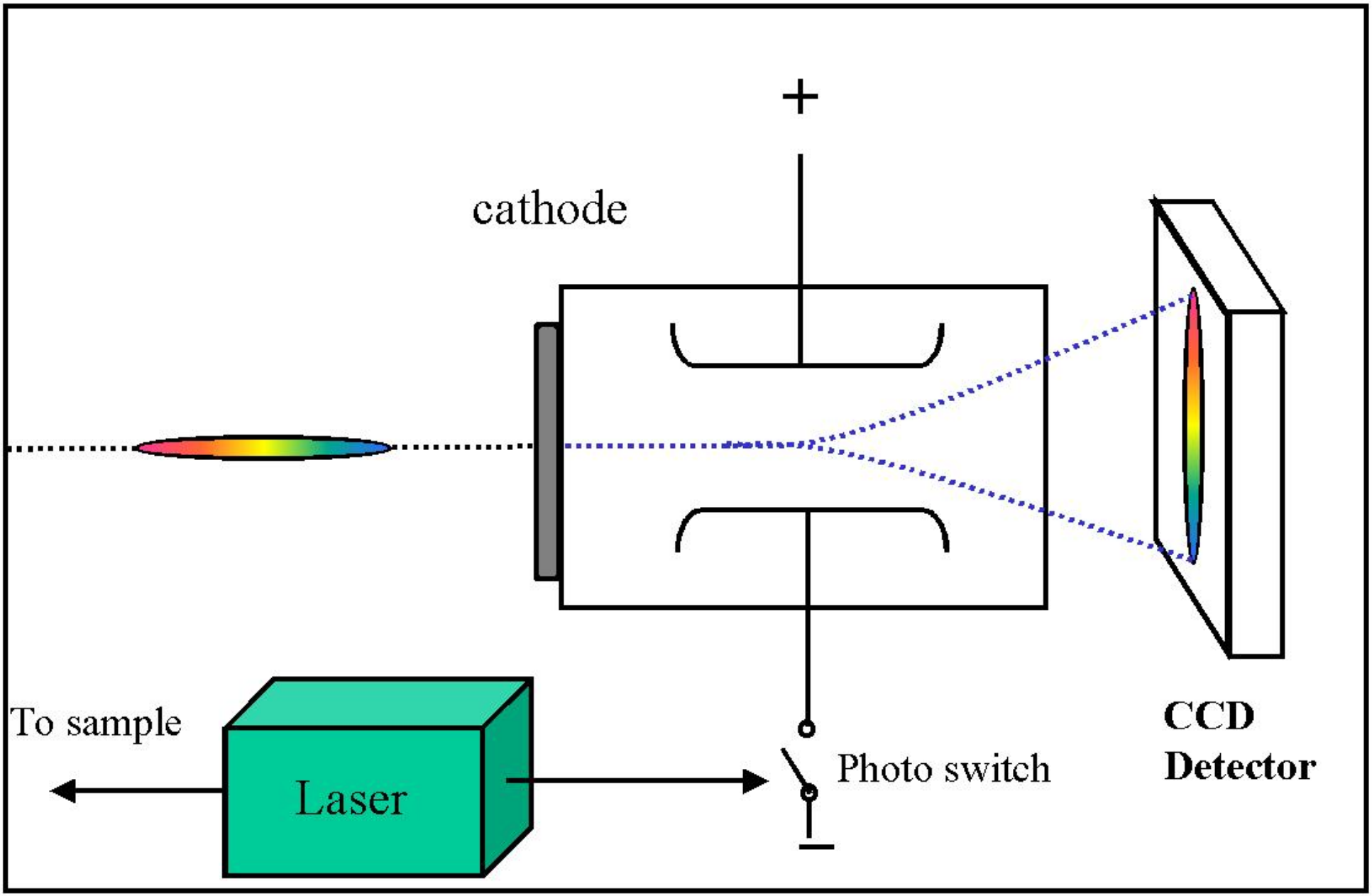
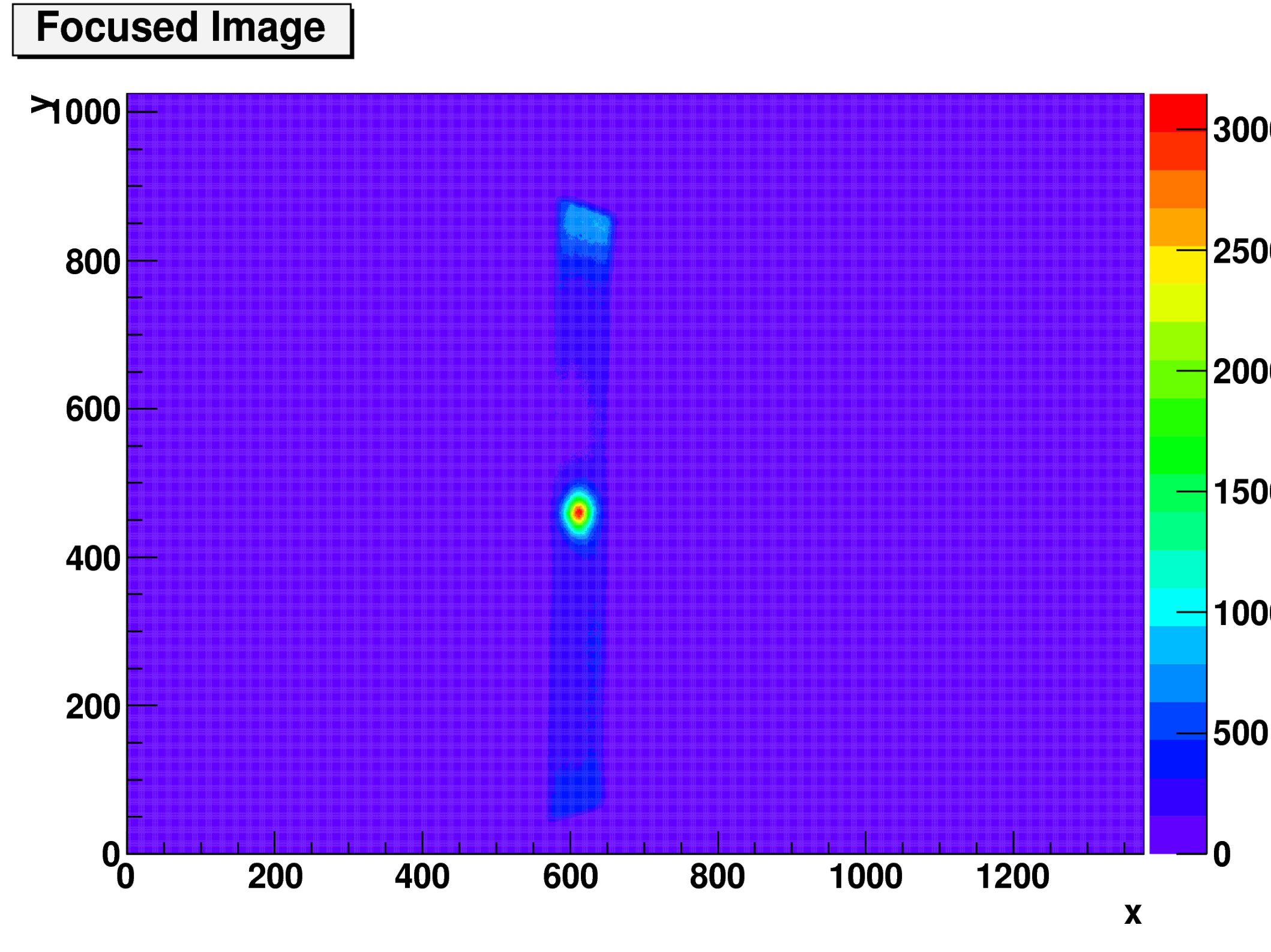
Preliminary Analysis of Streak Camera Data

David Newton

Liverpool Group Meeting

3/2/10


+
cathode
To sample
Laser
Photo switch
CCD
Detector


Focused Image
Y
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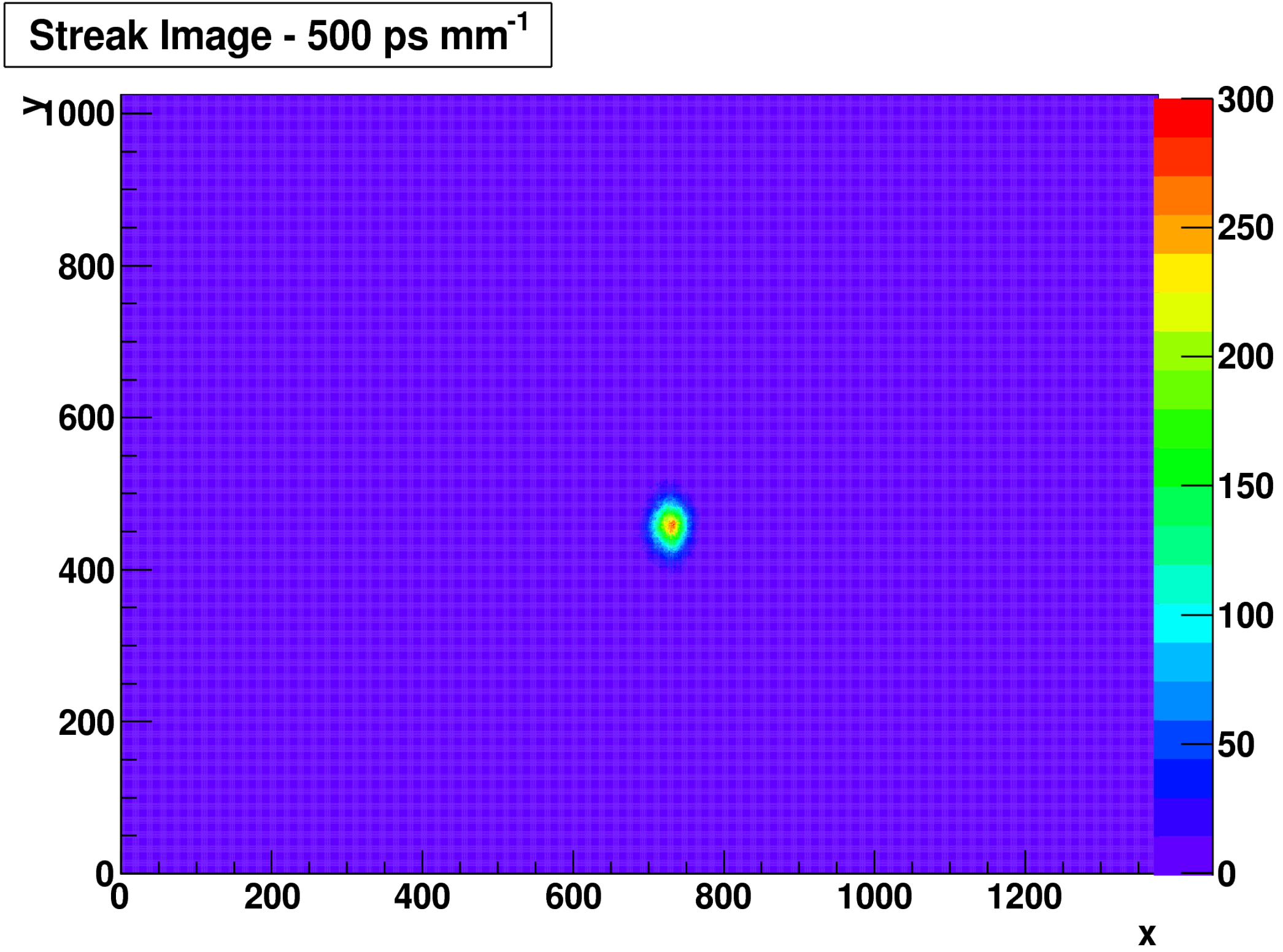
Streak Image - 500 ps mm-1
y
1000
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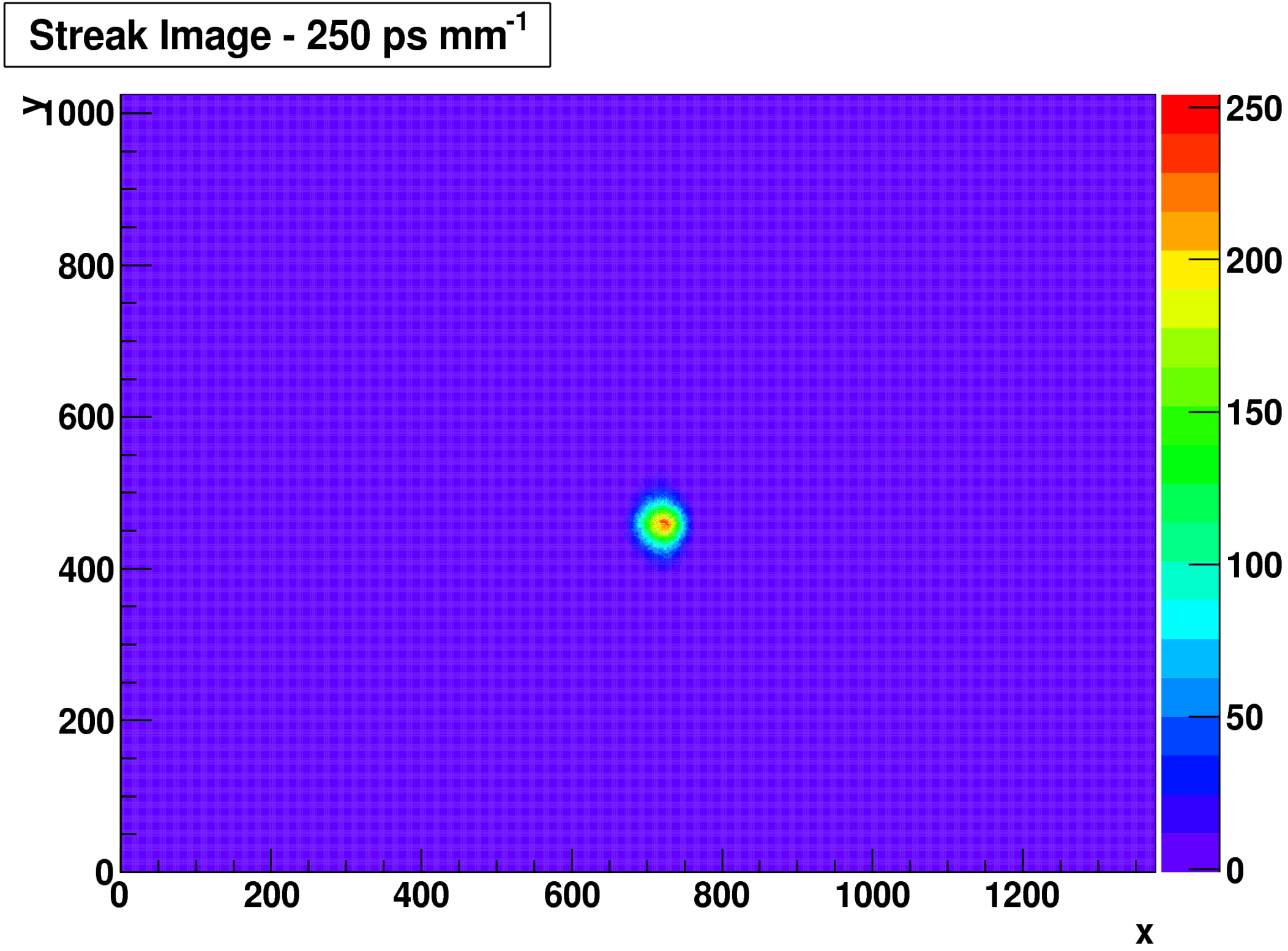
Streak Image - 250 ps mm-1
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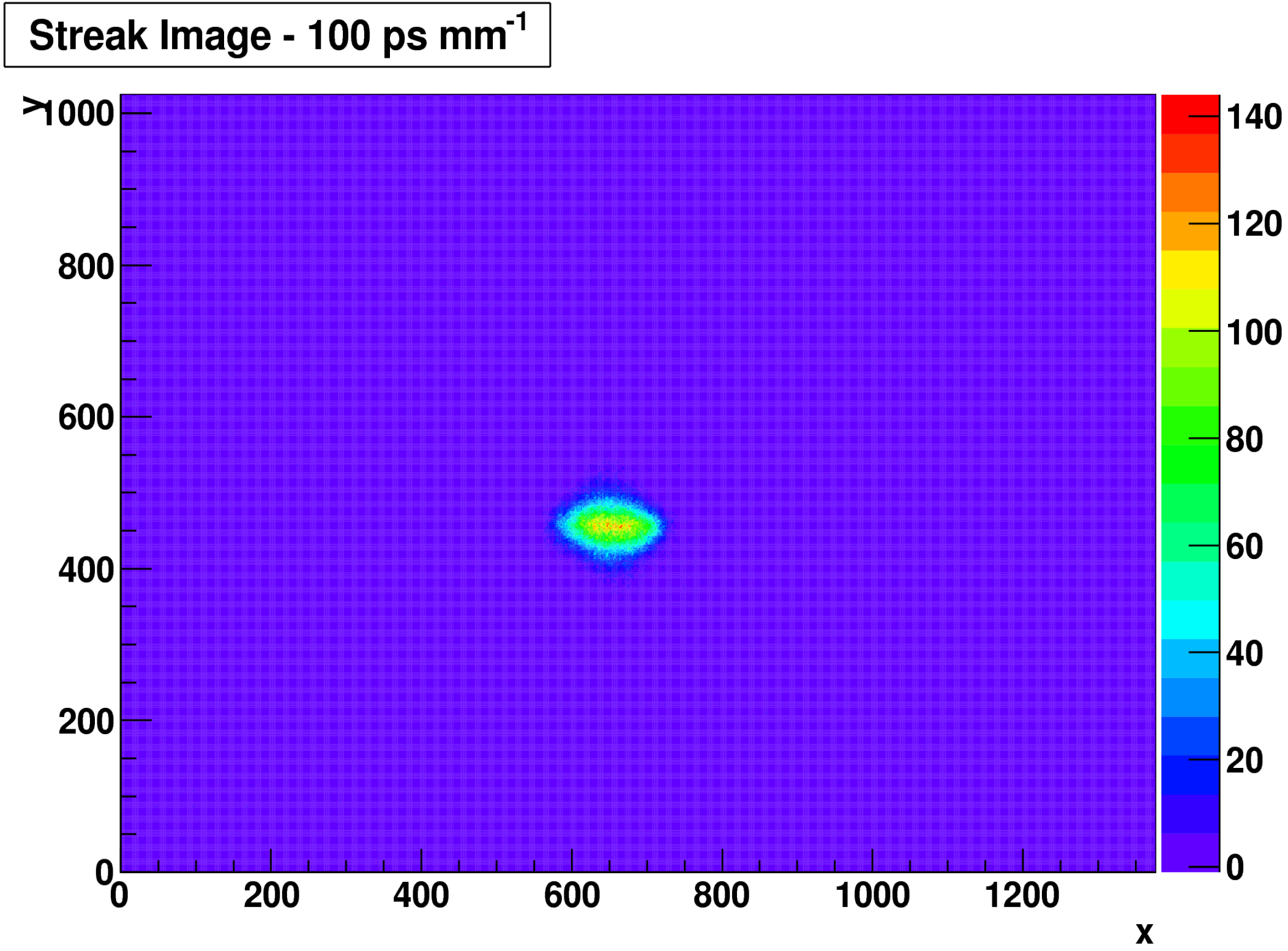
Streak Image - 100 ps mm-1
y
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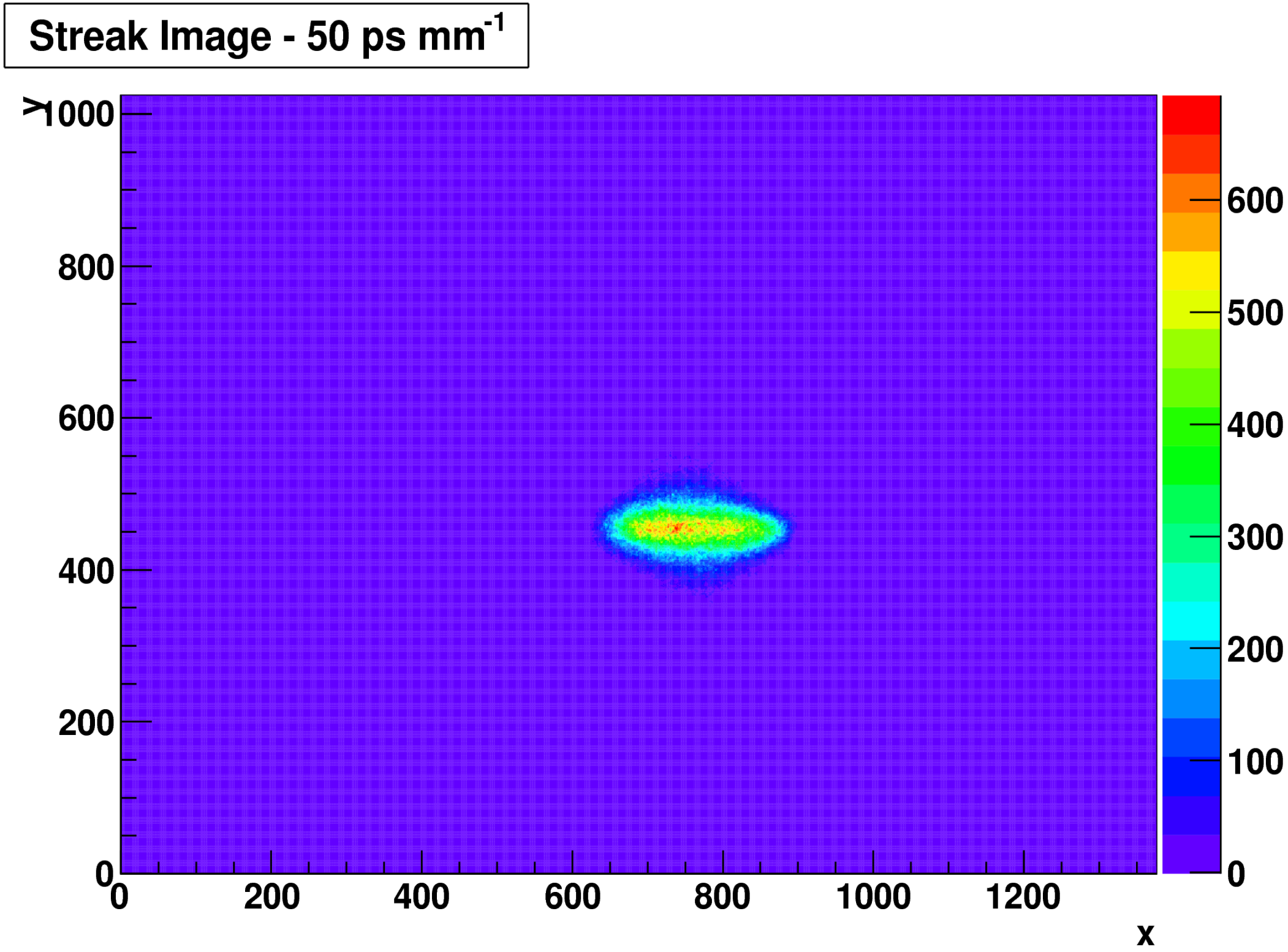
Streak Image - 50 ps mm-1
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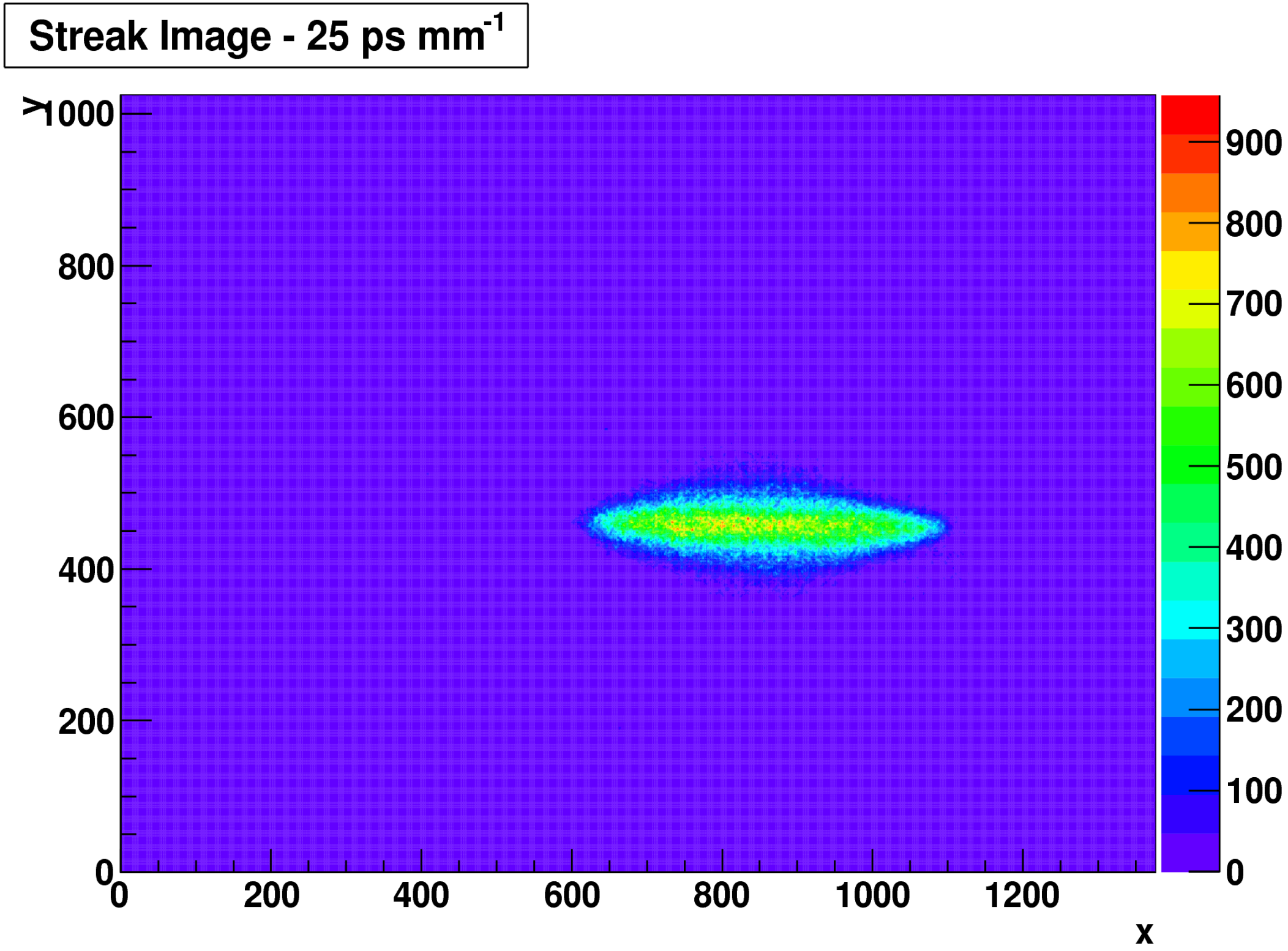
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y
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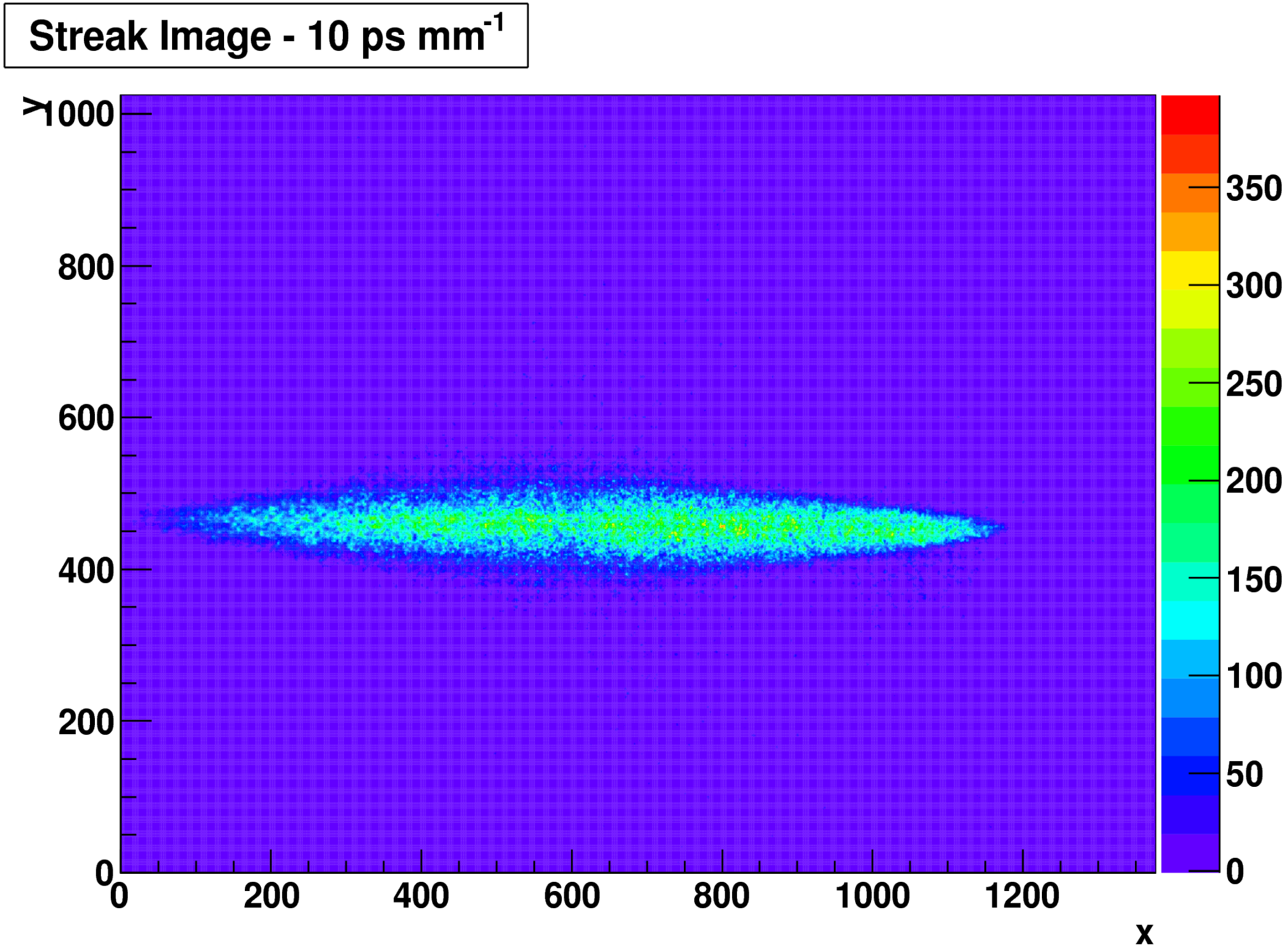
Streak Image - 10 ps mm-1
y
1000
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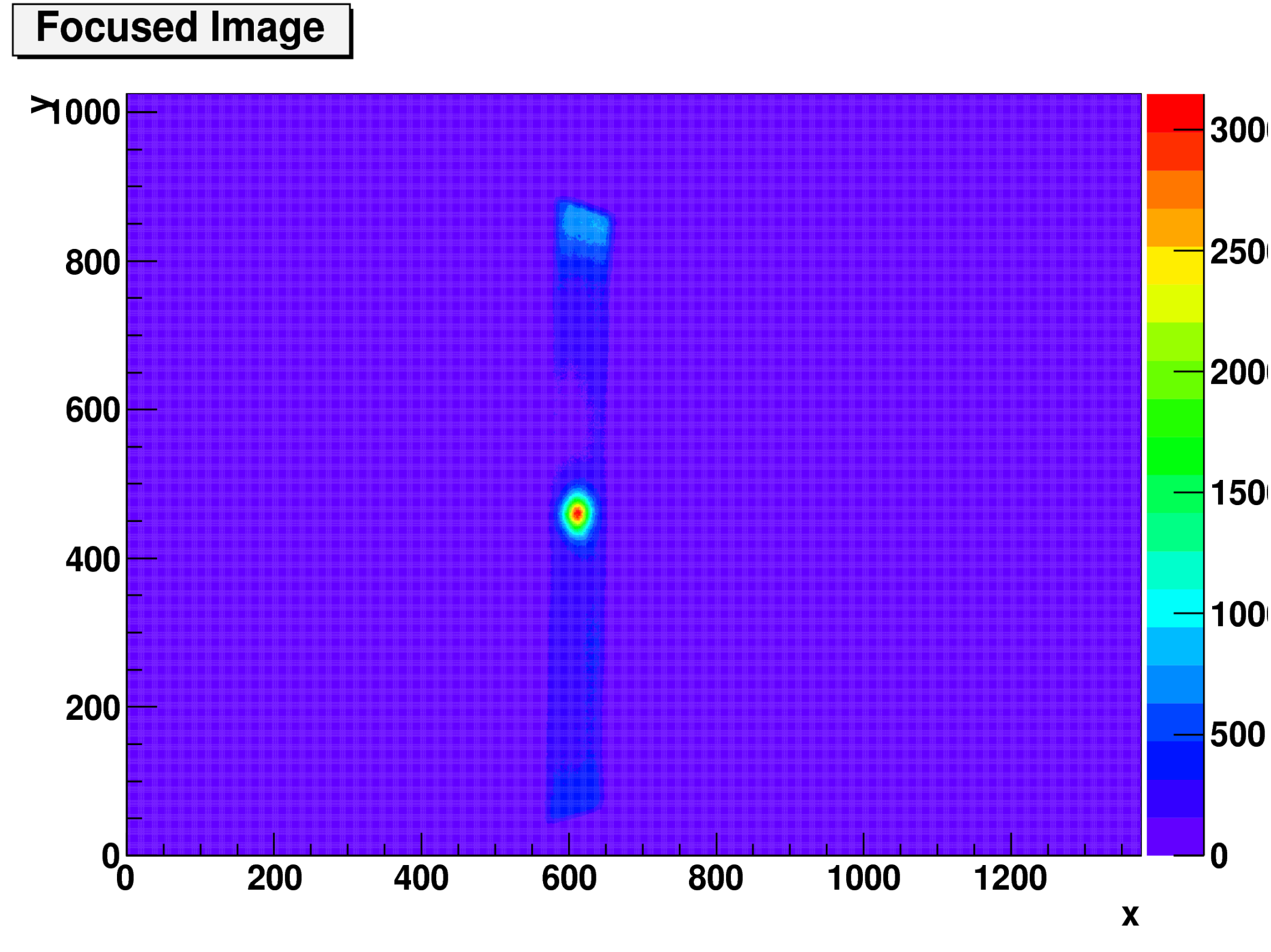
Focused Image
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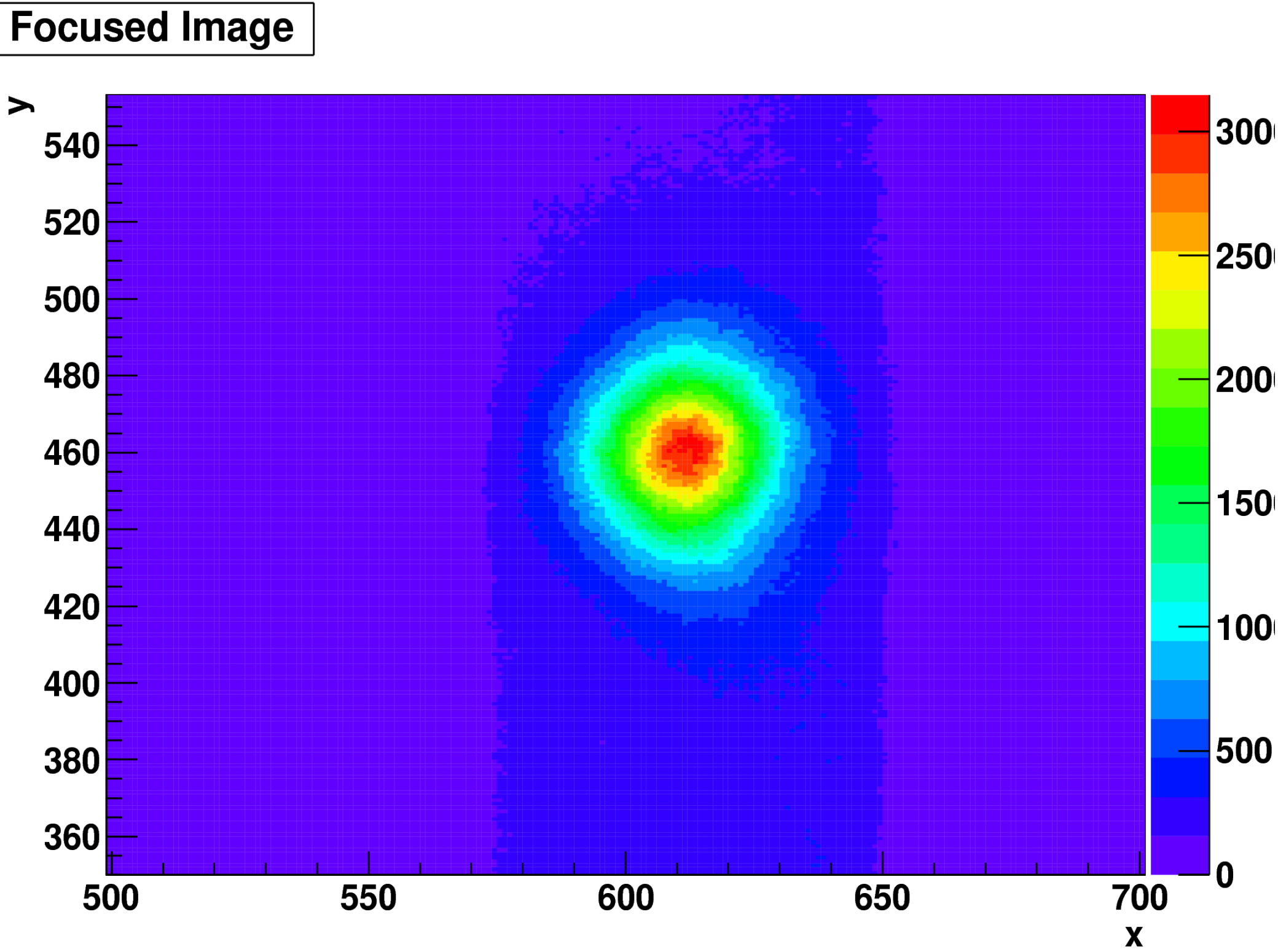
Focused Image
y
540
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x
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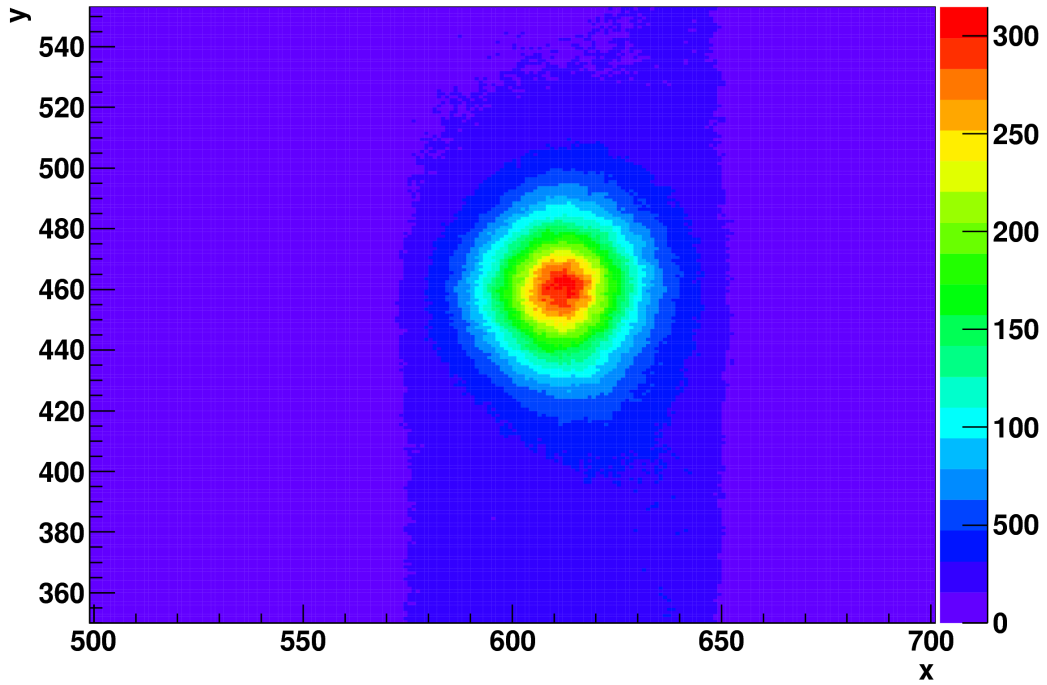
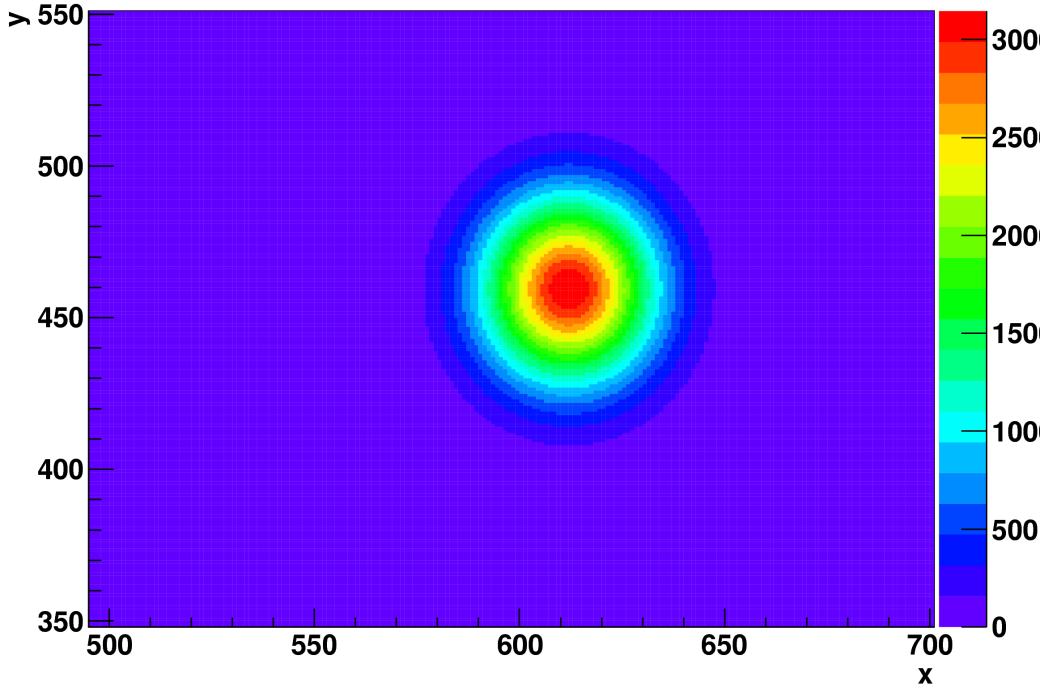
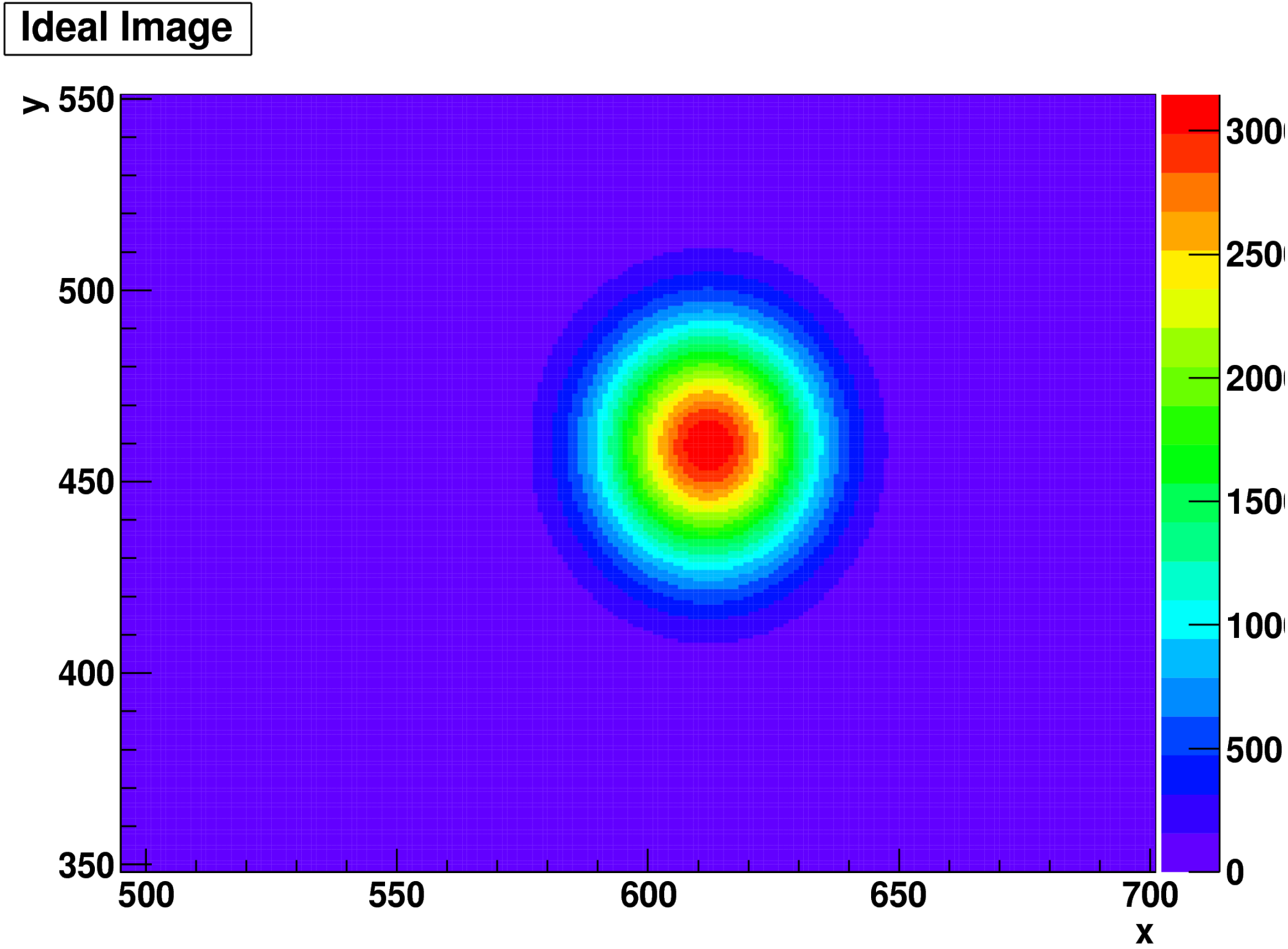
Focused Image



Ideal Image




Ideal Image
y
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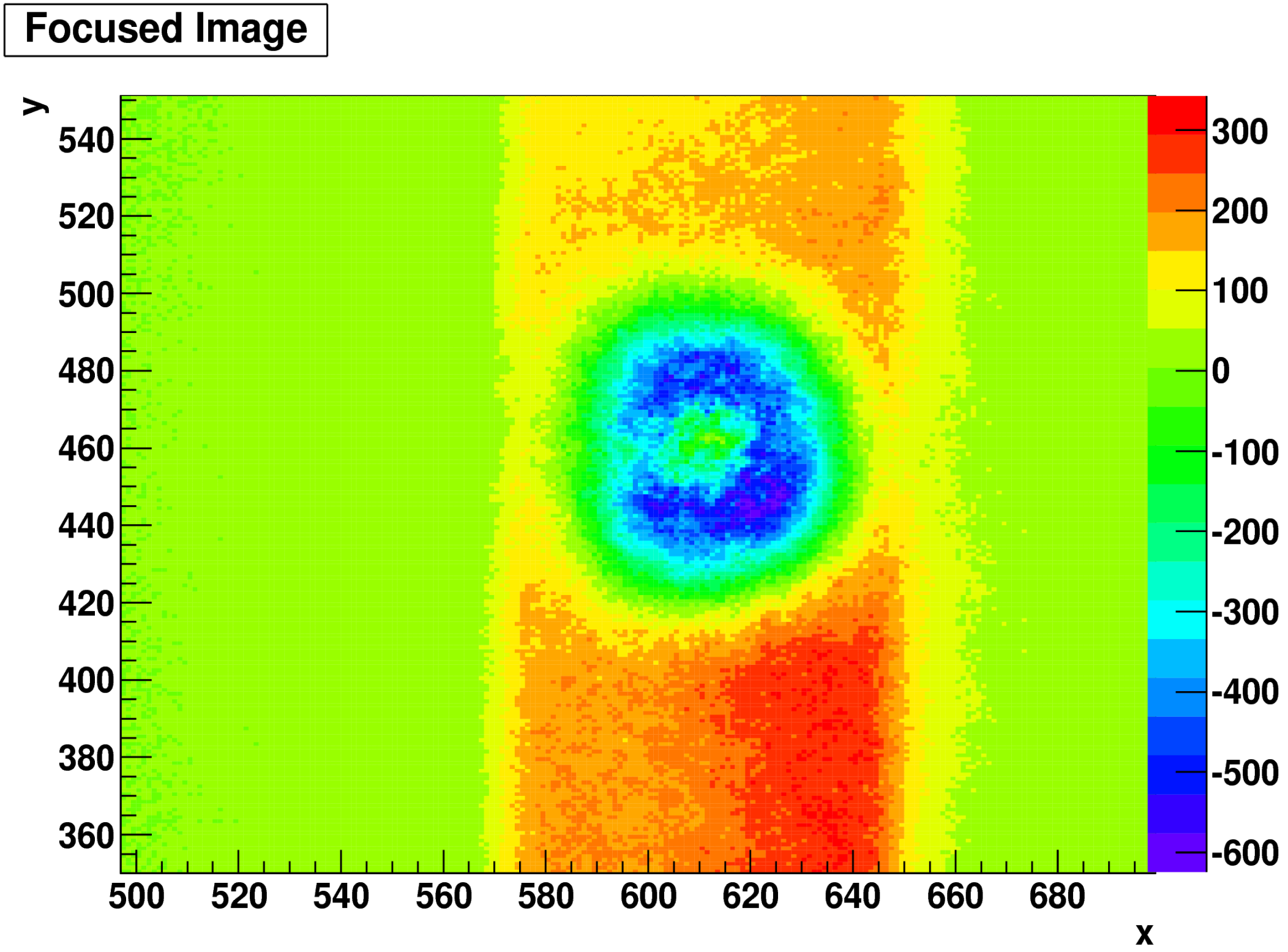
Focused Image
y
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x
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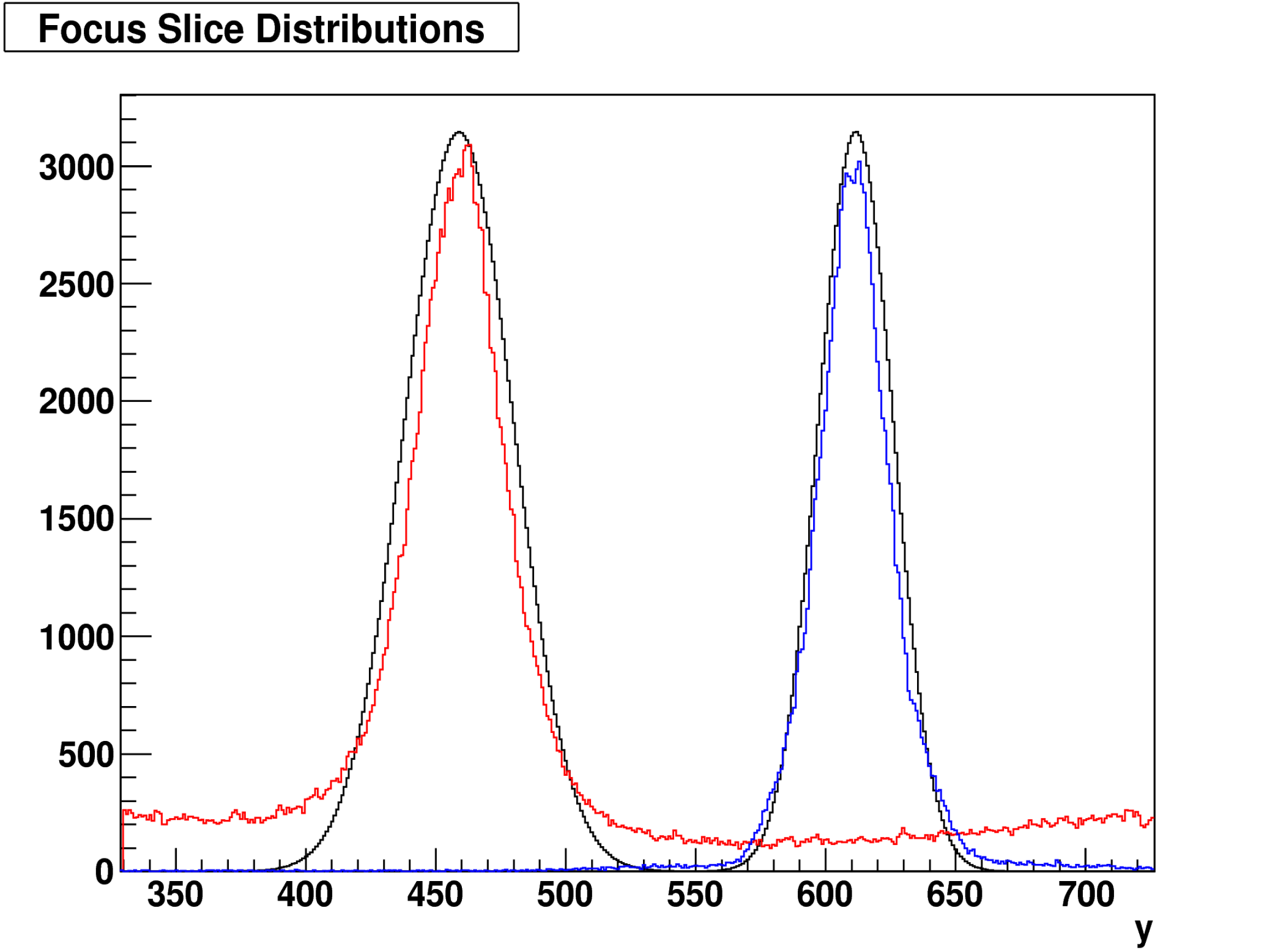
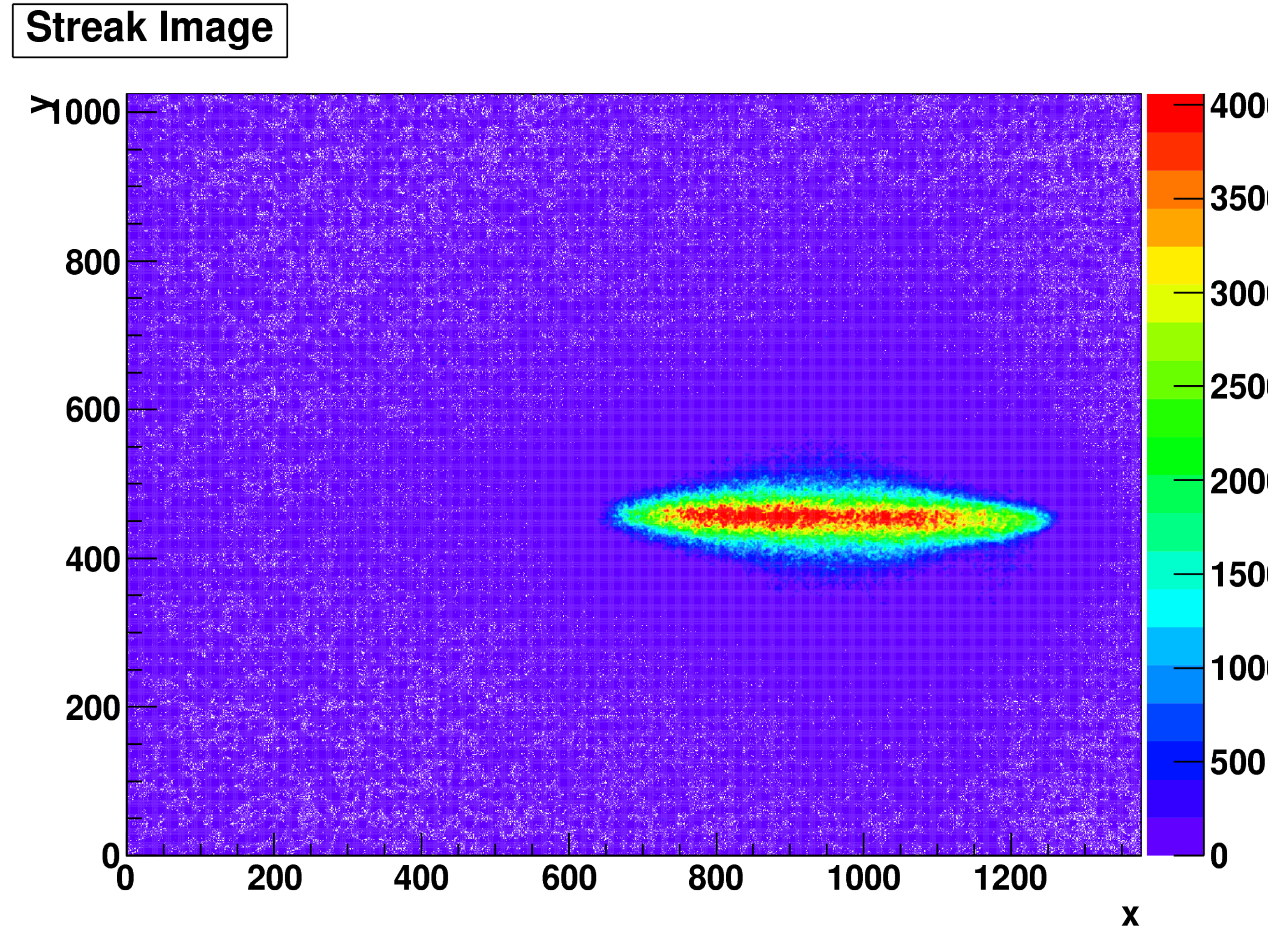

Focus Slice Distributions
3000
2500
2000
1500
1000
500
0
350
400
450
500
550
600
650
700
y


Streak Image
y
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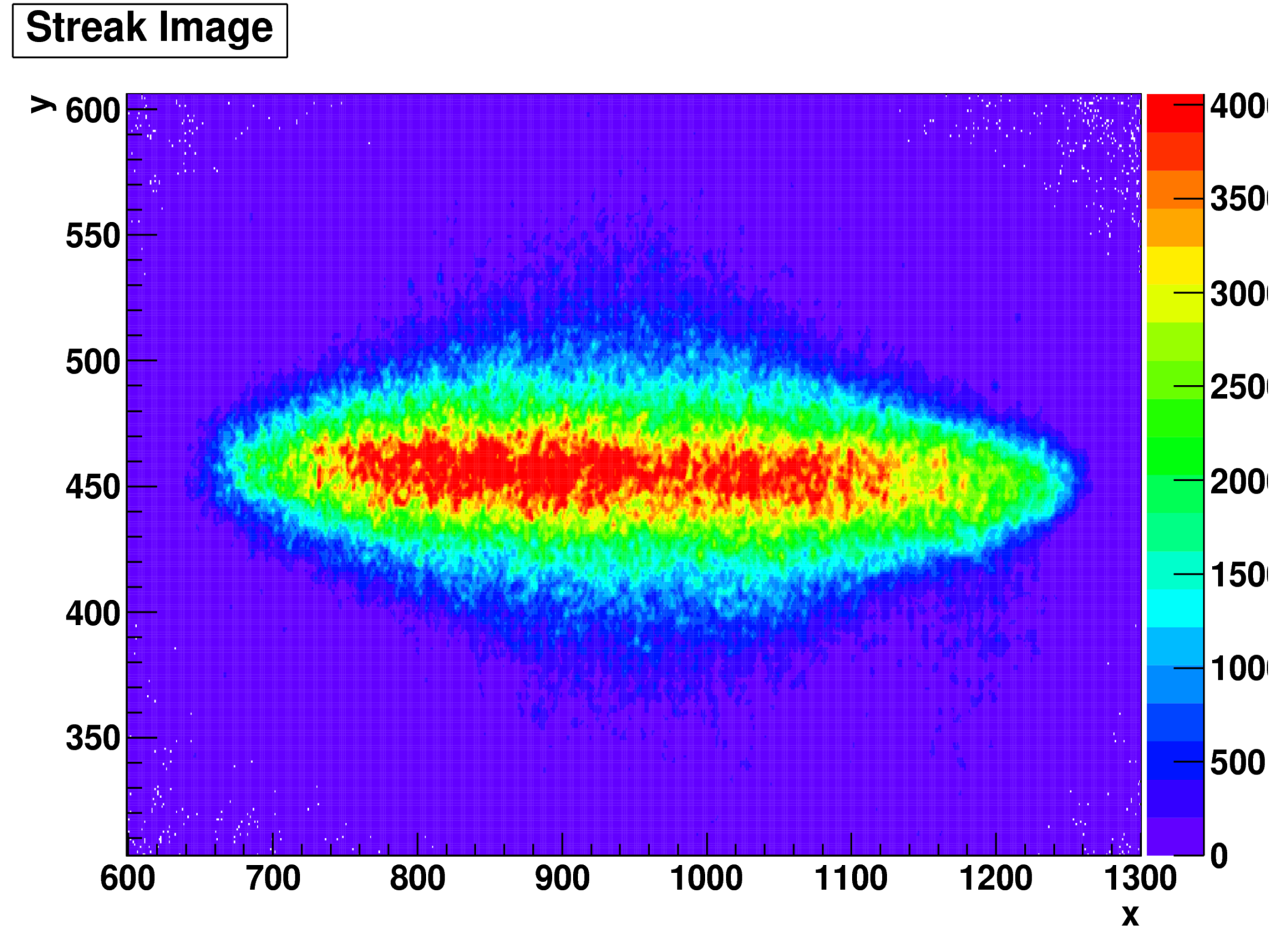
Streak Image
y
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1300
x
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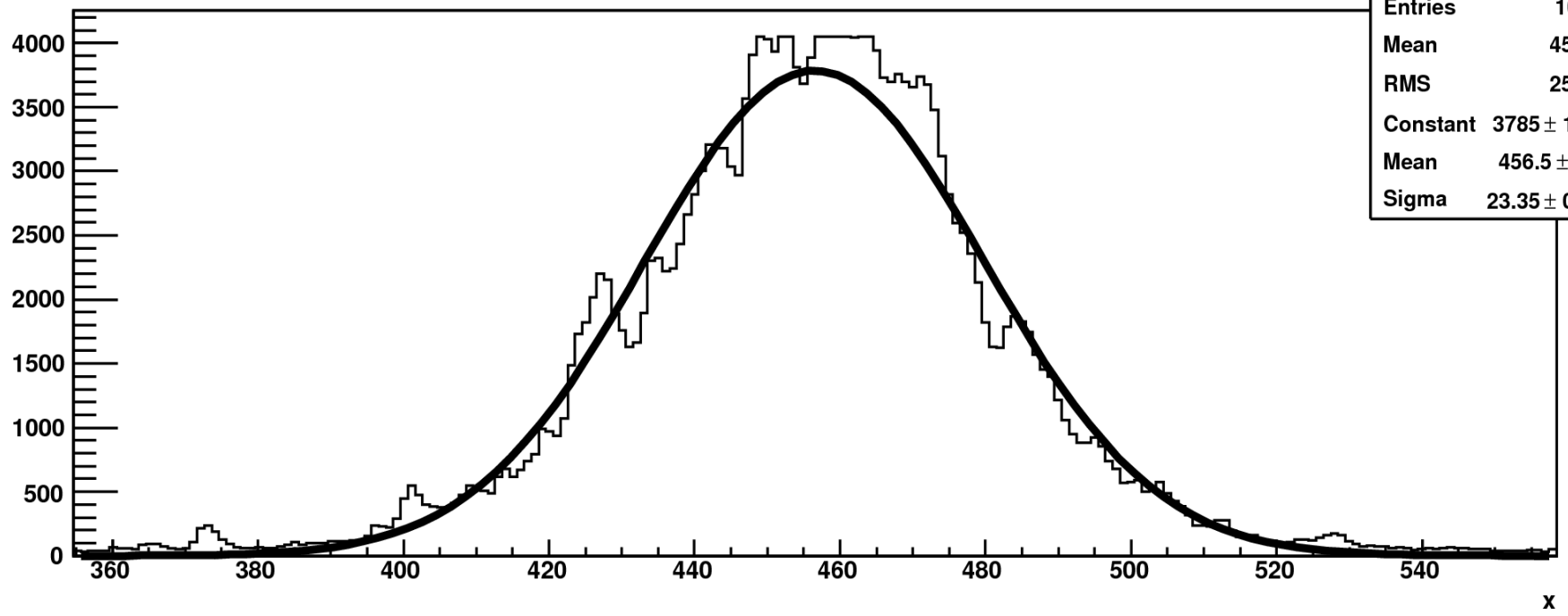
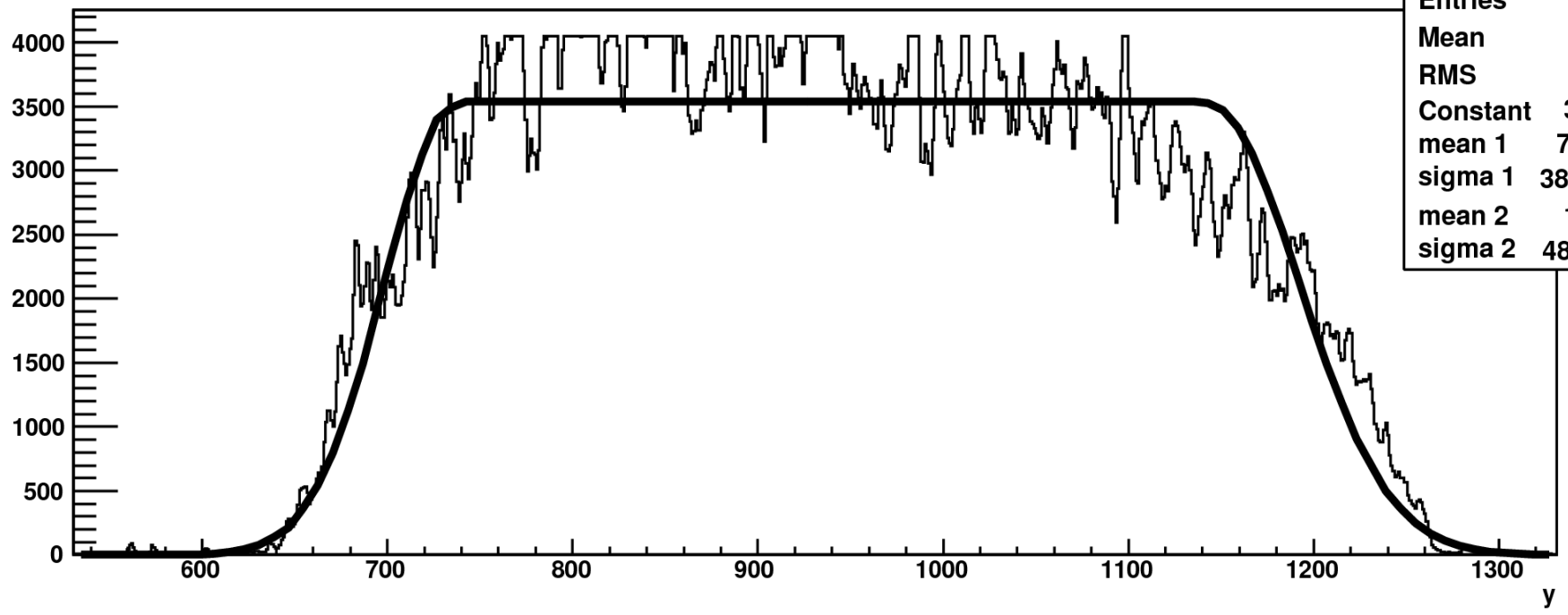
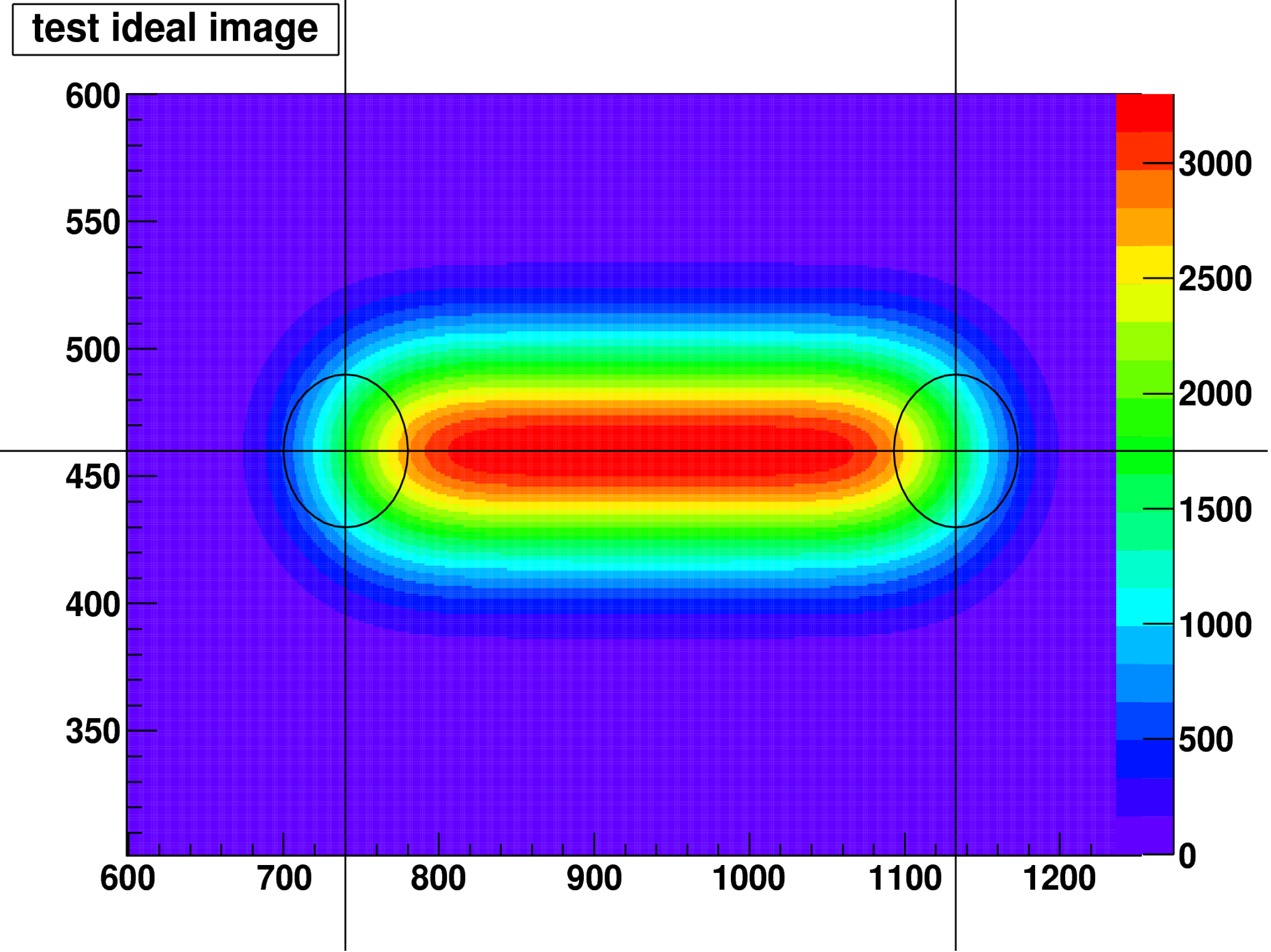
500
0

x slice



y slice




test ideal image
600
550
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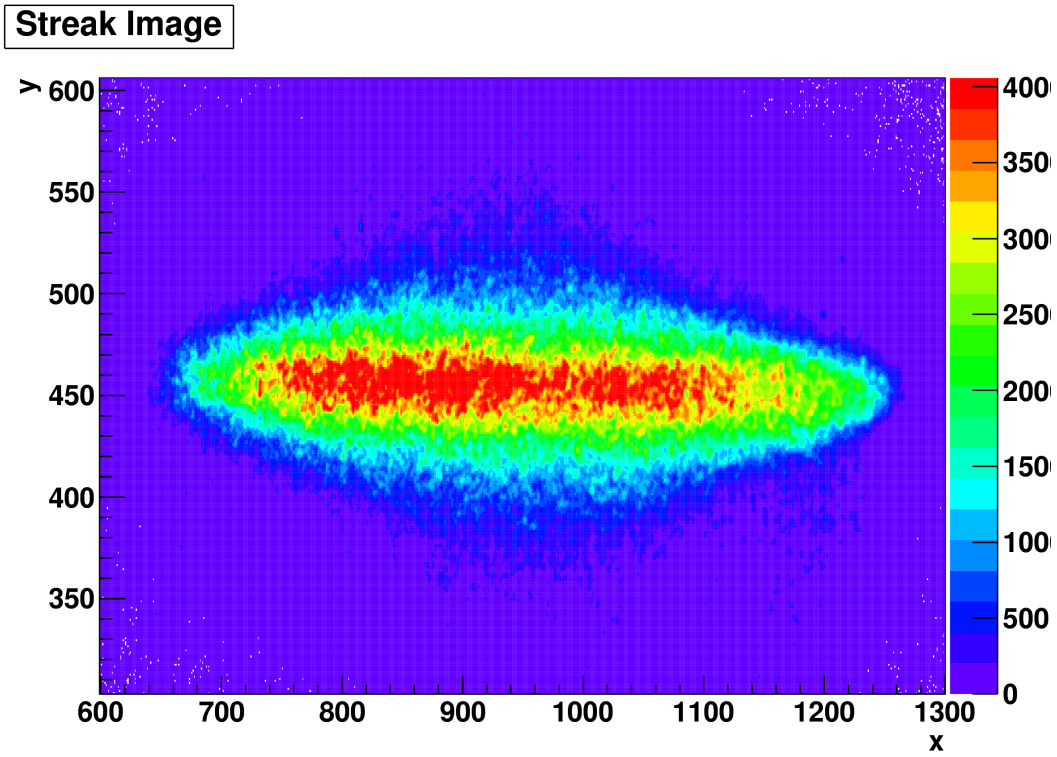
Streak Image
y
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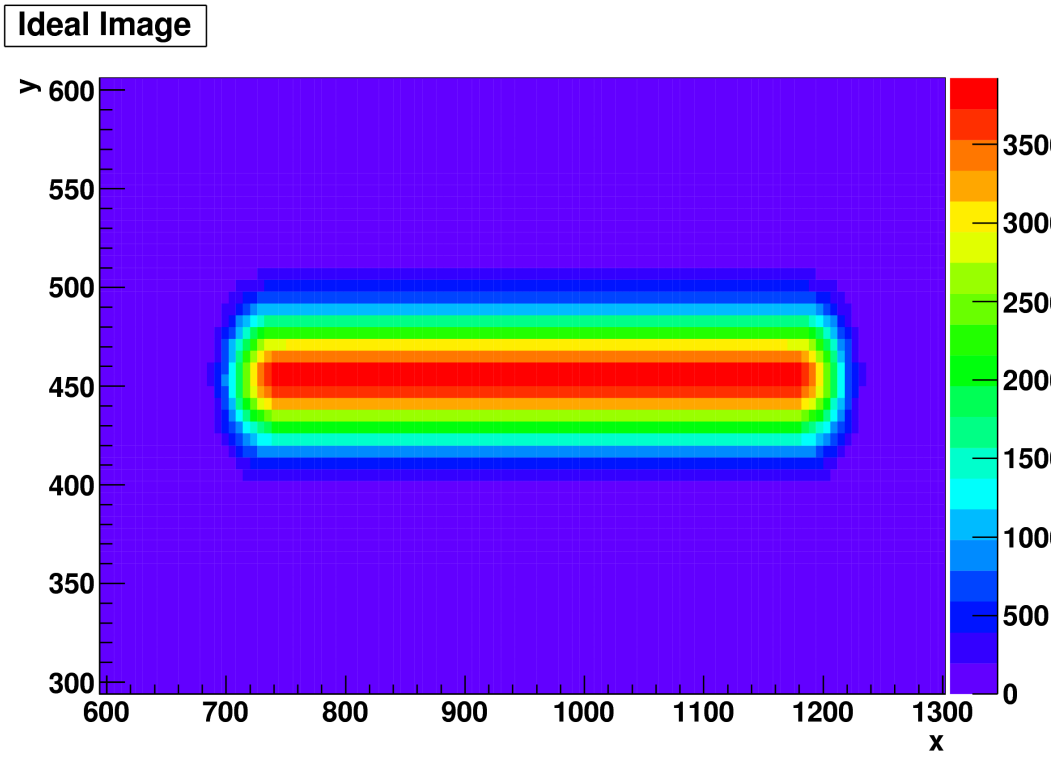
Ideal Image
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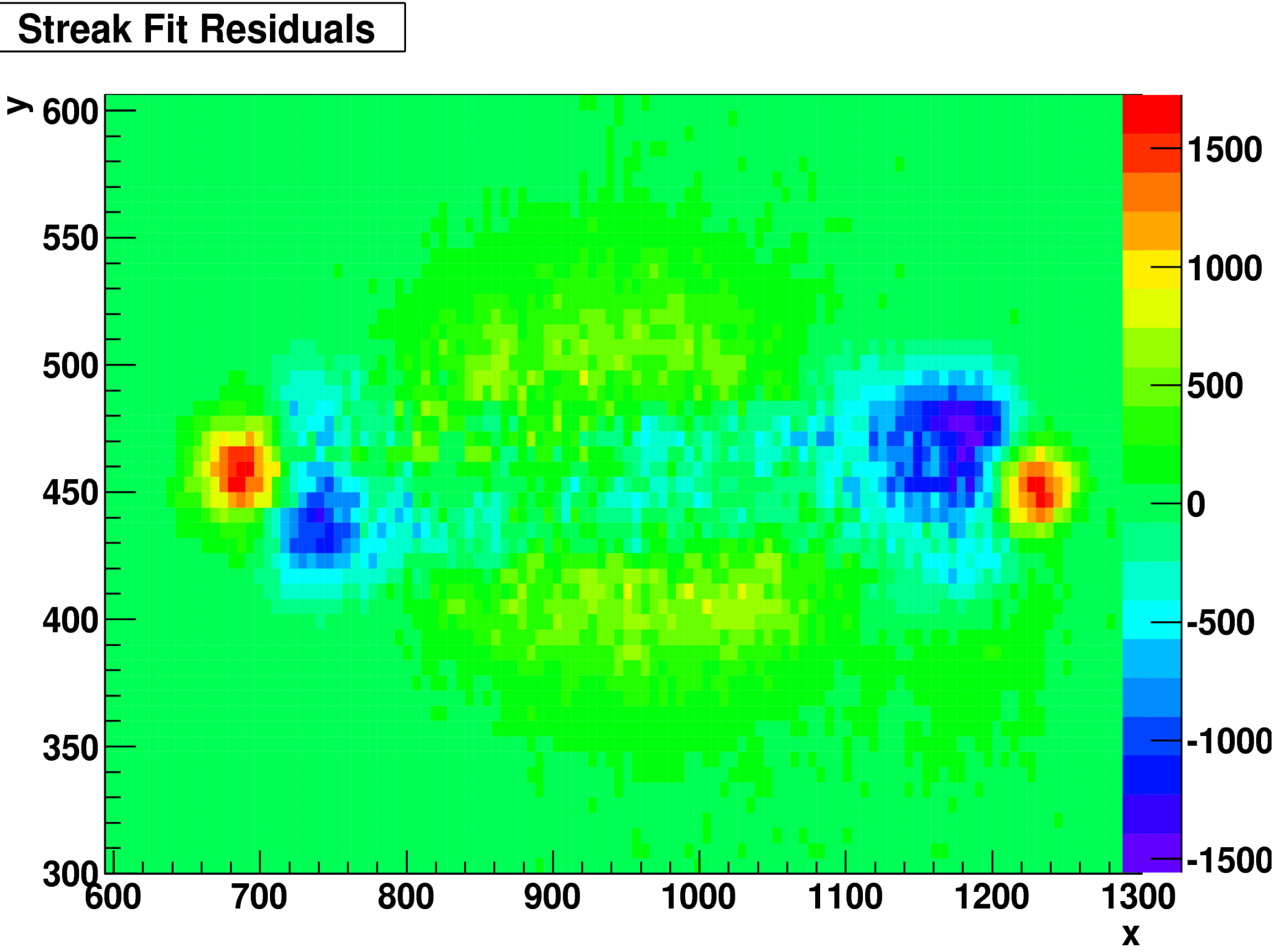
Streak Fit Residuals
y
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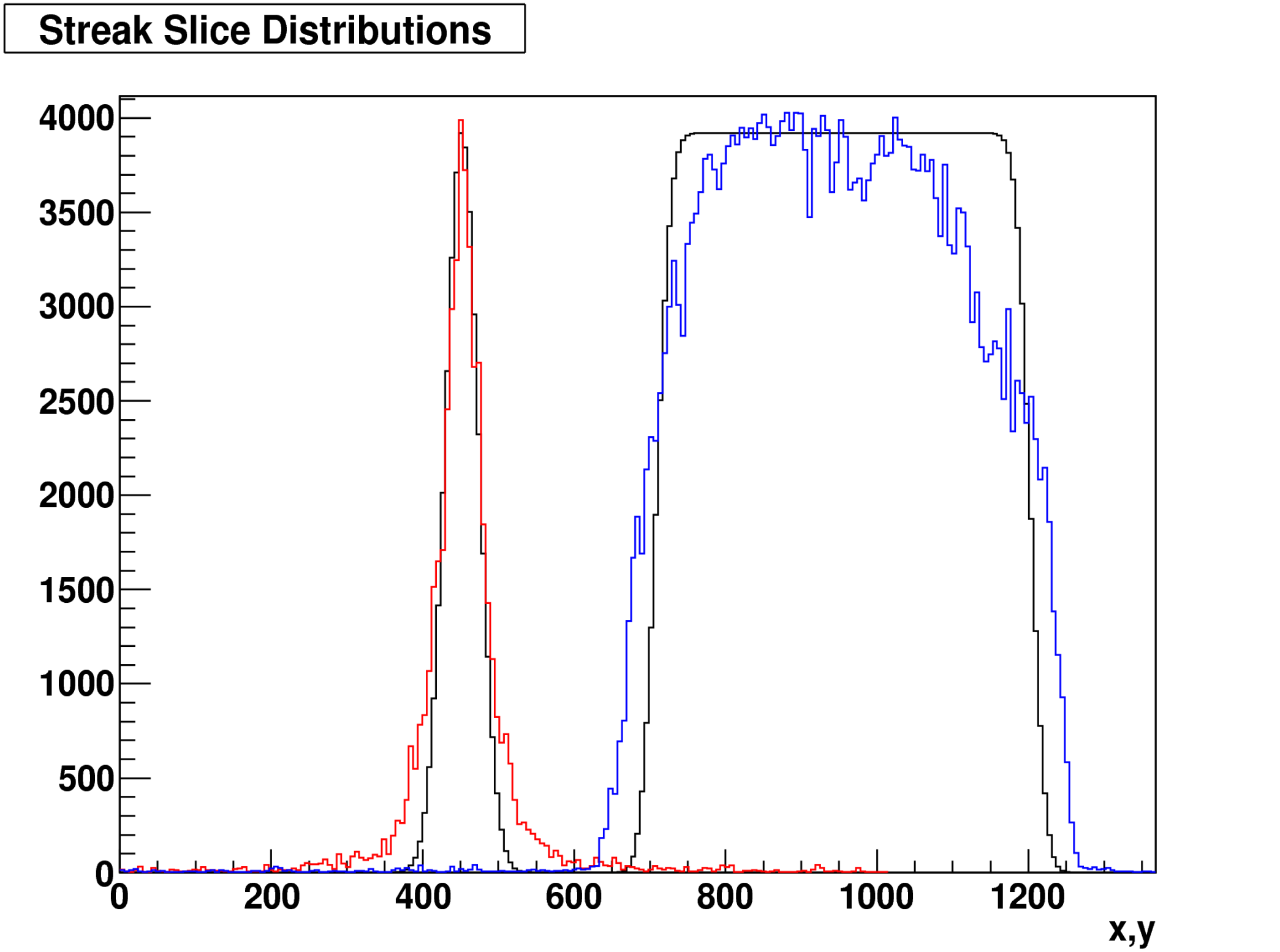
-500
-1000
-1500


Streak Slice Distributions
4000
3500
3000
2500
2000
1500
1000
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0
0
200
400
600
800
1000
1200
x,y

Conclusions...

- So far only the full pulse has been observed
  - Calibrate Intensity against the gain, attenuation, and the CCD charge with the photon number
- Decreasing the aperture slit will allow slices in 'x' to be observed
  - Reduce the longitudinal 'smearing' of the image
  - Allow cleaner fitting solution
- More accurate modelling
  - Each 28 ps pulse is actually four 7 ps pulses
  - Measurement of the uncertainties in the CCD data
- Characterisation of the drive laser pulse shape
- Install the streak camera on the Alice beam line
  - Eventual goal is to characterise the longitudinal profile of the beam