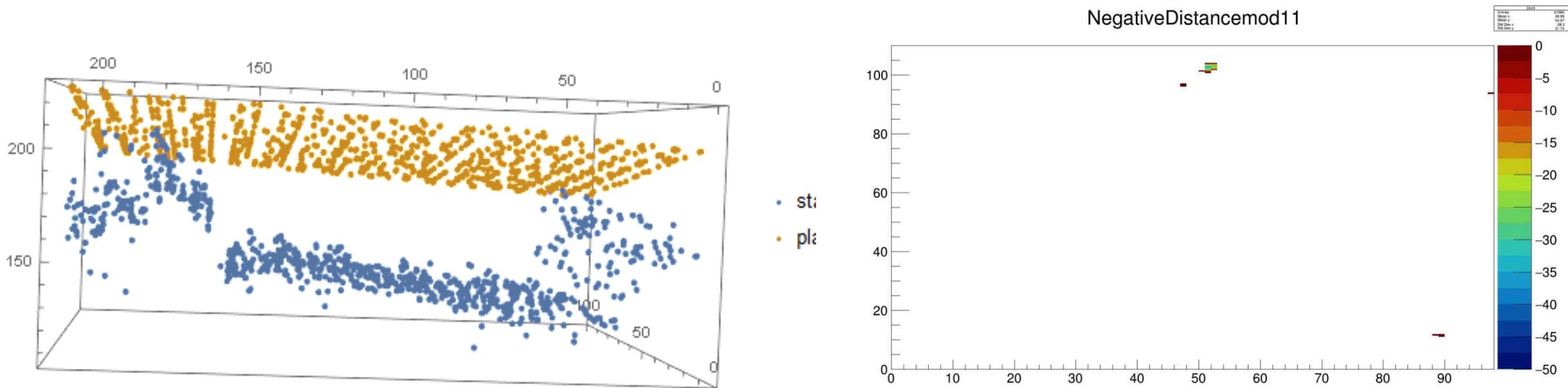
Distancemod11



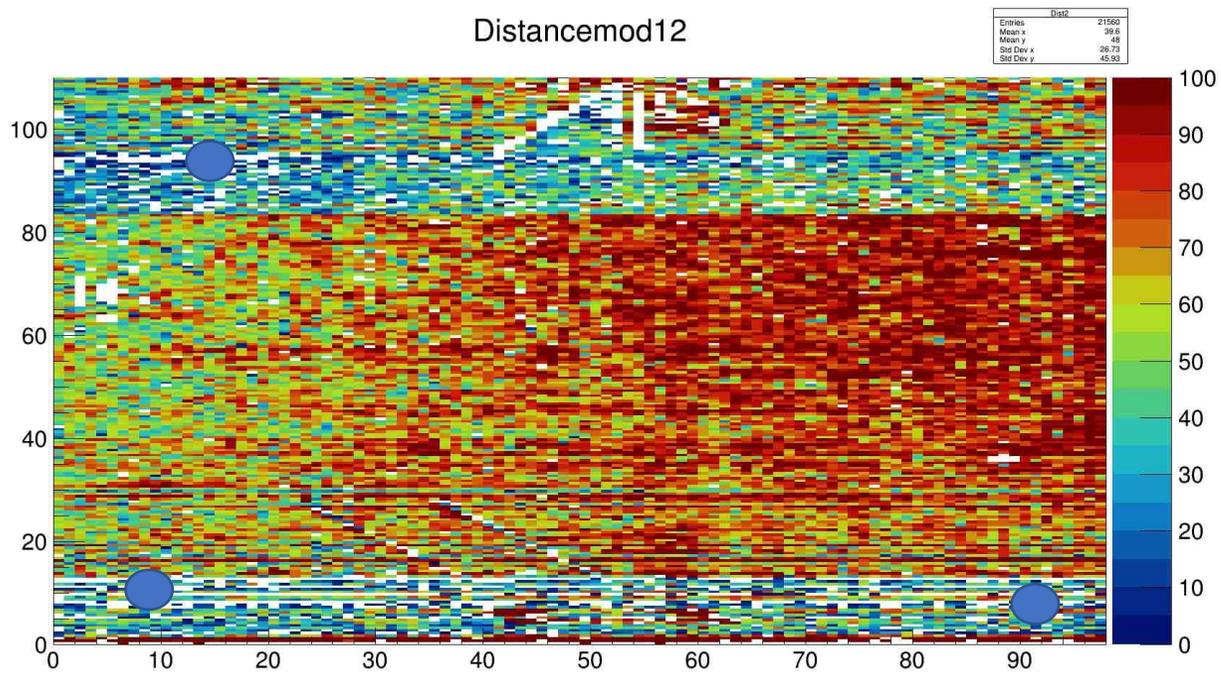
Histmod11



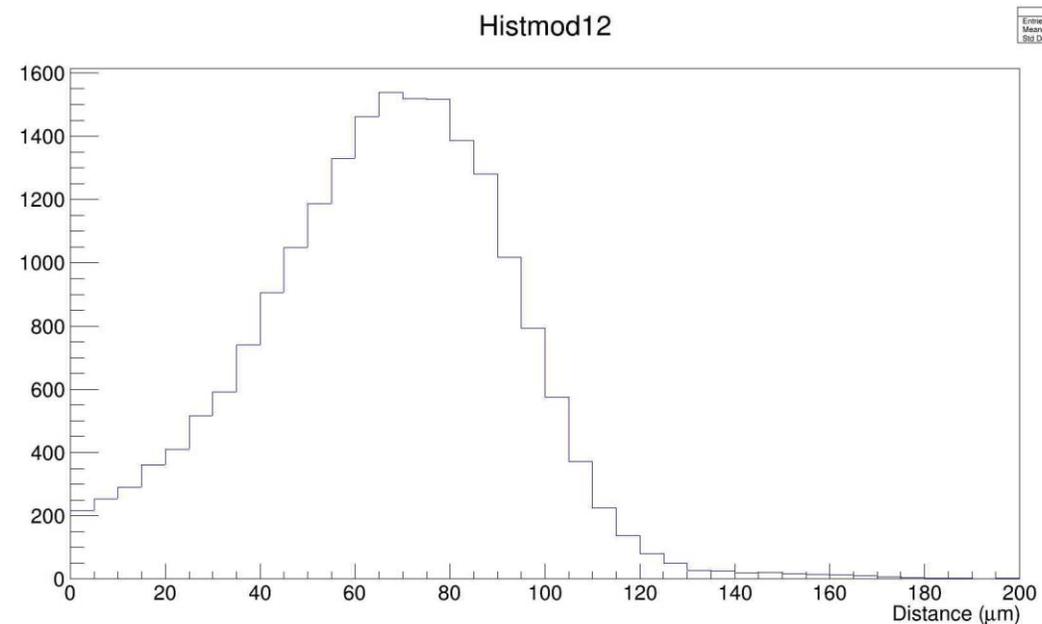
NegativeDistancemod11



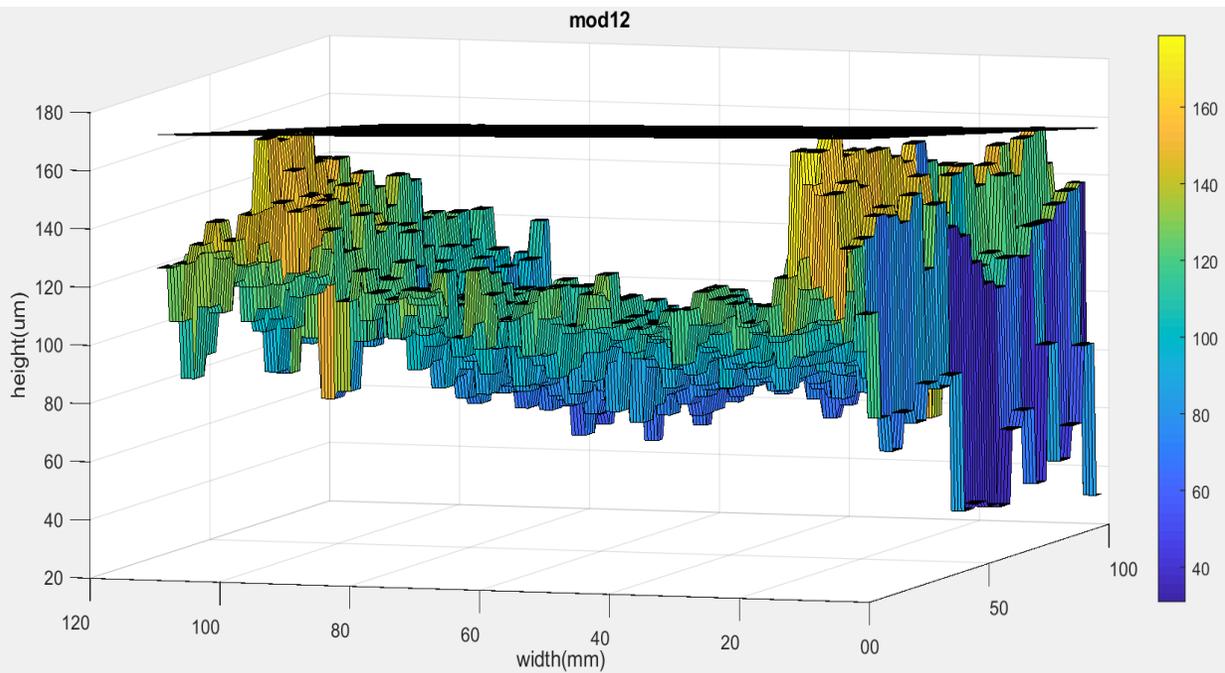
### Distancemod12



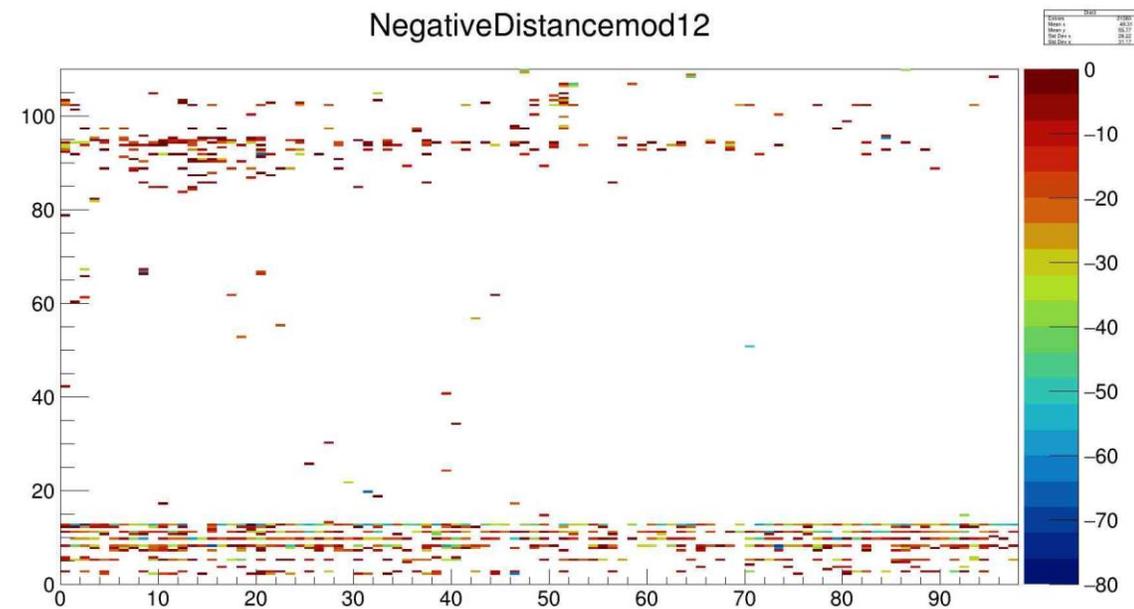
### Histmod12



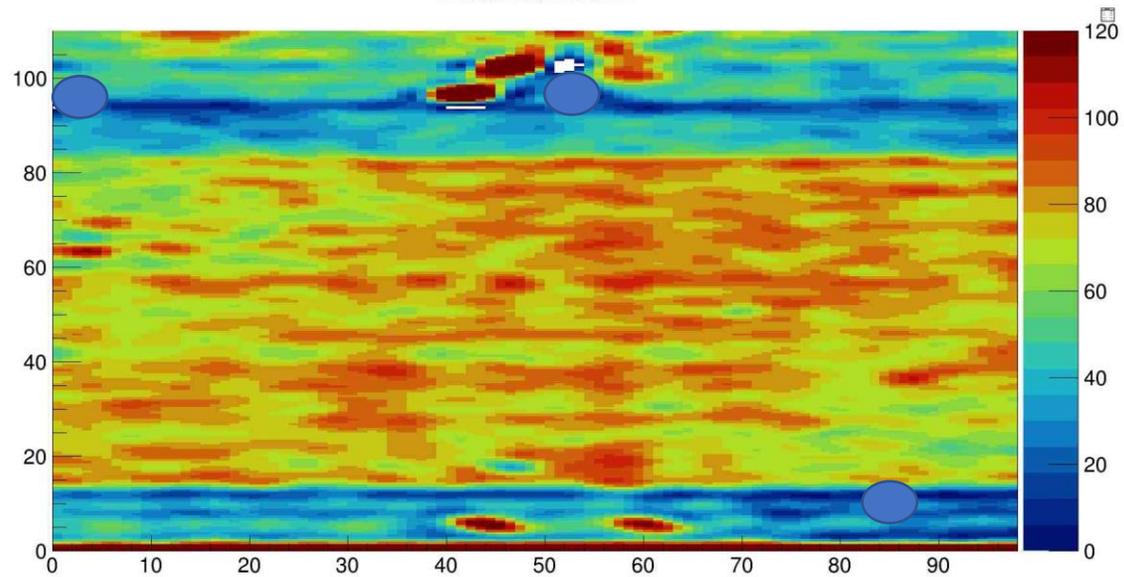
### mod12



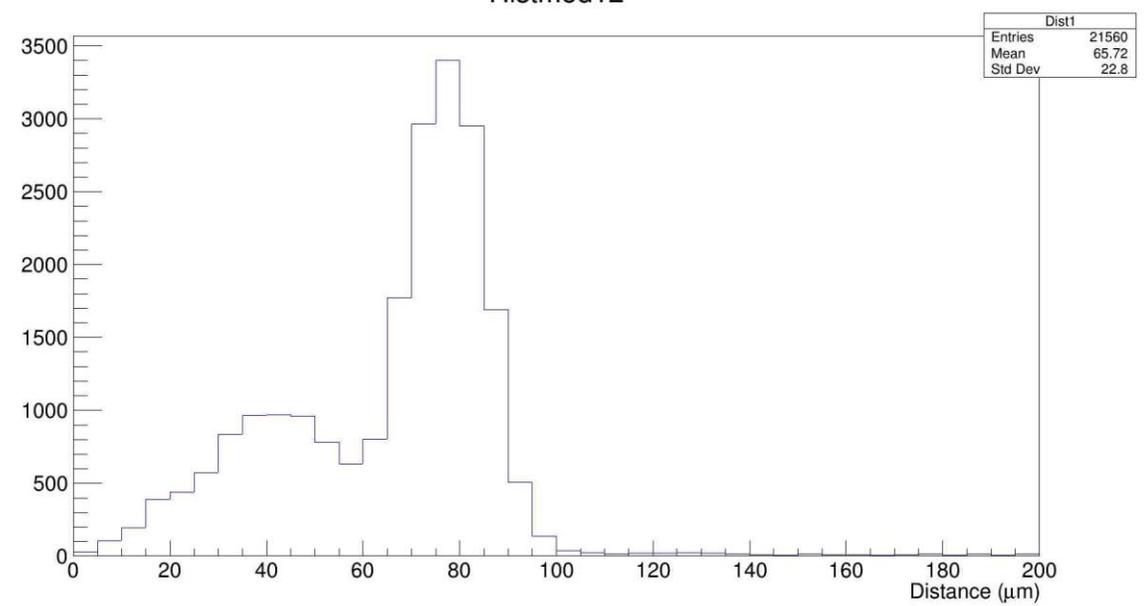
### NegativeDistancemod12



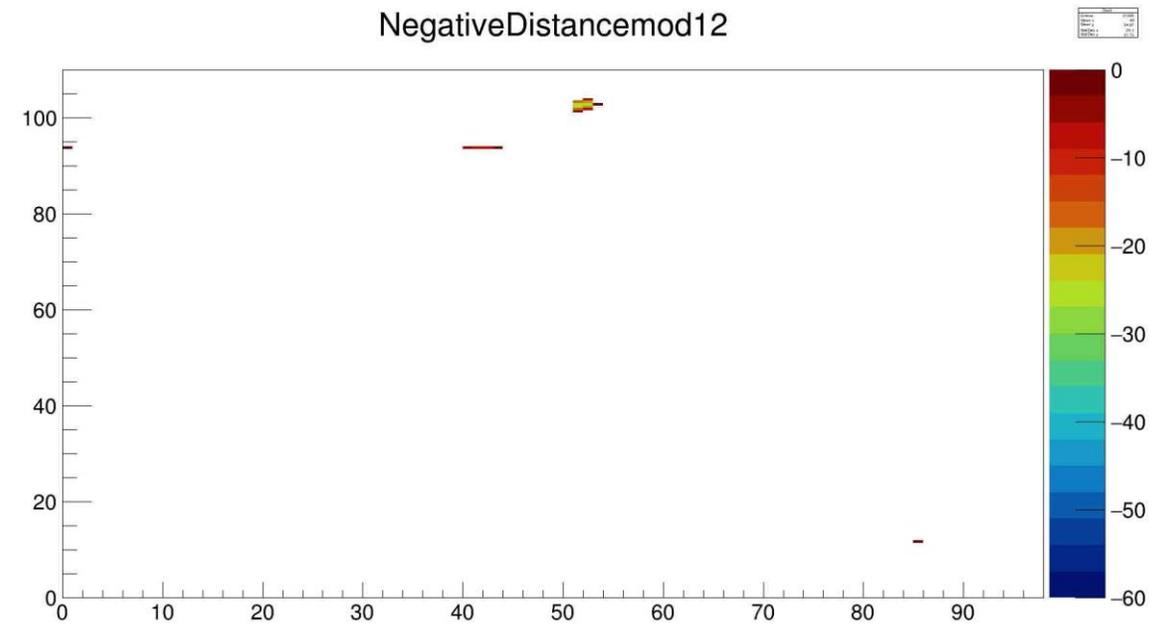
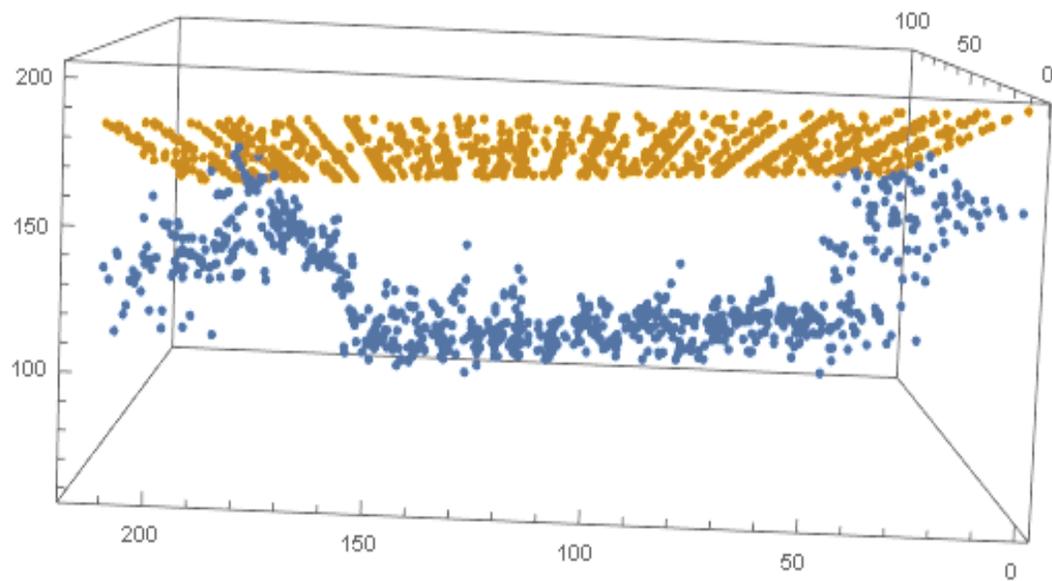
Distancemod12



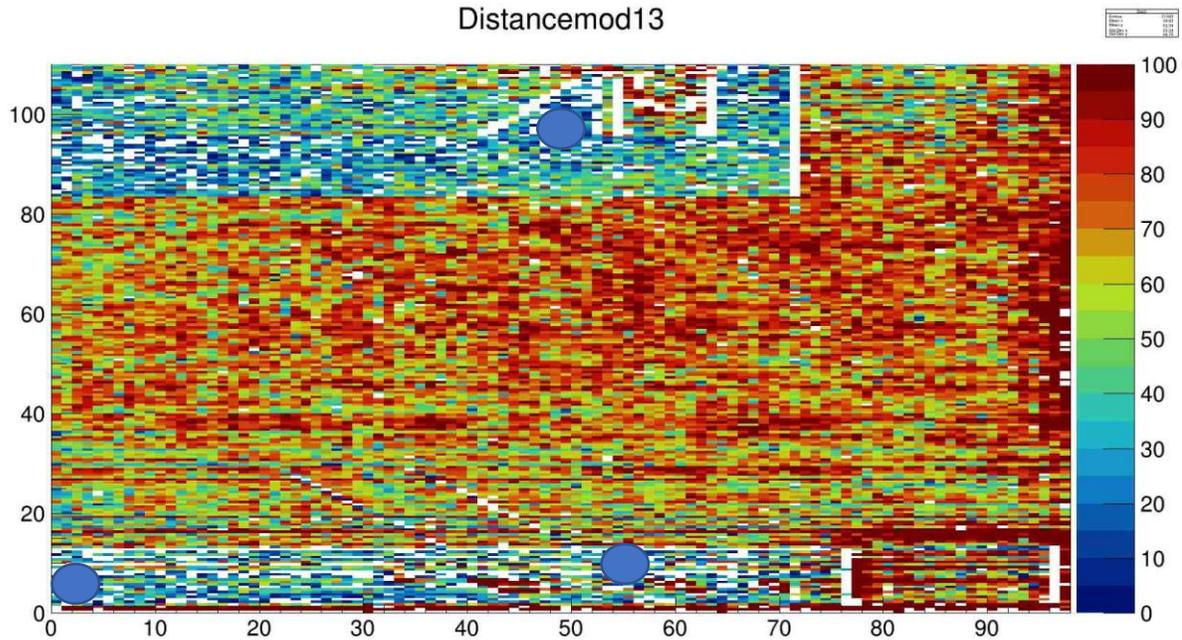
Histmod12



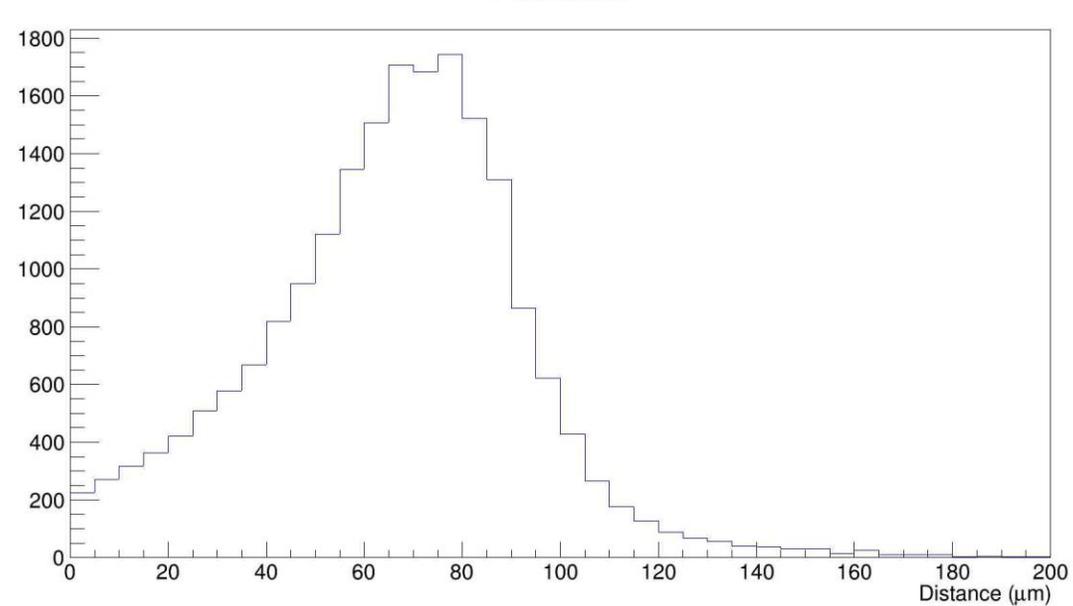
NegativeDistancemod12



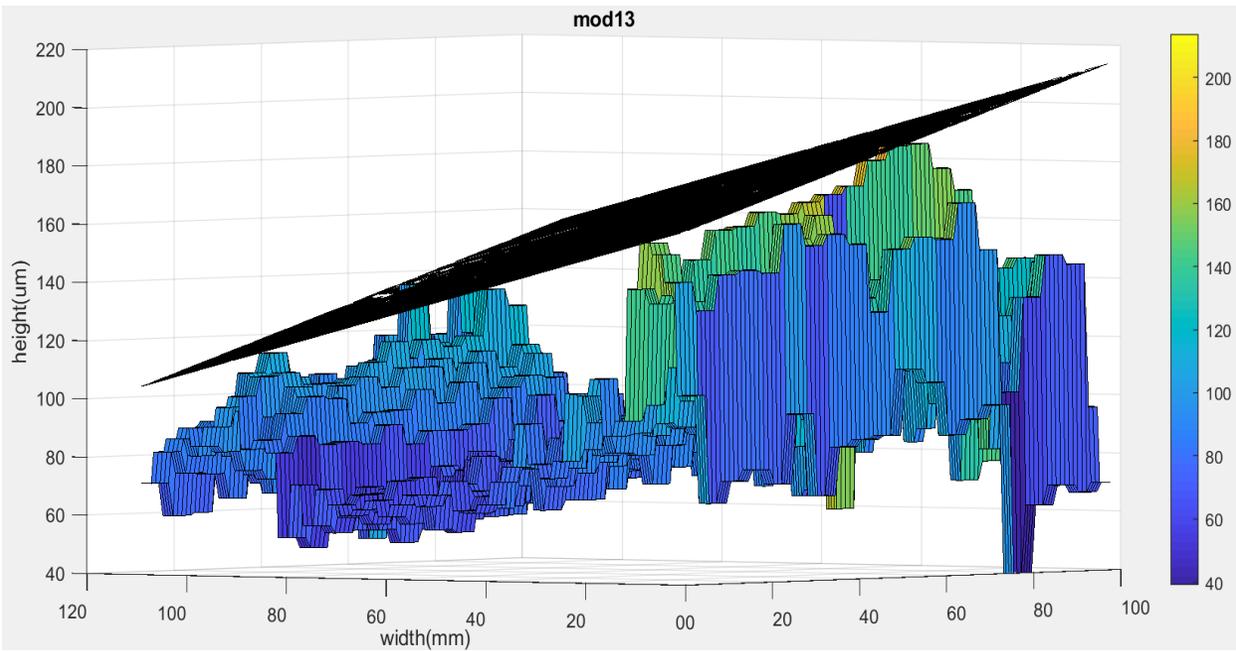
Distancemod13



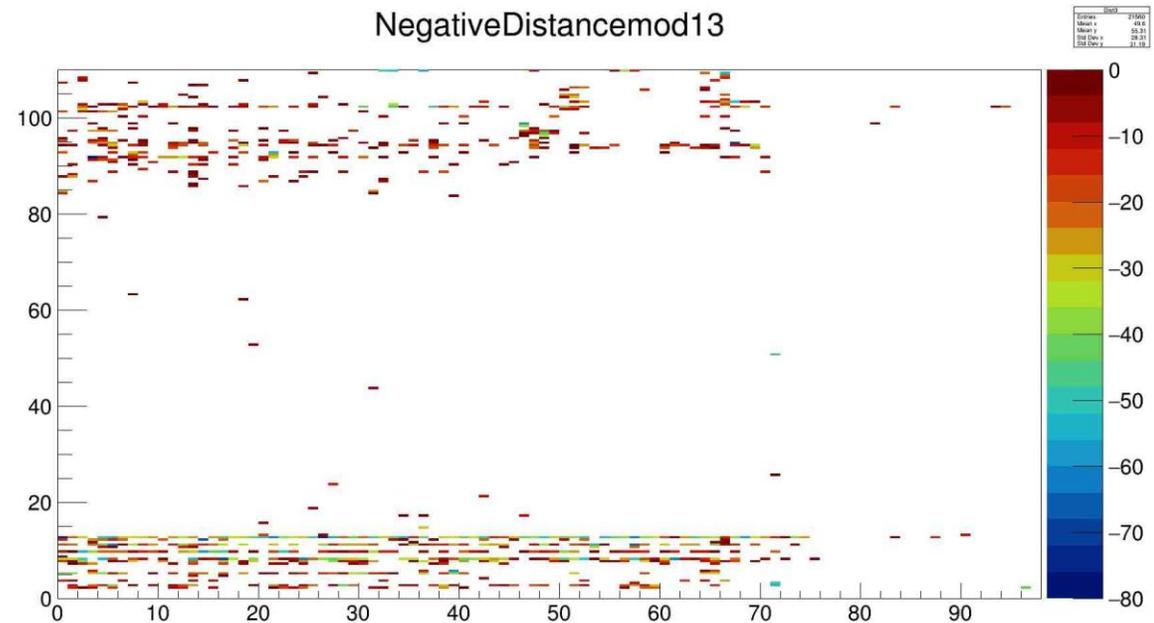
Histmod13



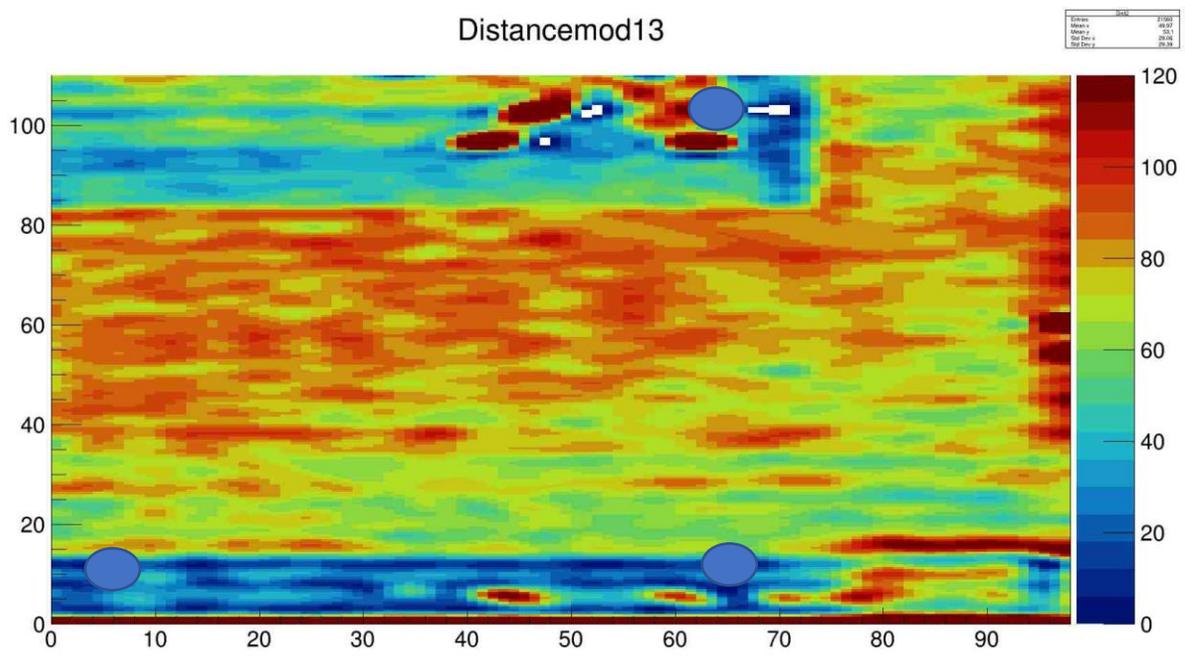
mod13



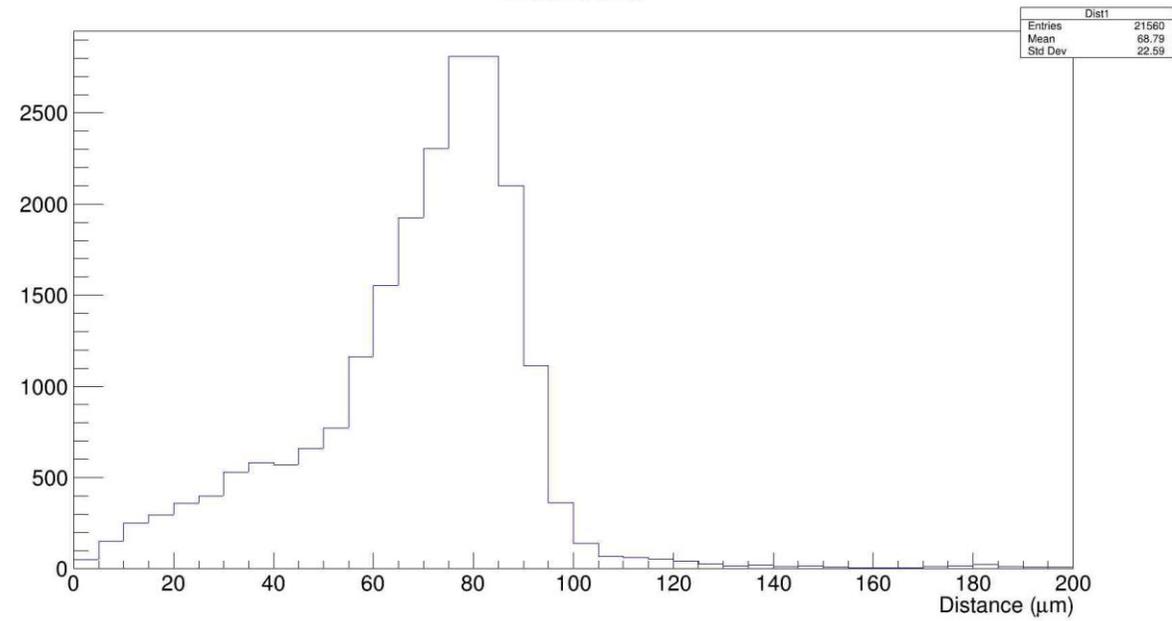
NegativeDistancemod13



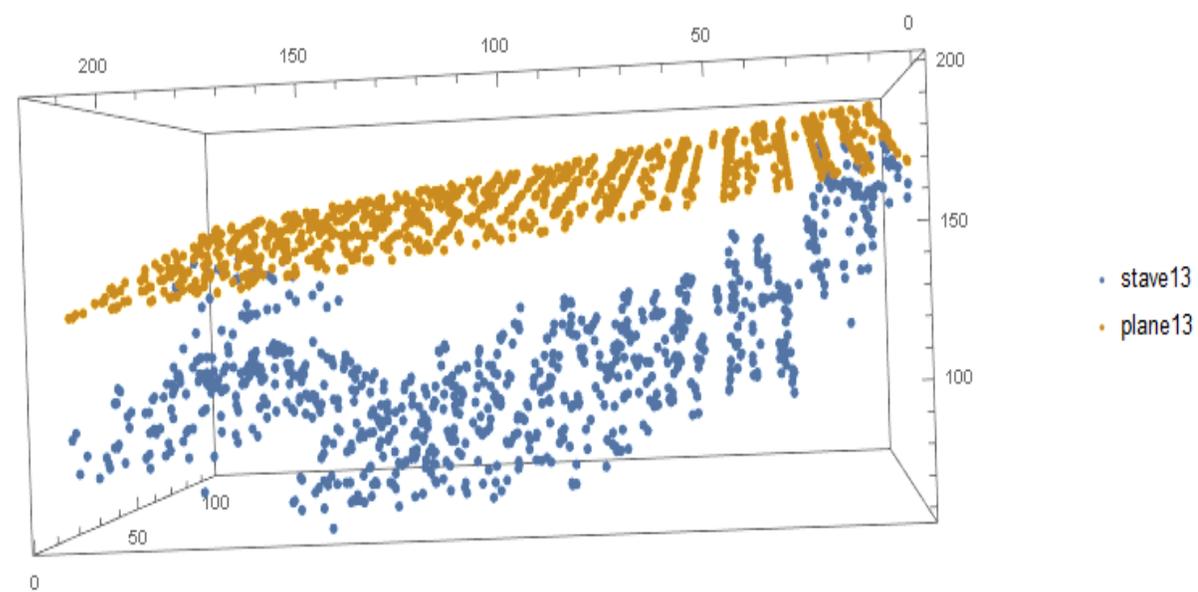
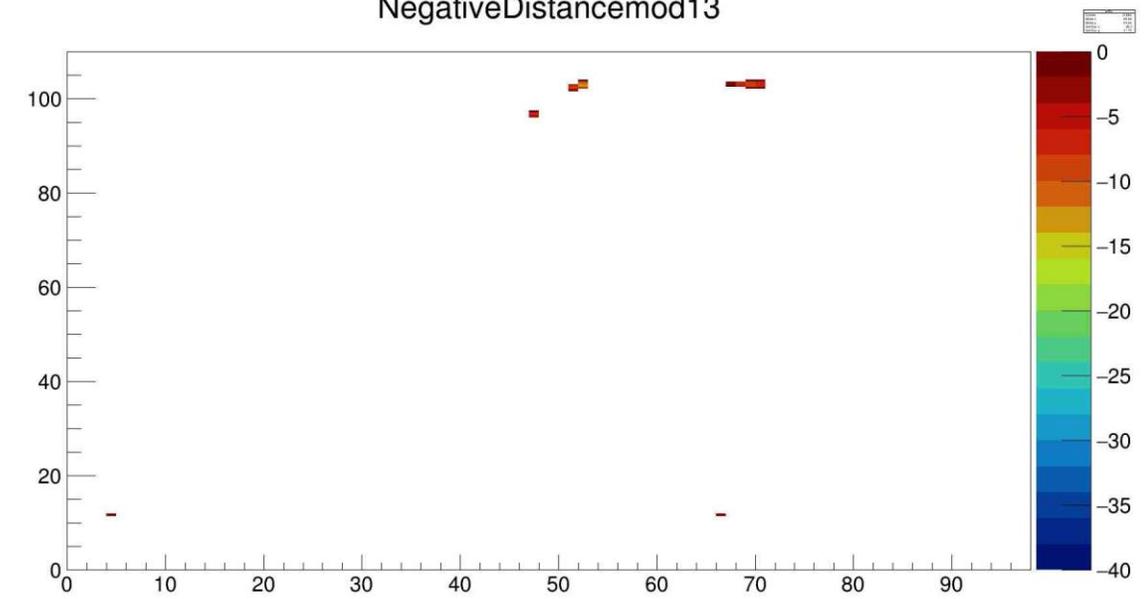
Distancemod13



Histmod13

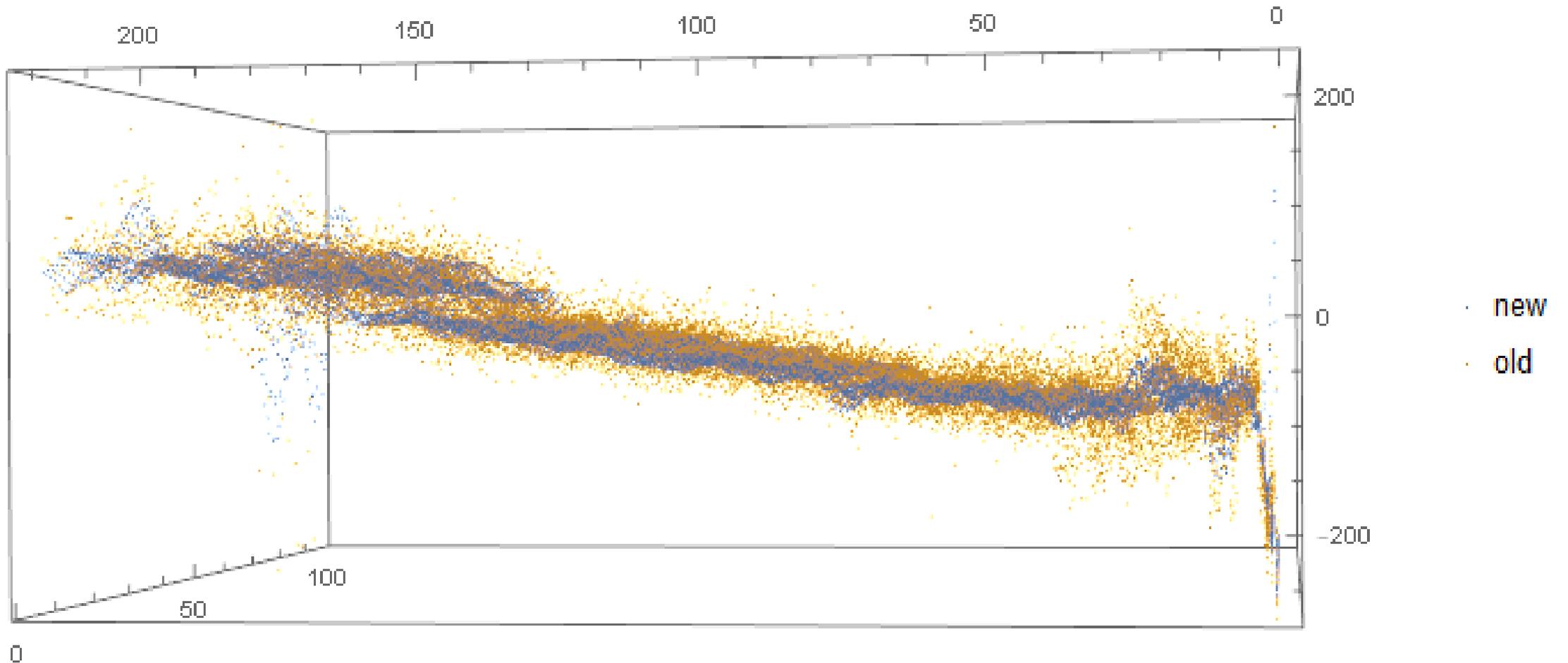


NegativeDistancemod13



# Back up: Plot of filtered data vs scanned data

Blue dots: filtered data



# Back up: Location of the rejected areas (2<sup>nd</sup> method)

- The rejected areas/points for each module is similar.

