

Beam Loss Data Batch Analyser

MICE Target Workshop
2nd March 2009

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DAQ Output = Analyser Input

1 target dip per file. 100, 000 kHz sampling rate.

Normal ISIS rep rate gives 5 spills per file, 1 with target present, four nominally without

| Sample | BeamIntensity | TargetPosition | BeamPositionSum | TotalBeamLoss | BLM7SUM | BLM8SUM |
|--------|---------------|----------------|-----------------|---------------|---------|---------|
| 0 | -0.01 | 5.16 | 3.23E-005 | -0.08 | -0.01 | -0.02 |
| 1 | -0.01 | 5.16 | 3.23E-005 | -0.03 | -0.02 | -0.02 |
| 2 | -0.01 | 5.16 | 0 | -0.04 | -0.01 | -0.02 |
| 3 | -0.01 | 5.16 | 0 | -0.06 | -0.01 | -0.02 |
| 4 | -0.01 | 5.16 | 0 | -0.01 | -0.01 | -0.02 |
| 5 | -0.01 | 5.16 | 0 | -0.04 | -0.01 | -0.02 |
| 6 | -0.01 | 5.16 | 0 | -0.05 | -0.01 | -0.02 |
| 7 | -0.01 | 5.16 | 0 | -0.02 | -0.01 | -0.02 |
| 8 | -0.01 | 5.16 | 3.23E-005 | -0.04 | -0.01 | -0.02 |

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Analyser Output – Reduced Data Set

1 target dip event per line

FP = 3rd order polynomial fit peak loss algorithm

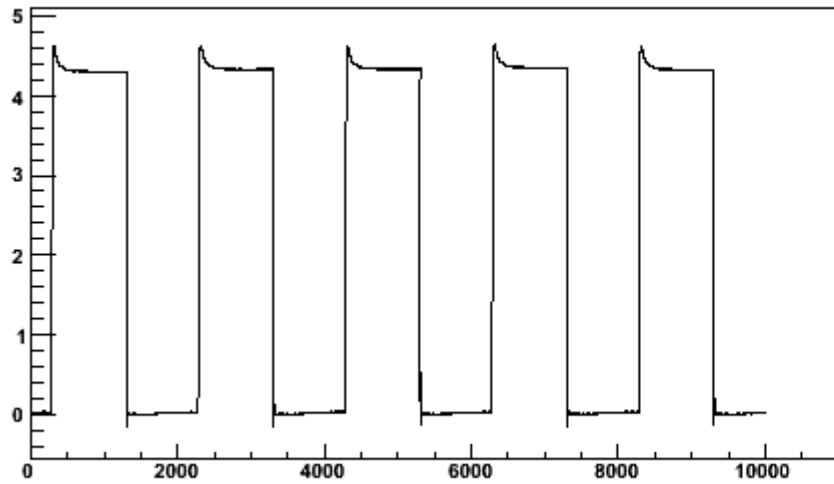
BSP = Background subtraction peak loss algorithm

| Timestamp | TotalBL (FP) | BLSec7 (FP) | BLSec8 (FP) | TotalBL (BSP) | BLSec7 (BSP) | BLSec8 (BSP) | TgtDepth(V) | TgtDipTime(ms) |
|-----------------------------------|--------------|-------------|-------------|---------------|--------------|--------------|-------------|----------------|
| 2008_11_29 10_51_49_86 6377 | 1.84 | -0.25 | -0.37 | 1.64 | 0.01 | 0.01 | 1.18 | 11.34 |
| 2008_11_29 10_51_52_43 4710 | 1.83 | -0.25 | -0.38 | 1.67 | 0.01 | 0.02 | 1.18 | 10.88 |
| 2008_11_29 10_51_54_98 6360 | 1.77 | -0.24 | -0.36 | 1.61 | 0.01 | 0.02 | 1.21 | 10.55 |

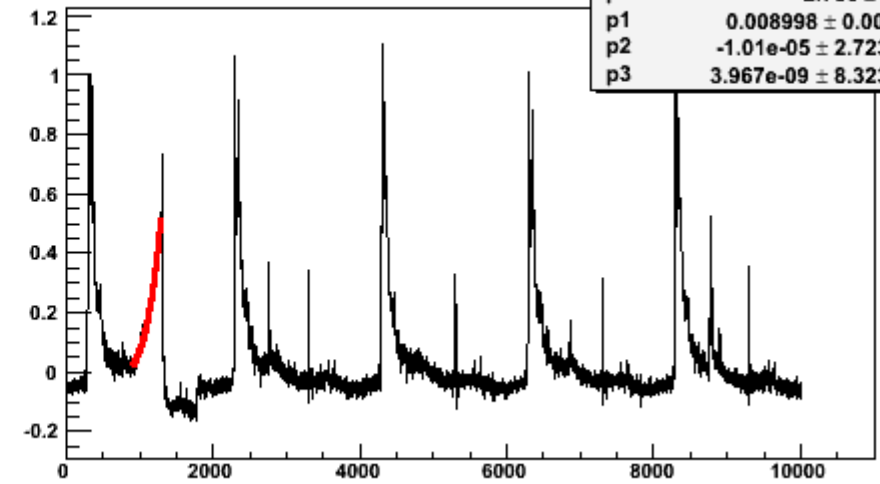
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Fit Algorithm

Beam Intensity

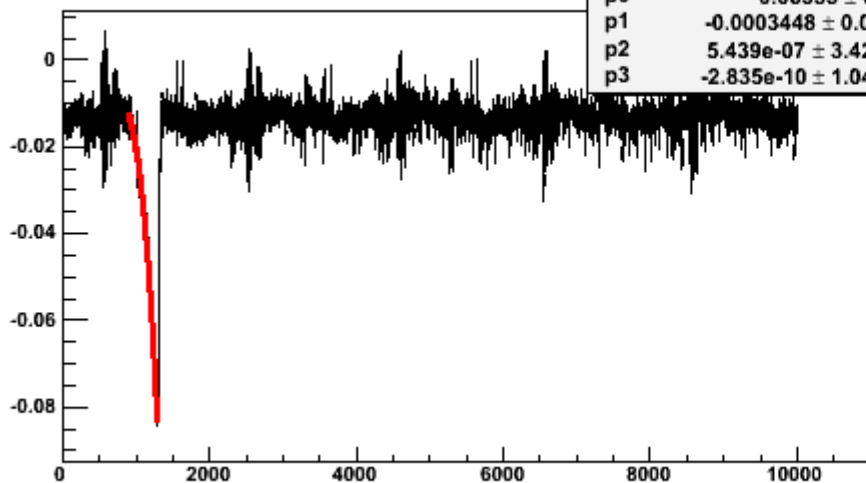


Total Beam Loss



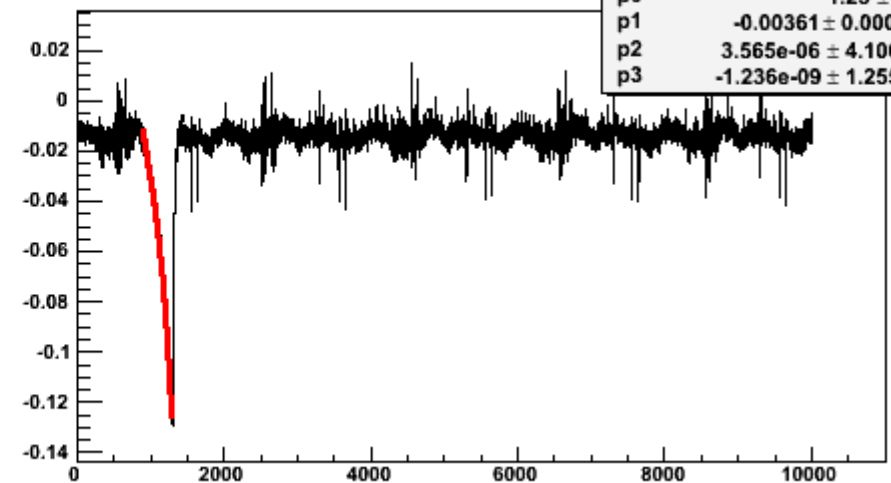
| | |
|-----------------------|---------------------------|
| χ^2 / ndf | 0.1633 / 397 |
| p0 | -2.786 \pm 1.061 |
| p1 | 0.008998 \pm 0.002952 |
| p2 | -1.01e-05 \pm 2.723e-06 |
| p3 | 3.967e-09 \pm 8.323e-10 |

Total Beam Loss in Sector 7



| | |
|-----------------------|----------------------------|
| χ^2 / ndf | 0.002579 / 397 |
| p0 | 0.06355 \pm 0.1333 |
| p1 | -0.0003448 \pm 0.000371 |
| p2 | 5.439e-07 \pm 3.421e-07 |
| p3 | -2.835e-10 \pm 1.046e-10 |

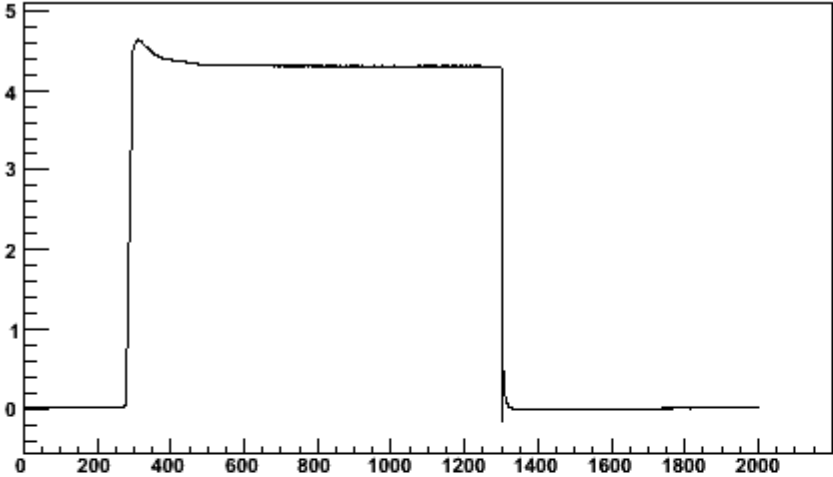
Total Beam Loss in Sector 8



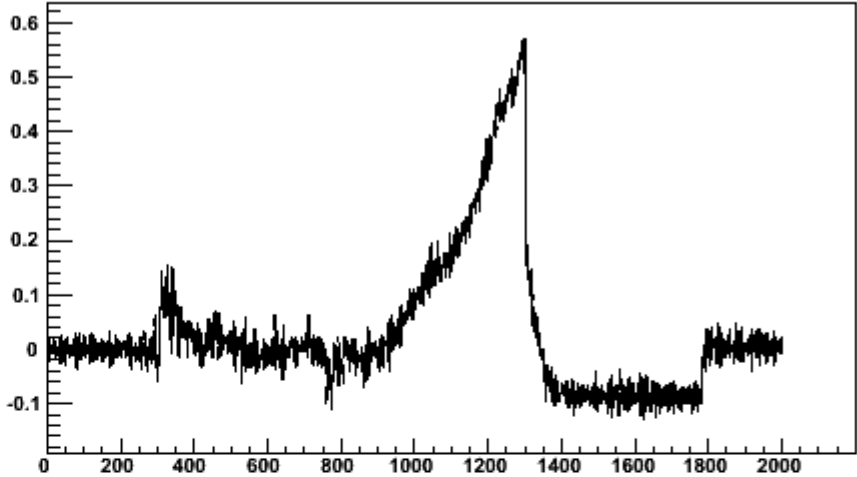
| | |
|-----------------------|----------------------------|
| χ^2 / ndf | 0.003714 / 397 |
| p0 | 1.25 \pm 0.16 |
| p1 | -0.00361 \pm 0.0004452 |
| p2 | 3.565e-06 \pm 4.106e-07 |
| p3 | -1.236e-09 \pm 1.255e-10 |

Background Subtraction Algorithm

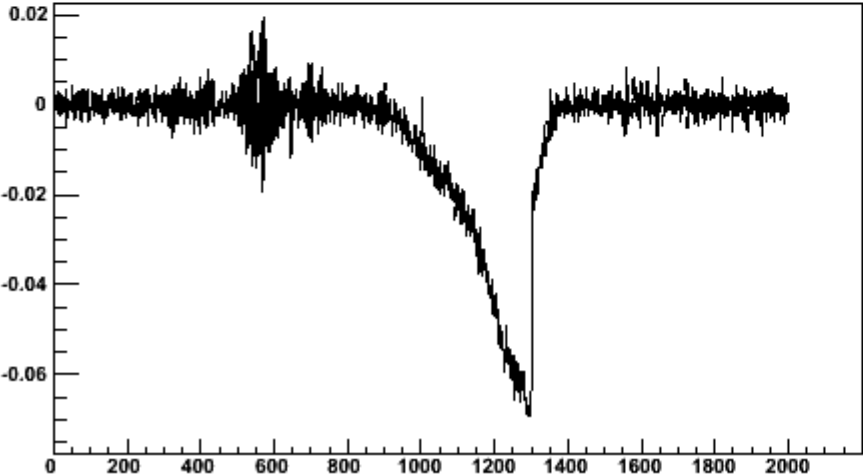
Beam Intensity



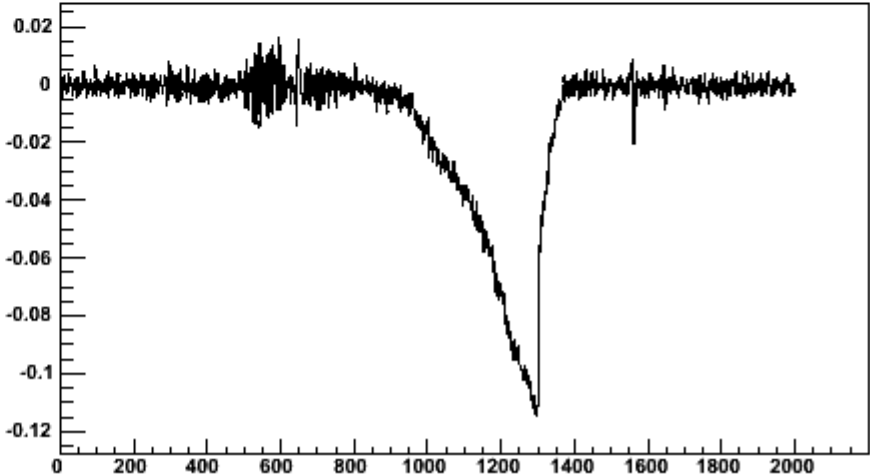
Background Subtracted Total Beam Loss



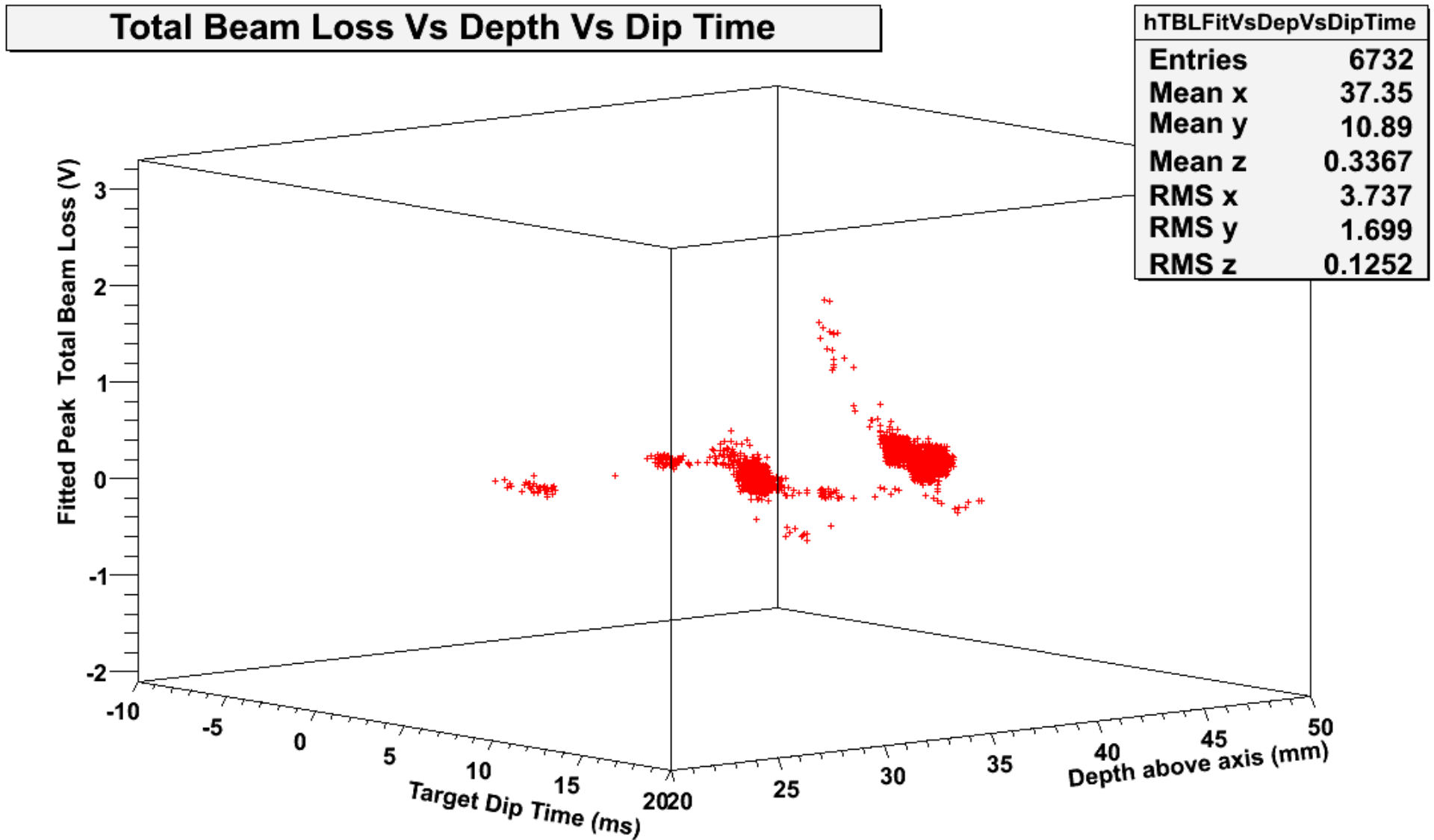
Background Subtracted Total Sector 7 Beam Loss



Background Subtracted Total Sector 8 Beam Loss



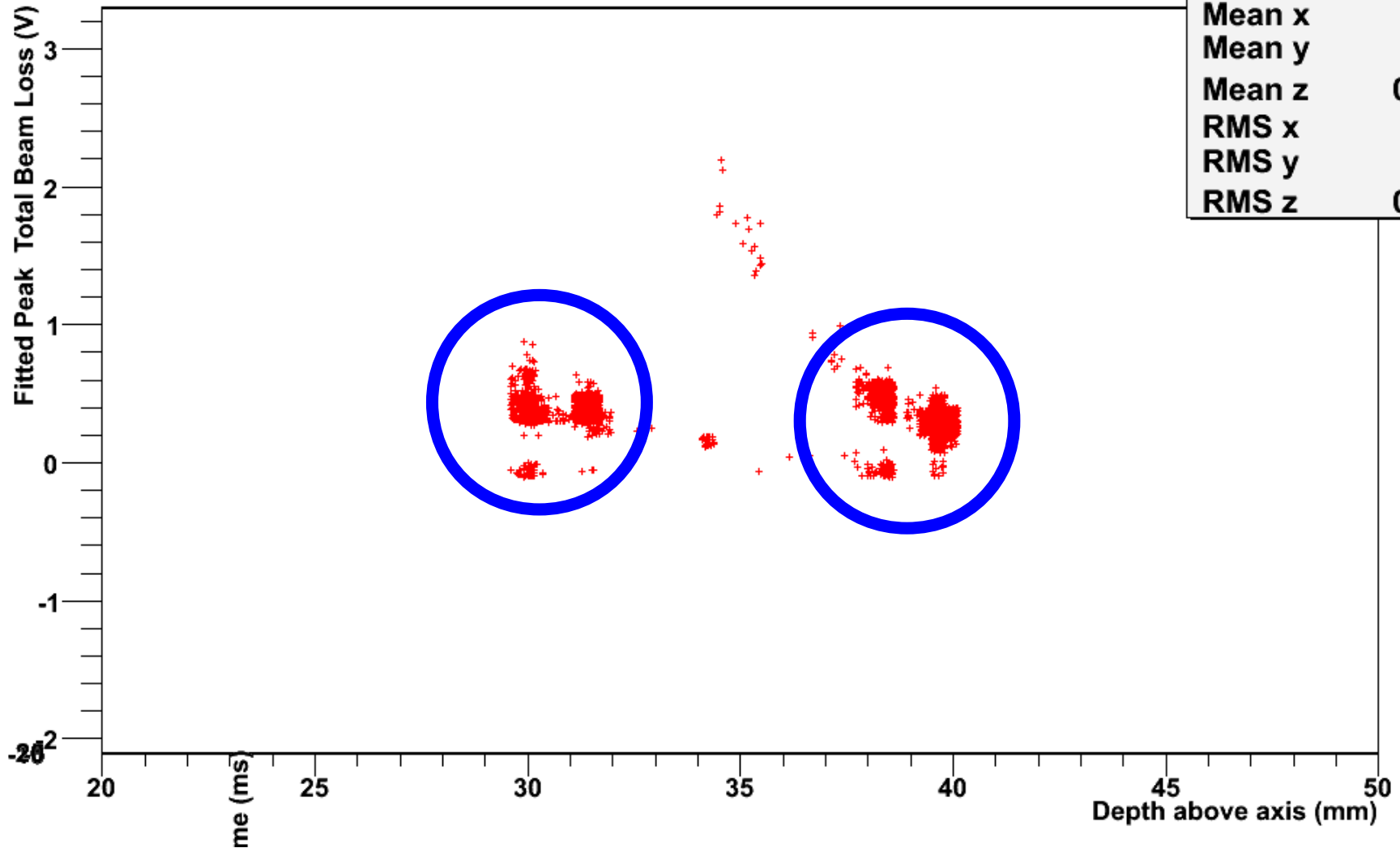
Reduced Data Set Plot



Target Depth View

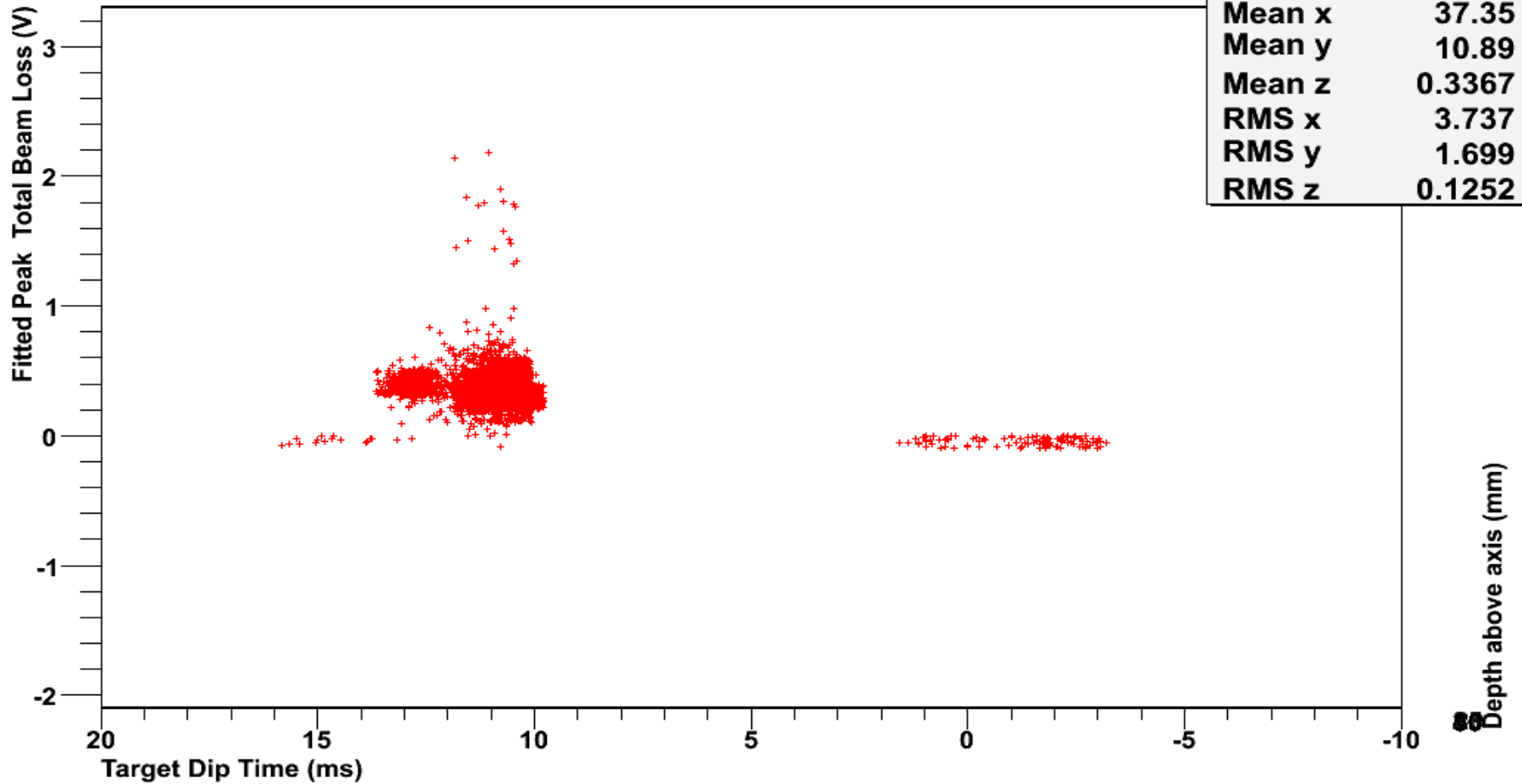
Total Beam Loss Vs Depth Vs Dip Time

| hTBLFitVsDepVsDipTime | |
|-----------------------|--------|
| Entries | 6732 |
| Mean x | 37.35 |
| Mean y | 10.89 |
| Mean z | 0.3367 |
| RMS x | 3.737 |
| RMS y | 1.699 |
| RMS z | 0.1252 |

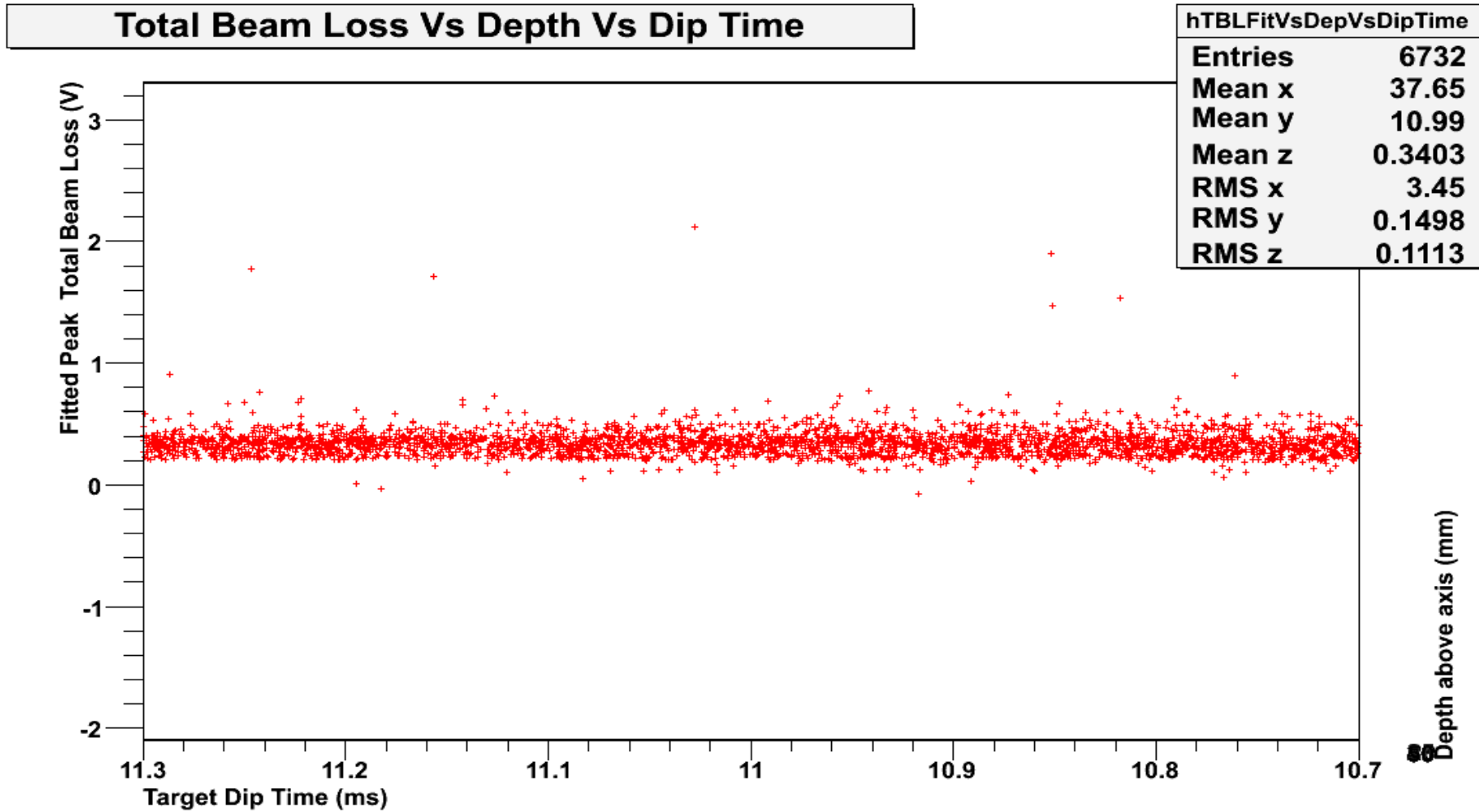


Target Dip Time View

Total Beam Loss Vs Depth Vs Dip Time



Target Dip Time View - Zoomed



Target Depth View - Cut on Dip Time

