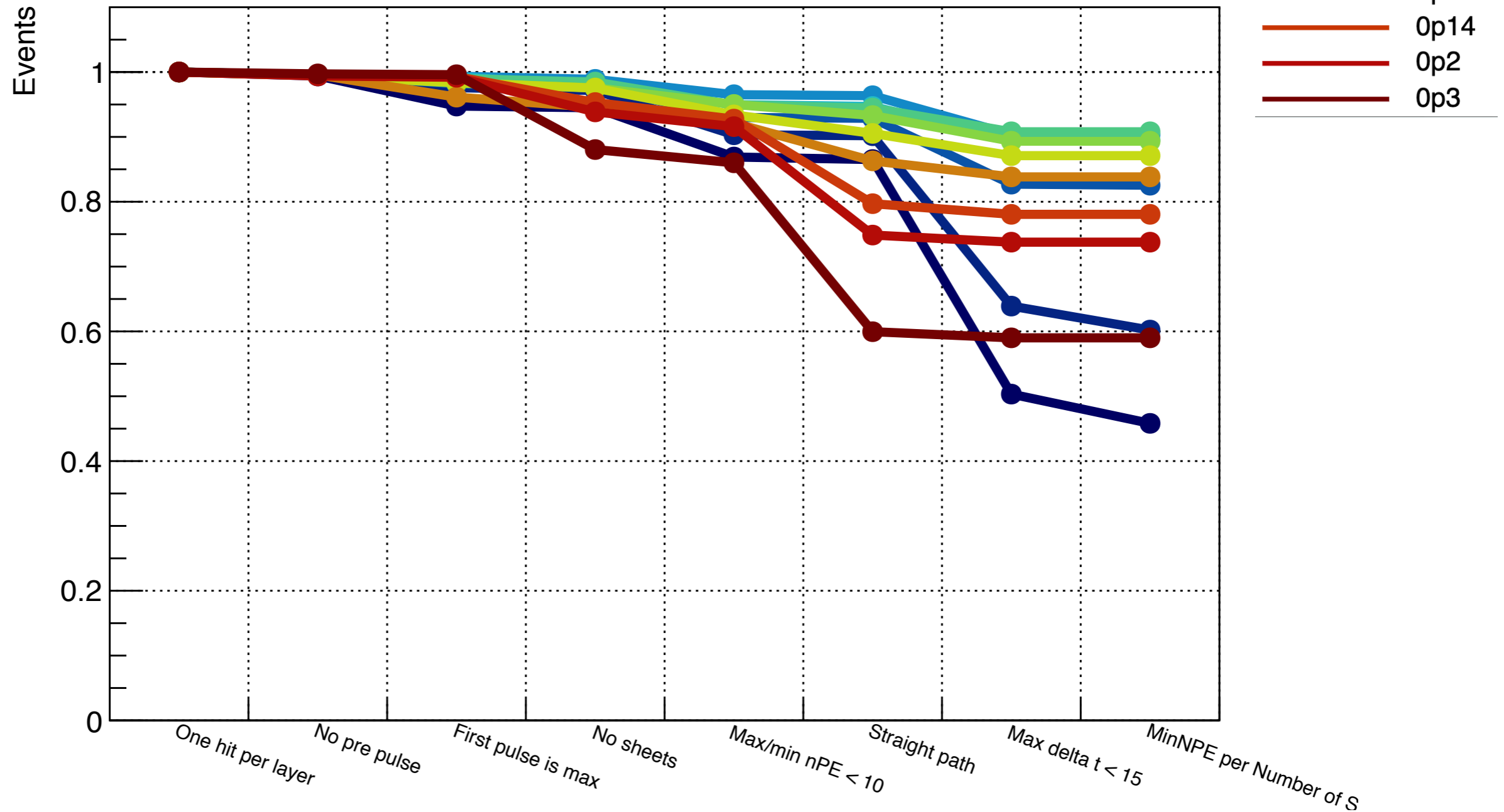


Unblinding checks

Matthew Citron

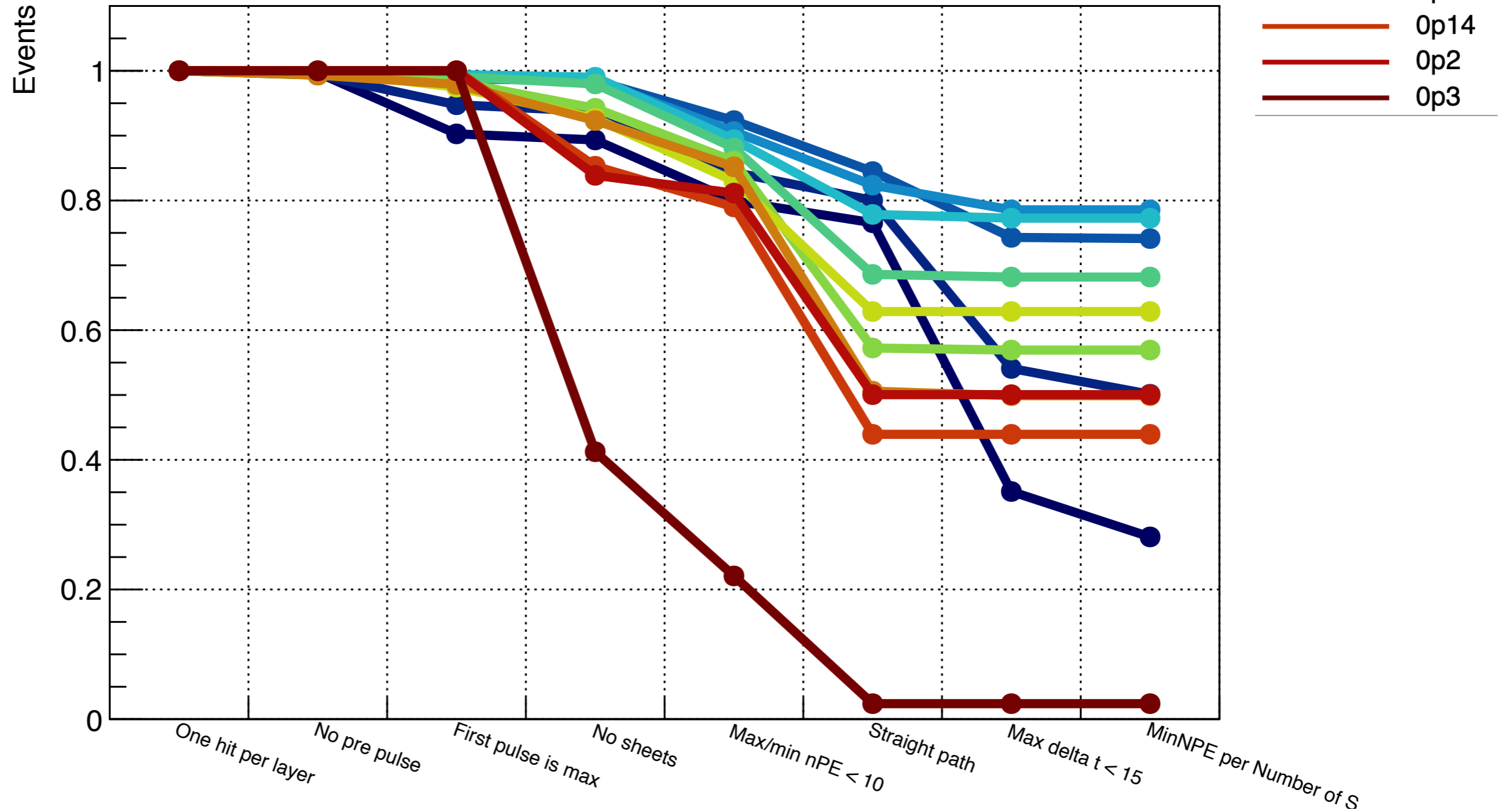
Signal efficiencies (m = 3 GeV)

Cut efficiencies for mass m3p0



Signal efficiencies (m = 0.1 GeV)




Cut efficiencies for mass m0p1



Reminder: steps for unblinding

- Check ABCD ratios/predictions consistent between beam on/off periods
- Invert panel veto and unblind in this region
 - Beam off period shows good closure in this region with $\sim 1/3$ stats of panel veto region (except for 2 slab region)
- Invert muon veto on slabs and unblind here
 - Very low stats in beam off period
- Unblind 10% of data to check for significant deviations

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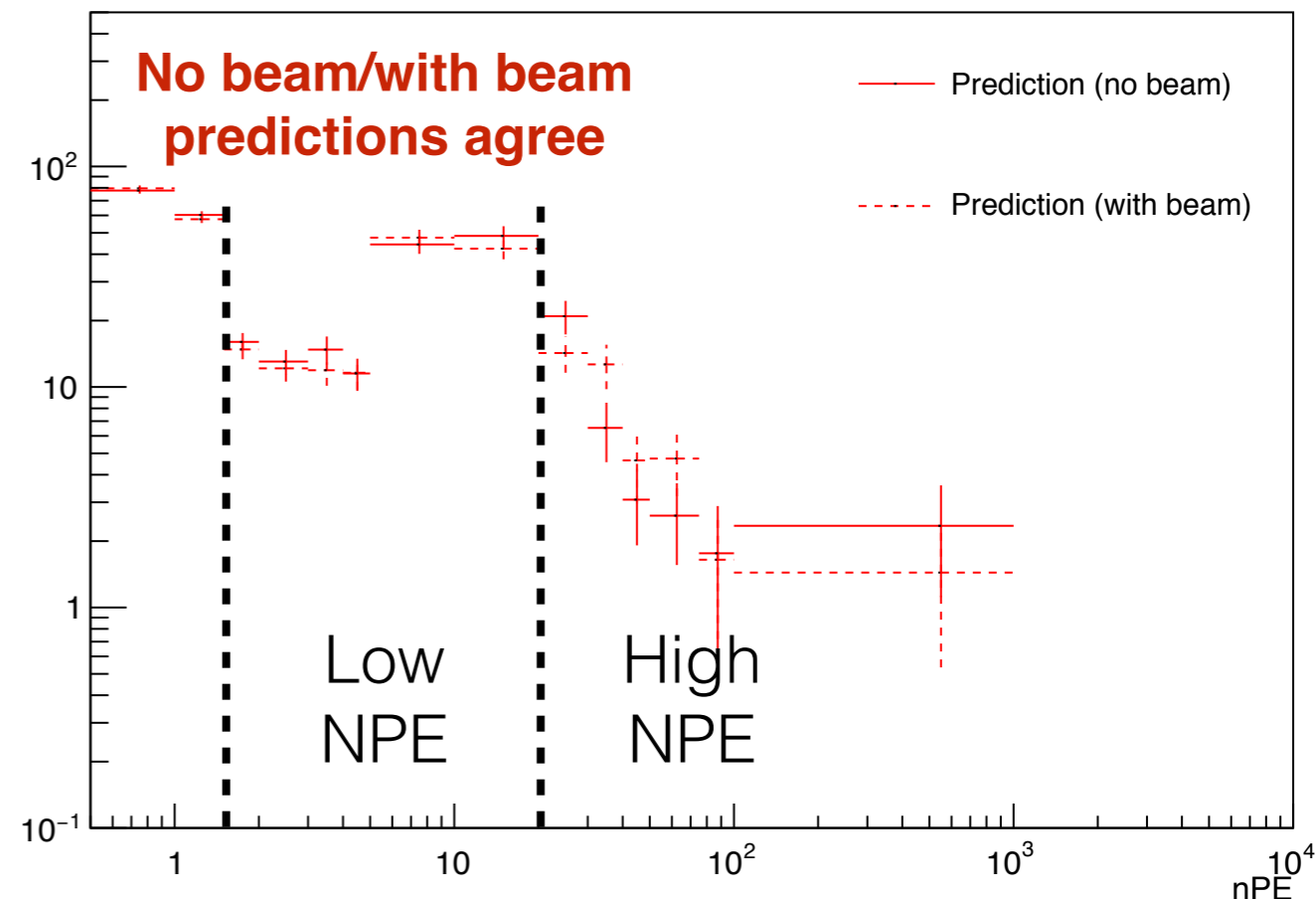
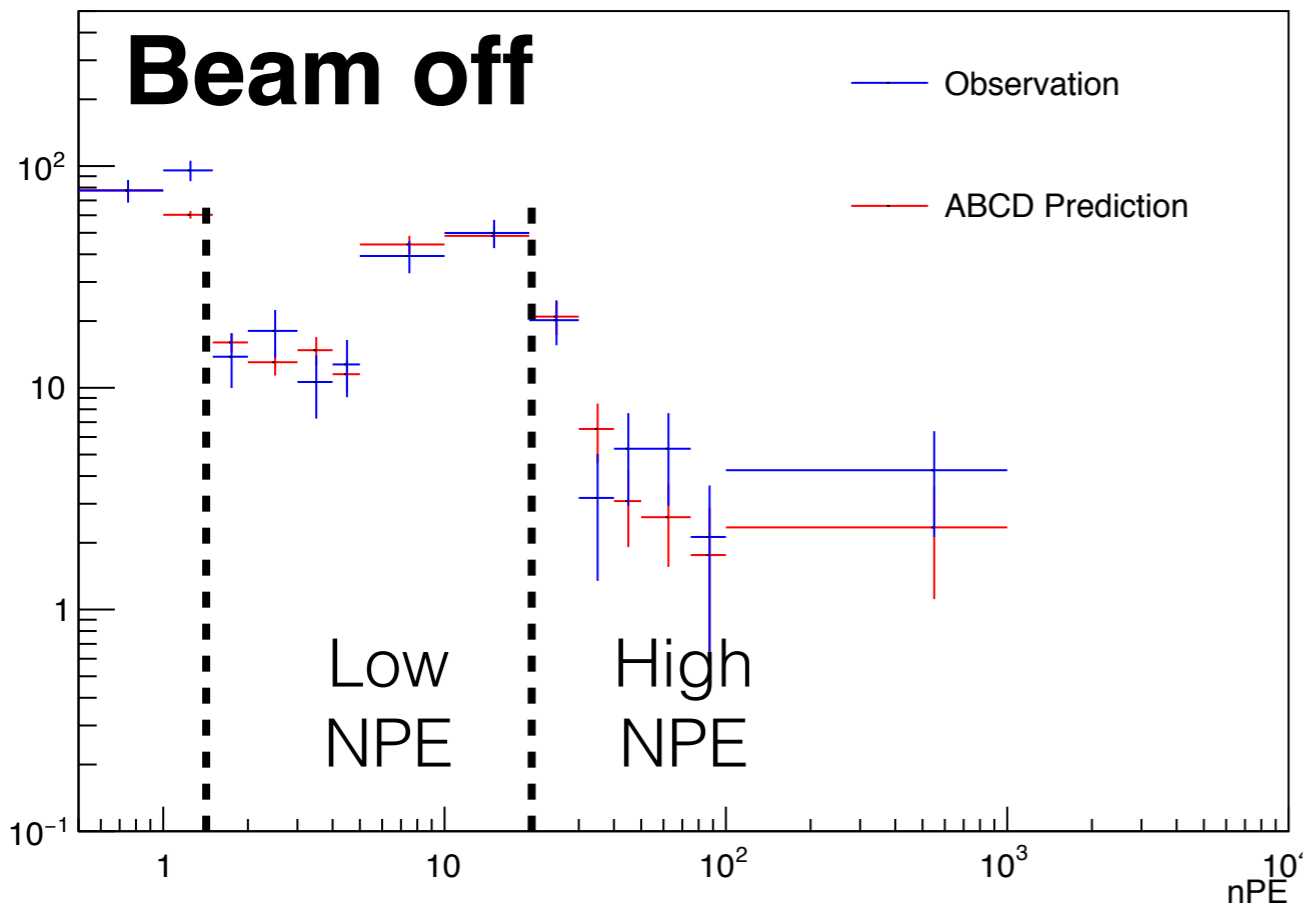
Introduction

- Have begun unblinding procedure (results positive so far!)
- Found bug: was cutting on NPE rather than NPE corr for final selection only
- Updated to NPE corr but causes shift in NPE distribution (especially at low end):
 - Mean NPE (no slab) 2.0, Mean NPE corr (no slab) 2.3 → shift lower bound from 1.5 to 2 to avoid SPE region where ABCD breaks down

Signal region predictions

No slab hit regions (before fix) **Charges 0.005 - 0.01**

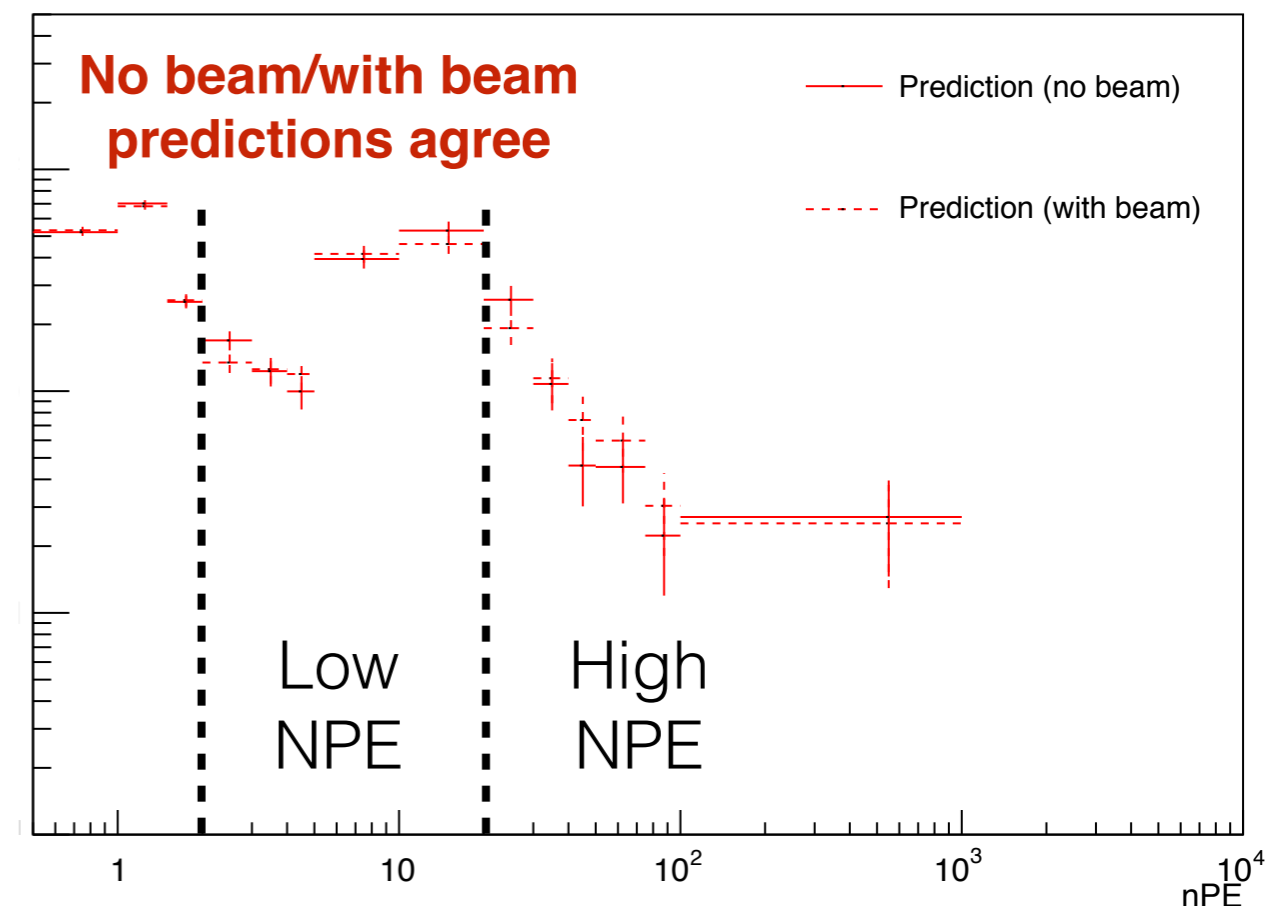
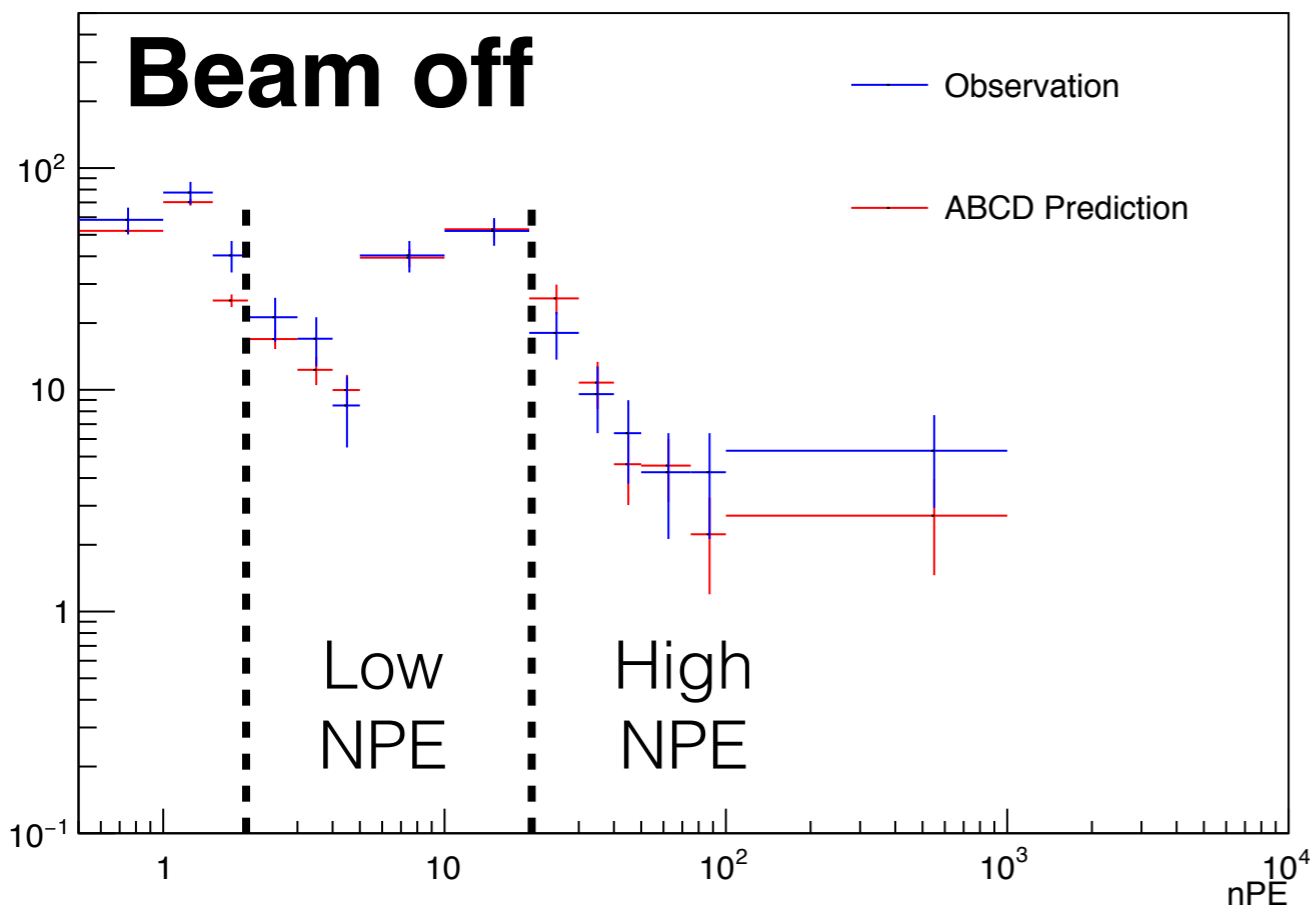
- Selections: min NPE 1.5 \rightarrow 20, $>$ 20
- Validation (beam off): pred 145 ± 6 **obs** 144, 36 ± 5 **obs** 40
- Predictions (beam on): 141 ± 6 , 39 ± 5



No slab hit regions

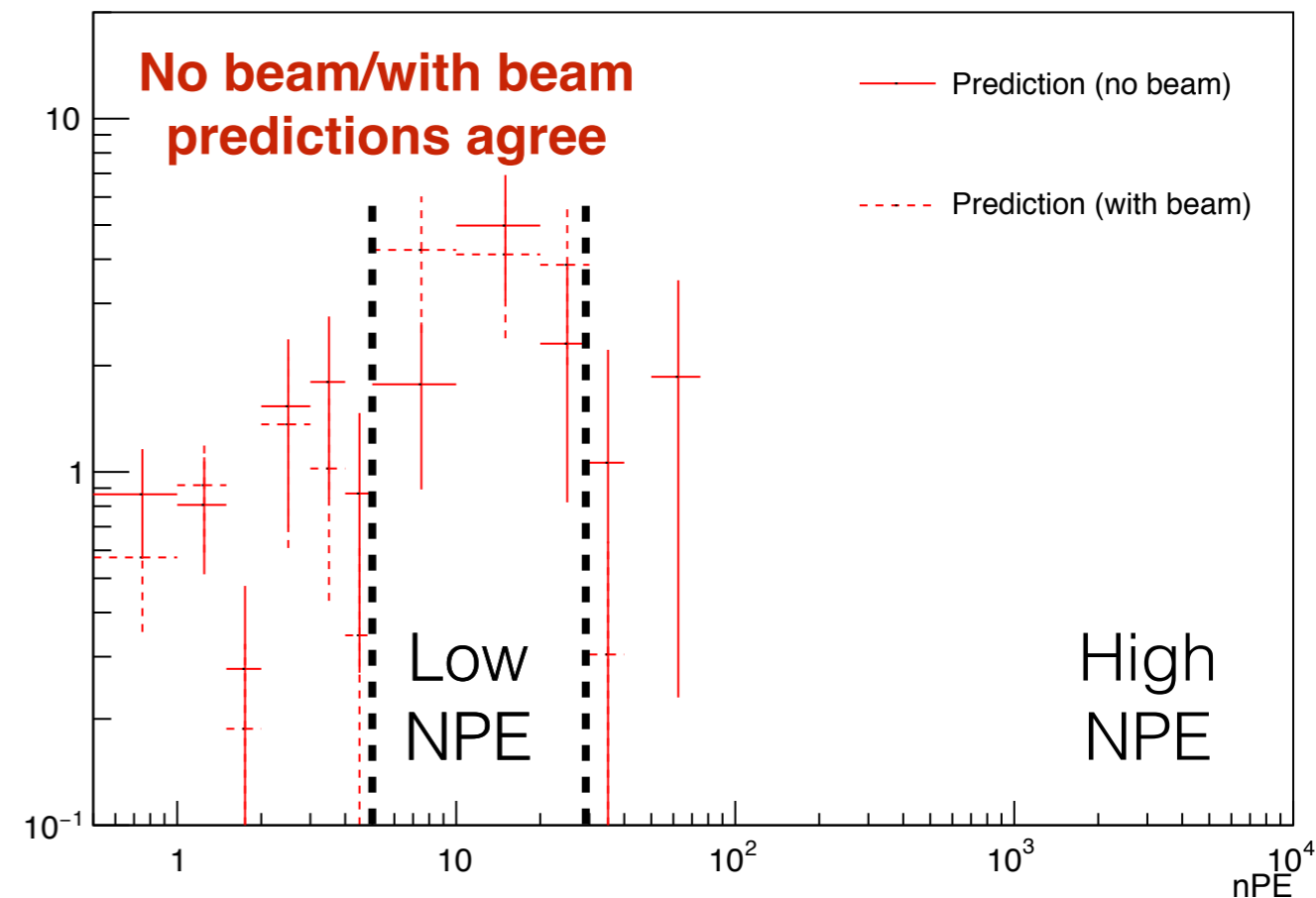
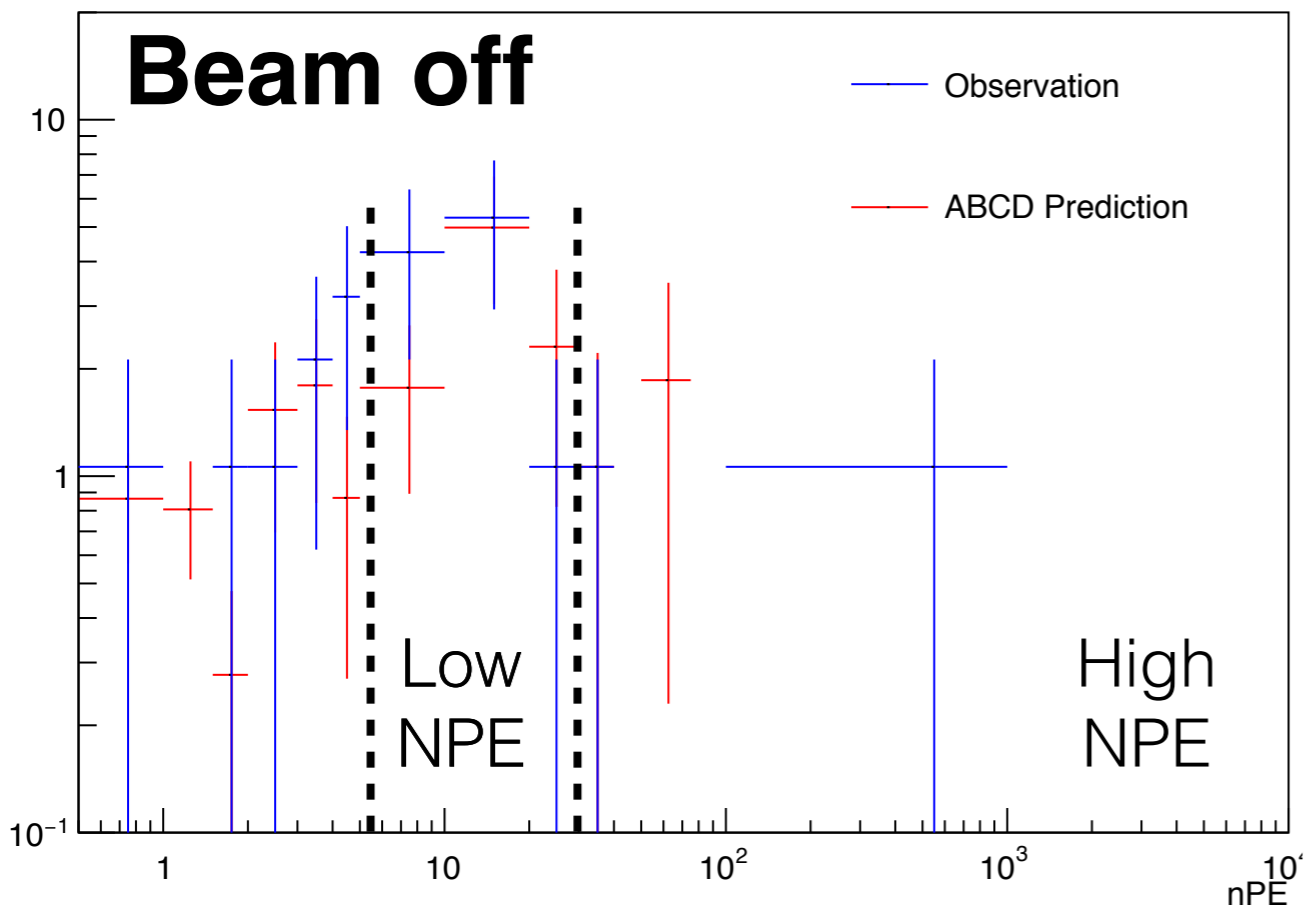
Charges 0.005 - 0.01

- Selections: min NPE 2 \rightarrow 20, $>$ 20
- Validation (beam off): pred 128.8 ± 6 **obs** 139, 50 ± 5 **obs** 48
- Predictions (beam on): 124 ± 6 , 49 ± 5



One slab hit regions (before fix) **Charges 0.01 - 0.03**

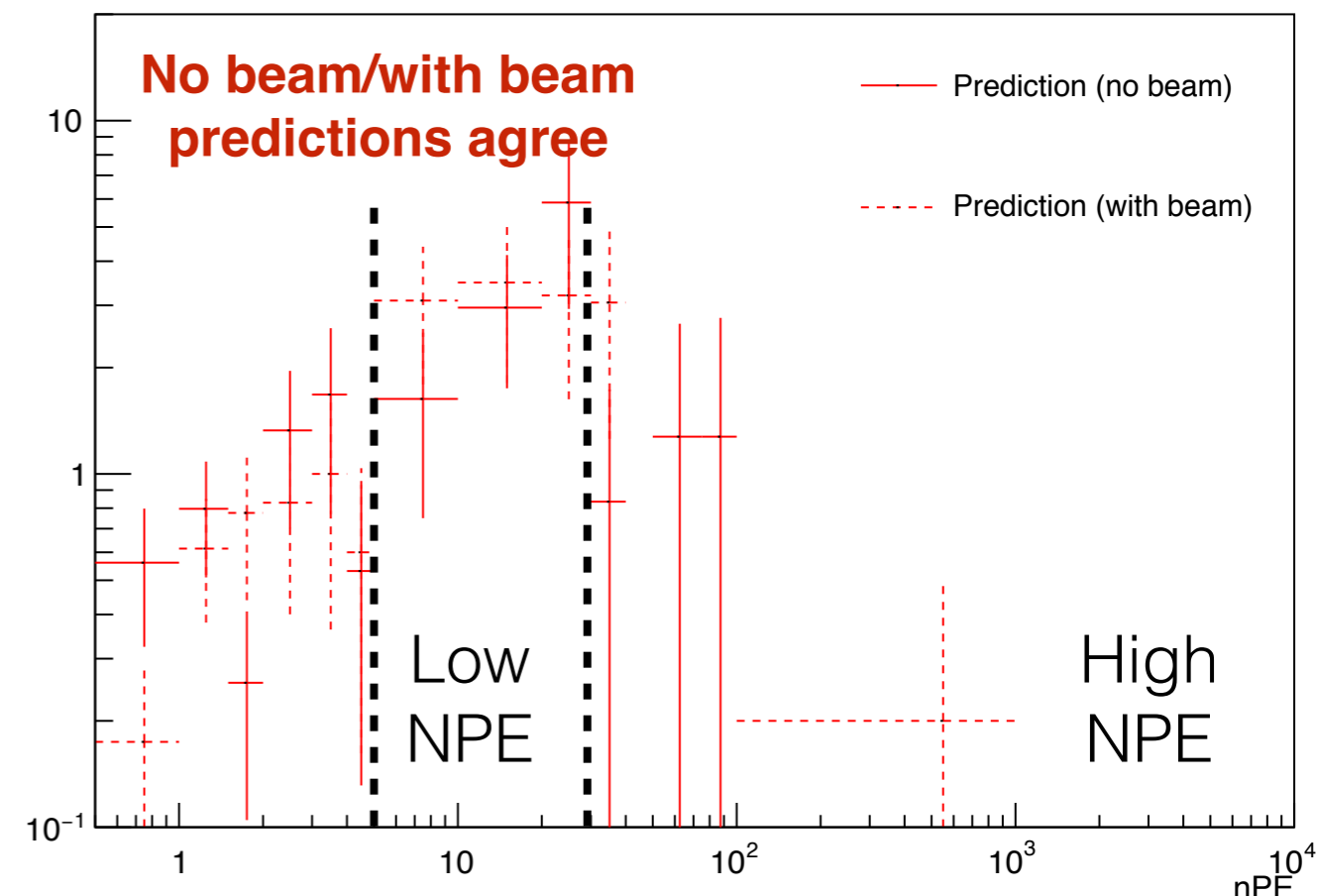
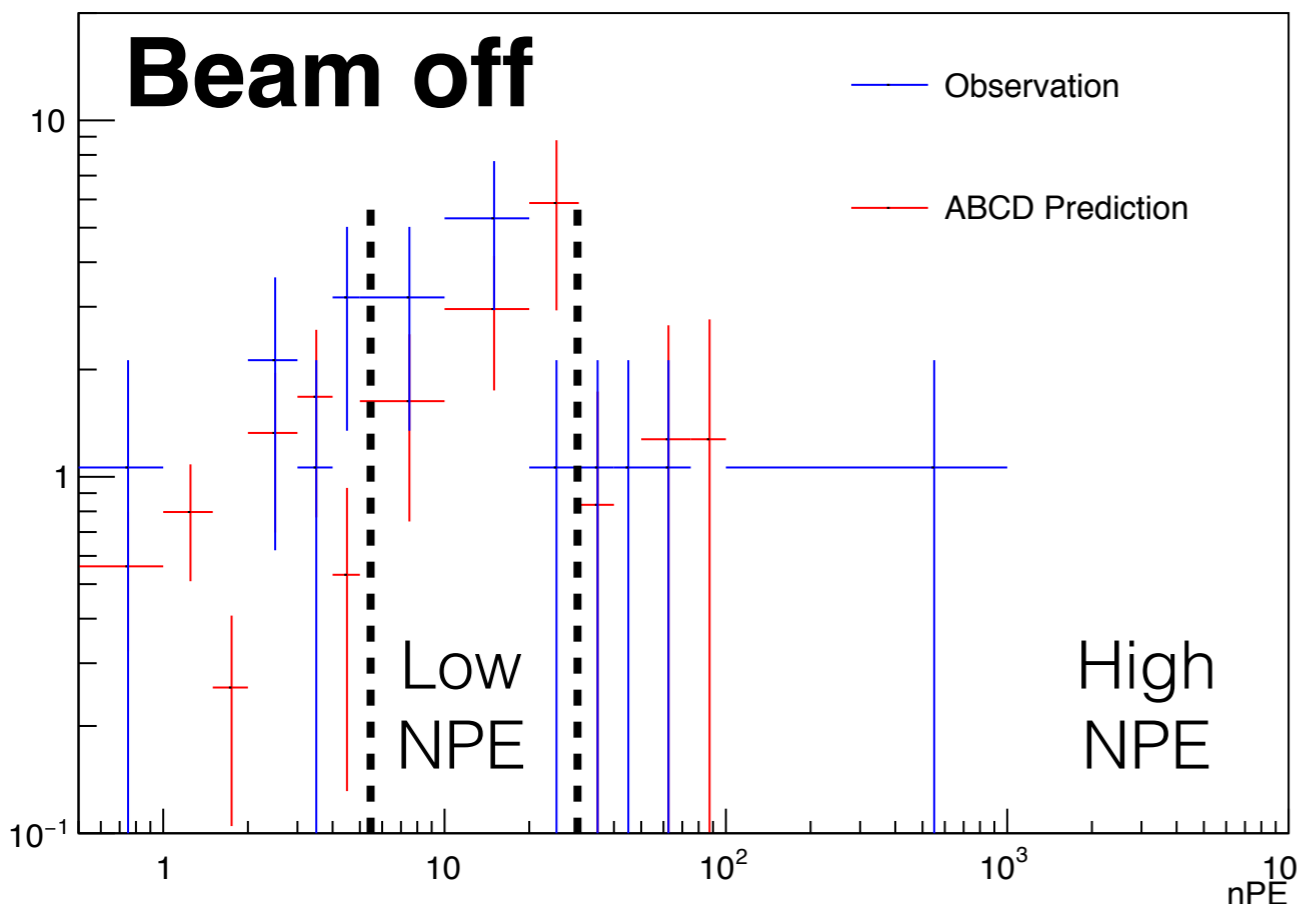
- Selections: min NPE 5 \rightarrow 30, $>$ 30
- Validation (beam off): pred 8.4 ± 6 **obs** 11, 2.7 ± 1.8 **obs** 2
- Predictions (beam on): 13 ± 3 , 0.4 ± 0.4



One slab hit regions

Charges 0.01 - 0.03

- Selections: min NPE 5 \rightarrow 30, $>$ 30
- Validation (beam off): pred 8.4 ± 2 **obs** 10, 2.8 ± 1.8 **obs** 4
- Predictions (beam on): 10.7 ± 2.7 , 2.4 ± 1.1



Two slab hit regions

Slab NPE < 250

- Selections: min NPE inclusive
- Validation (beam off): pred 0.9 ± 0.9 **obs** 1
- Predictions (beam on): 0 ± 0.6

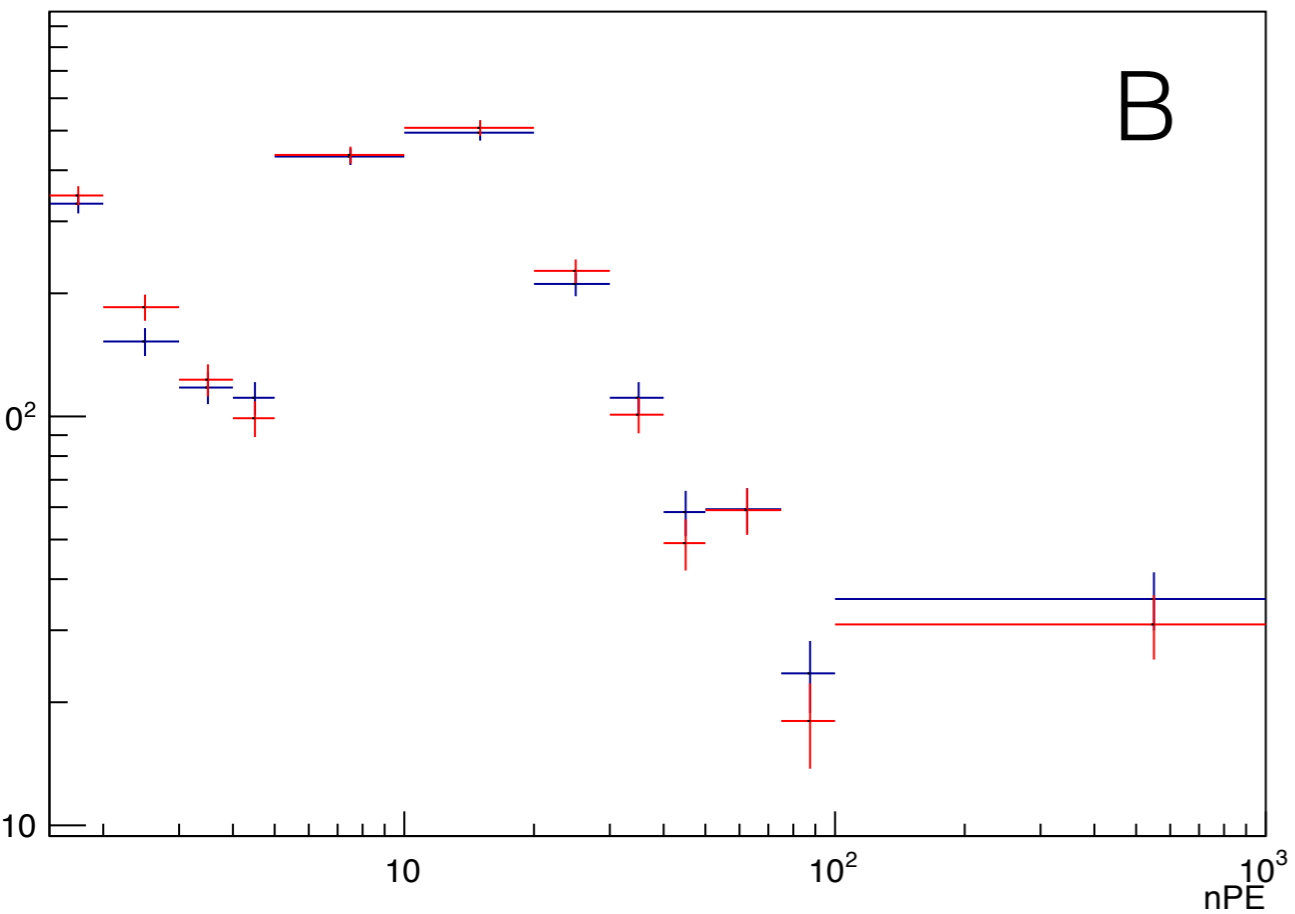
Charges 0.03 - 0.2

Insufficient stats for NPE distribution

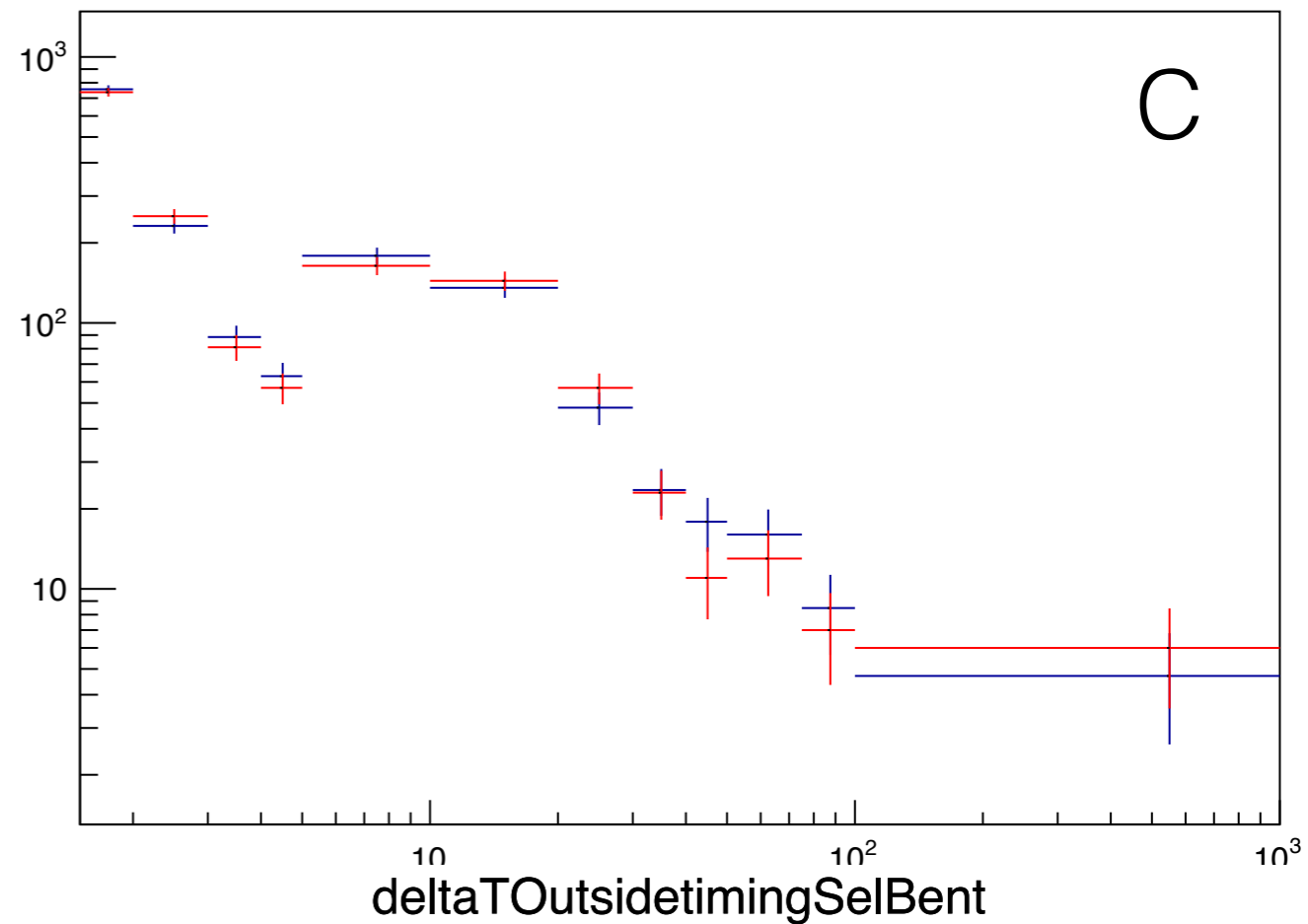
Unblinding checks - BCD regions

LogY

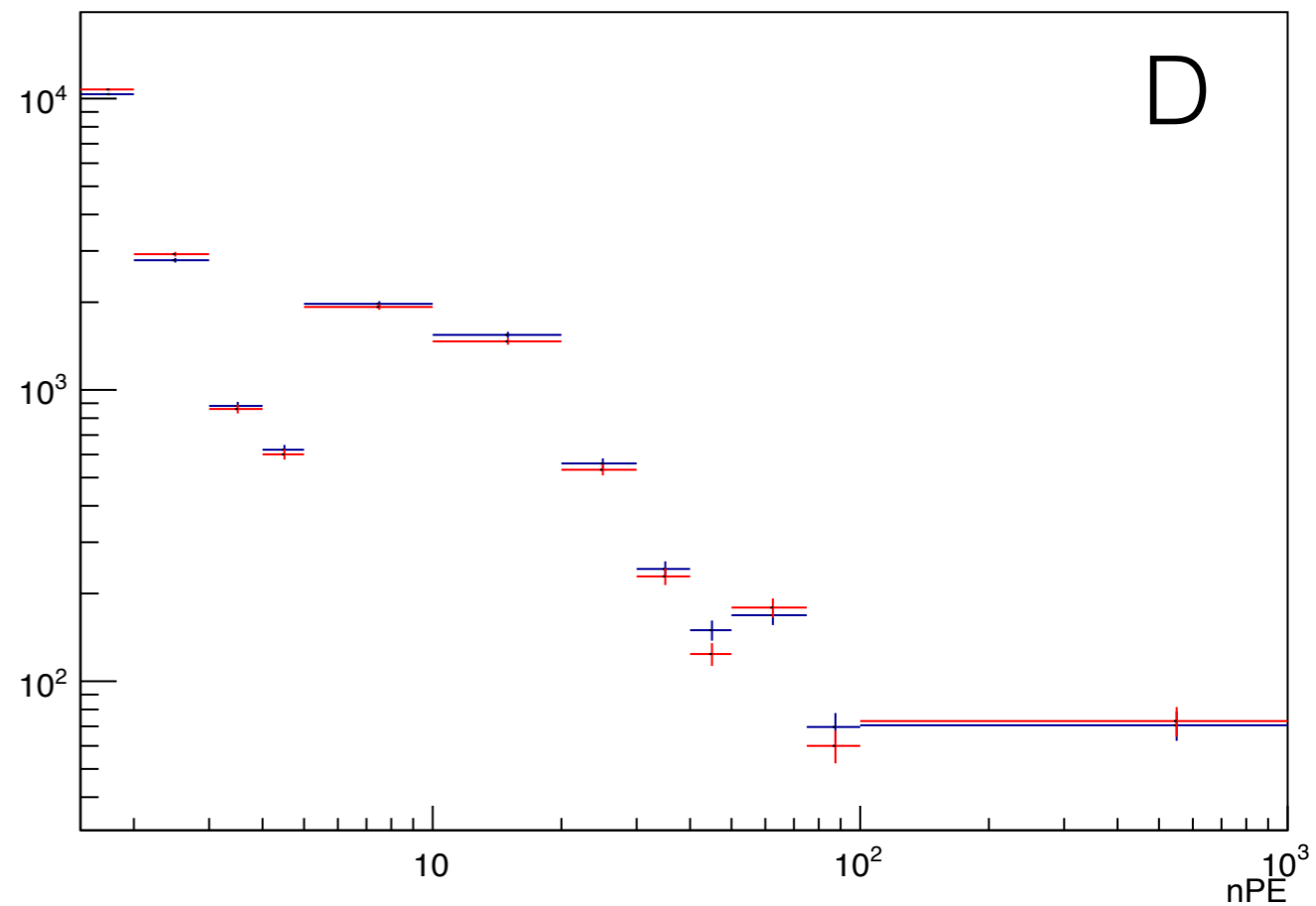
deltaTWithintimingSelBent



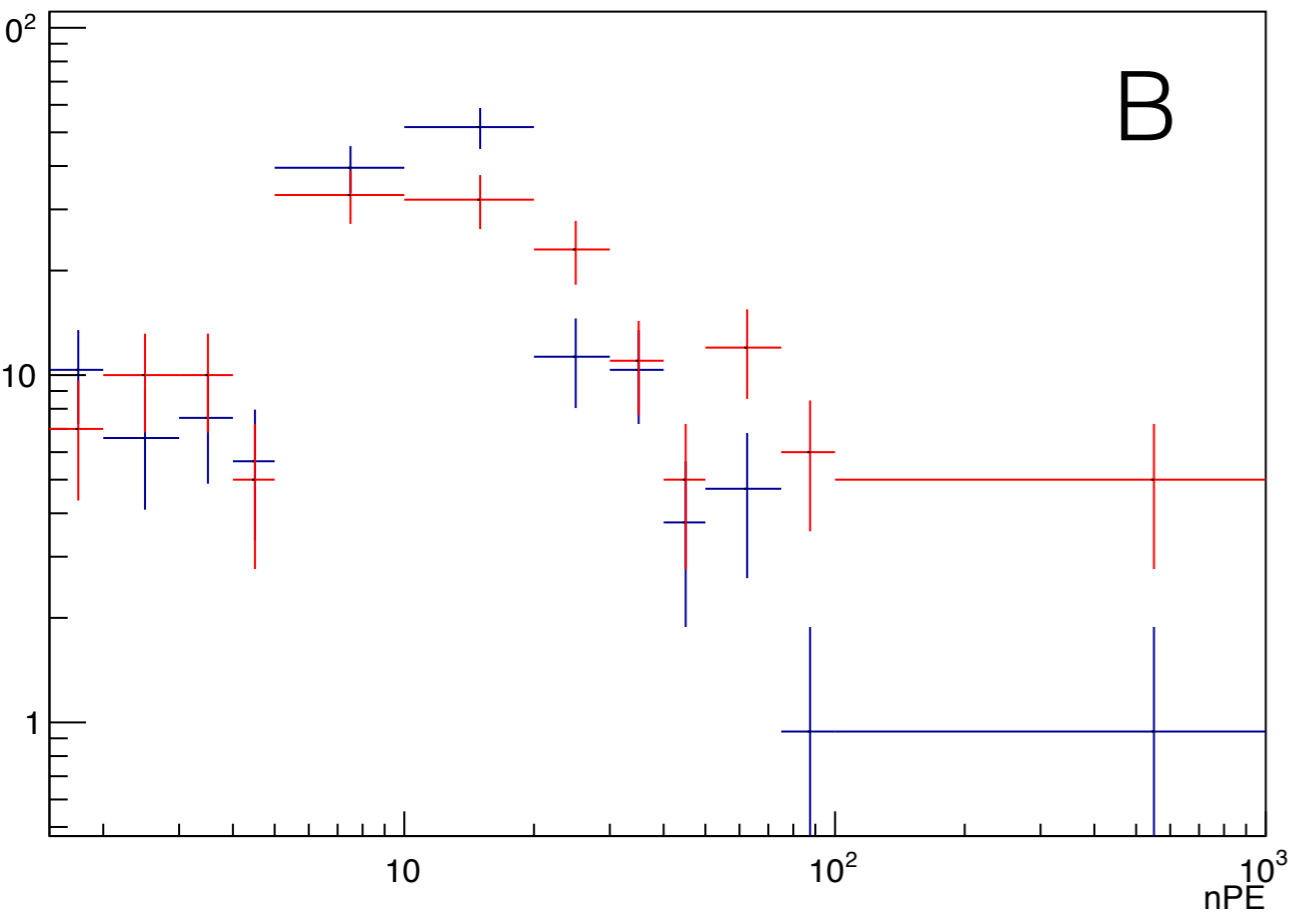
deltaTOutsidetimingSelStraight



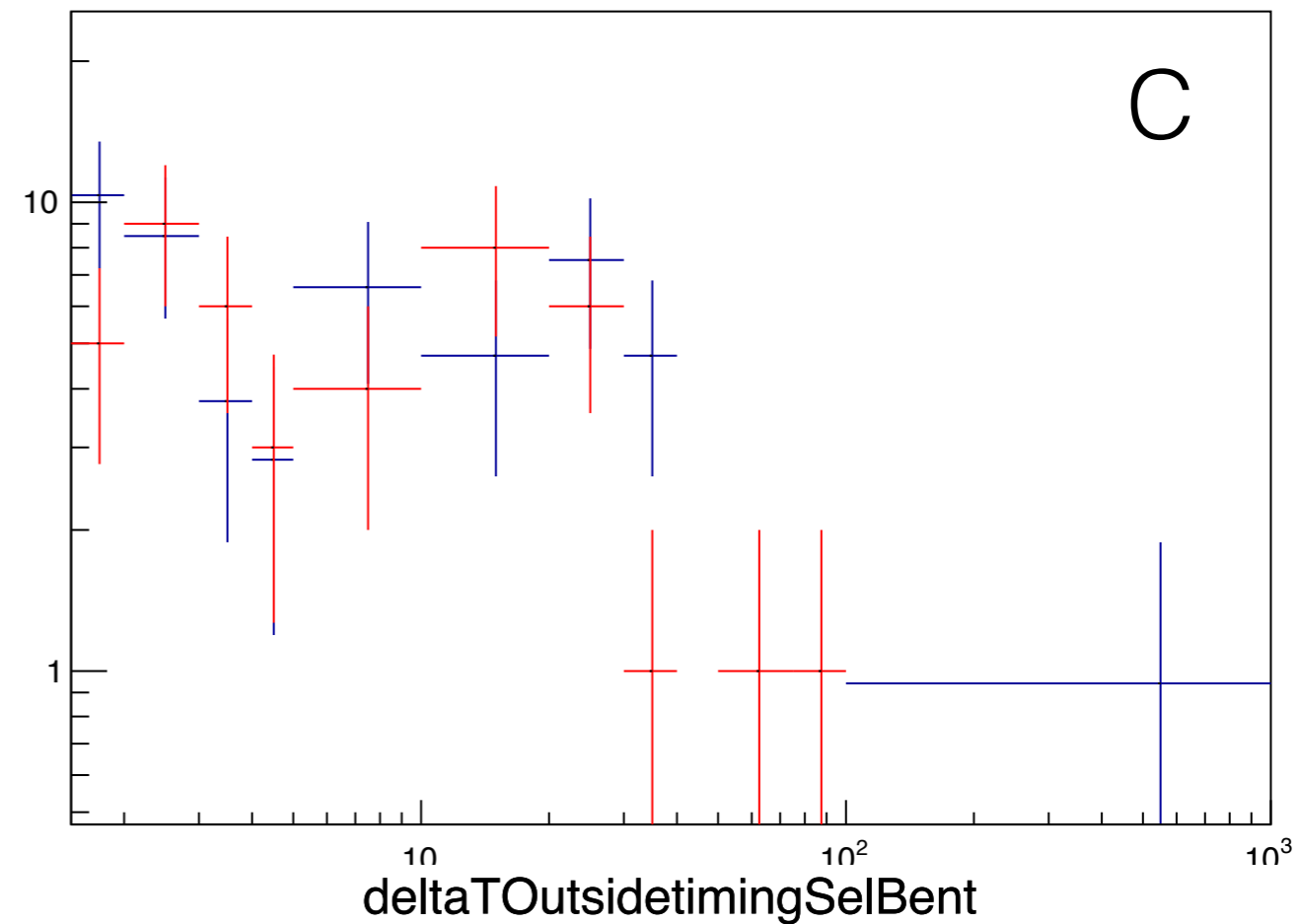
No Slab
Beam
No Beam



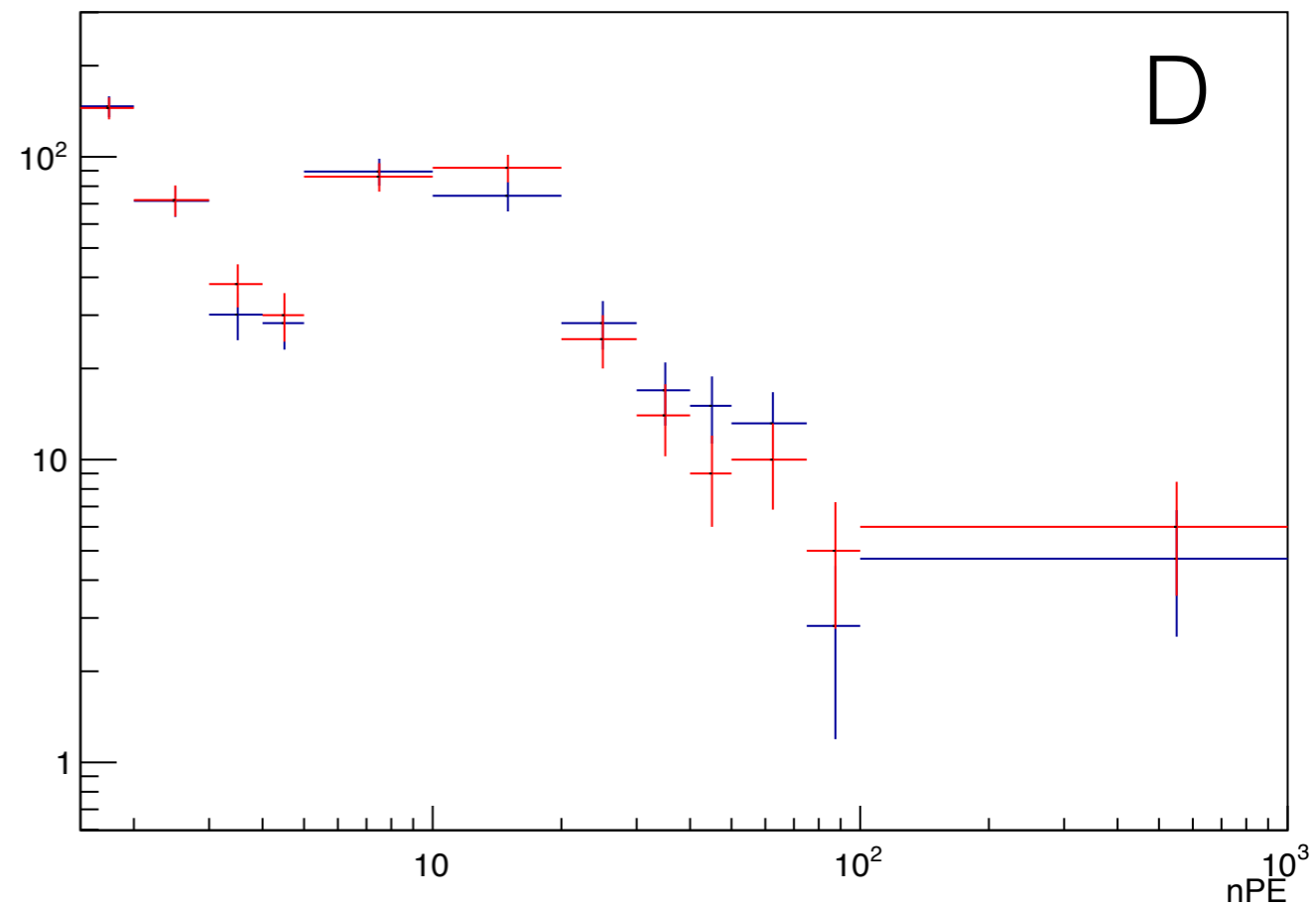
deltaTWithintimingSelBent



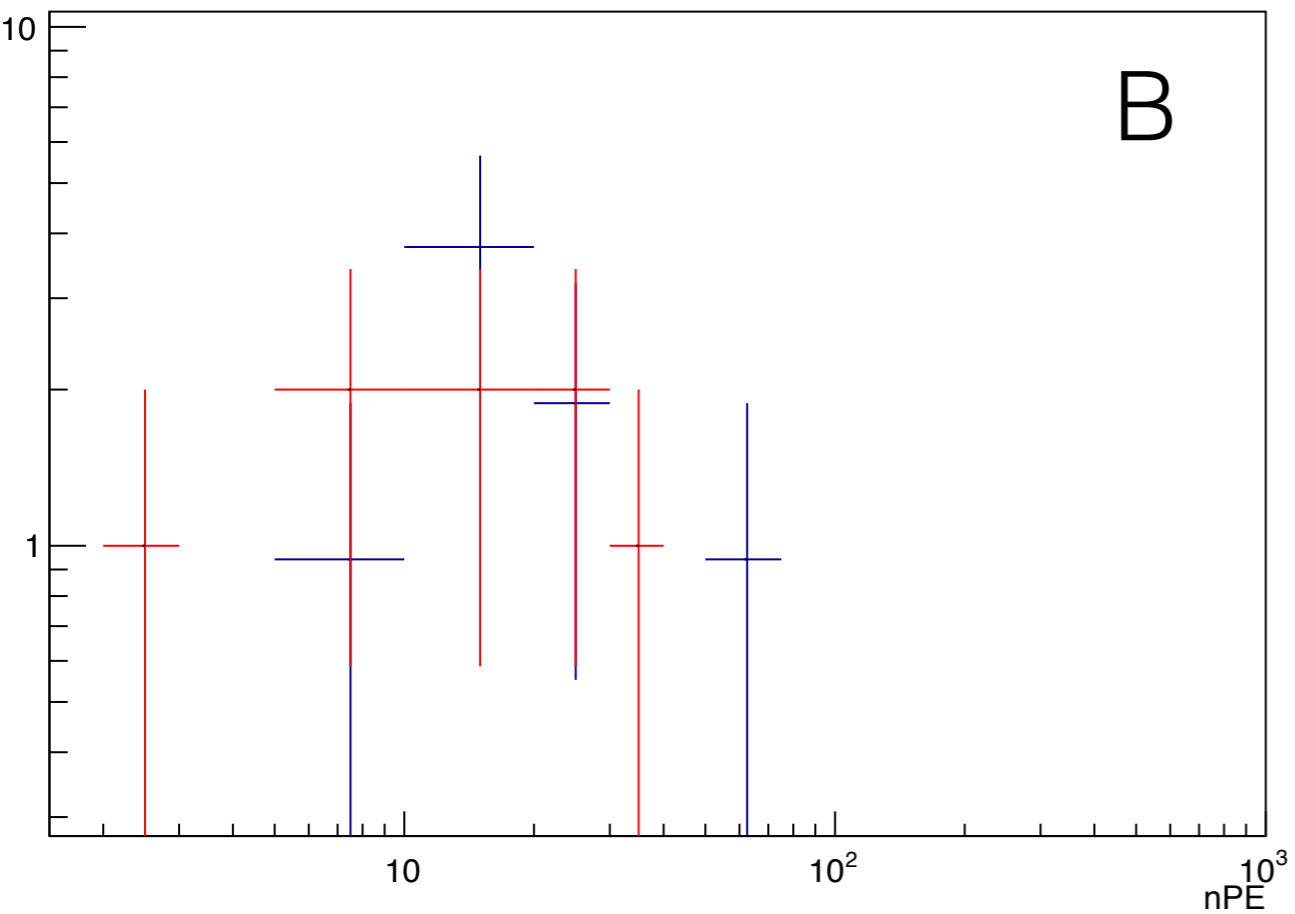
deltaTOutsidetimingSelStraight



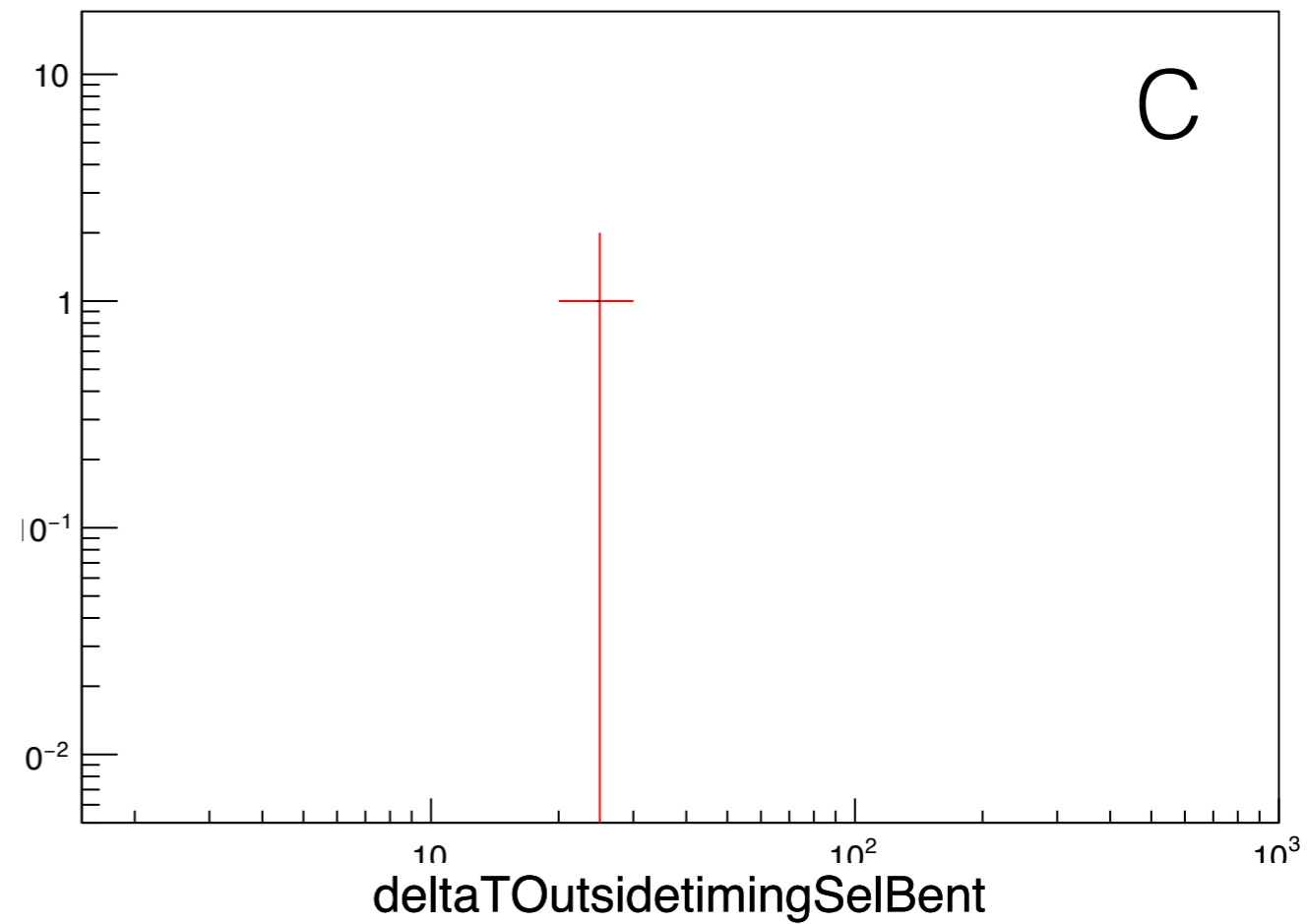
One Slab
Beam
No Beam



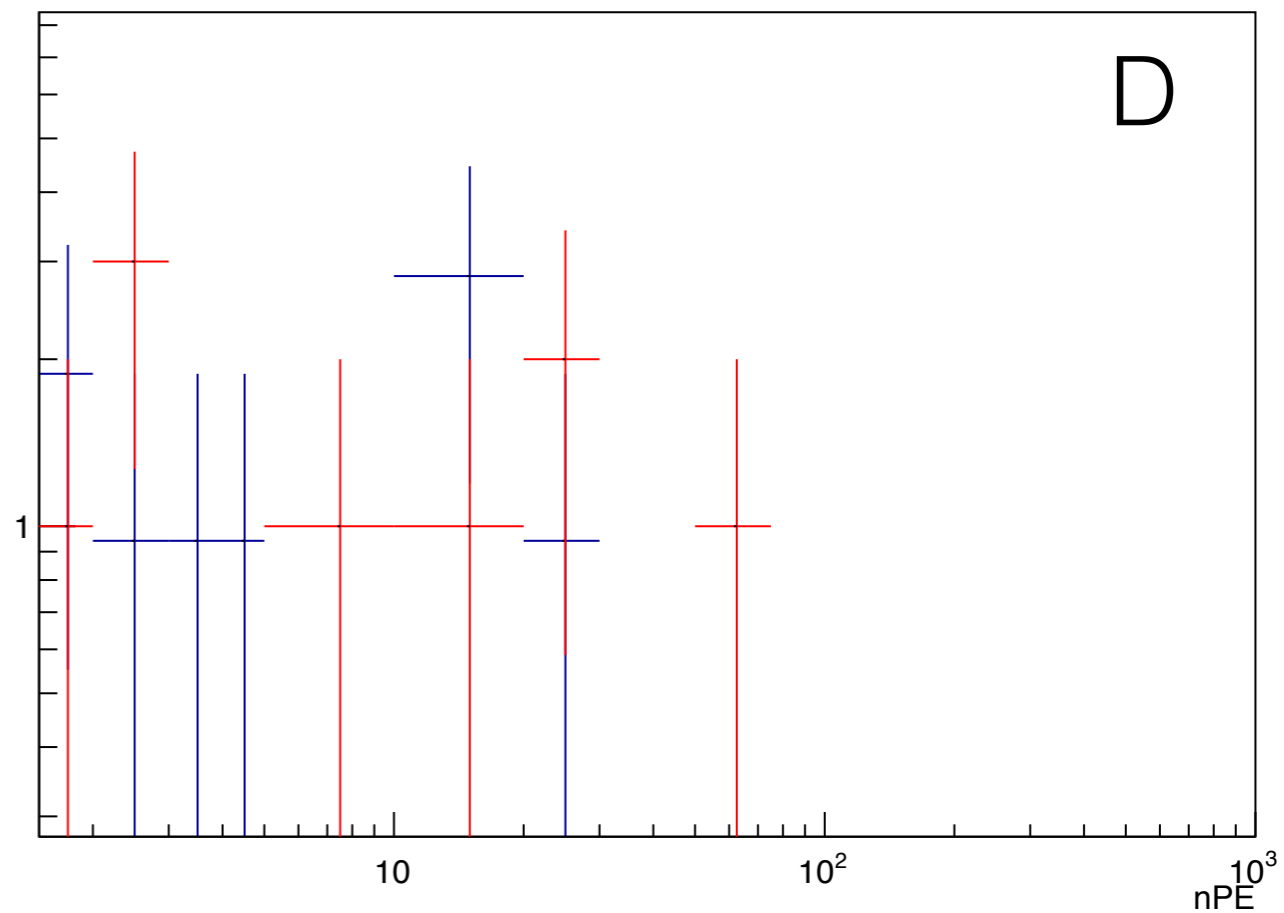
deltaTWithintimingSelBent



deltaTOutsidetimingSelStraight

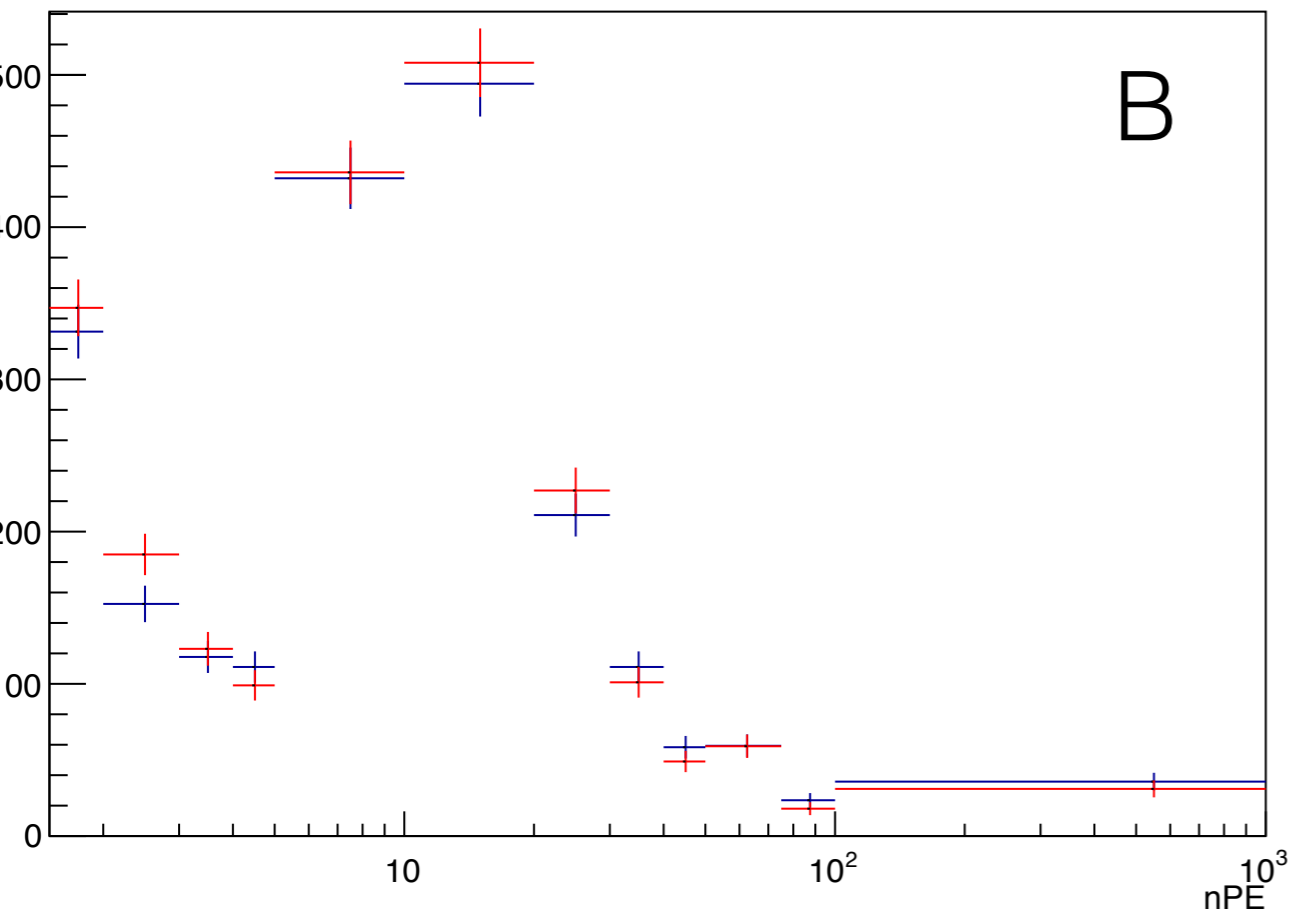


> 1 Slab
Beam
No Beam

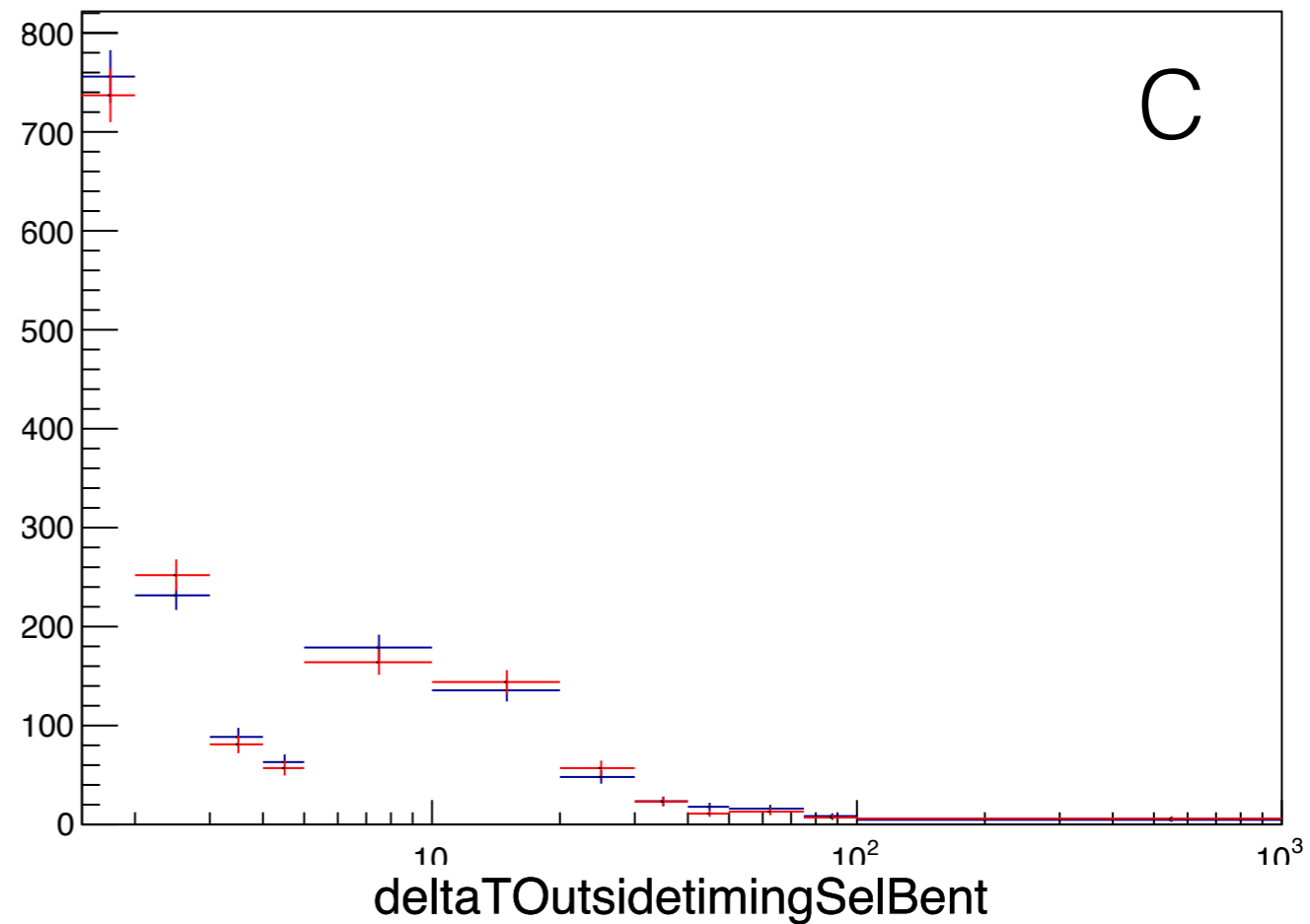


Lin

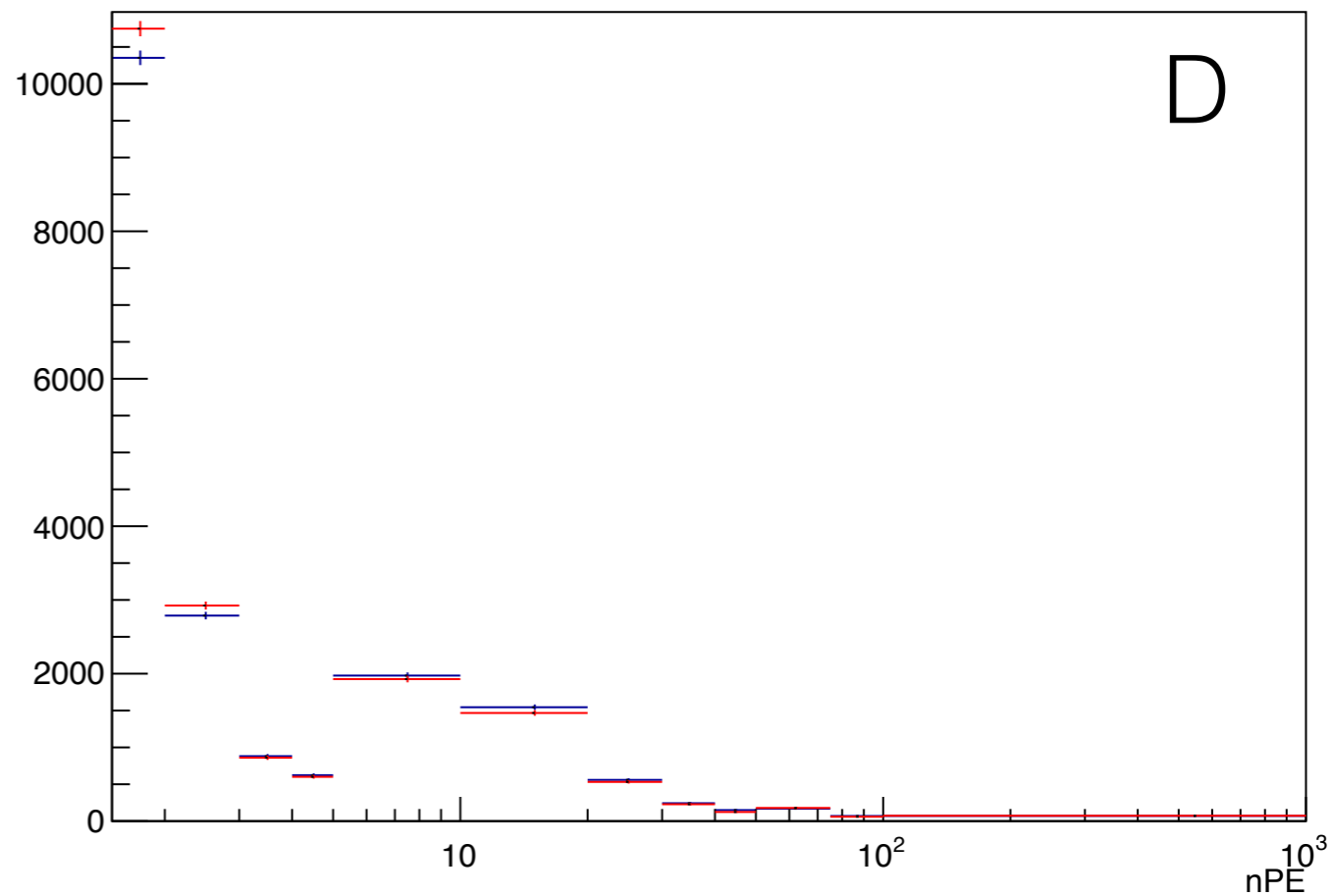
deltaTWithintimingSelBent



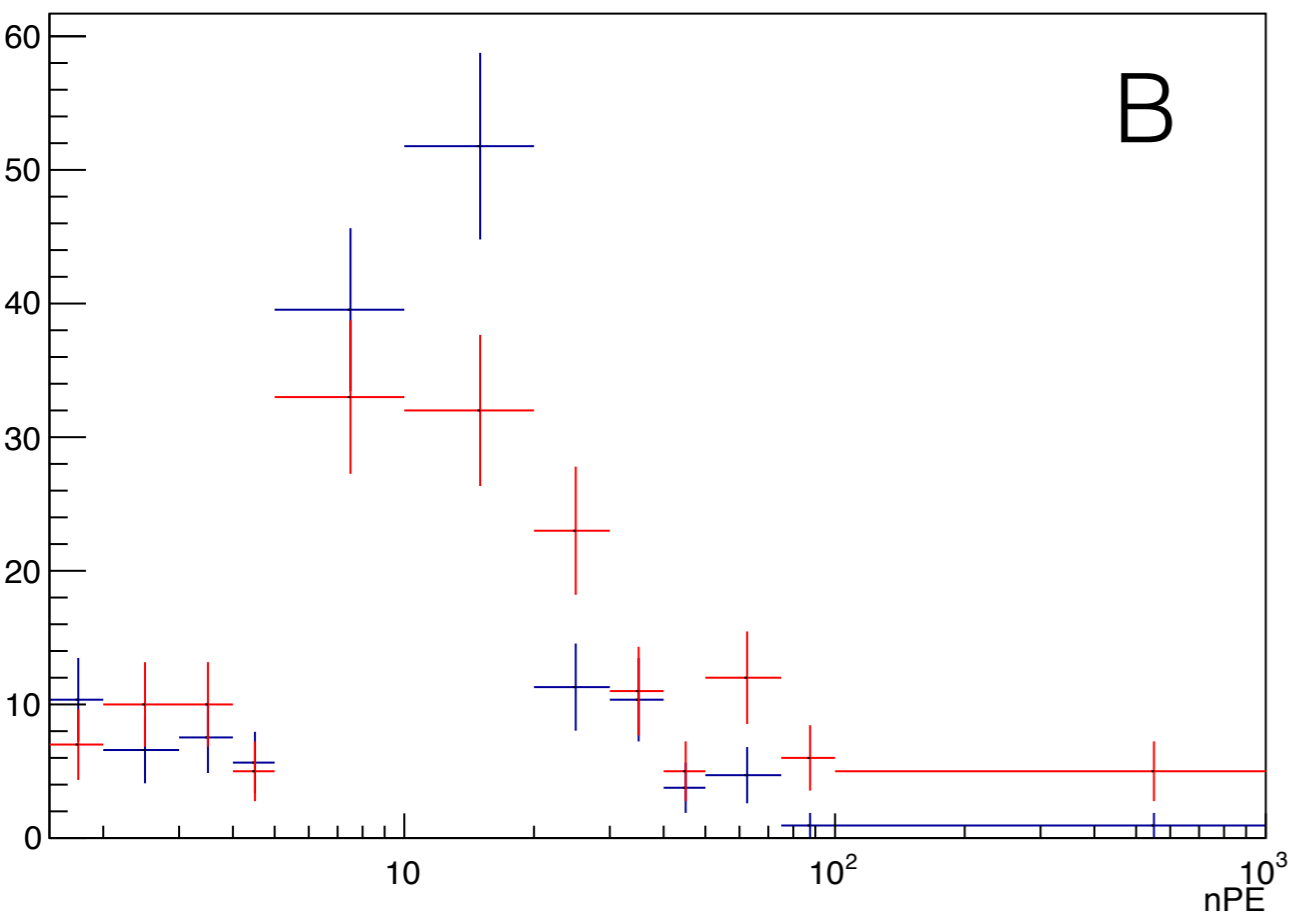
deltaTOutsidetimingSelStraight



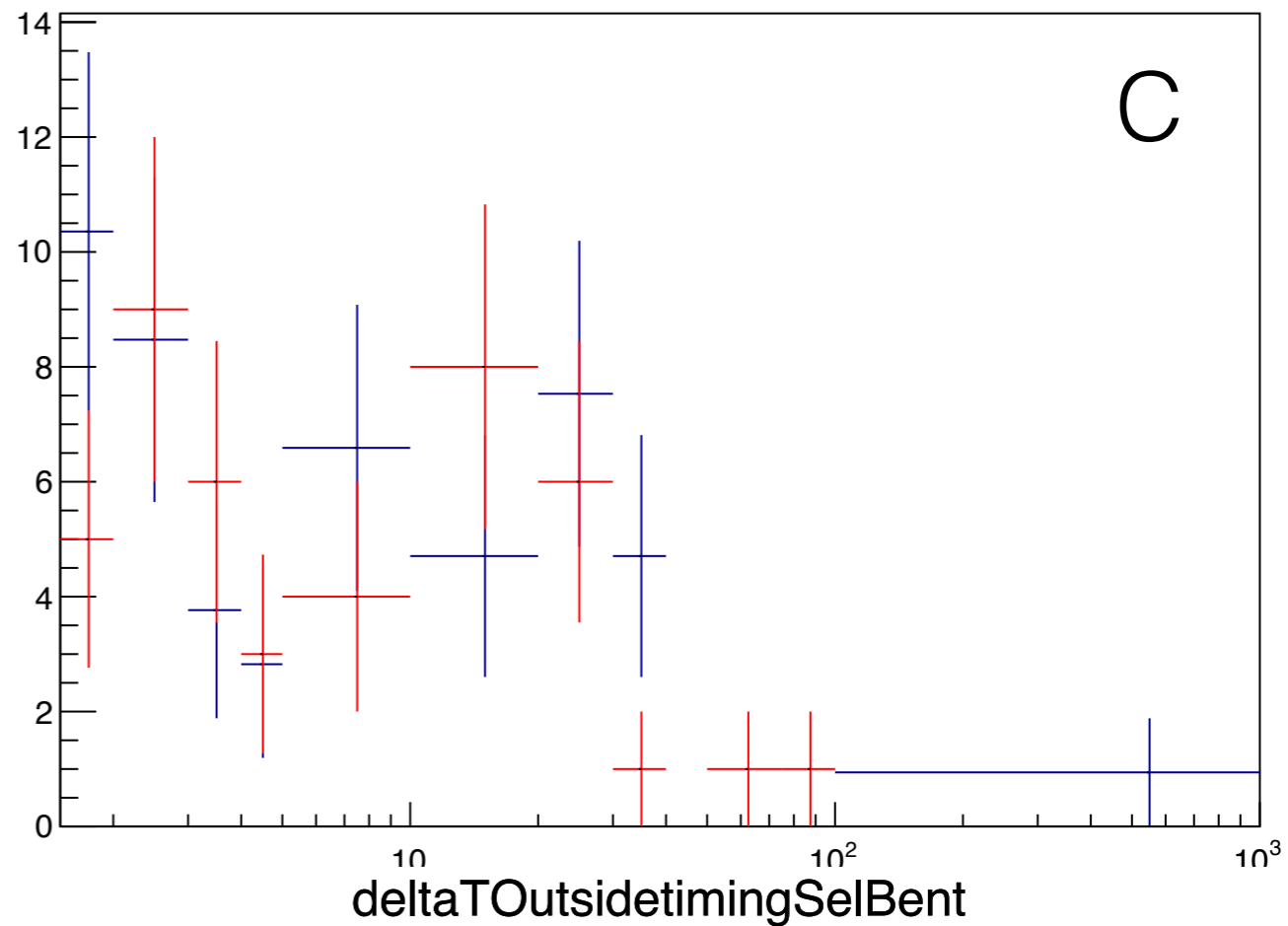
No Slab
Beam
No Beam



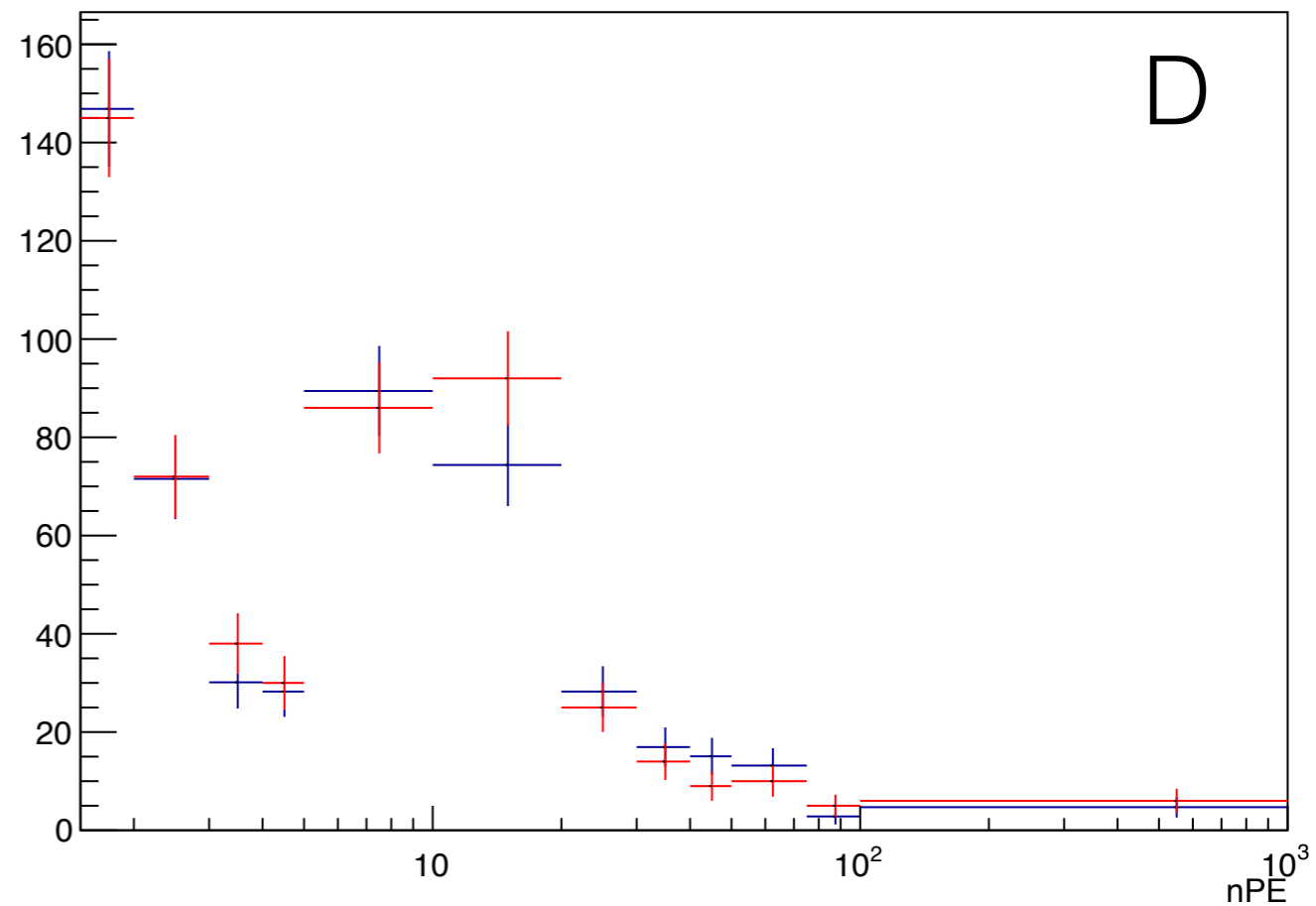
deltaTWithintimingSelBent



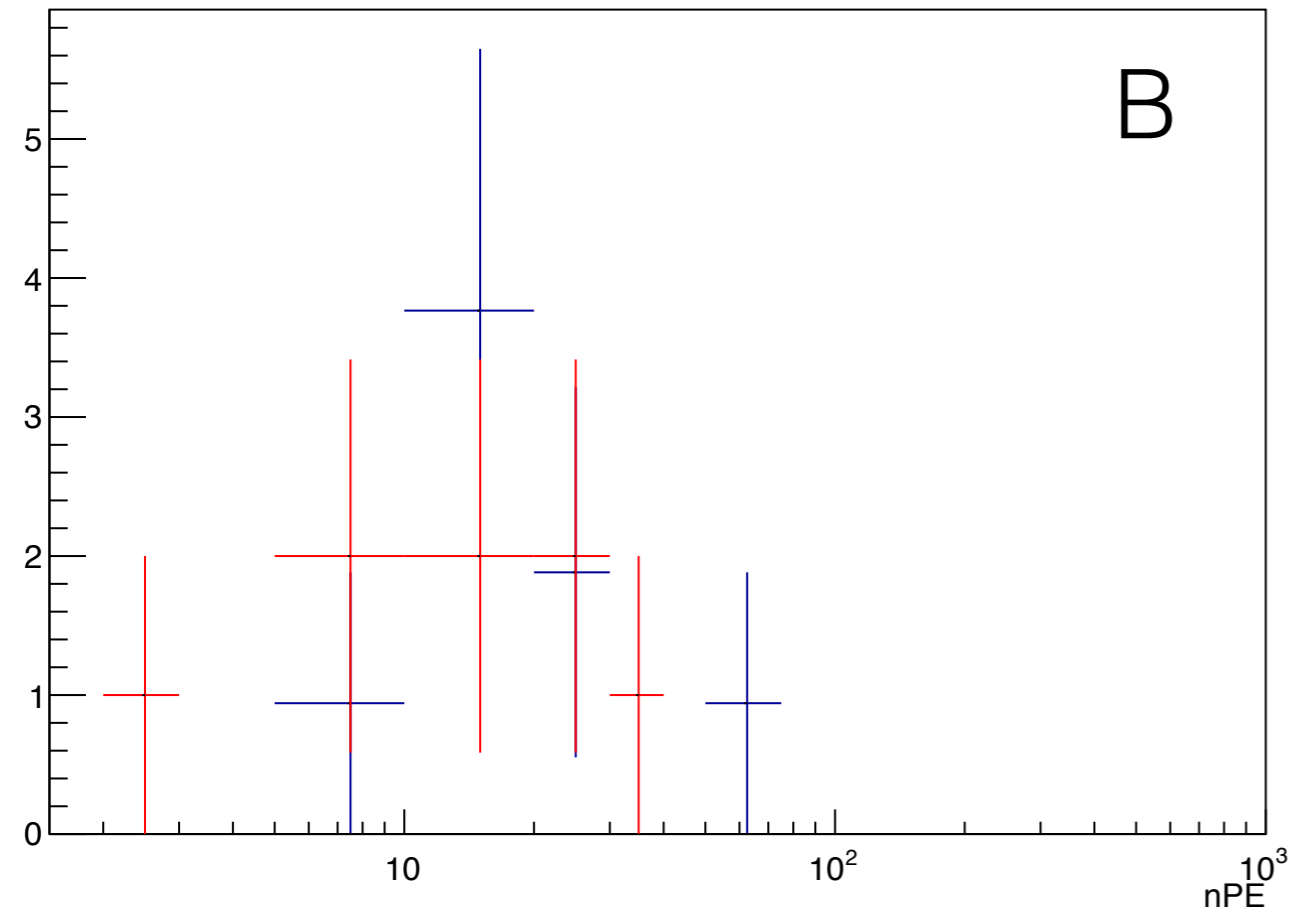
deltaTOutsidetimingSelStraight



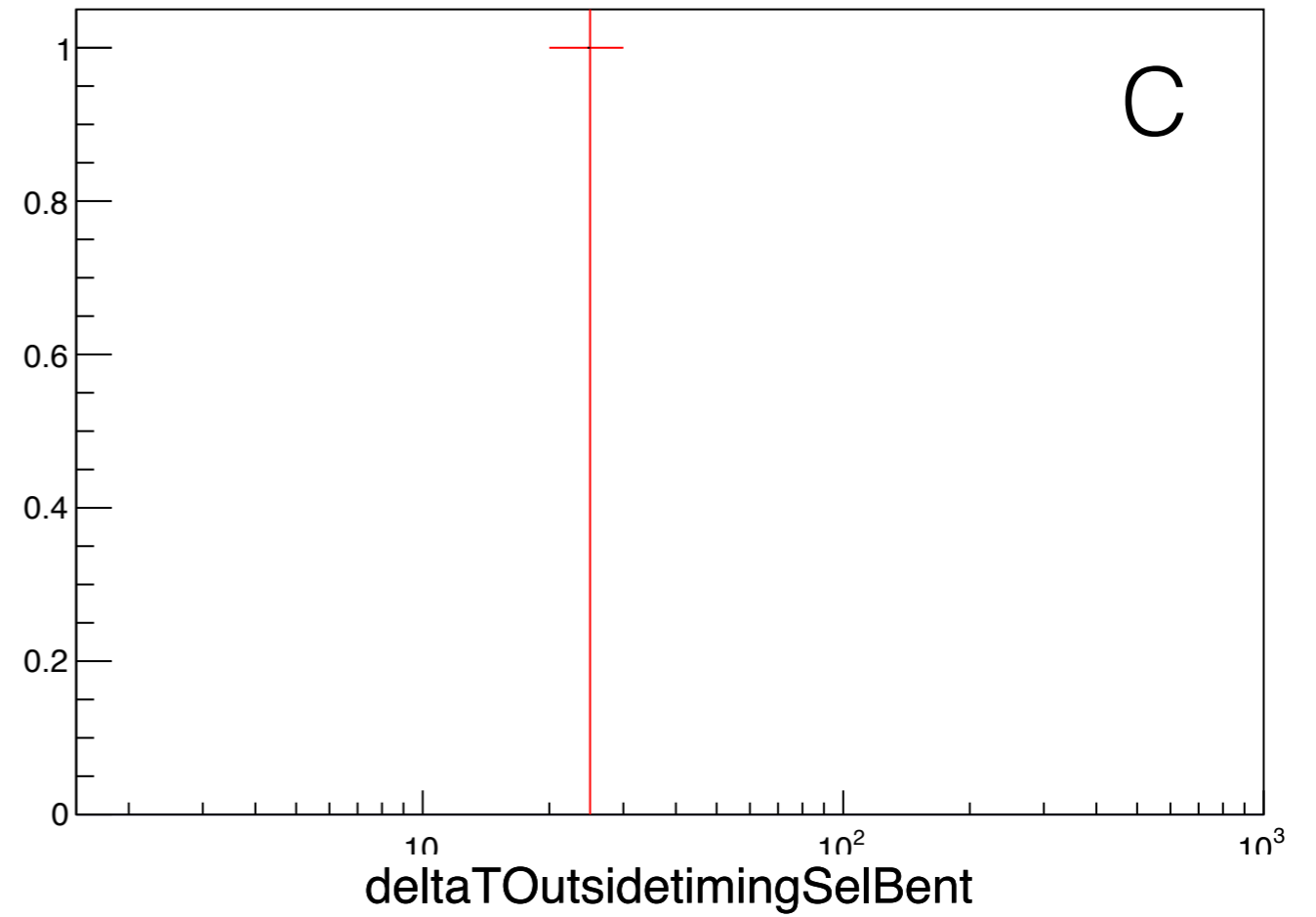
One Slab
Beam
No Beam



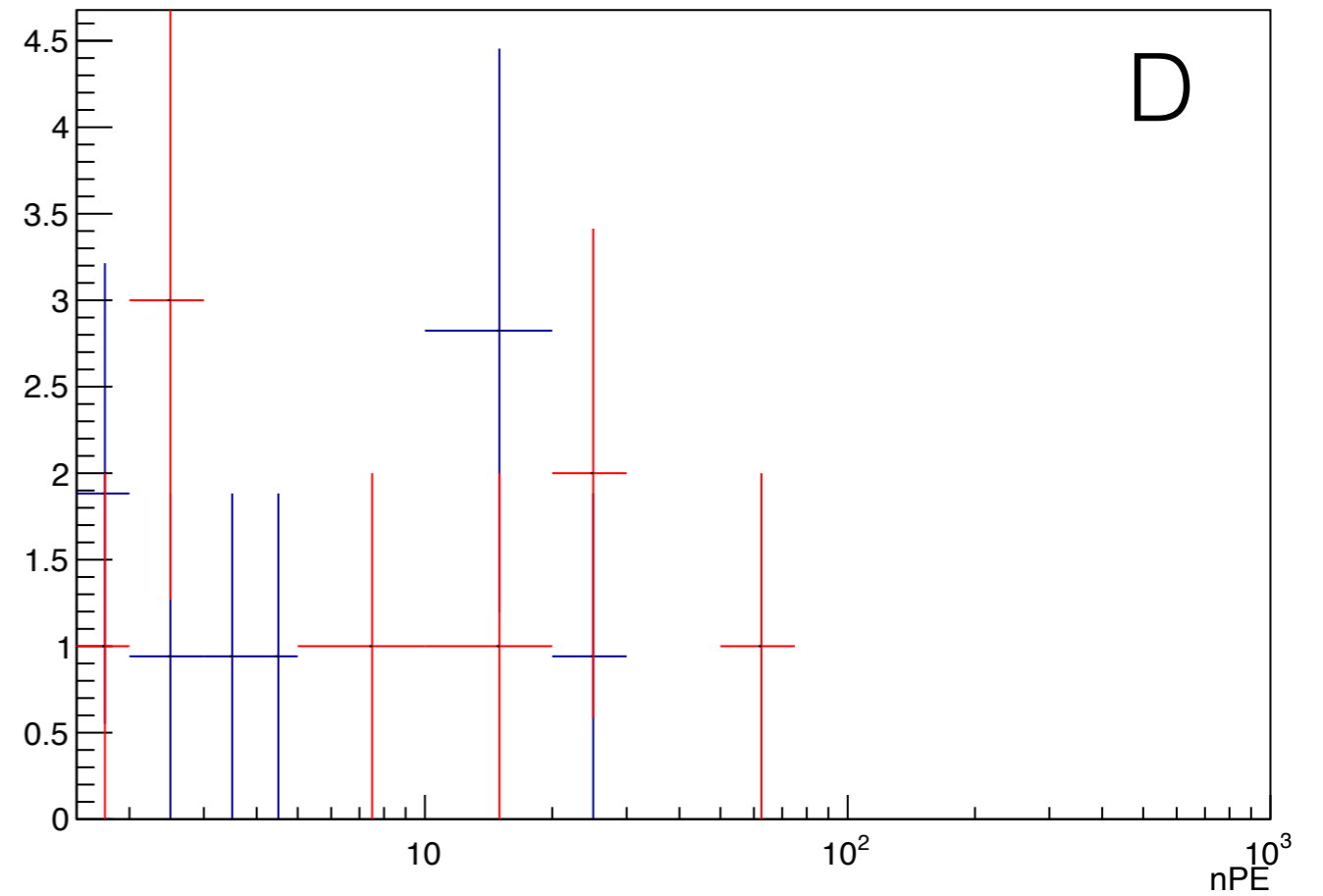
deltaTWithintimingSelBent



deltaTOutsidetimingSelStraight

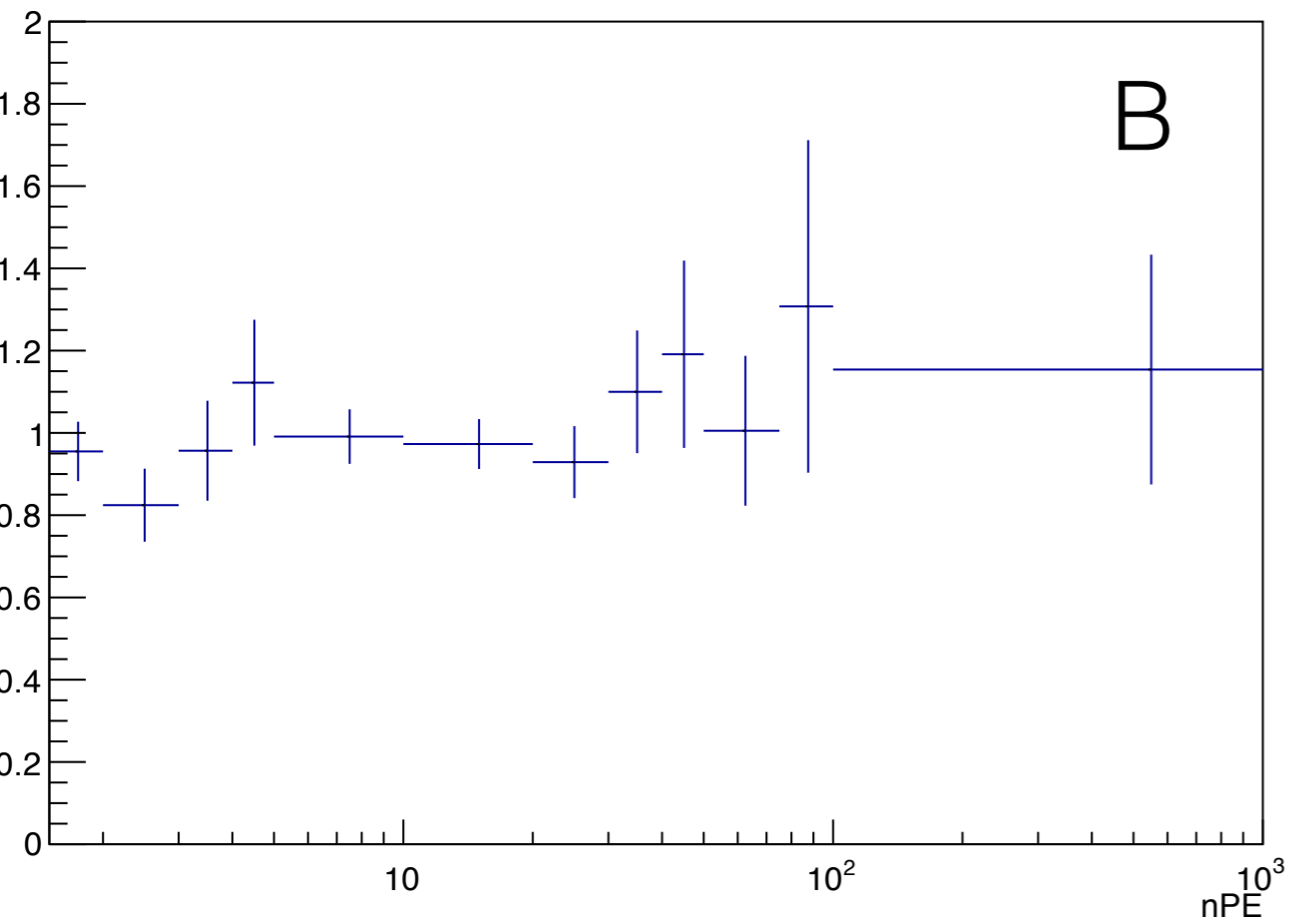


> 1 Slab
Beam
No Beam

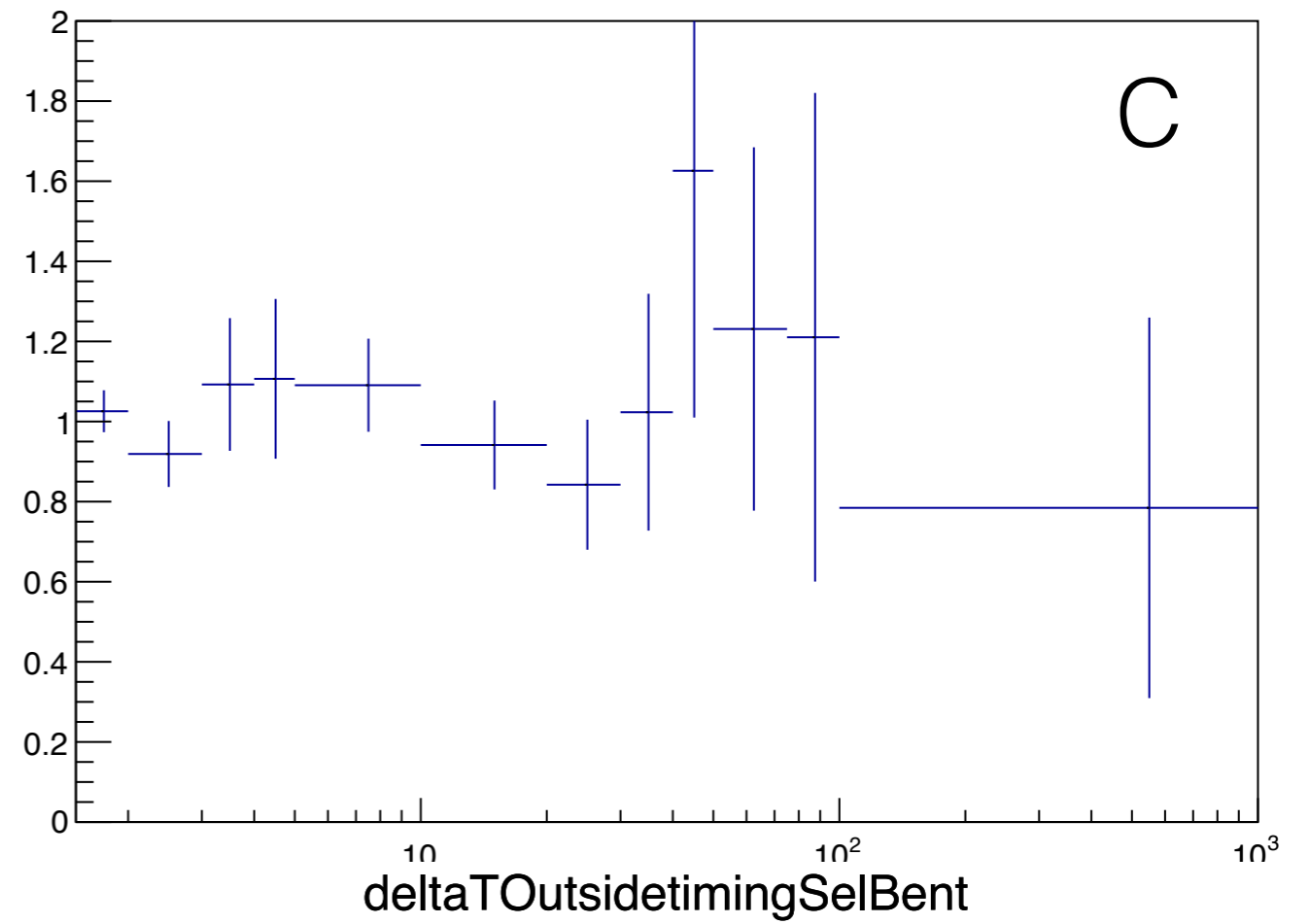


Ratio (beam/no beam)

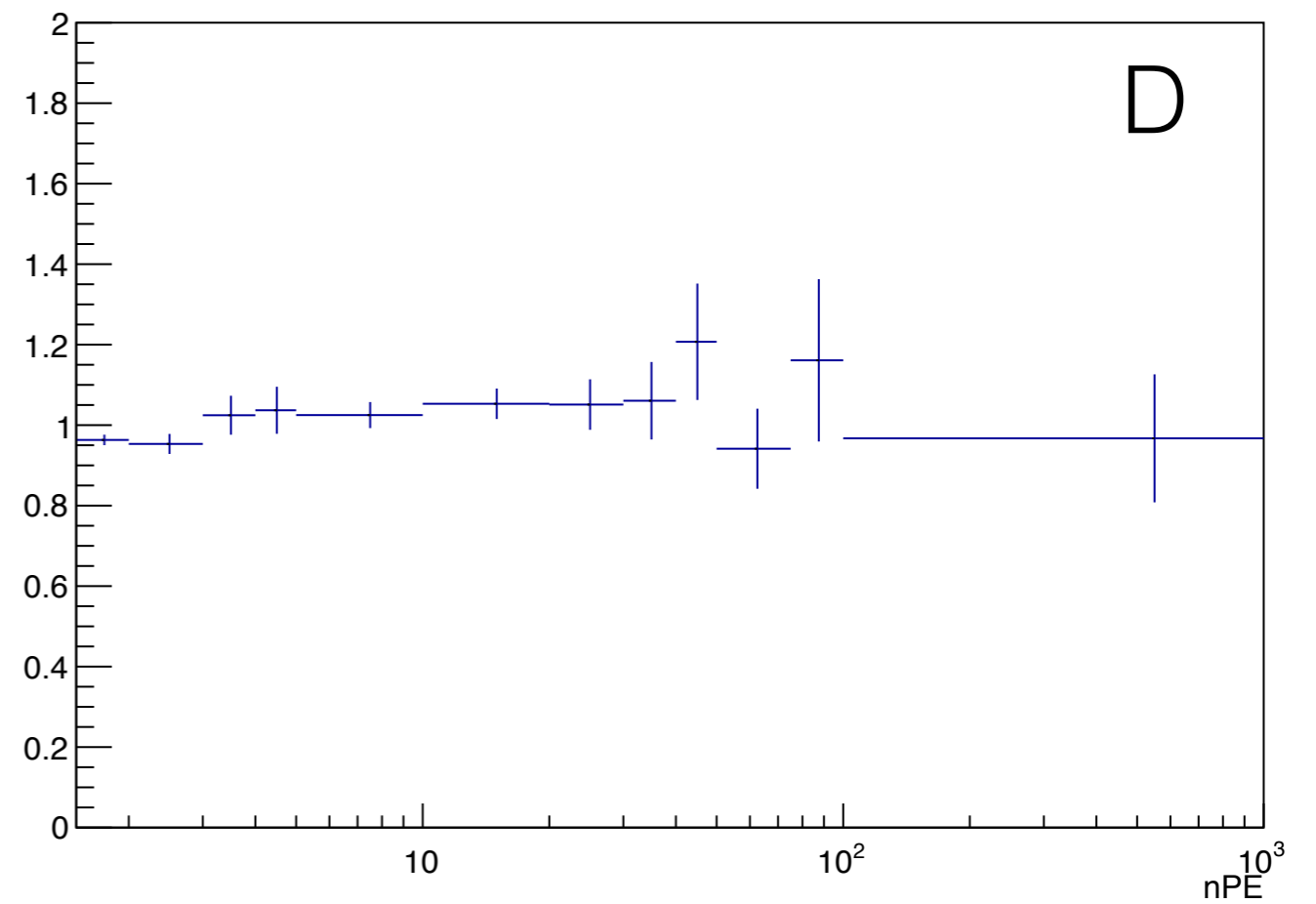
deltaTWithintimingSelBent



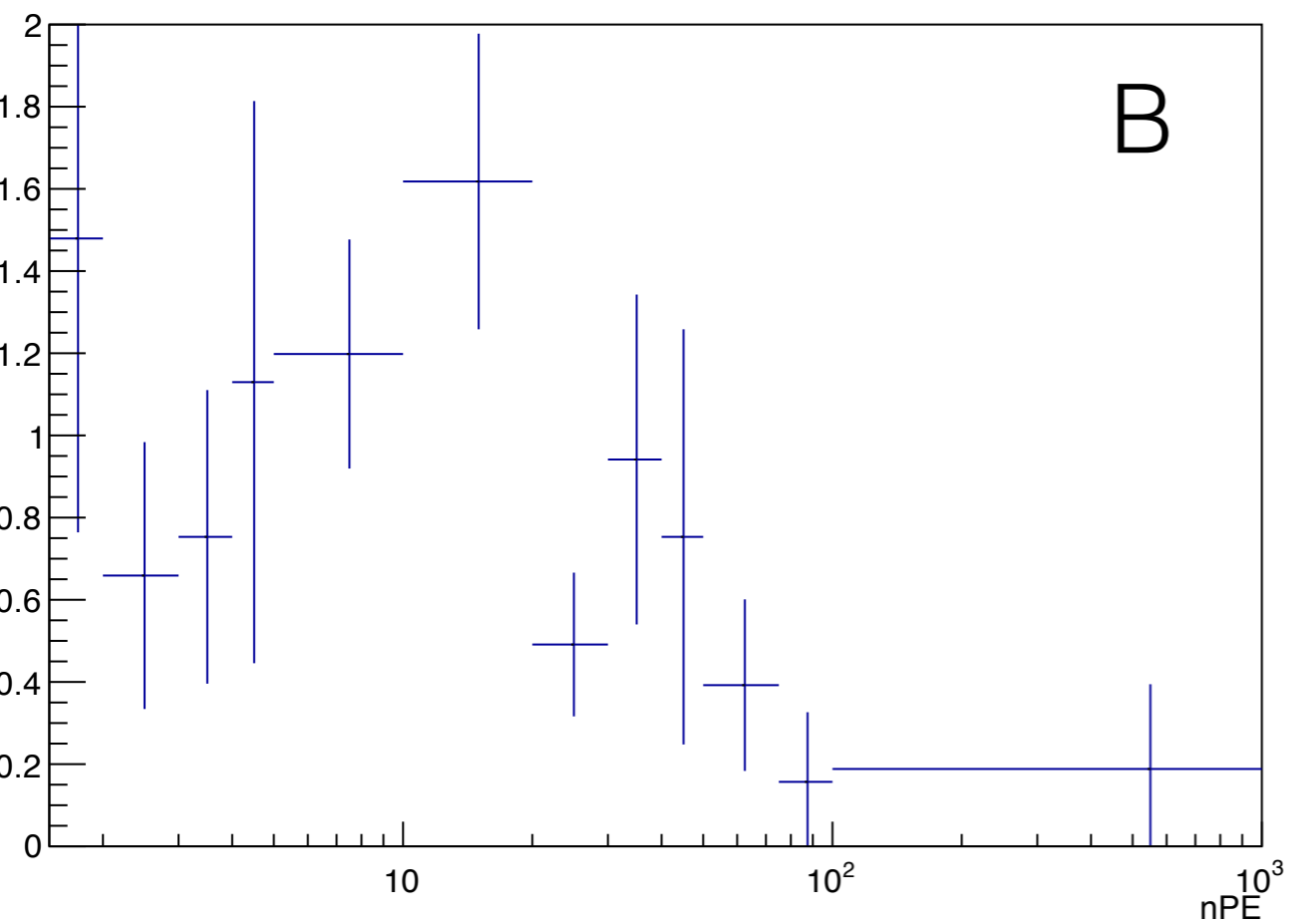
deltaTOutsidetimingSelStraight



No Slab
Ratio

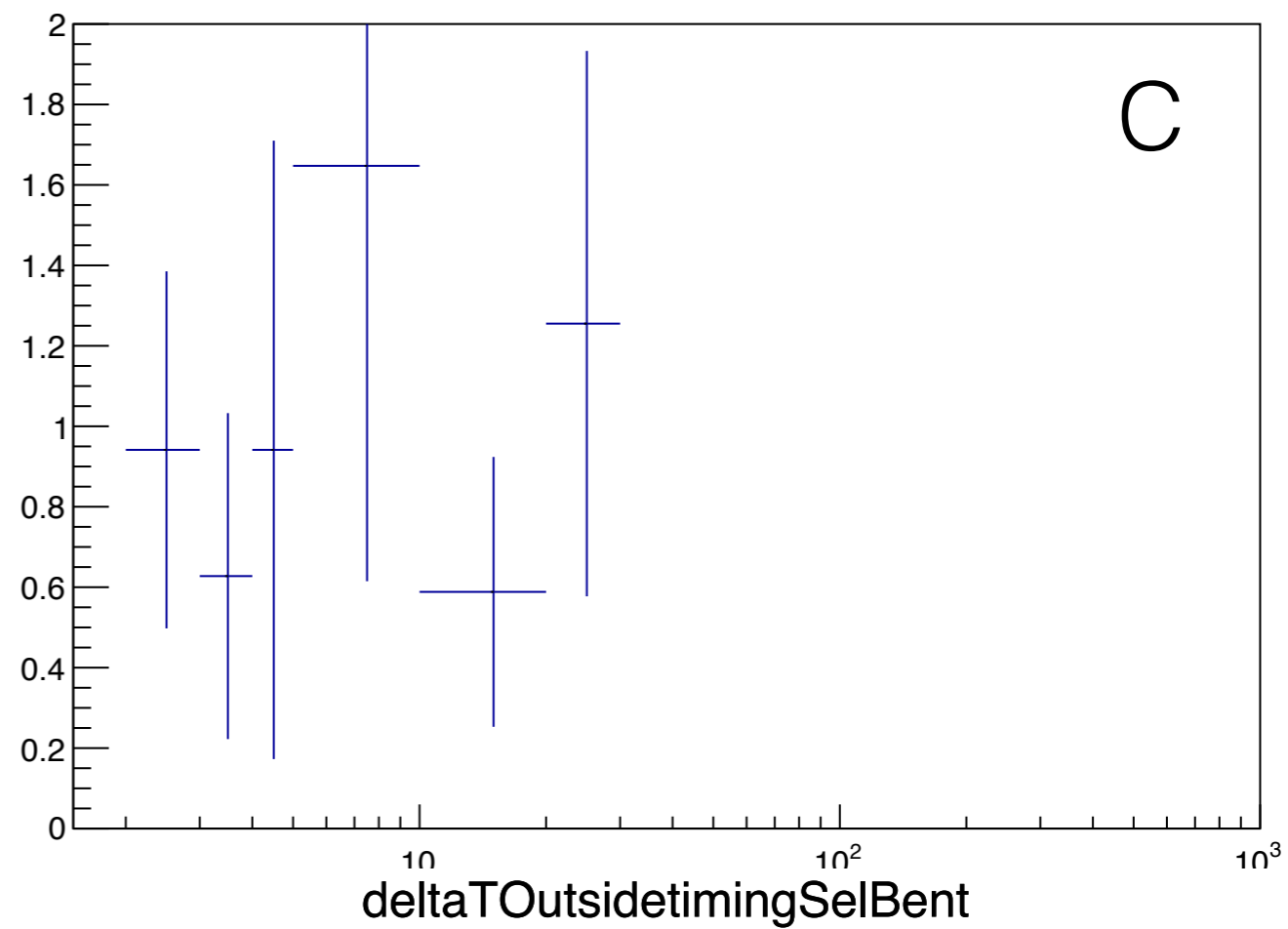


deltaTWithintimingSelBent



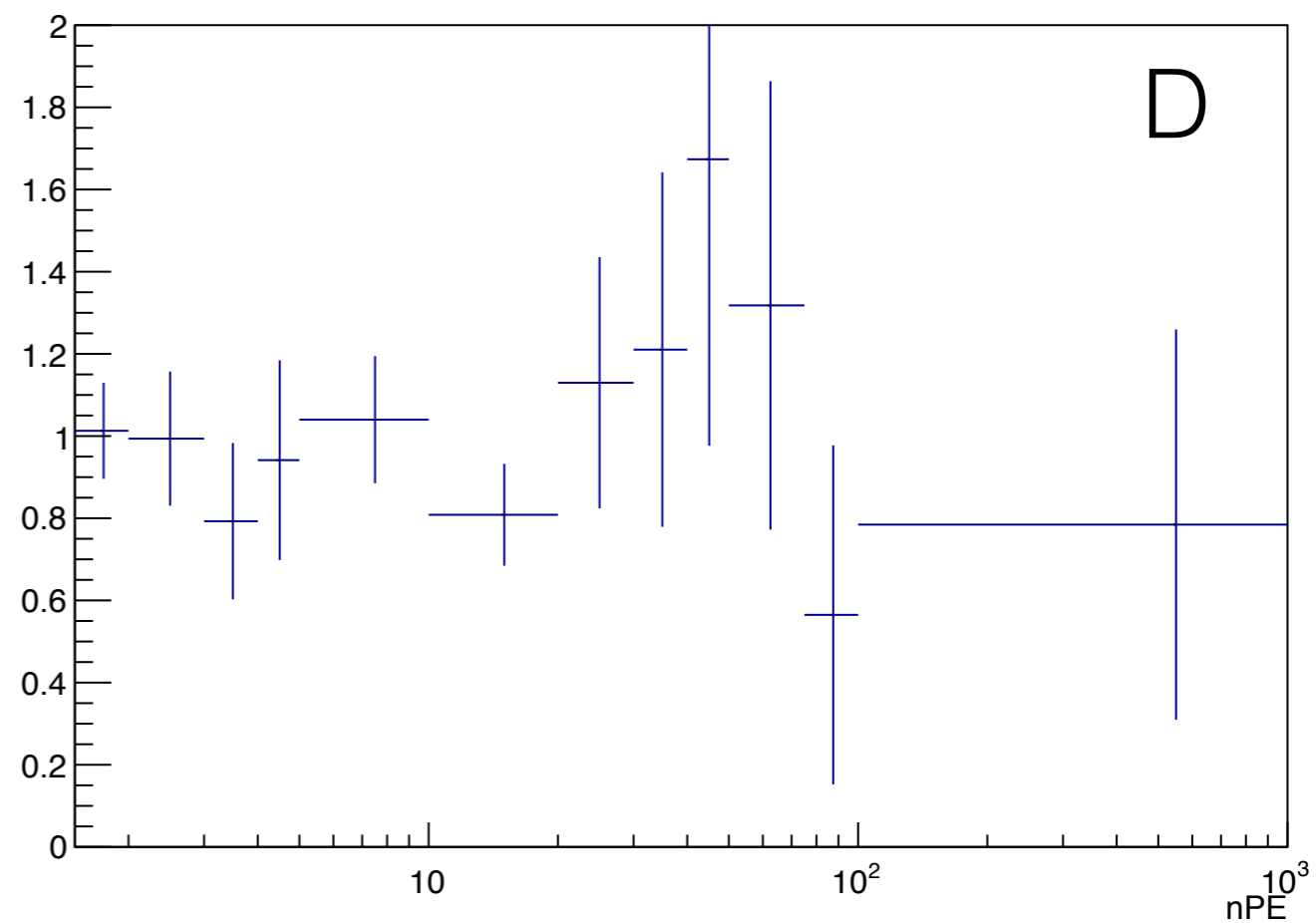
B

deltaTOutsidetimingSelStraight



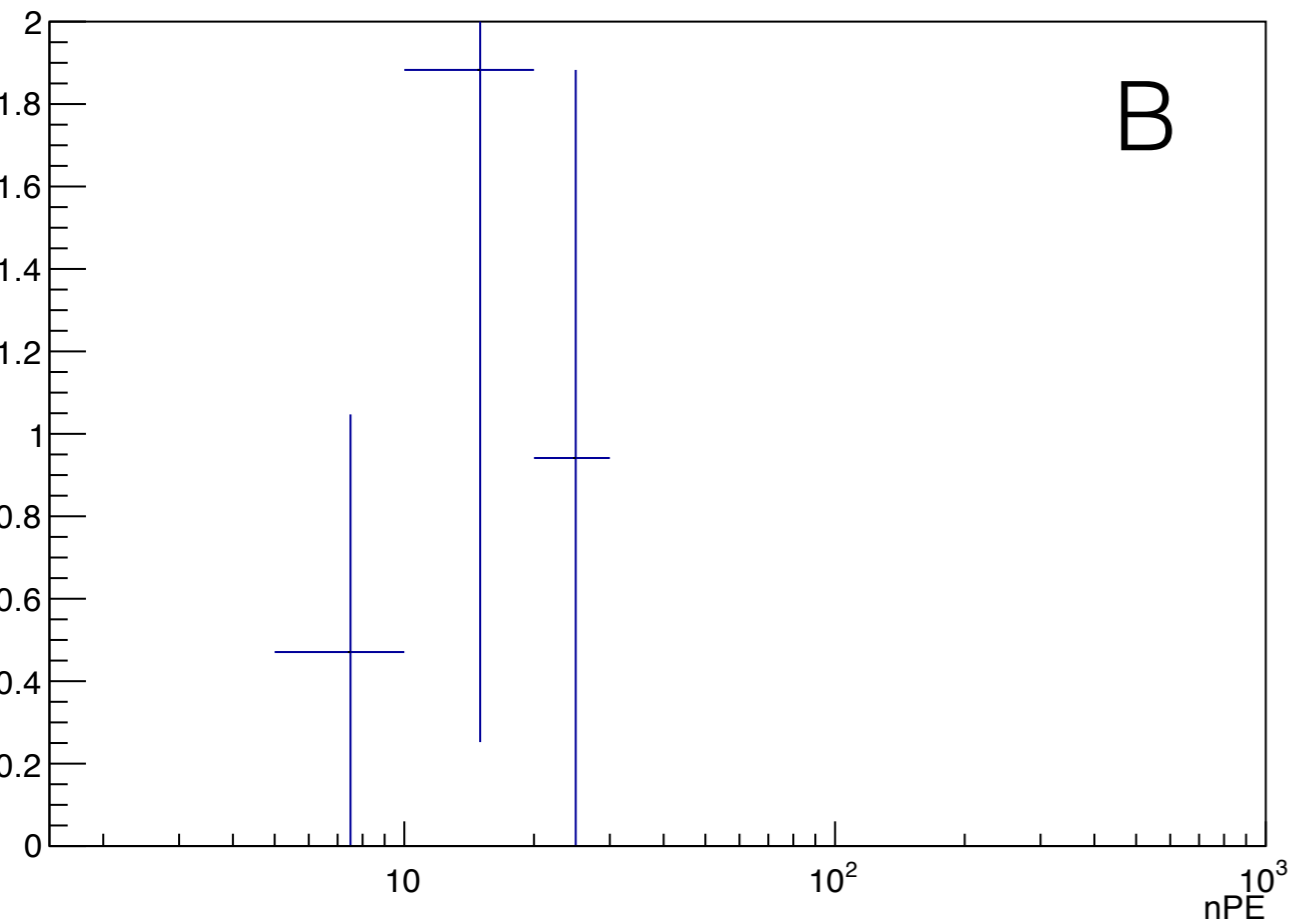
C

One Slab
Ratio

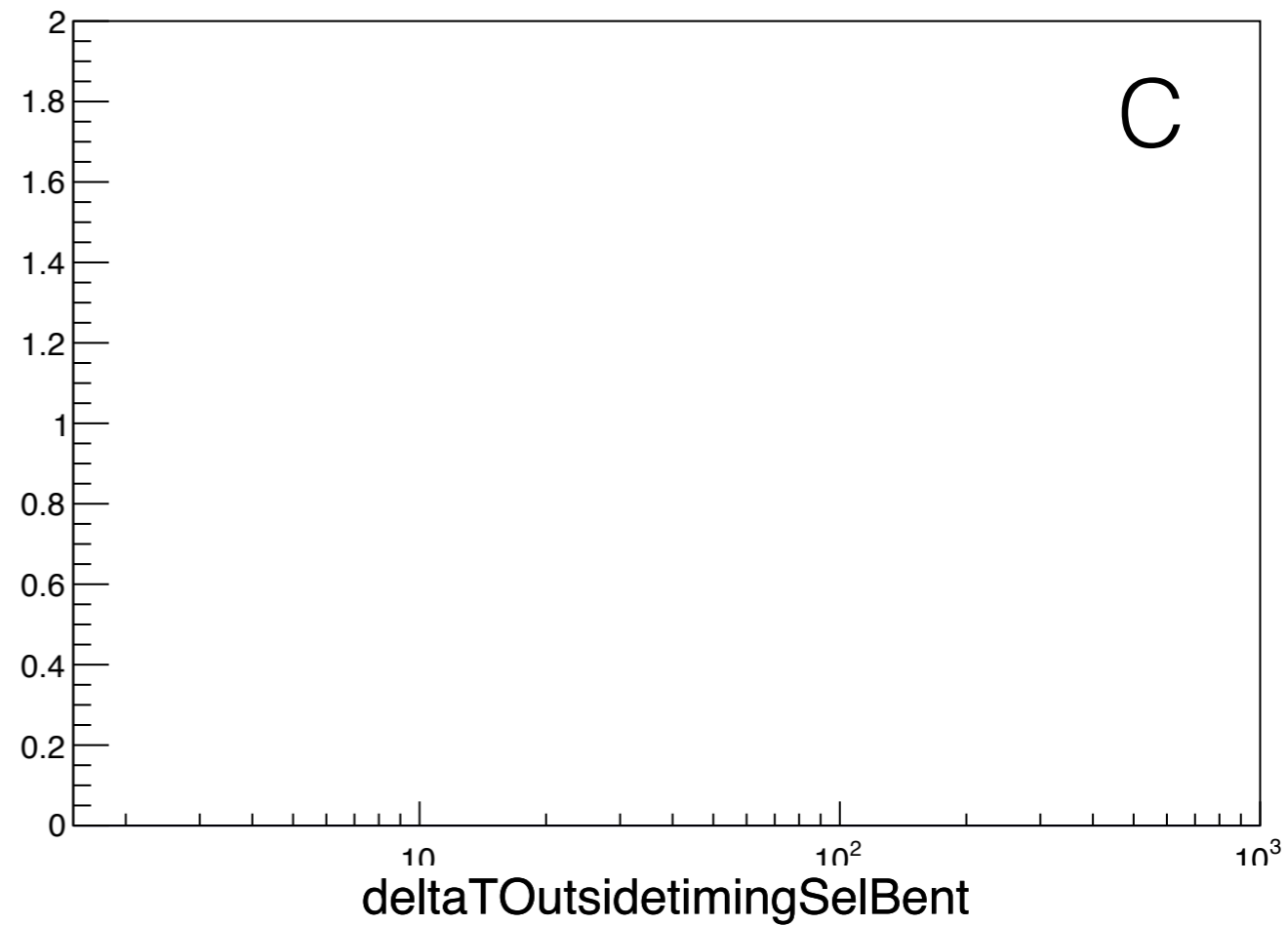


D

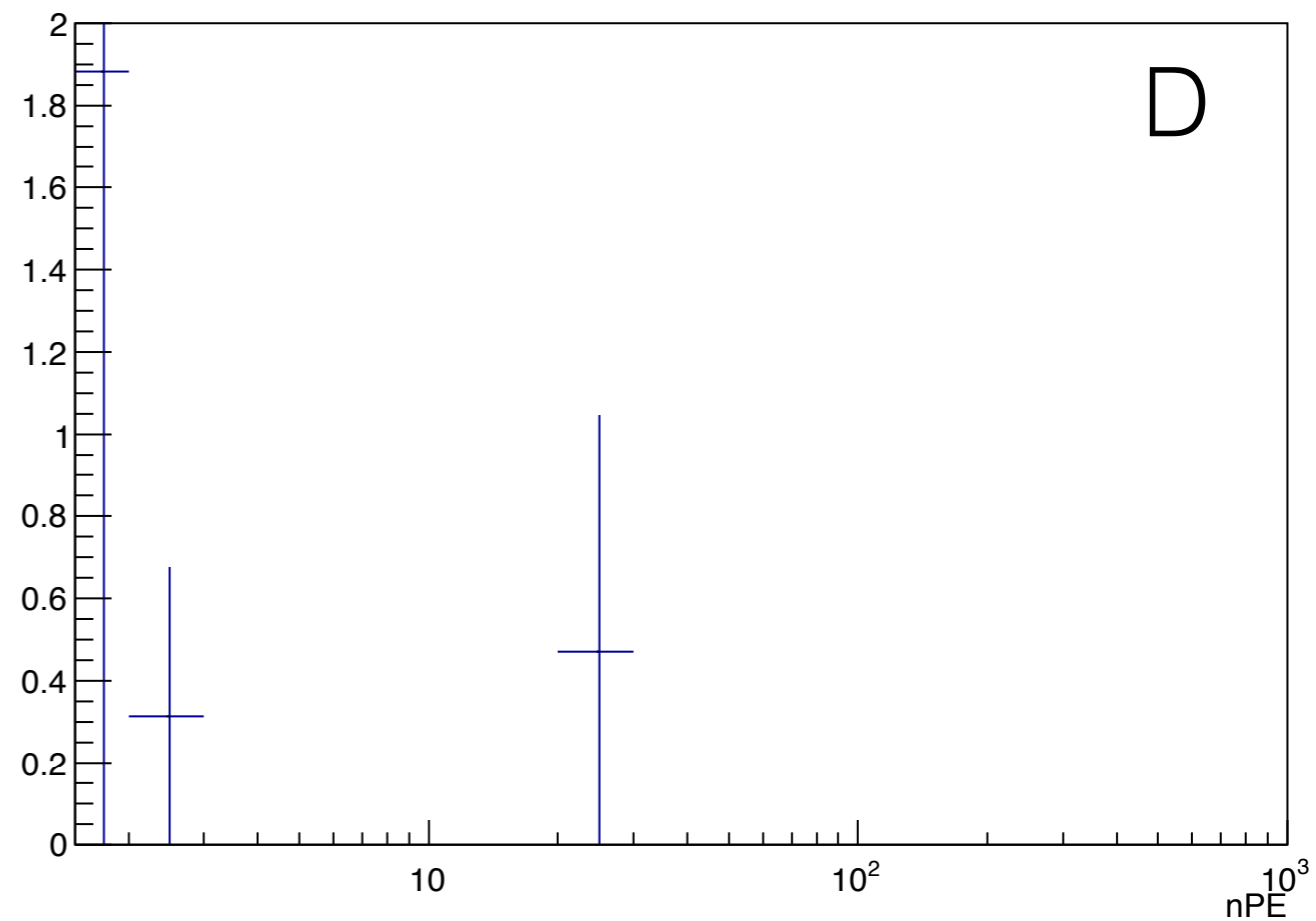
deltaTWithintimingSelBent



deltaTOutsidetimingSelStraight



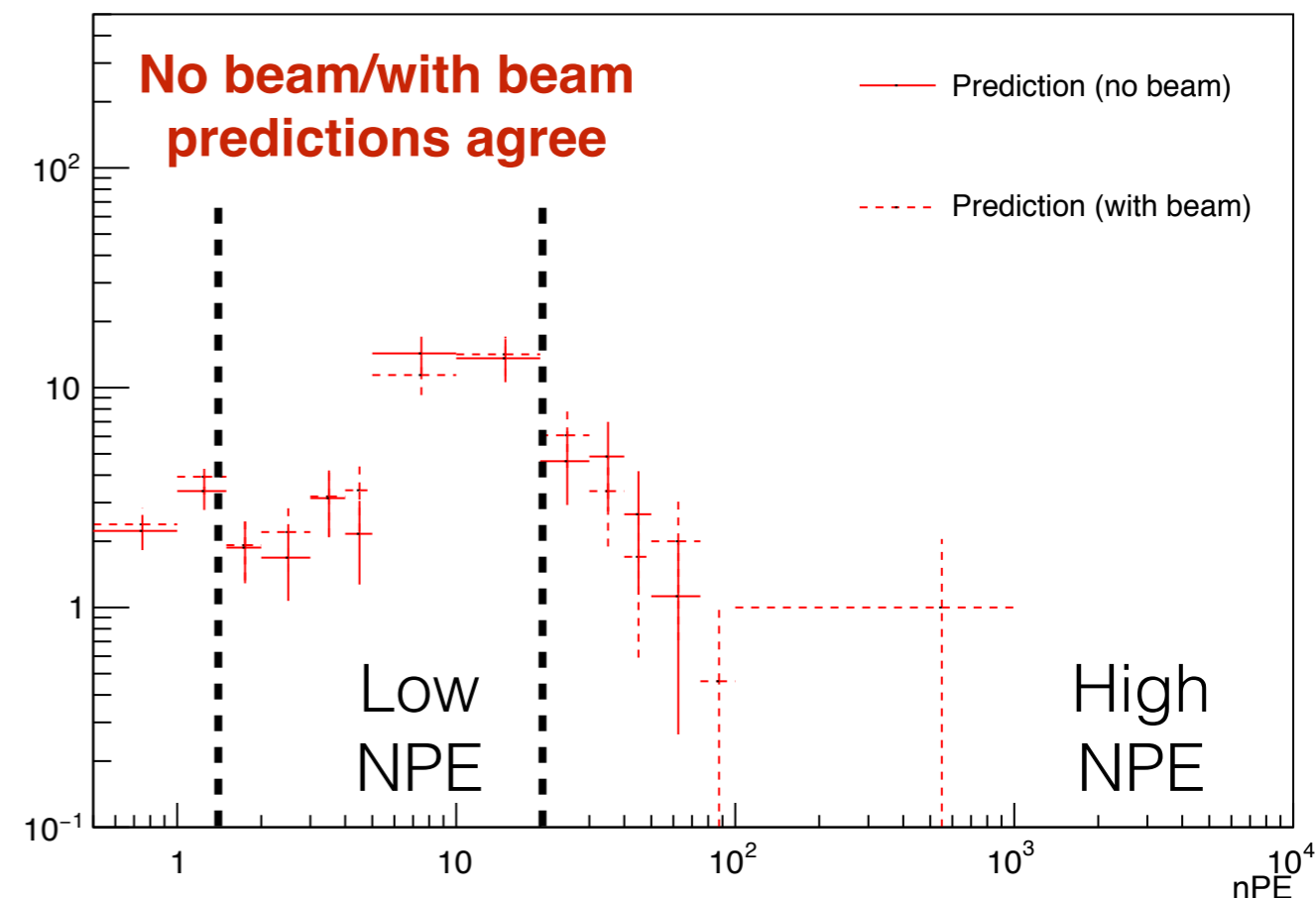
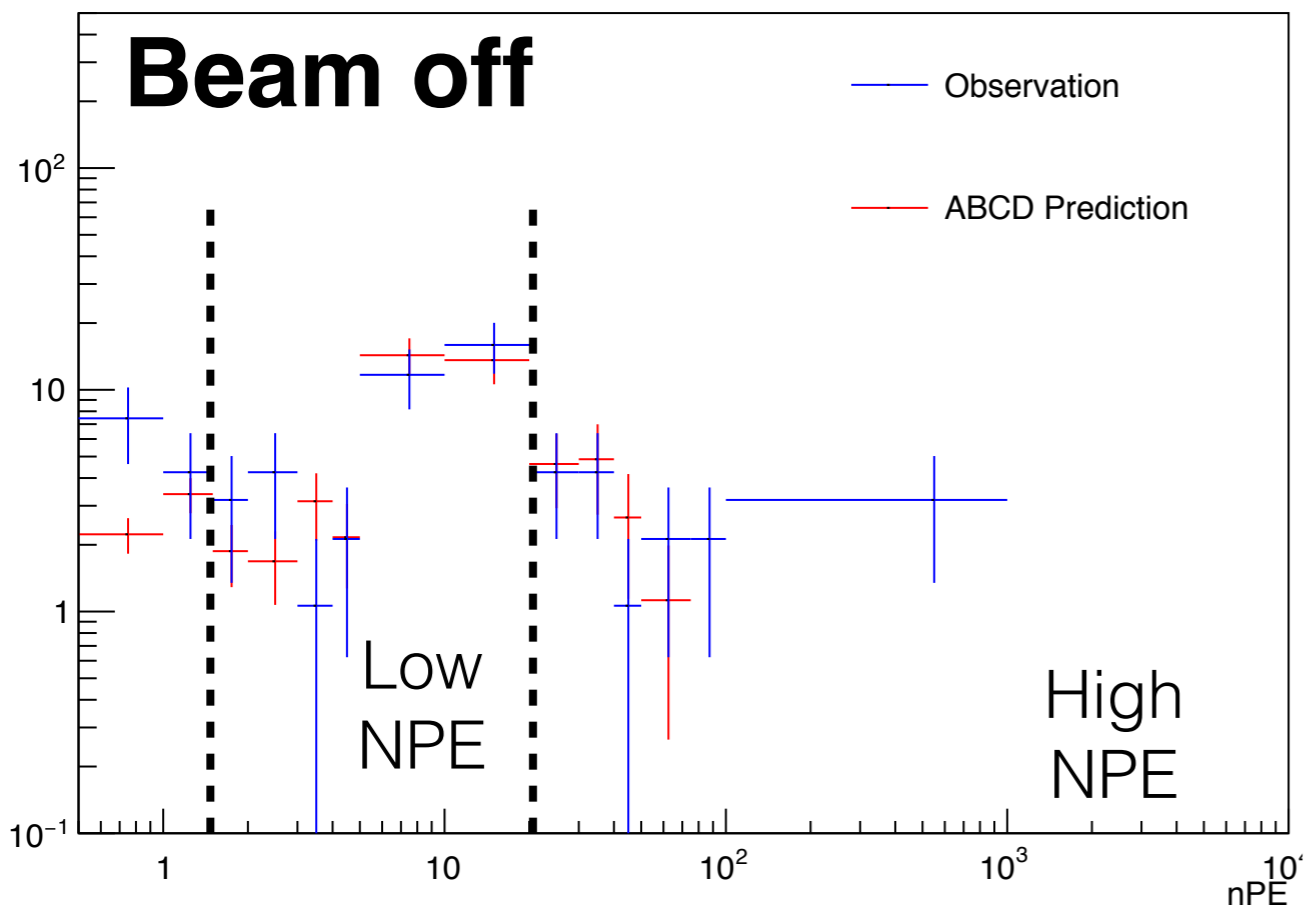
> 1 Slab
Ratio



Signal region predictions - with panel hit

No slab hit regions (before fix) **Charges 0.005 - 0.01**

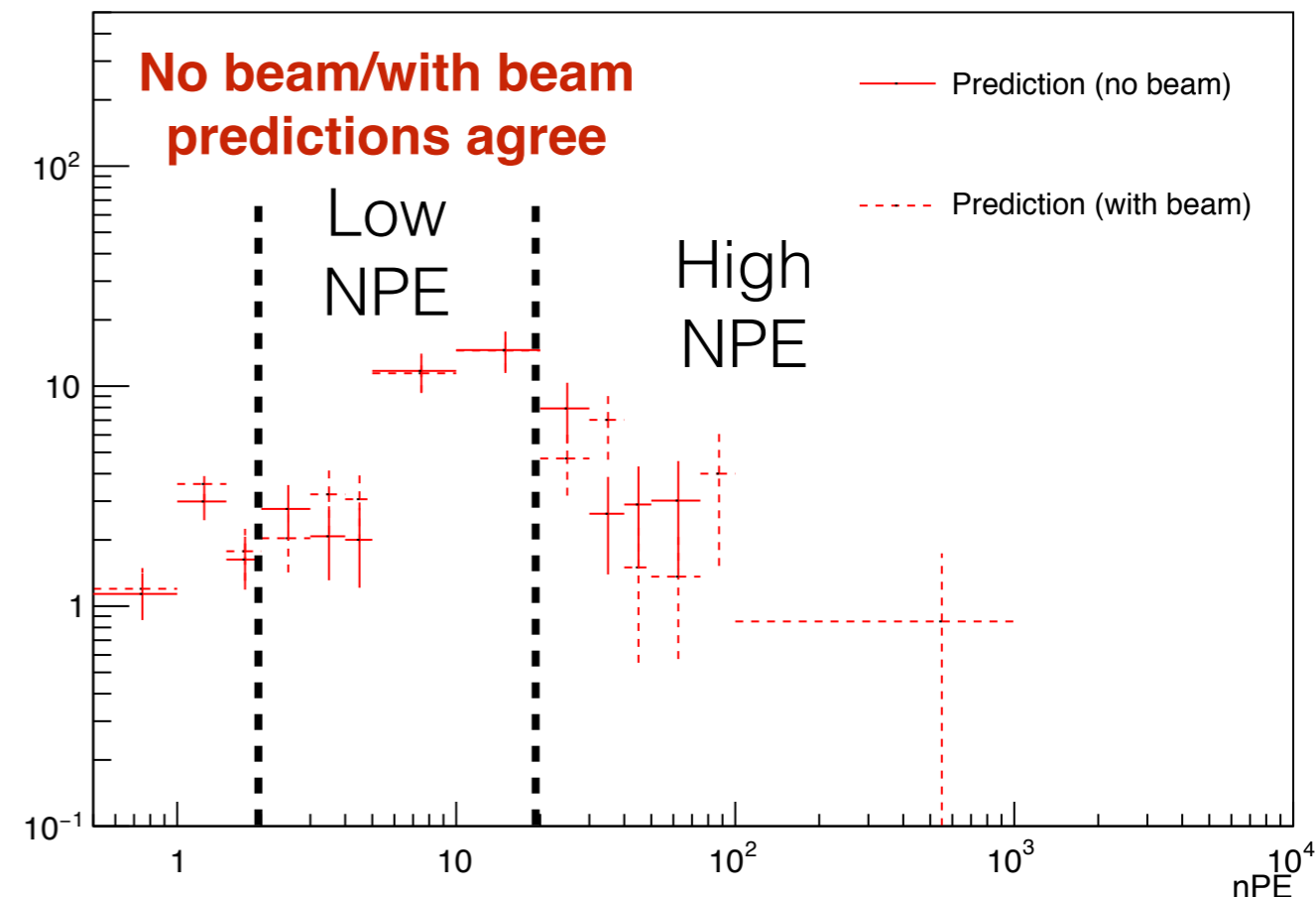
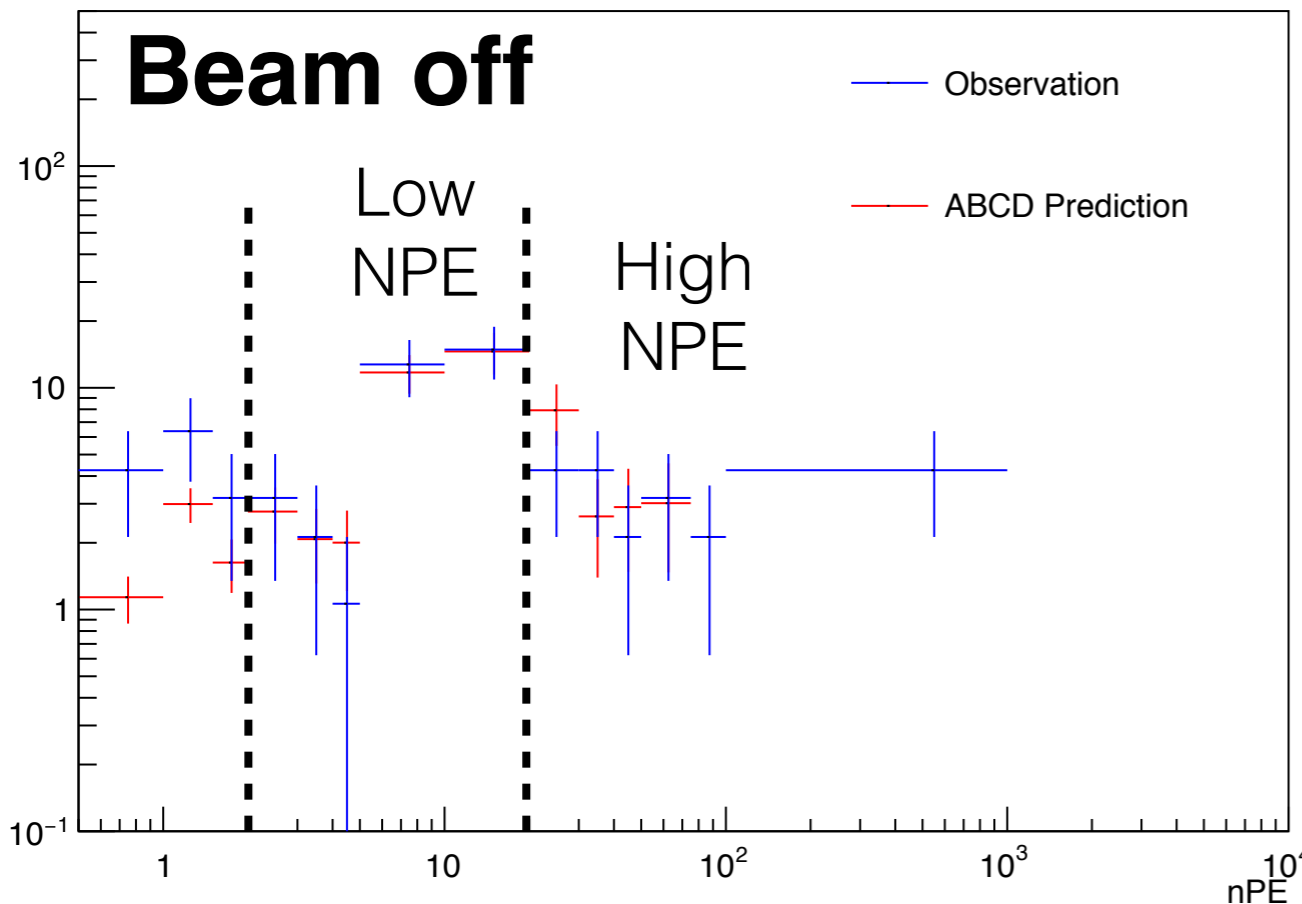
- Selections: min NPE 1.5 \rightarrow 20, $>$ 20
- Validation (beam off): pred 37 ± 4 **obs** 38, 14 ± 3 **obs** 17
- Predictions (beam on): 36 ± 4 , 15 ± 3



No slab hit regions

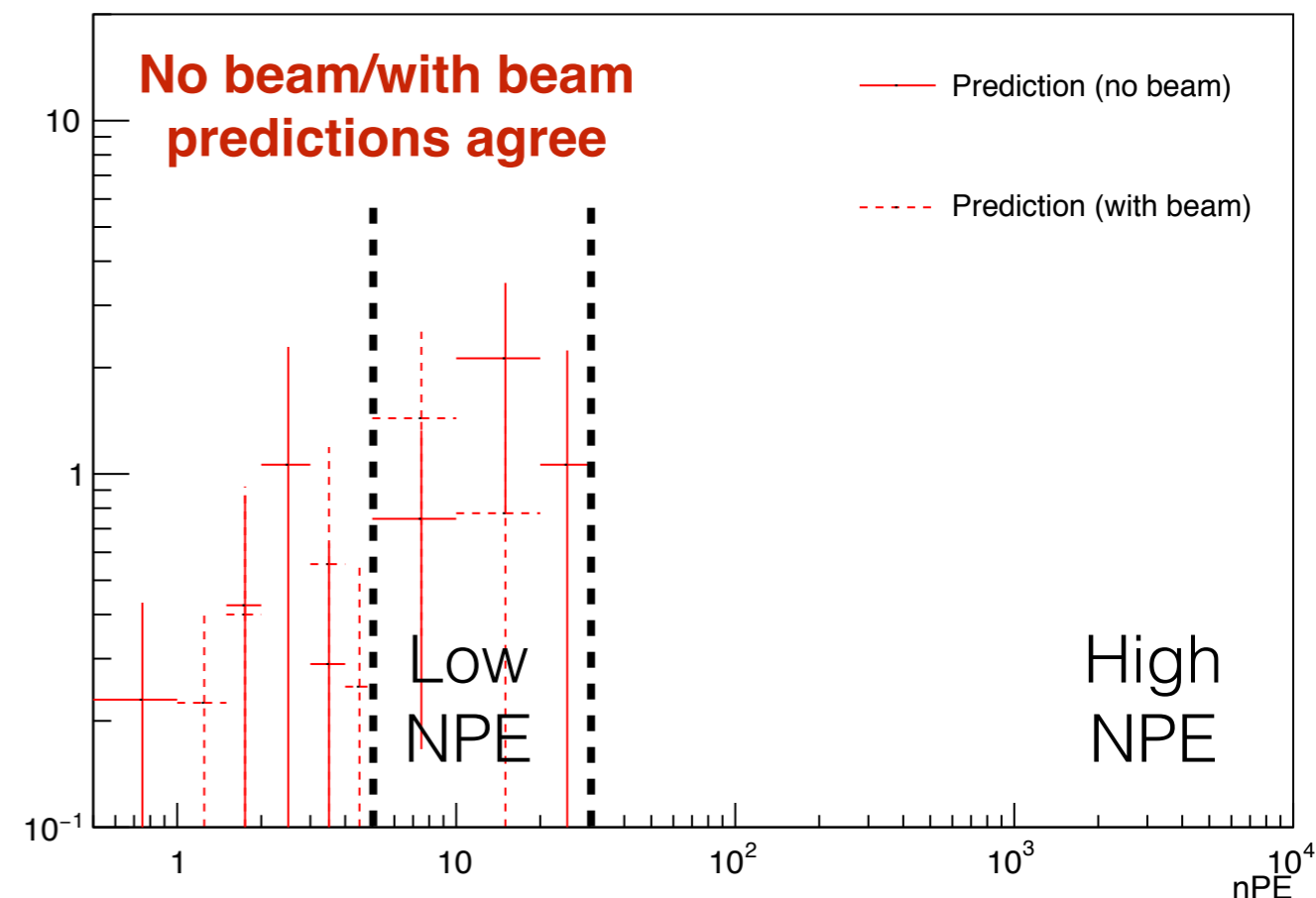
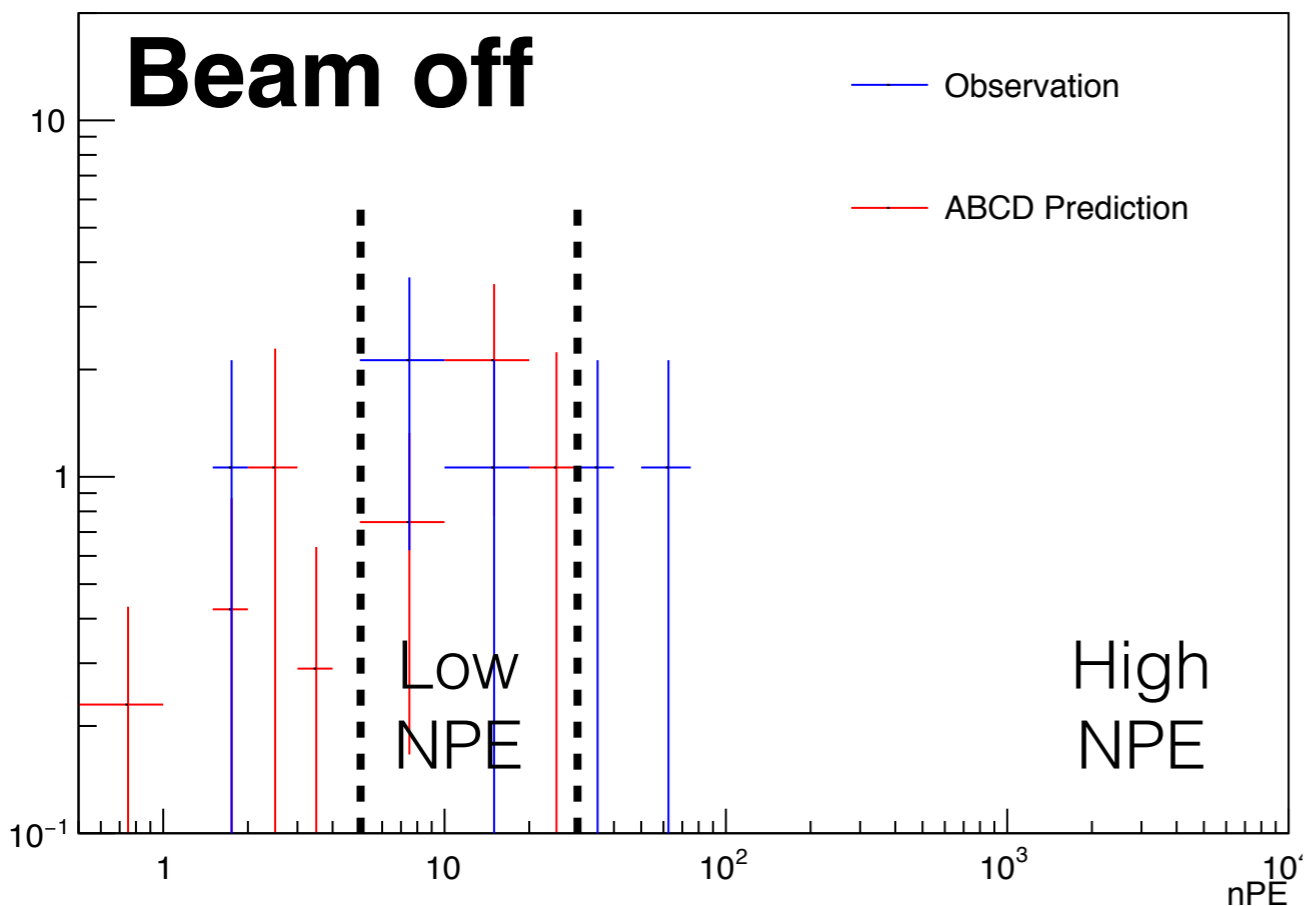
Charges 0.005 - 0.01

- Selections: min NPE 2 \rightarrow 20, $>$ 20
- Validation (beam off): pred 34 ± 4 **obs** 34, 18 ± 3.6 **obs** 20
- Predictions (beam on): 33 ± 4 , **obs** 39, 18 ± 4 , **obs** 13



One slab hit regions (before fix) **Charges 0.01 - 0.03**

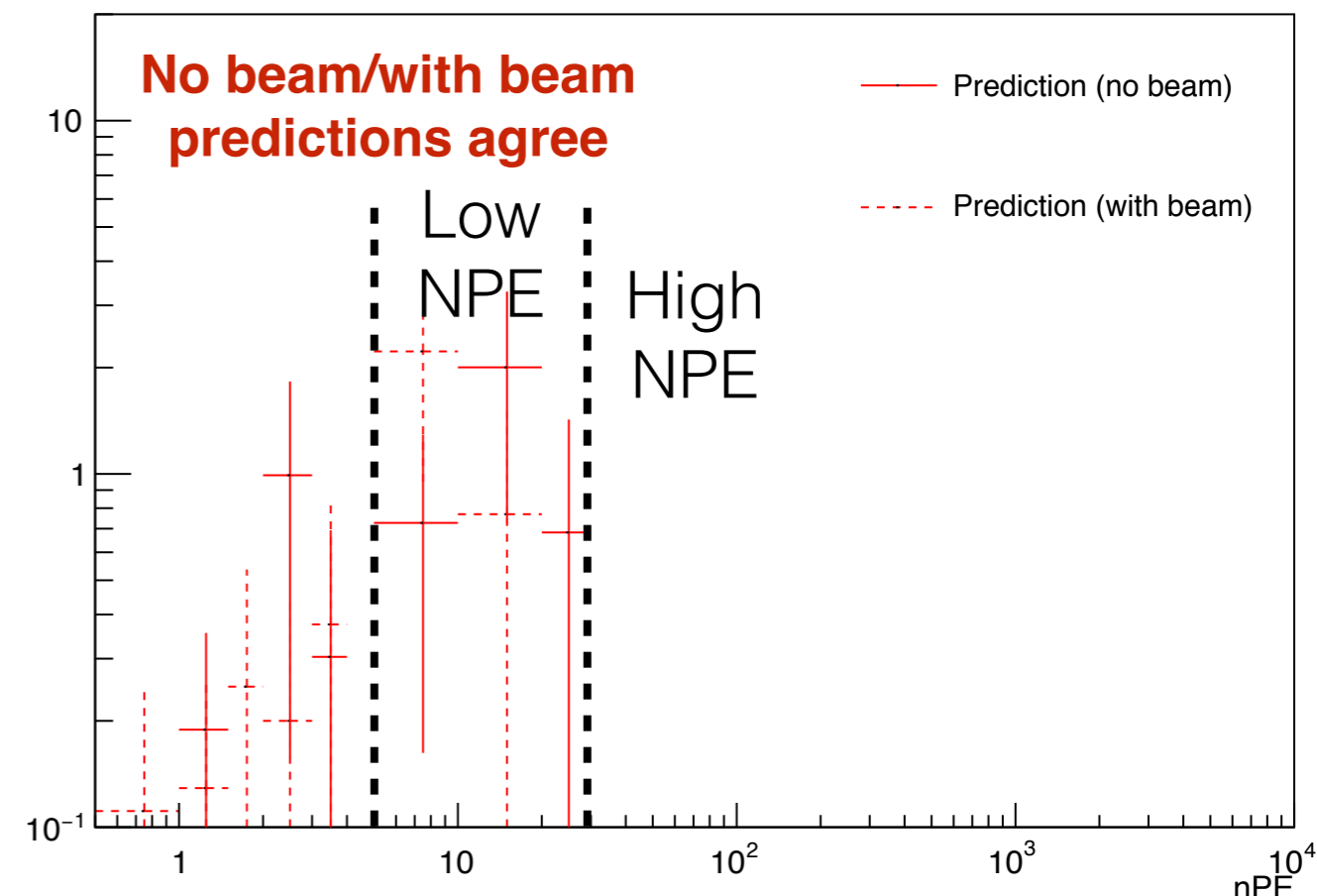
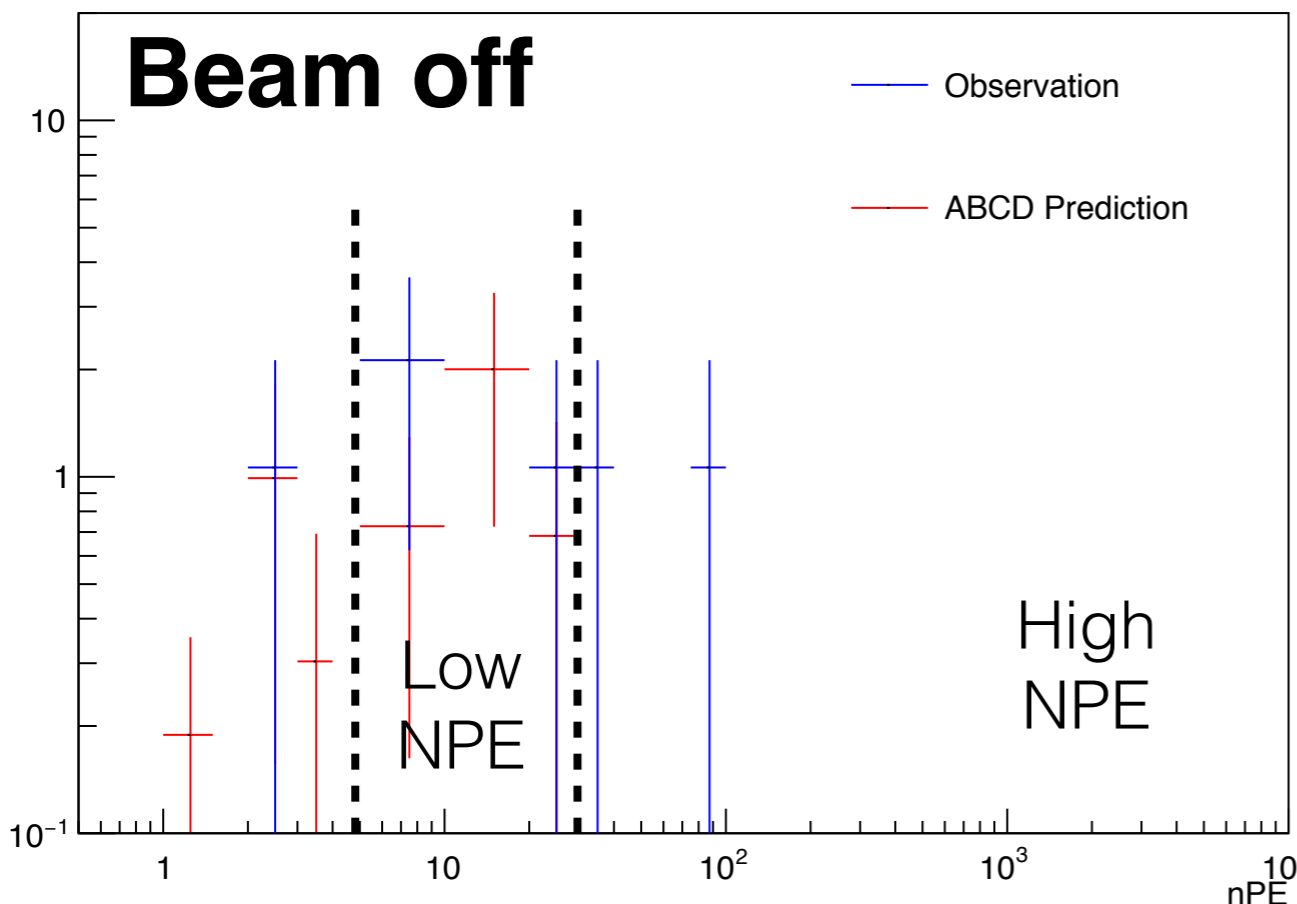
- Selections: min NPE 5 \rightarrow 30, $>$ 30
- Validation (beam off): pred 3.6 ± 2 **obs** 3.2, 0 ± 1.8 **obs** 2.1
- Predictions (beam on): 2 ± 1.2 , 0 ± 1.8



One slab hit regions

Charges 0.01 - 0.03

- Selections: min NPE 5 \rightarrow 30, $>$ 30
- Validation (beam off): pred 3.2 ± 6 **obs** 3, 0 ± 1.4 **obs** 2
- Predictions (beam on): 3.4 ± 1.7 , **obs** 4, 0 ± 1.1 **obs** 2



Two slab hit regions

Slab NPE < 250

- Selections: min NPE inclusive
- Validation (beam off): pred 1.6 ± 1.3 , **obs** 0
- Predictions (beam on): 0 ± 1.4 , **obs** 3

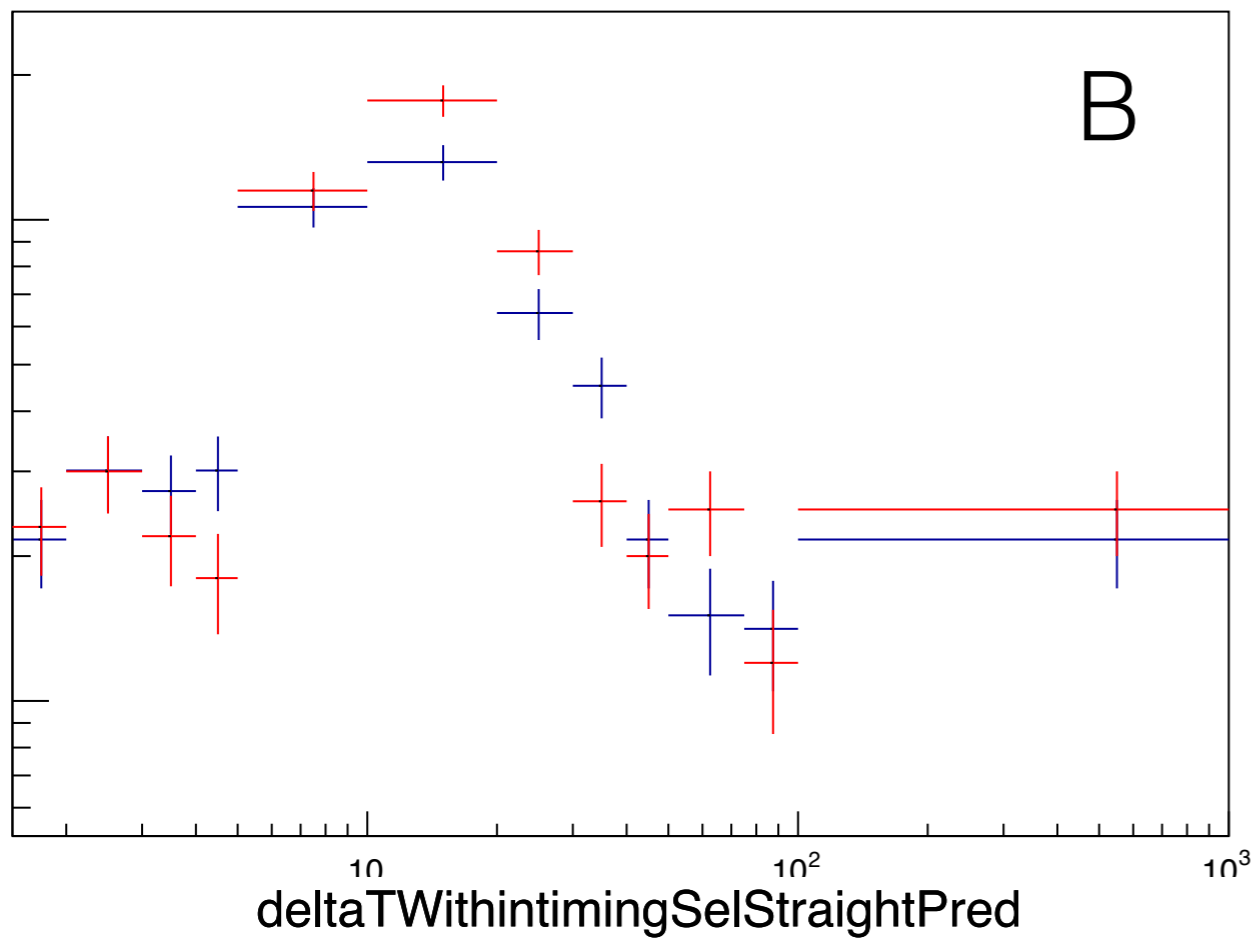
Charges 0.03 - 0.2

Insufficient stats for NPE distribution

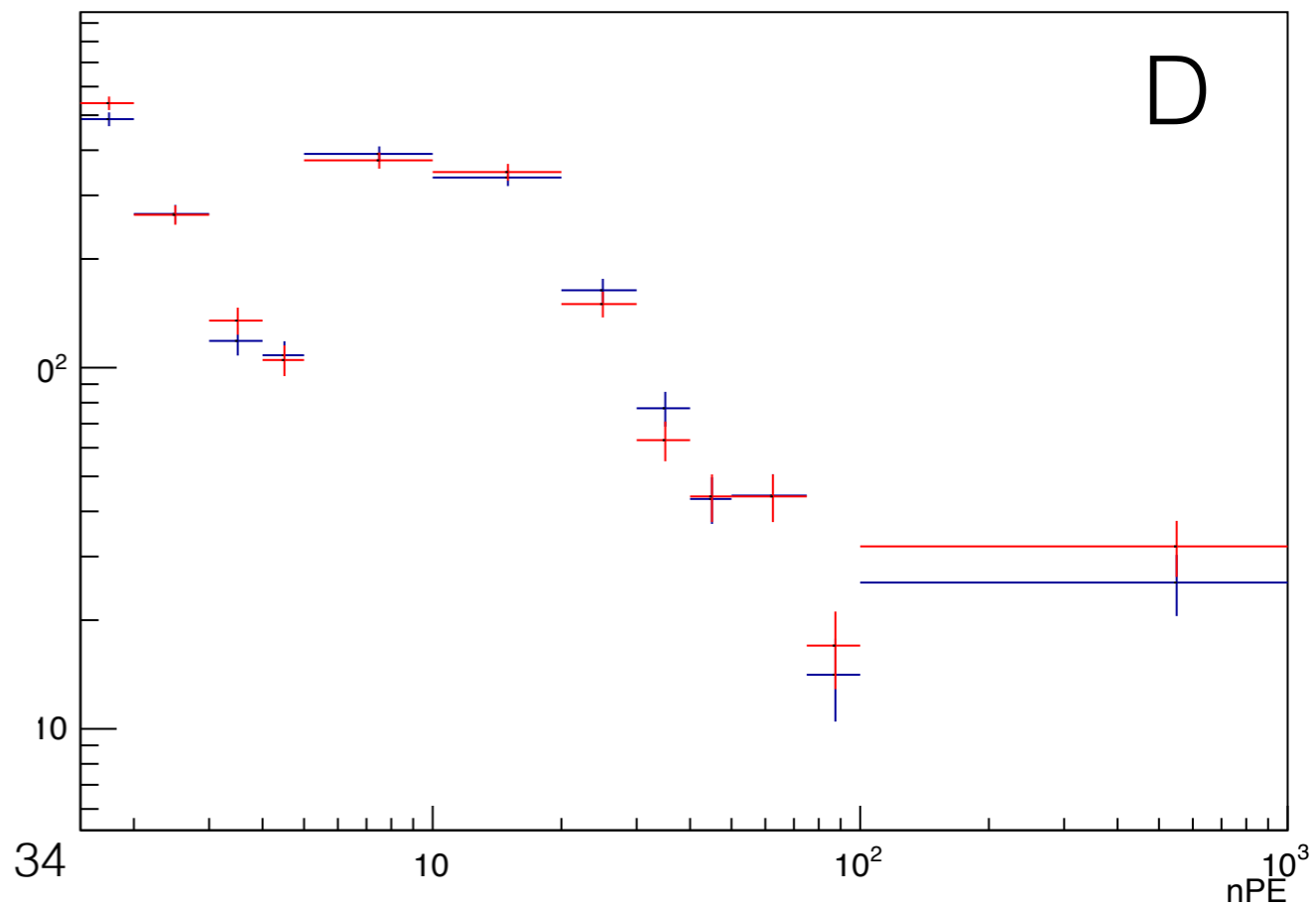
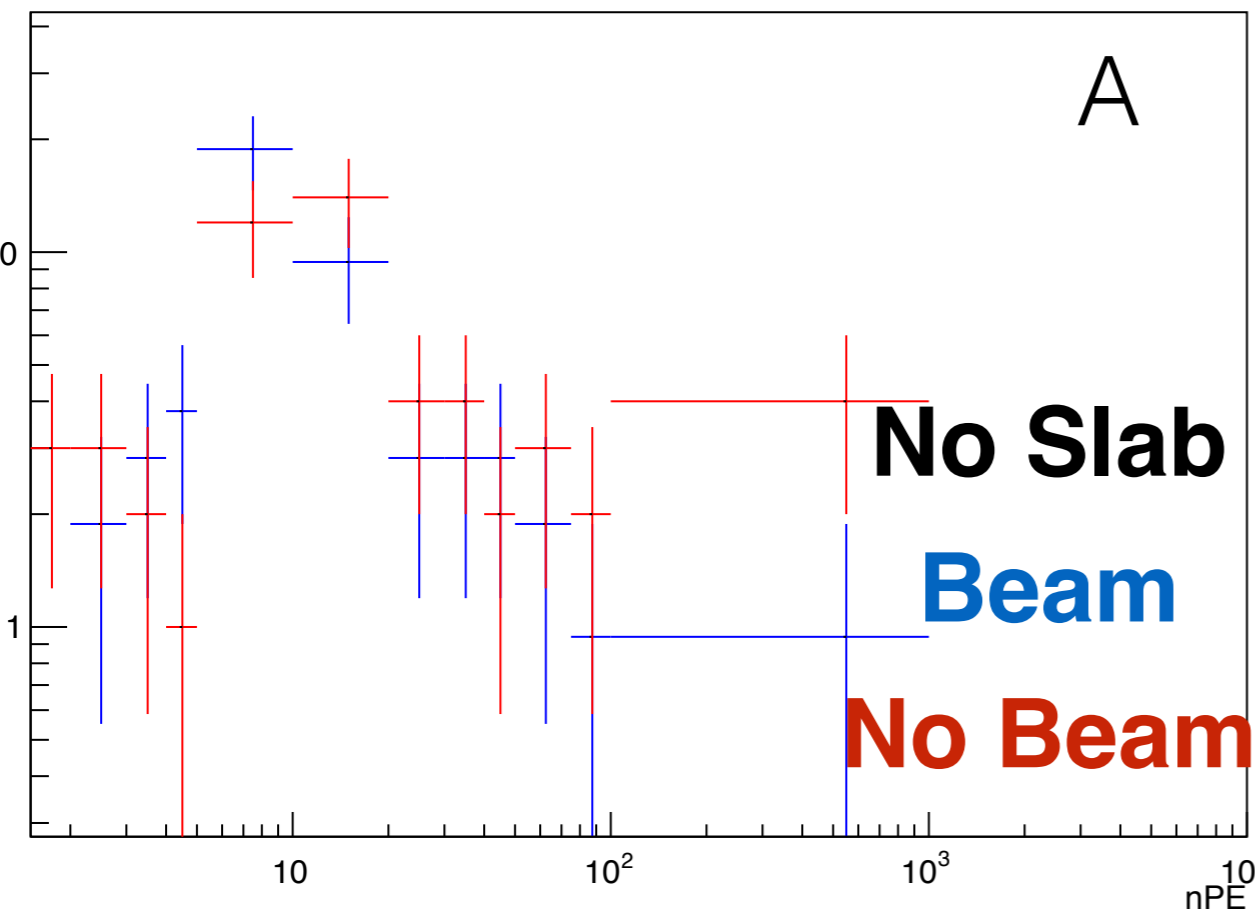
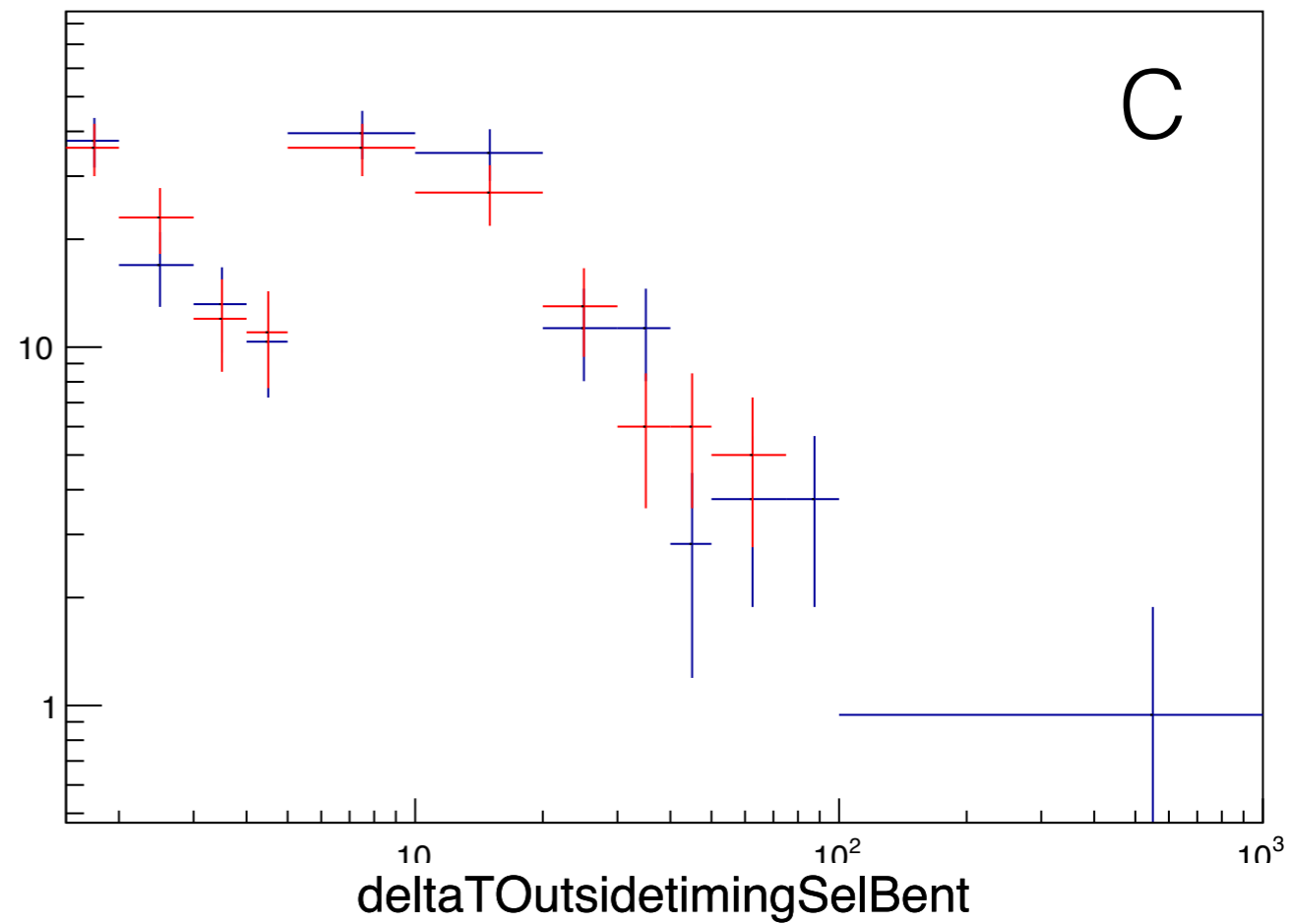
Unblinding checks - require
panel hit

LogY

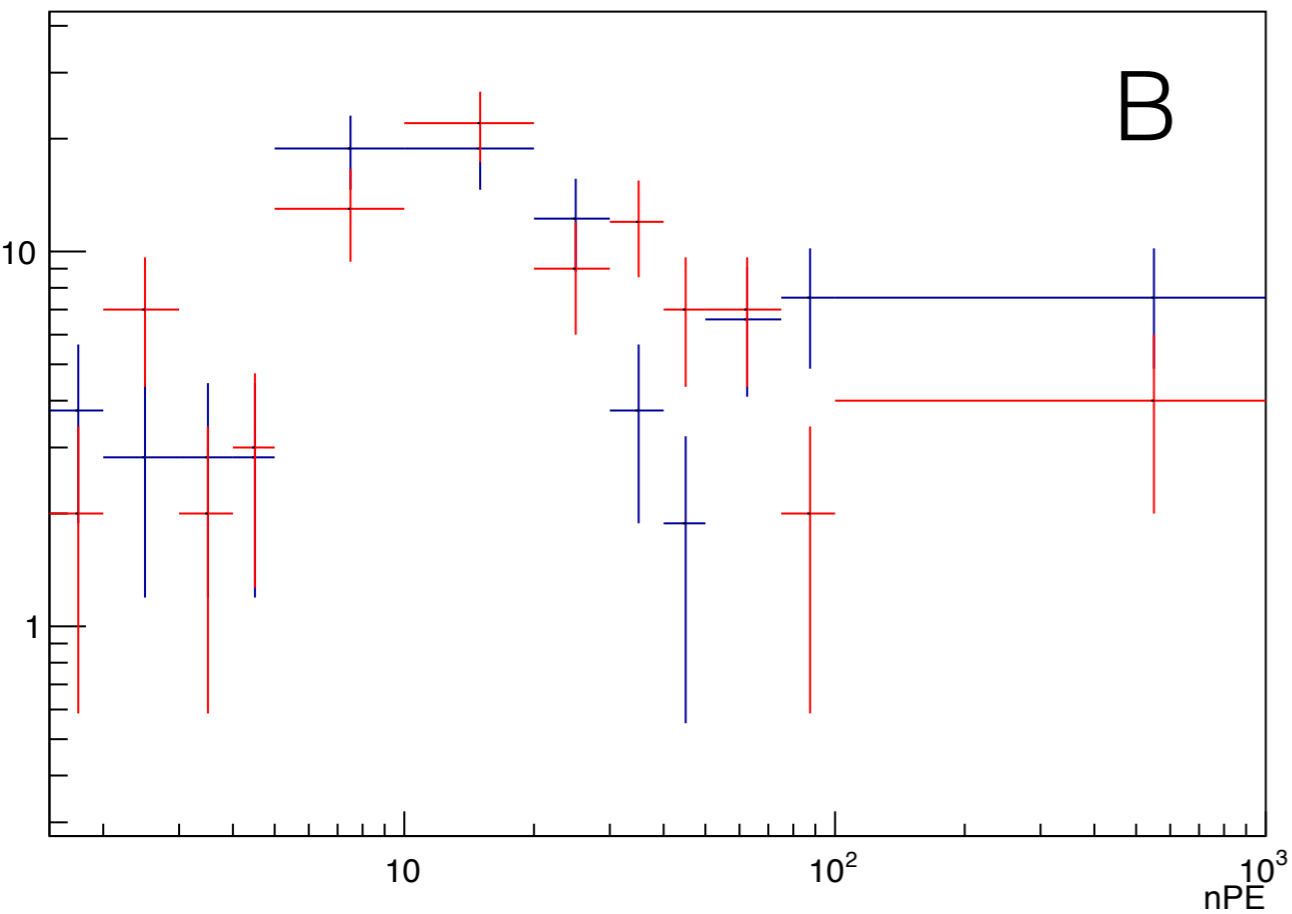
deltaTWithintimingSelBent



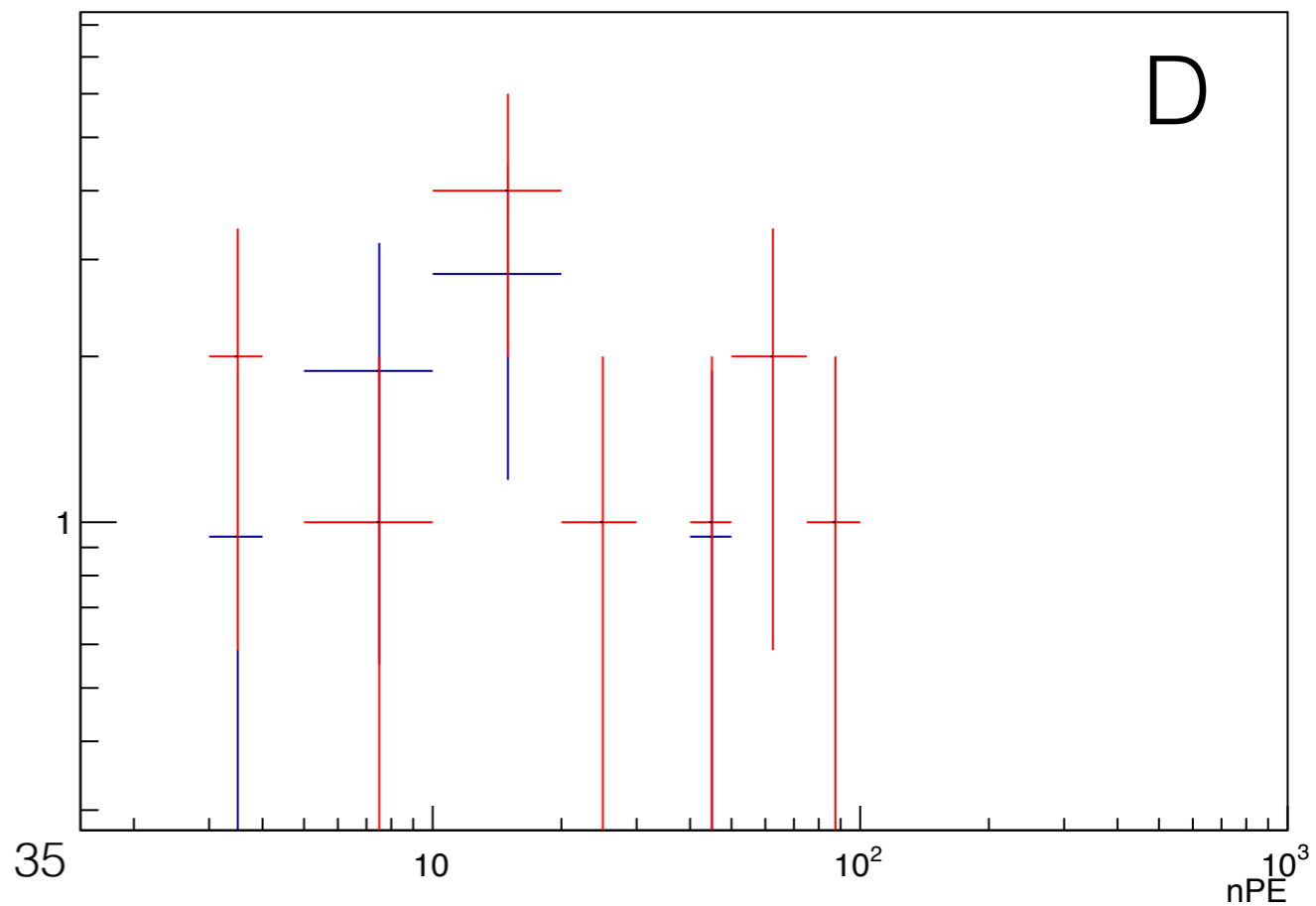
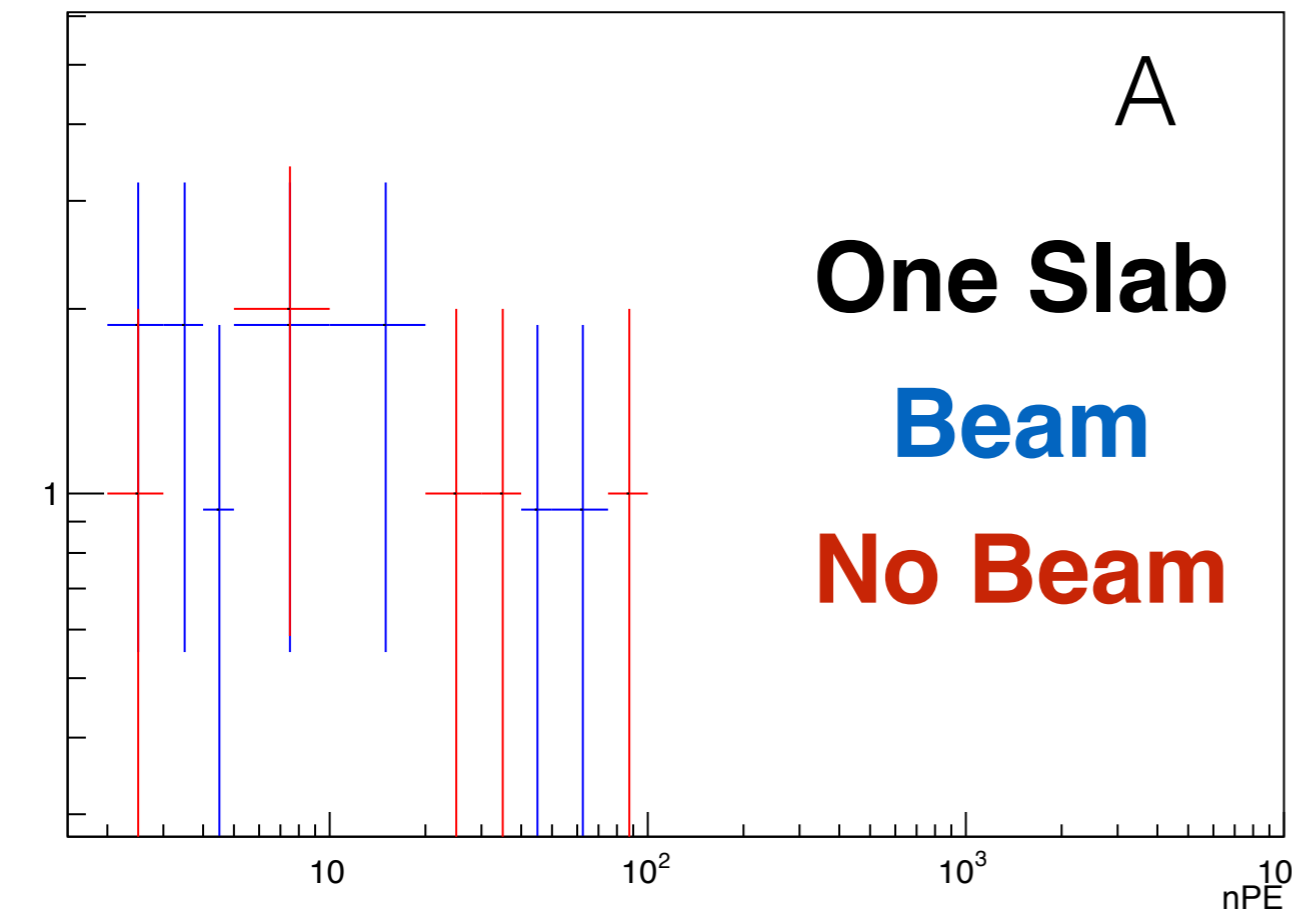
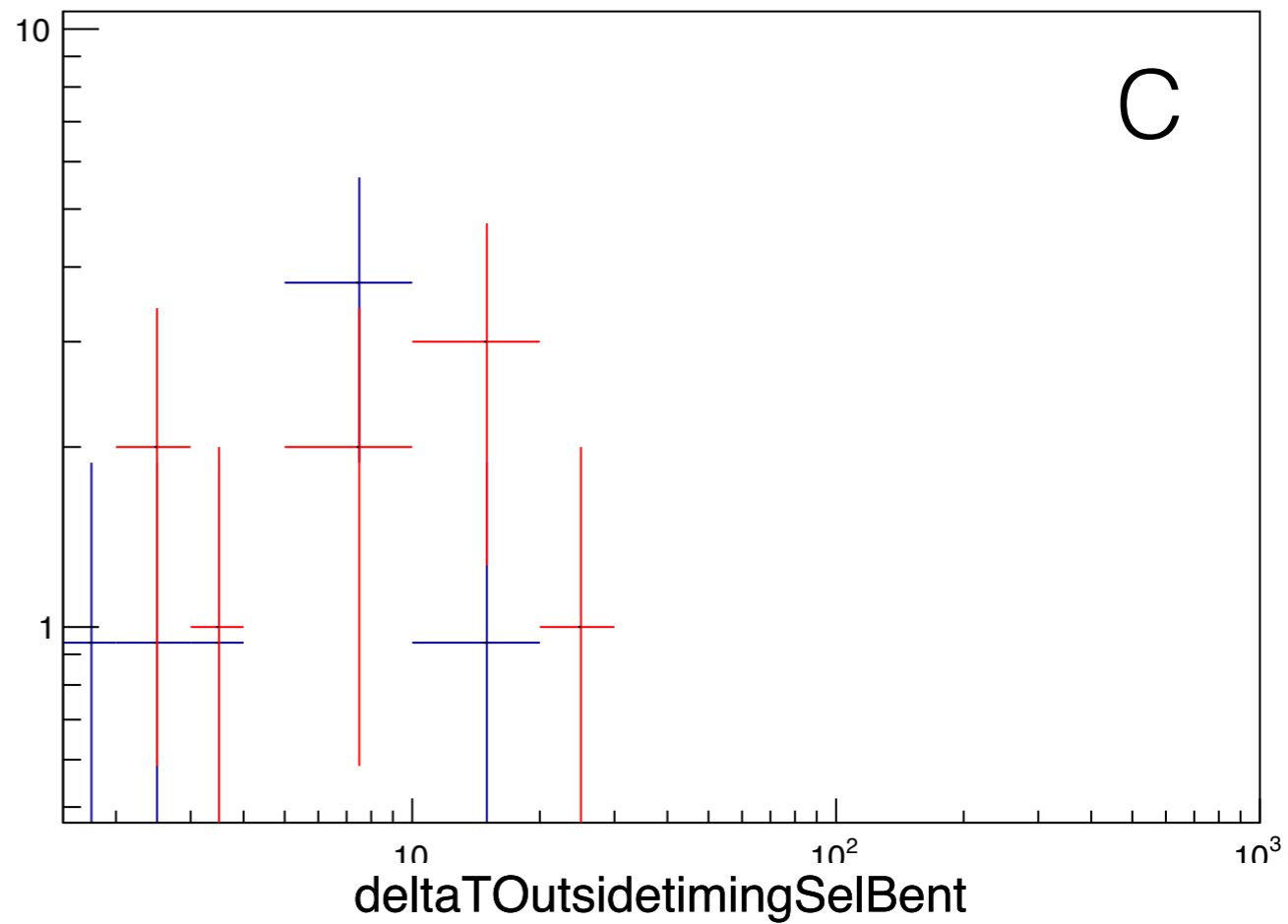
deltaTOutsidetimingSelStraight



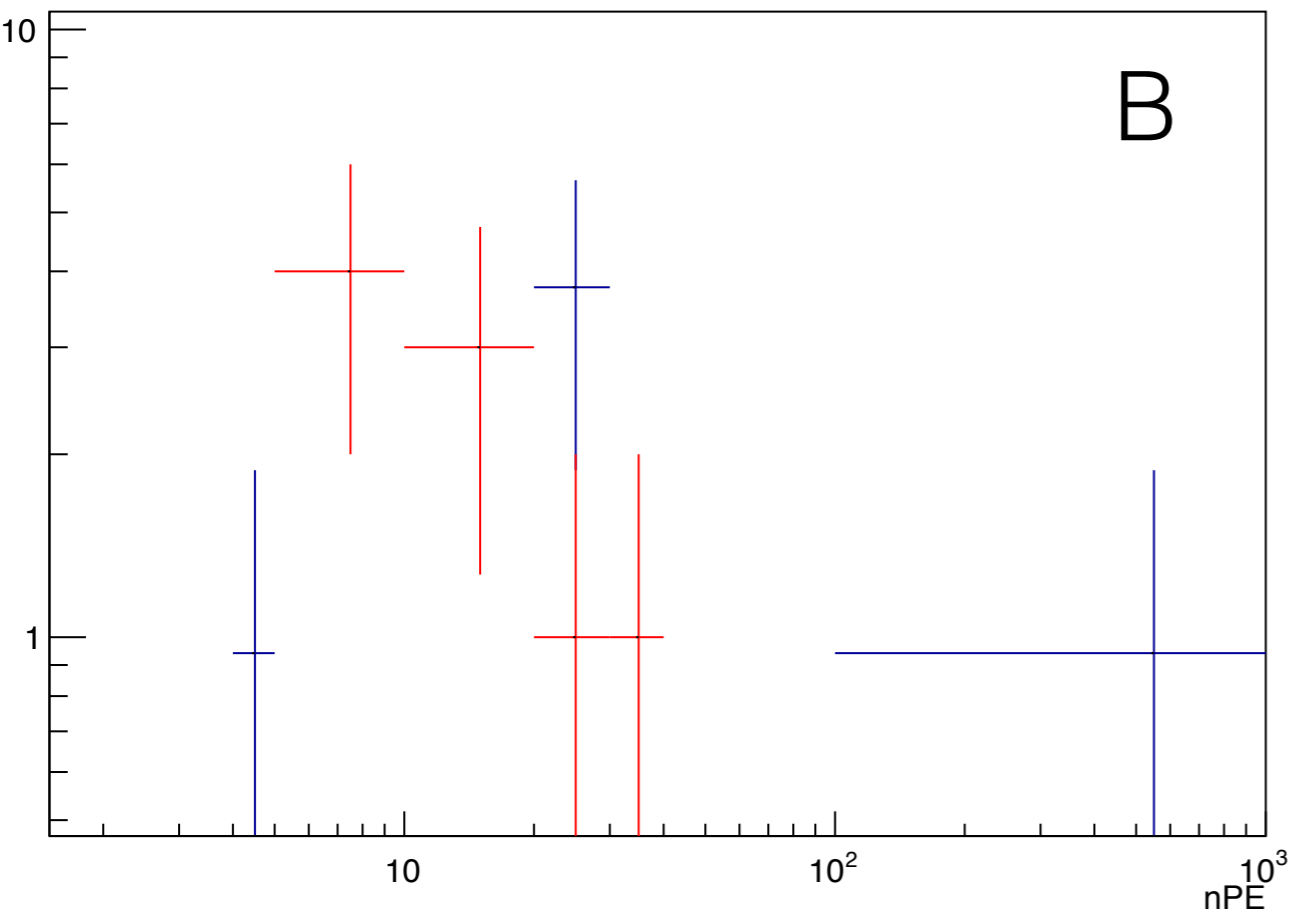
deltaTWithintimingSelBent



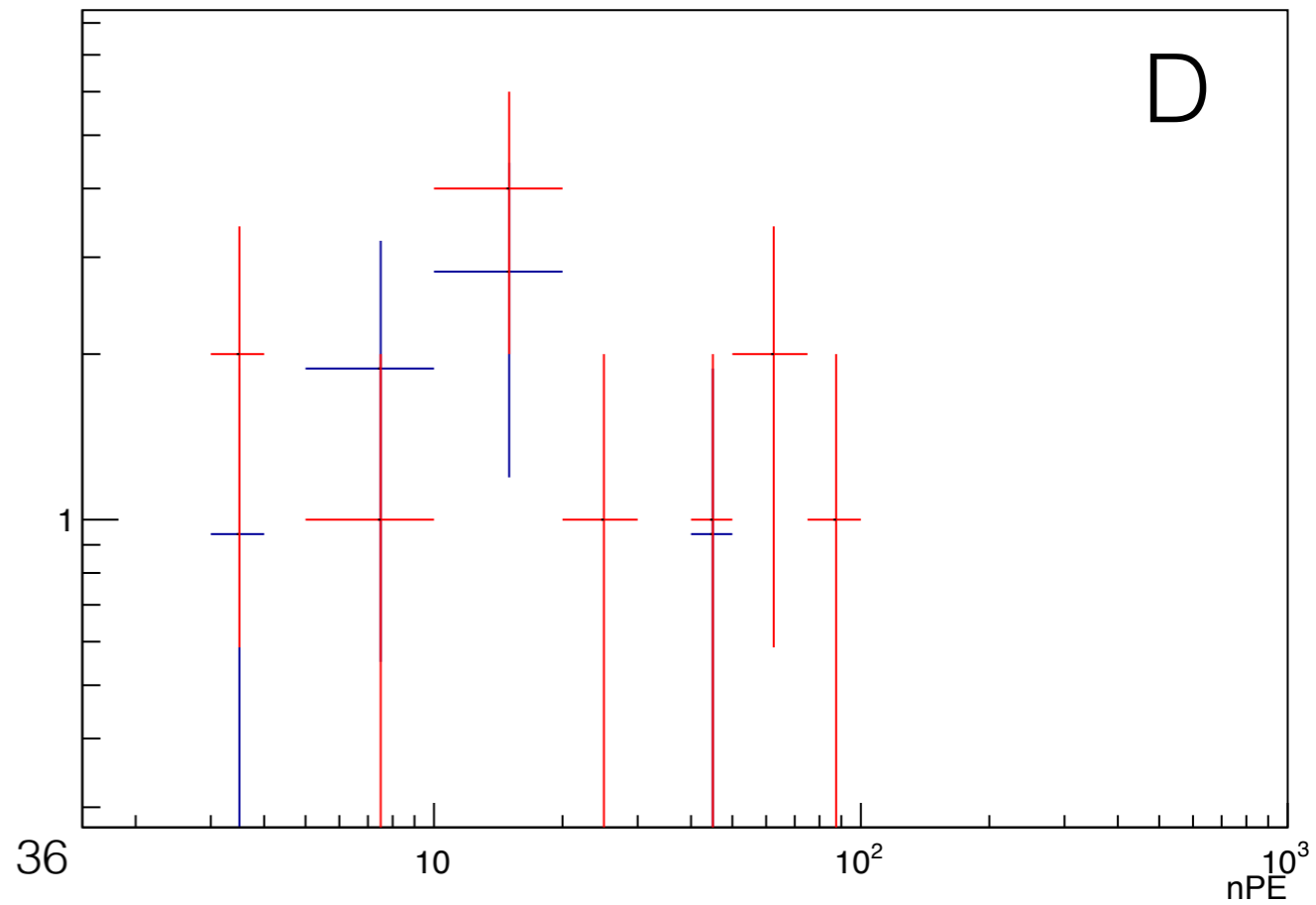
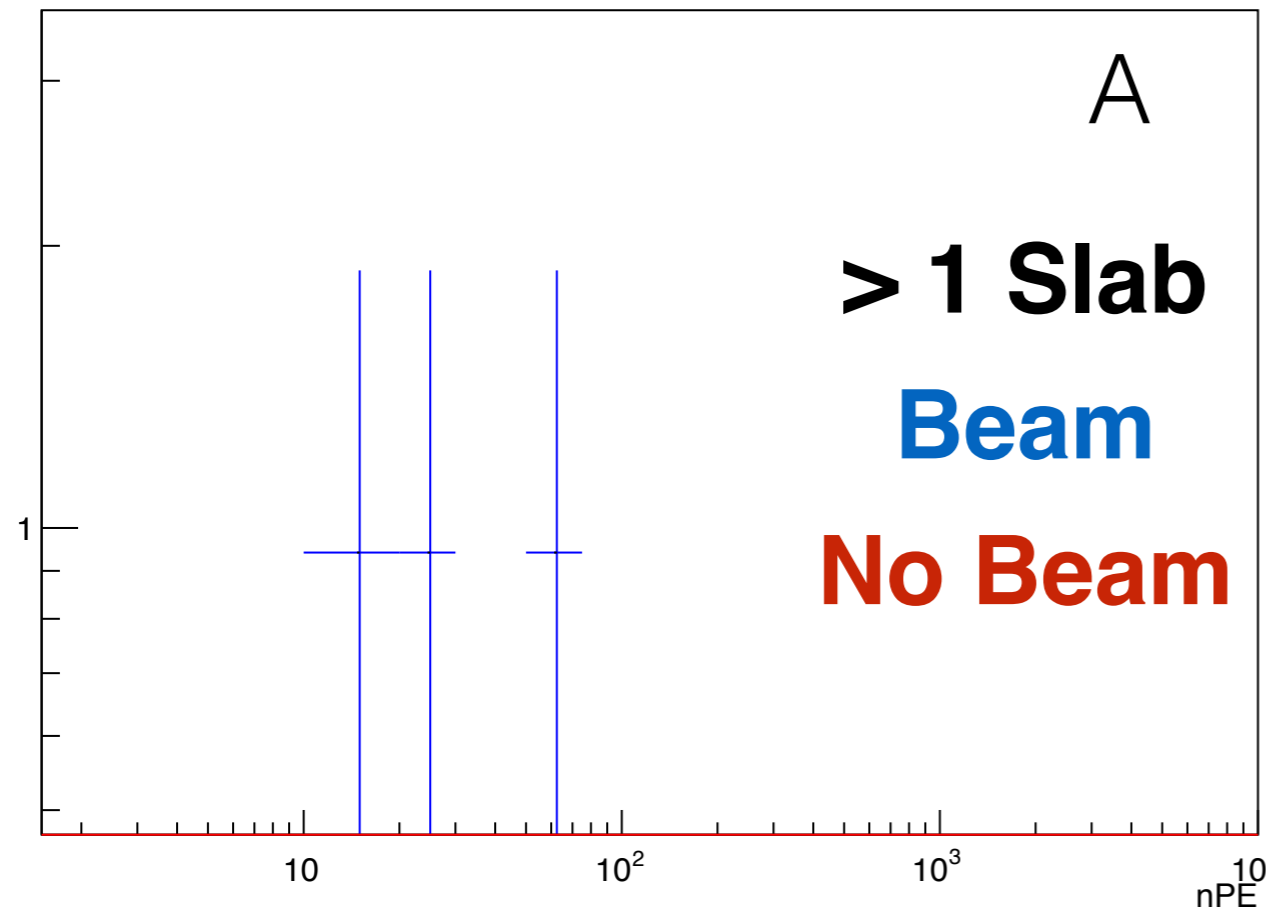
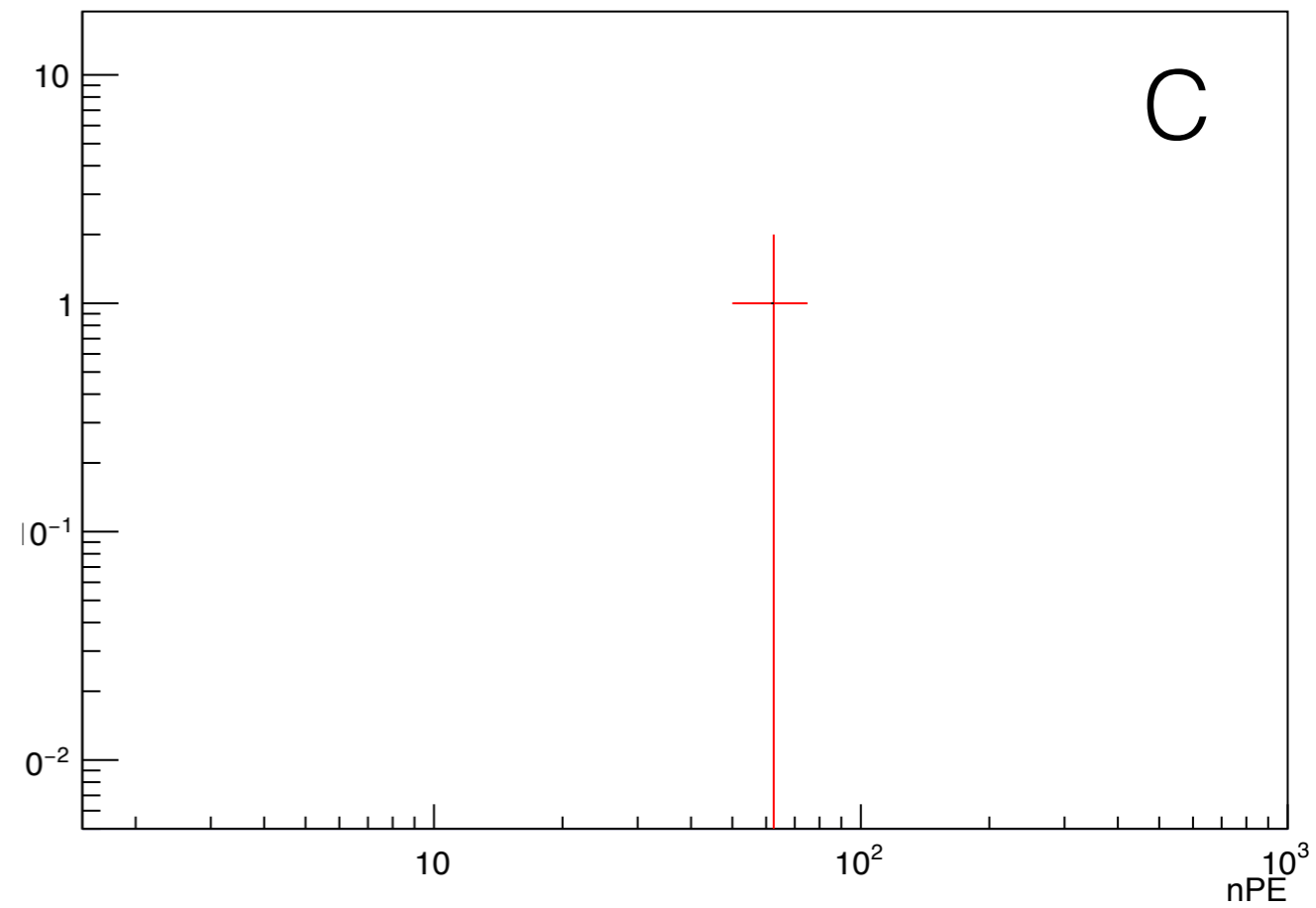
deltaTOutsidetimingSelStraight



deltaTWithintimingSelBent

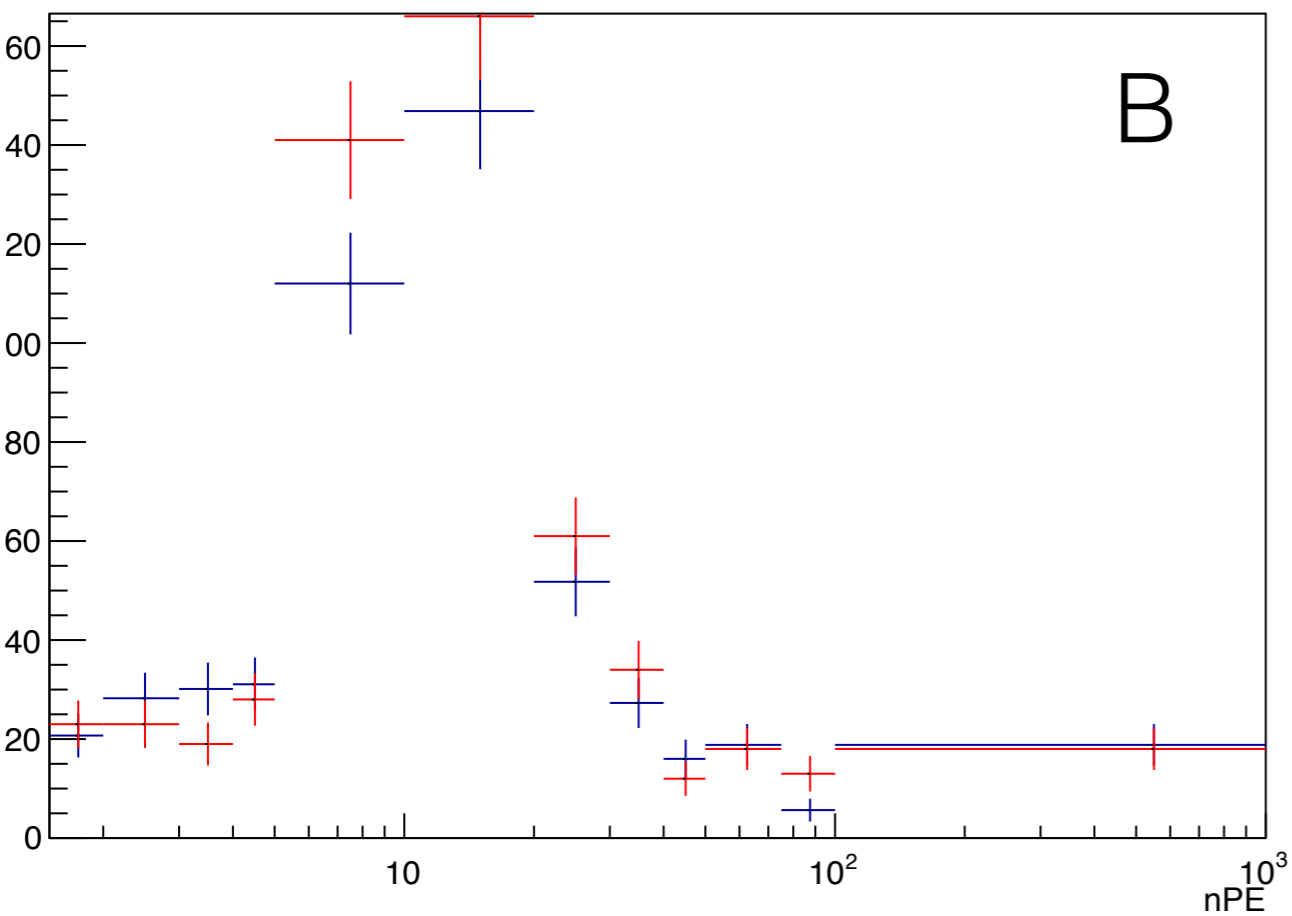


deltaTOutsidetimingSelStraight

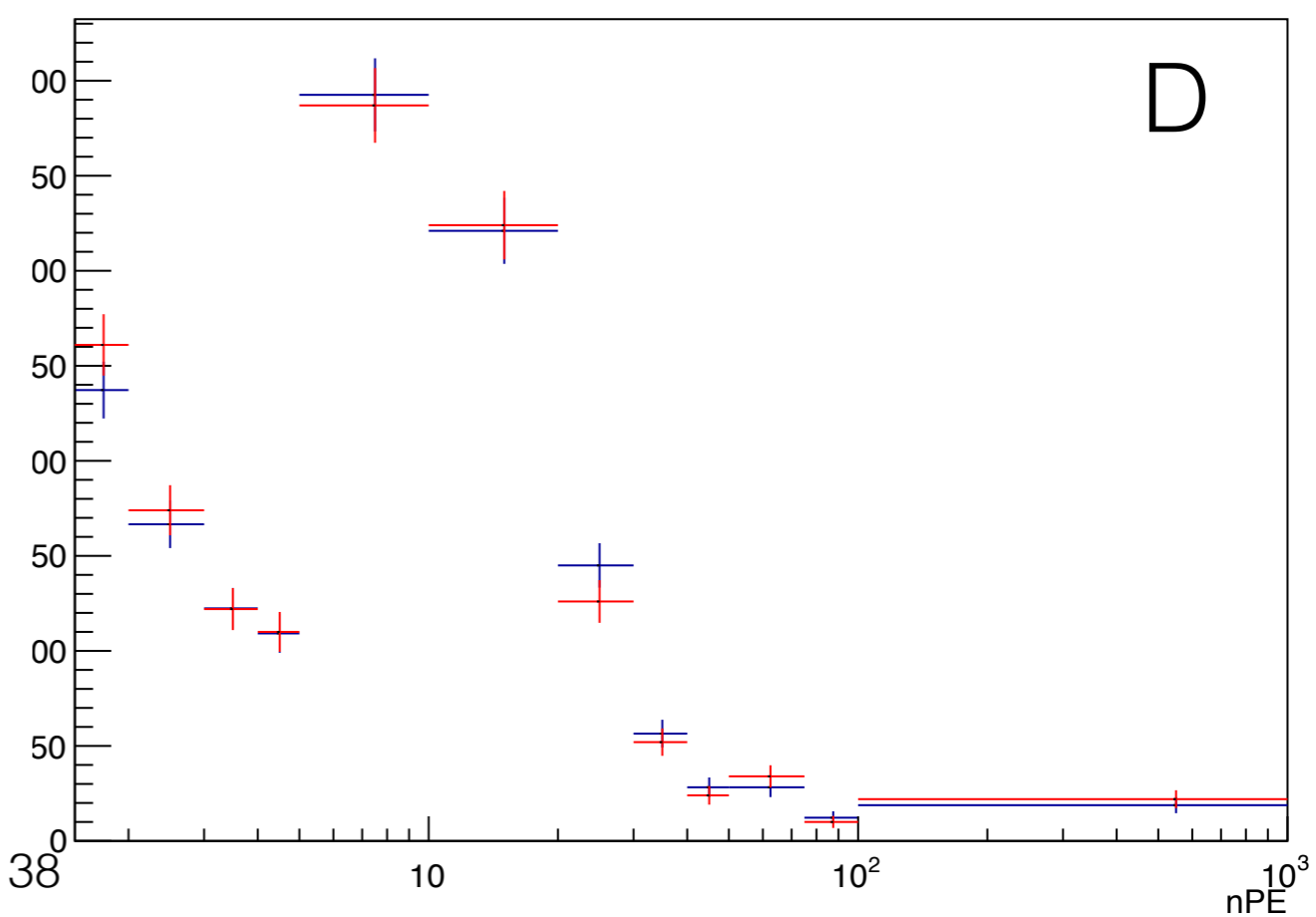
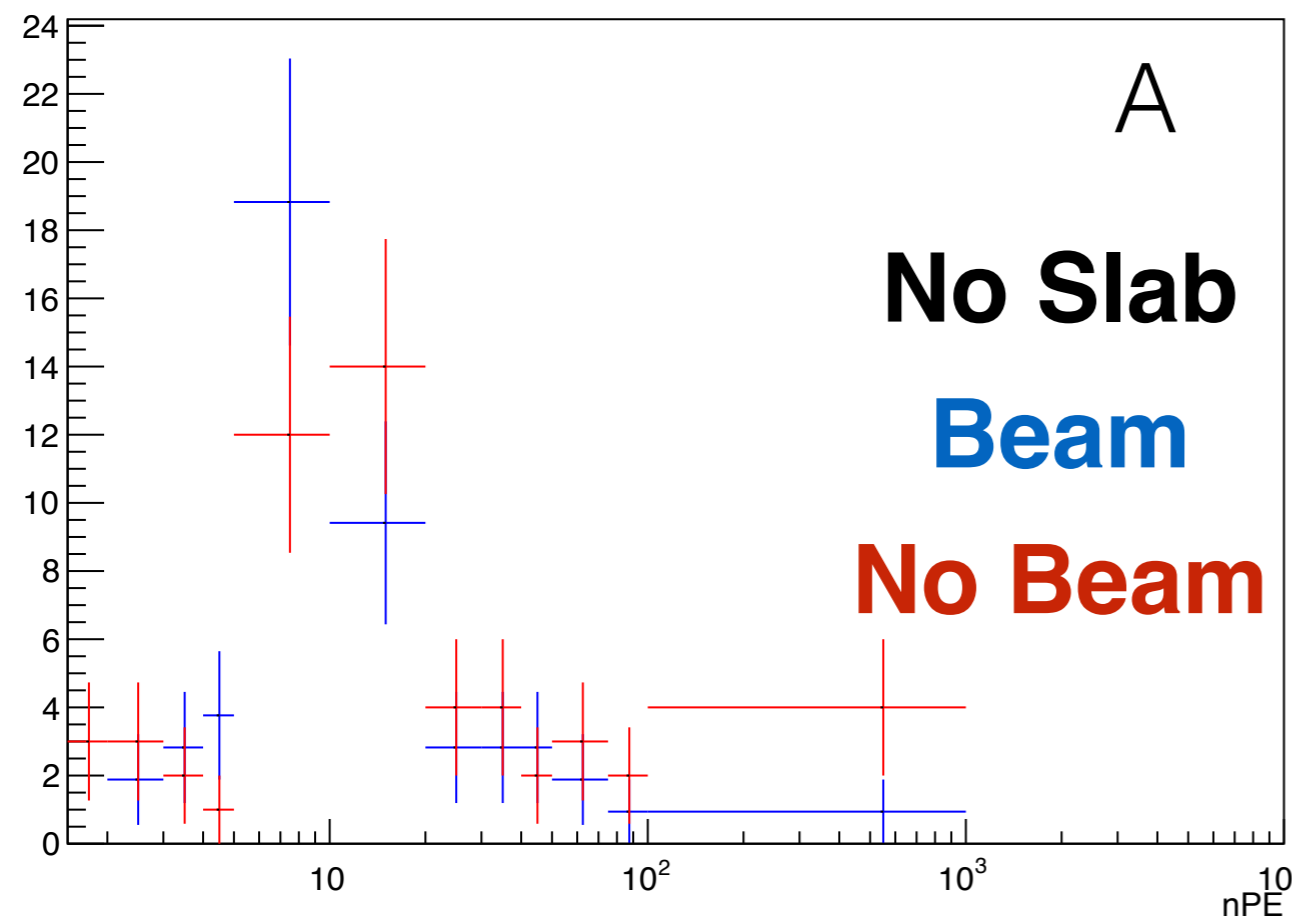
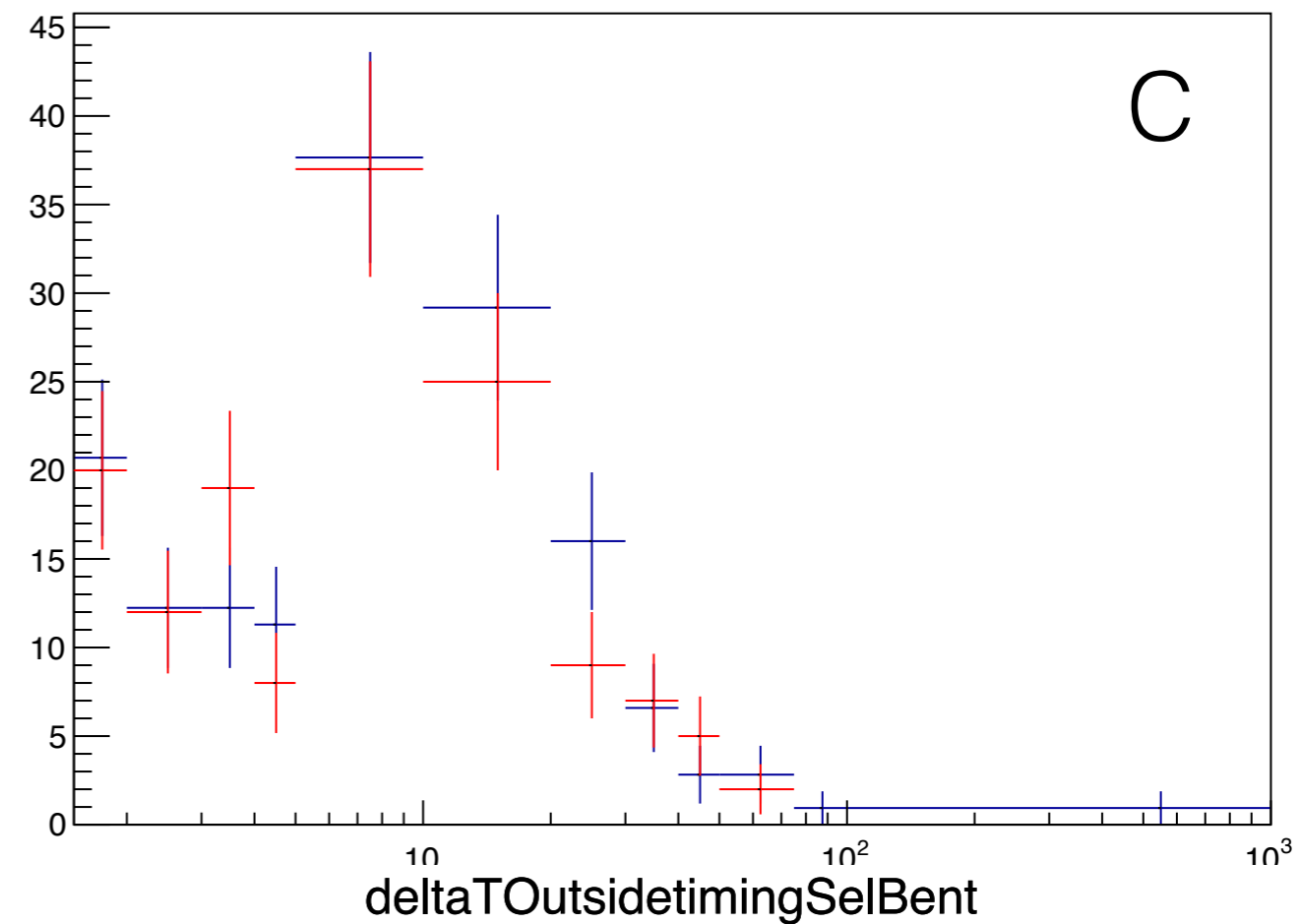


Lin

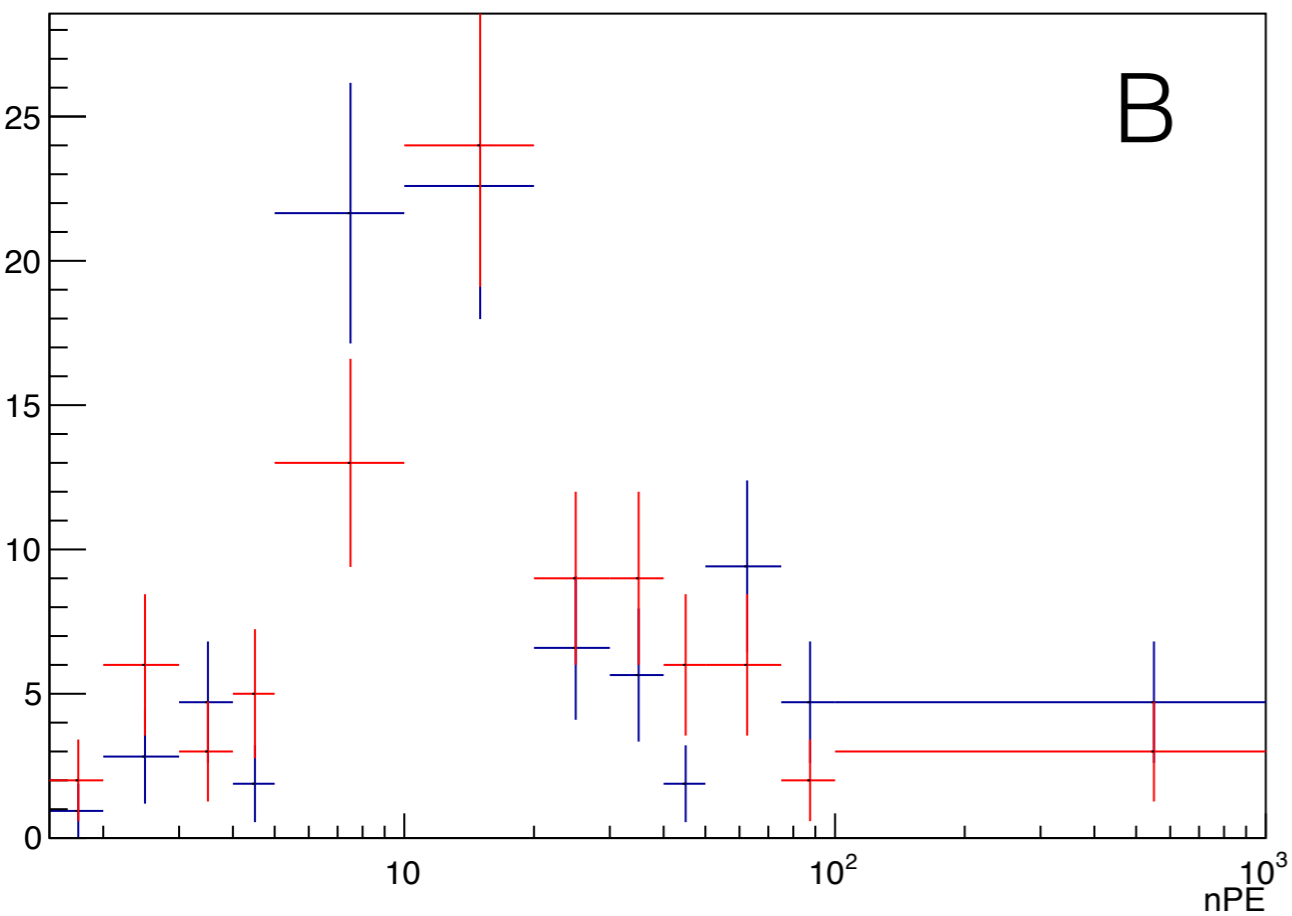
deltaTWithintimingSelBent



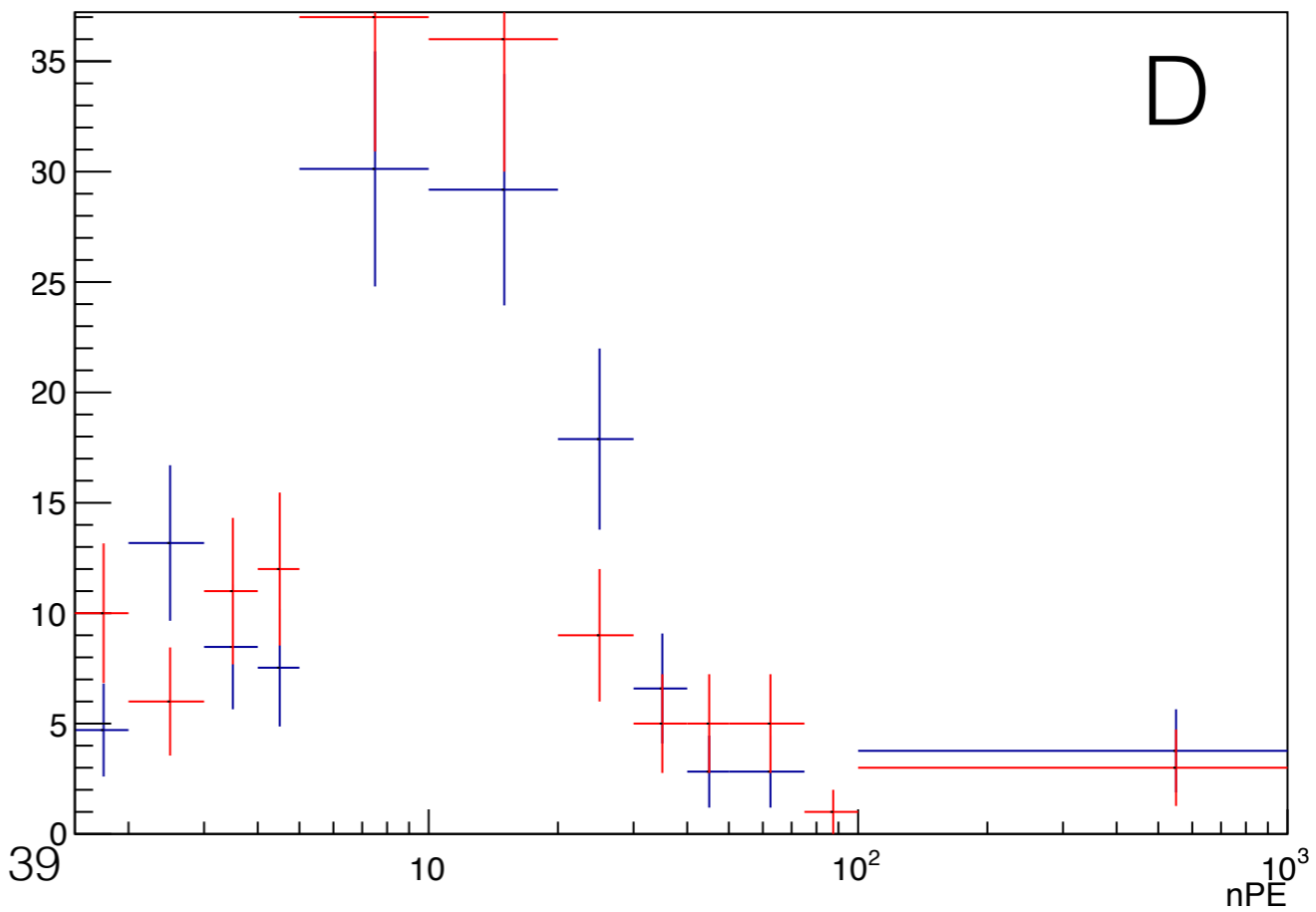
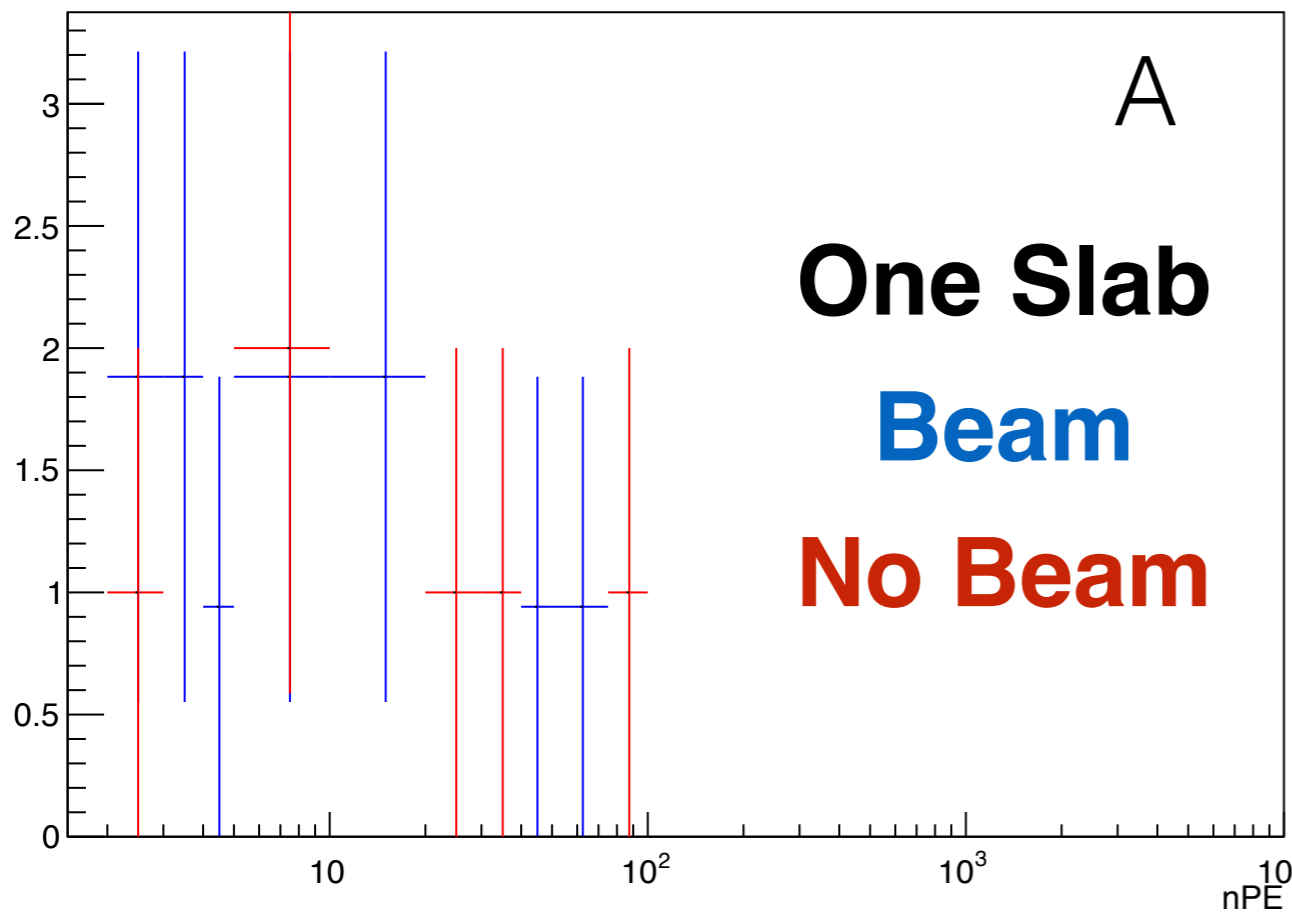
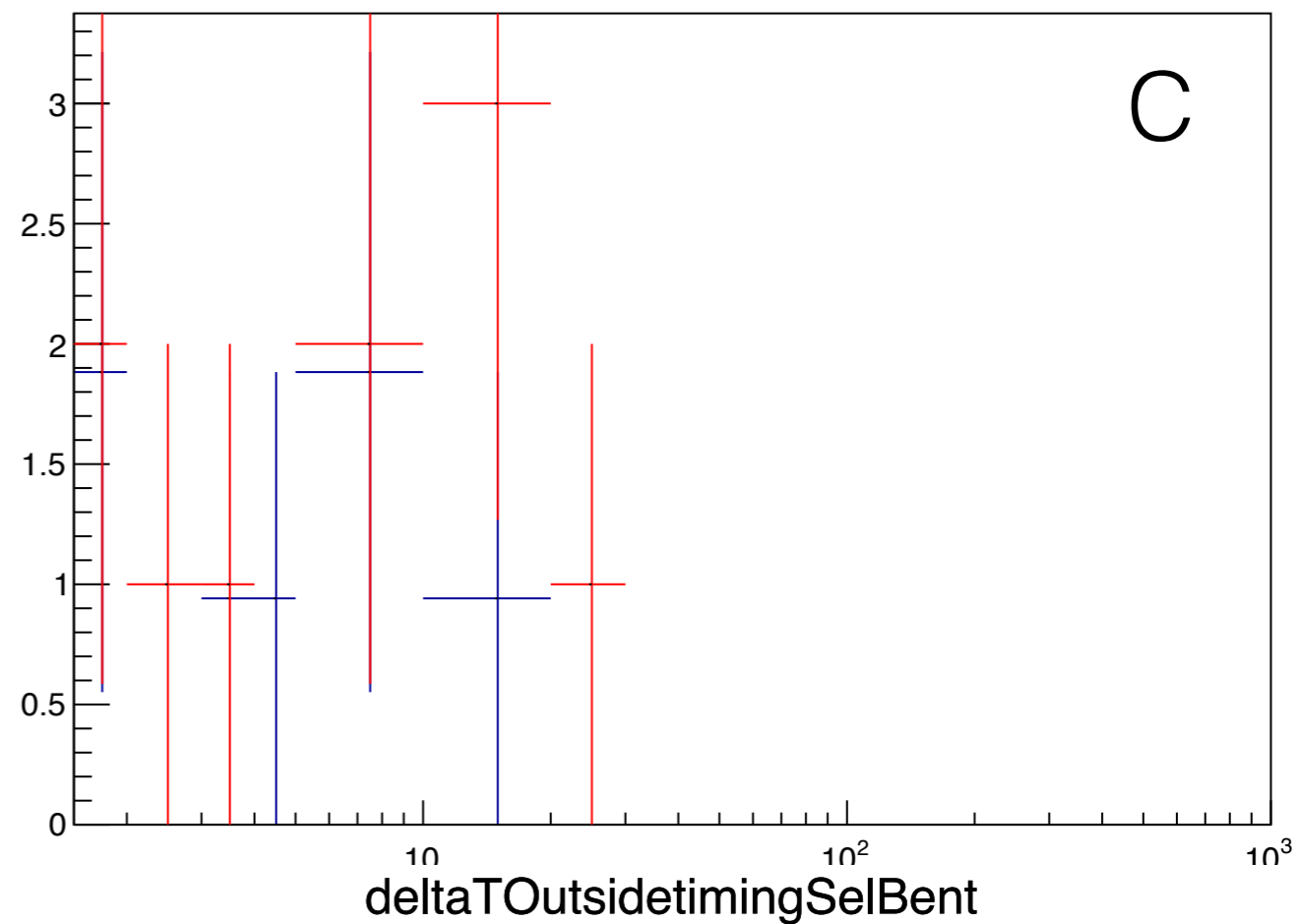
deltaTOutsidetimingSelStraight



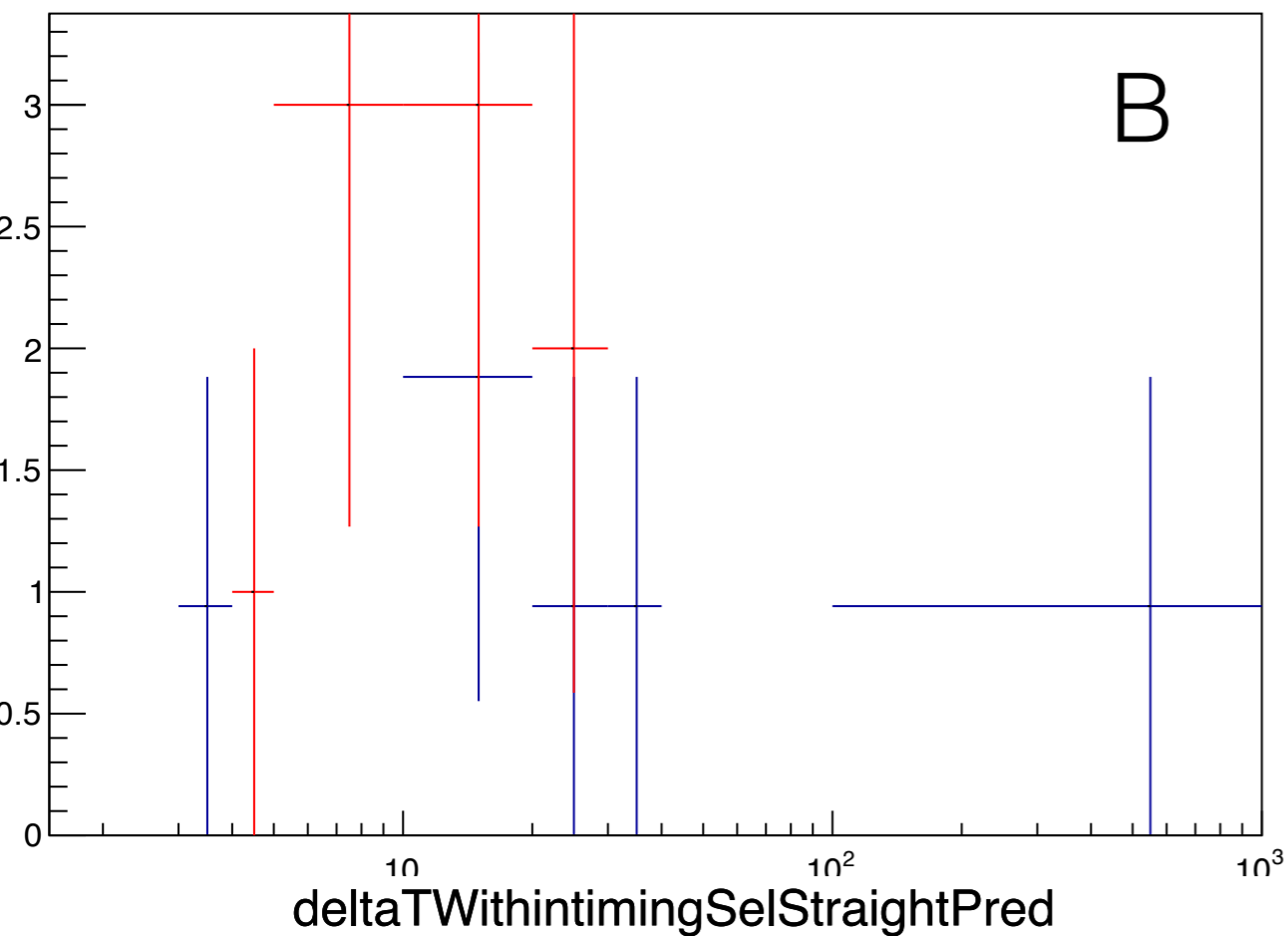
deltaTWithintimingSelBent



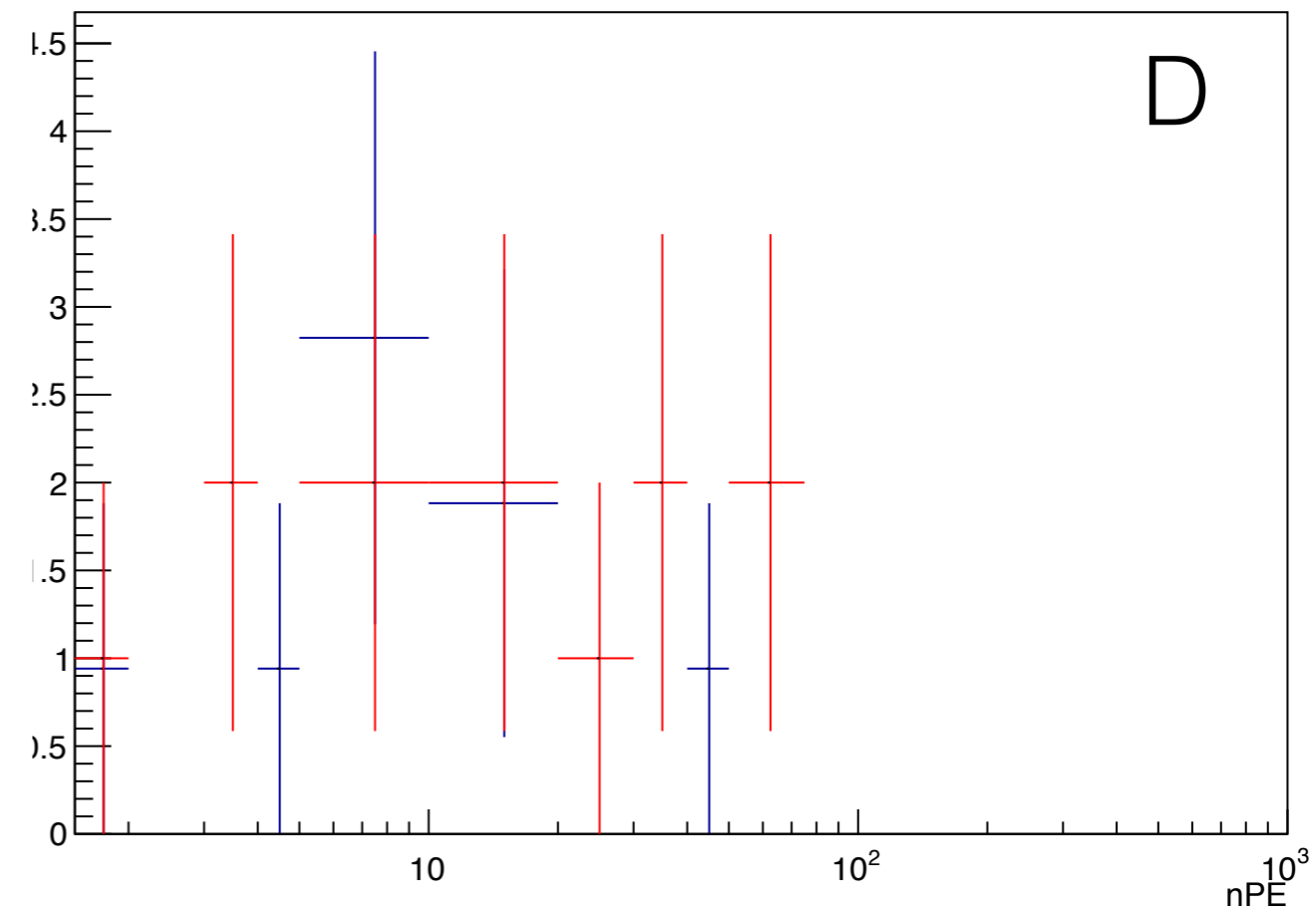
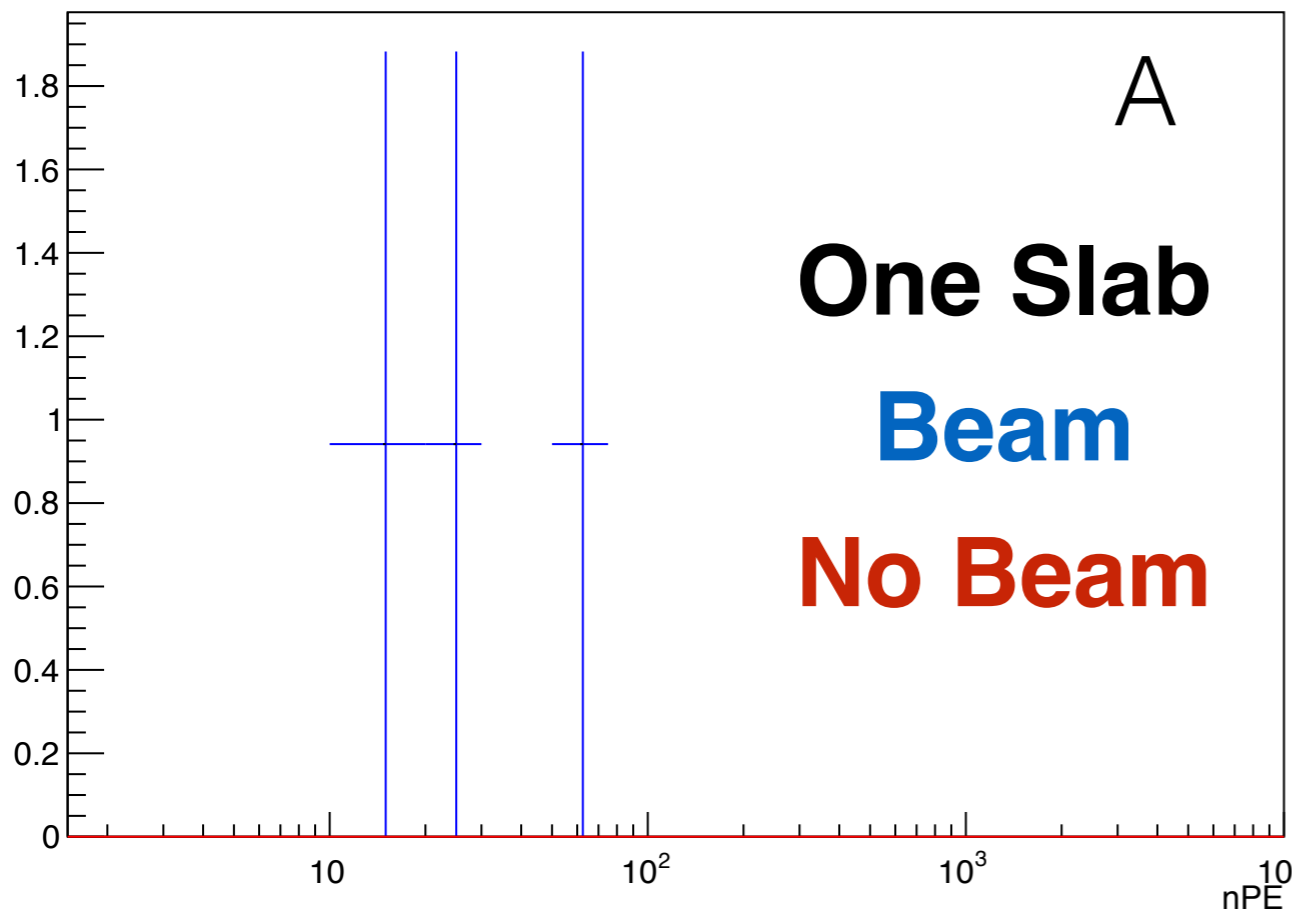
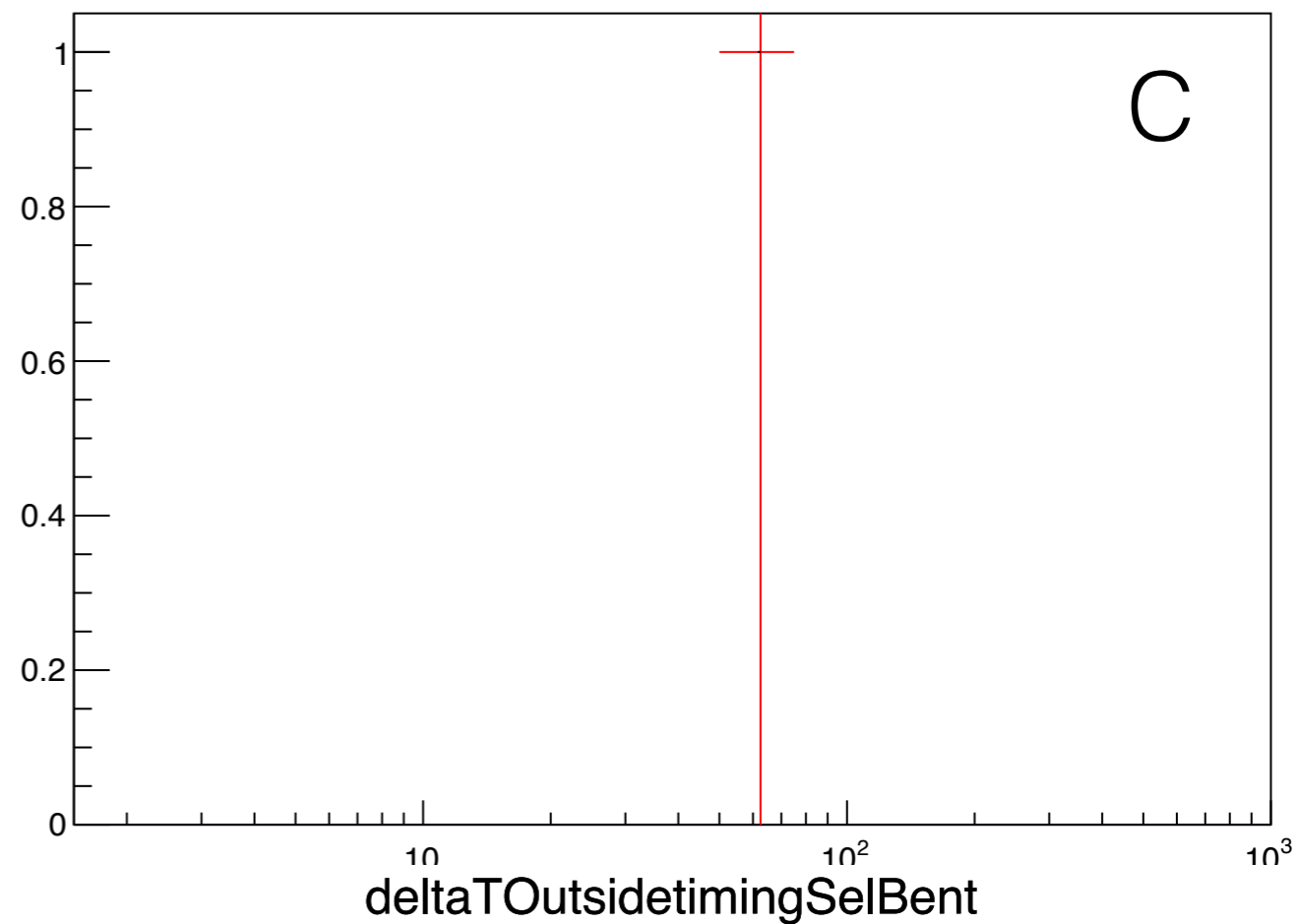
deltaTOutsidetimingSelStraight



deltaTWithintimingSelBent

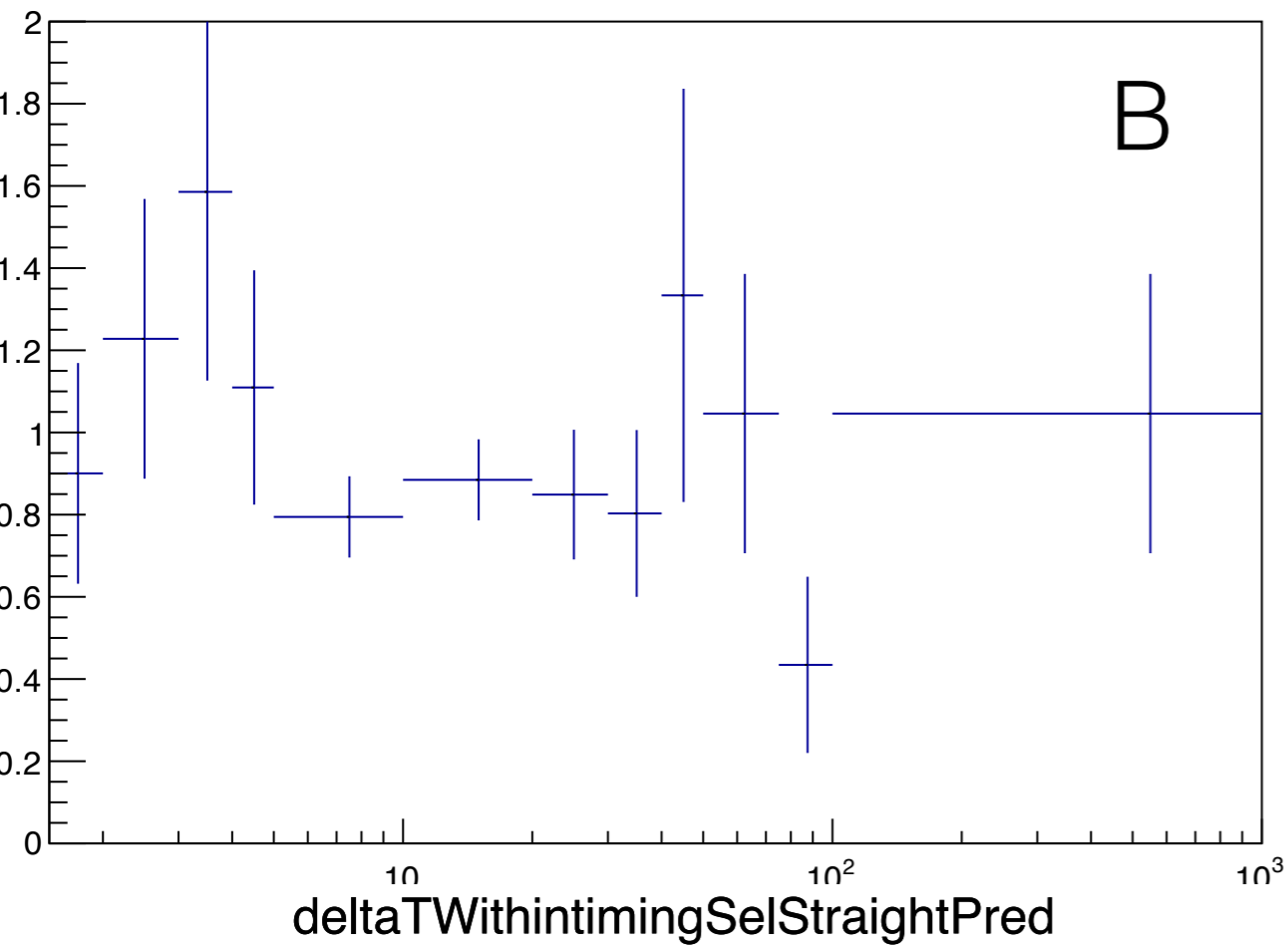


deltaTOutsidetimingSelStraight

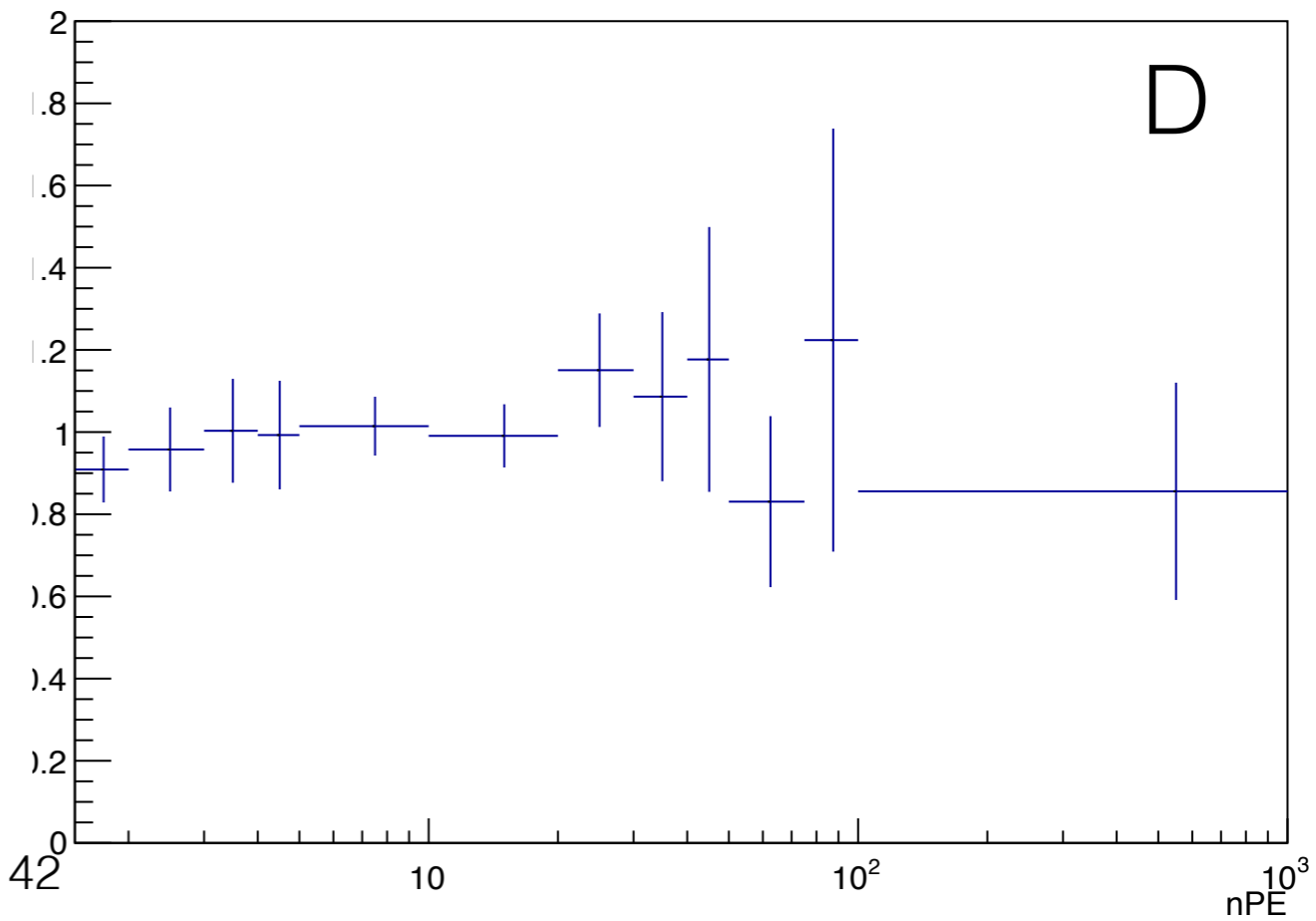
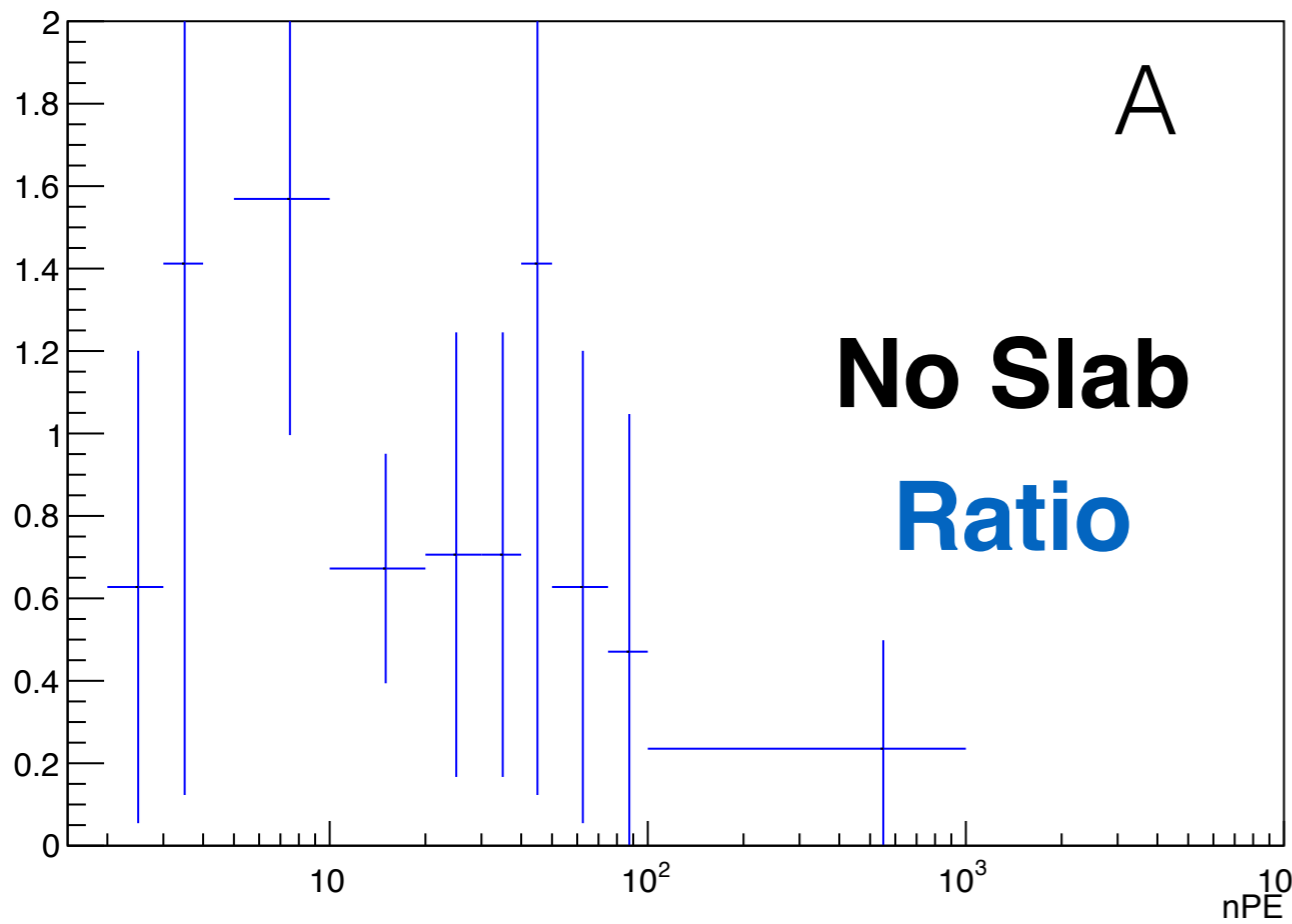
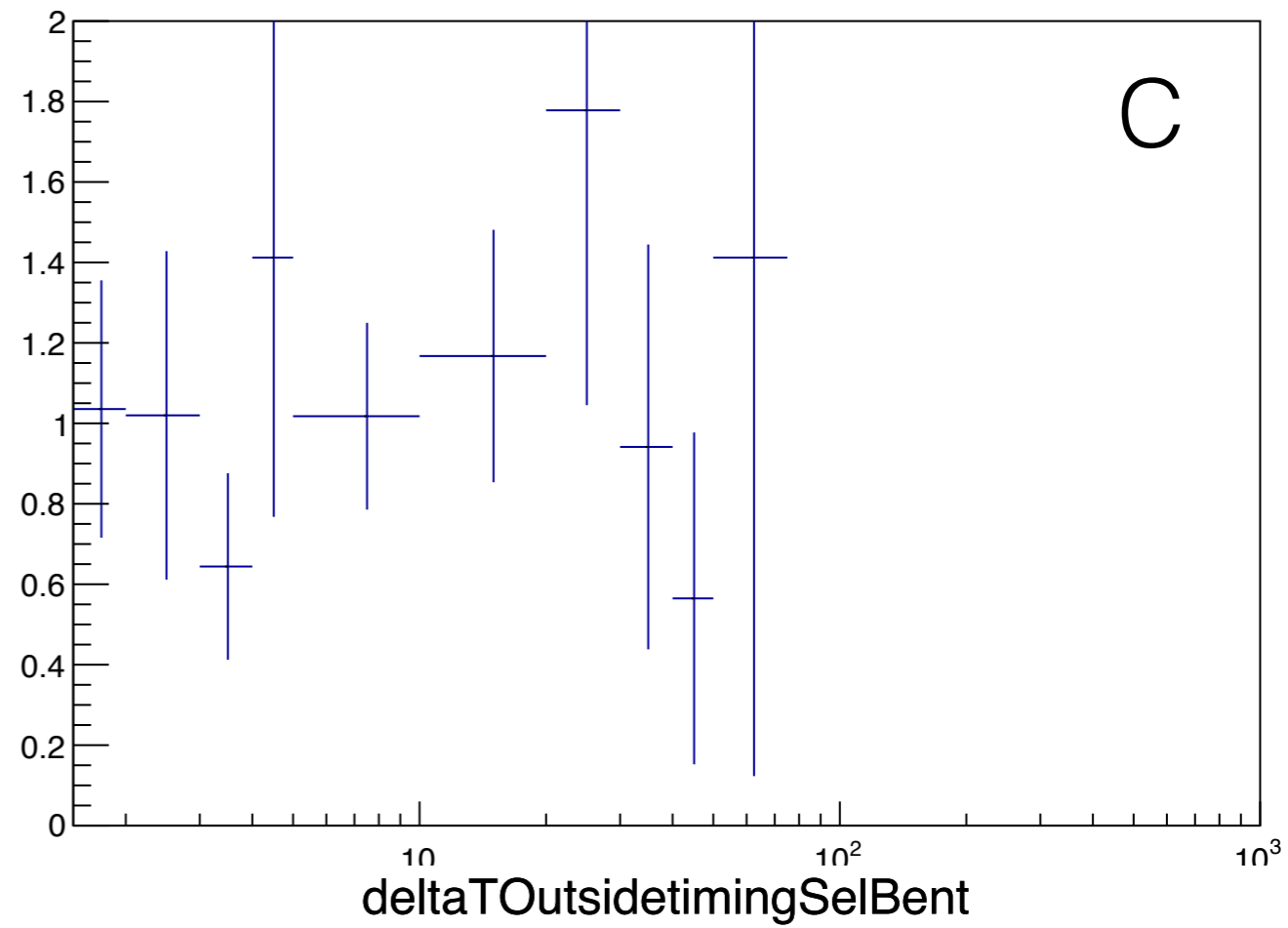


Ratio (beam/no beam)

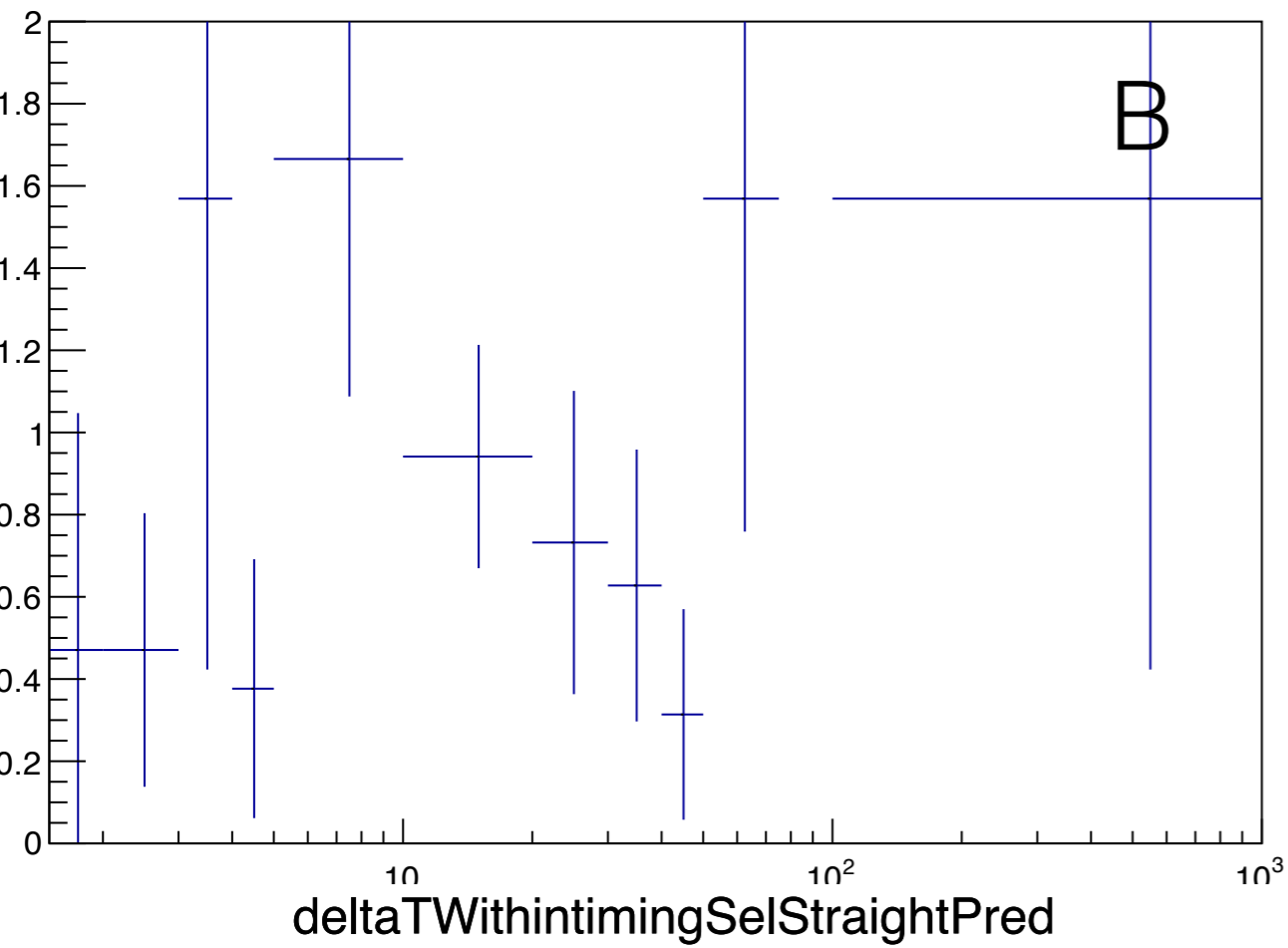
deltaTWithintimingSelBent



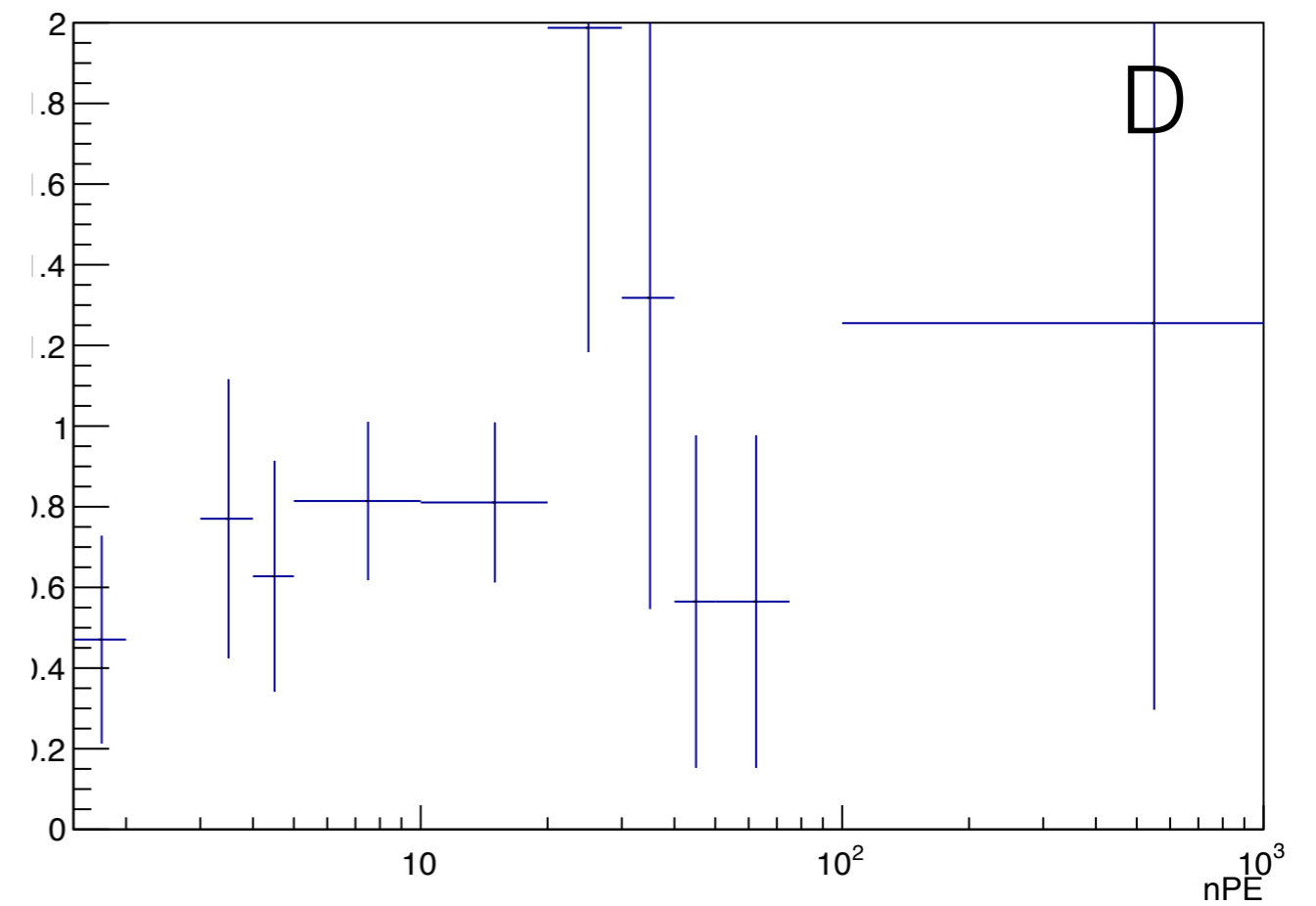
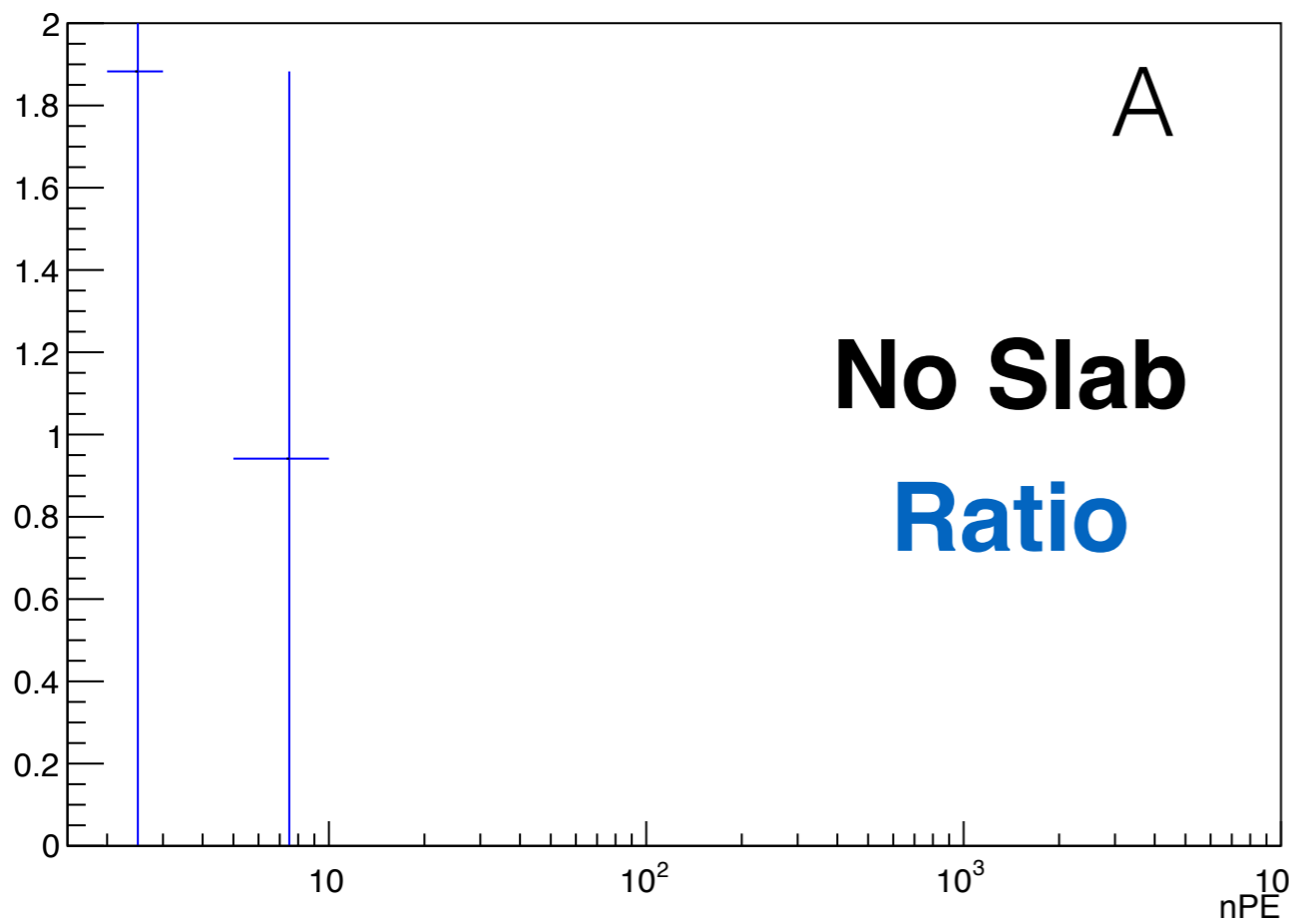
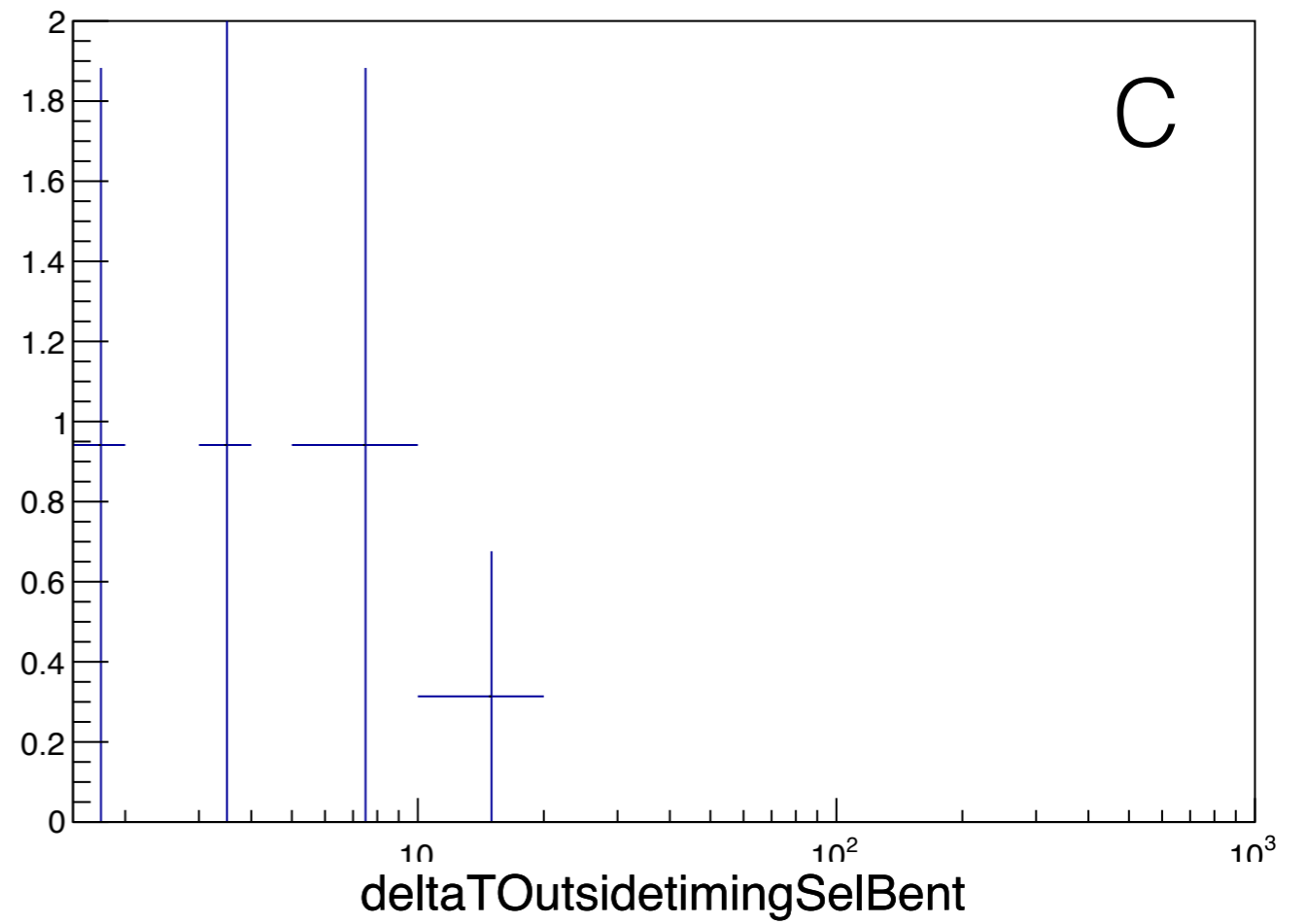
deltaTOutsidetimingSelStraight



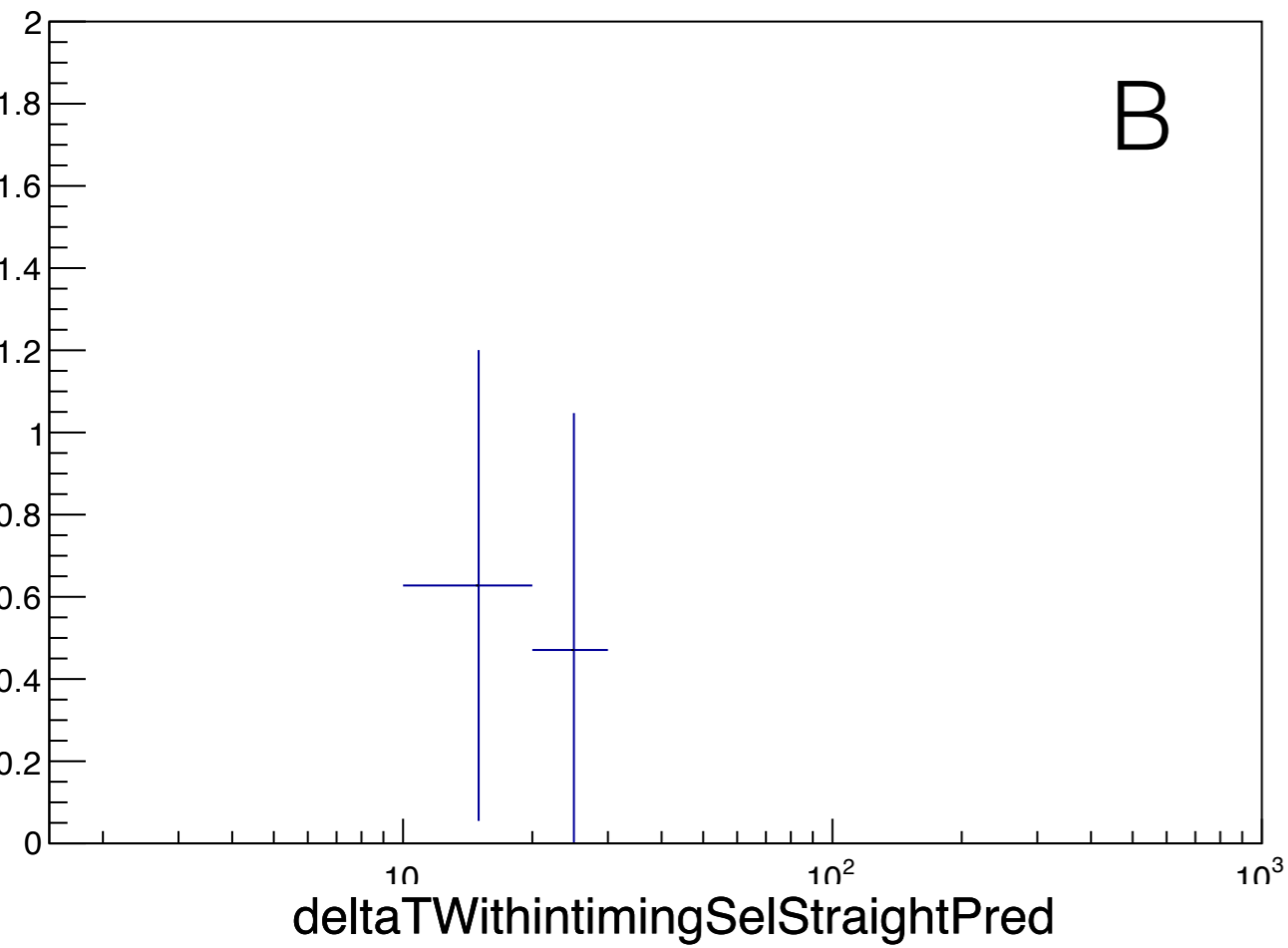
deltaTWithintimingSelBent



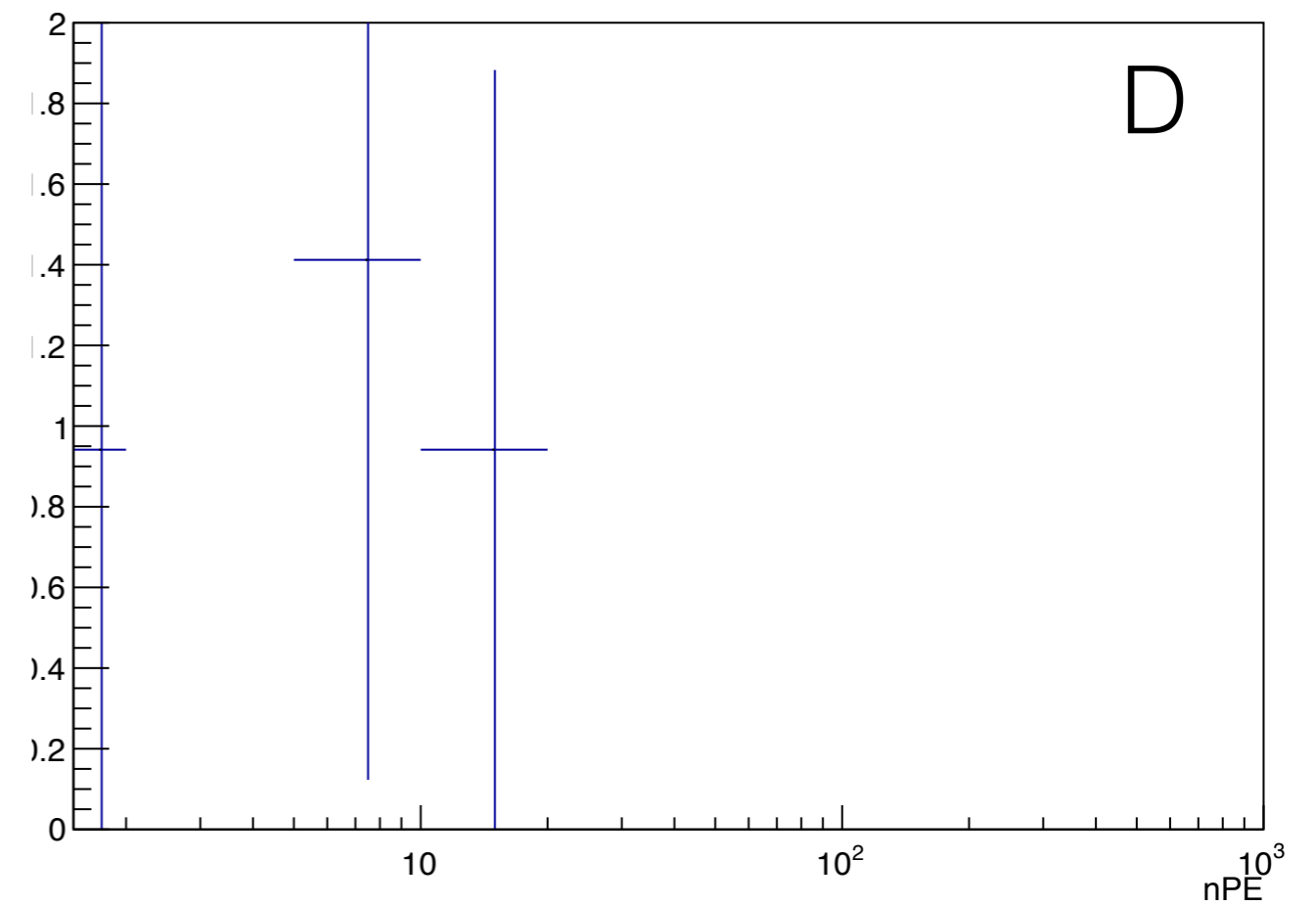
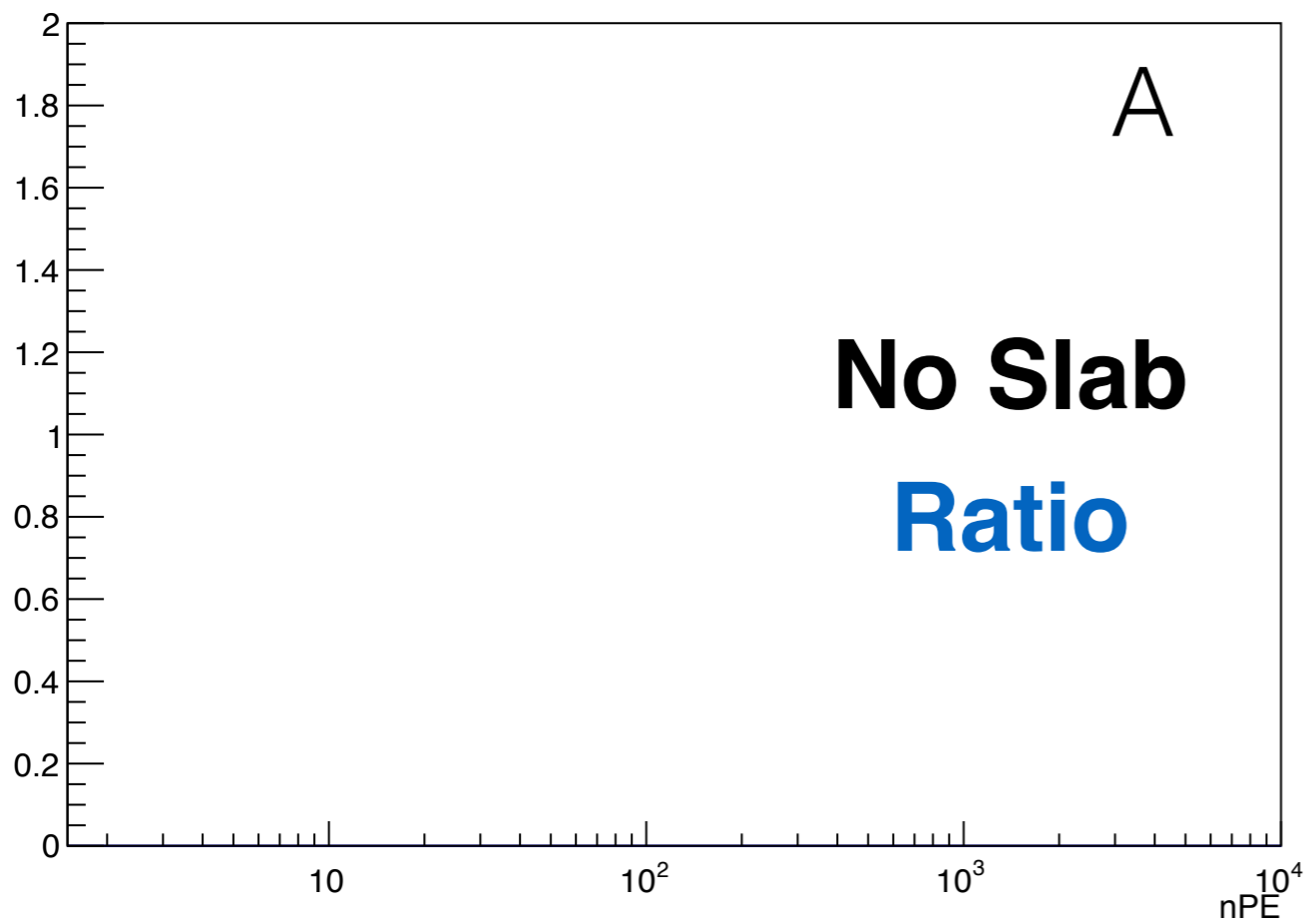
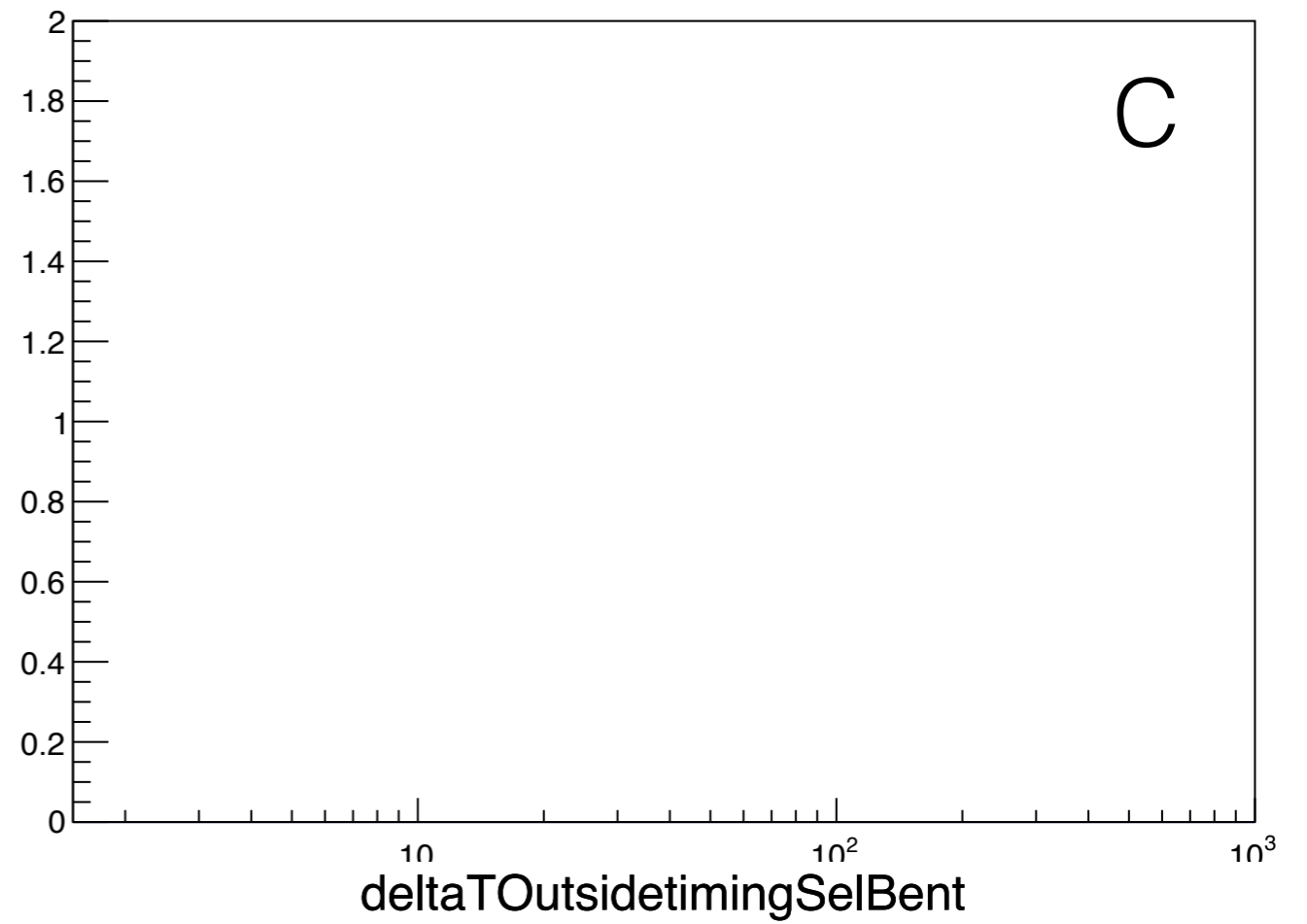
deltaTOutsidetimingSelStraight



deltaTWithintimingSelBent



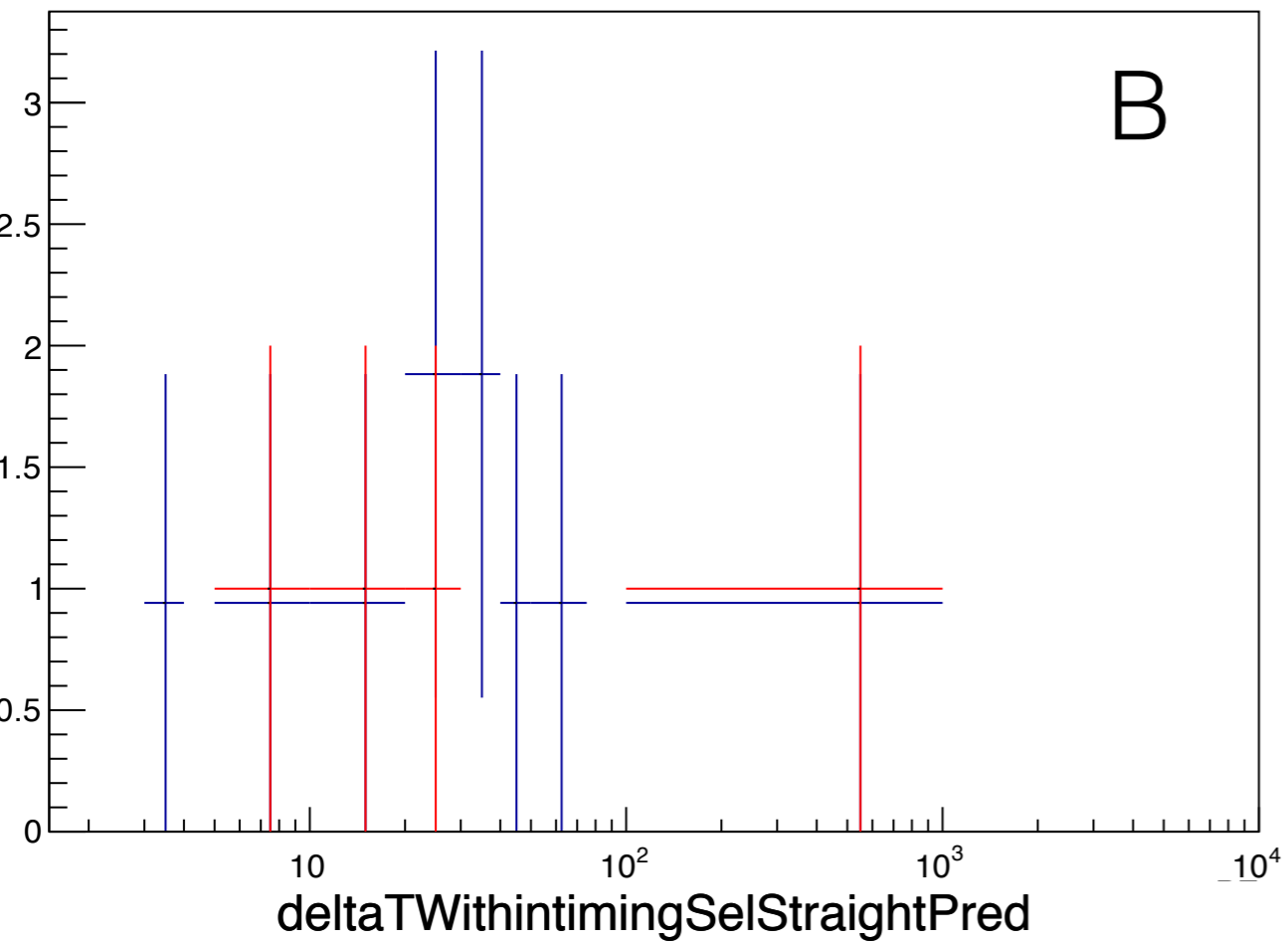
deltaTOutsidetimingSelStraight



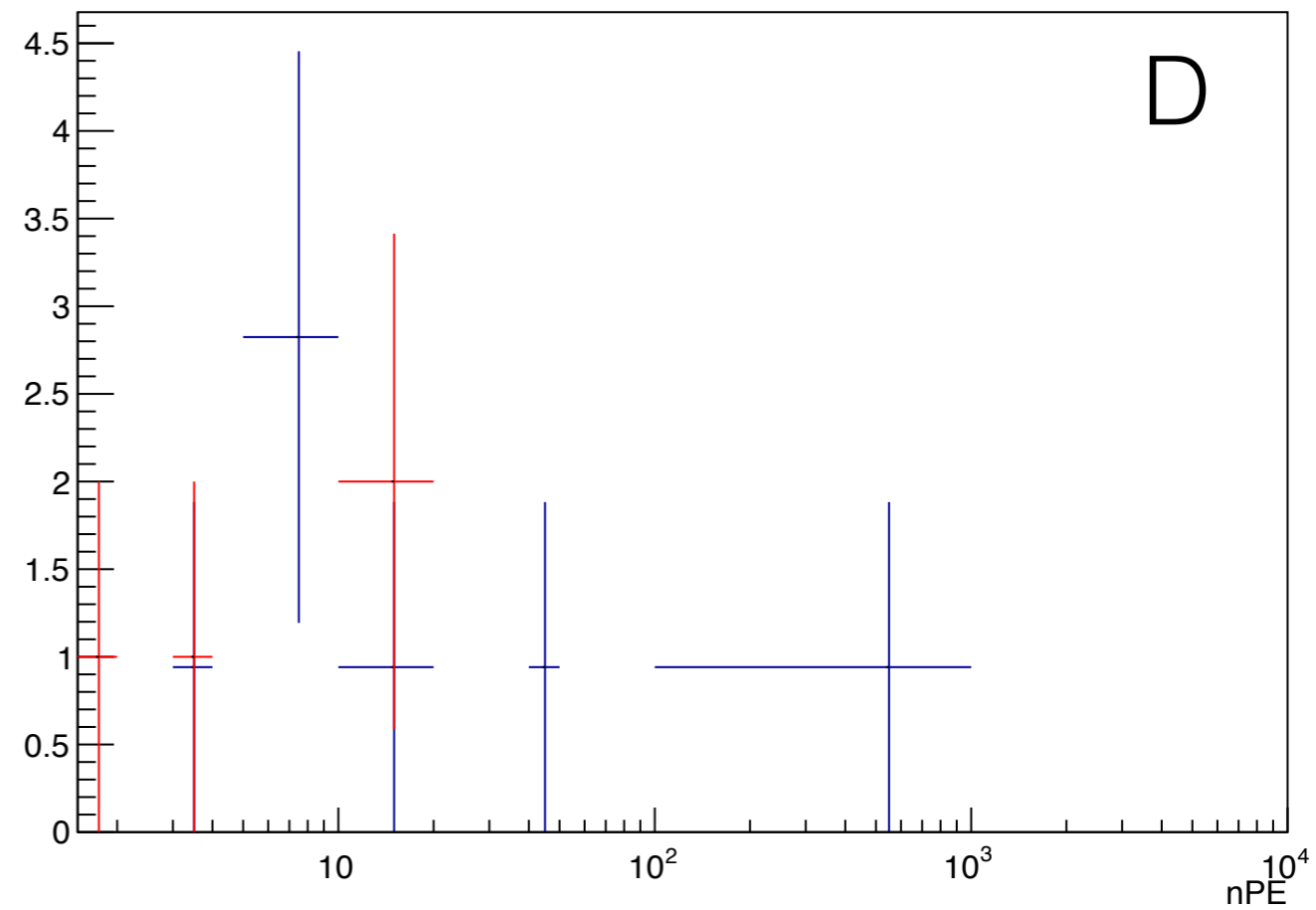
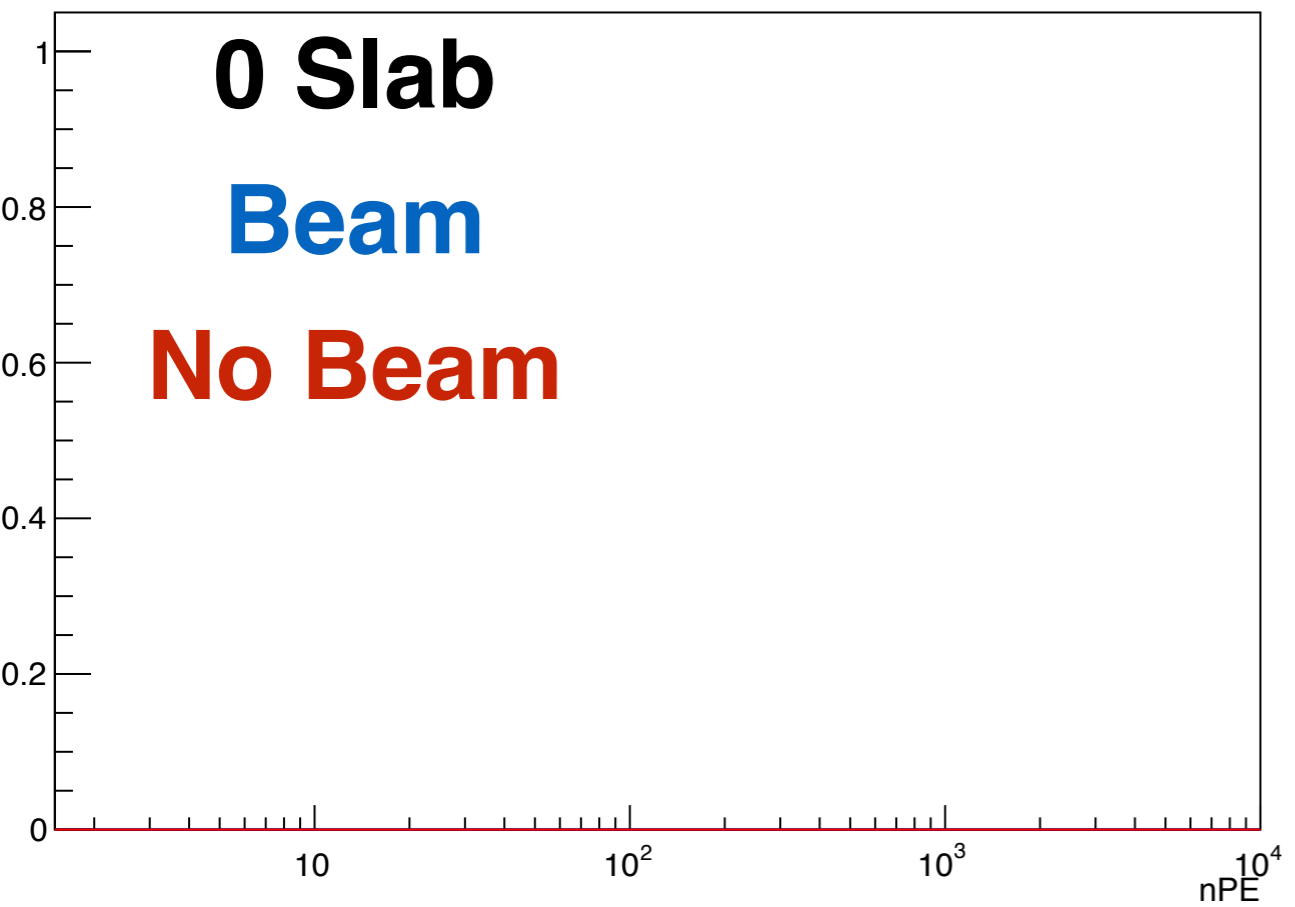
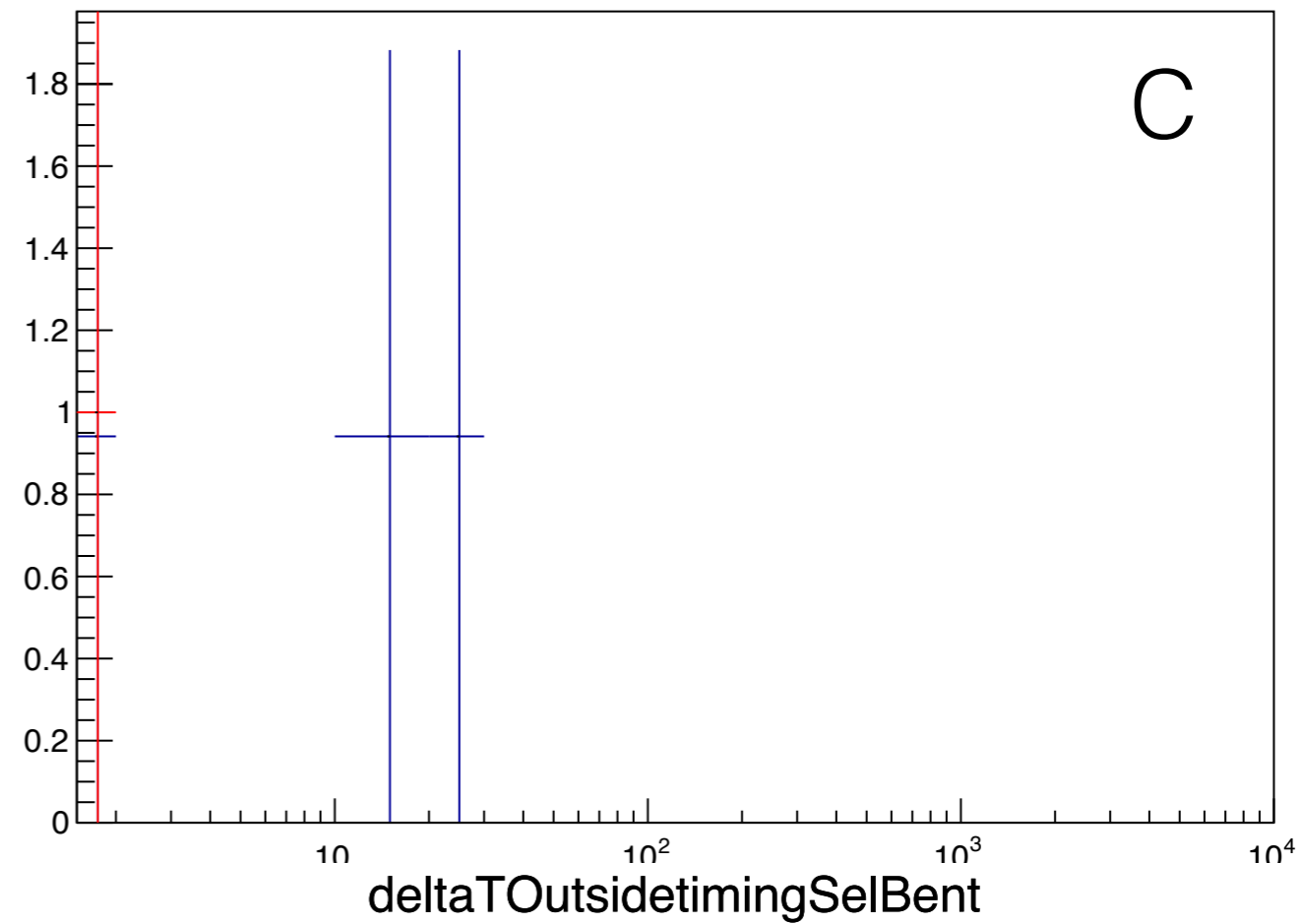
Invert beam muon veto on slabs

Lin

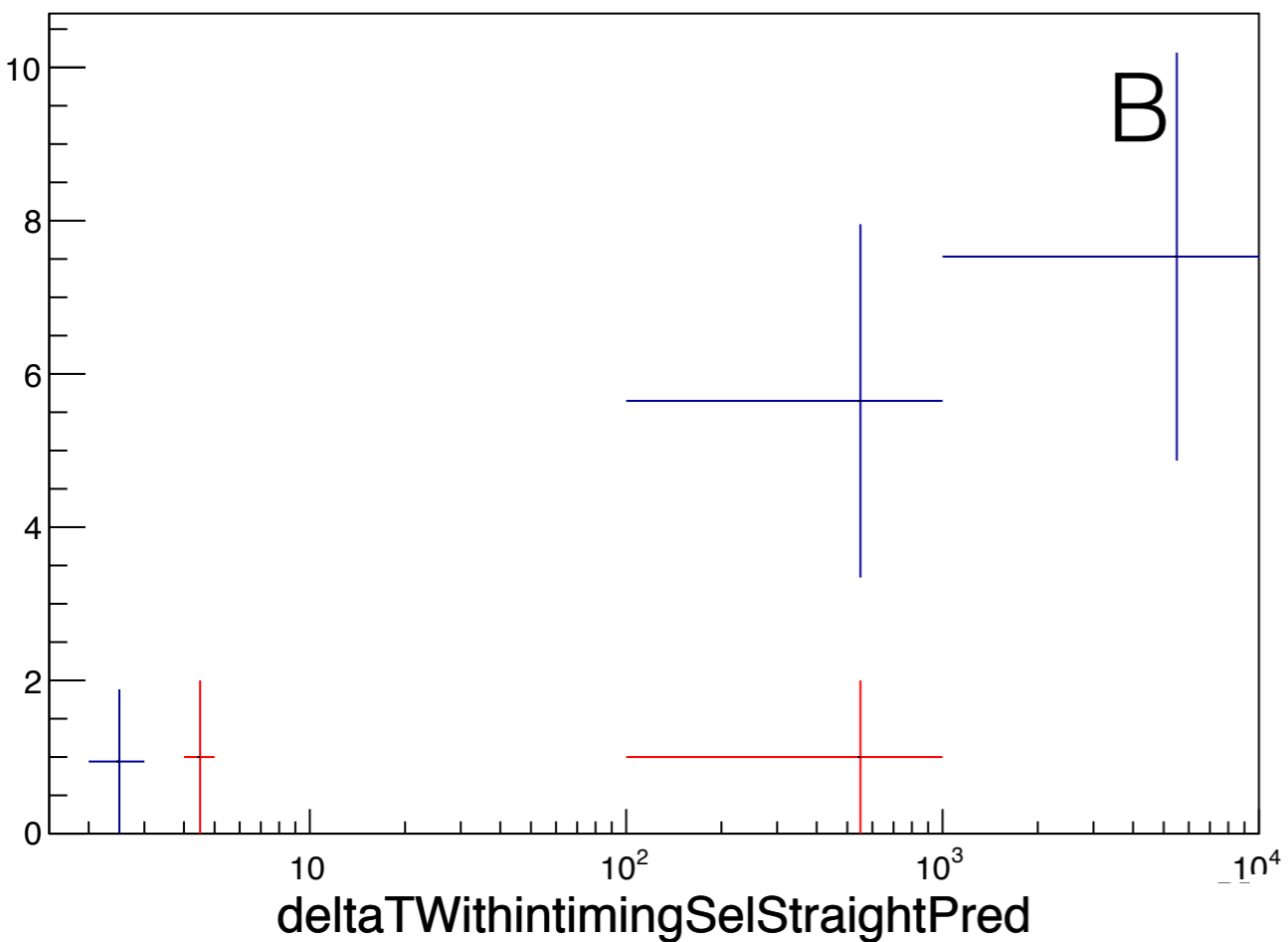
deltaTWithintimingSelBent



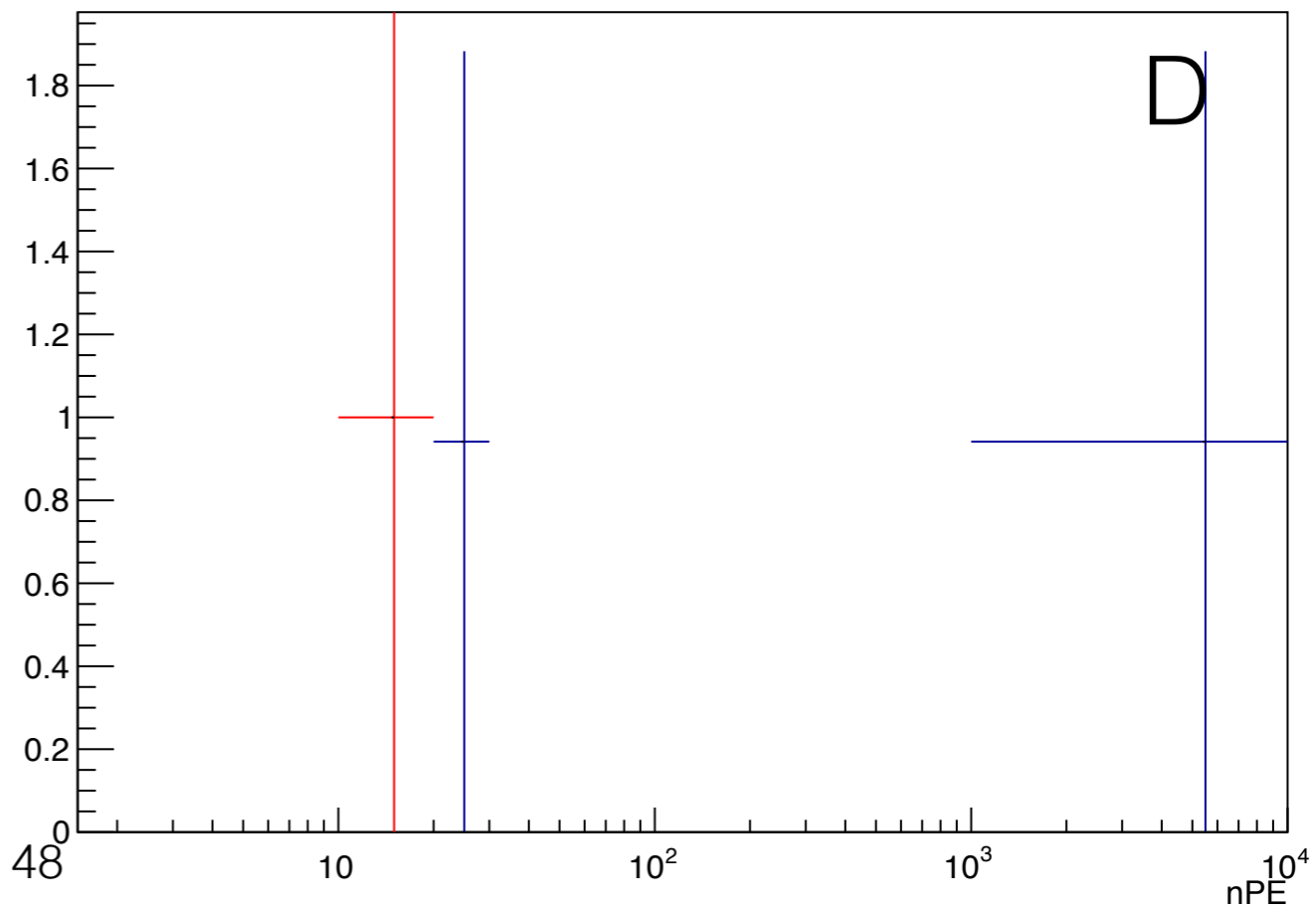
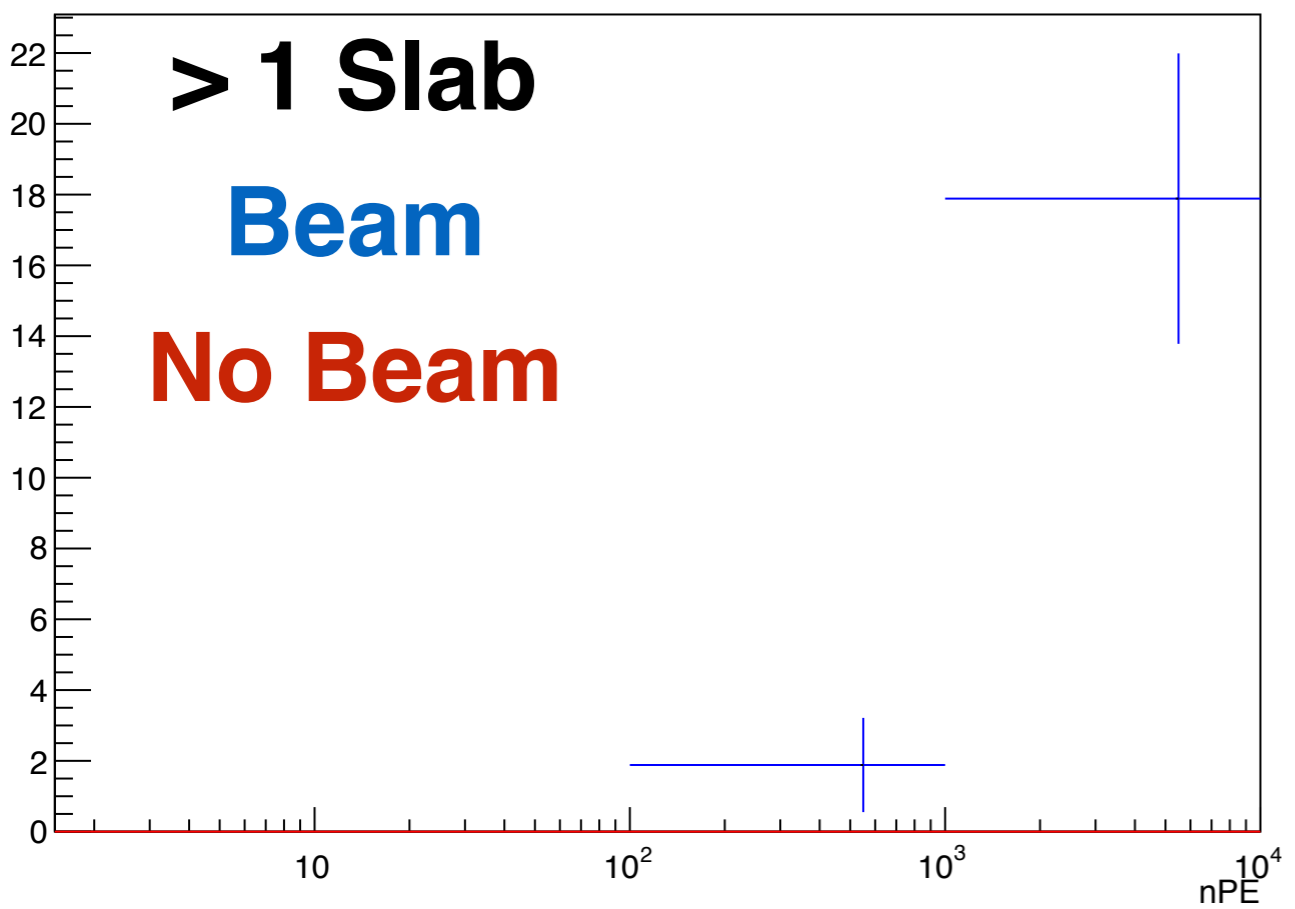
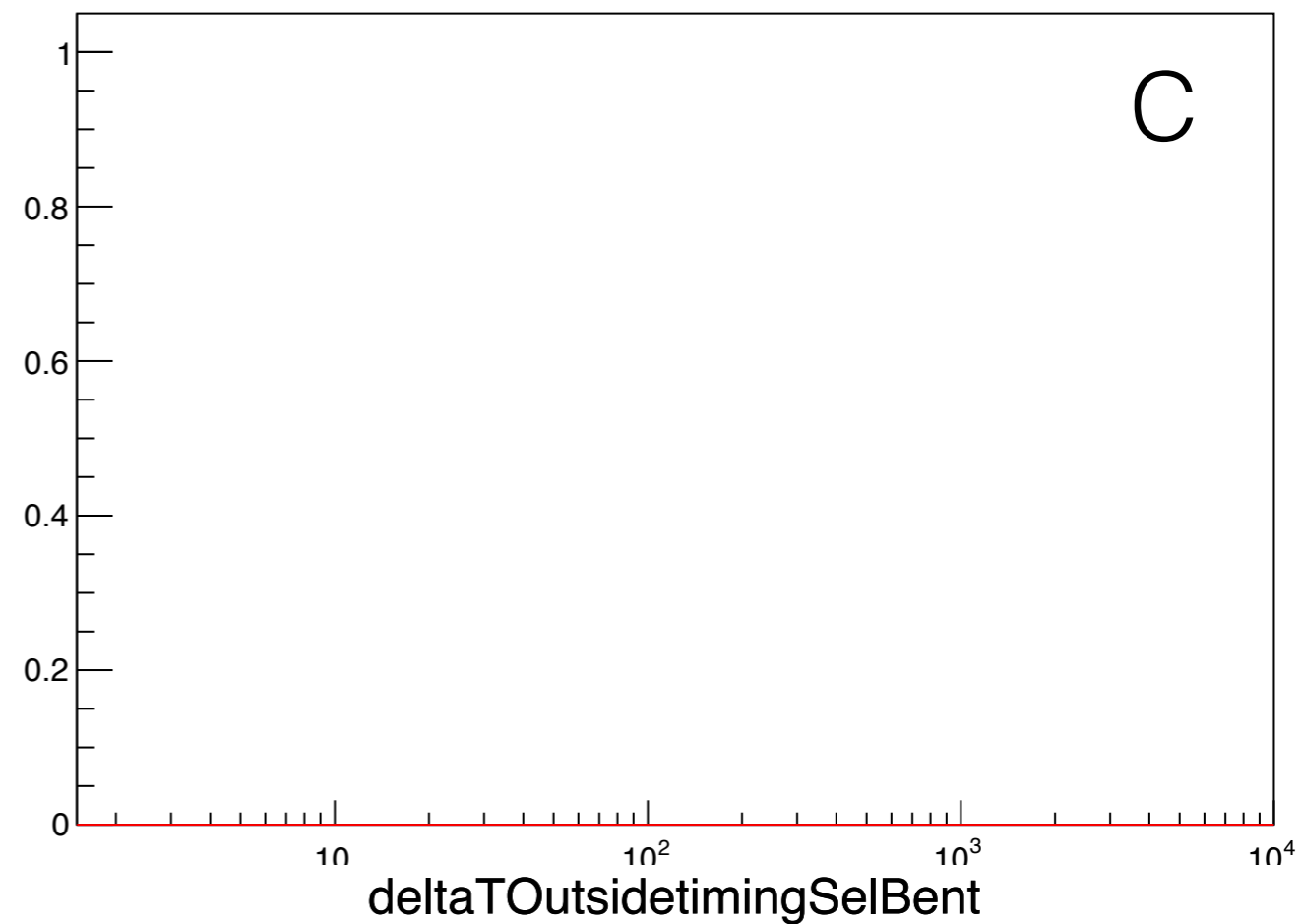
deltaTOutsidetimingSelStraight



deltaTWithintimingSelBent



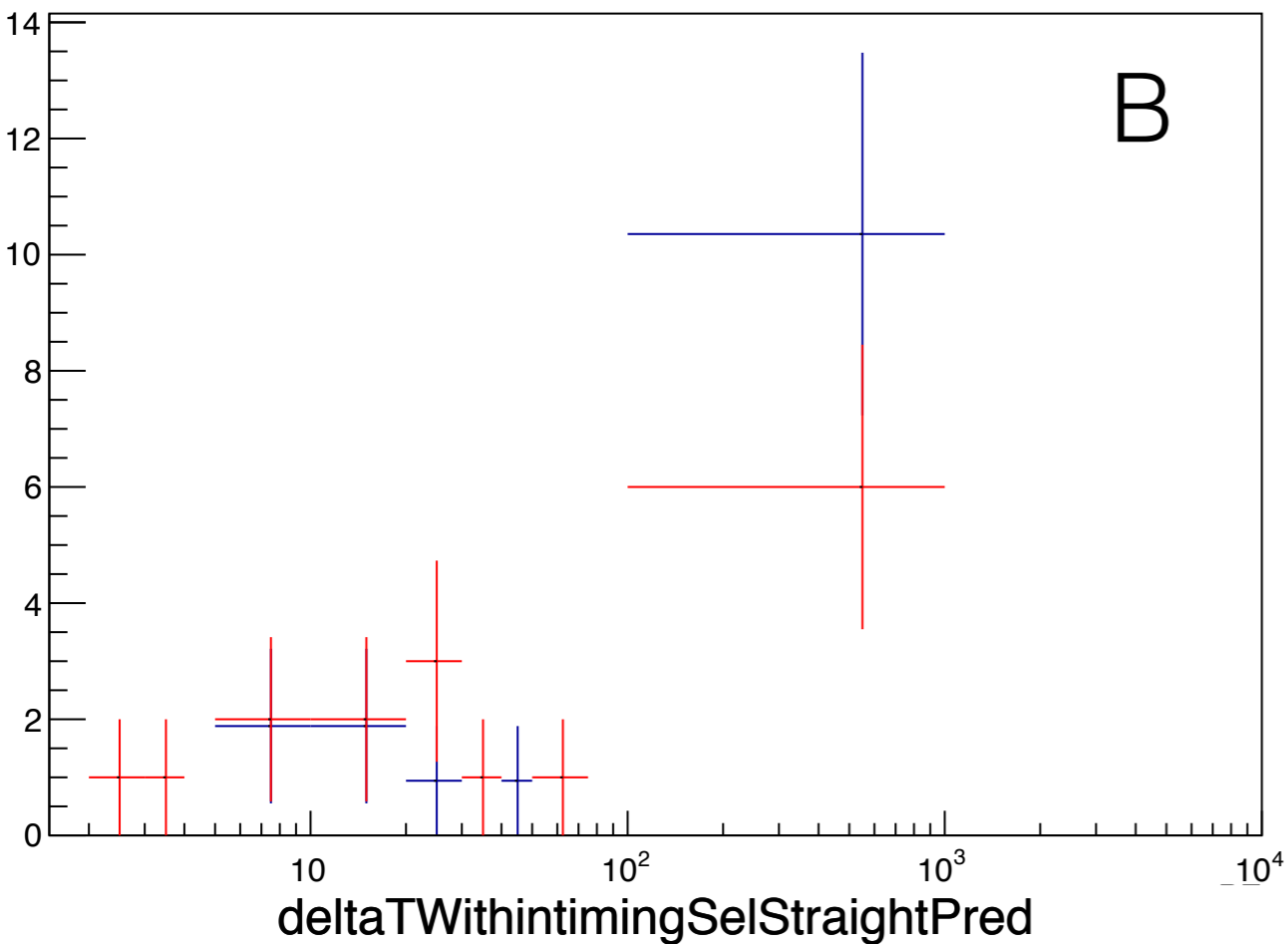
deltaTOutsidetimingSelStraight



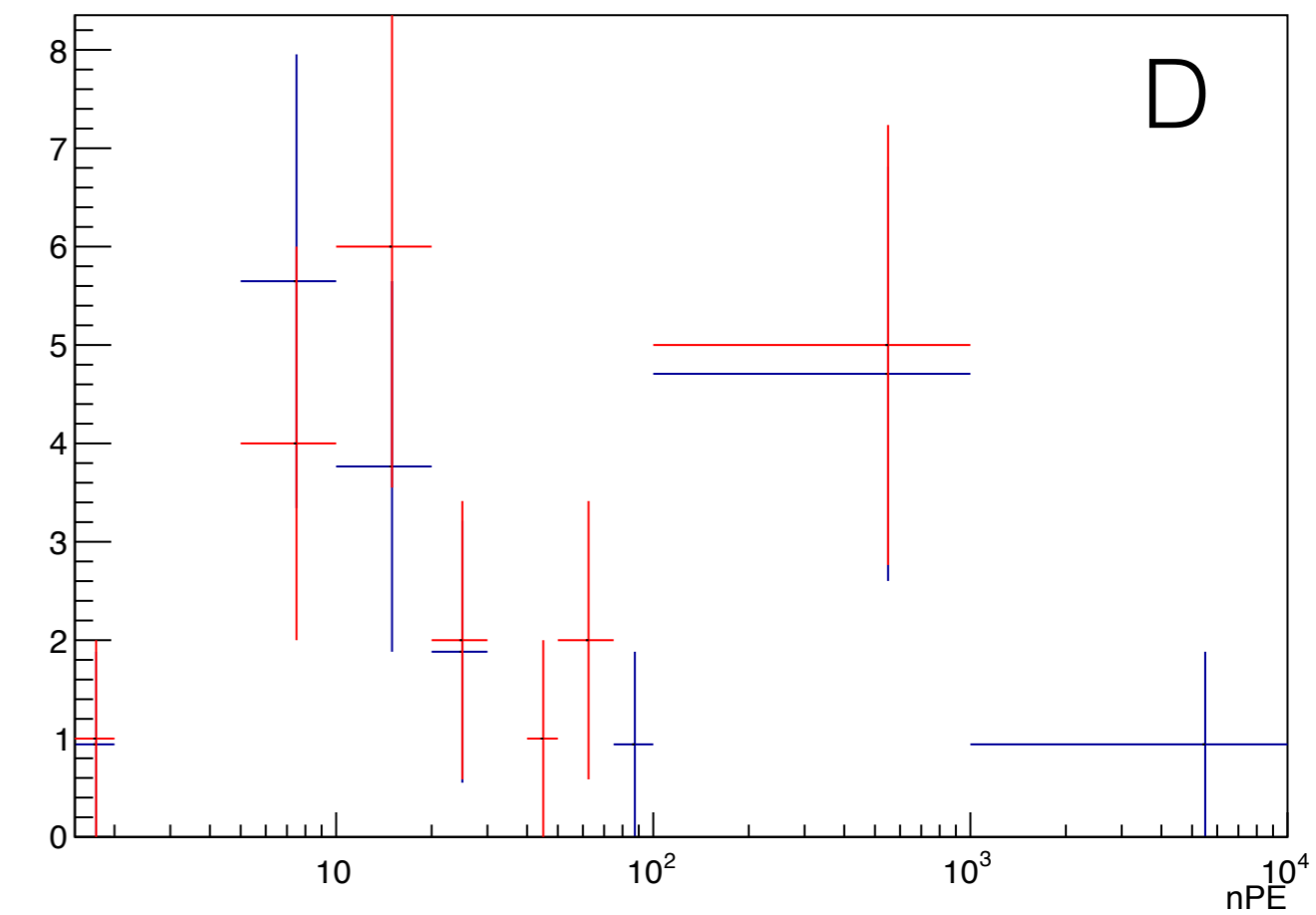
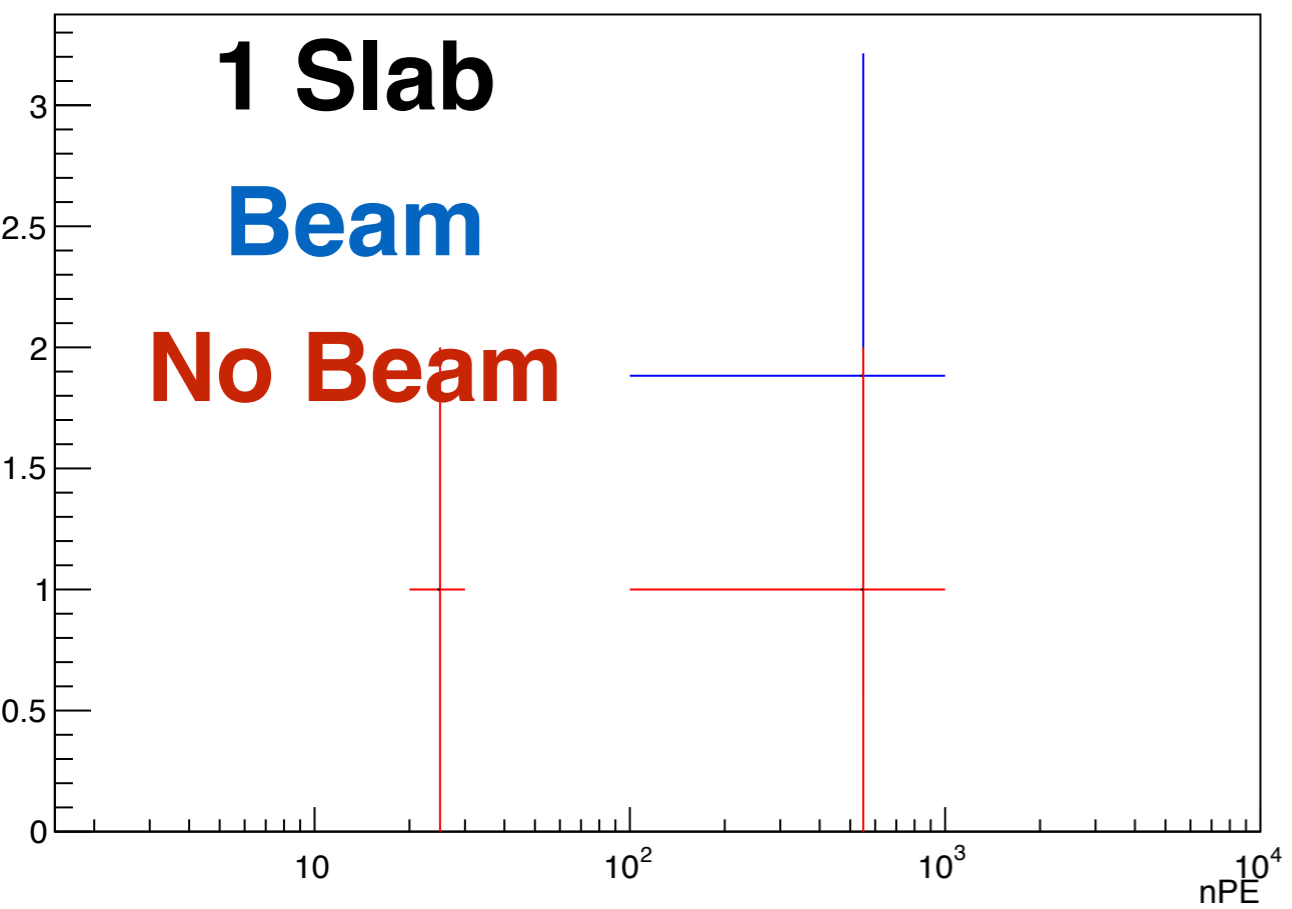
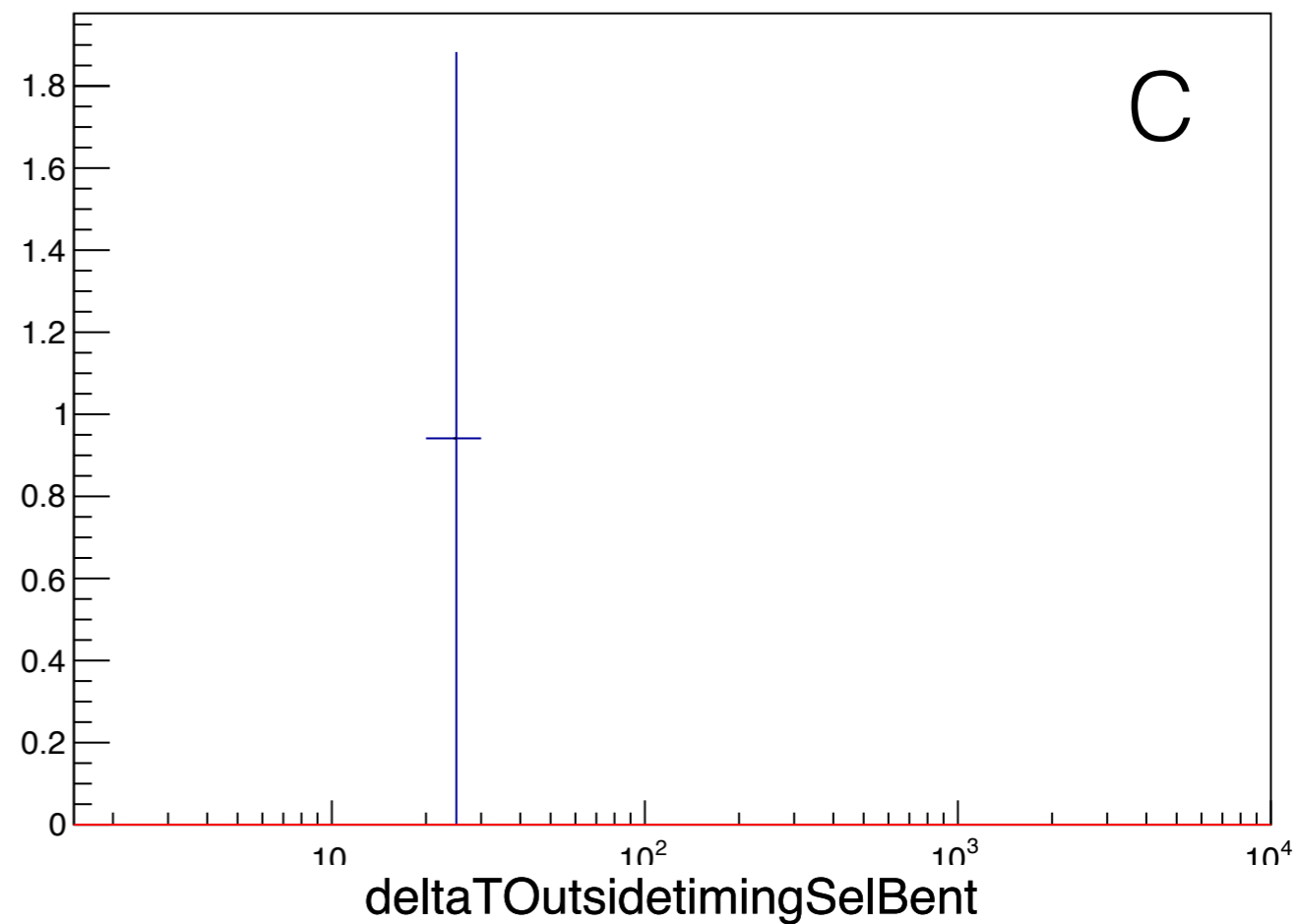
Invert beam muon veto on
slabs + remove panel veto

Lin

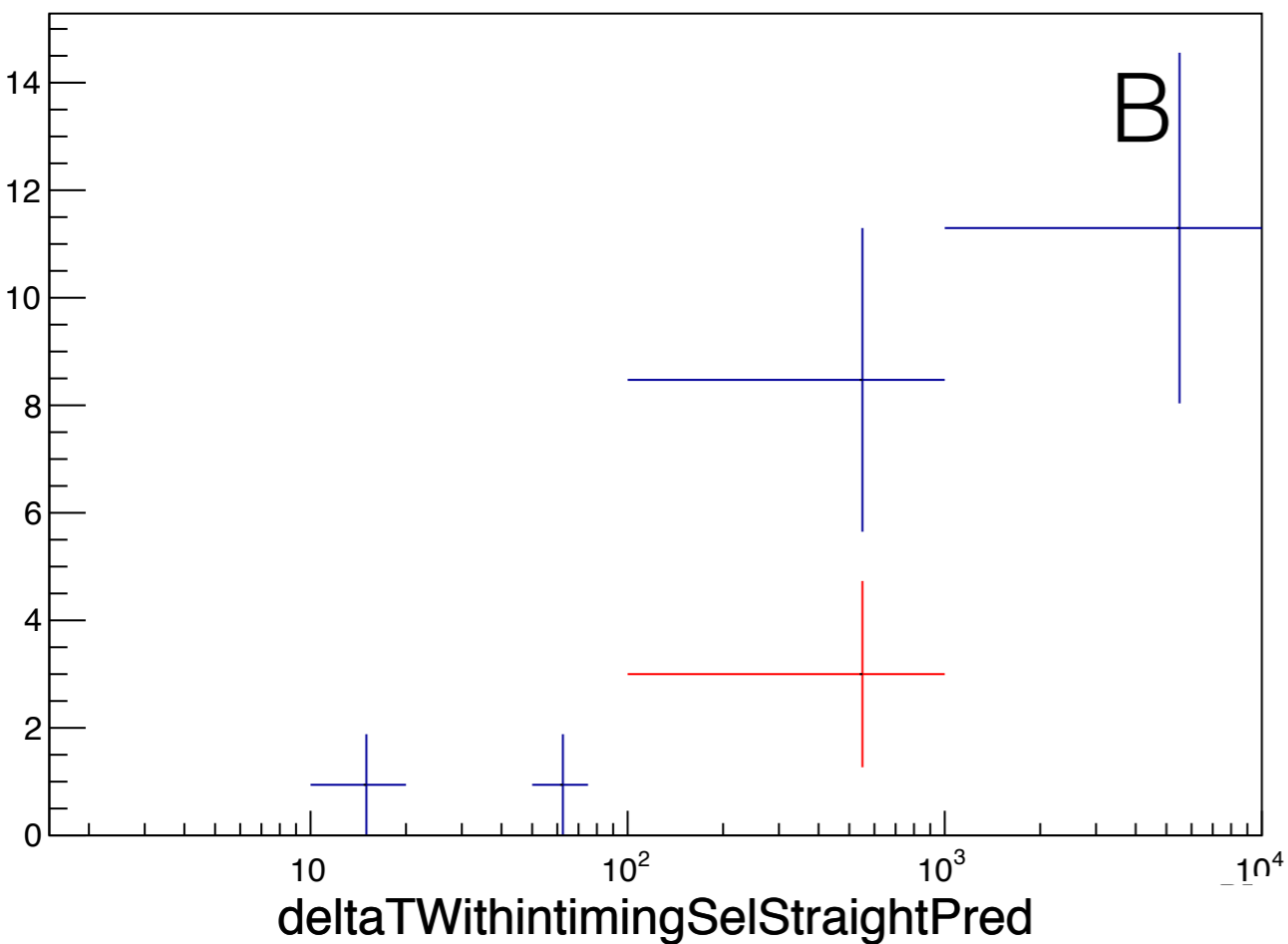
deltaTWithintimingSelBent



deltaTOutsidetimingSelStraight



deltaTWithintimingSelBent



deltaTOutsidetimingSelStraight

