Xenon doping analysis in pDUNE

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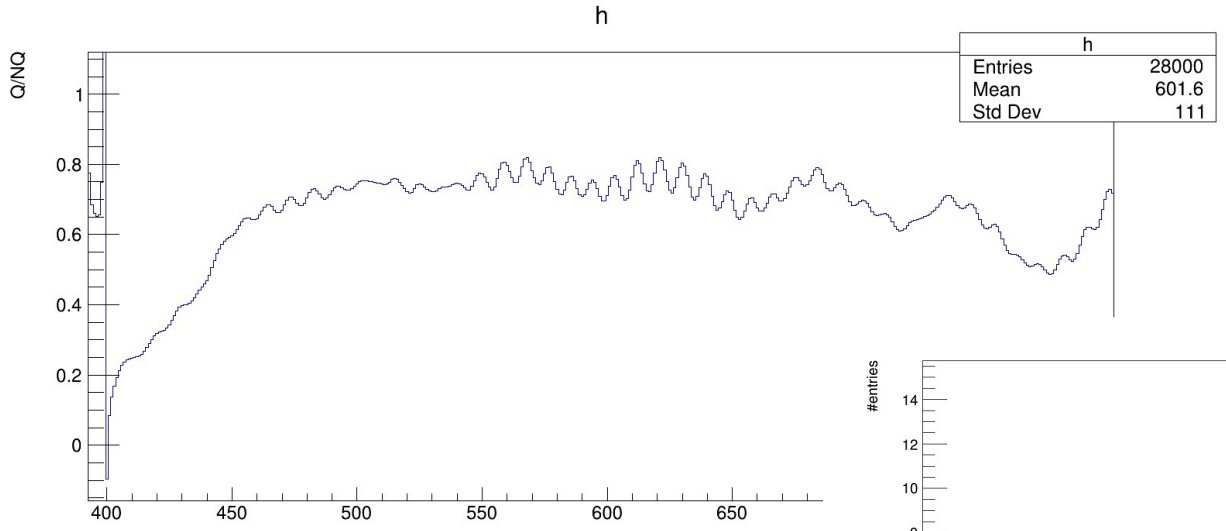
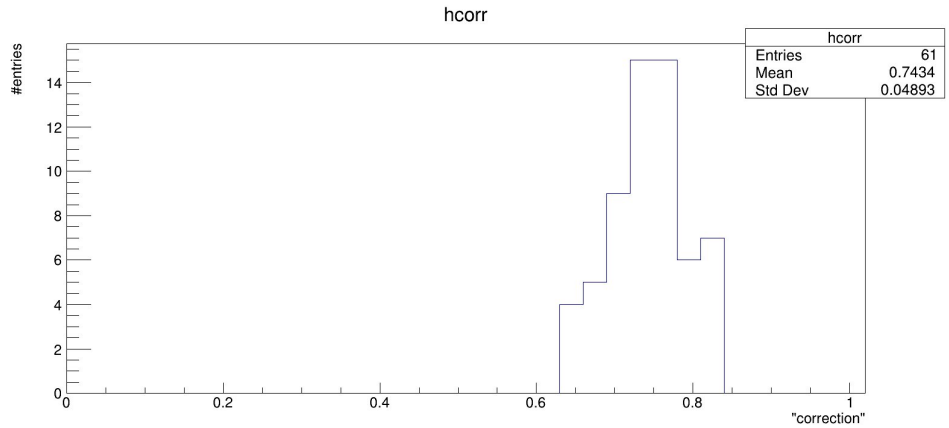
Intercalibration factor

- To find the intercalibation factor we consider doping 5 stable period
- The LAr light should be negligible after ~1 us
- The ratio between the Q and NQ deconvolved signal gives an intercalibration factor
- The ratio is computed run by run and the average is evaluated

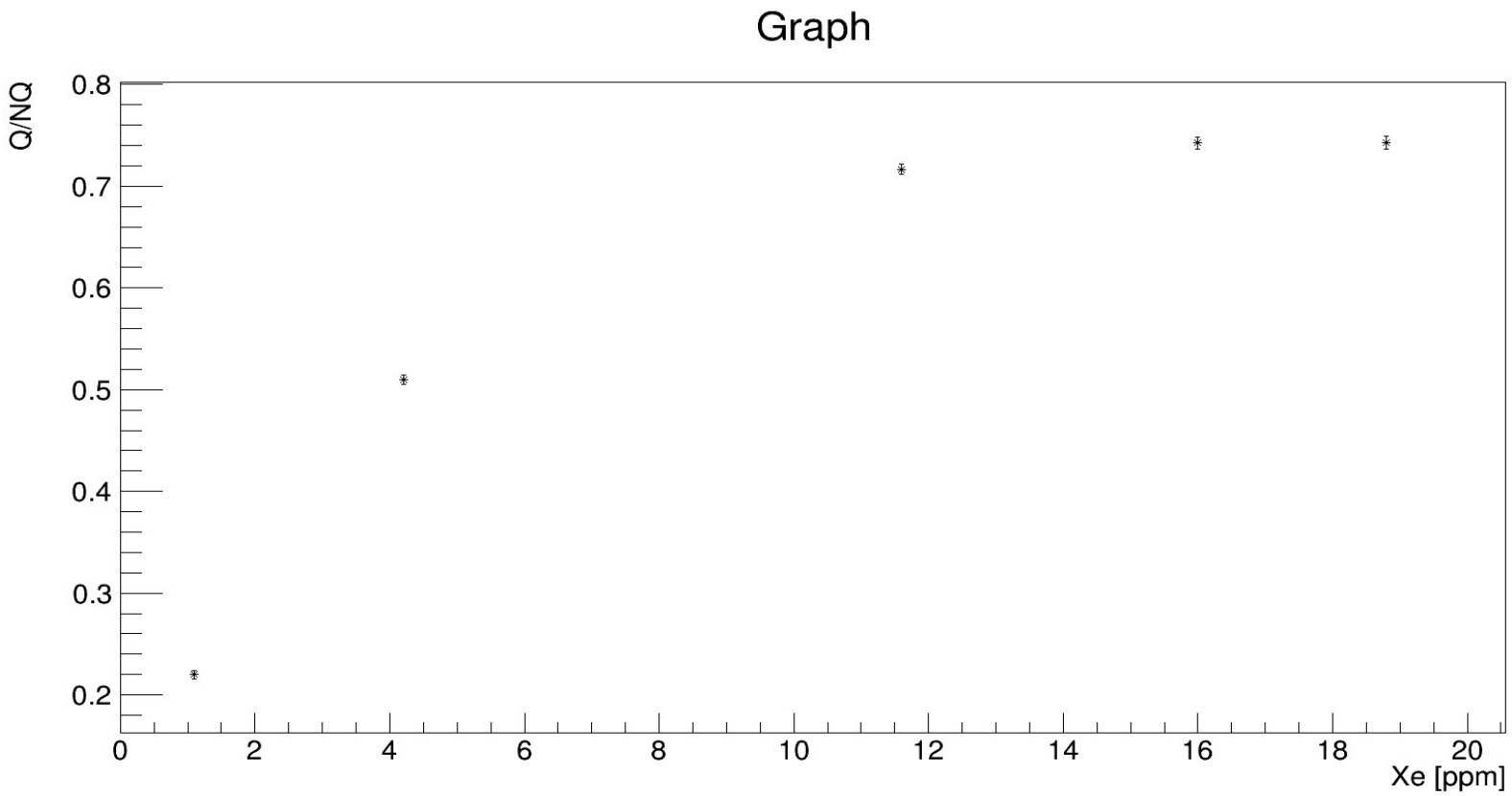


$$\epsilon = 0.74$$



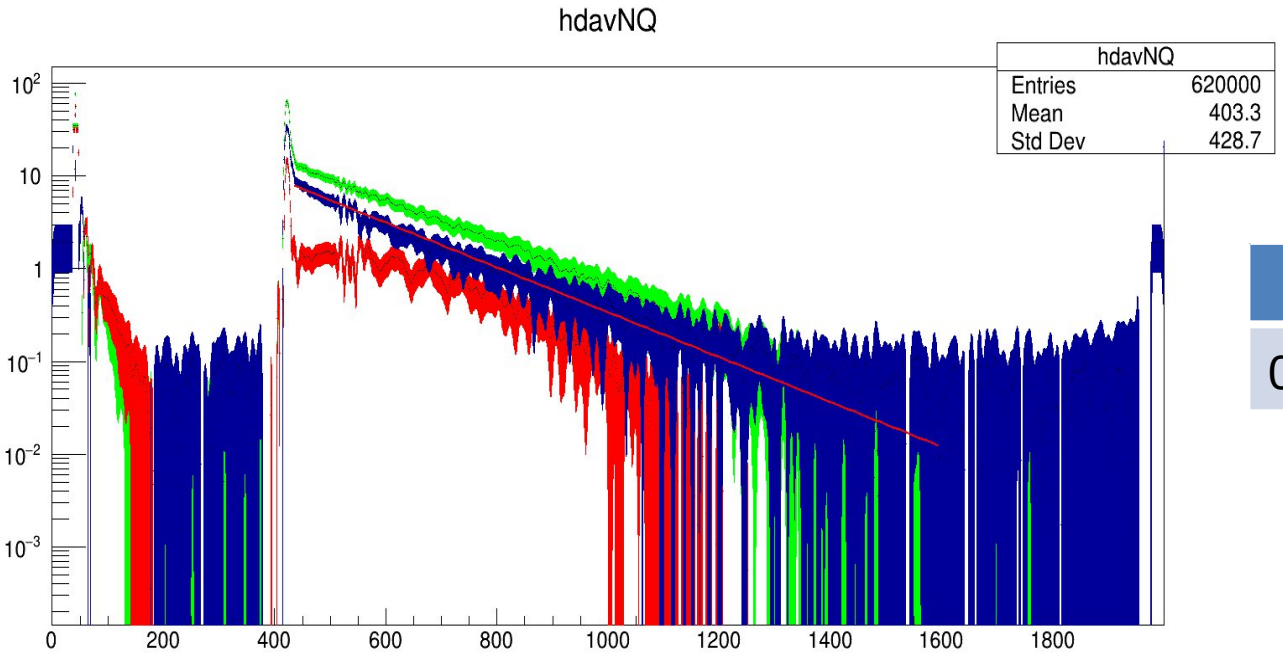
Intercalibration factor

- The intercalibration factor is extracted from doping 5 is used to subtract the Q(t) signal from NQ(t) signal



Doping 1

- The intercalibration factor is extracted from doping 5 is used to subtract the Q(t) signal from NQ(t) signal

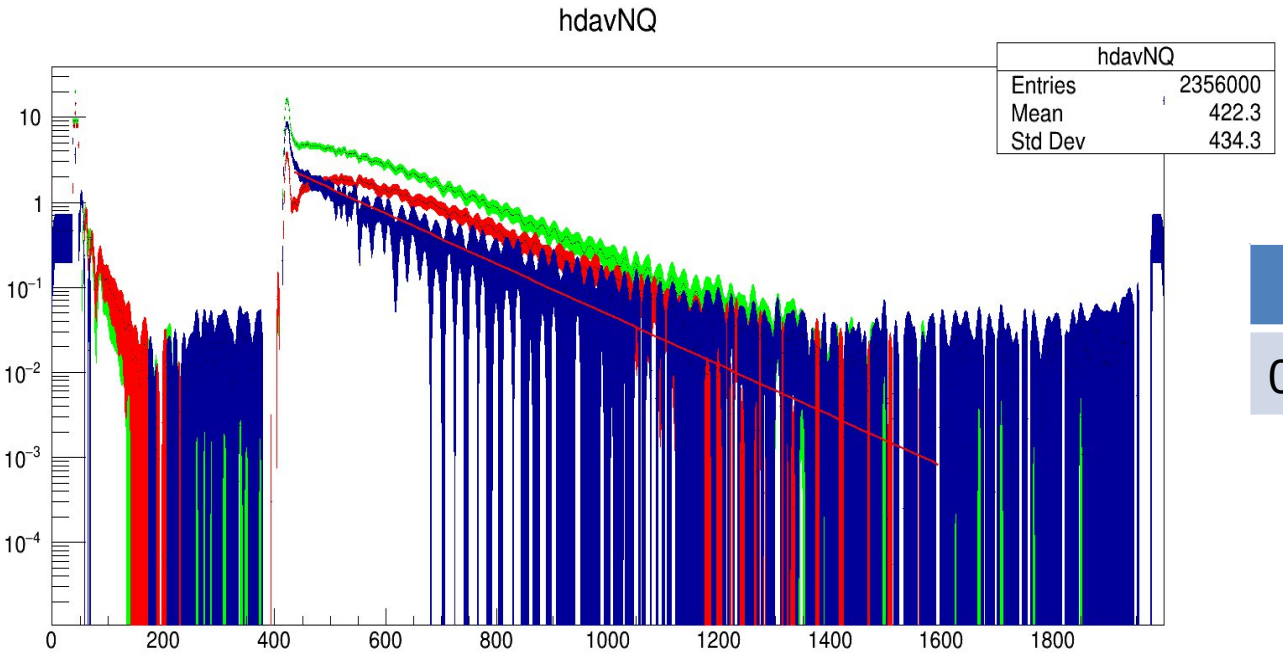


NQ/Q	τ
0.219(4)	1196 ns

- NQ
- Q
- $(NQ \times \epsilon - Q)$

Doping 2

- The intercalibration factor is extracted from doping 5 is used to subtract the Q(t) signal from NQ(t) signal

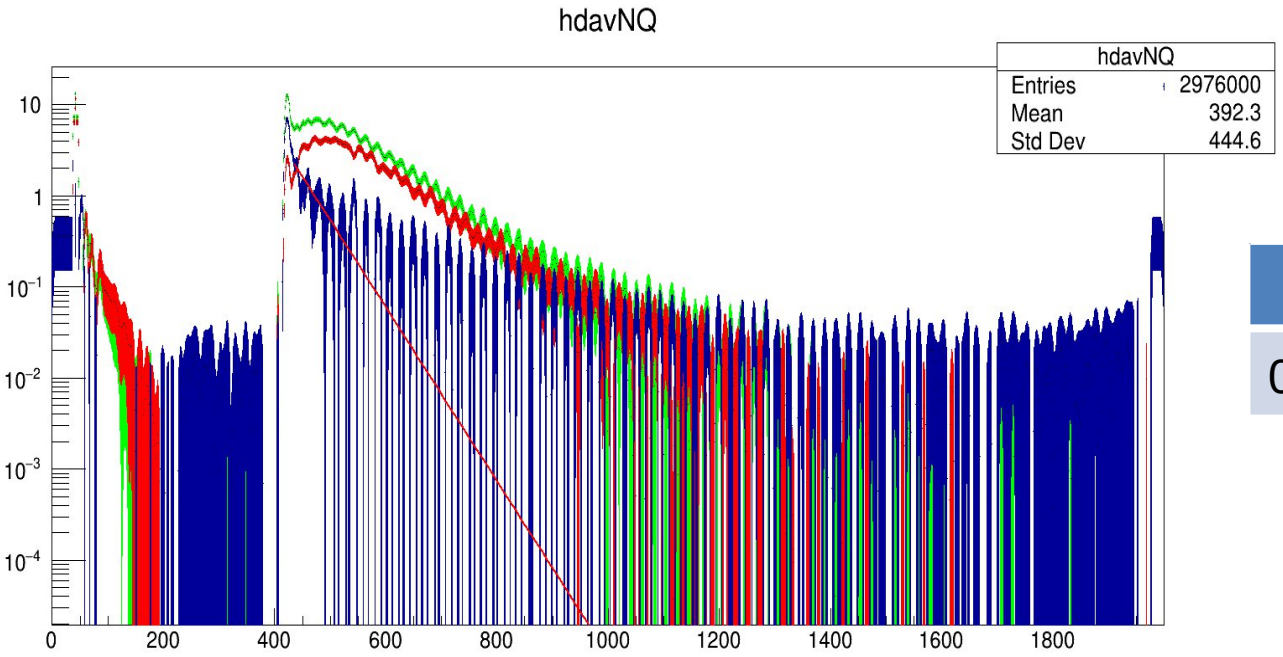


NQ/Q	τ
0.510(5)	974 ns

- NQ
- Q
- $(NQ \times \epsilon - Q)$

Doping 3

- The intercalibration factor is extracted from doping 5 is used to subtract the Q(t) signal from NQ(t) signal

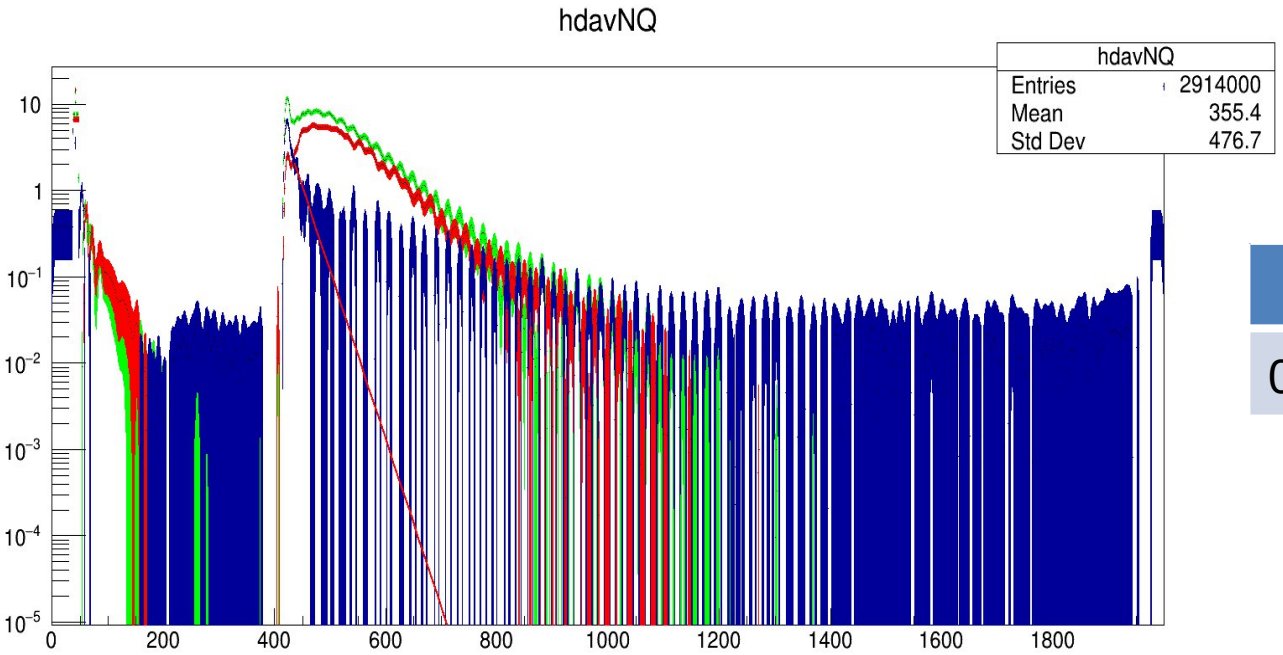


NQ/Q	τ
0.717(5)	303 ns

- NQ
- Q
- $(NQ \times \epsilon - Q)$

Doping 4

- The intercalibration factor is extracted from doping 5 is used to subtract the Q(t) signal from NQ(t) signal

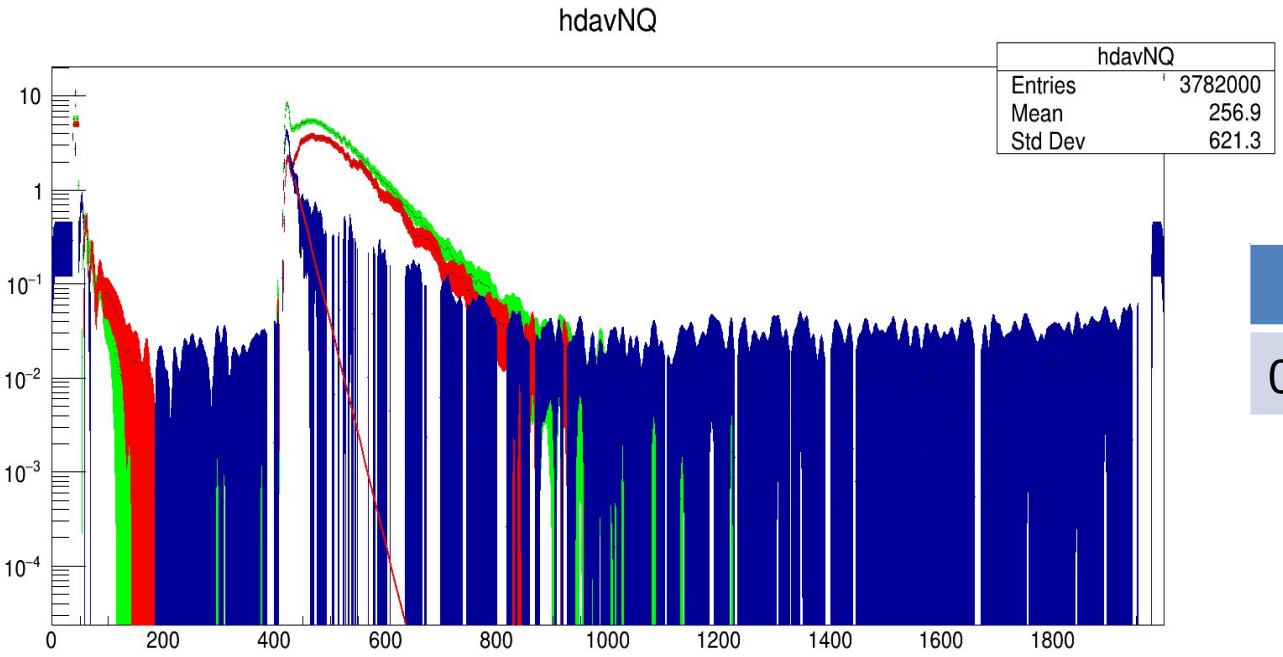


NQ/Q	τ
0.743(6)	149 ns

- NQ
- Q
- $(NQ \times \epsilon - Q)$

Doping 5

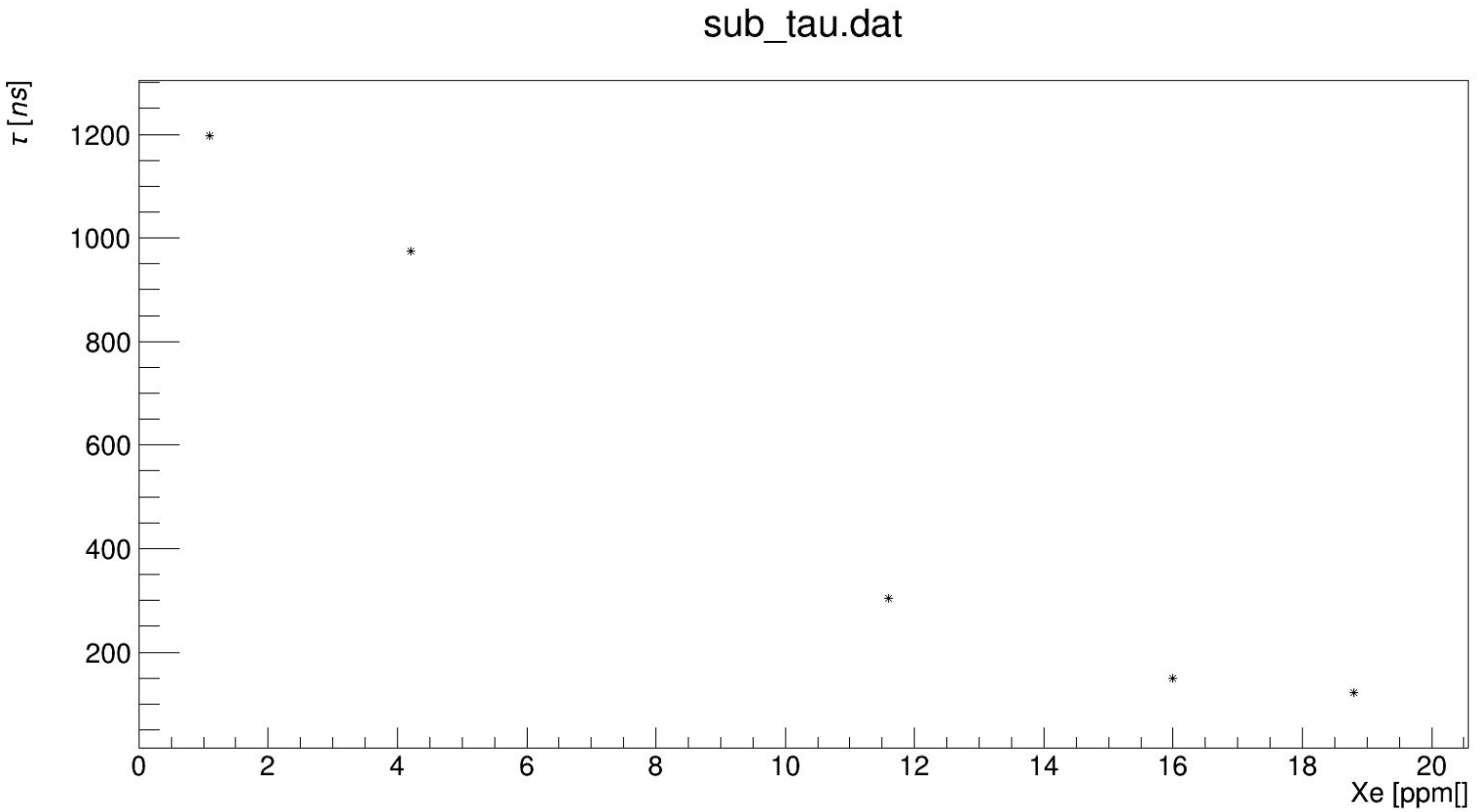
- The intercalibration factor is extracted from doping 5 is used to subtract the Q(t) signal from NQ(t) signal



NQ/Q	τ
0.743(6)	122 ns

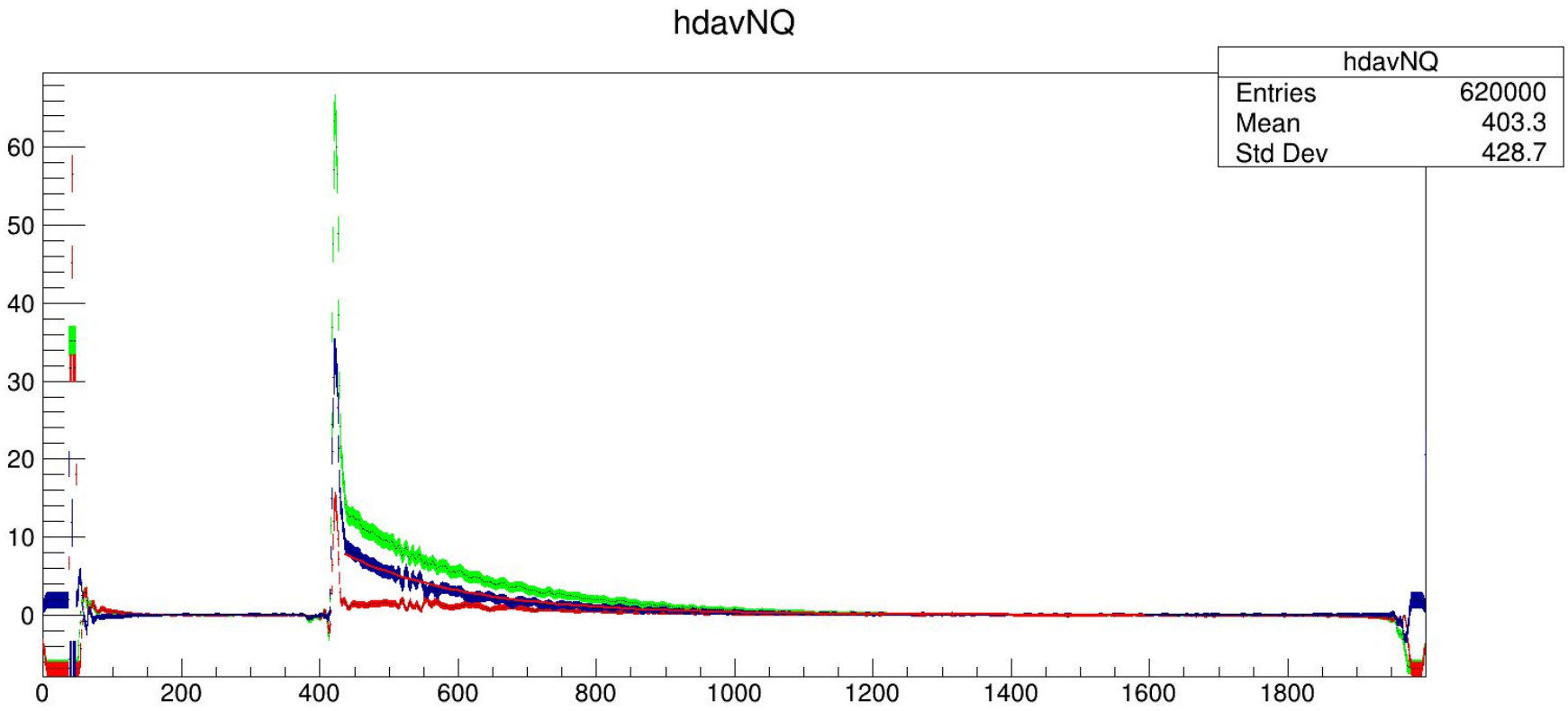
- NQ
- Q
- $(NQ \times \epsilon - Q)$

Time constant - subtracted signal

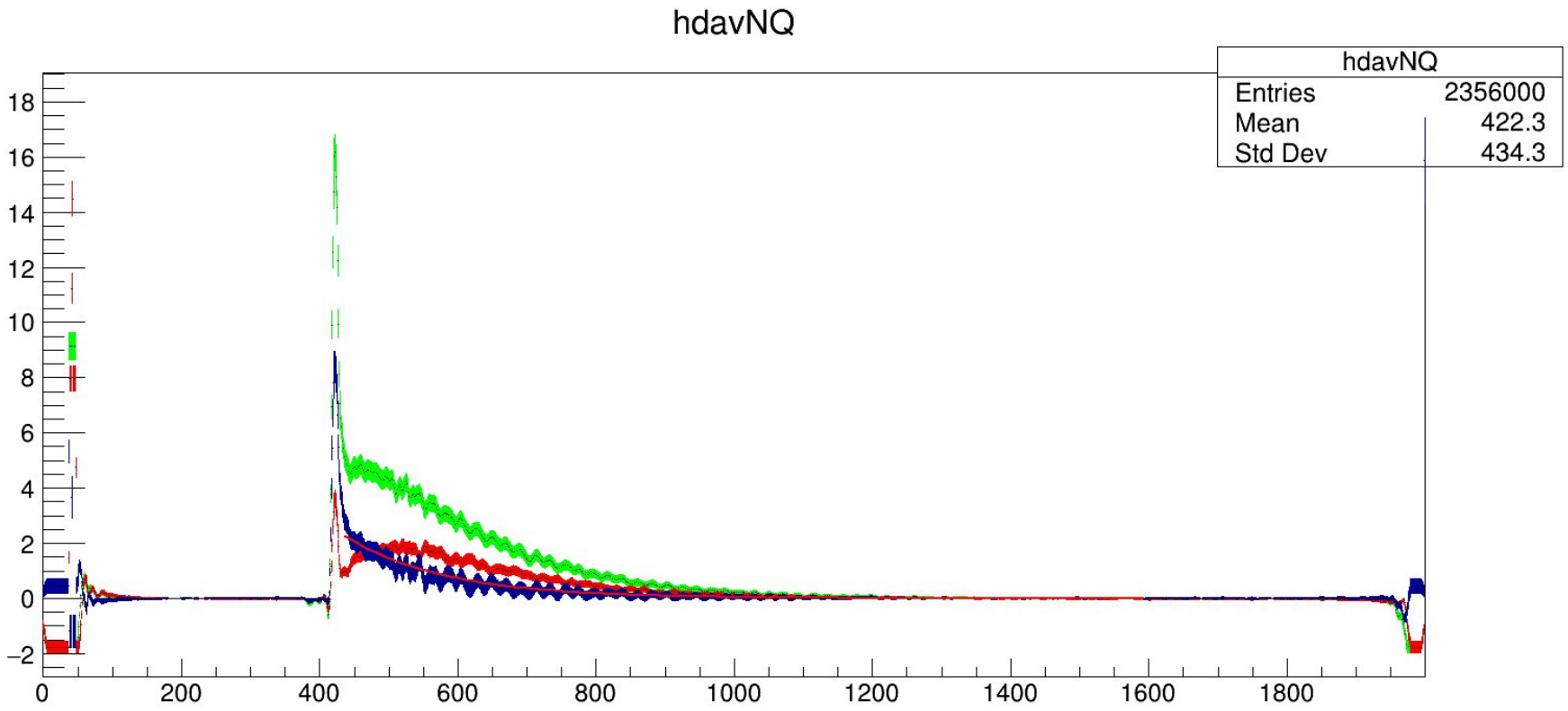


BACKUP

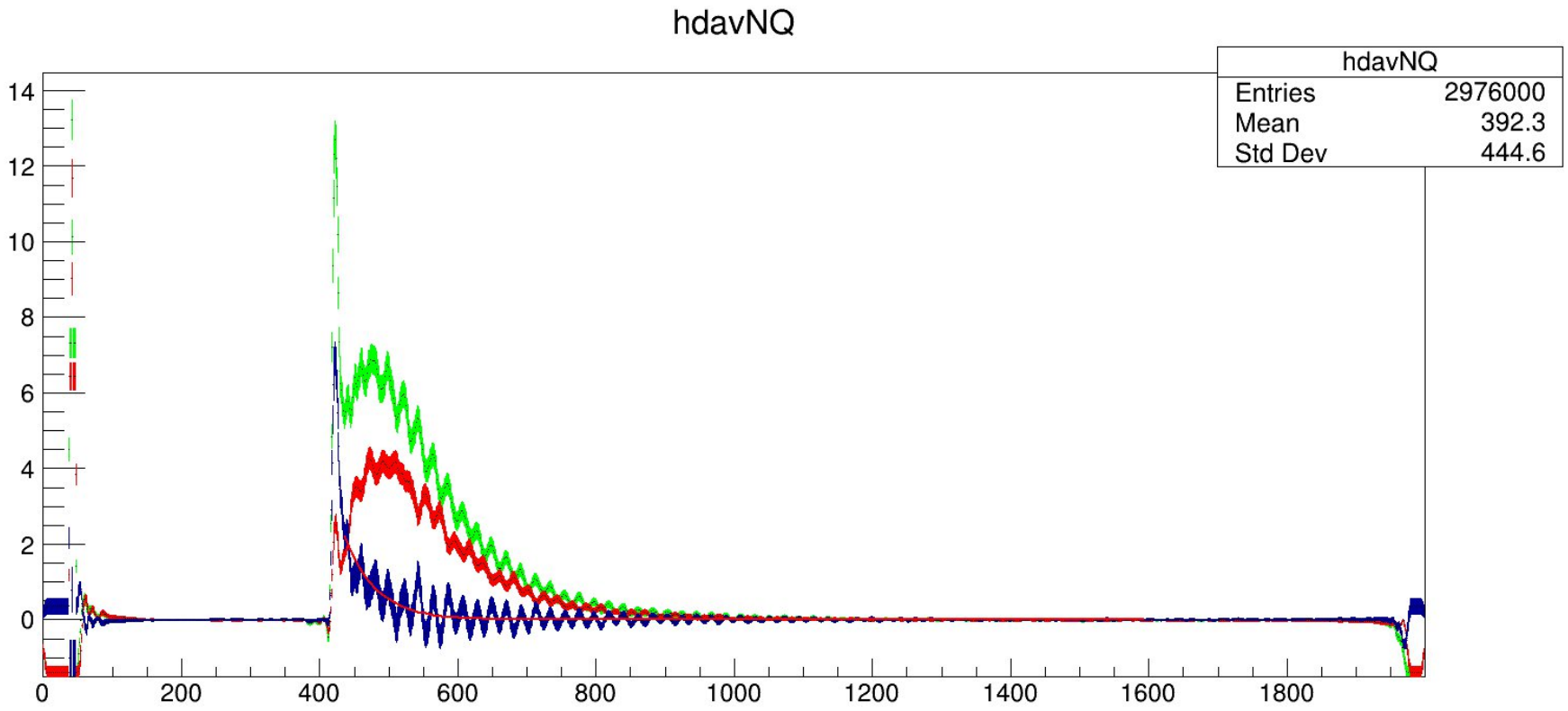
Doping 1


hdavNQ
hdavNQ
Entries 620000
Mean 403.3
Std Dev 428.7
60
50
40
30
20
10
0
0
200
400
600
800
1000
1200
1400
1600
1800

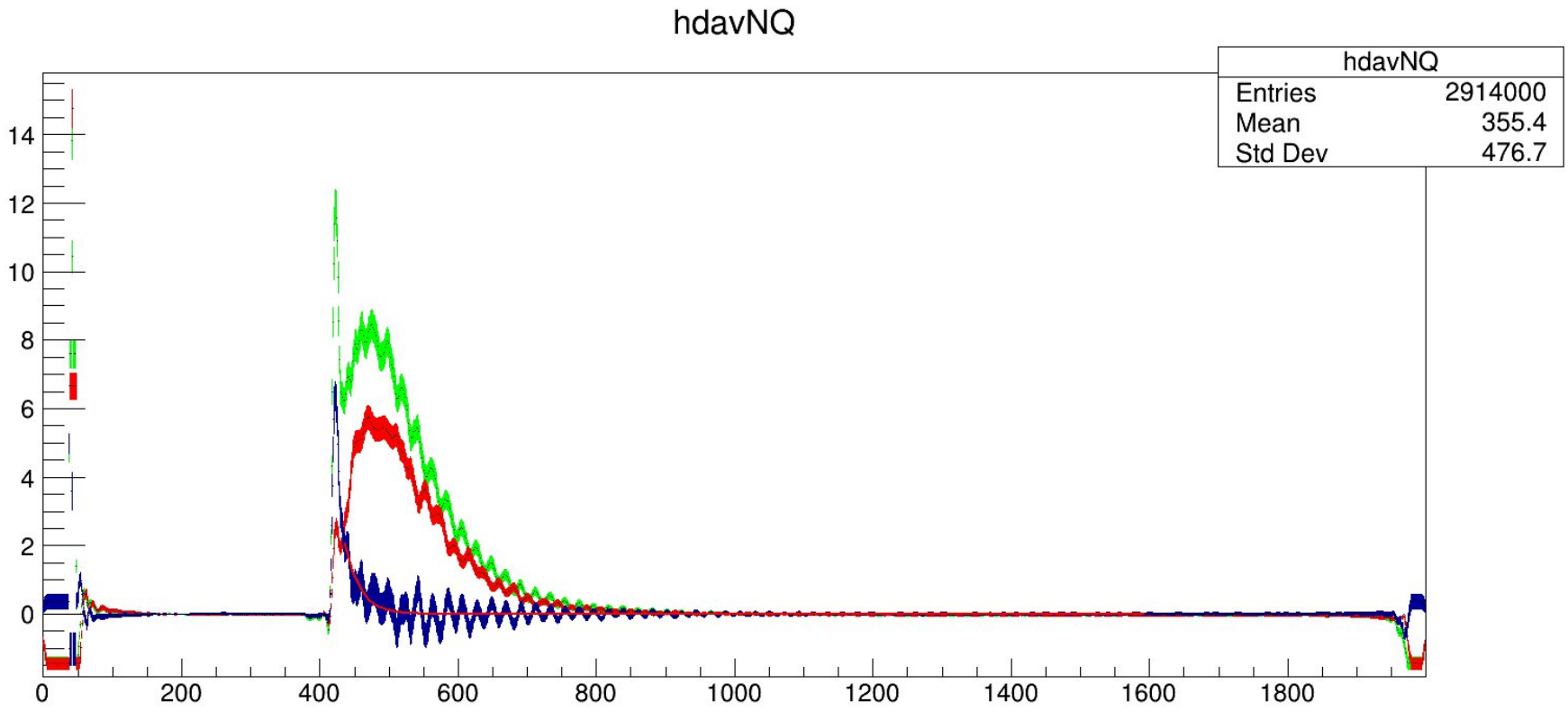
Doping 2


hdavNQ
hdavNQ
Entries 2356000
Mean 422.3
Std Dev 434.3
18
16
14
12
10
8
6
4
2
0
−2
0
200
400
600
800
1000
1200
1400
1600
1800

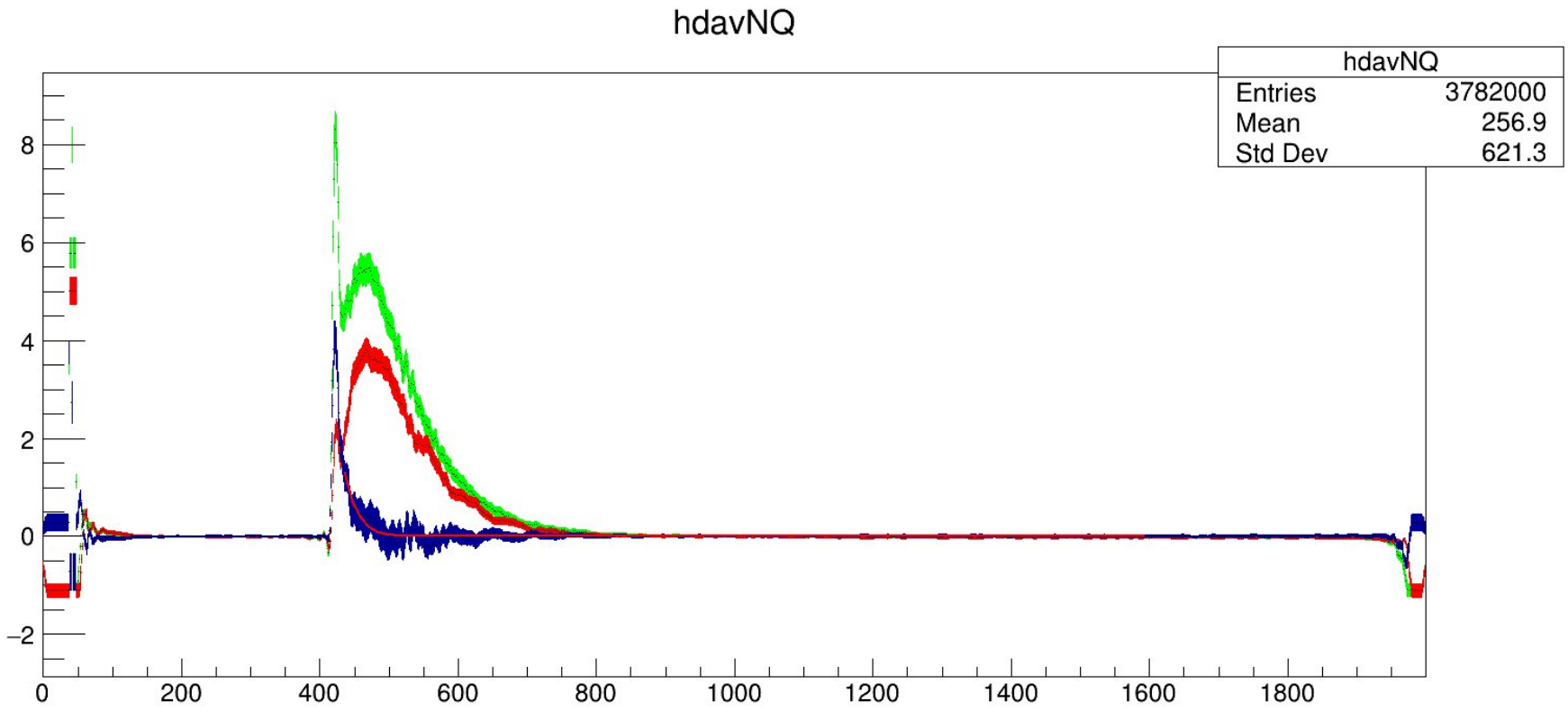
Doping 3


hdavNQ
hdavNQ
Entries 2976000
Mean 392.3
Std Dev 444.6
14
12
10
8
6
4
2
0
0
200
400
600
800
1000
1200
1400
1600
1800

Doping 4


hdavNQ
hdavNQ
Entries 2914000
Mean 355.4
Std Dev 476.7
14
12
10
8
6
4
2
0
0
200
400
600
800
1000
1200
1400
1600
1800

Doping 5


hdavNQ
hdavNQ
Entries 3782000
Mean 256.9
Std Dev 621.3
8
6
4
2
0
−2
0
200
400
600
800
1000
1200
1400
1600
1800