GENIE Event Sample Comparisons

Event Sample:

Notes:

Event Numbers:

ALL : 2000000 [test sample], 2000000 [ref sample]

QEL : 382337 [test sample], 382337 [ref sample]

QEL-CC : 0 [test sample], 0 [ref sample]

QEL-NC : 382337 [test sample], 382337 [ref sample]

RES : 1423537 [test sample], 1423537 [ref sample]

RES-CC : 1133177 [test sample], 1133177 [ref sample]

RES-NC : 290360 [test sample], 290360 [ref sample]

DIS : 117118 [test sample], 117118 [ref sample]

DIS-CC : 78913 [test sample], 78913 [ref sample]

DIS-NC : 38205 [test sample], 38205 [ref sample]

COH : 0 [test sample], 0 [ref sample]

COH-CC : 0 [test sample], 0 [ref sample]

COH-NC : 0 [test sample], 0 [ref sample]

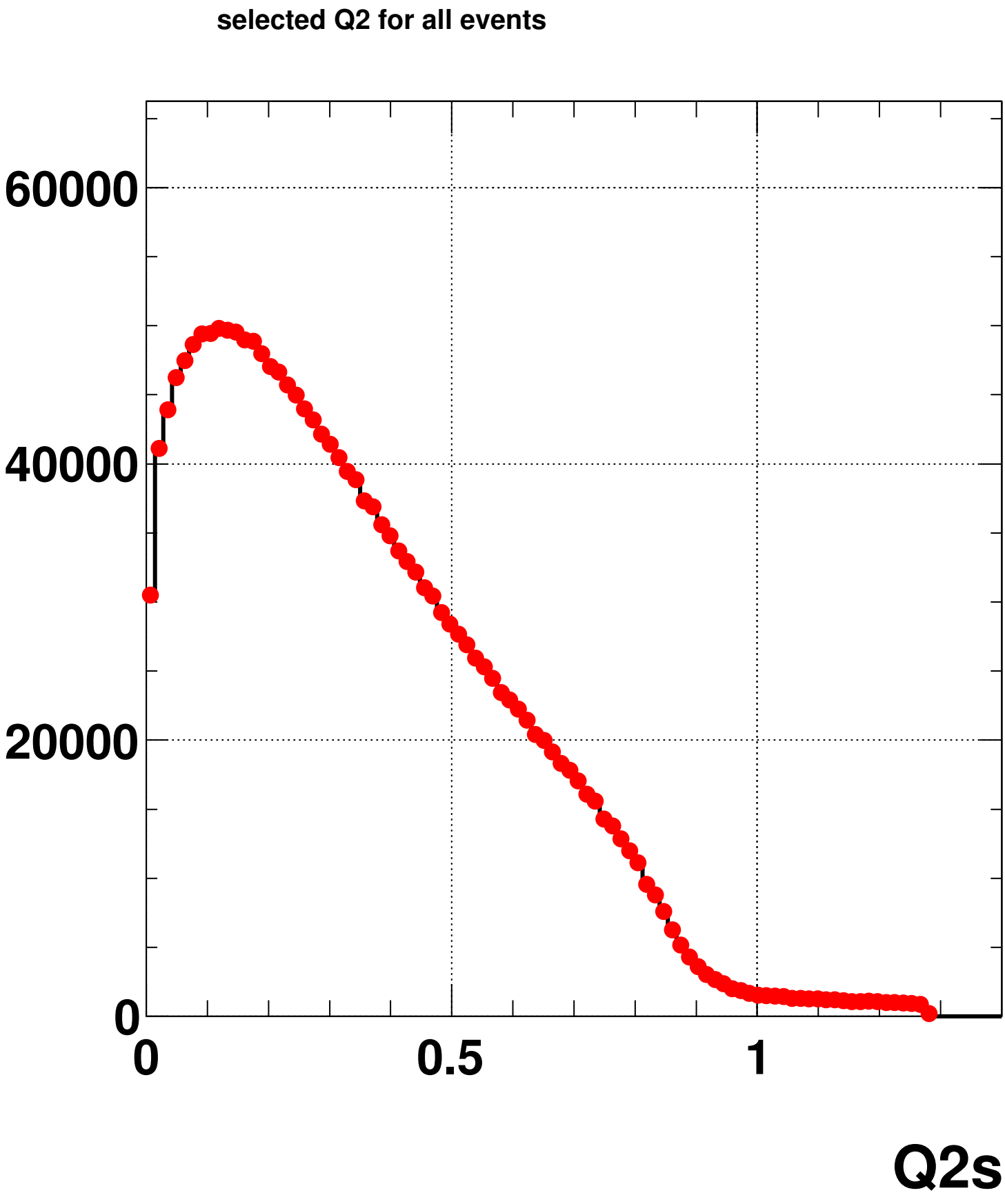
IMD : 0 [test sample], 0 [ref sample]

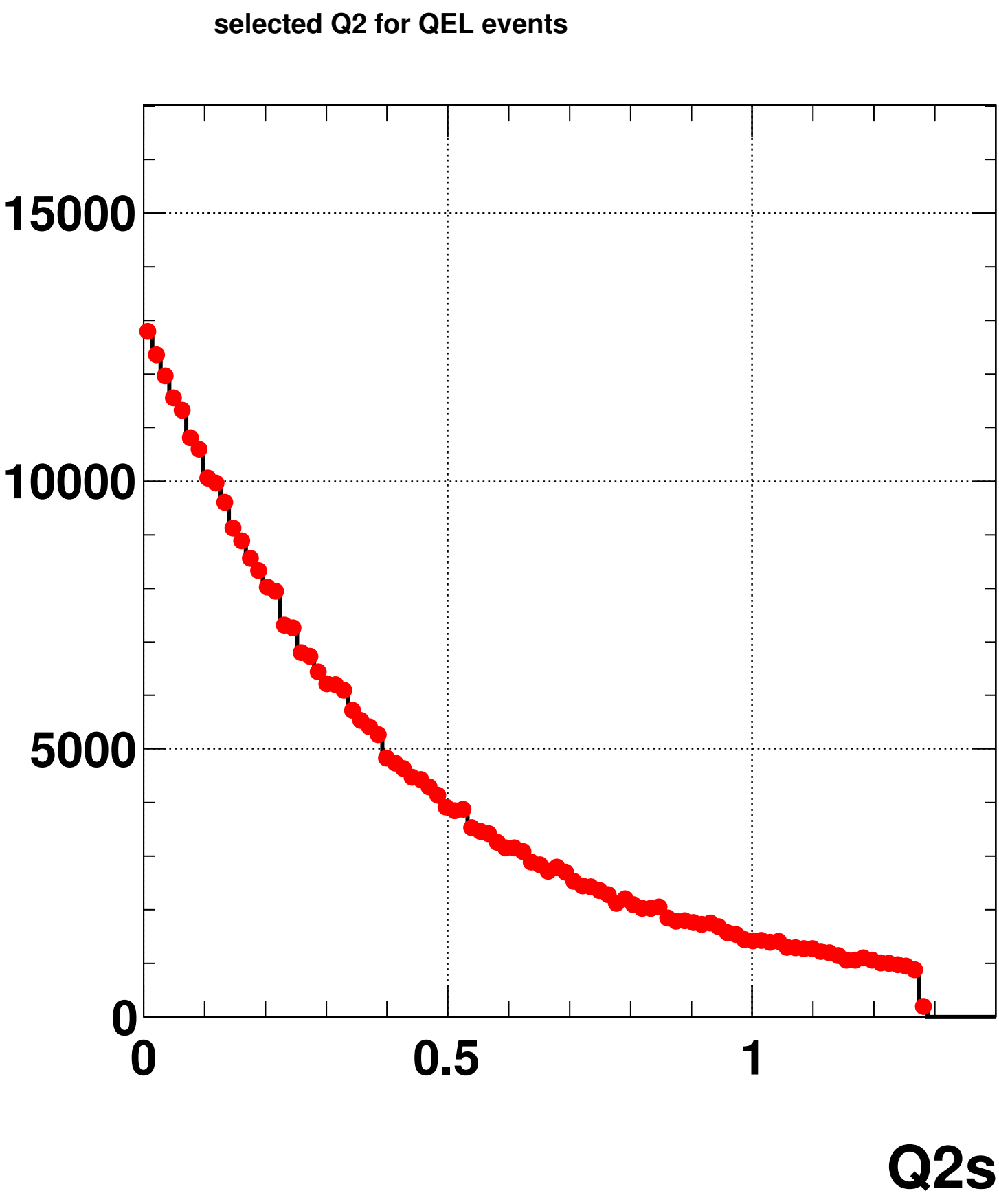
NuE-EL : 369 [test sample], 369 [ref sample]

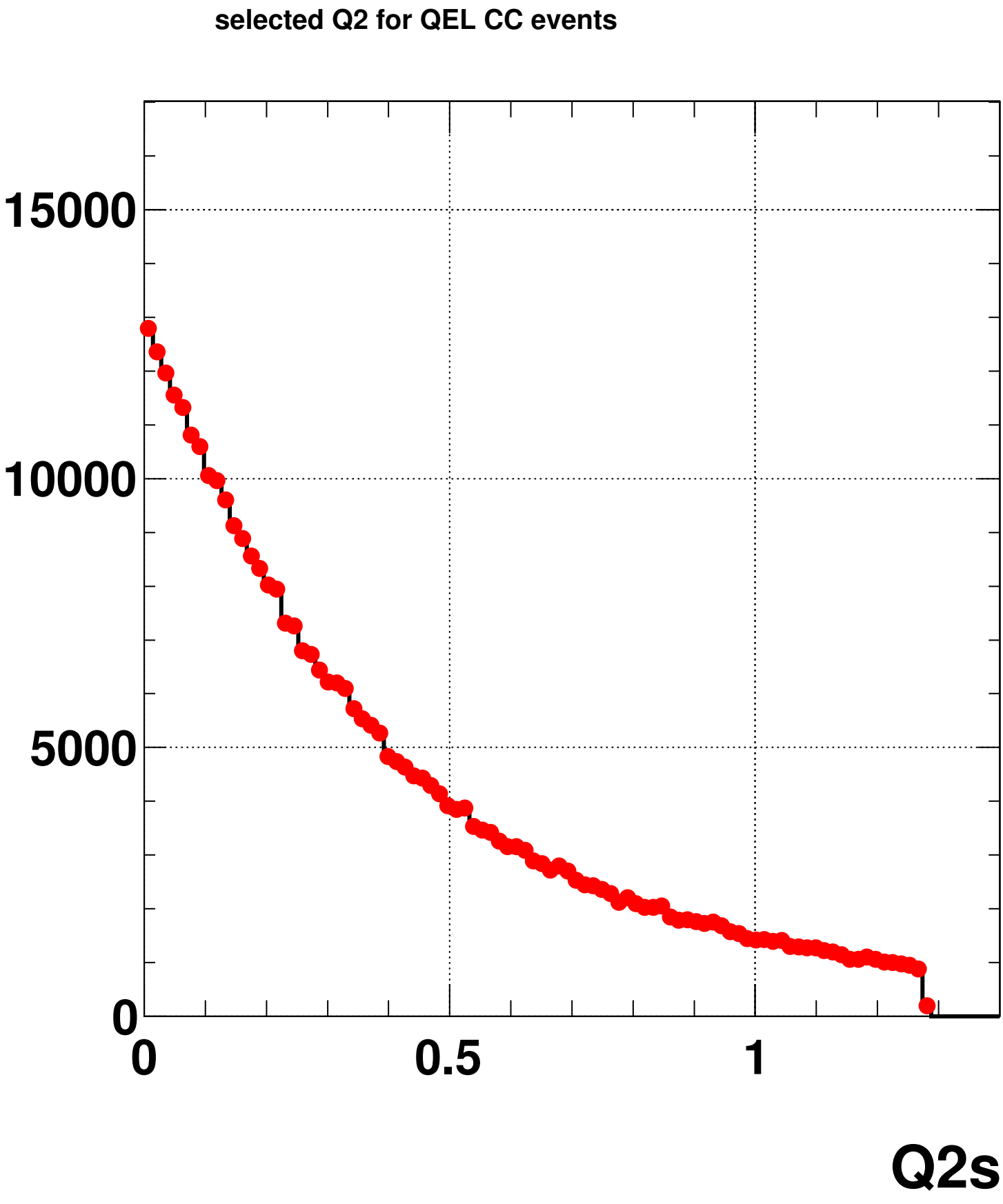
DIS-CHARM: 0 [test sample], 0 [ref sample]

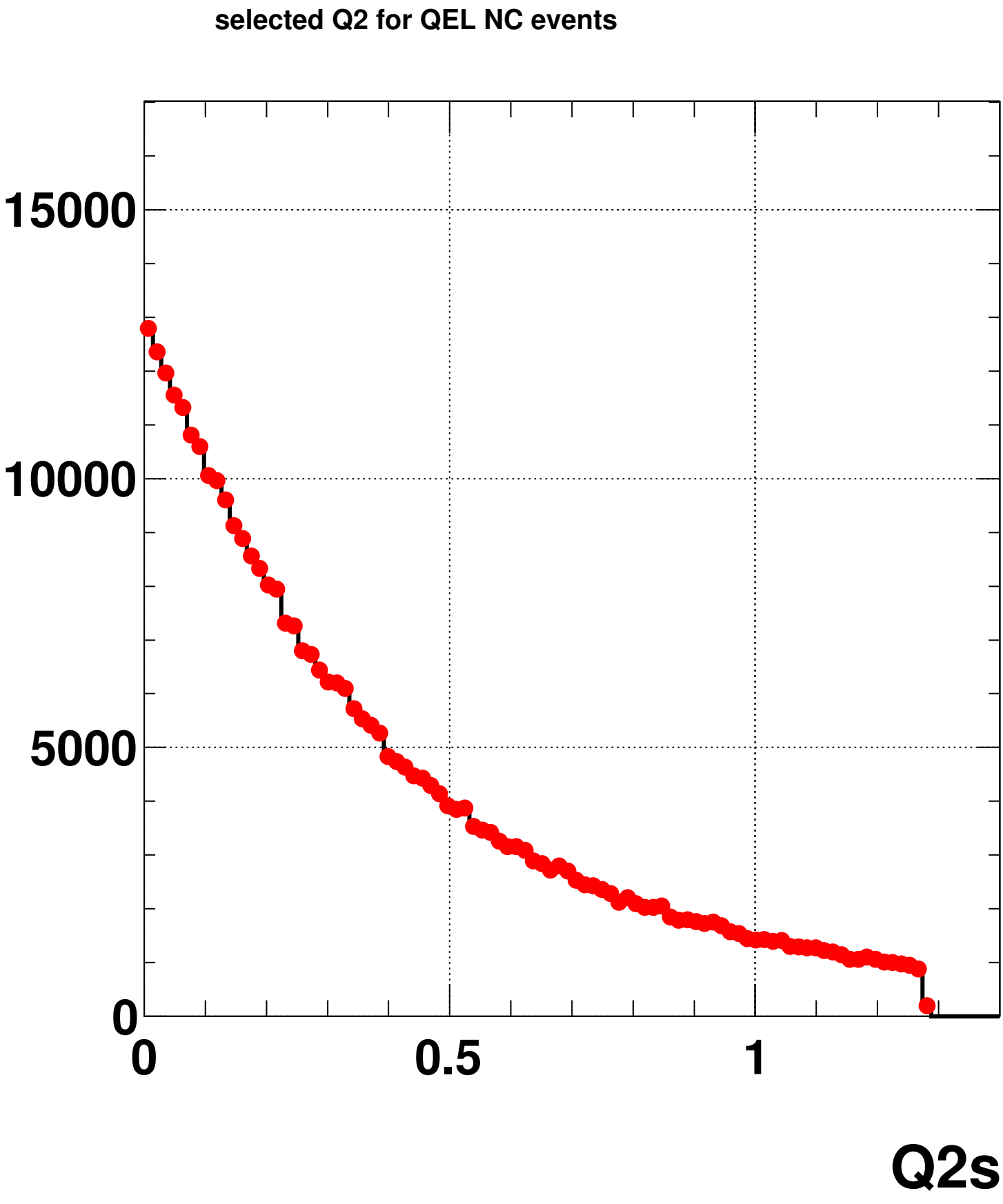
QEL-CHARM: 0 [test sample], 0 [ref sample]

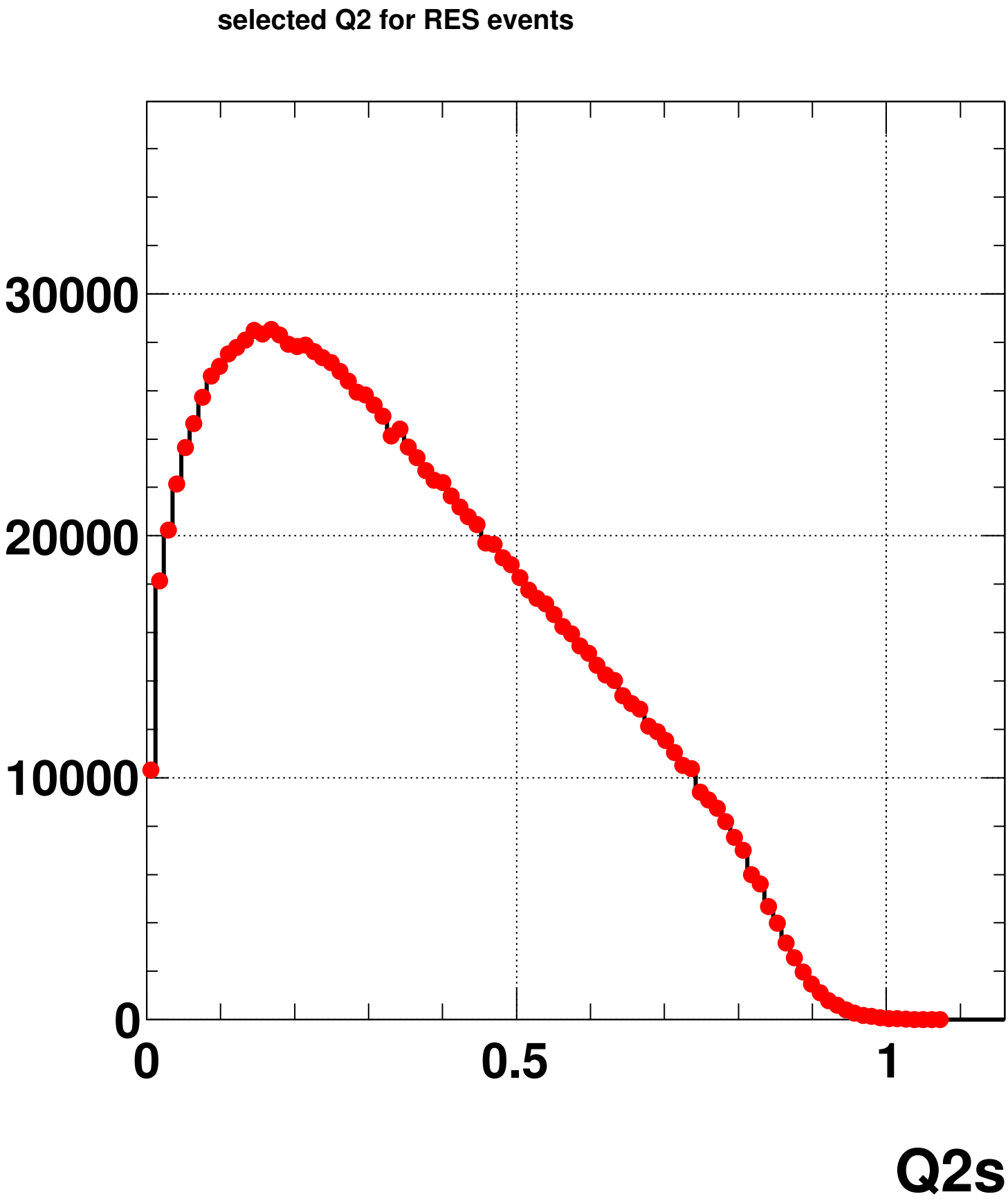
Selected Kinematical Quantities

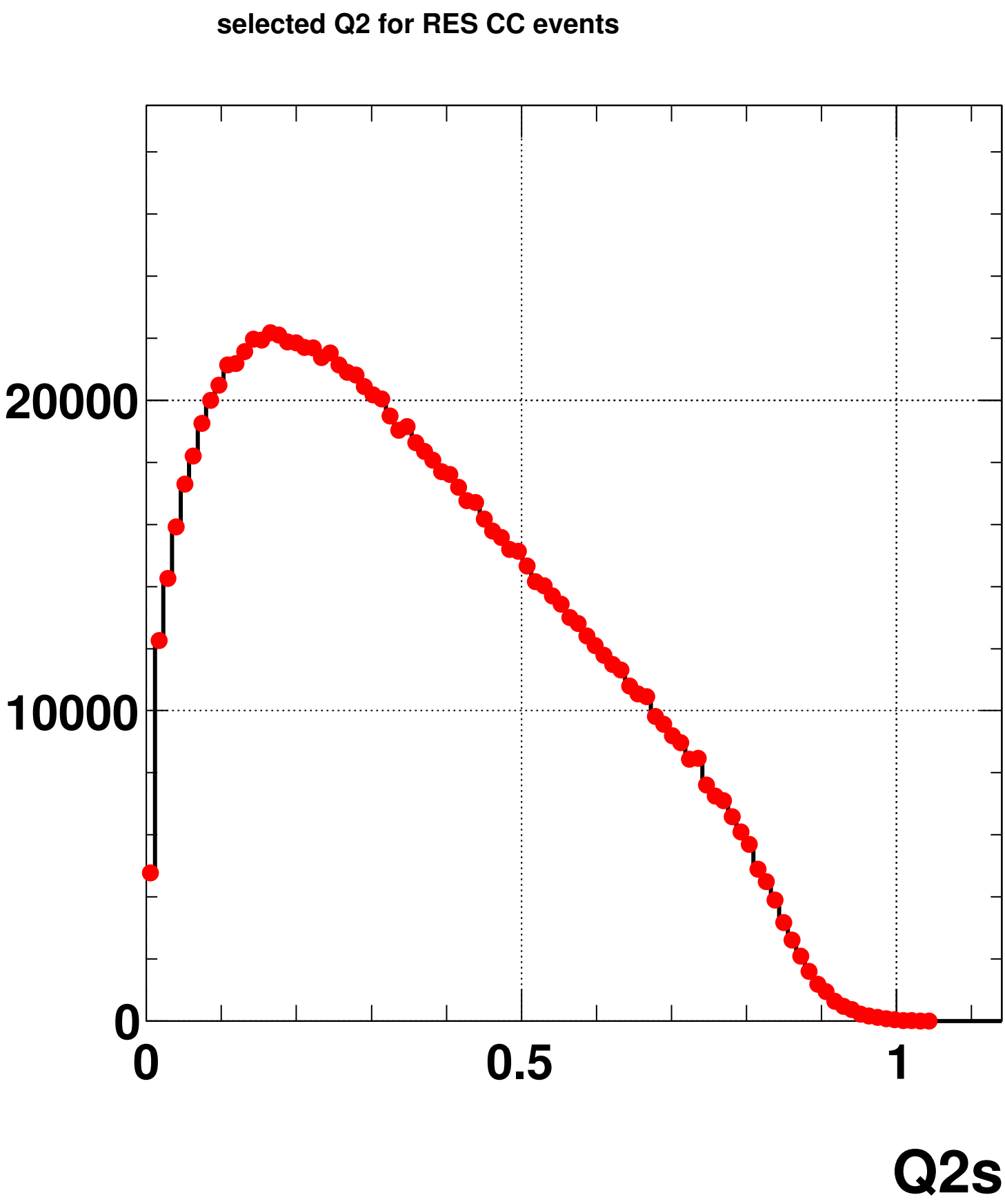

selected Q2 for all events
60000
40000
20000
0
0
0.5
1
Q2s

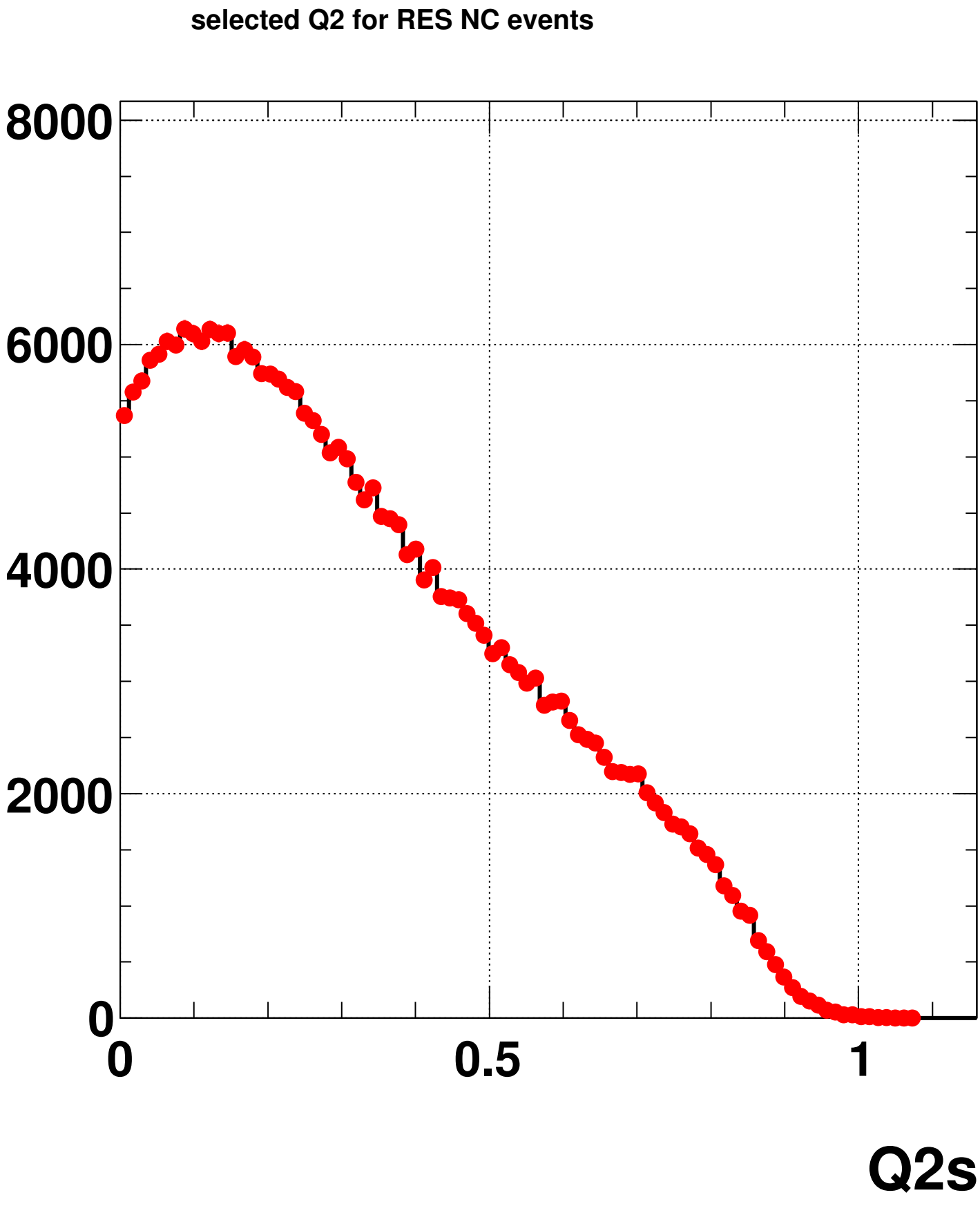

selected Q2 for QEL events
15000
10000
5000
0
0
0.5
1
Q2s

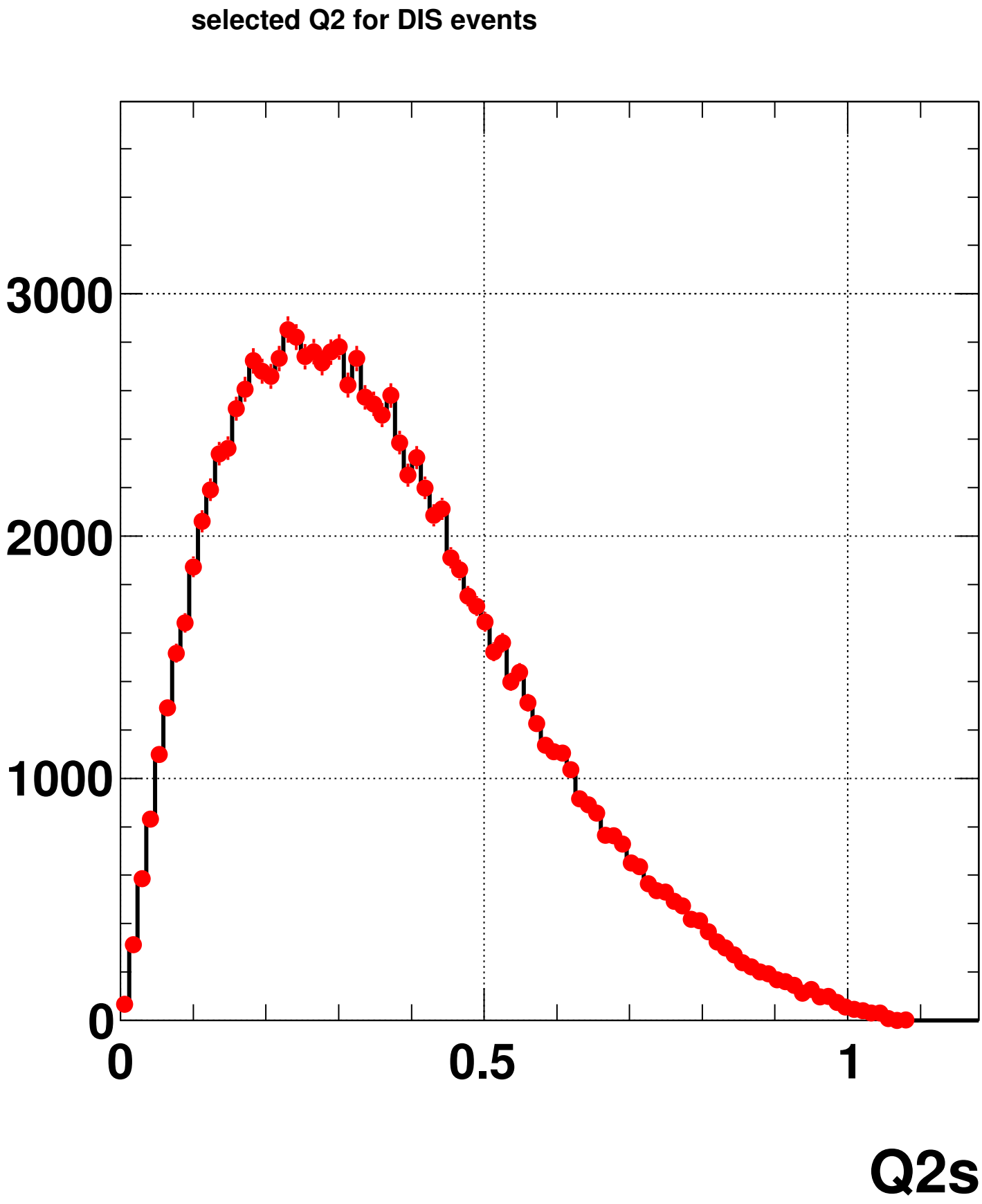

selected Q2 for QEL CC events
15000
10000
5000
0
0
0.5
1
Q2s

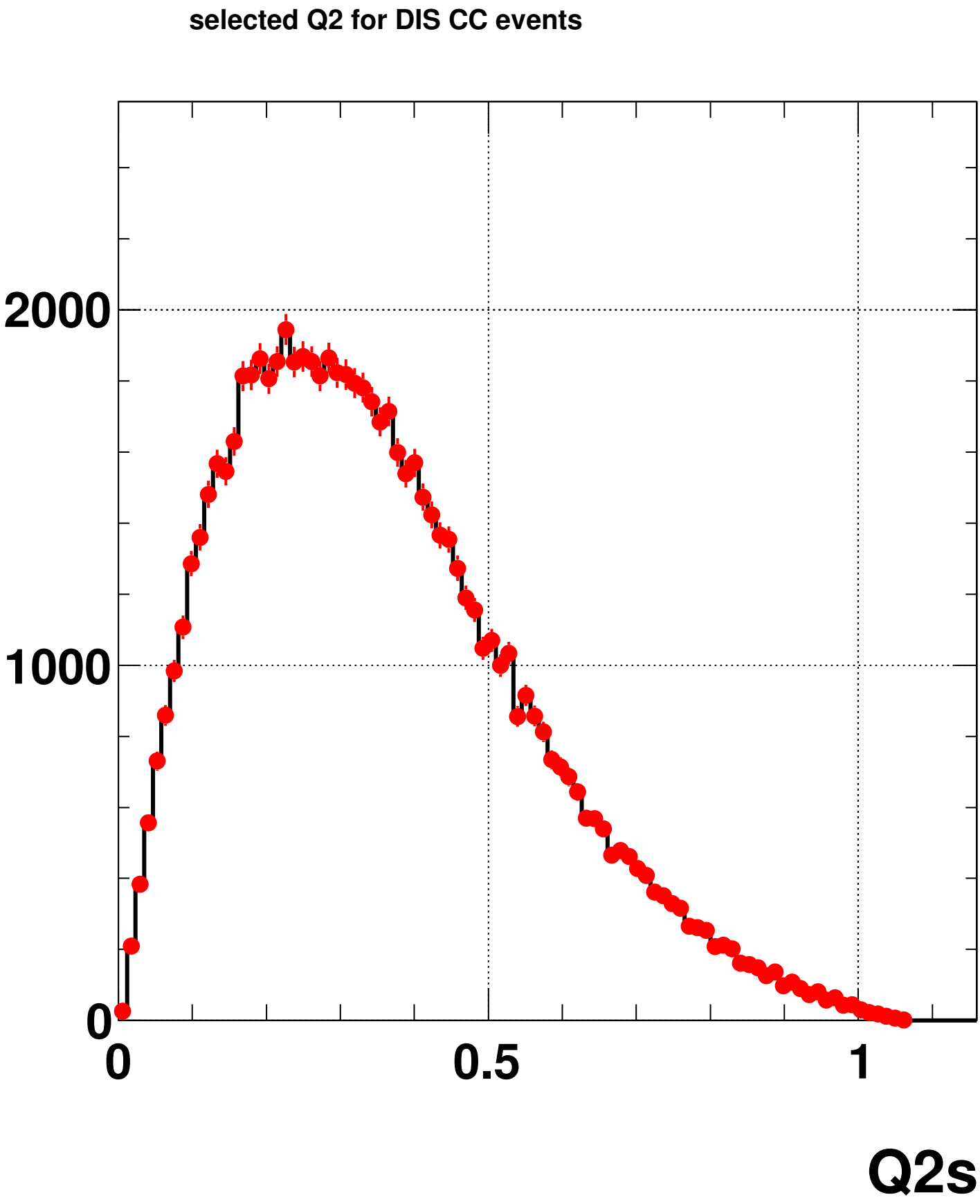

selected Q2 for QEL NC events
15000
10000
5000
0
0
0.5
1
Q2s

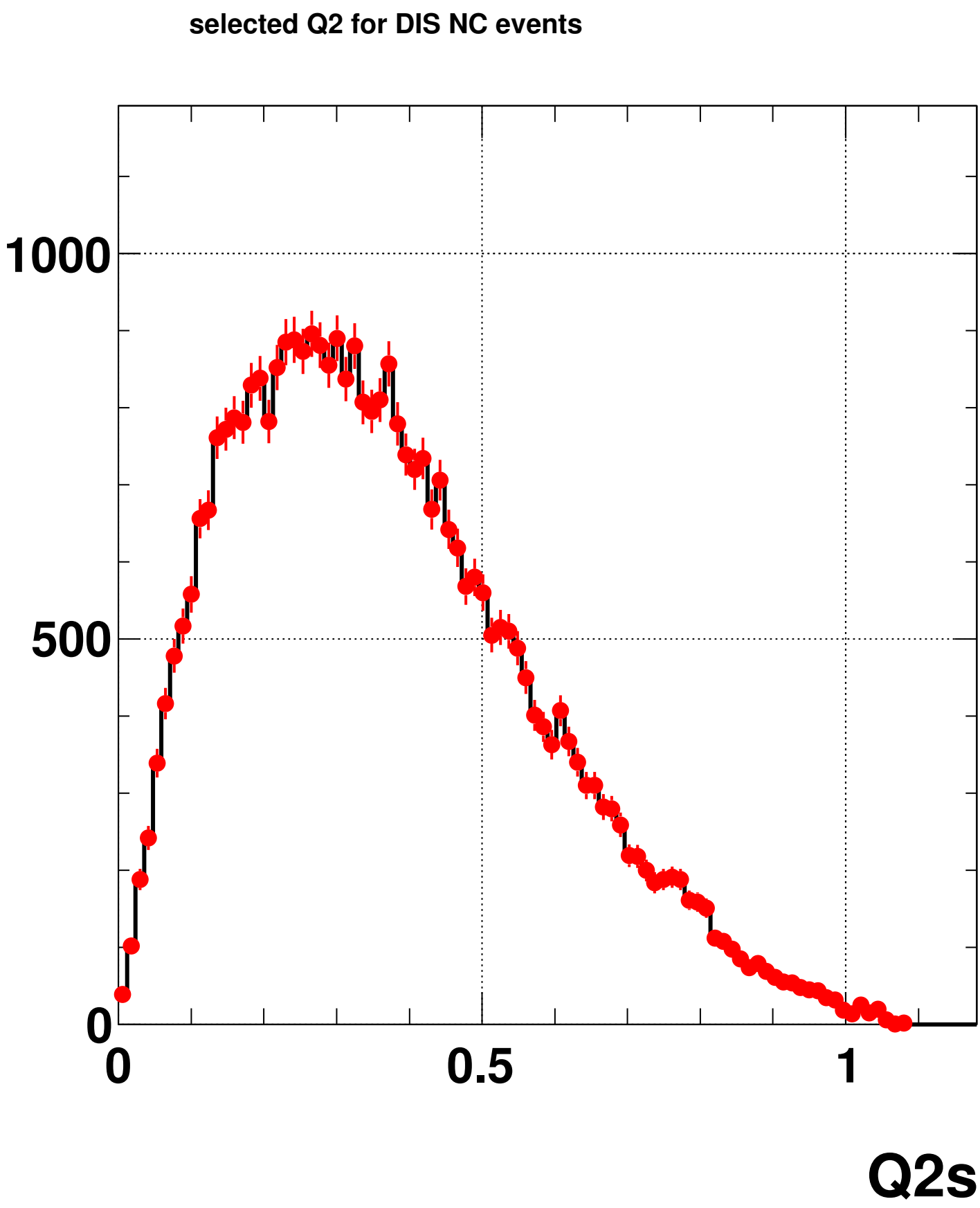

selected Q2 for RES events
30000
20000
10000
0
0
0.5
1
Q2s

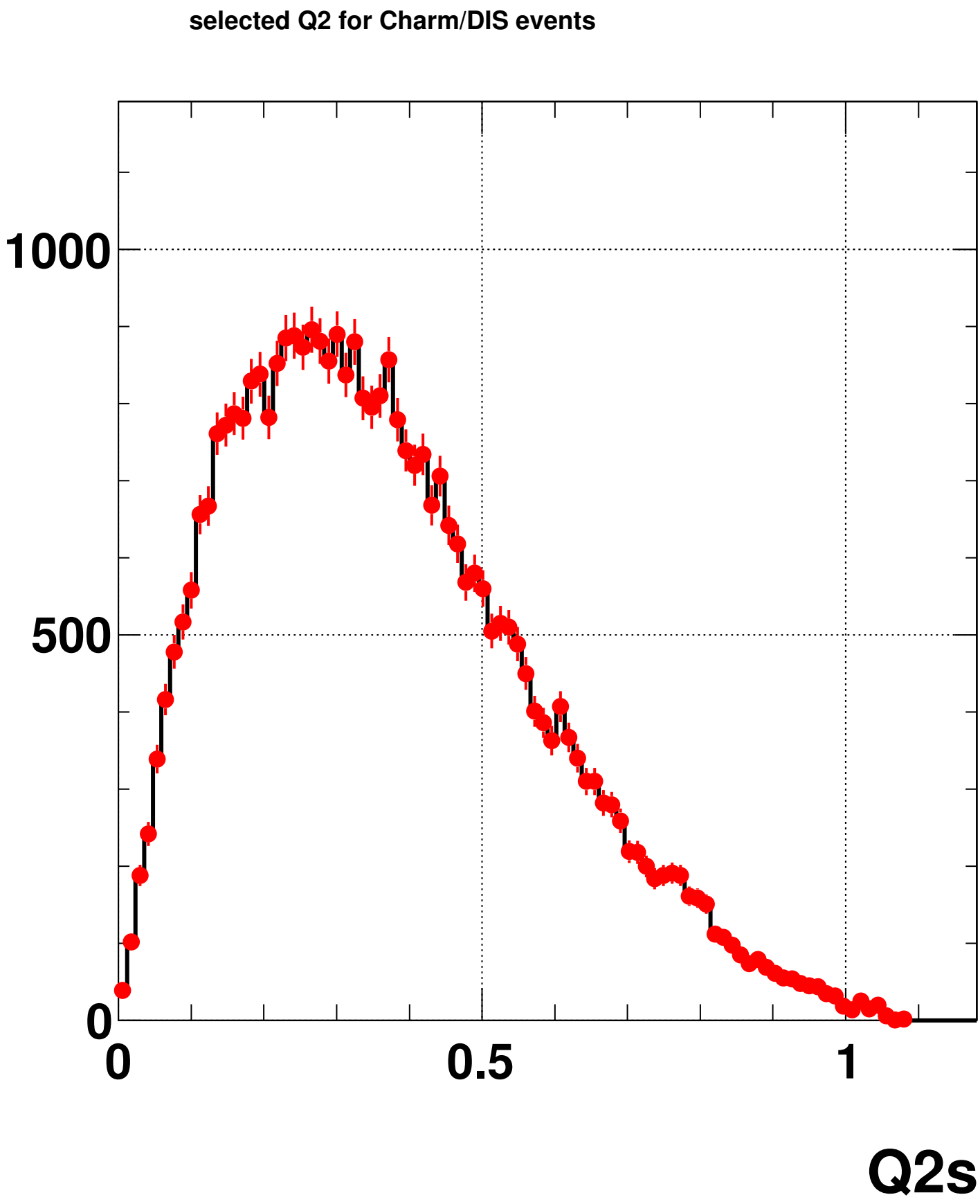

selected Q2 for RES CC events
20000
10000
0
0
0.5
1
Q2s

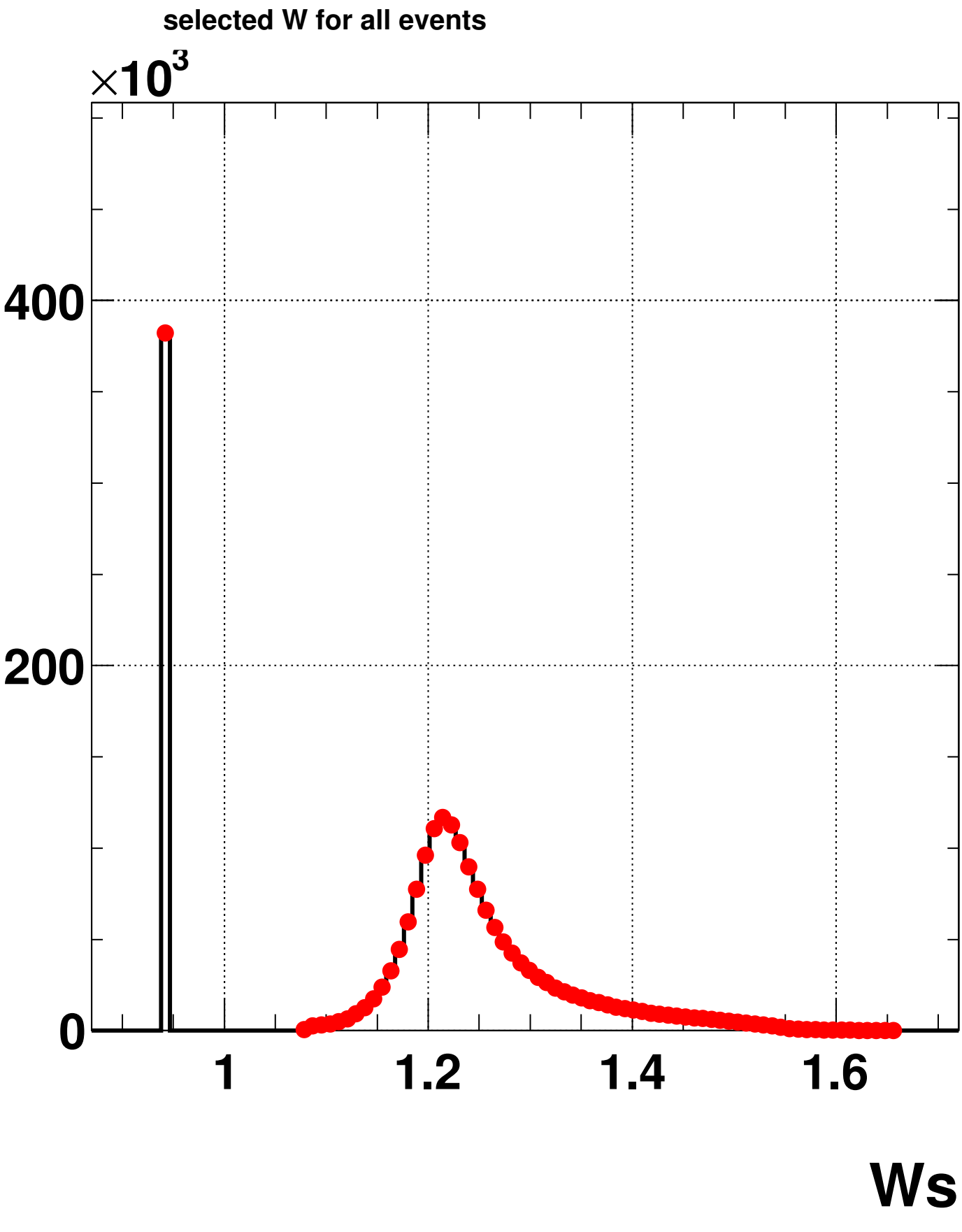

selected Q2 for RES NC events
8000
6000
4000
2000
0
0
0.5
1
Q2s

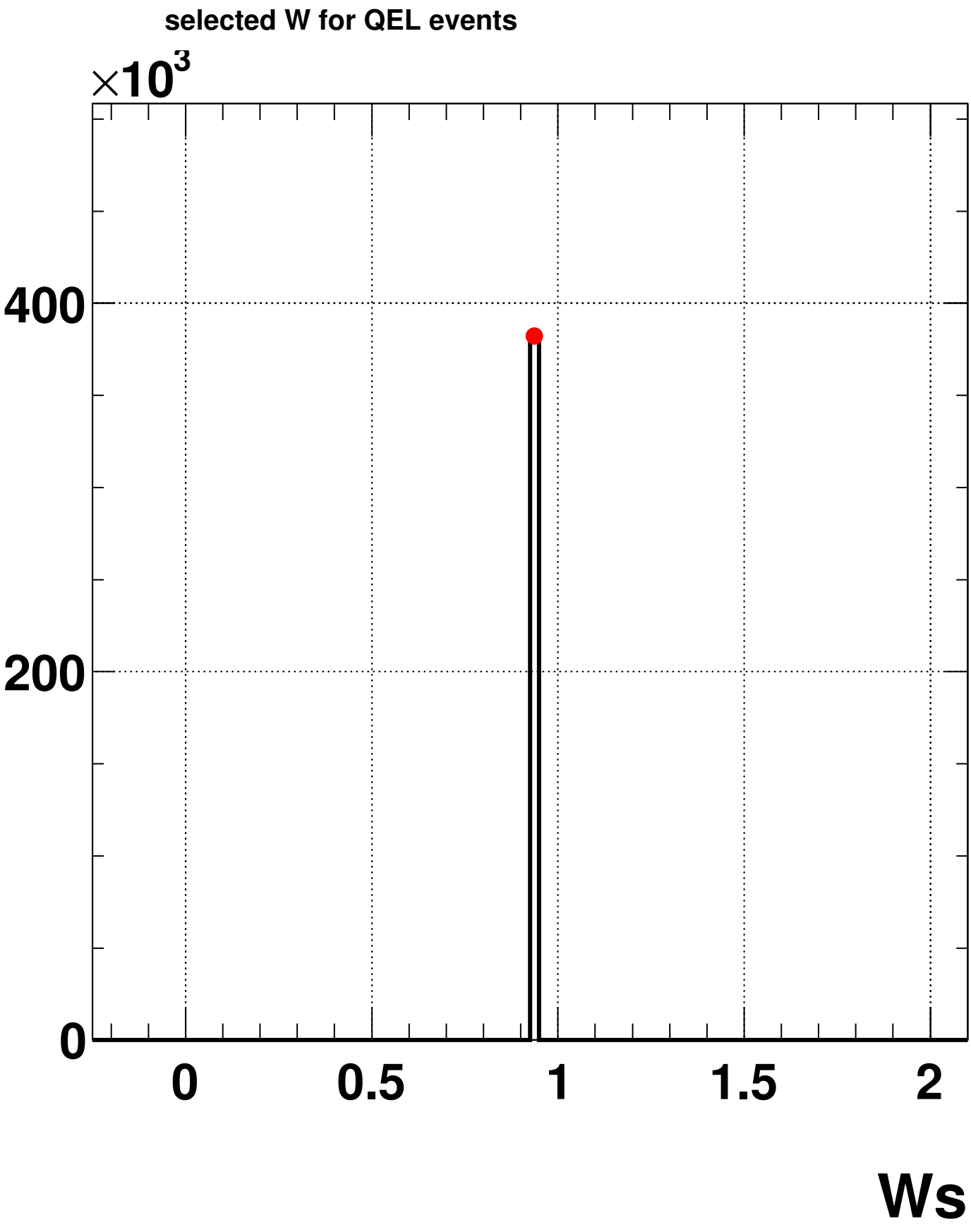

selected Q2 for DIS events
3000
2000
1000
0
0
0.5
1
Q2s

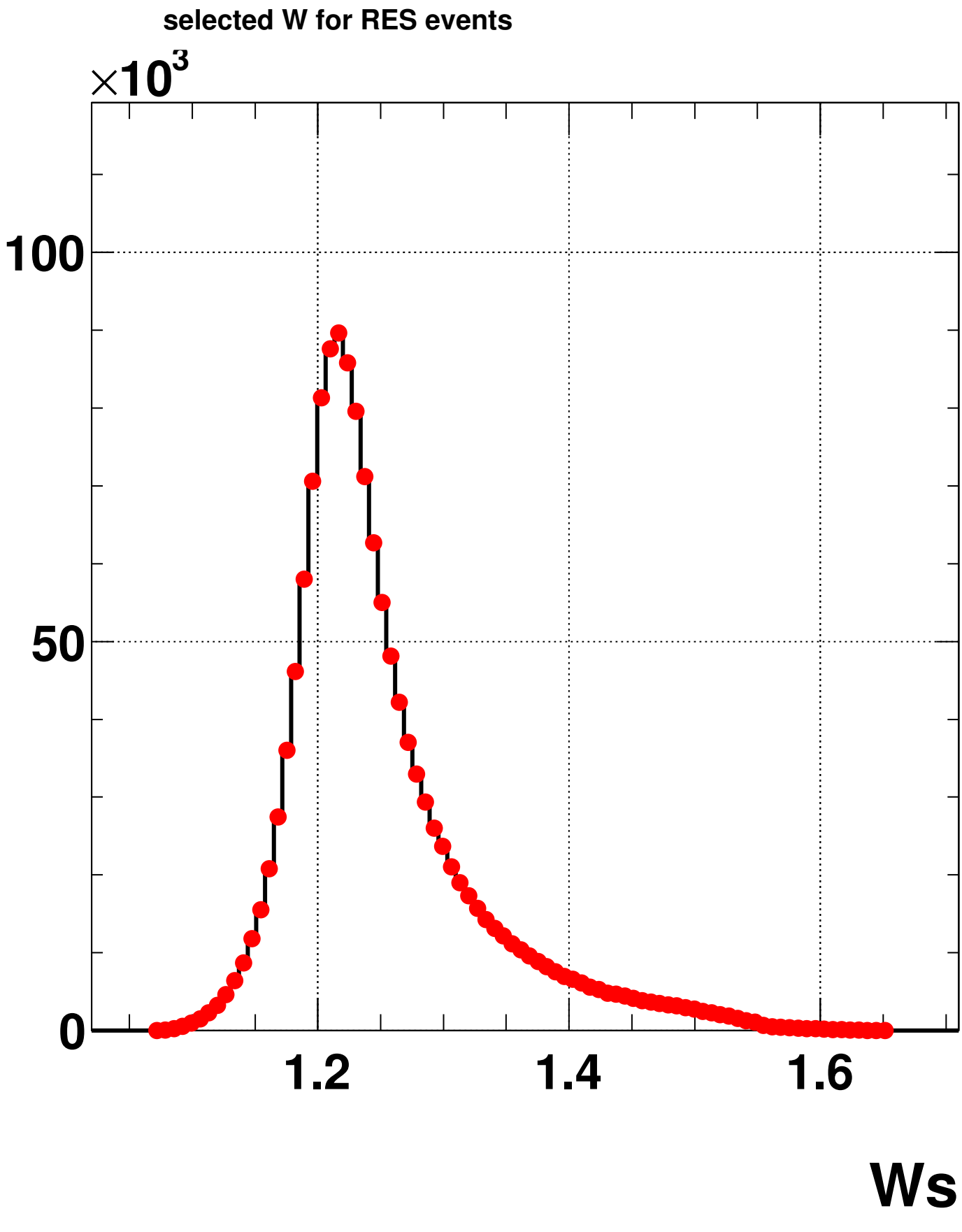

selected Q2 for DIS CC events
2000
1000
0
0
0.5
1
Q2s

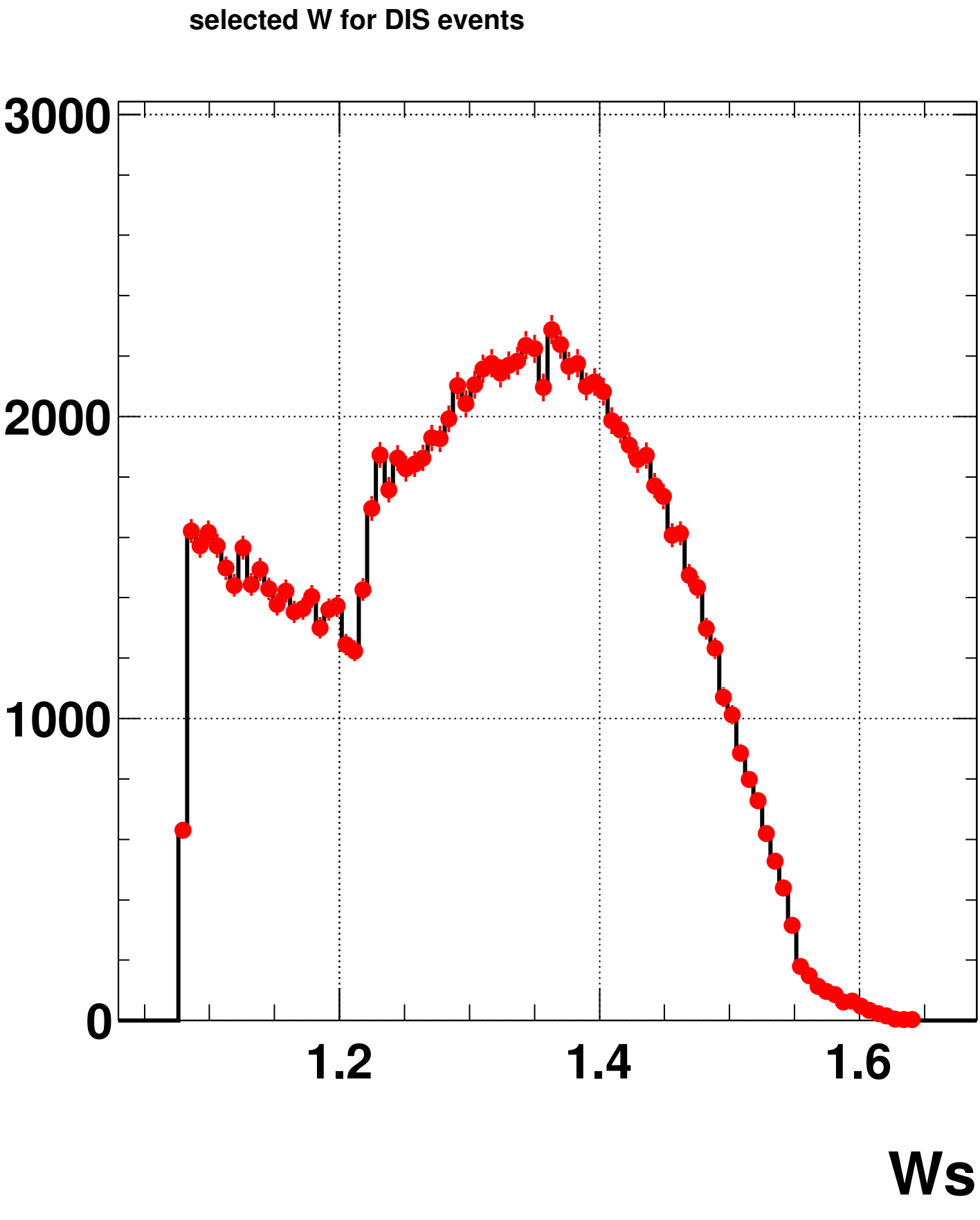

selected Q2 for DIS NC events
1000
500
0
0
0.5
1
Q2s

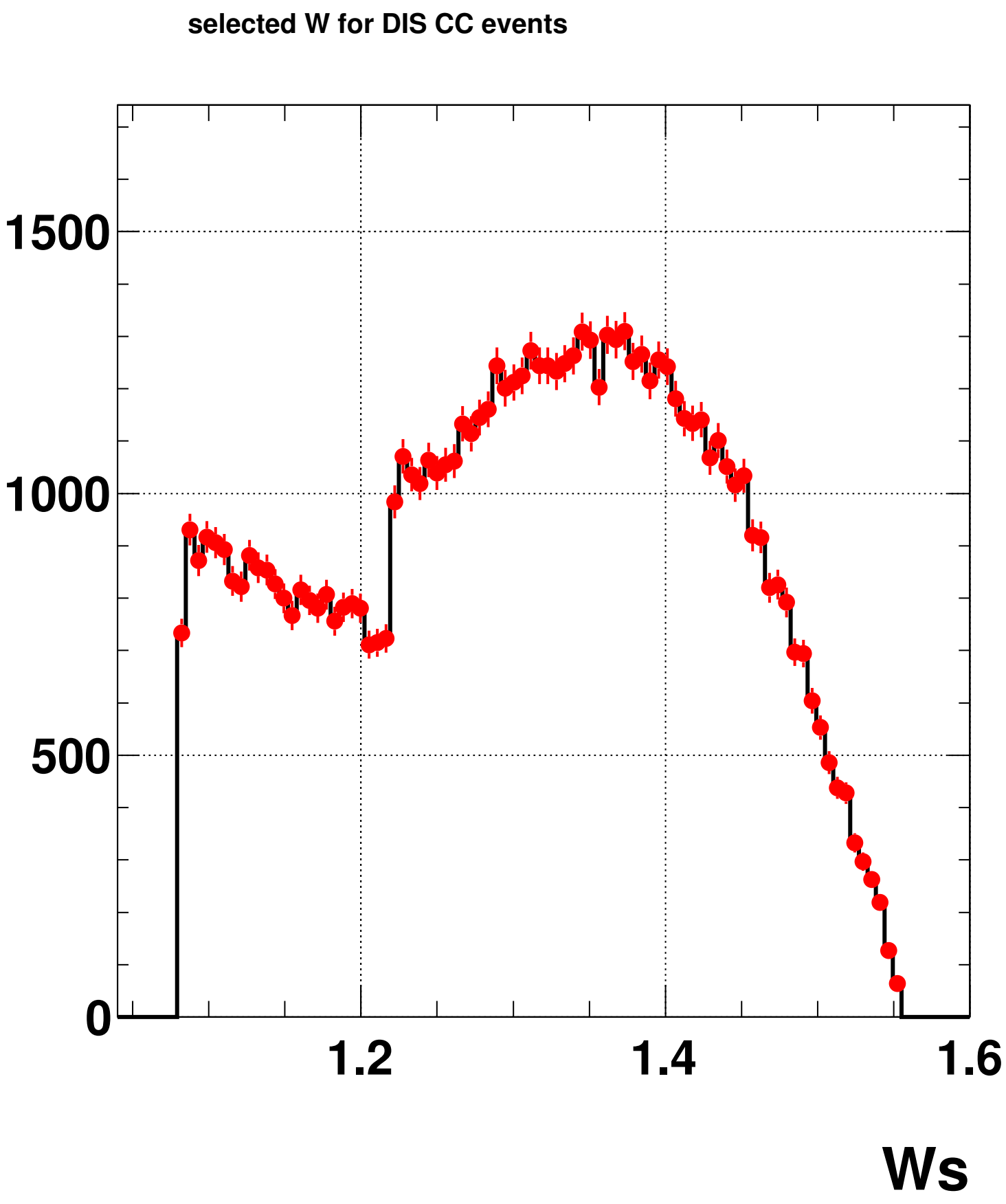

selected Q2 for Charm/DIS events
1000
500
0
0
0.5
1
Q2s

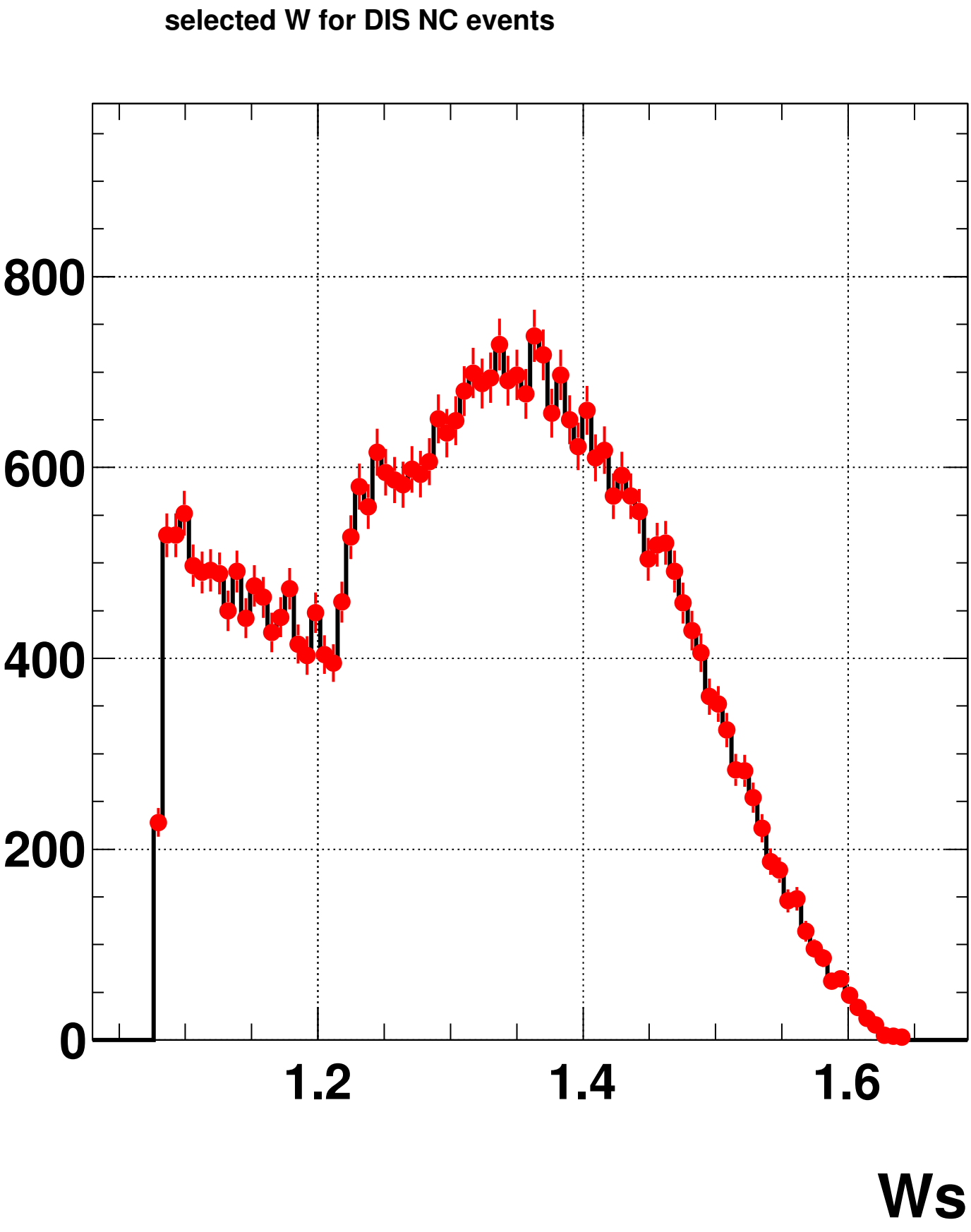

selected W for all events
×10^3
400
200
0
1
1.2
1.4
1.6
Ws

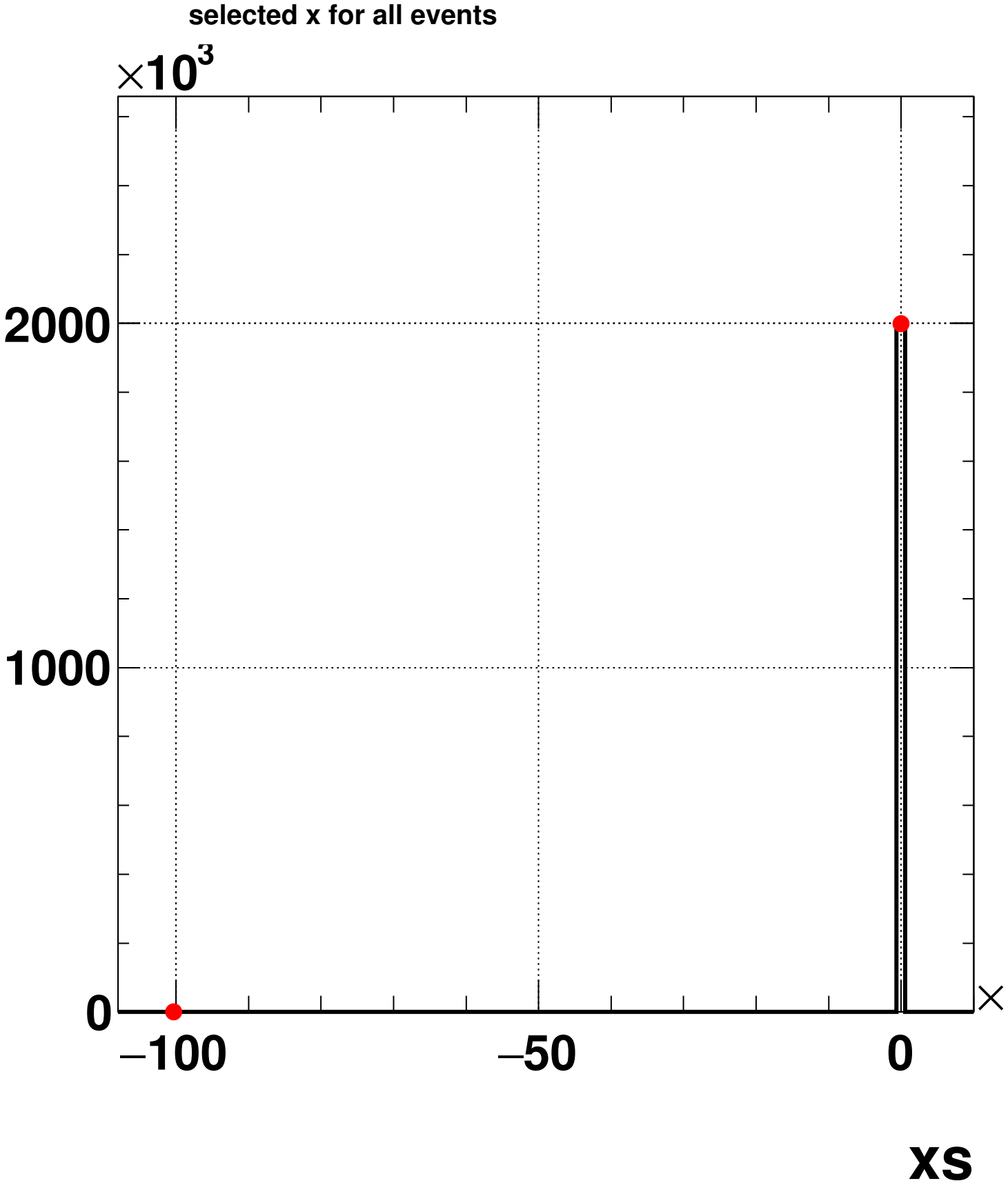

selected W for QEL events
×10^3
400
200
0
0
0.5
1
1.5
2
Ws

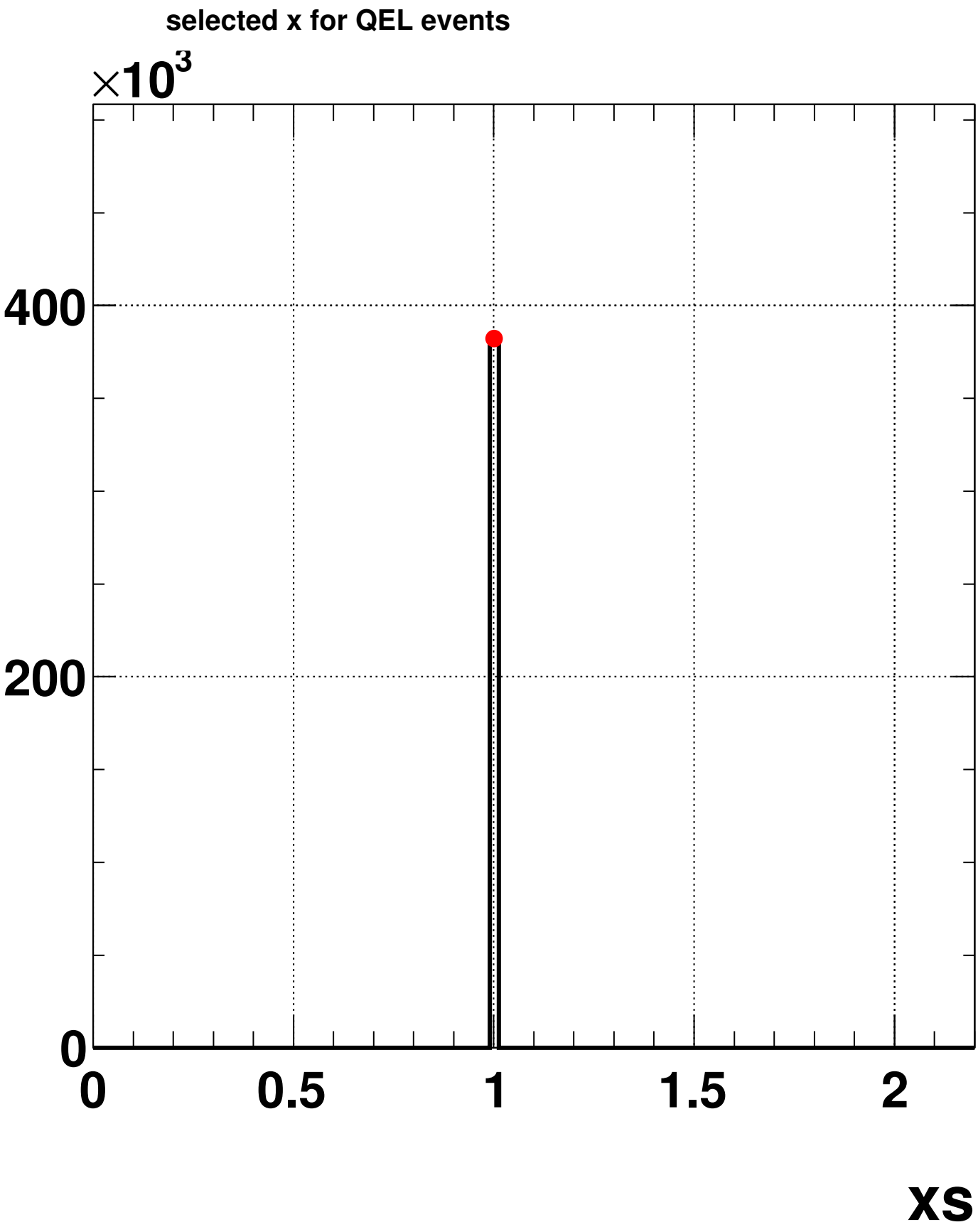

selected W for RES events
×10^3
100
50
0
1.2
1.4
1.6
Ws

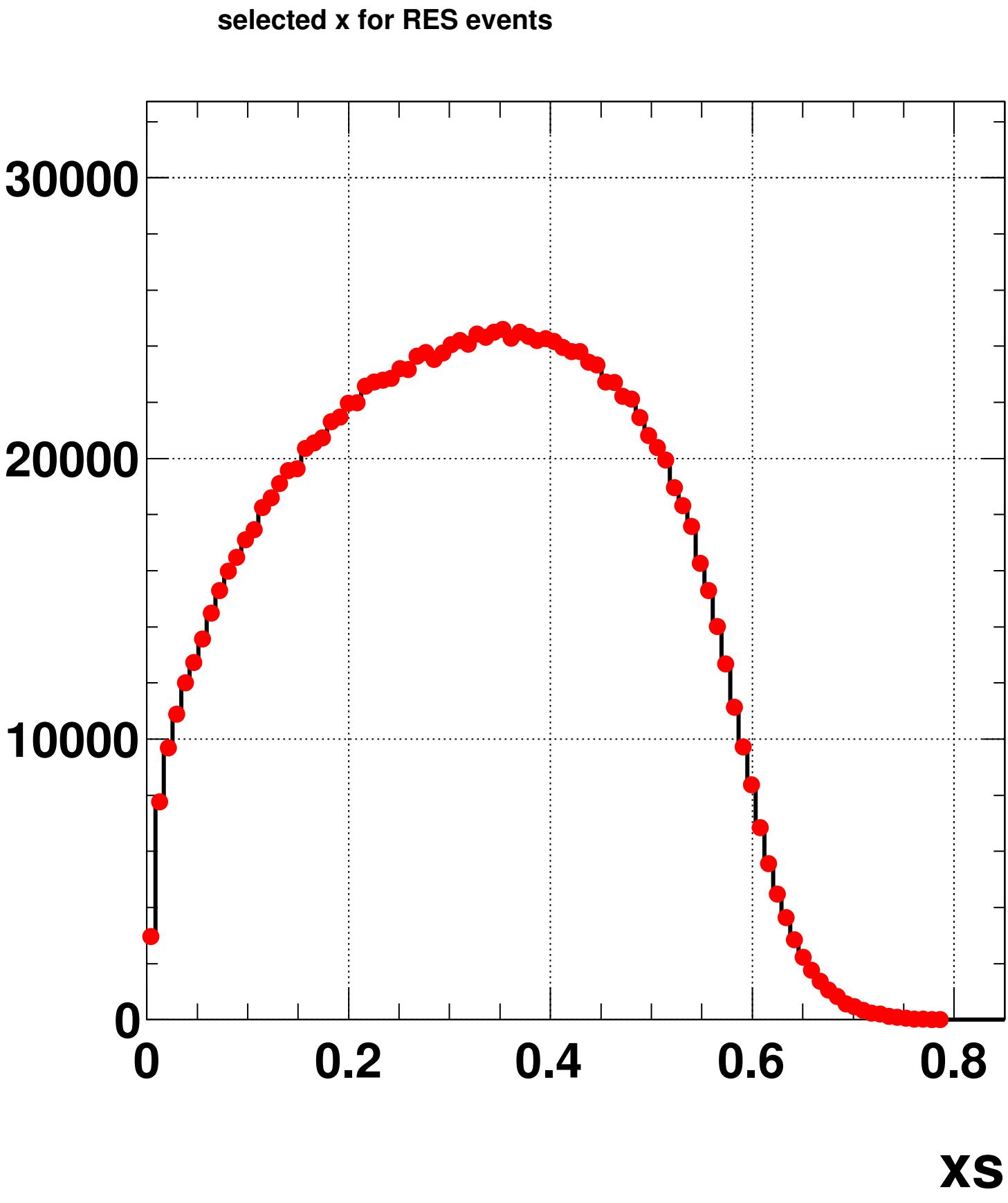

selected W for DIS events
3000
2000
1000
0
1.2
1.4
1.6
Ws

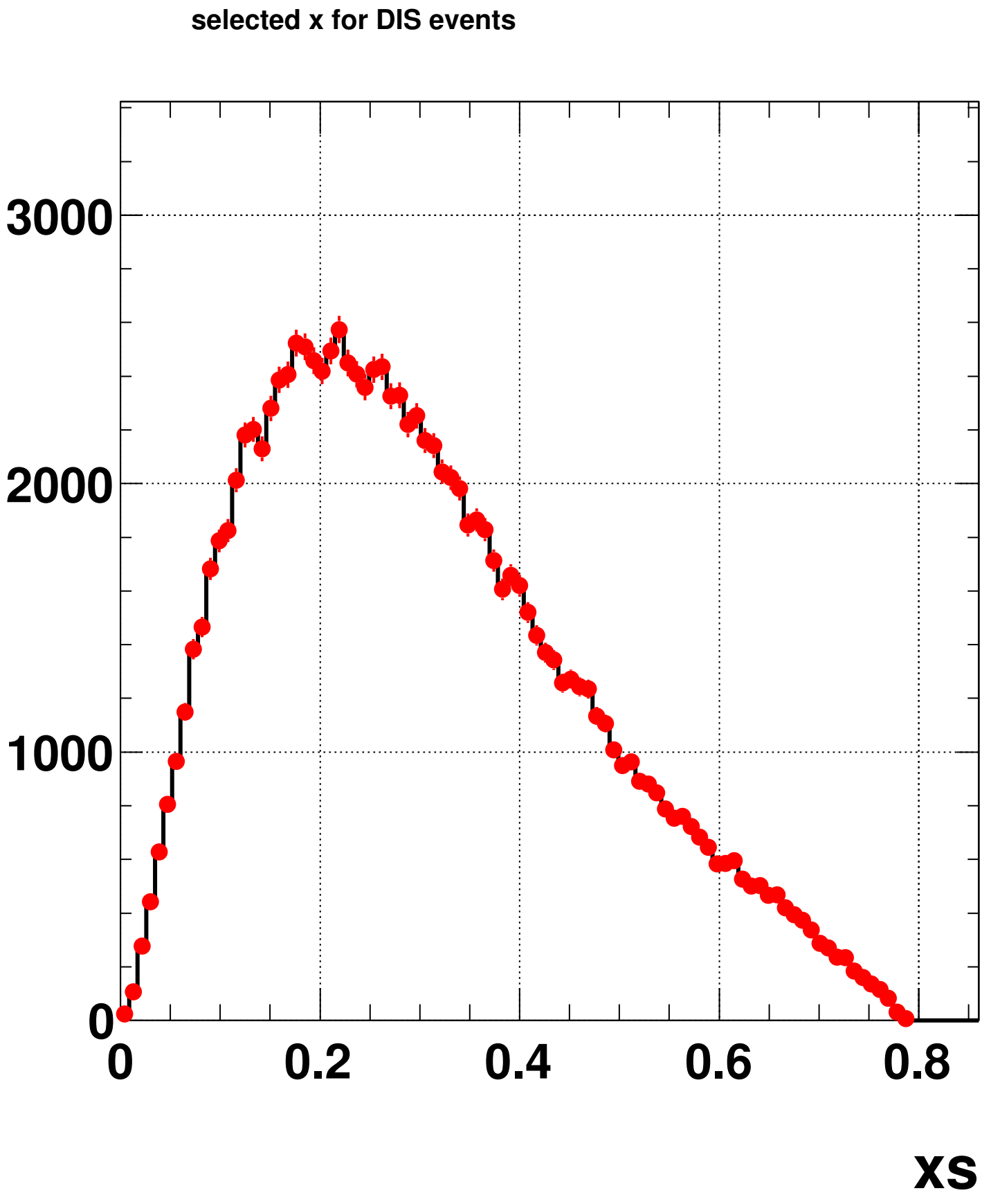

selected W for DIS CC events
1500
1000
500
0
1.2
1.4
1.6
Ws

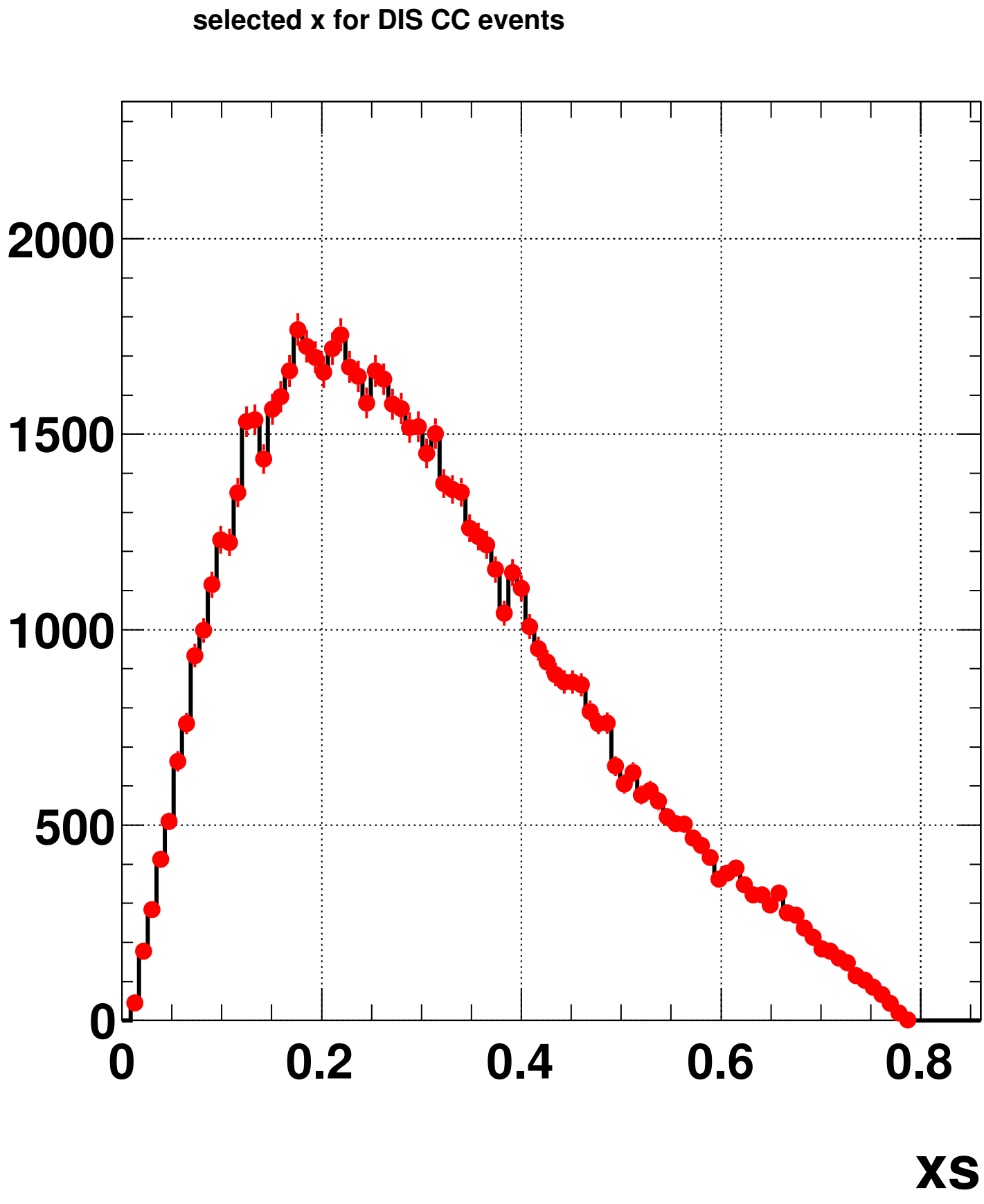

selected W for DIS NC events
800
600
400
200
0
1.2
1.4
1.6
Ws

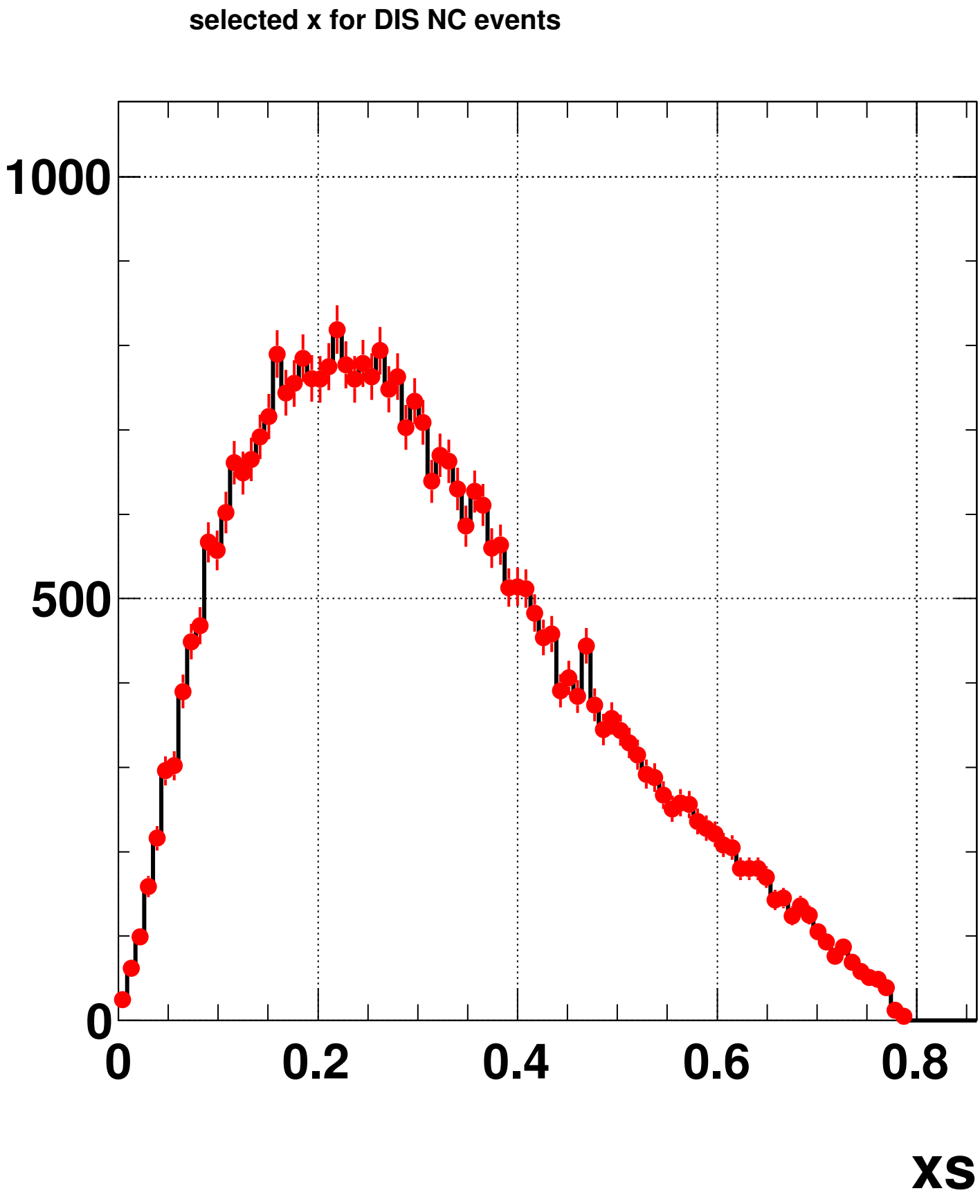

selected x for all events
×10^3
2000
1000
0
−100
−50
0
xs

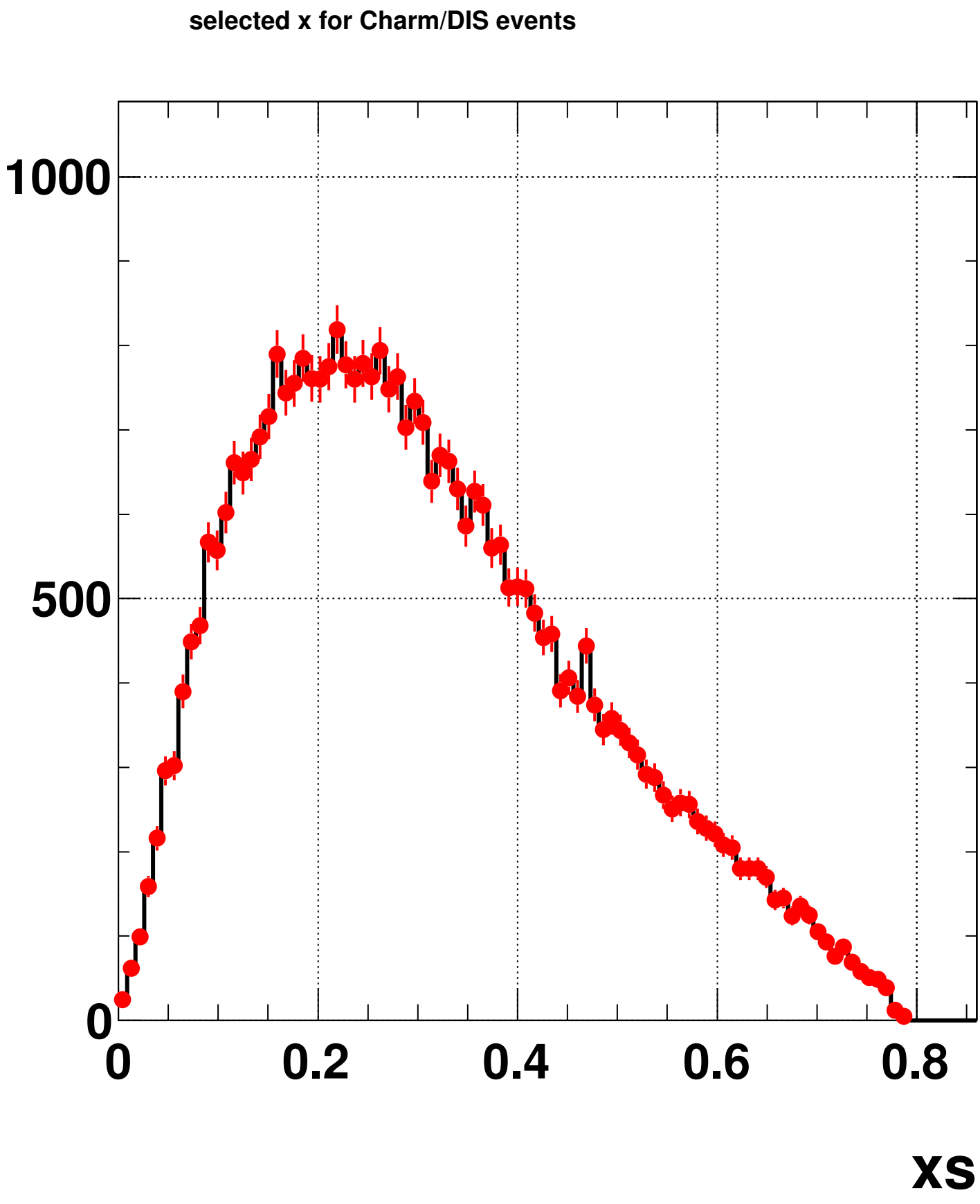

selected x for QEL events
×10^3
400
200
0
0
0.5
1
1.5
2
xs

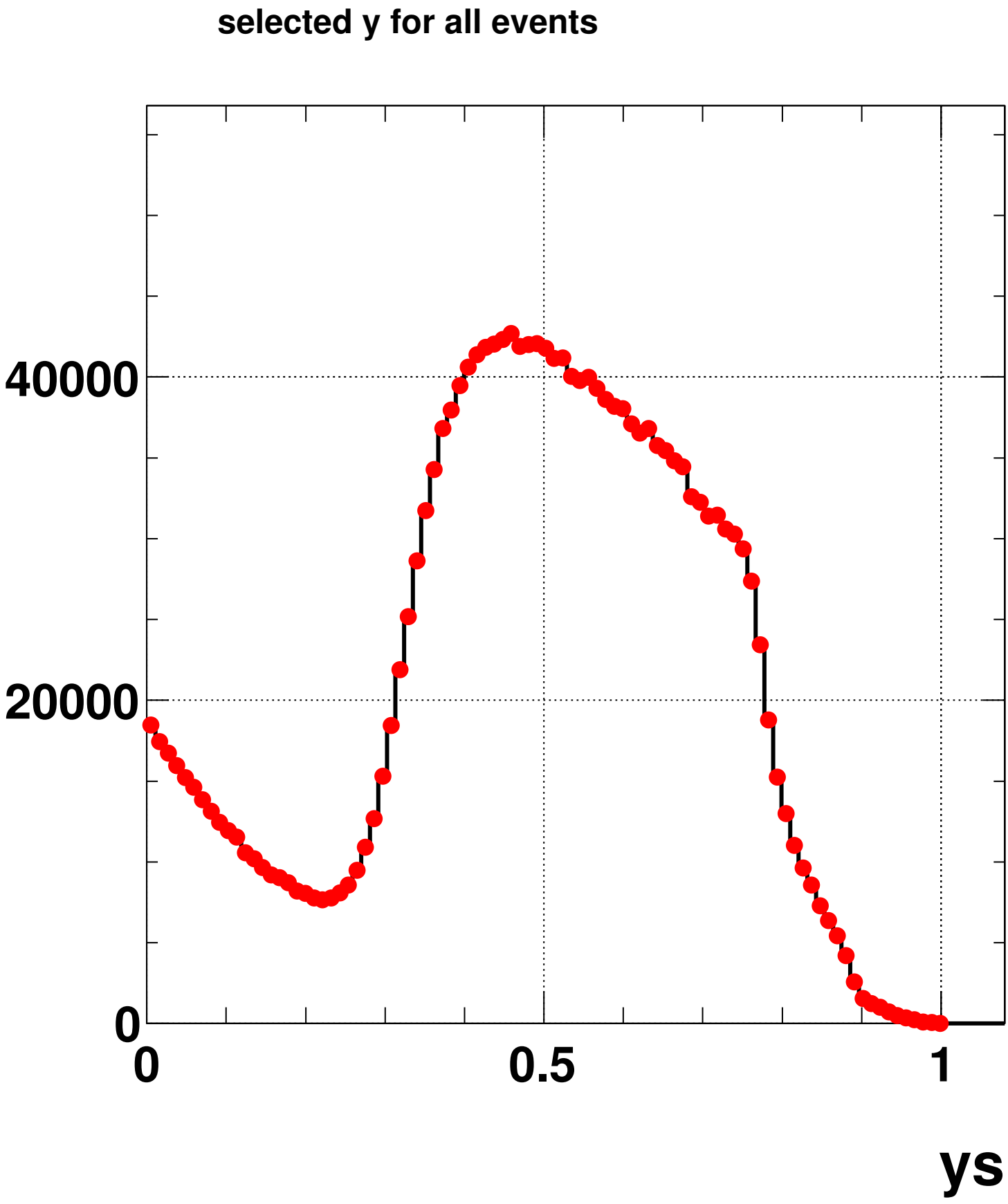

selected x for RES events
30000
20000
10000
0
0
0.2
0.4
0.6
0.8
xs

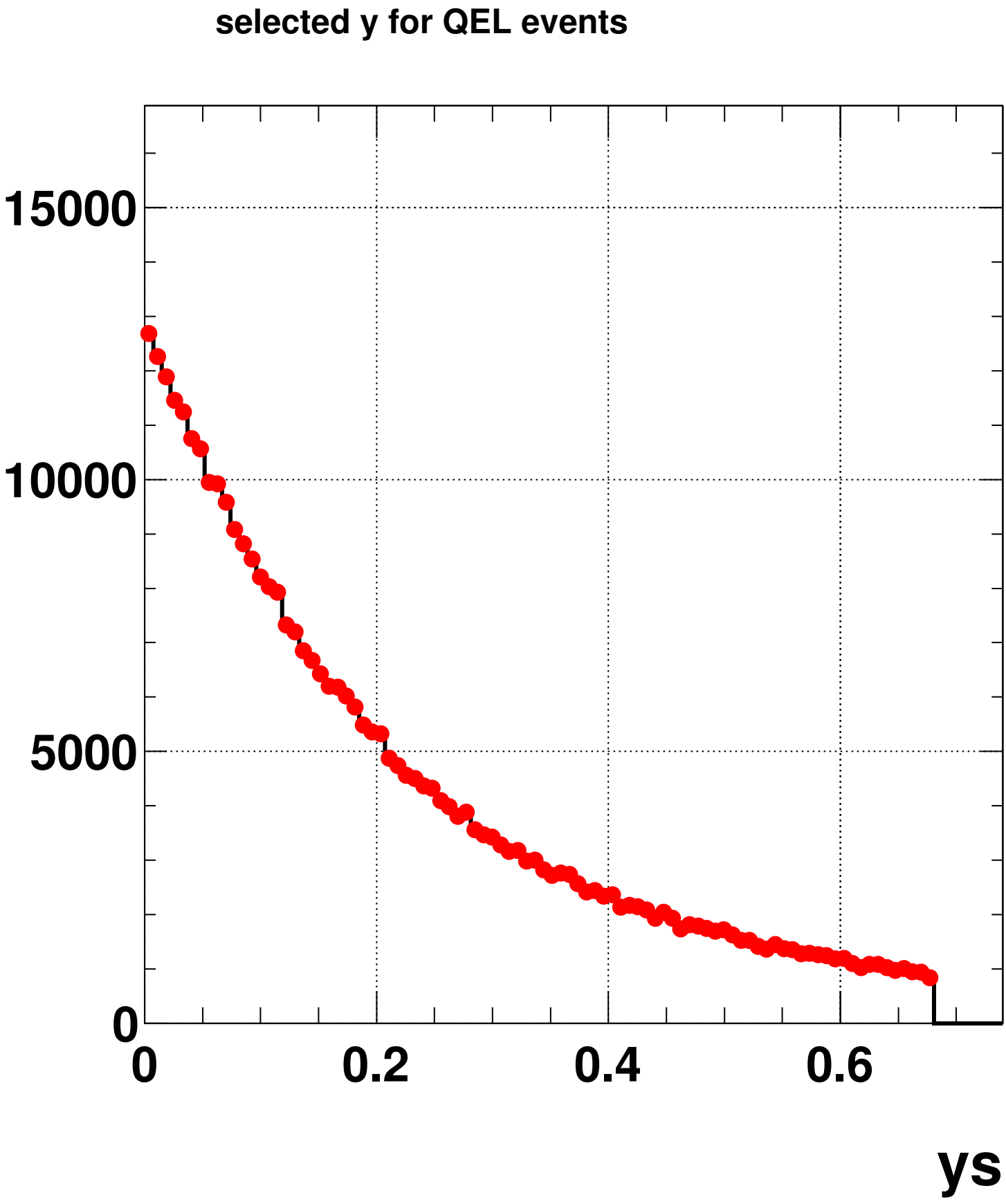

selected x for DIS events
3000
2000
1000
0
0
0.2
0.4
0.6
0.8
xs

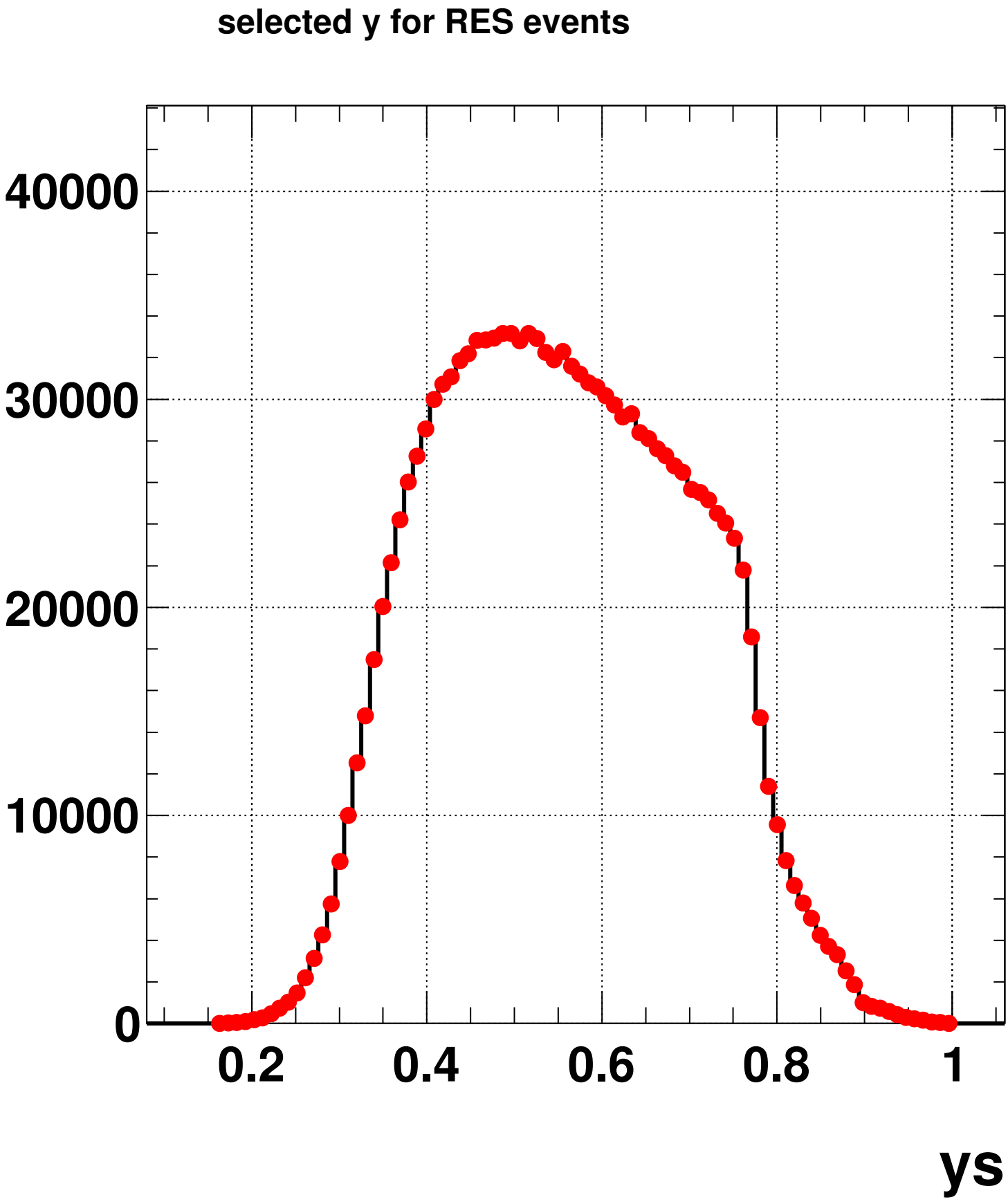

selected x for DIS CC events
2000
1500
1000
500
0
0
0.2
0.4
0.6
0.8
xs

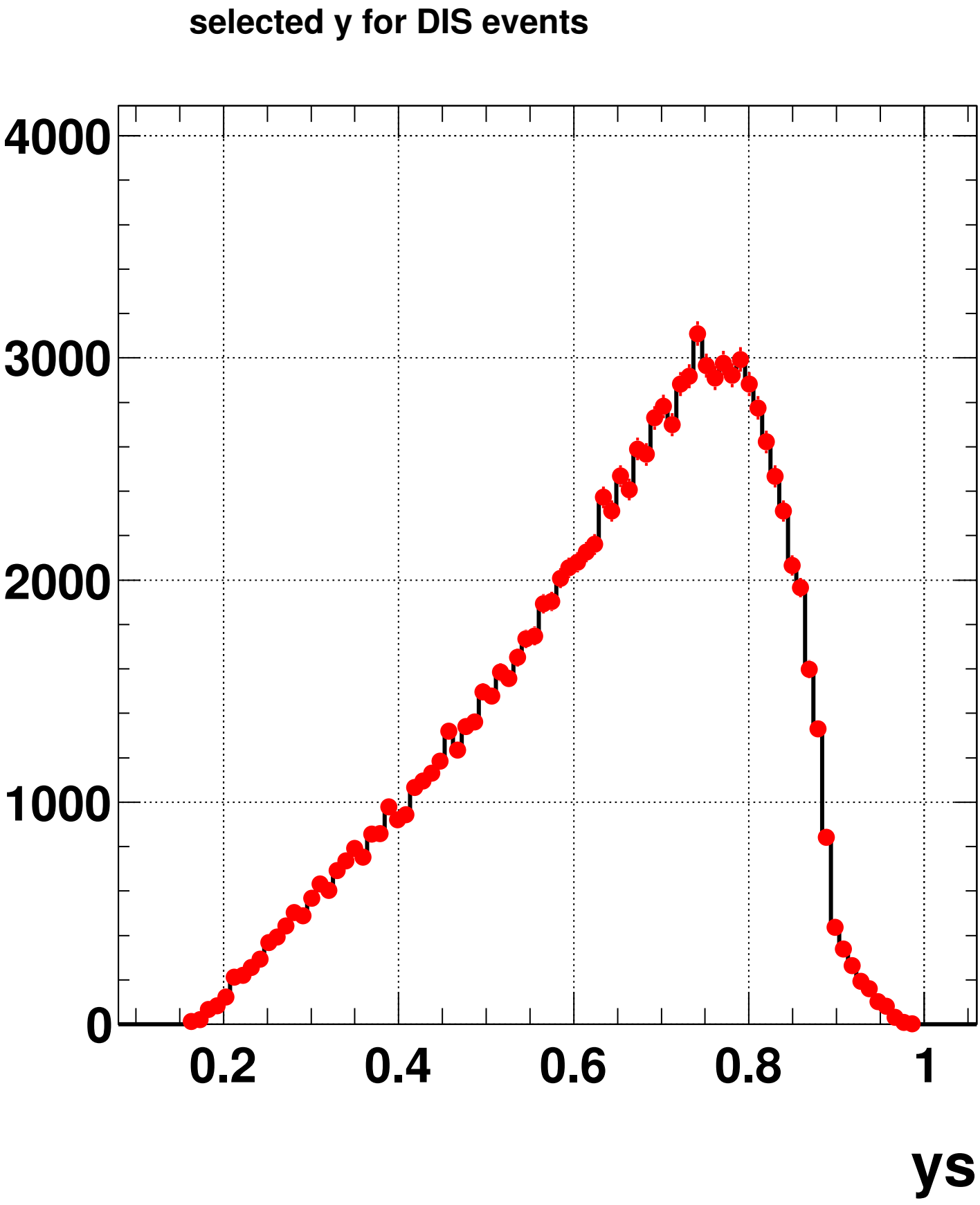

selected x for DIS NC events
1000
500
0
0
0.2
0.4
0.6
0.8
xs

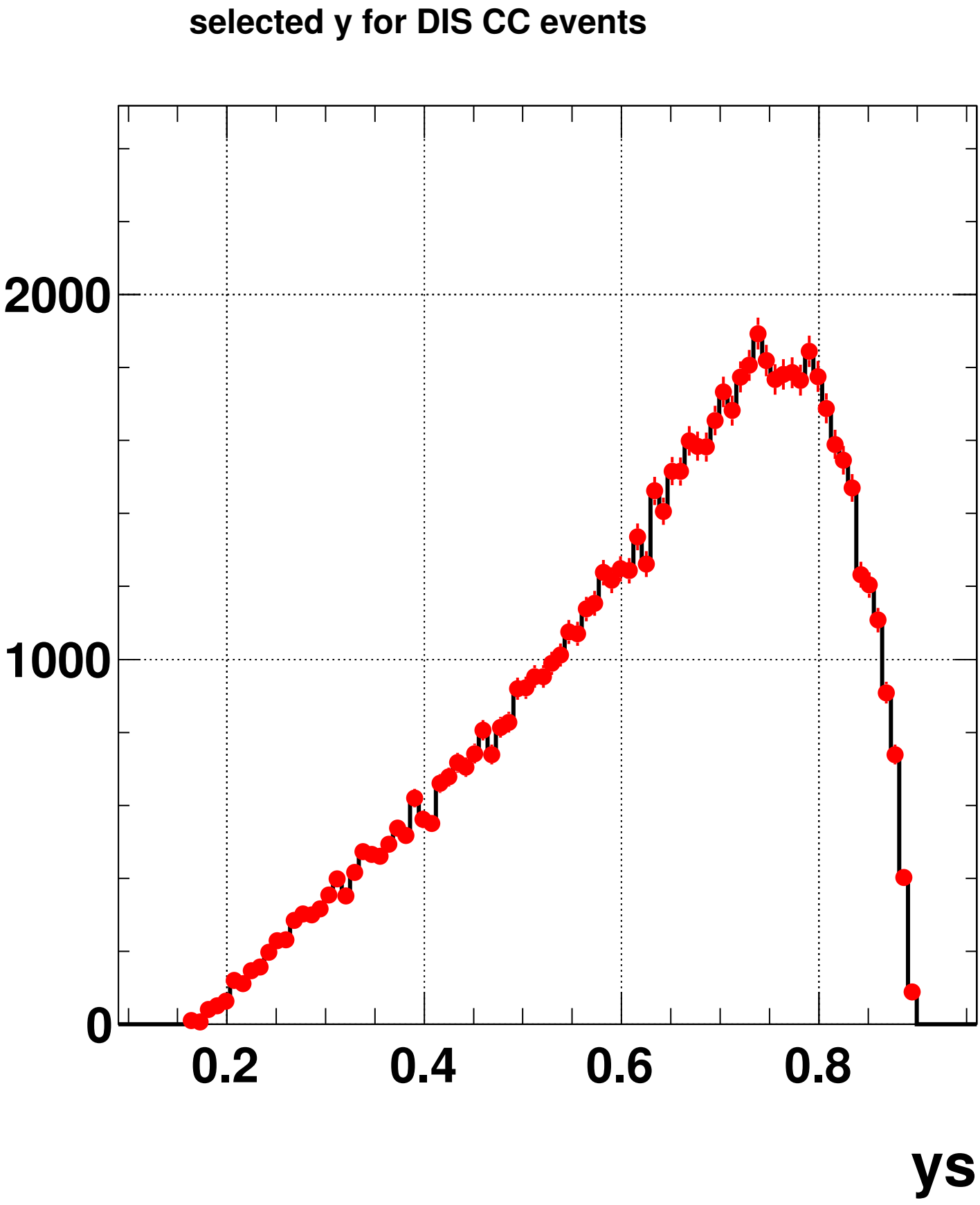

selected x for Charm/DIS events
1000
500
0
0
0.2
0.4
0.6
0.8
xs

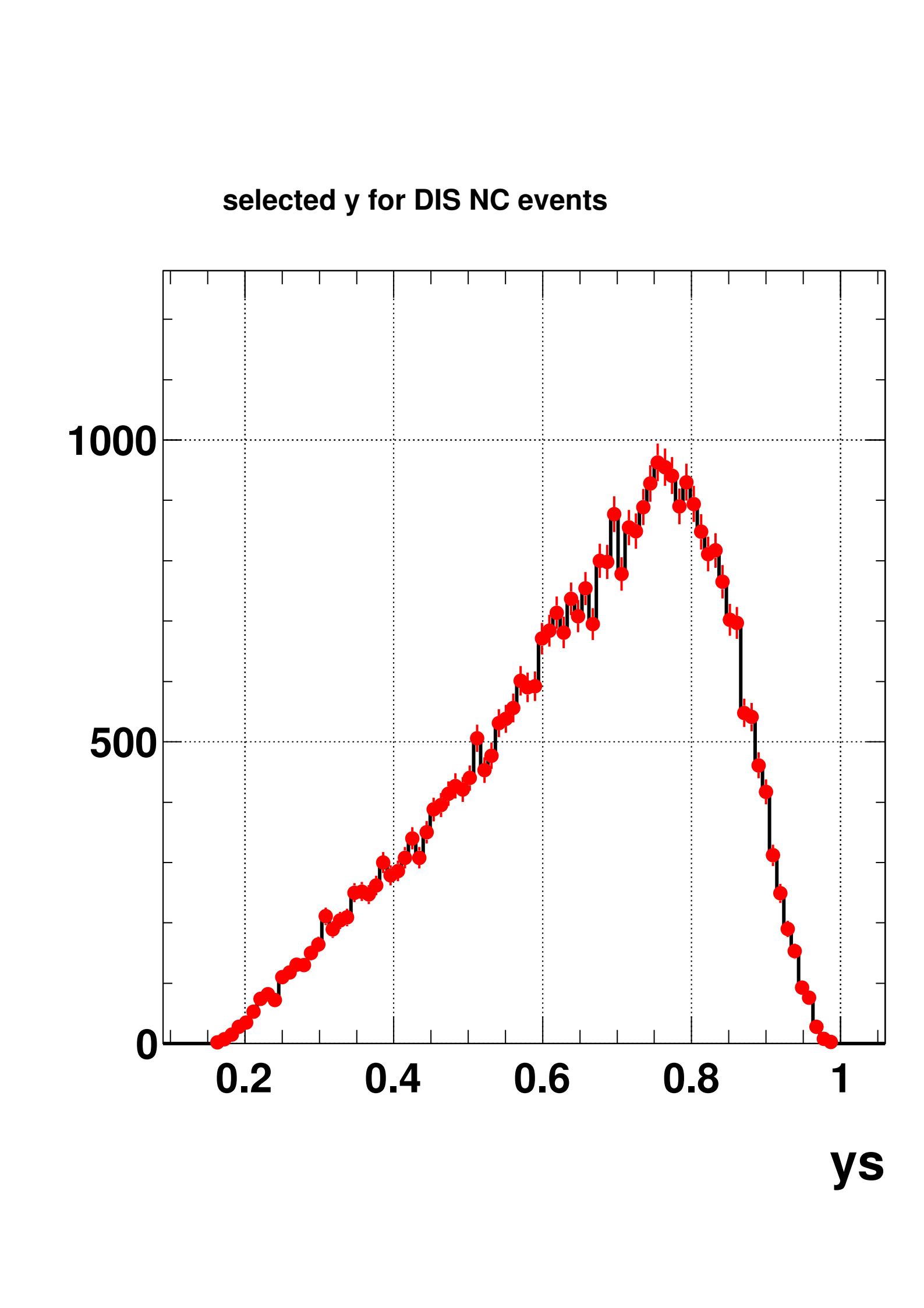

selected y for all events
40000
20000
0
0
0.5
1
ys

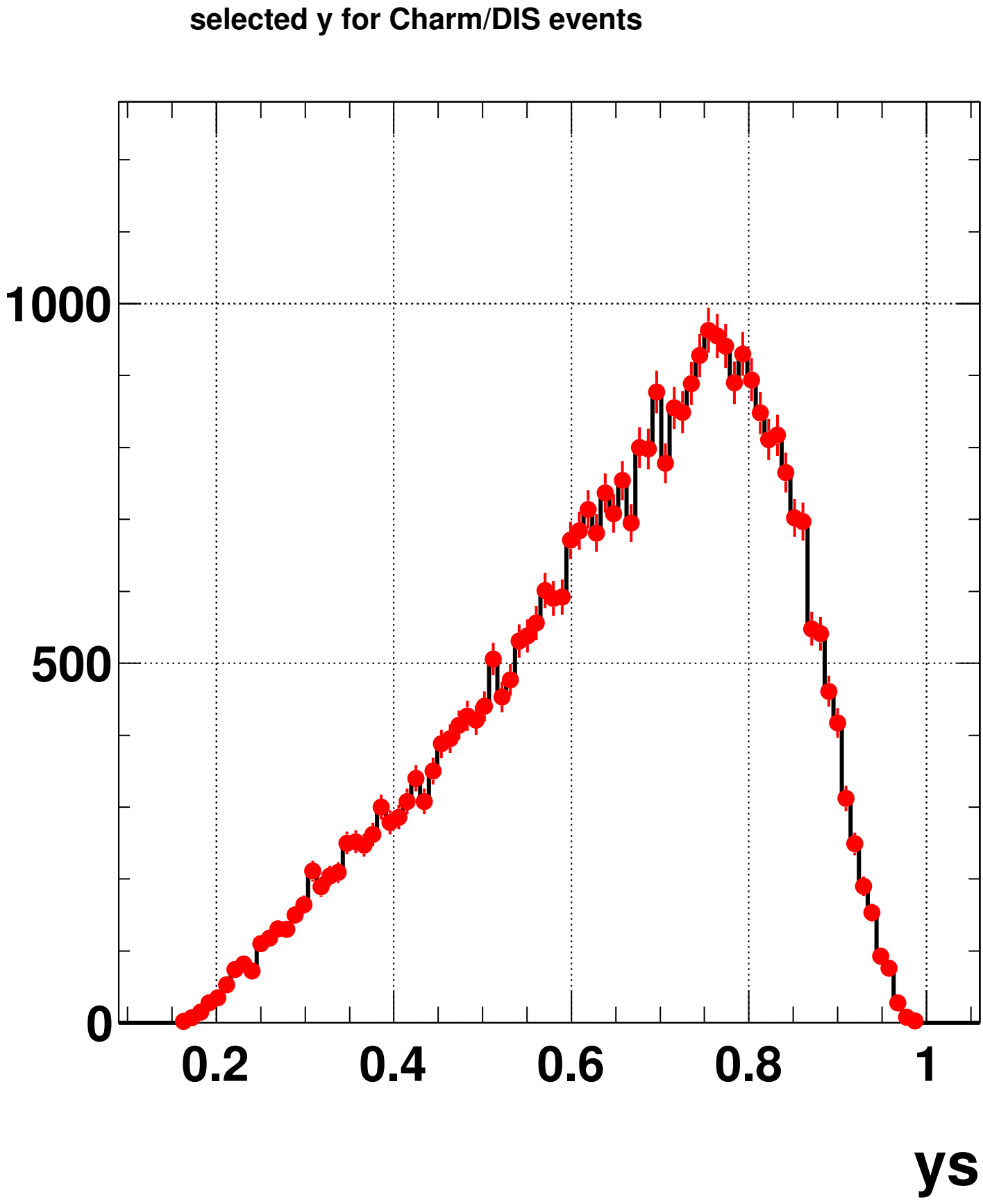

selected y for QEL events
15000
10000
5000
0
0
0.2
0.4
0.6
ys


selected y for RES events
40000
30000
20000
10000
0
0.2
0.4
0.6
0.8
1
ys


selected y for DIS events
4000
3000
2000
1000
0
0.2
0.4
0.6
0.8
1
ys


selected y for DIS CC events
2000
1000
0
0.2
0.4
0.6
0.8
ys

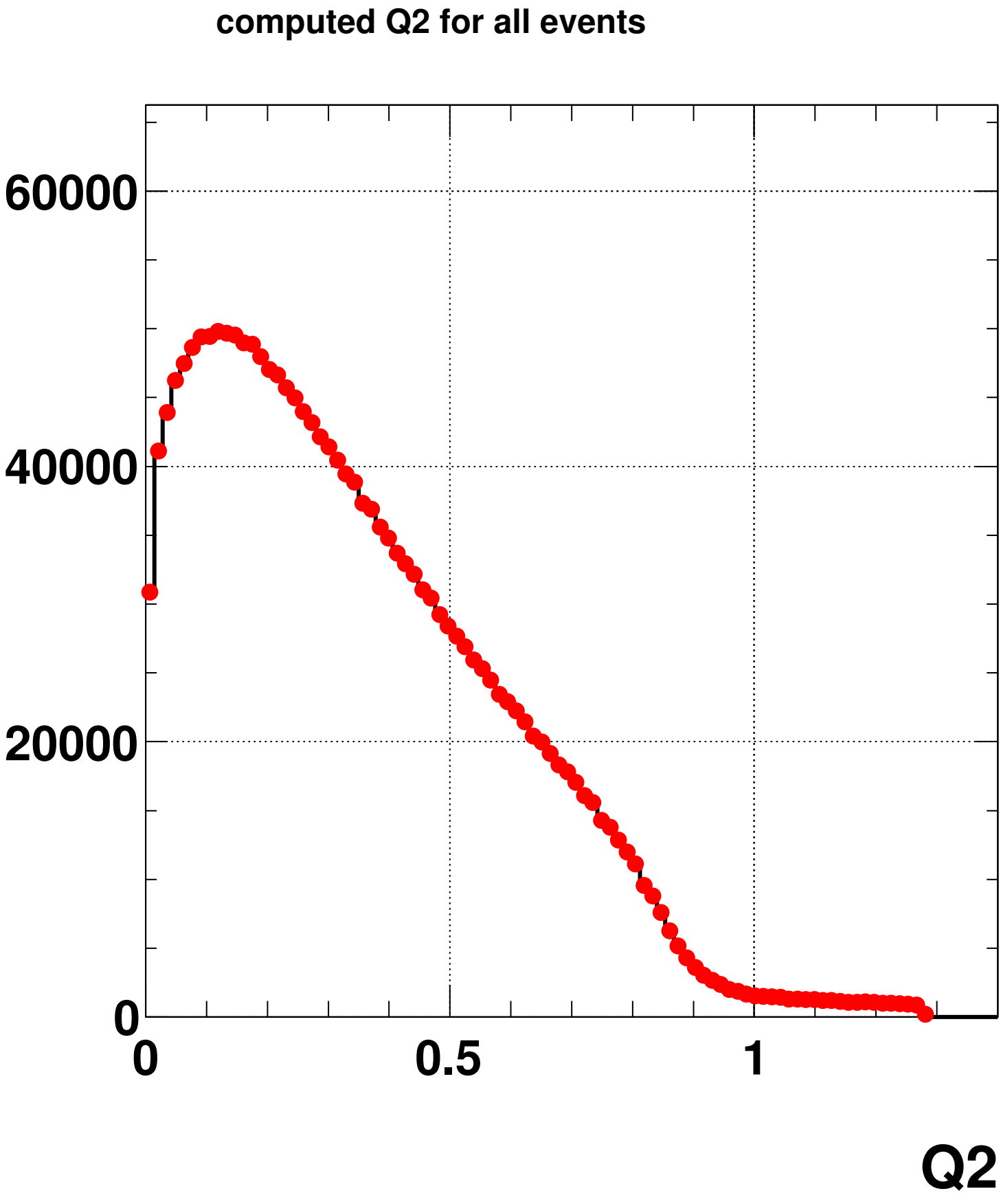

selected y for DIS NC events
1000
500
0
0.2
0.4
0.6
0.8
1
ys

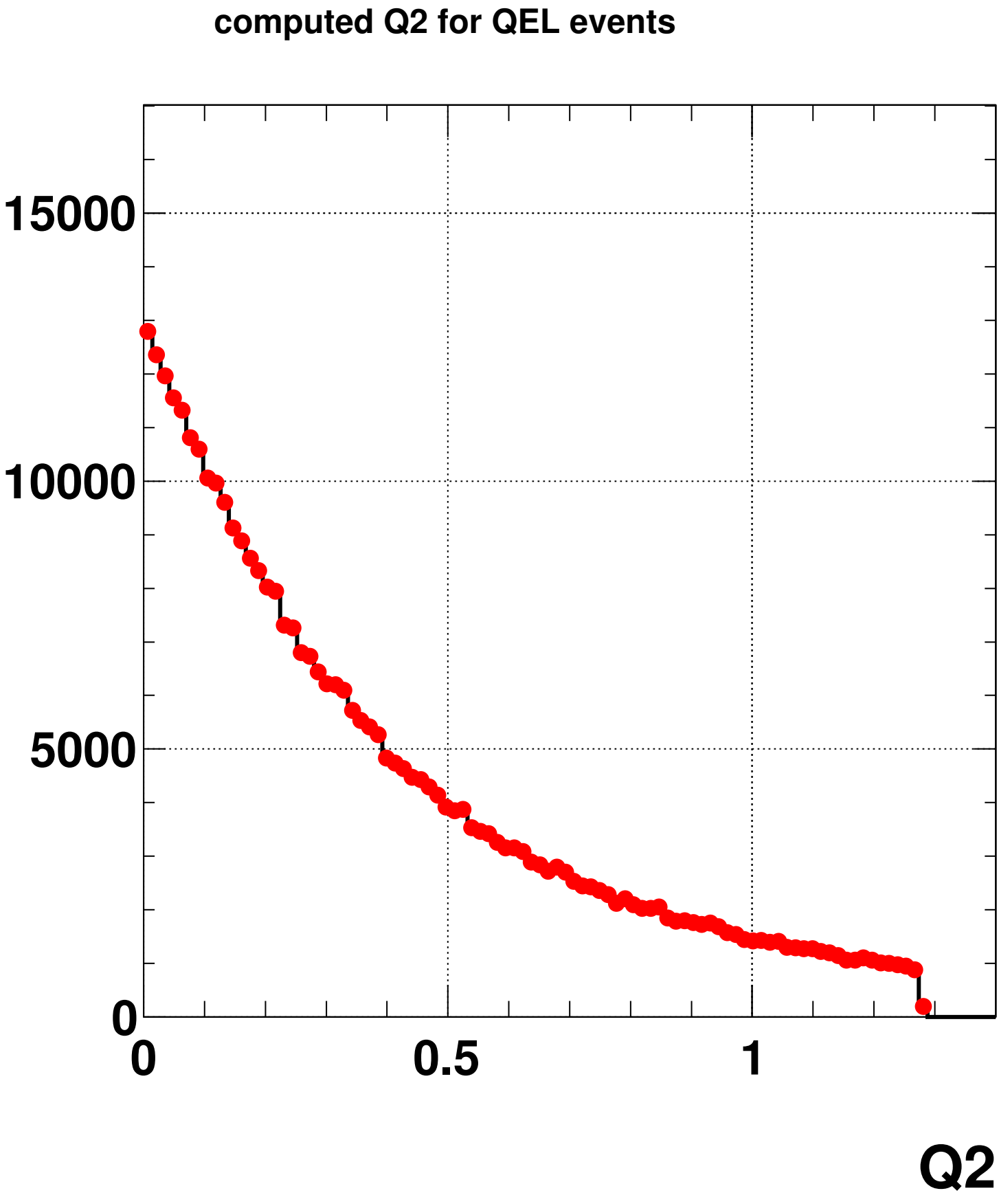

selected y for Charm/DIS events
1000
500
0
0.2
0.4
0.6
0.8
1
ys

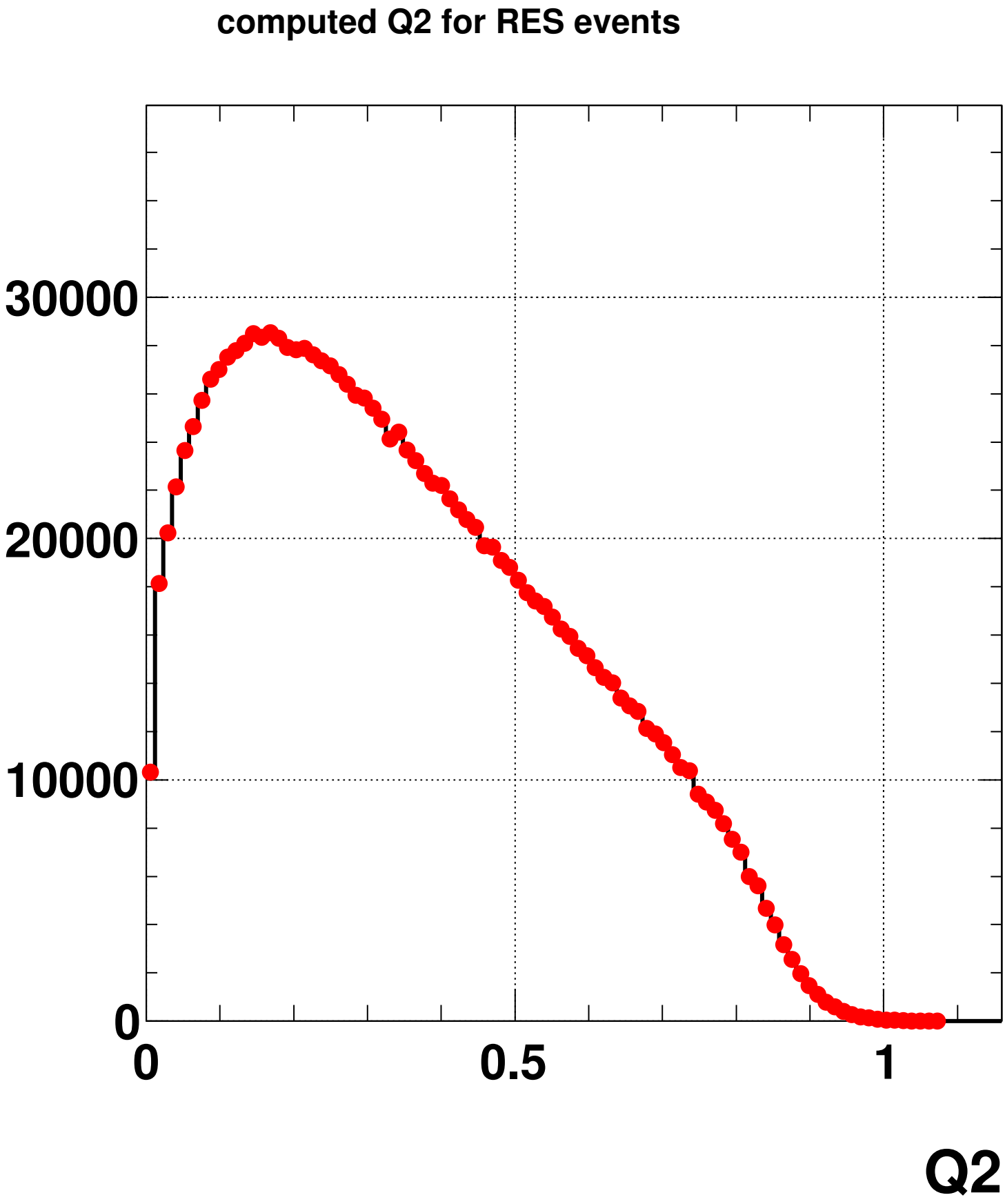
Kinematical Quantities

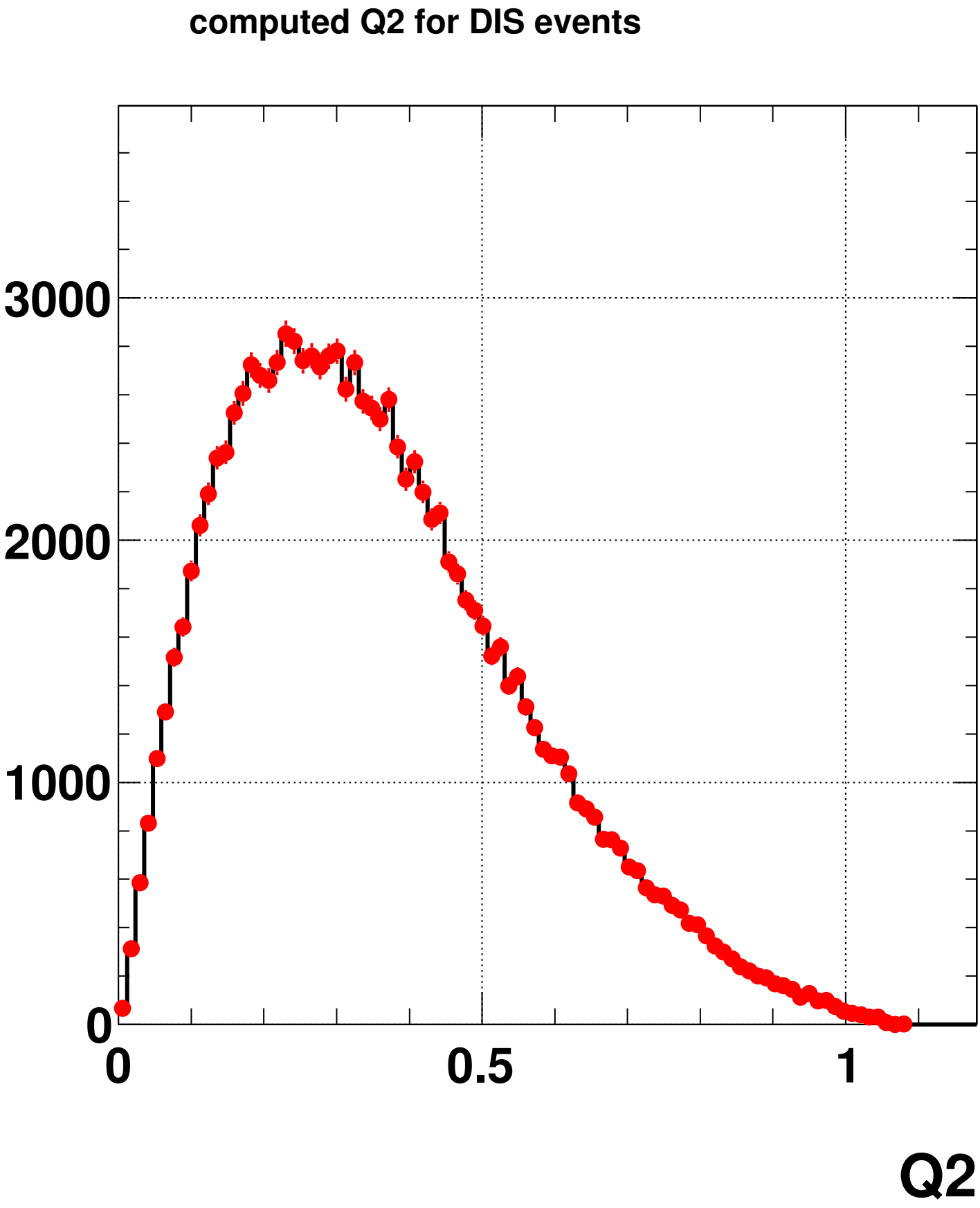
Similar to the previous set of plots but

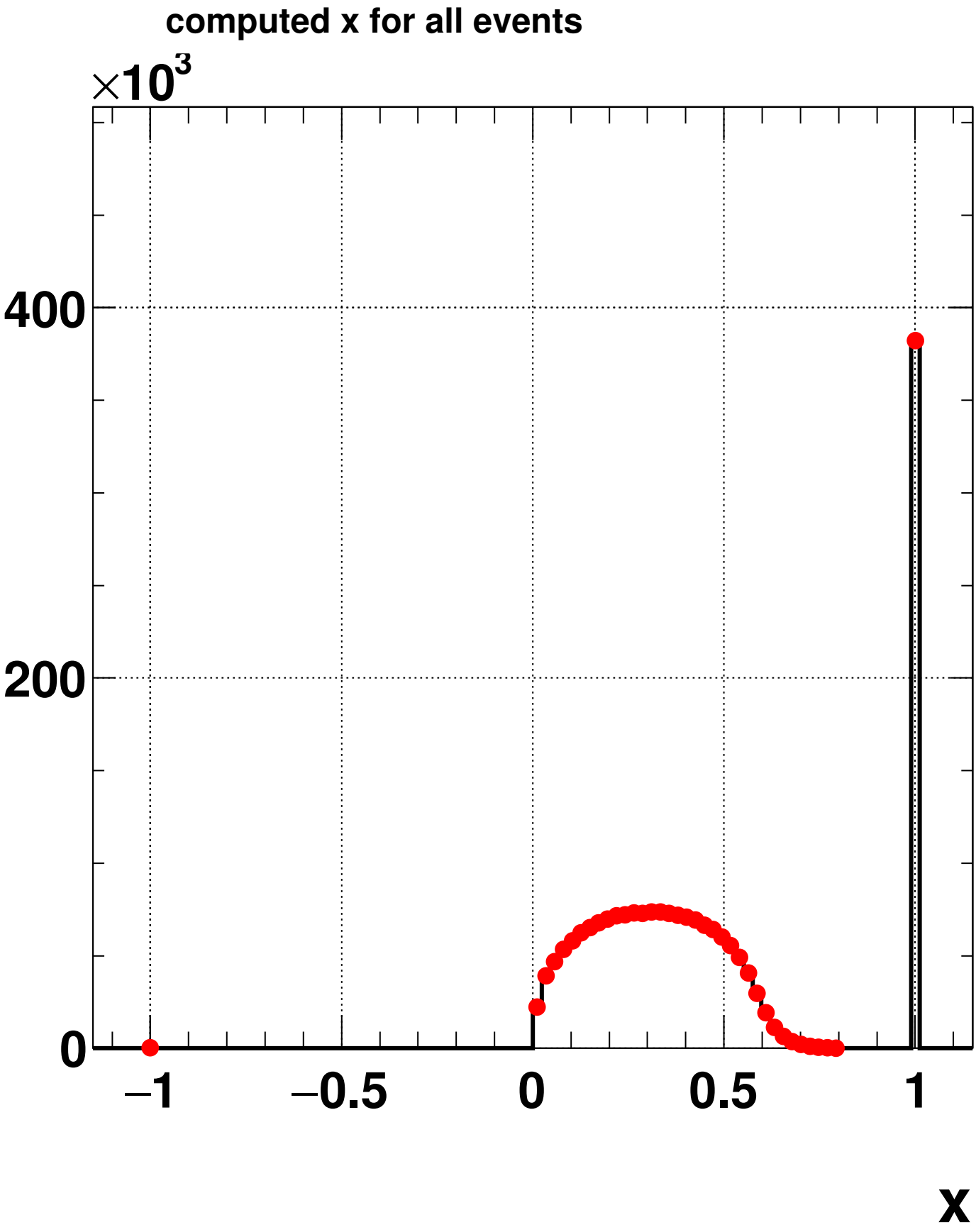
showing ’computed’ rather than ’selected’ variables

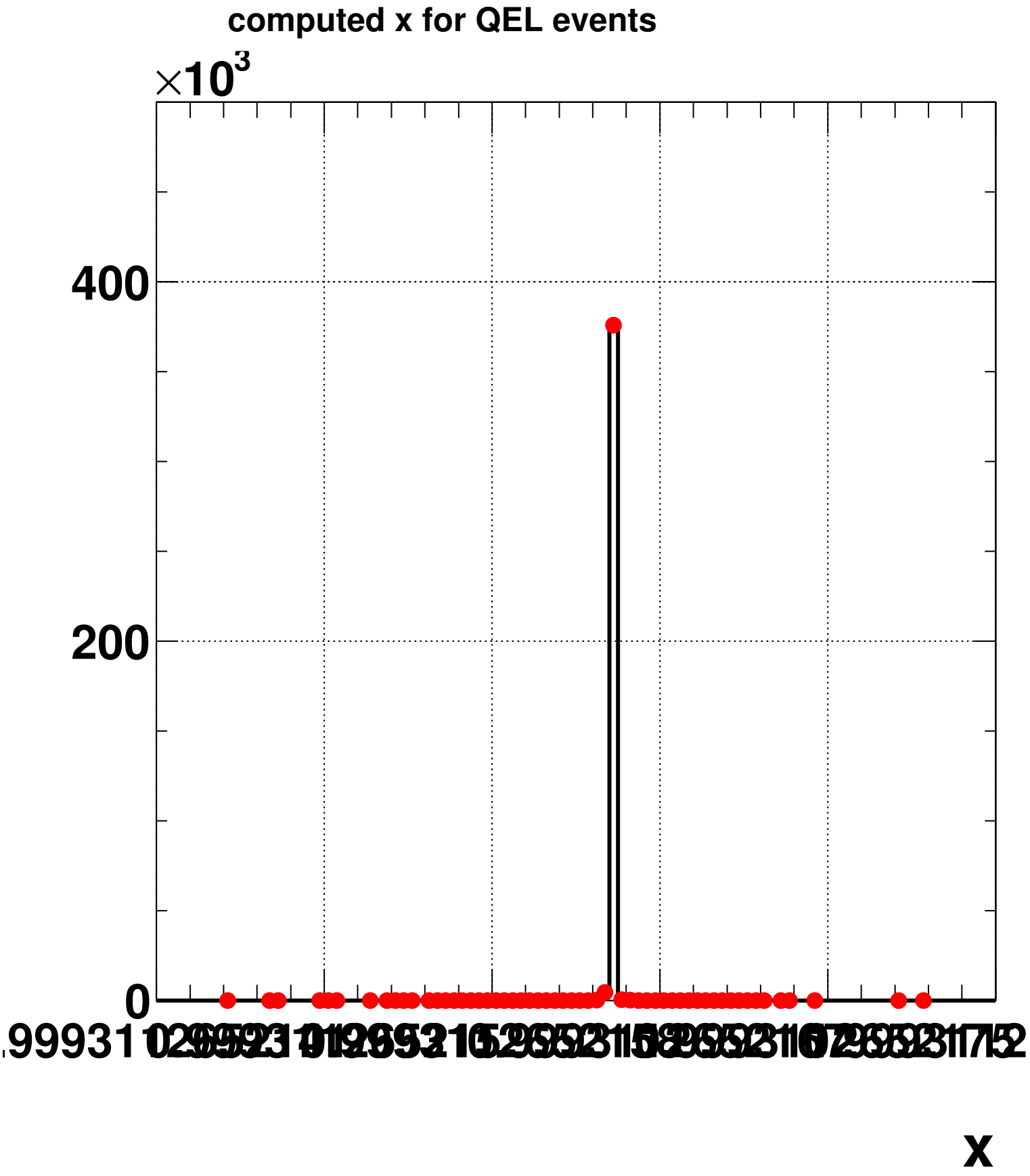

computed Q2 for all events
60000
40000
20000
0
0
0.5
1
Q2

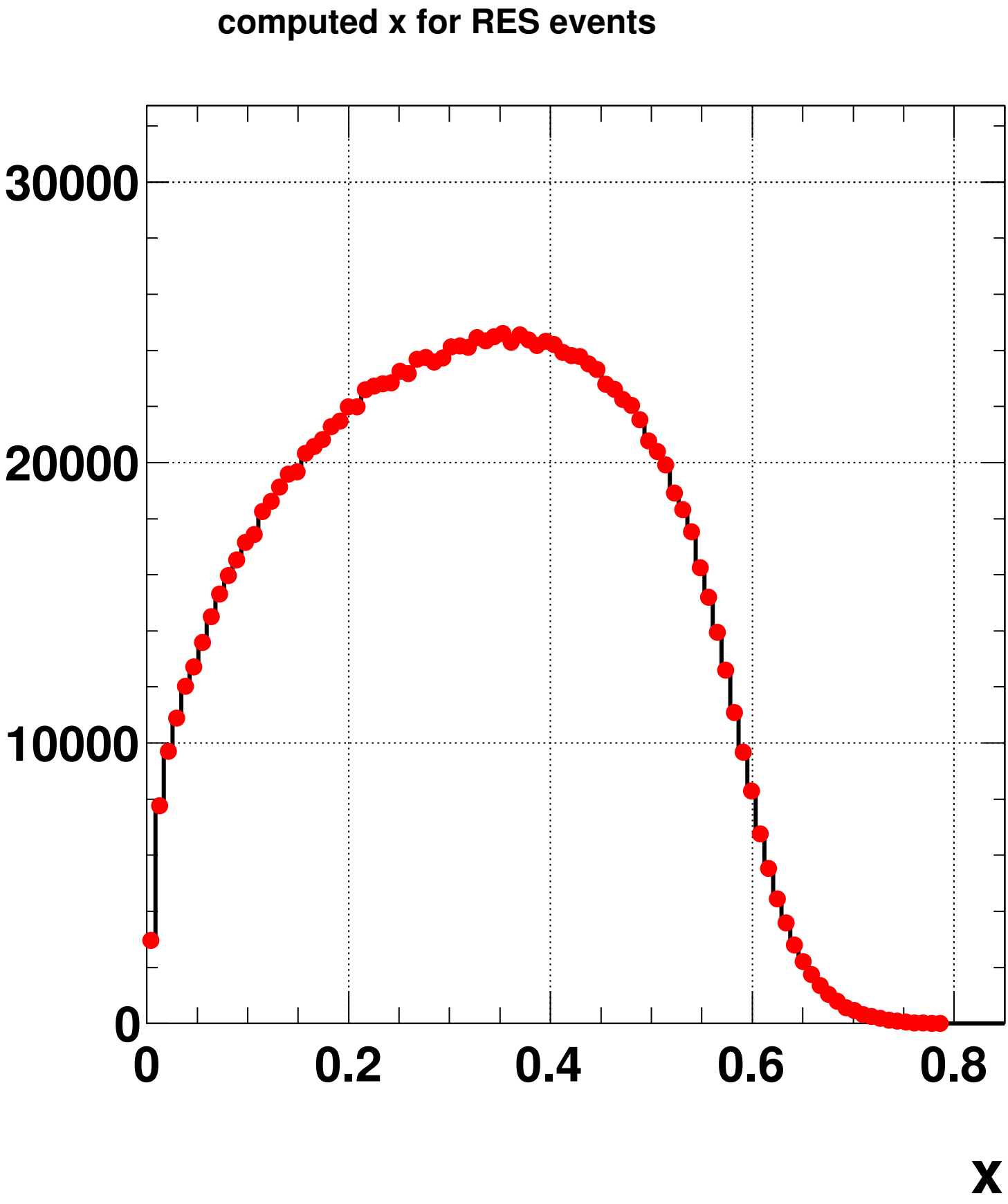

computed Q2 for QEL events
15000
10000
5000
0
0
0.5
1
Q2

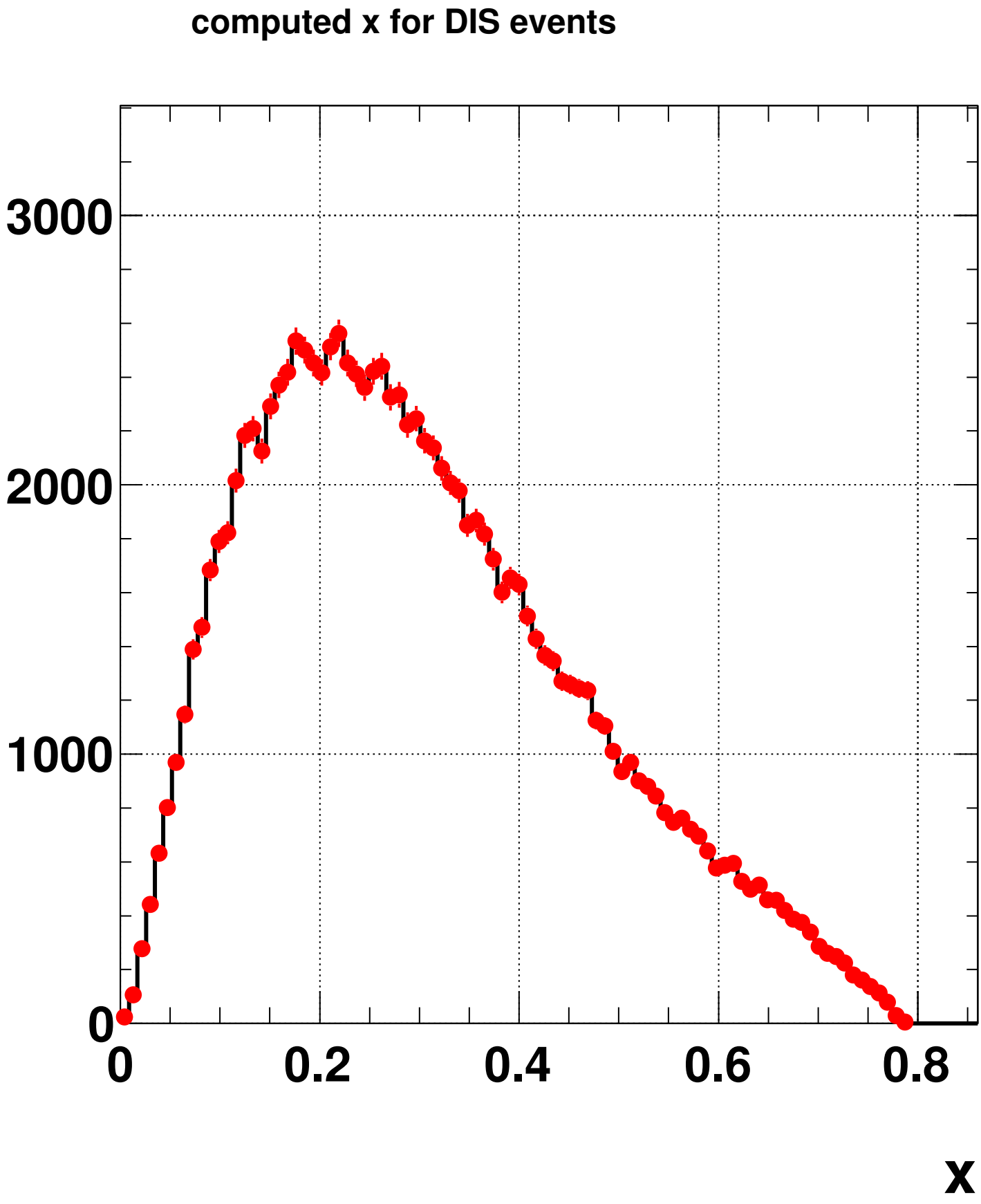

computed Q2 for RES events
30000
20000
10000
0
0
0.5
1
Q2

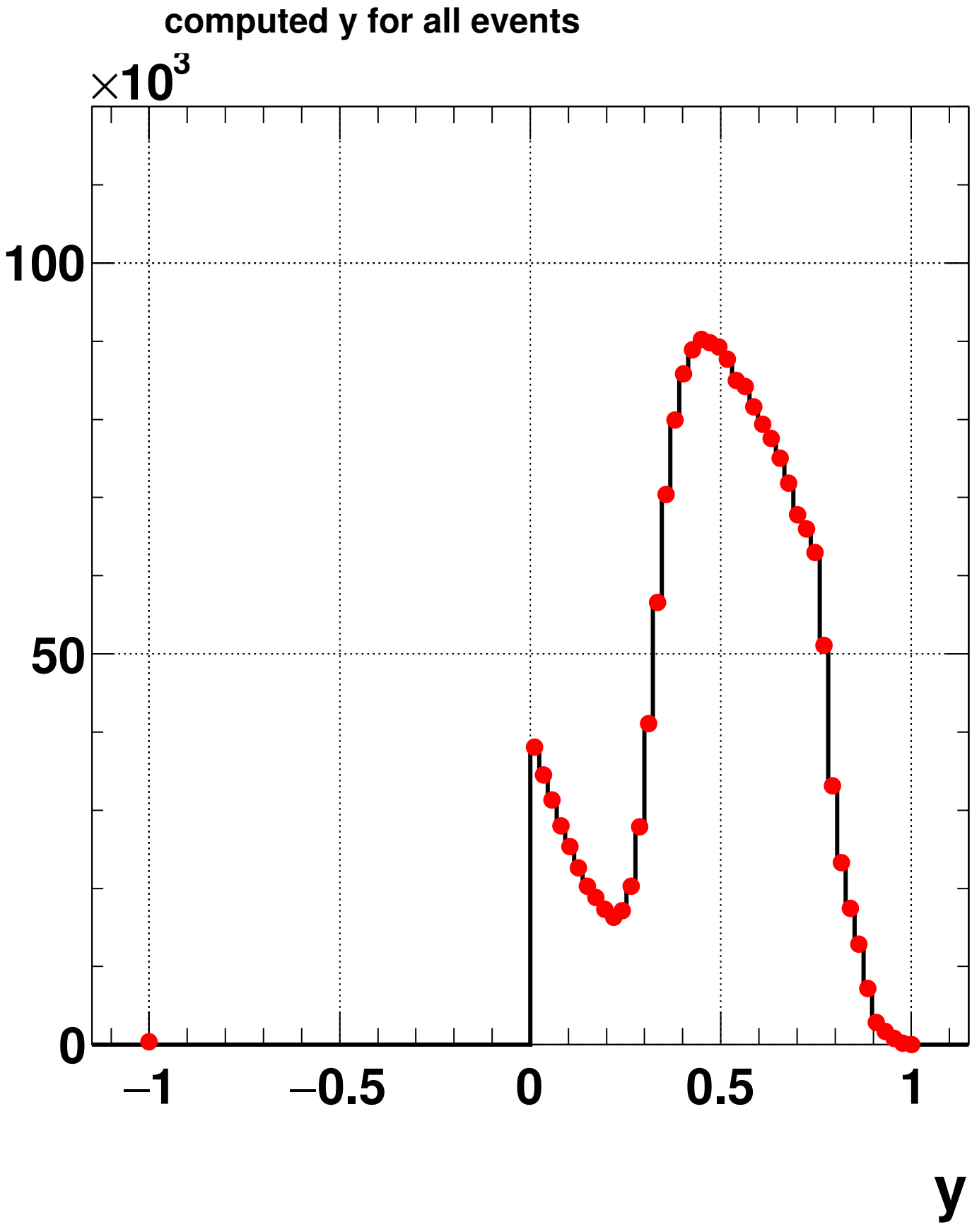

computed Q2 for DIS events
3000
2000
1000
0
0
0.5
1
Q2

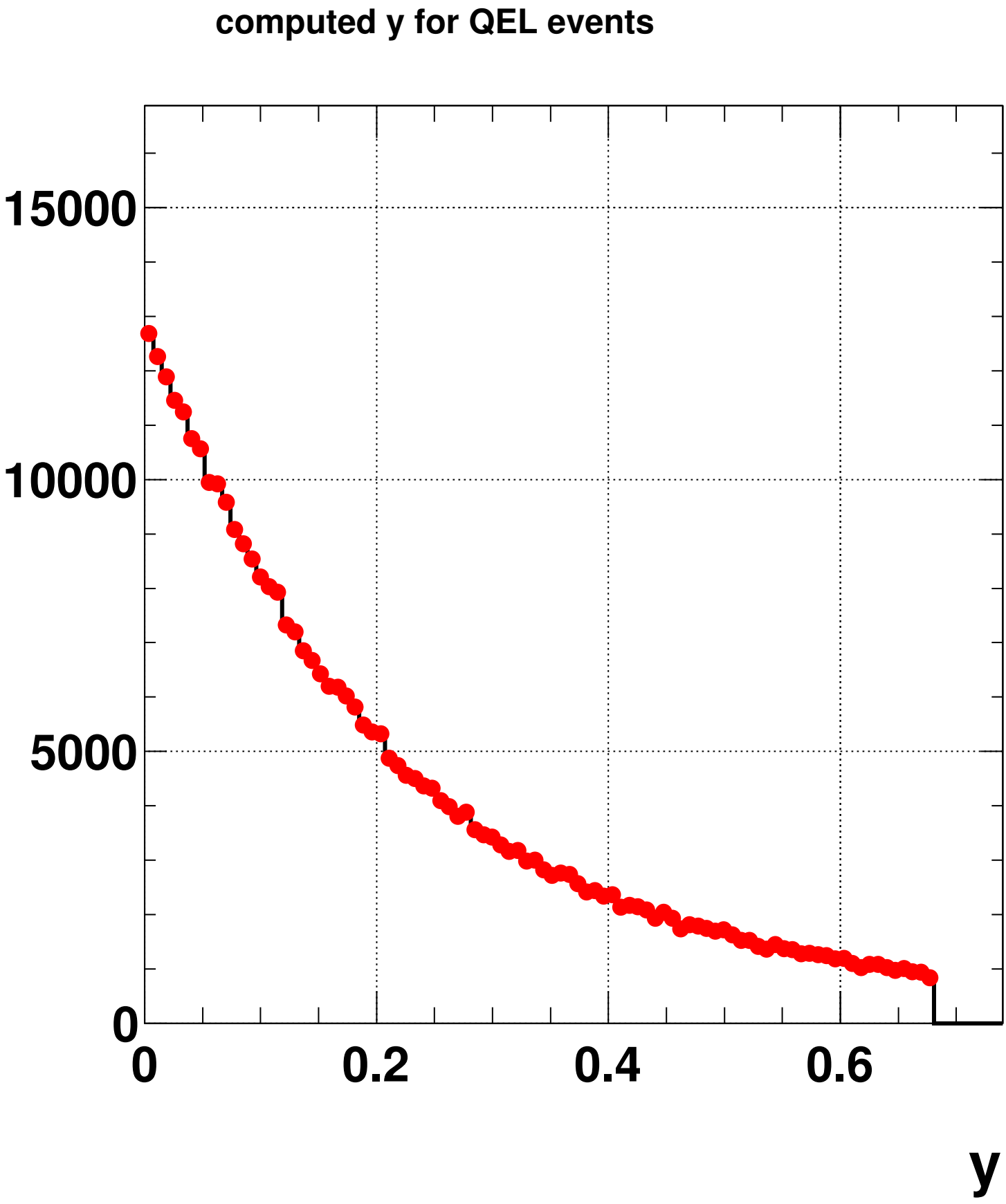

computed x for all events
×10^3
400
200
0
−1
−0.5
0
0.5
1
x

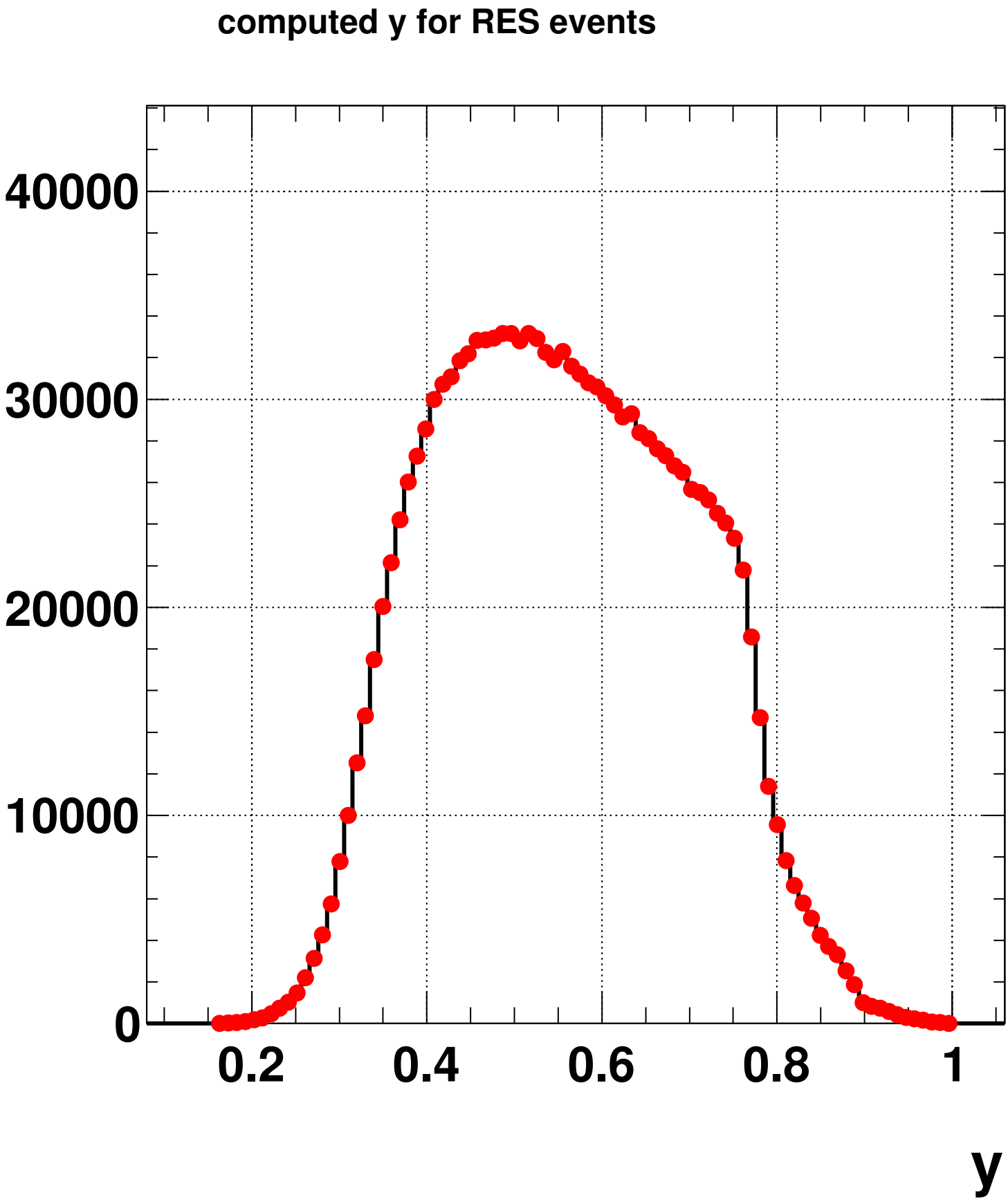

computed x for QEL events
×10^3
400
200
0
x

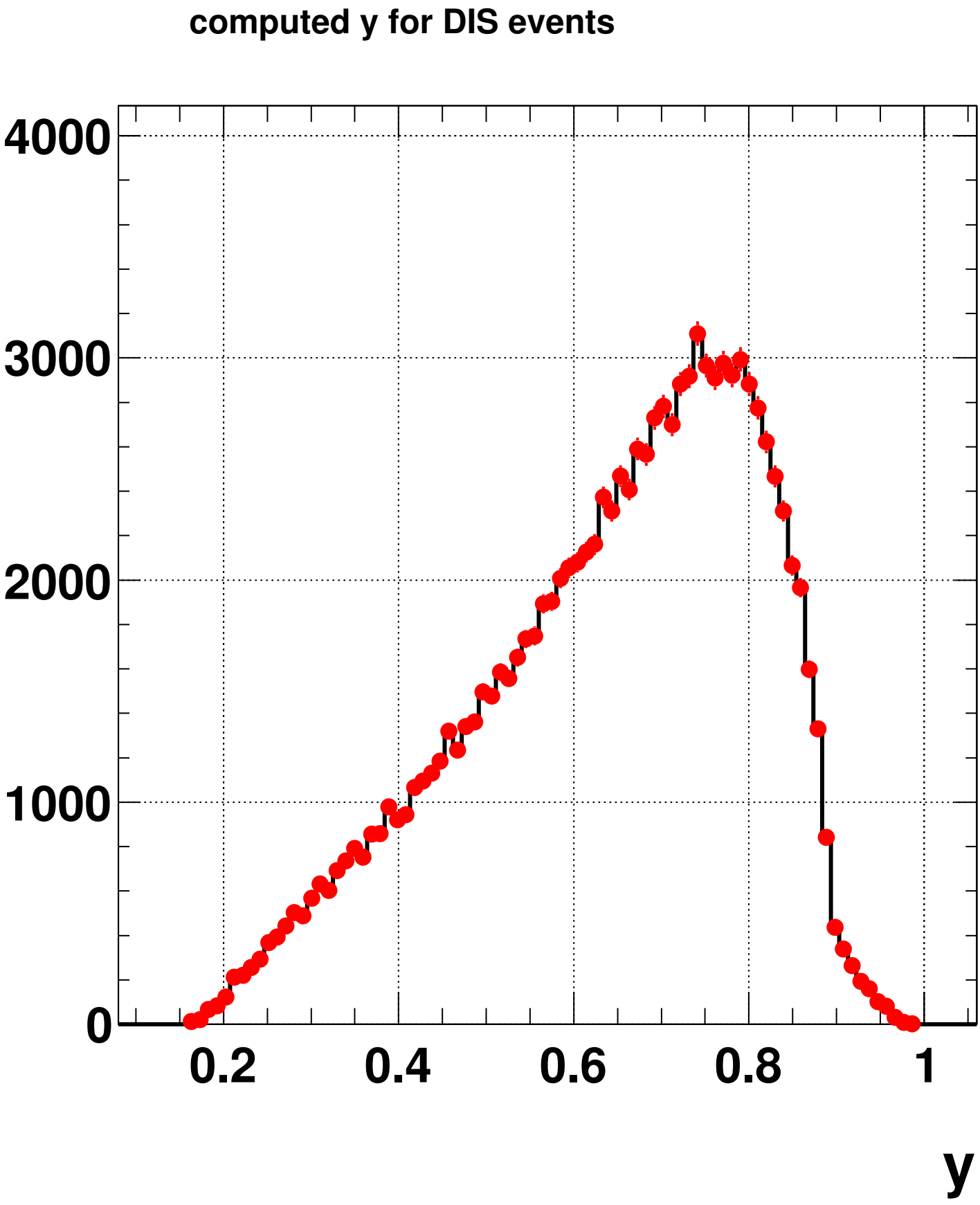

computed x for RES events
30000
20000
10000
0
0
0.2
0.4
0.6
0.8
x


computed x for DIS events
3000
2000
1000
0
0
0.2
0.4
0.6
0.8
x

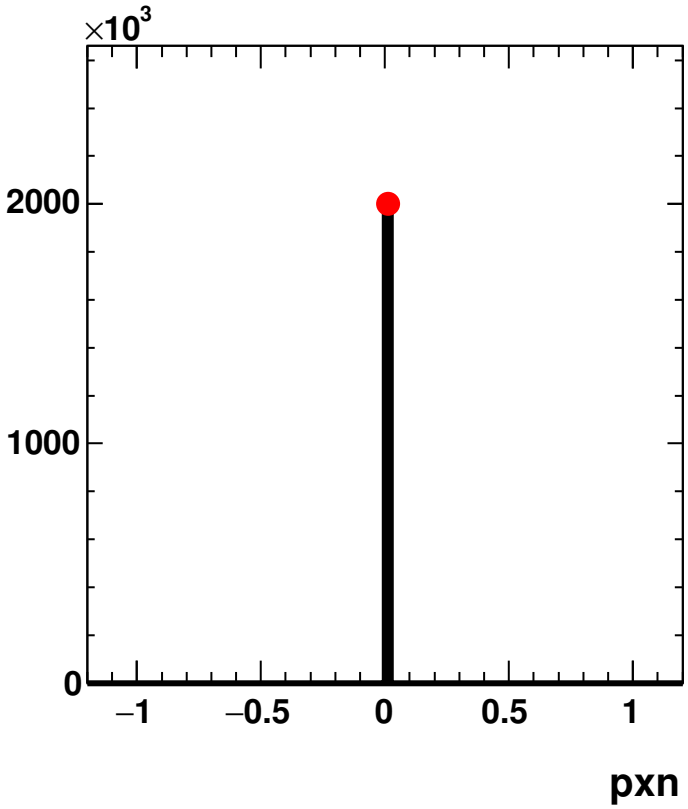

computed y for all events
×10^3
100
50
0
−1
−0.5
0
0.5
1
y


computed y for QEL events
15000
10000
5000
0
0
0.2
0.4
0.6
y


computed y for RES events
40000
30000
20000
10000
0
0.2
0.4
0.6
0.8
1
y


computed y for DIS events
4000
3000
2000
1000
0
0.2
0.4
0.6
0.8
1
y

Initial state nucleon 4-Momentum


×10^3
2000
1000
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−1
−0.5
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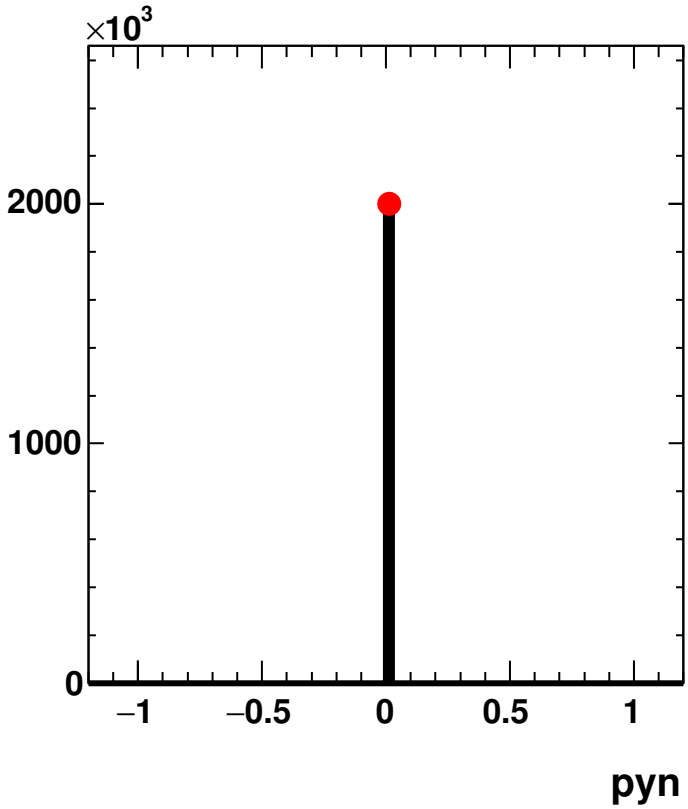
0.5
1
pxn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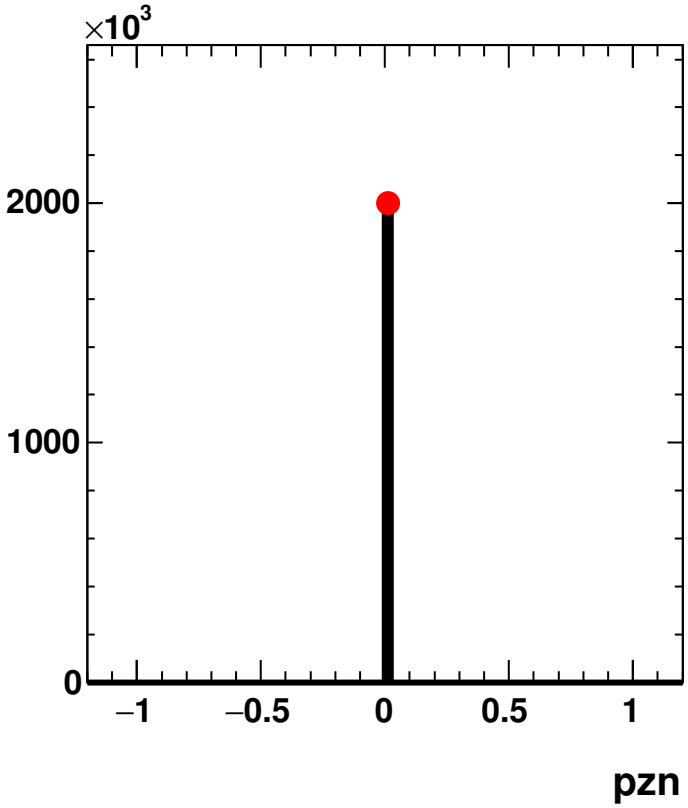
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2000
1000
0
−1
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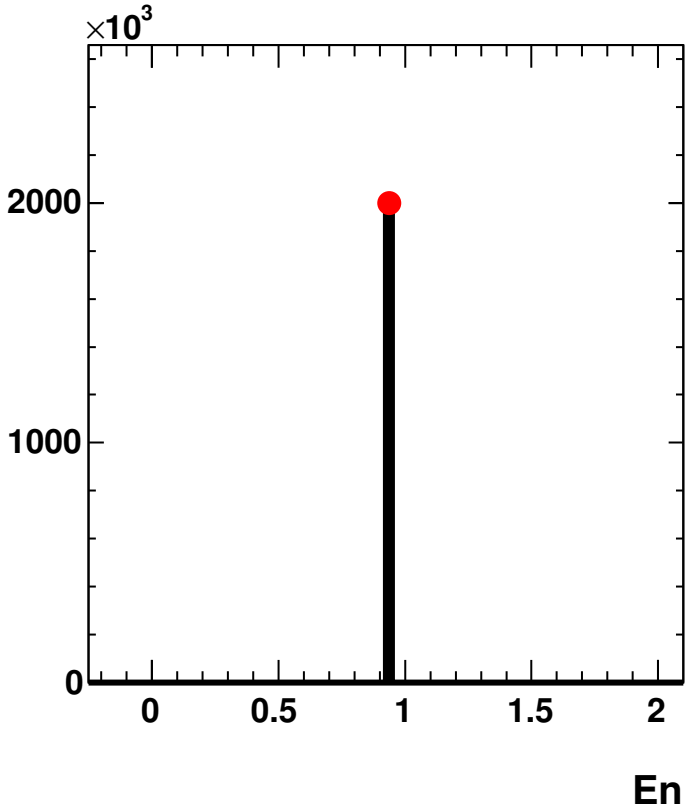
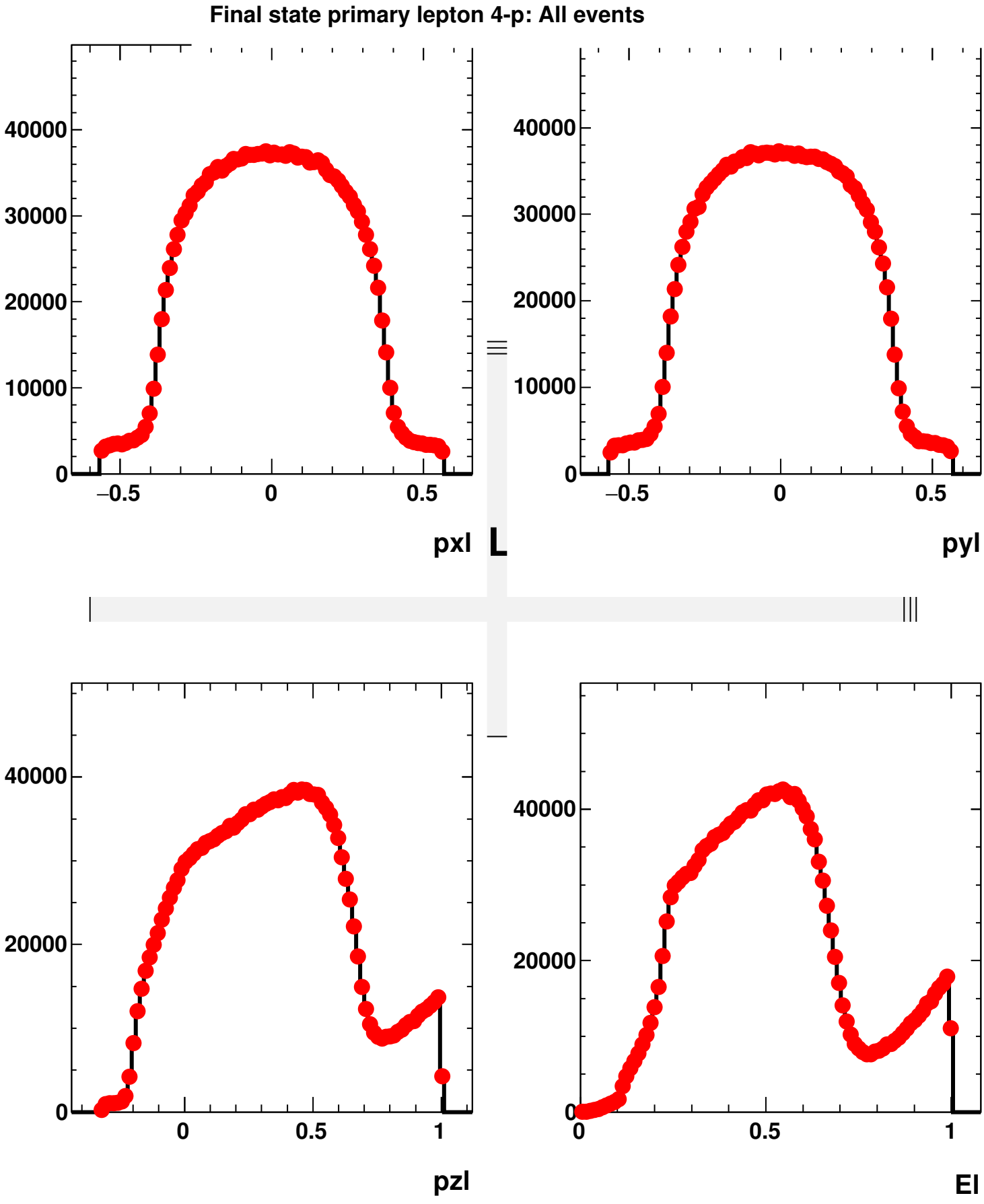
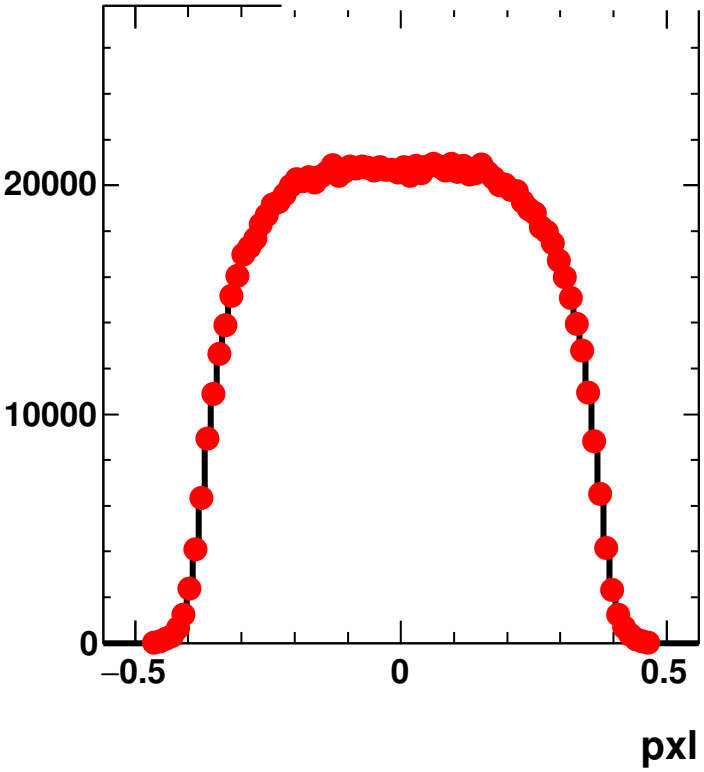
0
0.5
1
pzn

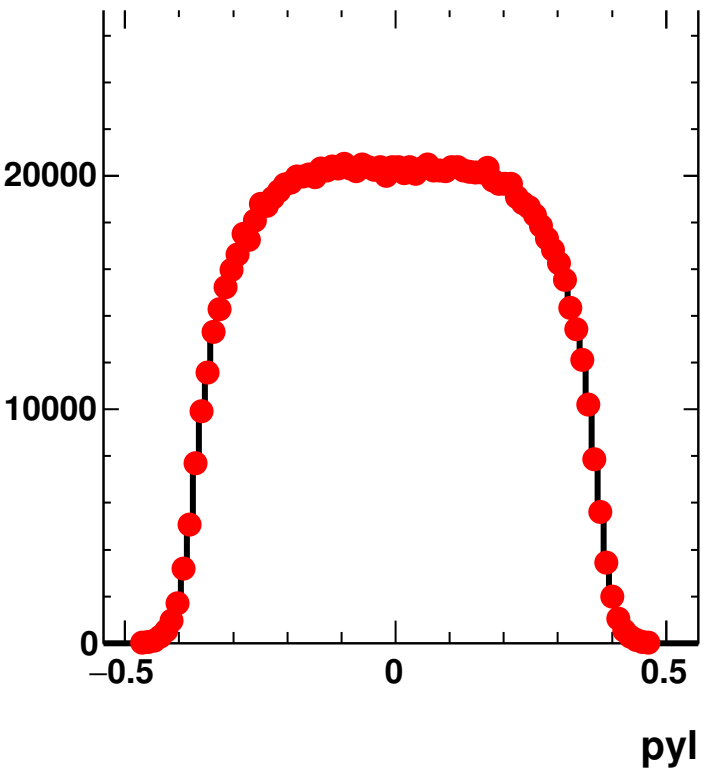

×10^3
2000
1000
0
0
0.5
1
1.5
2
En

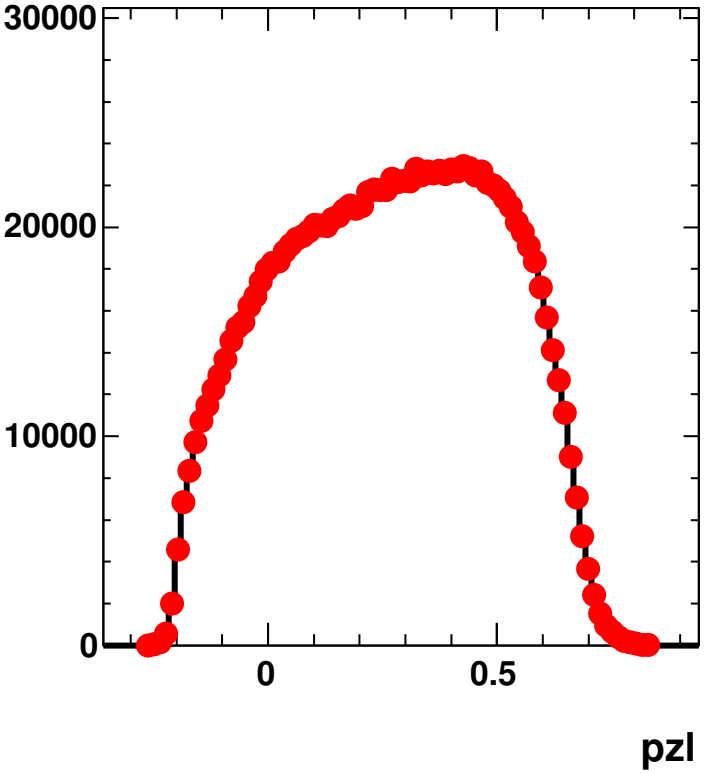
Final State Primary Lepton 4-Momentum

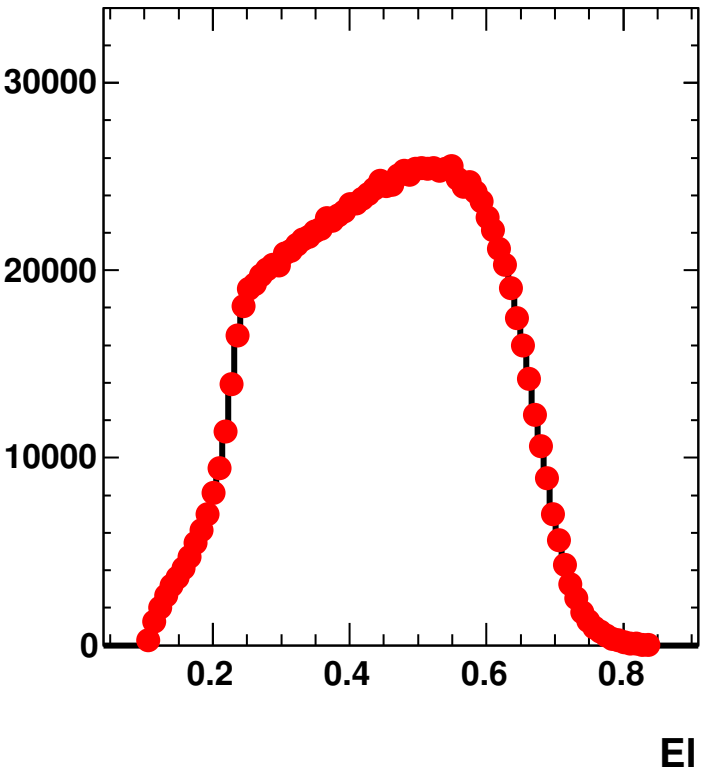

Final state primary lepton 4-p: All events
40000
30000
20000
10000
0
−0.5
0
0.5
pxl
pyl
L
40000
20000
0
0.5
1
pzl
El

Final state primary lepton 4-p: All CC events

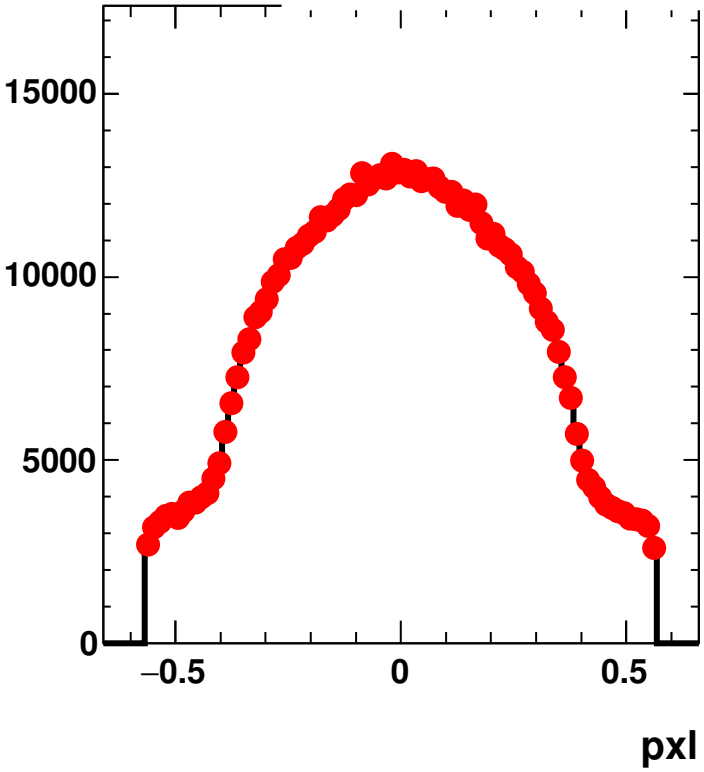


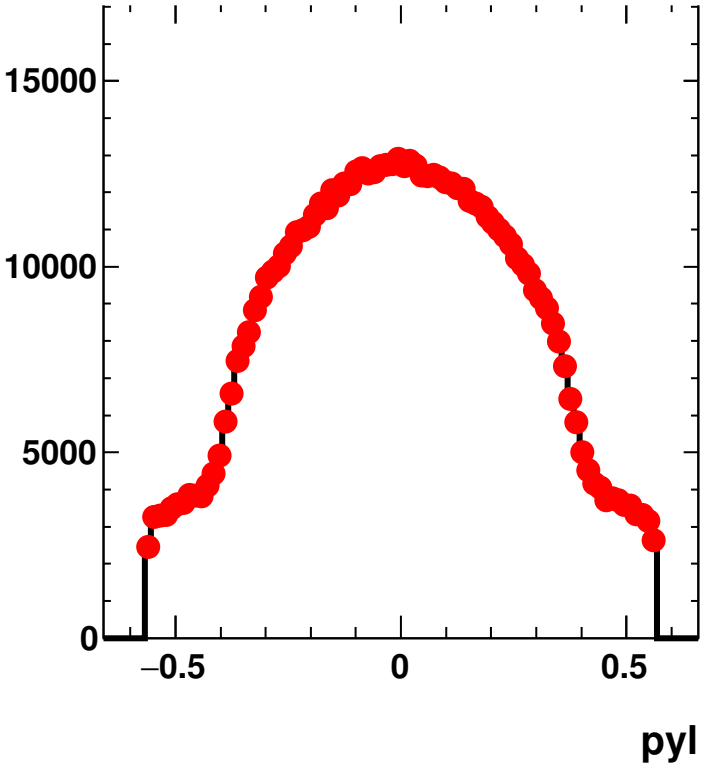


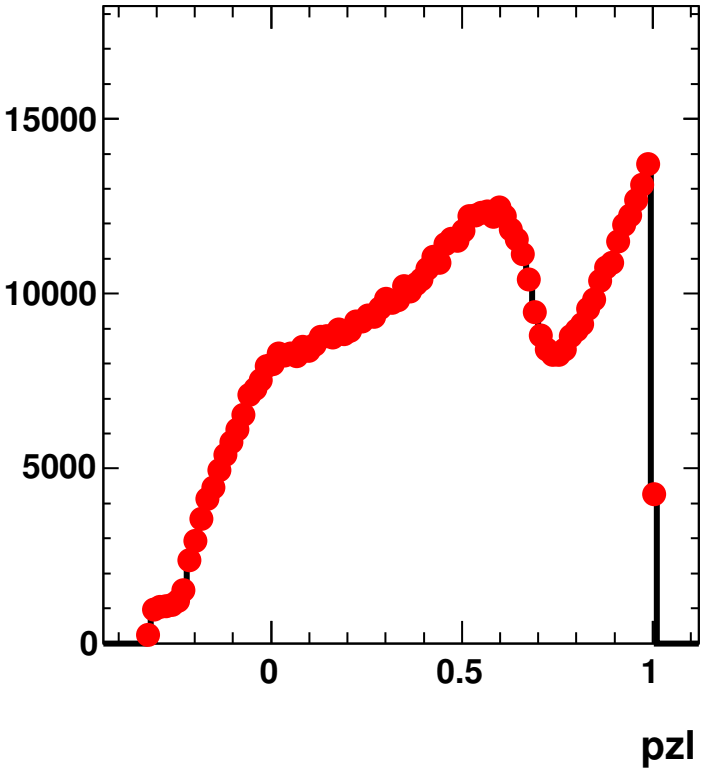


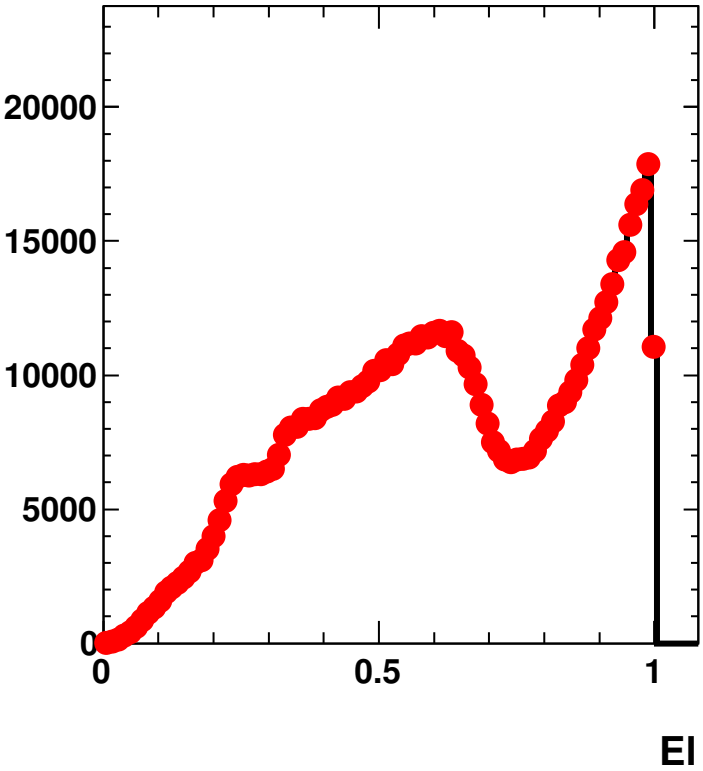


Final state primary lepton 4-p: All NC events

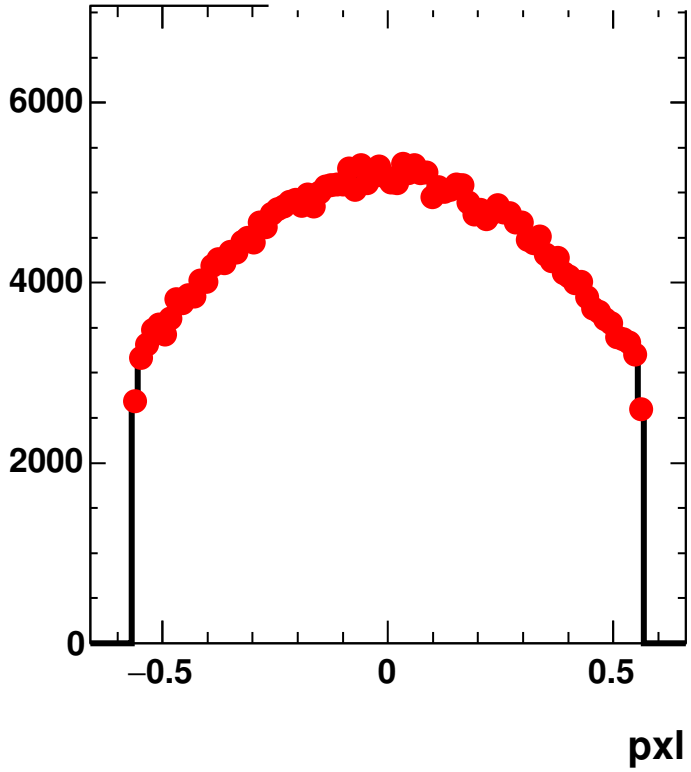


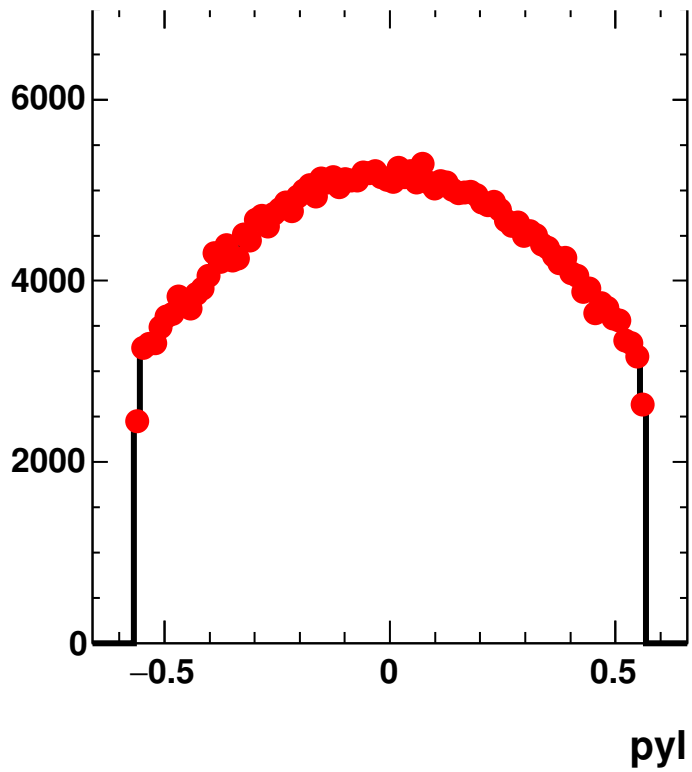


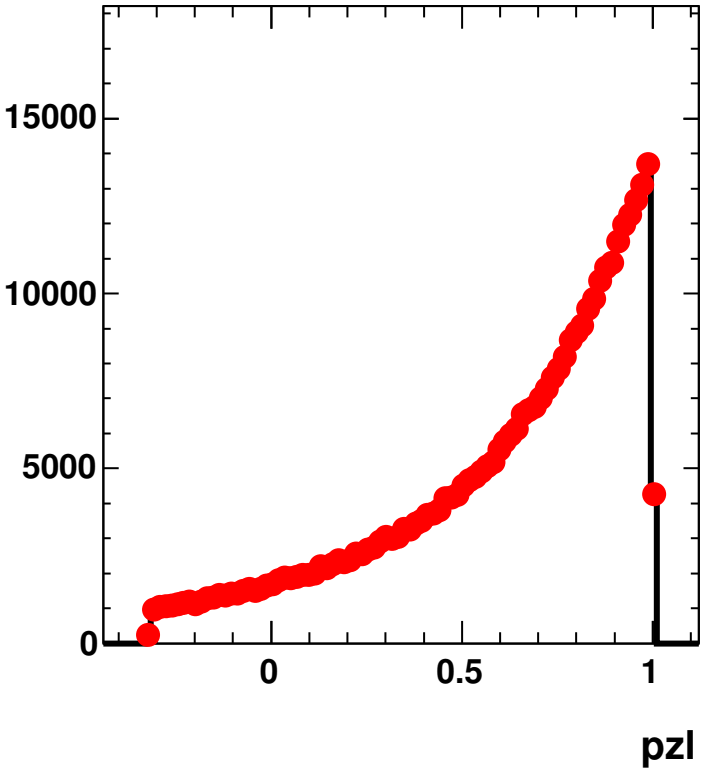


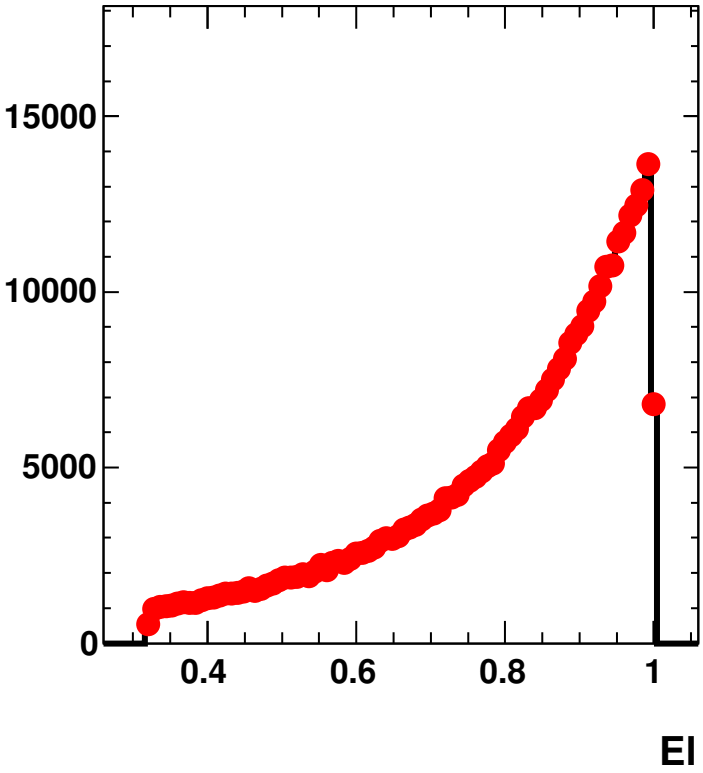


Final state primary lepton 4-p: QEL events

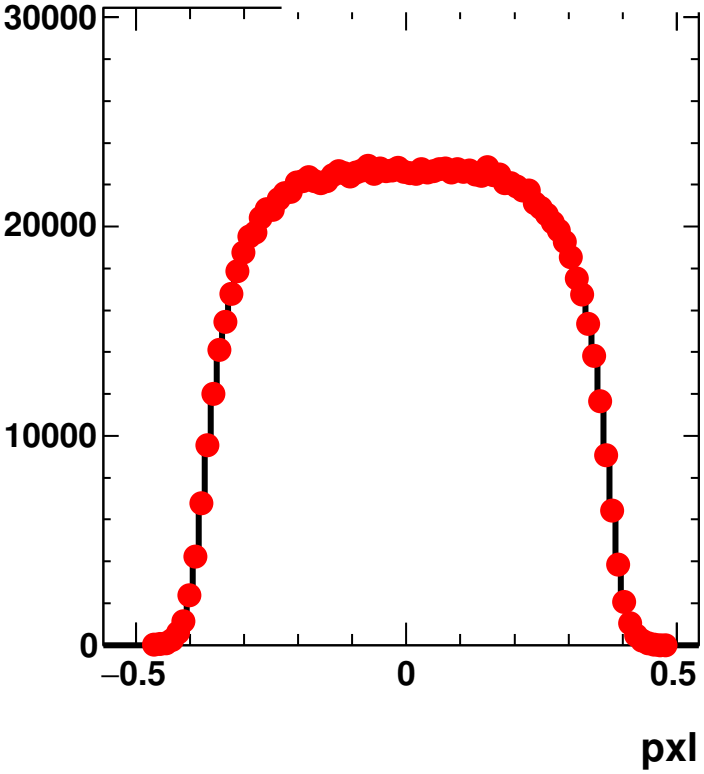


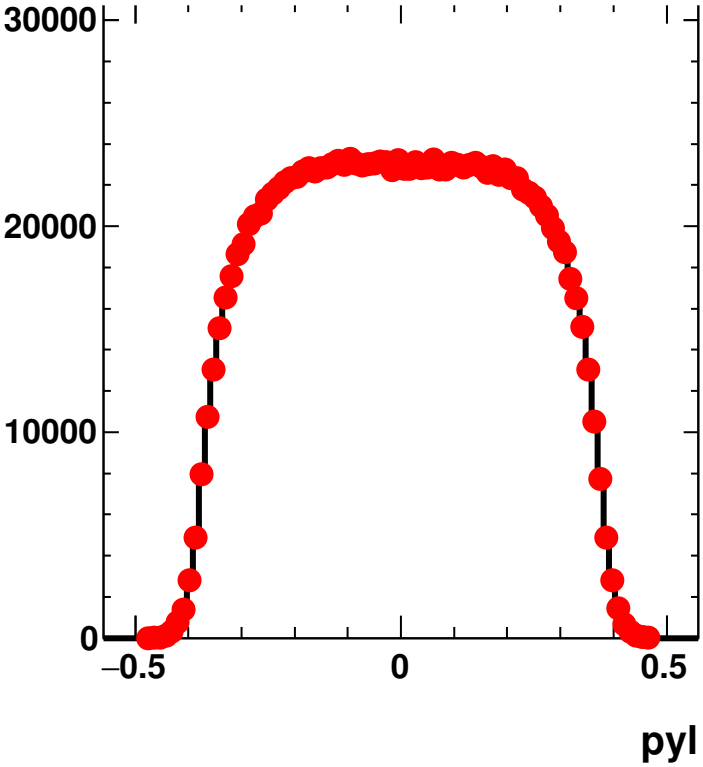


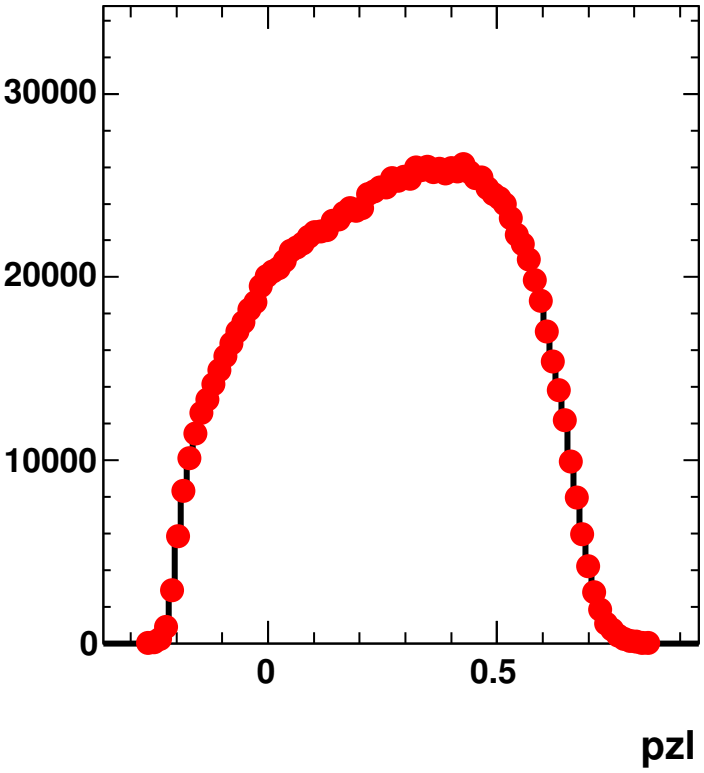


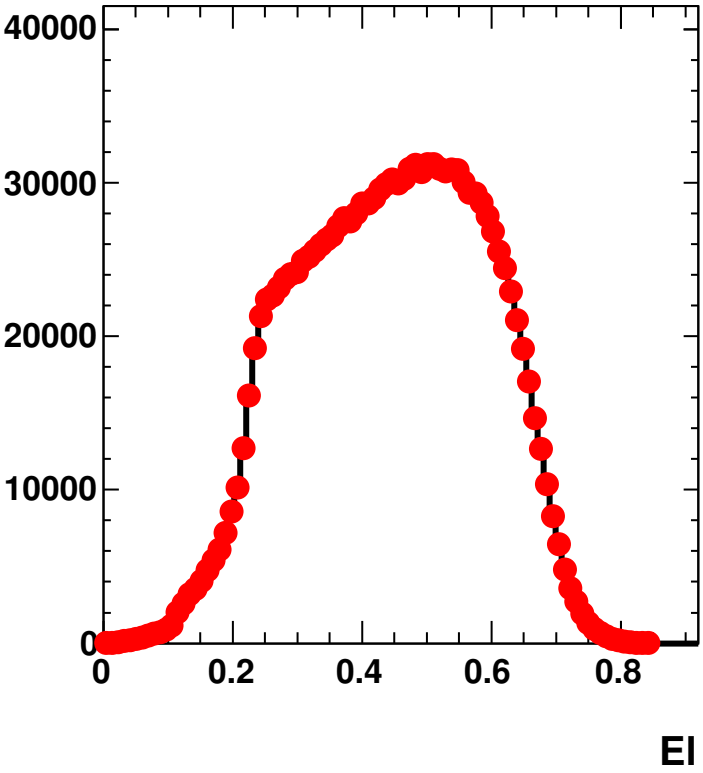


Final state primary lepton 4-p: RES events

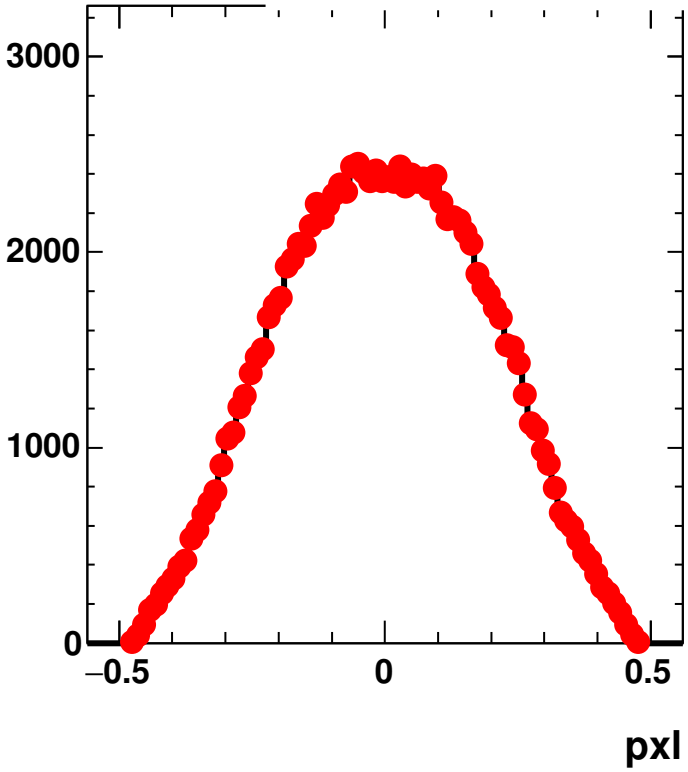


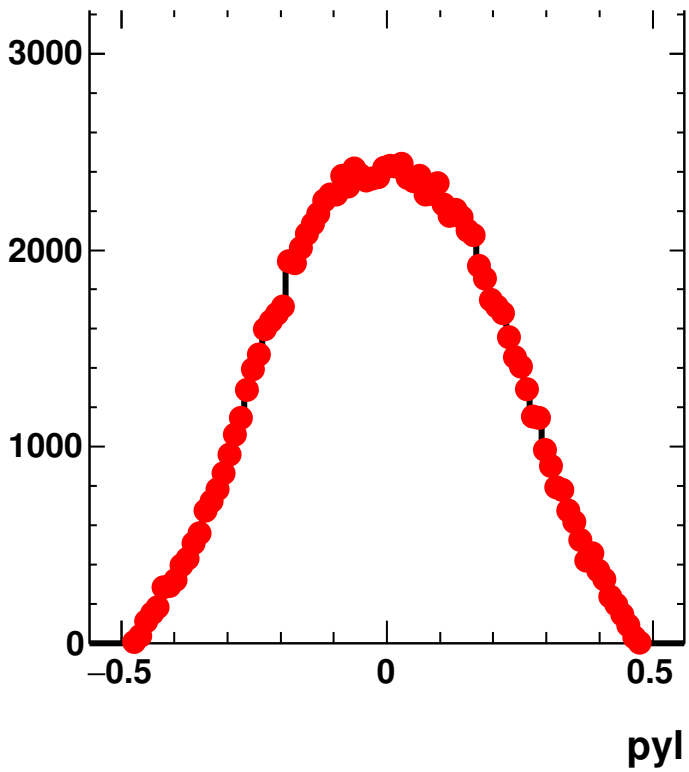


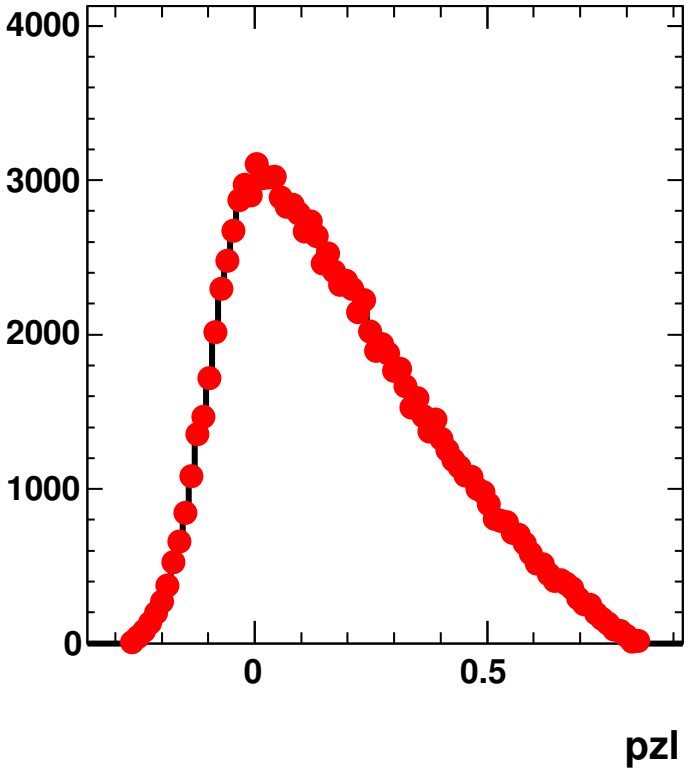


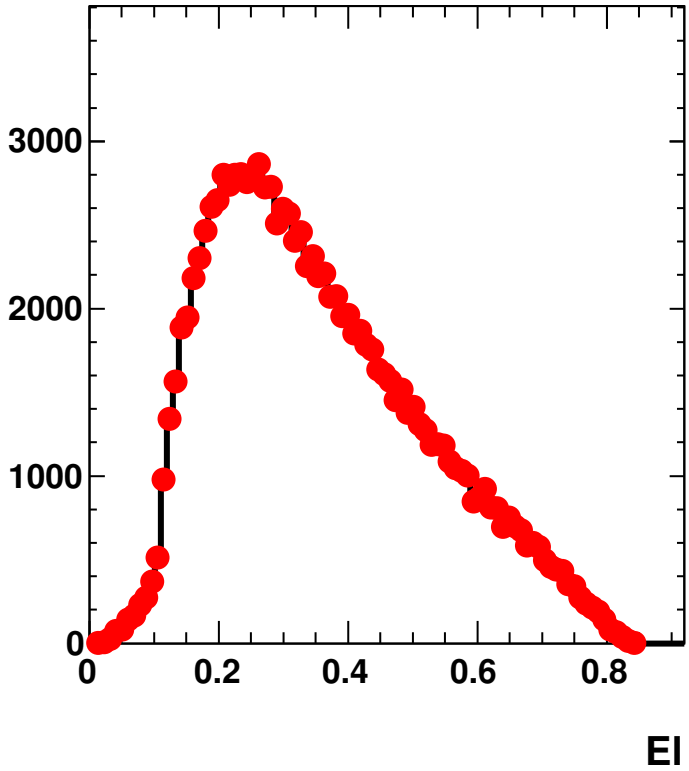


Final state primary lepton 4-p: All DIS events







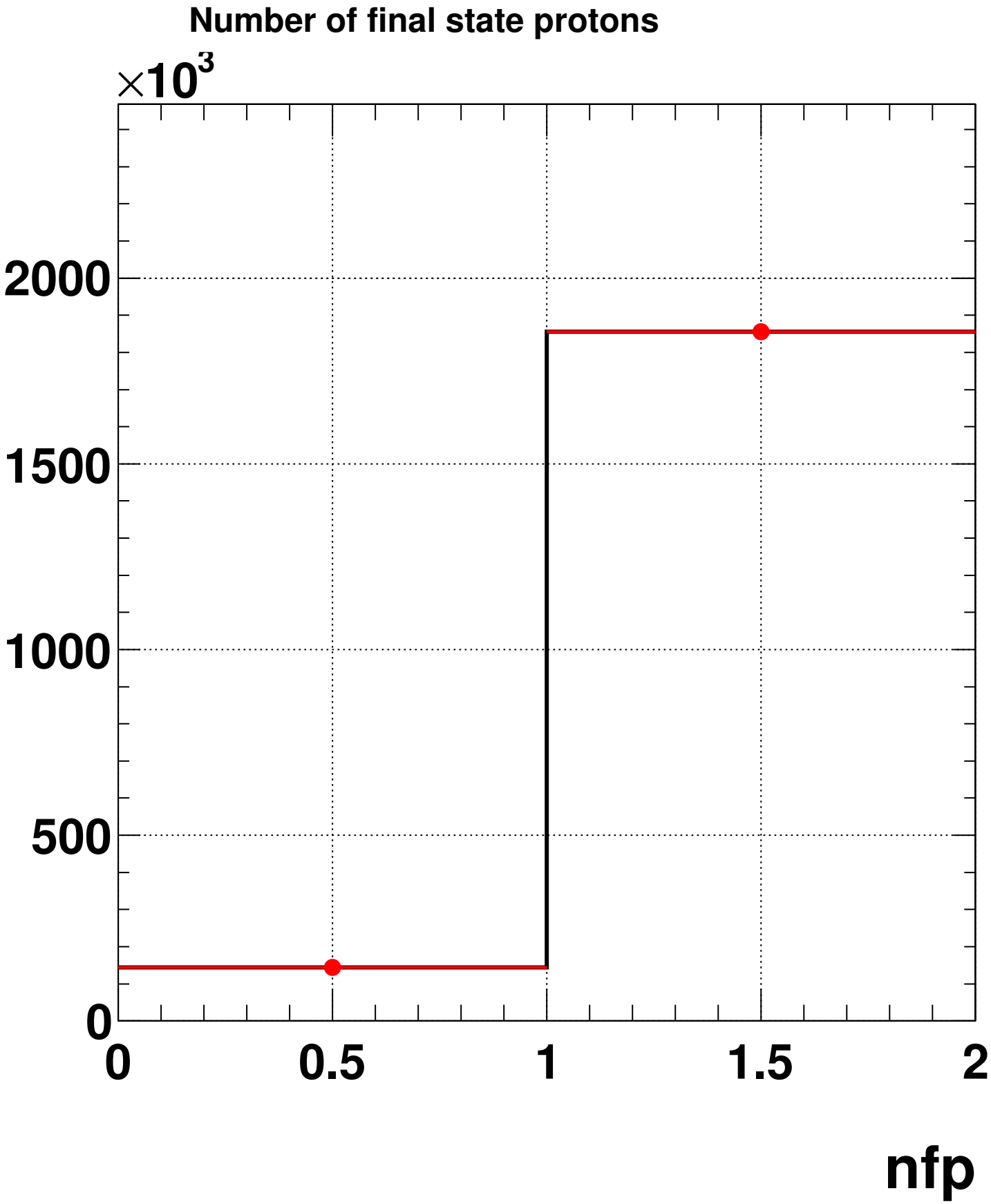


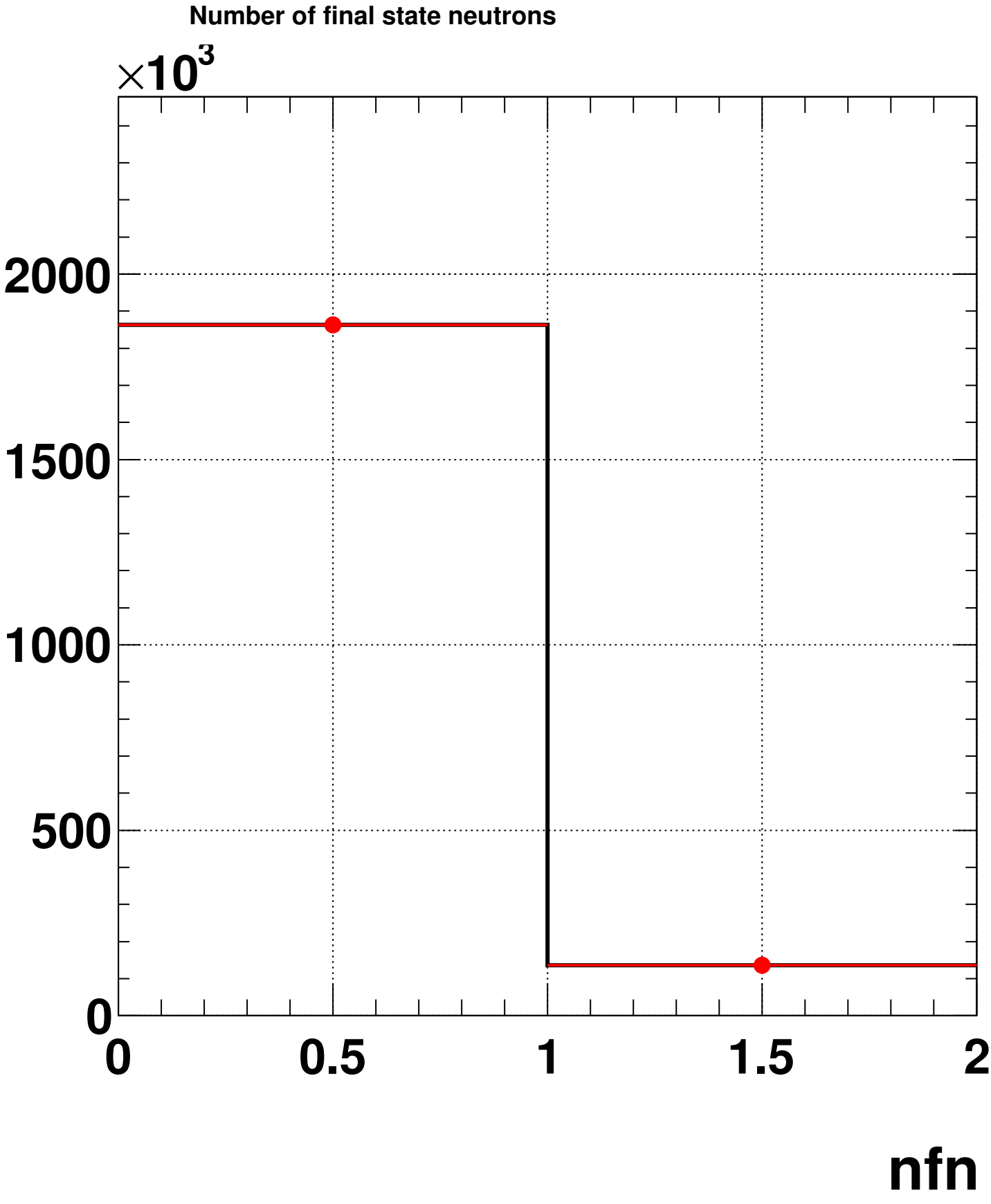
Final State Hadronic System

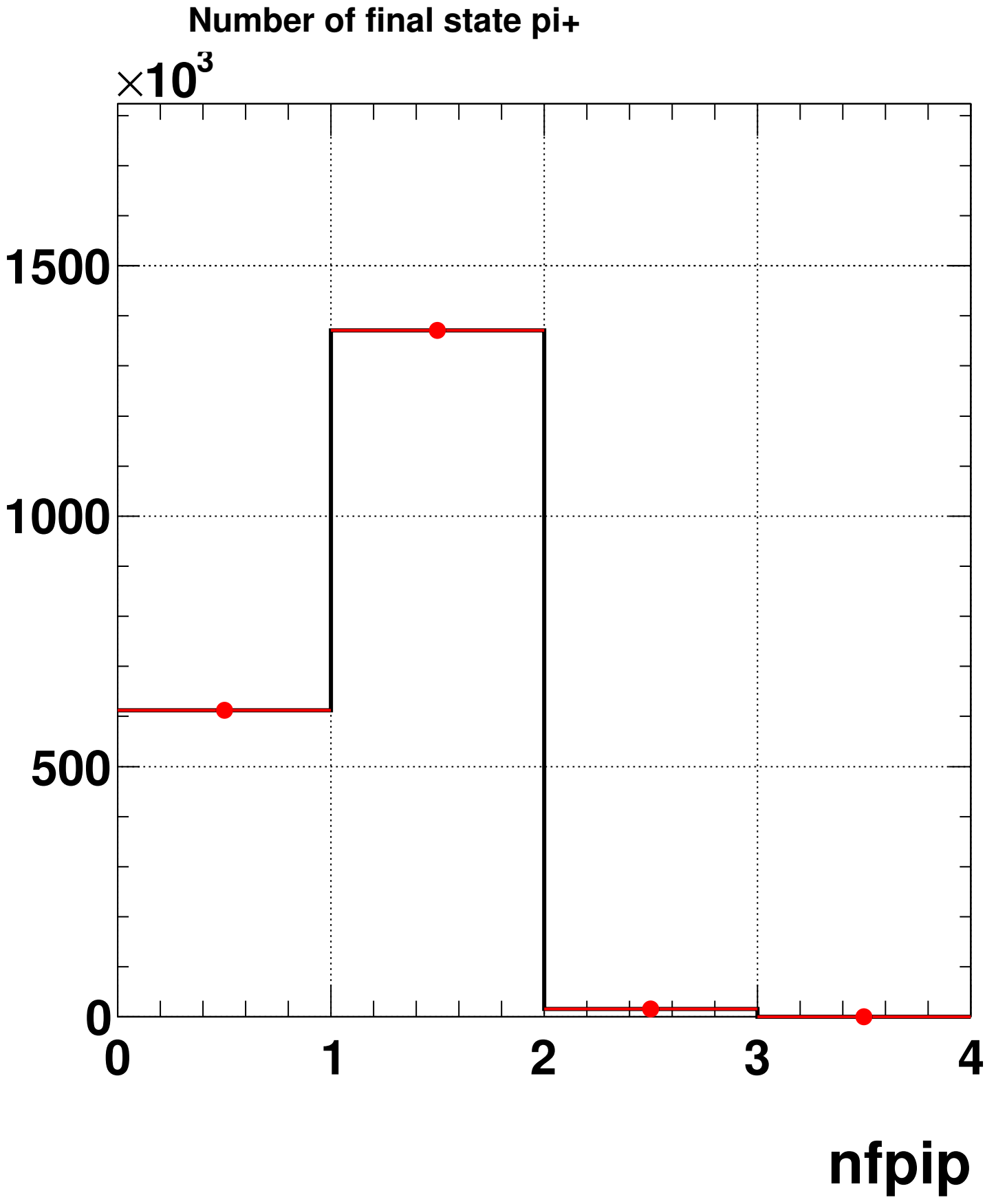
Multiplicities and 4-Momenta

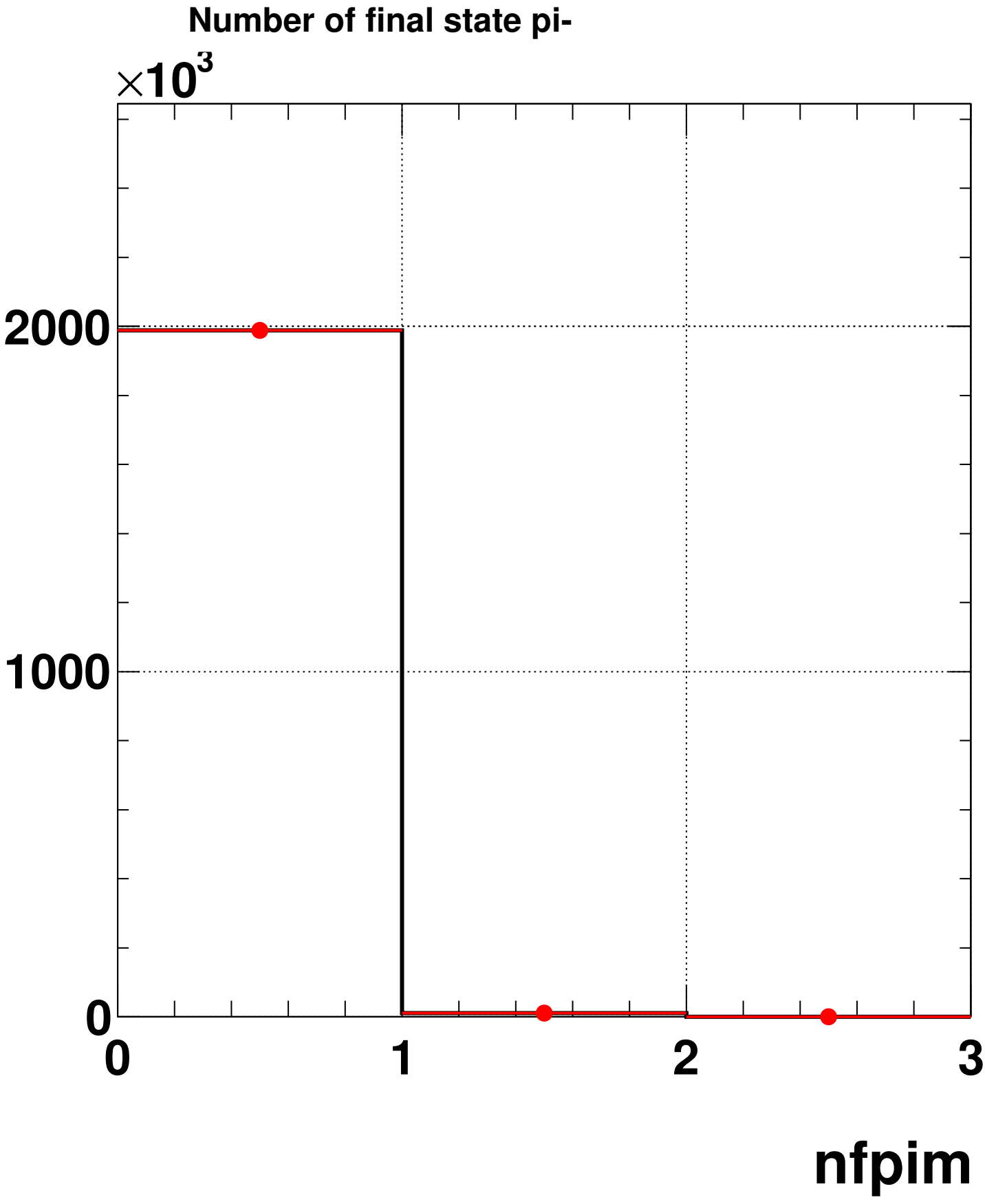
Note:

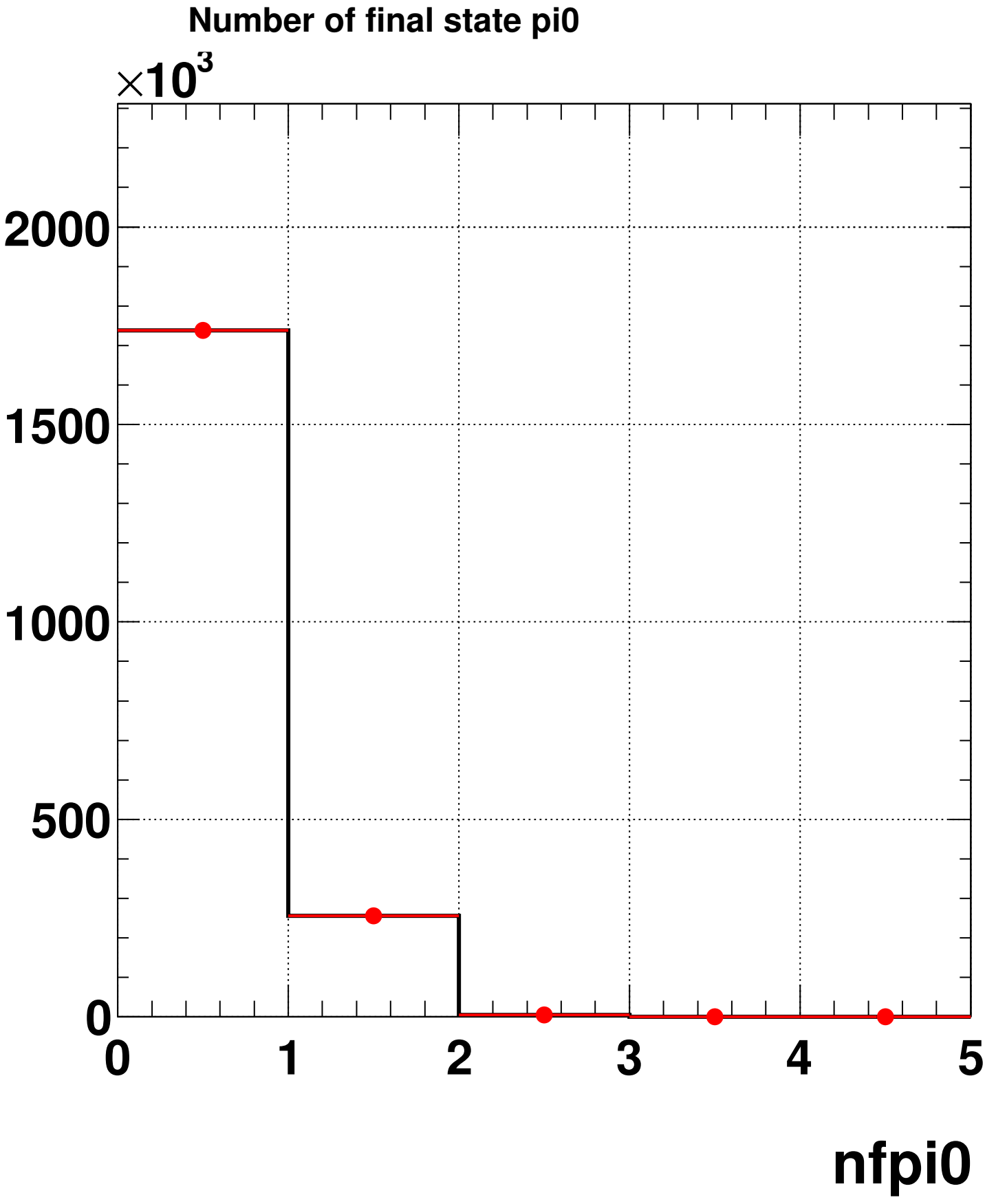
For nuclear targets these plots include the effect of intranuclear hadron transport / rescattering

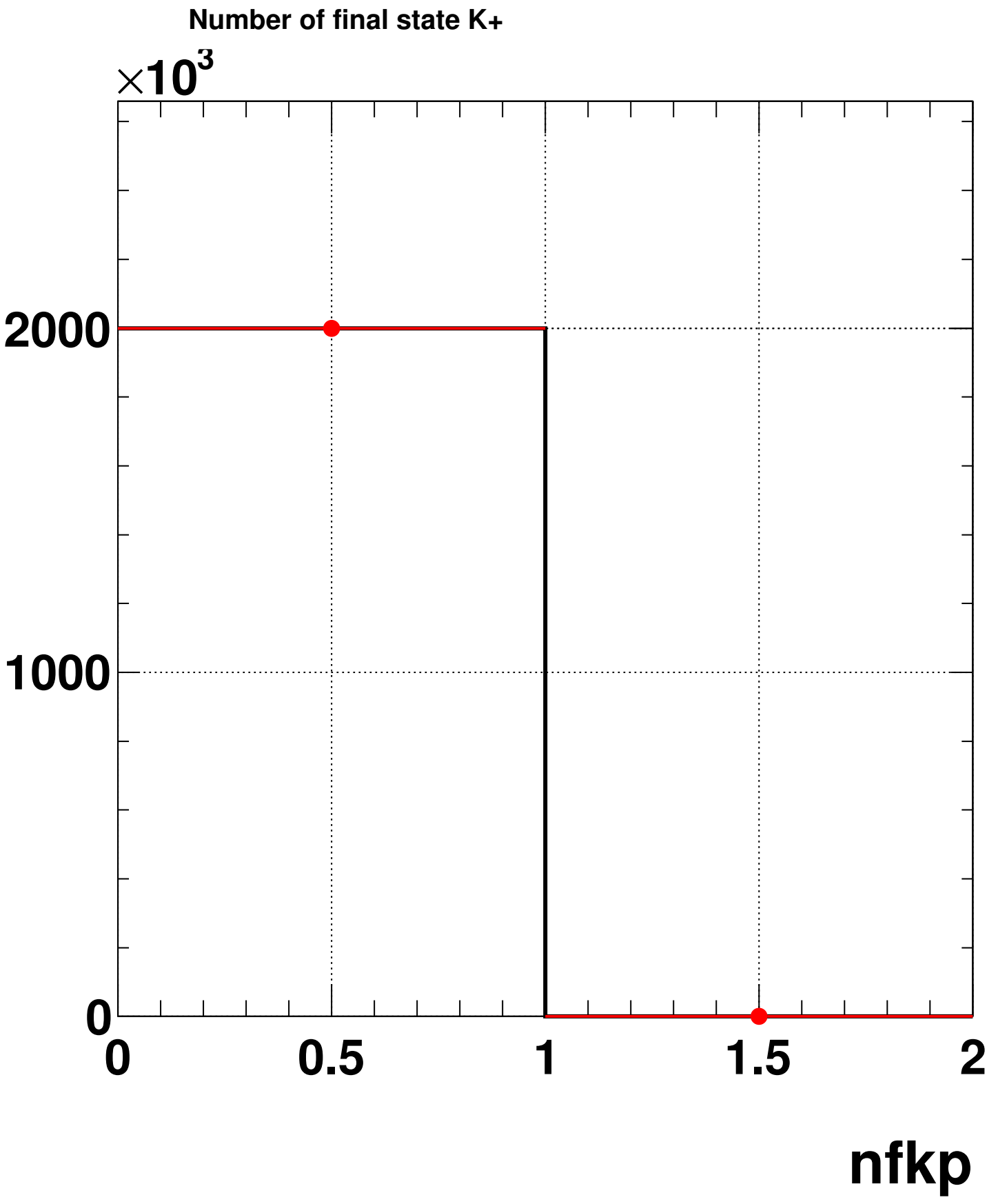

Number of final state protons
×10^3
2000
1500
1000
500
0
0
0.5
1
1.5
2
nfp

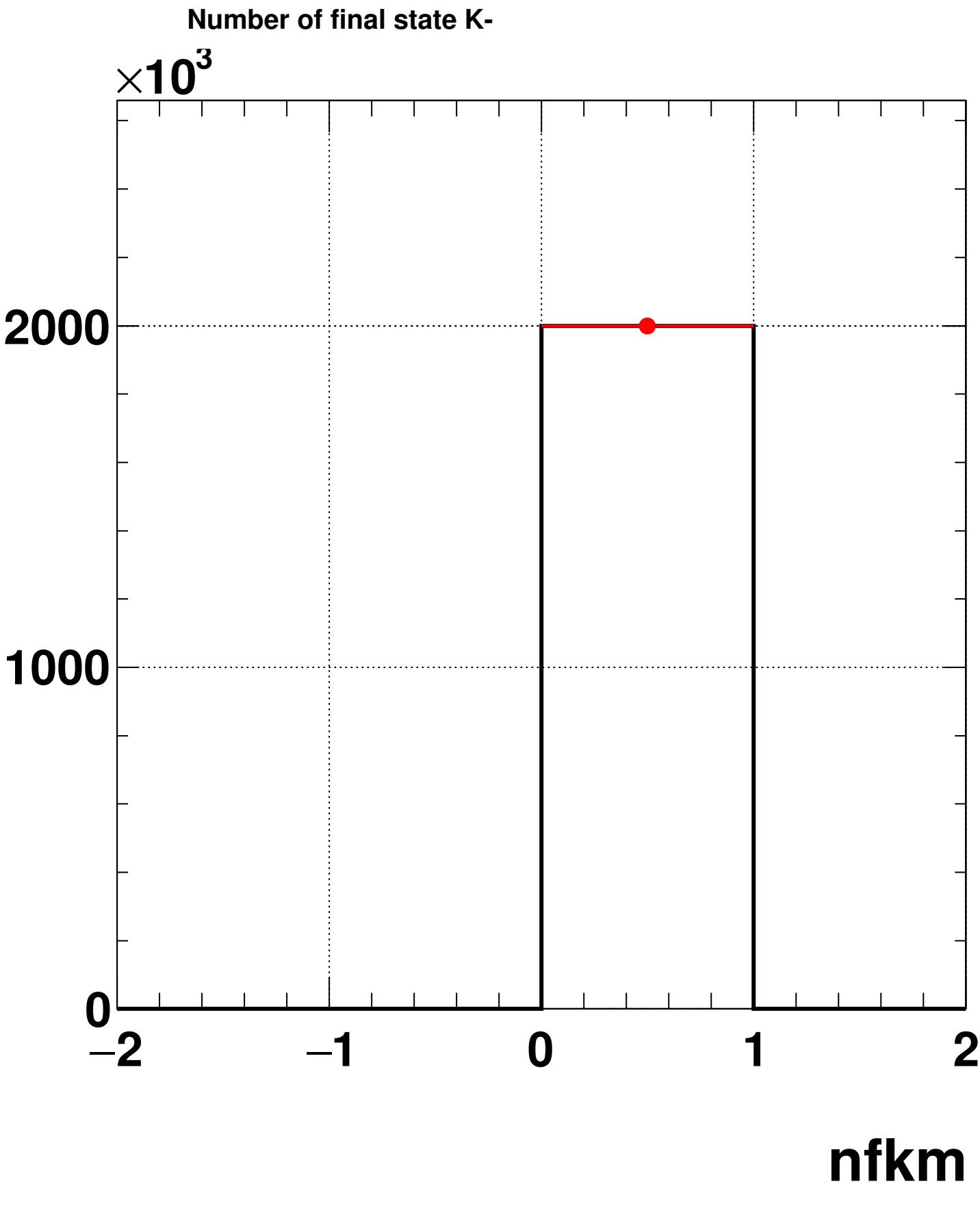

Number of final state neutrons
×10^3
2000
1500
1000
500
0
0
0.5
1
1.5
2
nfn

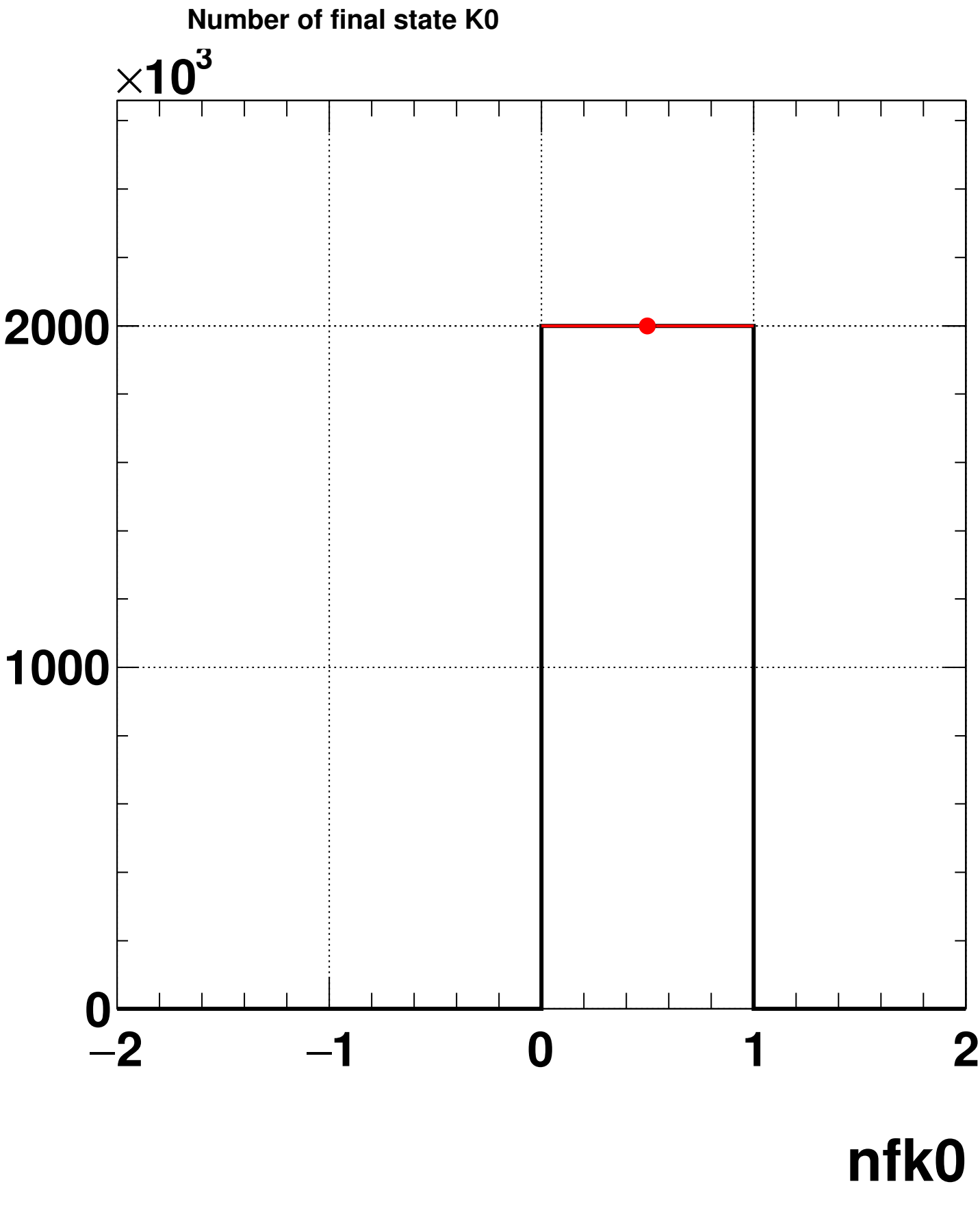

Number of final state pi+
×10^3
1500
1000
500
0
0
1
2
3
4
nfpip

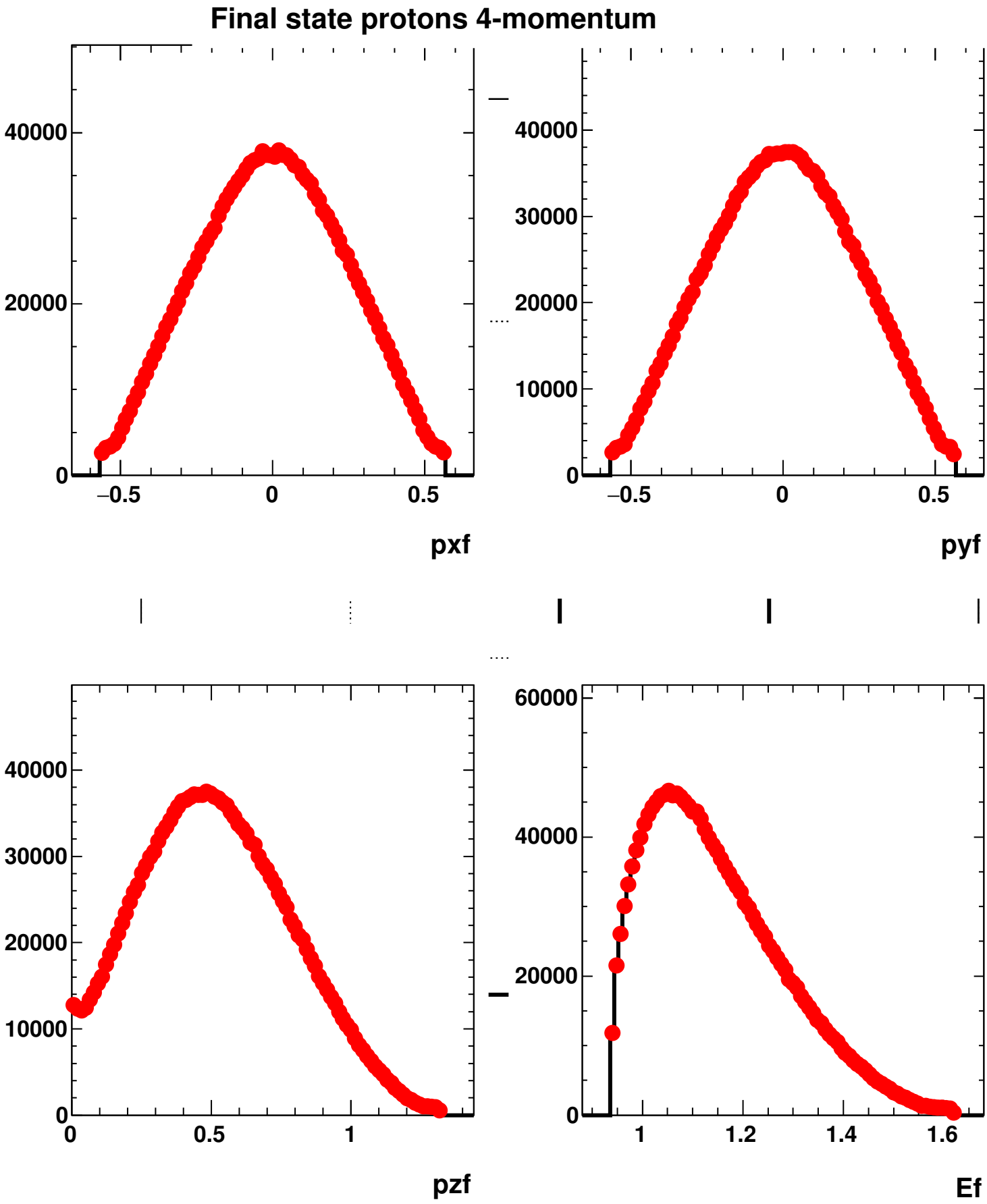

Number of final state pi-
×10^3
2000
1000
0
0
1
2
3
nfpim


Number of final state pi0
×10^3
2000
1500
1000
500
0
0
1
2
3
4
5
nfpi0

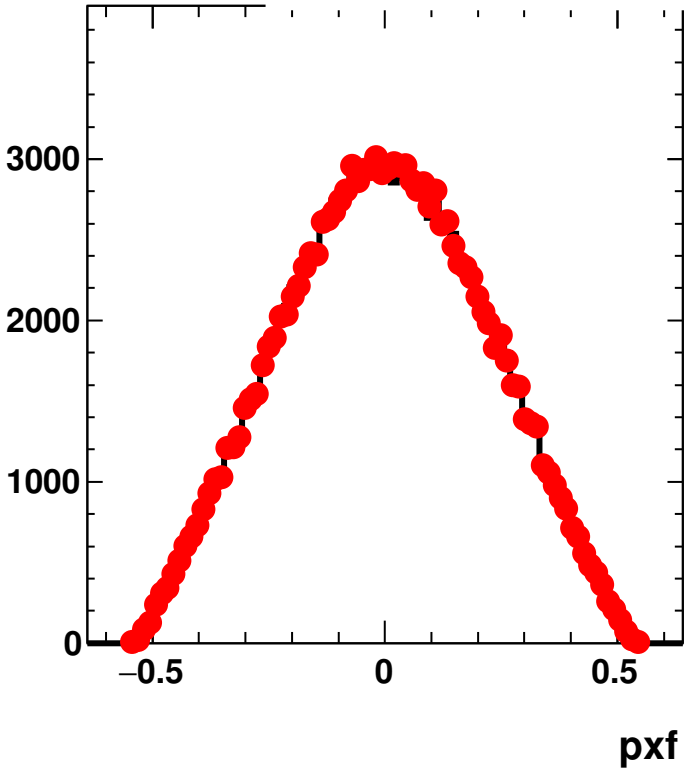

Number of final state K+
×10^3
2000
1000
0
0
0.5
1
1.5
2
nfkp

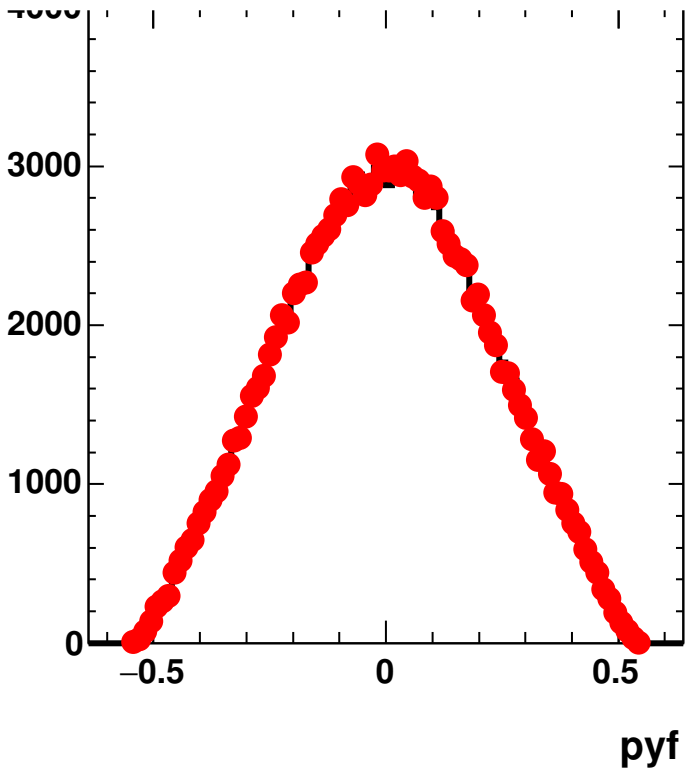

Number of final state K-
×10^3
2000
1000
0
−2
−1
0
1
2
nfkm

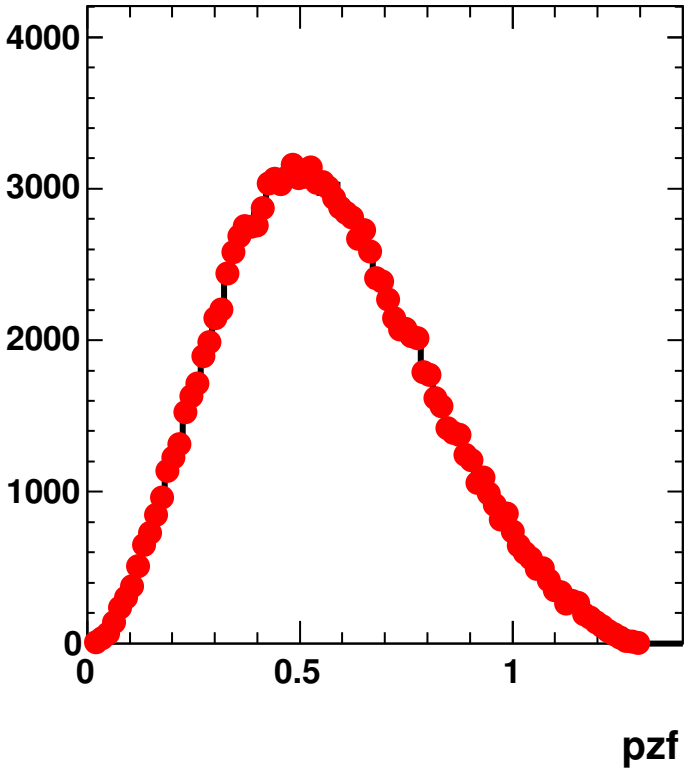

Number of final state K0
×10^3
2000
1000
0
−2
−1
0
1
2
nfk0

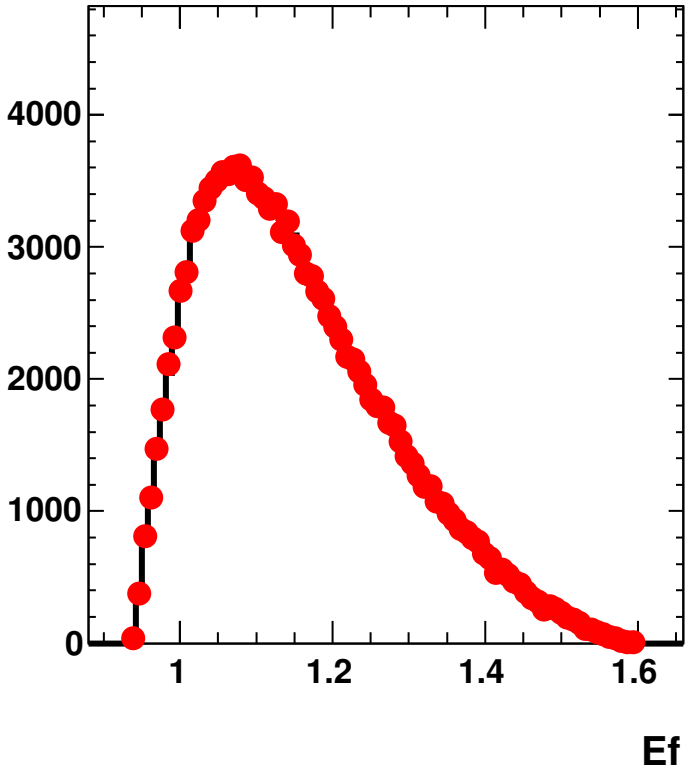

Final state protons 4-momentum
40000
20000
0
−0.5
0
0.5
pxf
40000
30000
20000
10000
0
−0.5
0
0.5
pyf
40000
30000
20000
10000
0
0
0.5
1
pzf
60000
40000
20000
0
1
1.2
1.4
1.6
Ef

Final state neutrons 4-momentum

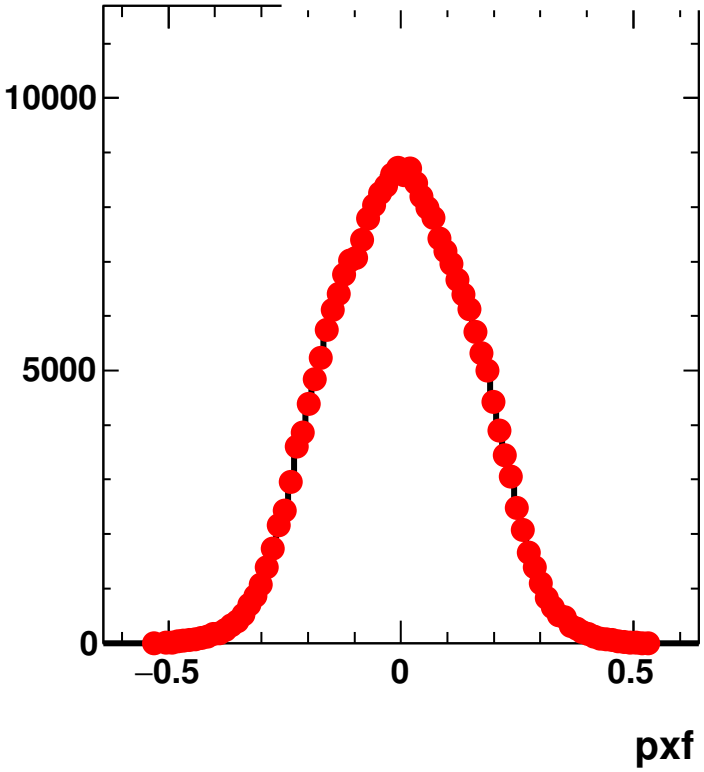


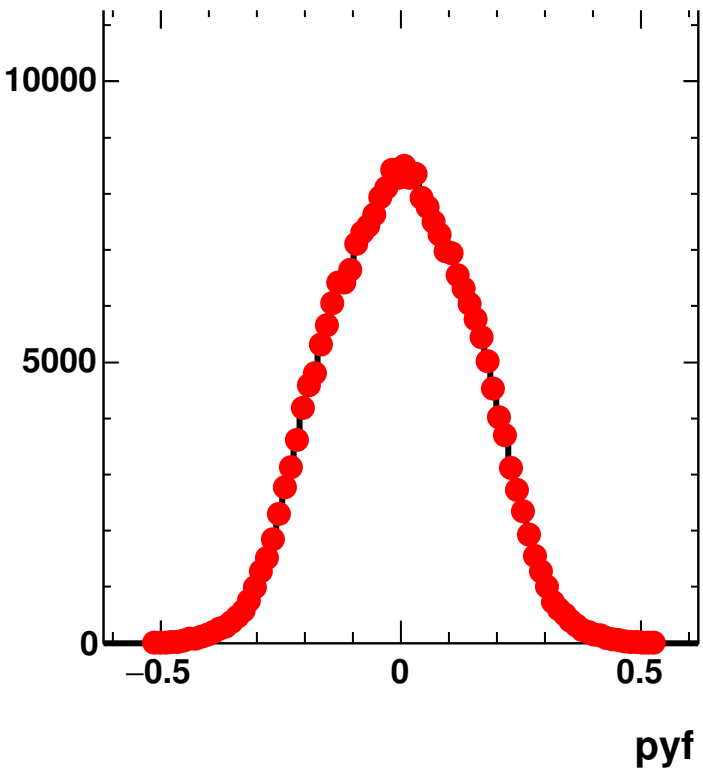


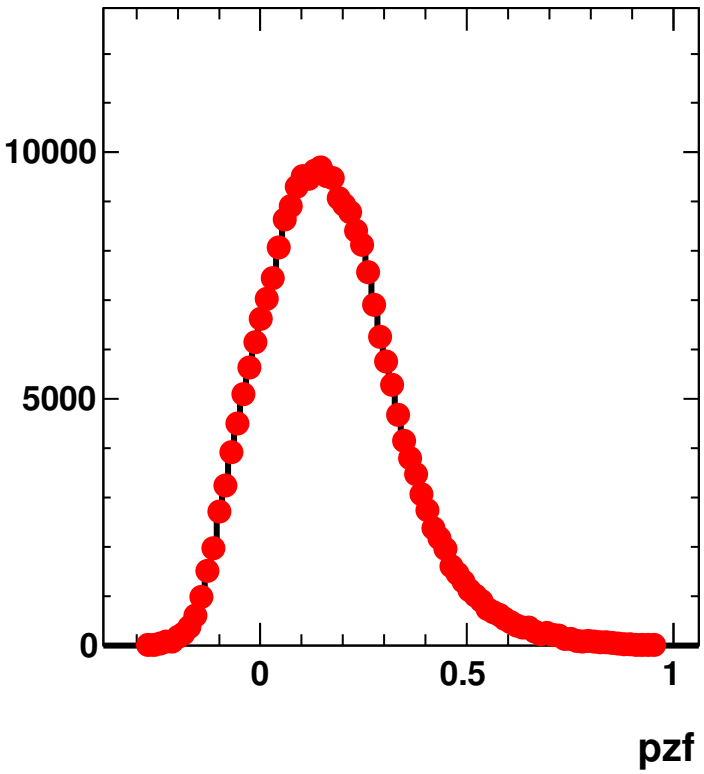


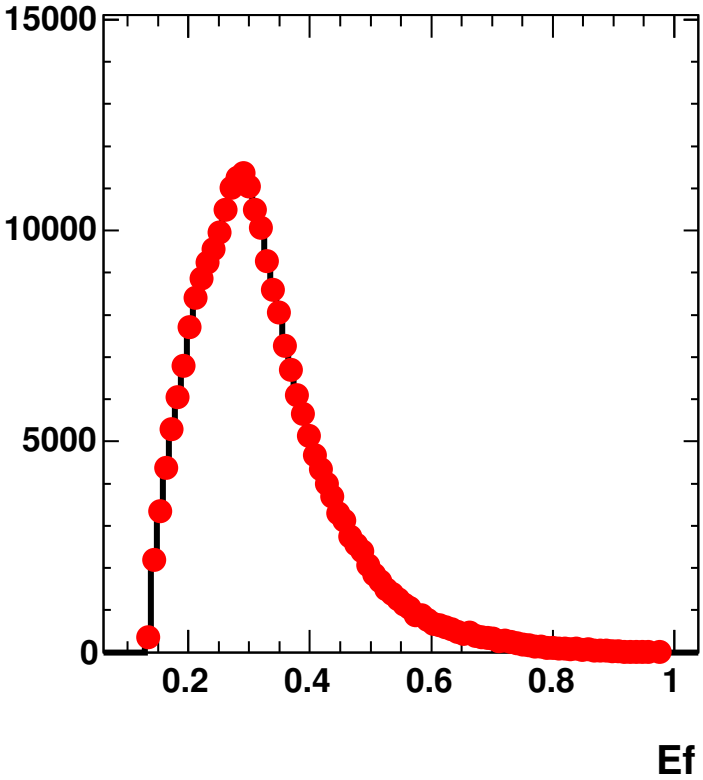


Final state pi0's 4-momentum

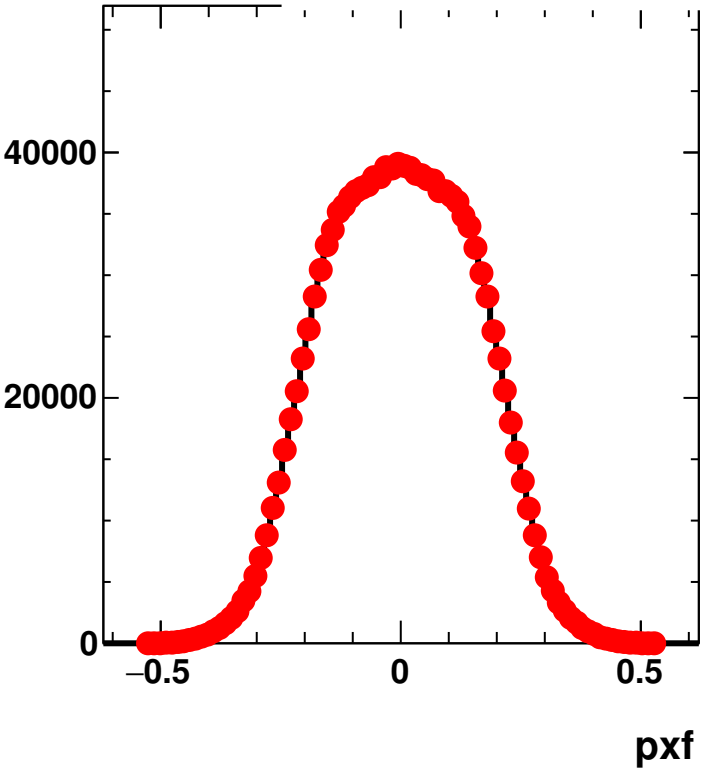


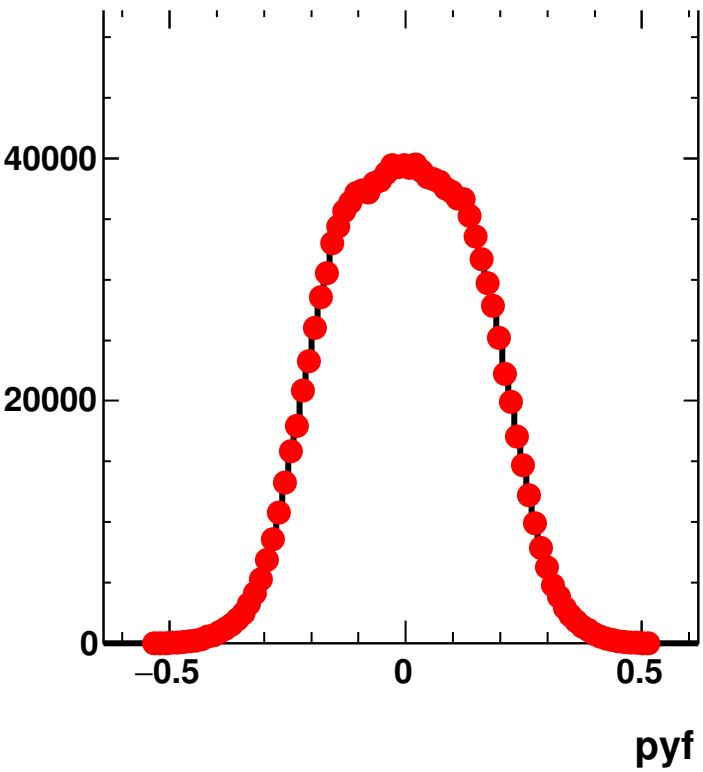


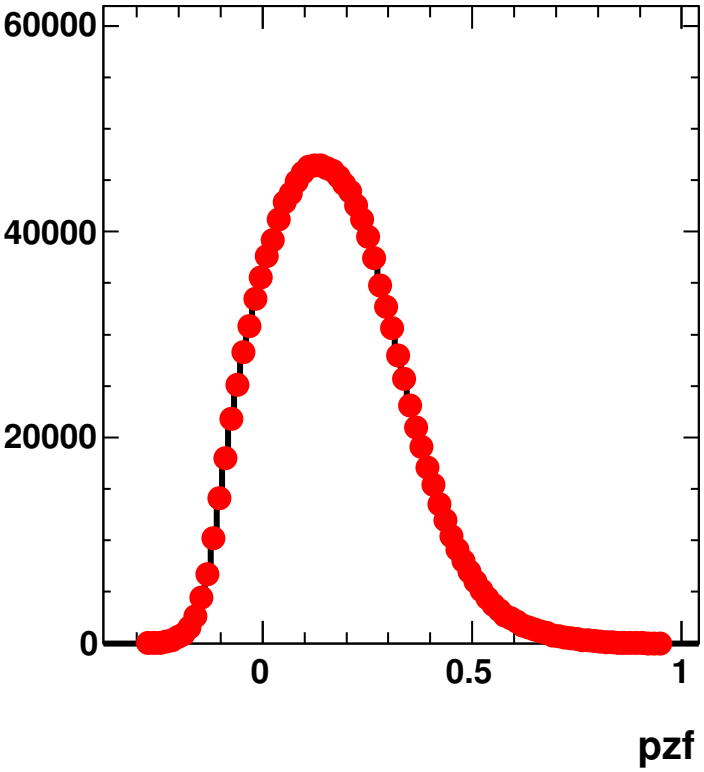


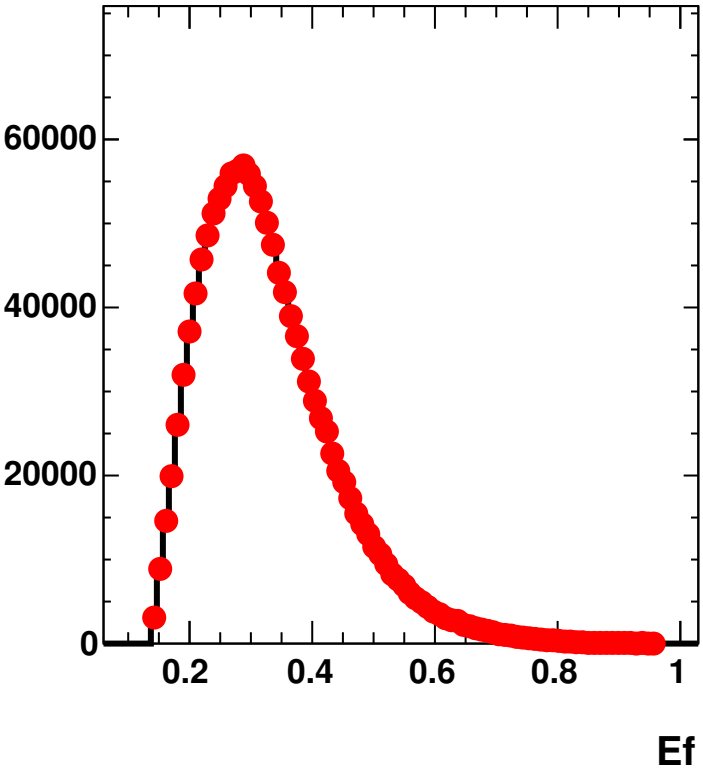


Final state pi+’s 4-momentum

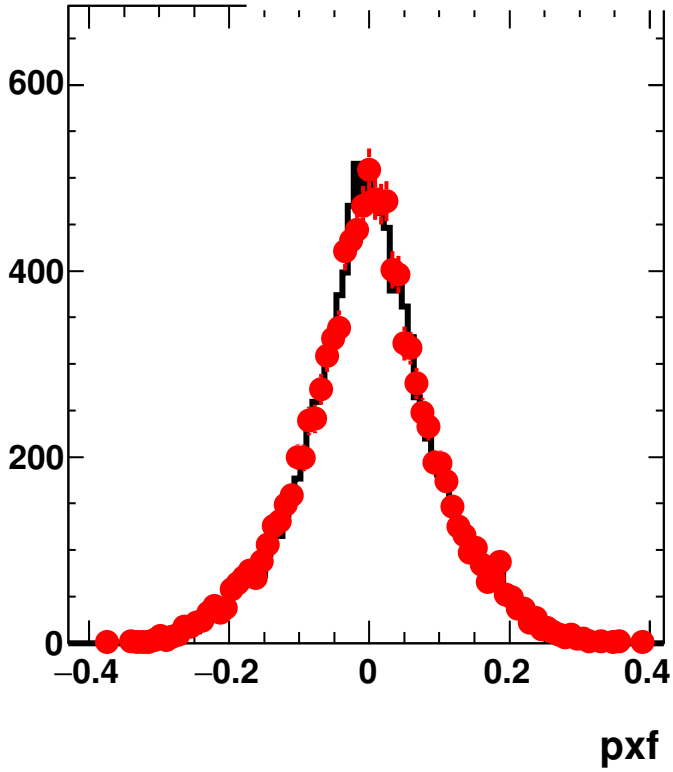


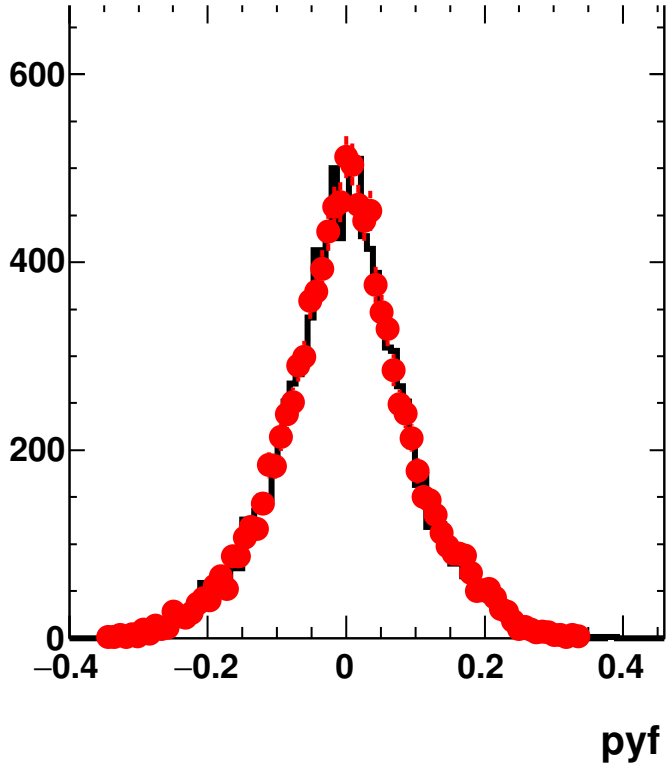


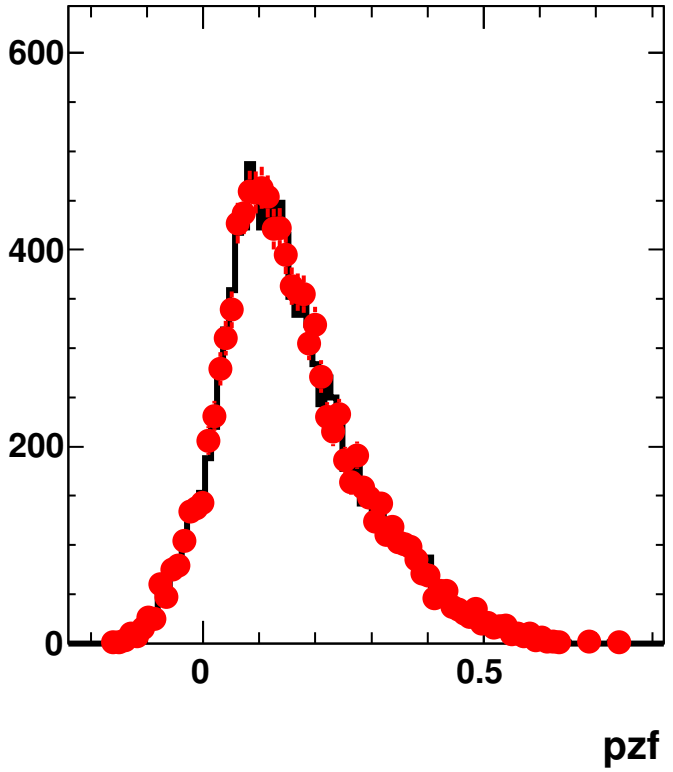


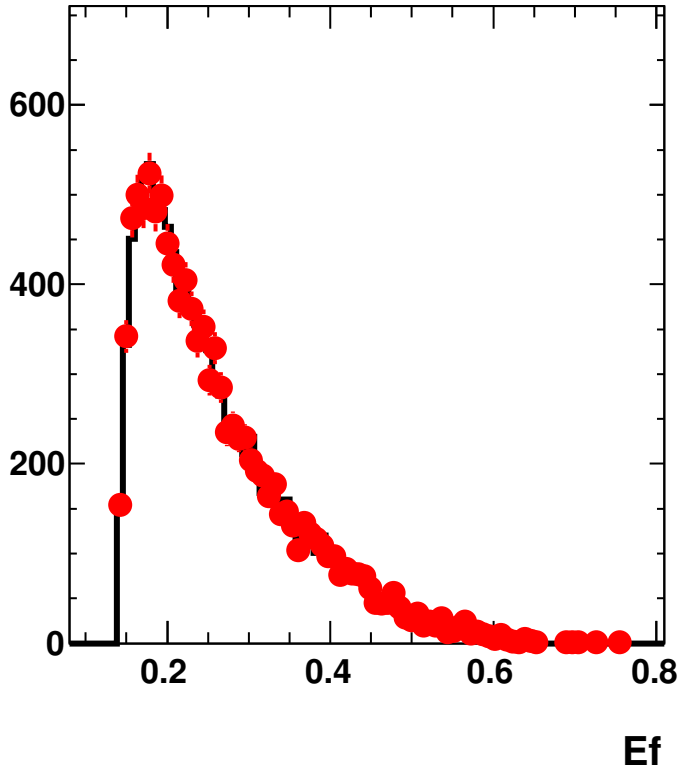


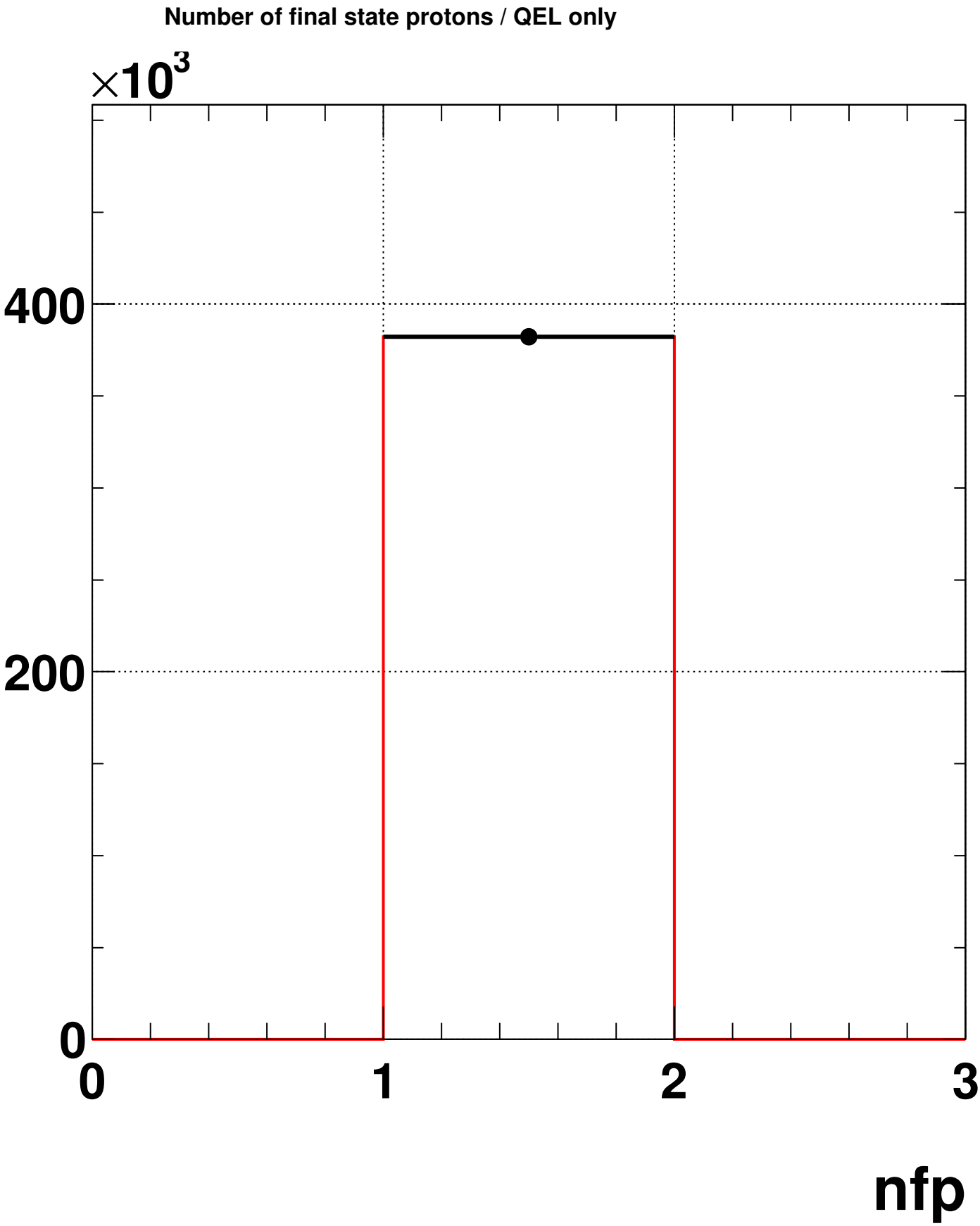
Final state pi-’s 4-momentum

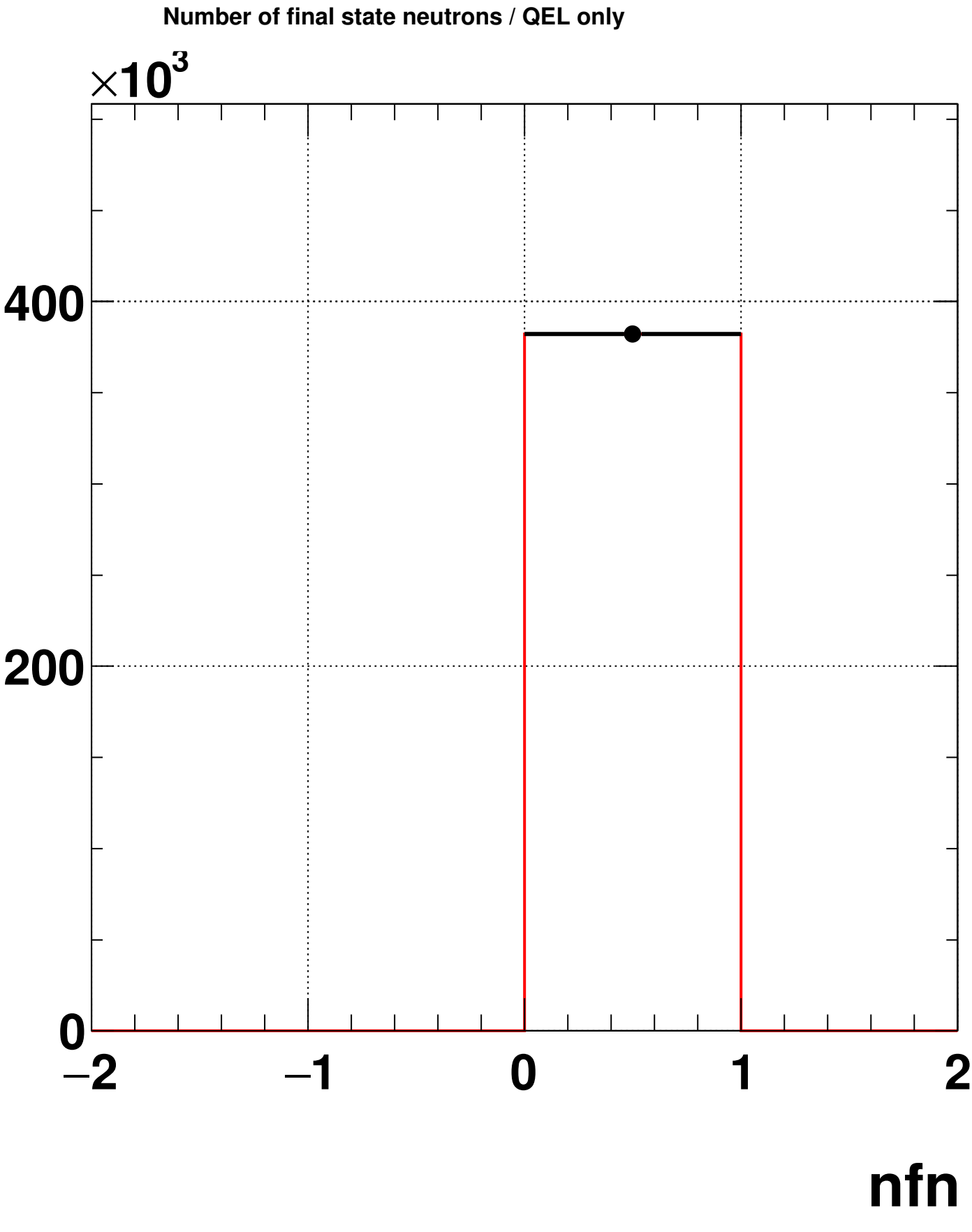


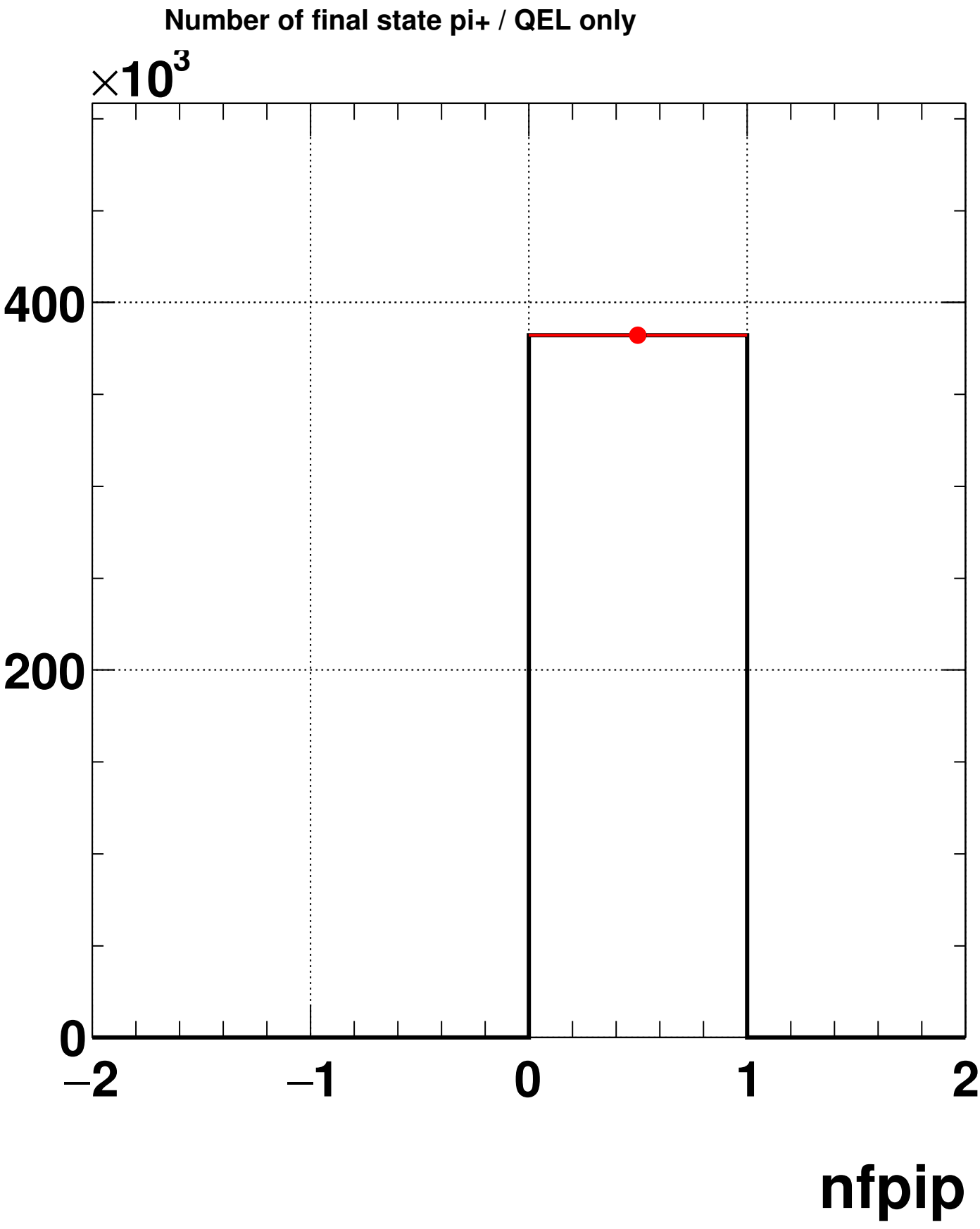


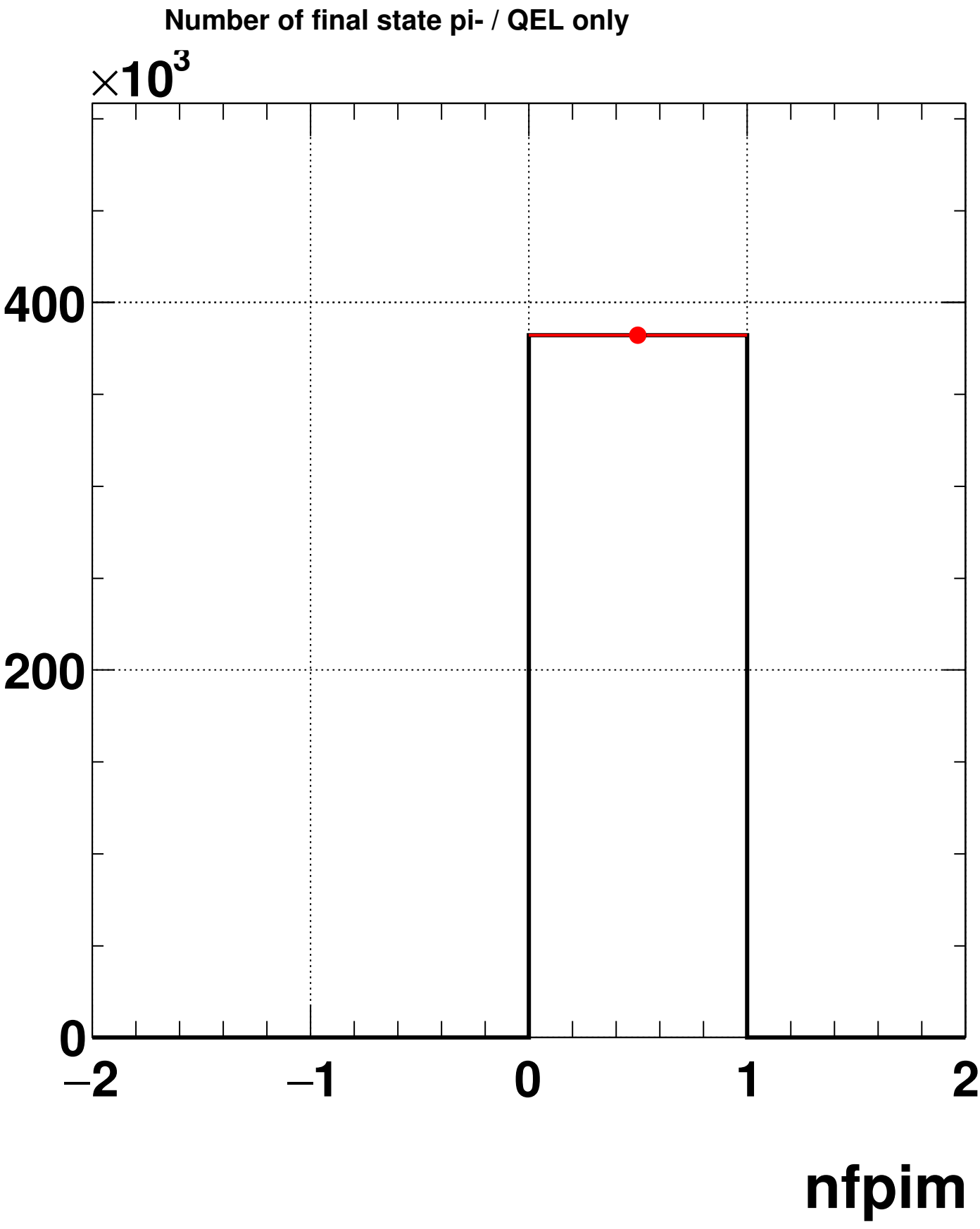


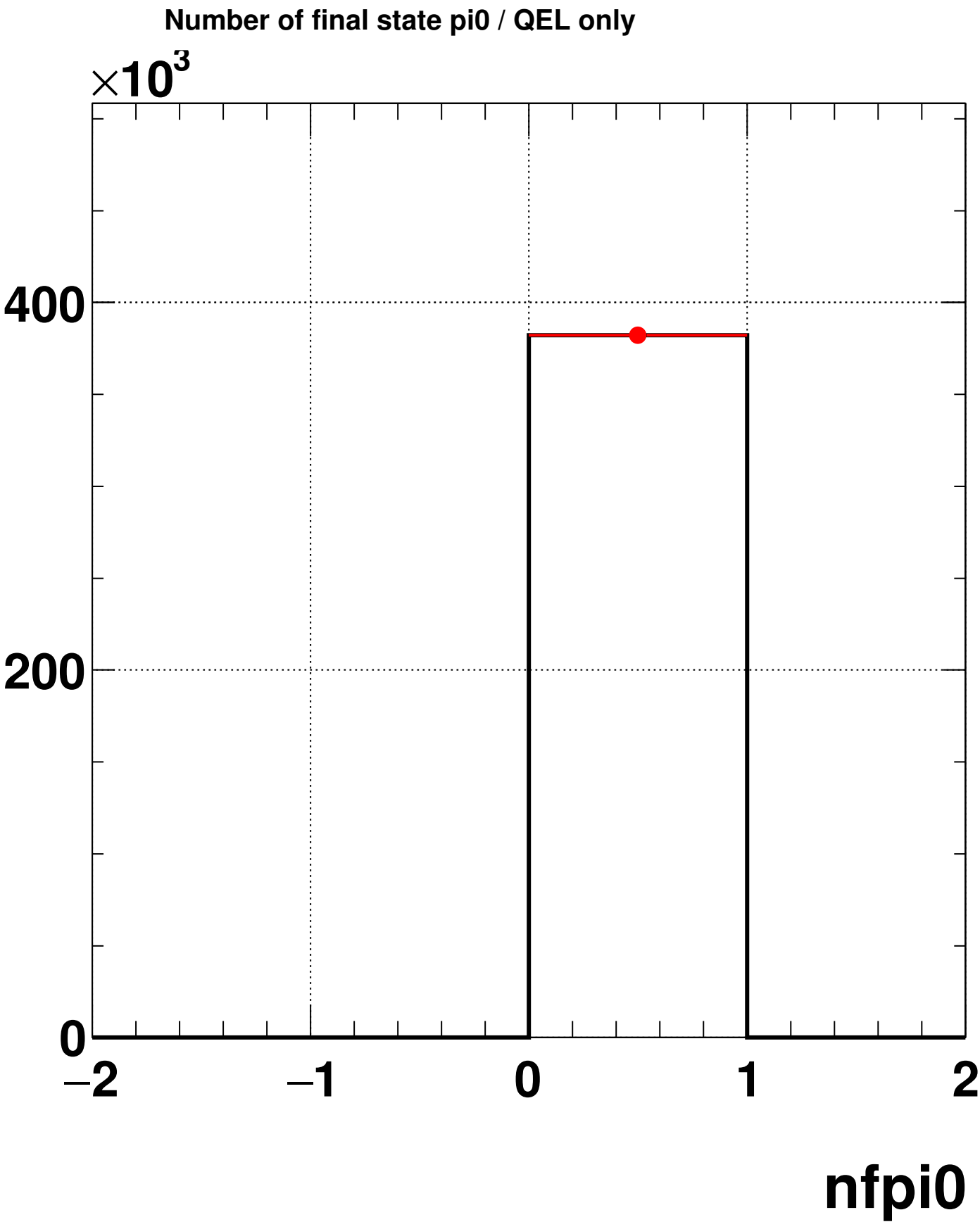


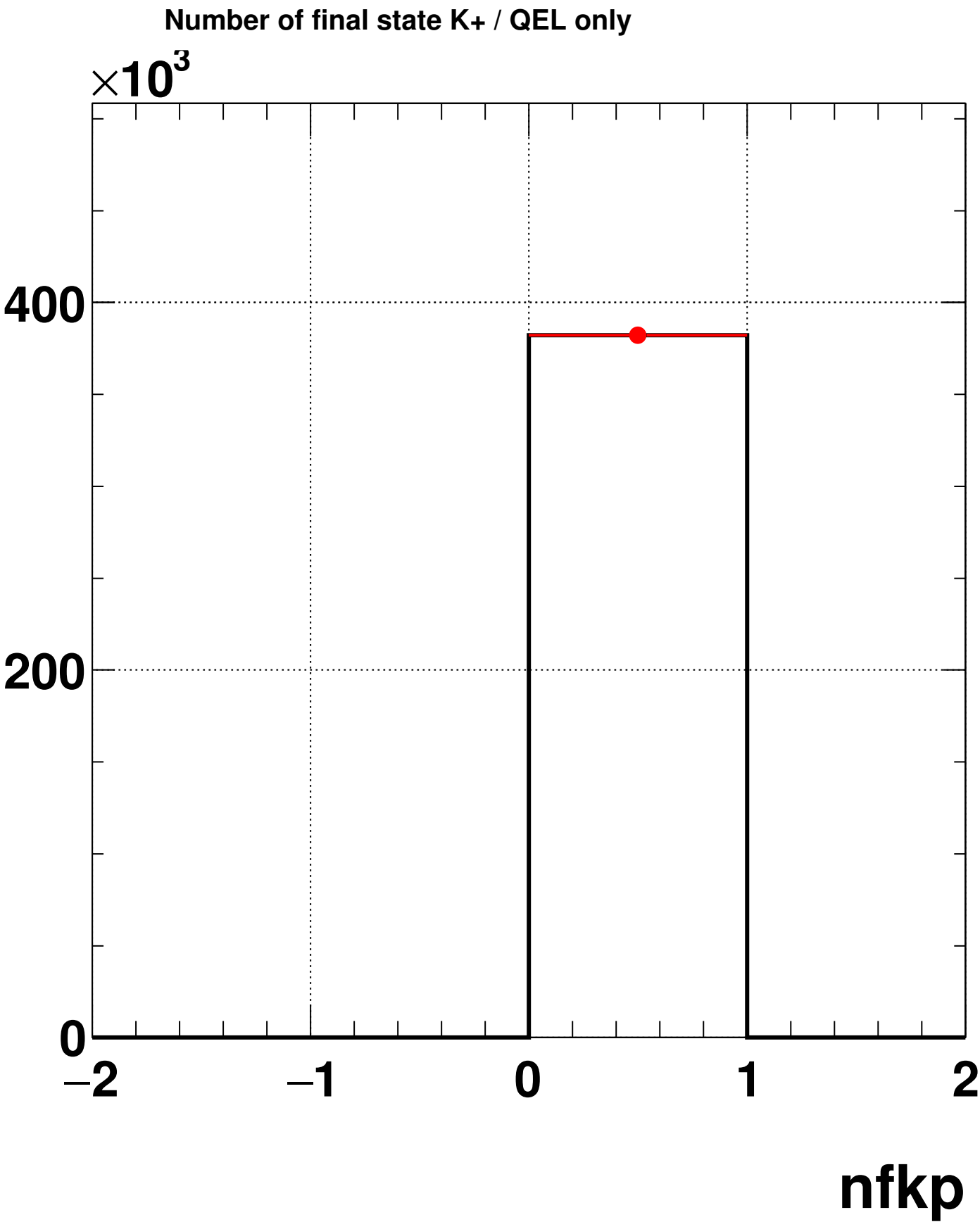

Number of final state protons / QEL only
×10^3
400
200
0
0
1
2
3
nfp

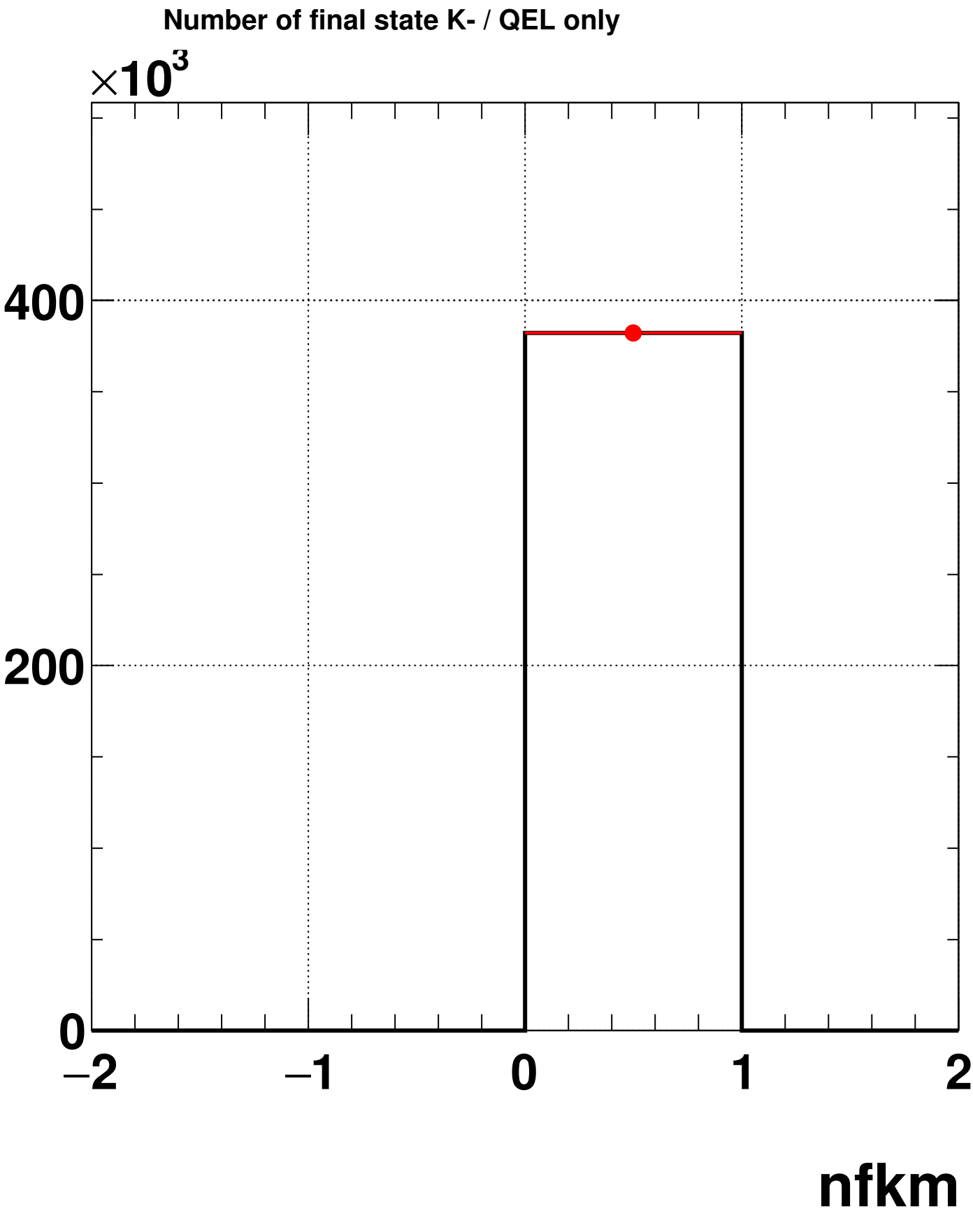

Number of final state neutrons / QEL only
×10^3
400
200
0
−2
−1
0
1
2
nfn

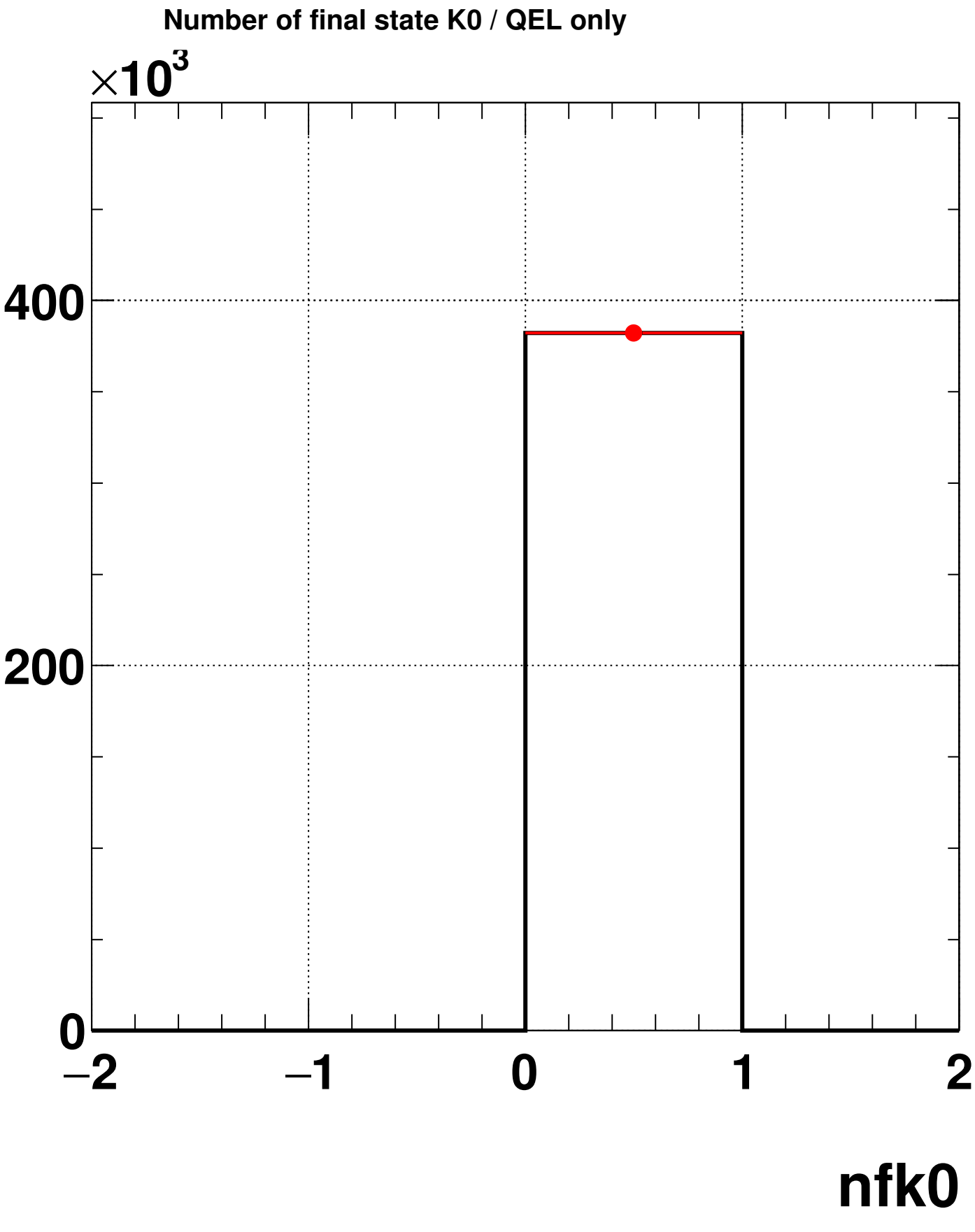

Number of final state pi+ / QEL only
×10^3
400
200
0
−2
−1
0
1
2
nfpip


Number of final state pi- / QEL only
×10^3
400
200
0
−2
−1
0
1
2
nfpim

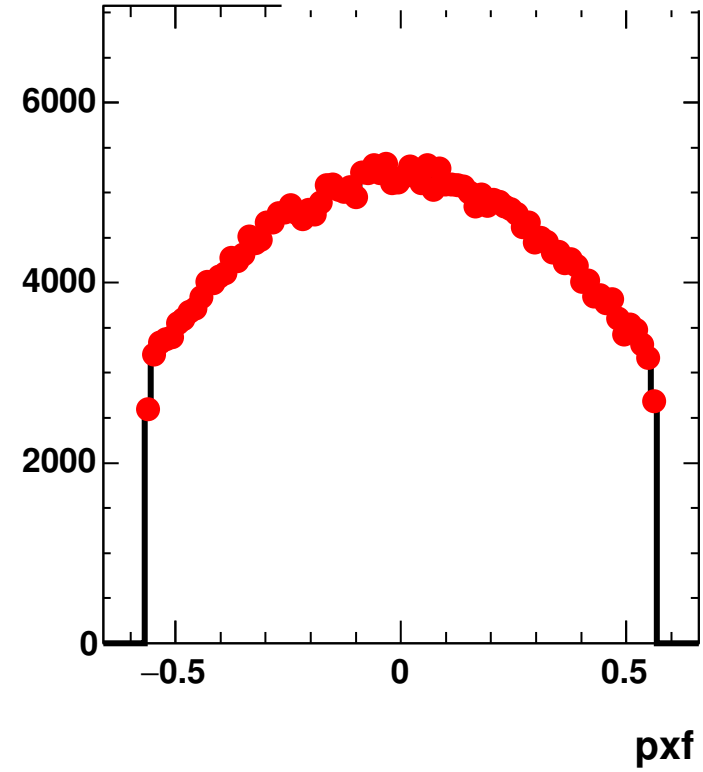

Number of final state pi0 / QEL only
×10^3
400
200
0
−2
−1
0
1
2
nfpi0

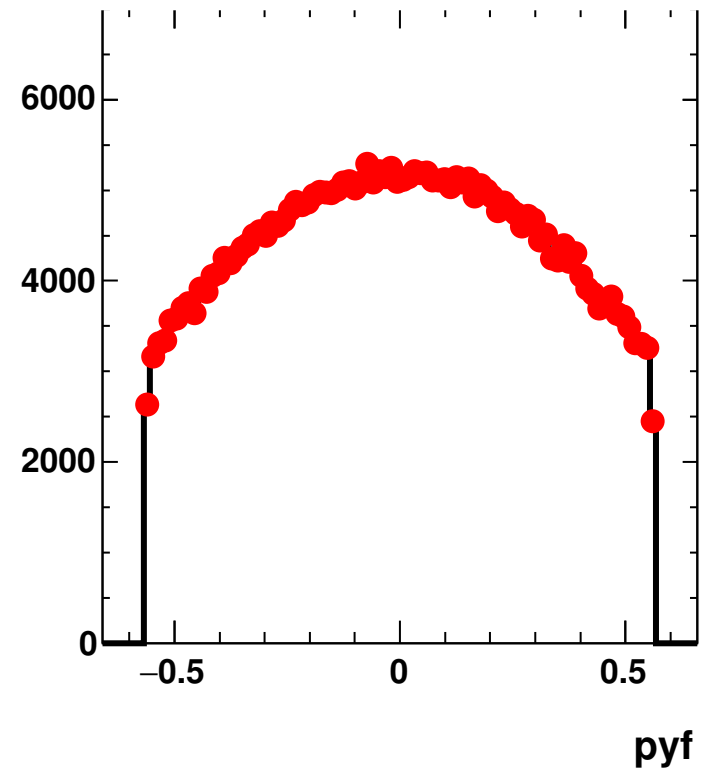

Number of final state K+ / QEL only
×10^3
400
200
0
−2
−1
0
1
2
nfkp

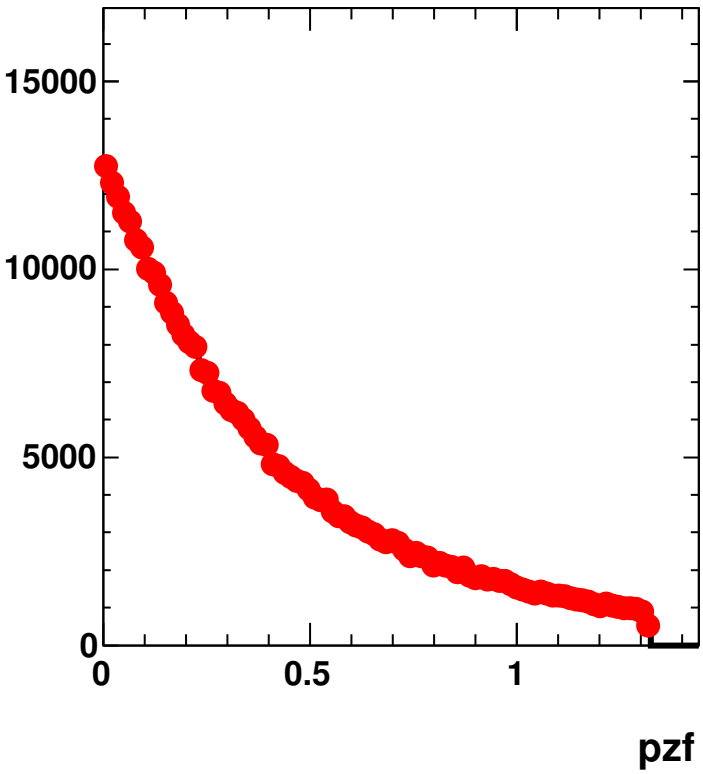

Number of final state K- / QEL only
×10^3
400
200
0
−2
−1
0
1
2
nfkm

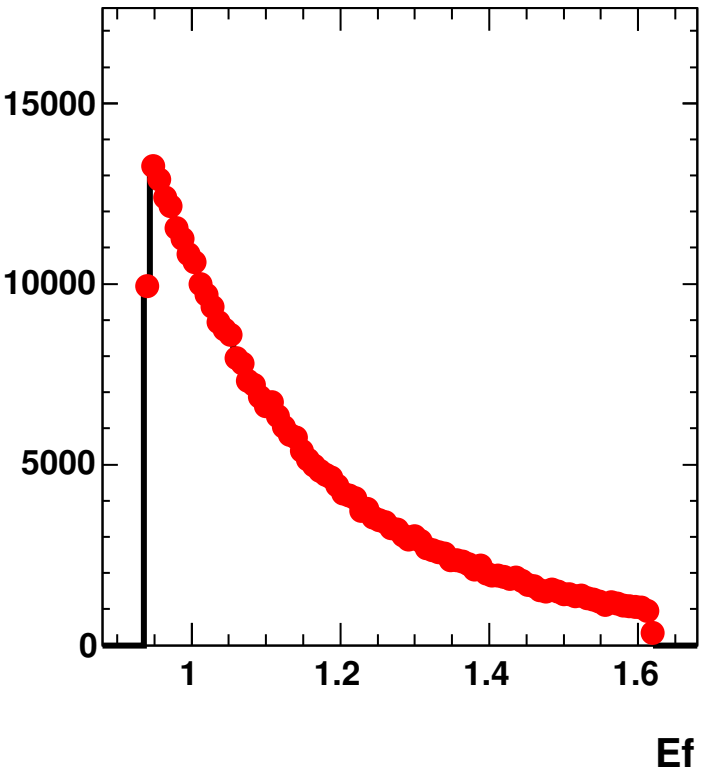

Number of final state K0 / QEL only
×10^3
400
200
0
−2
−1
0
1
2
nfk0

Final state protons 4-momentum / QEL only







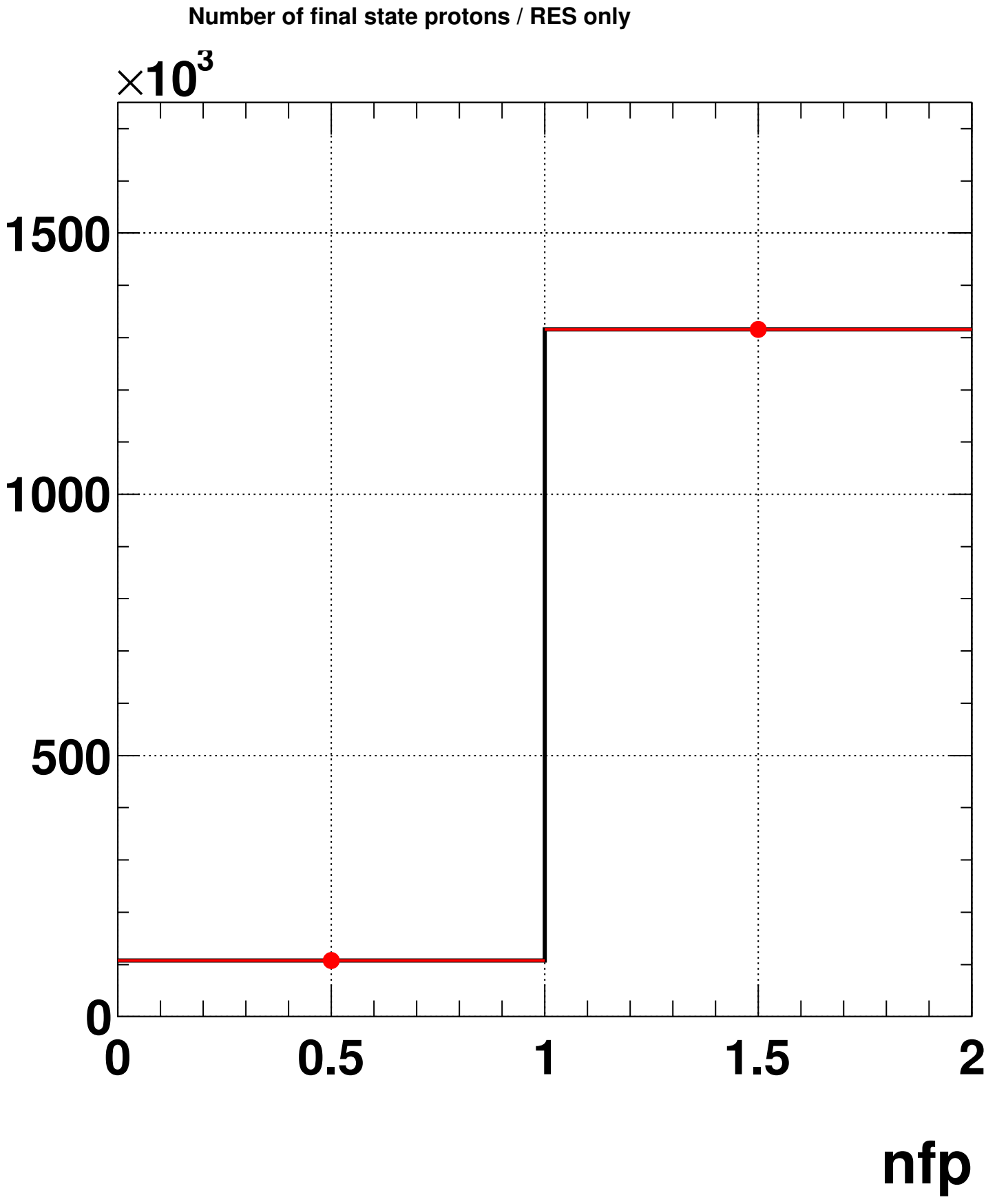


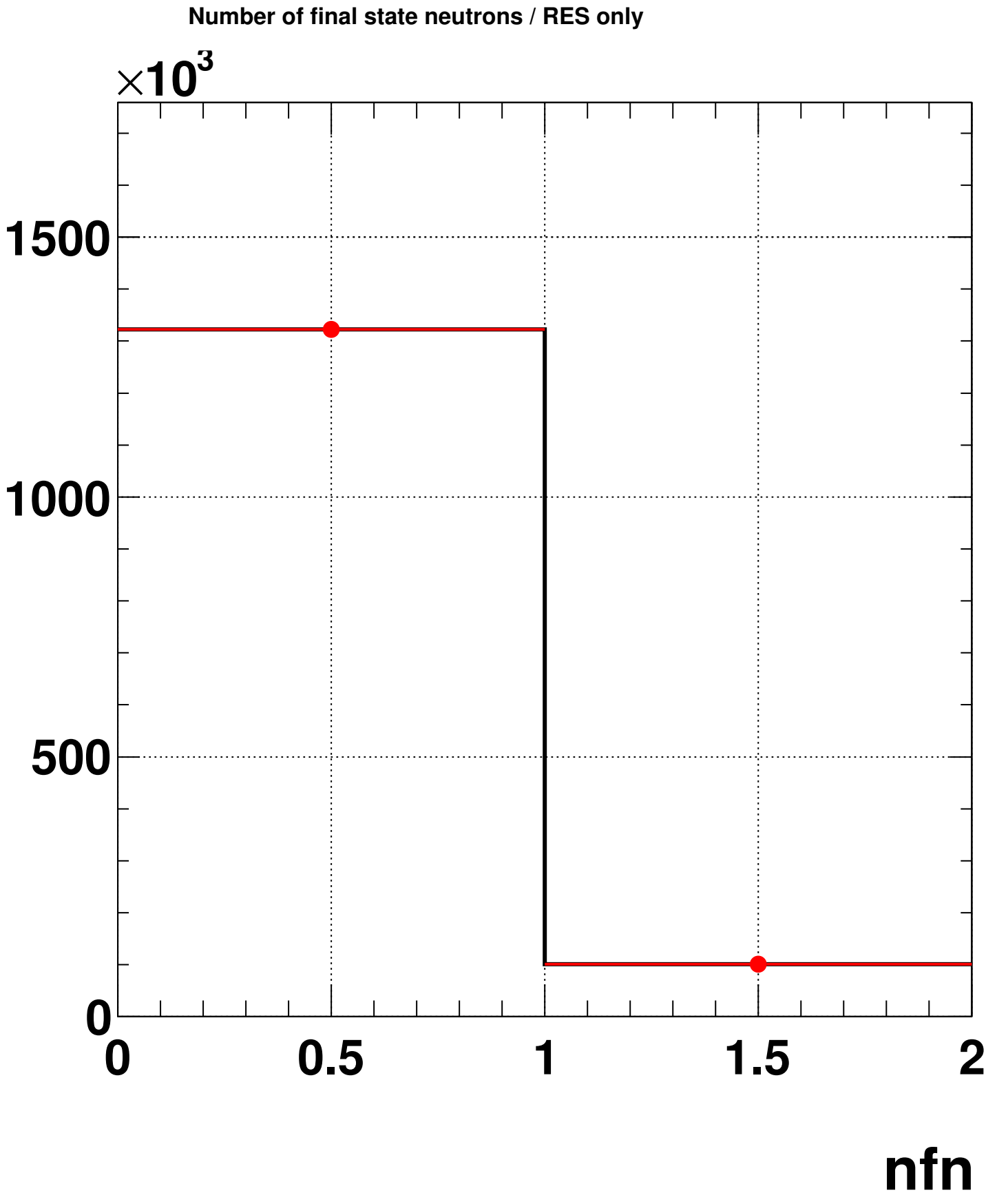
Final state neutrons 4-momentum / QEL only

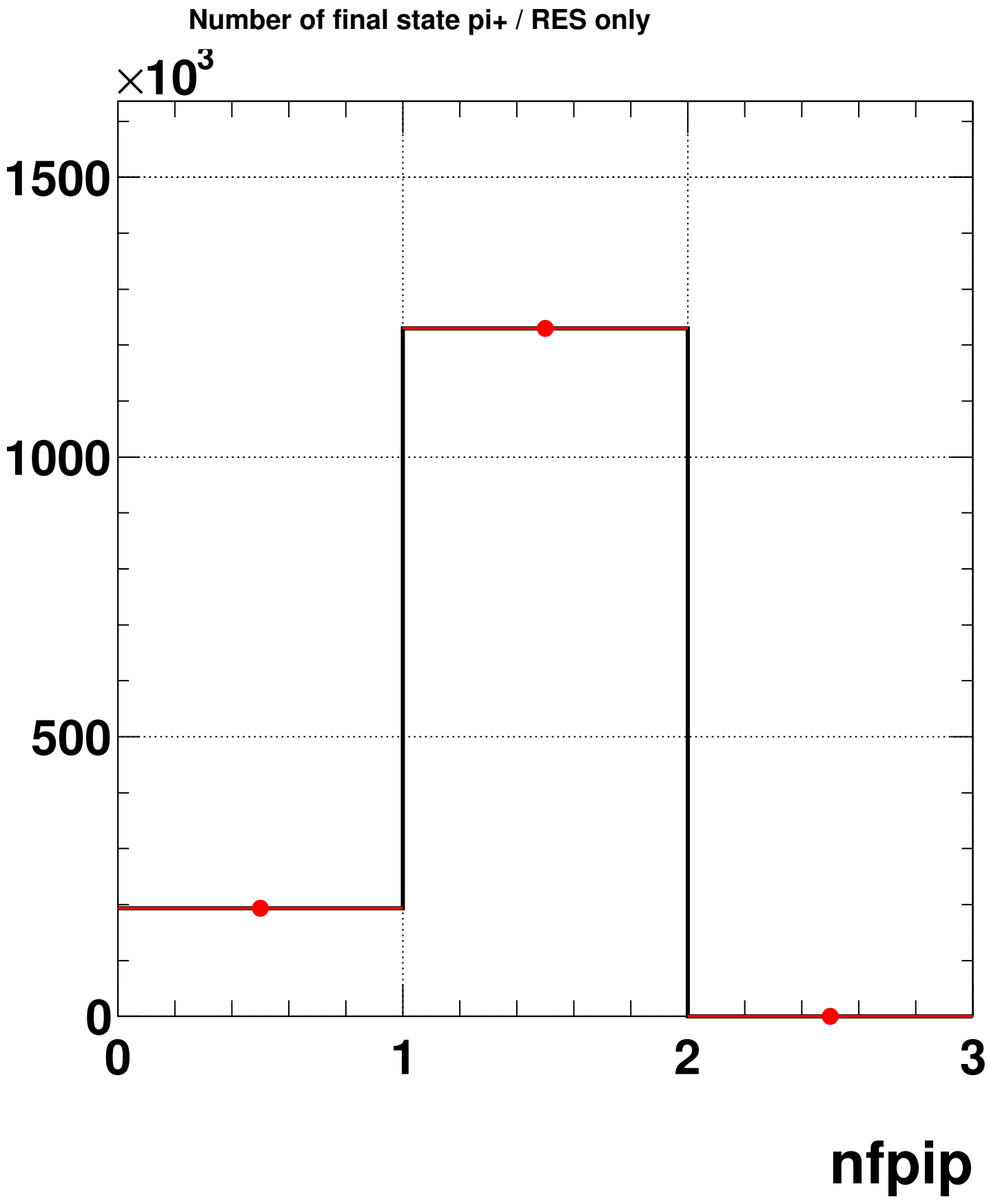
Final state pi0's 4-momentum / QEL only

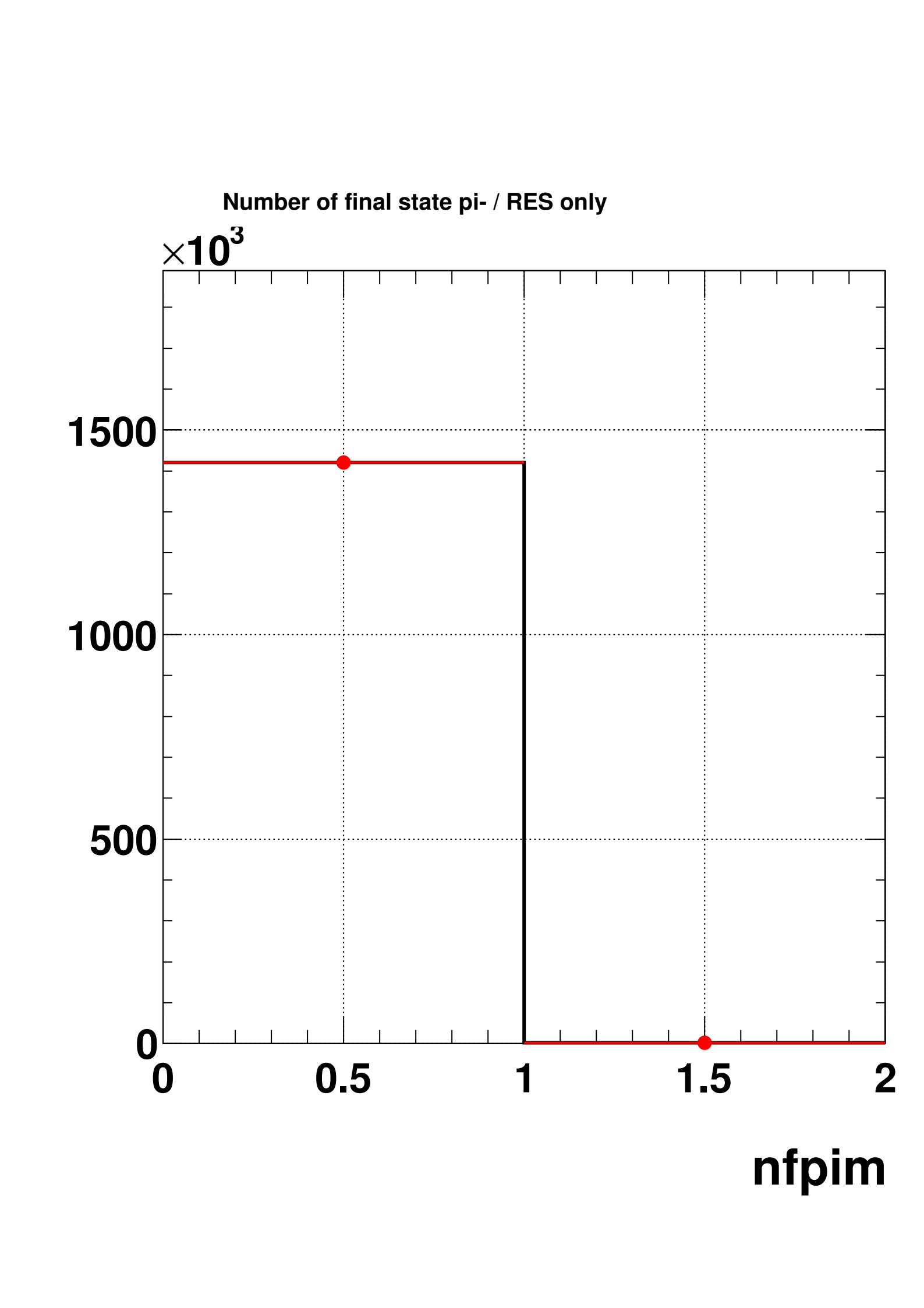
Final state pi+’s 4-momentum / QEL only

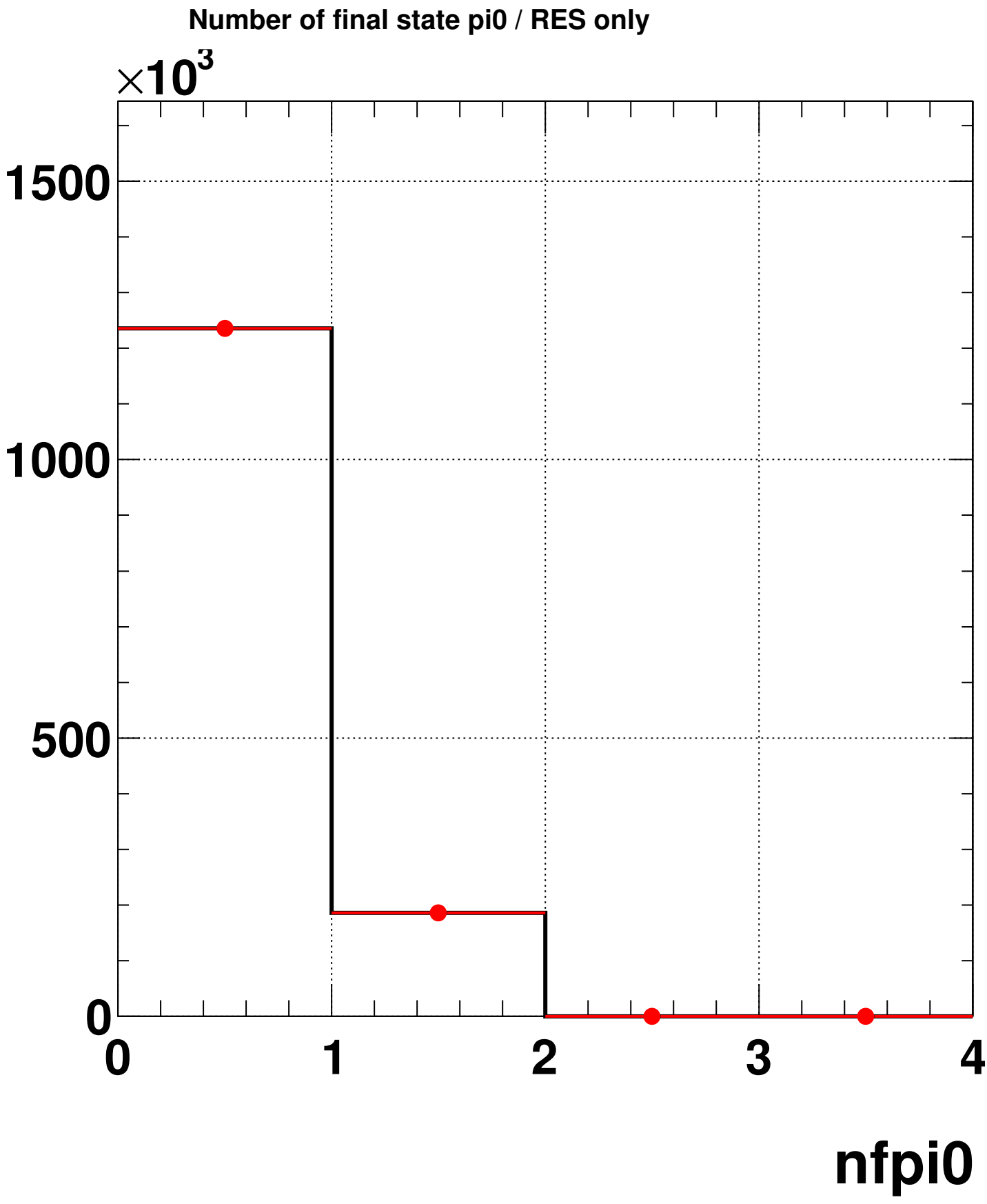
Final state pi-’s 4-momentum/ QEL only

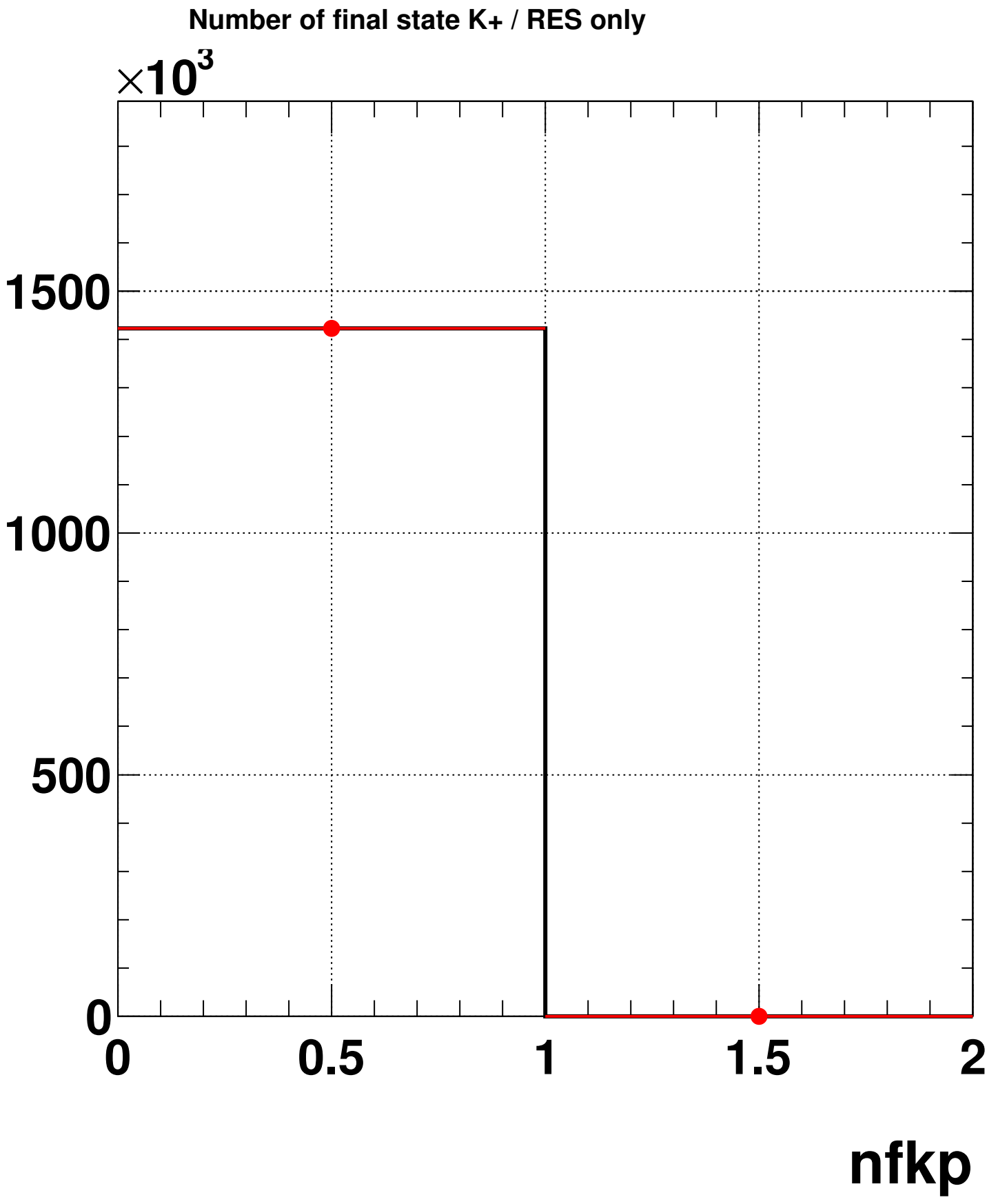

Number of final state protons / RES only
×10^3
1500
1000
500
0
0
0.5
1
1.5
2
nfp

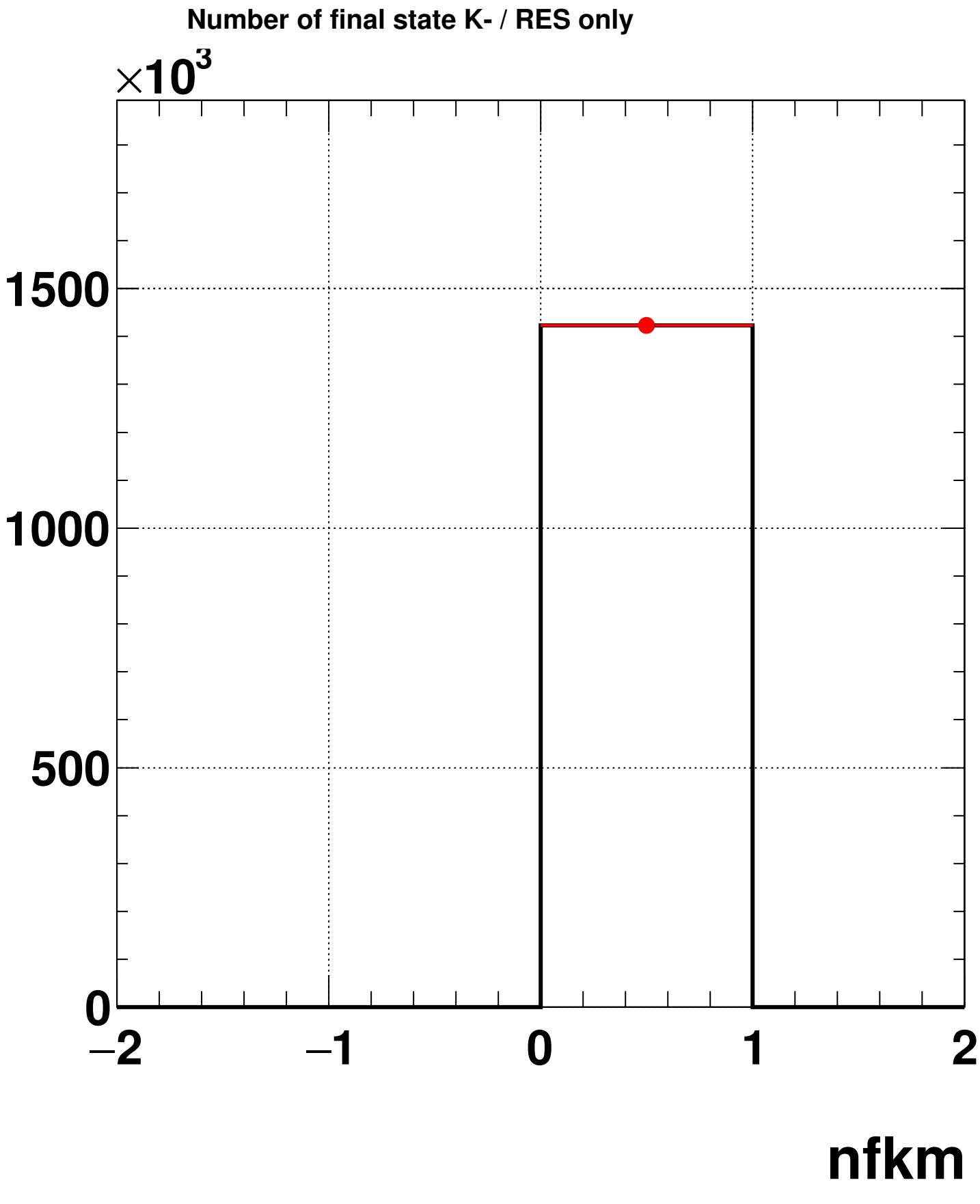

Number of final state neutrons / RES only
×10^3
1500
1000
500
0
0
0.5
1
1.5
2
nfn

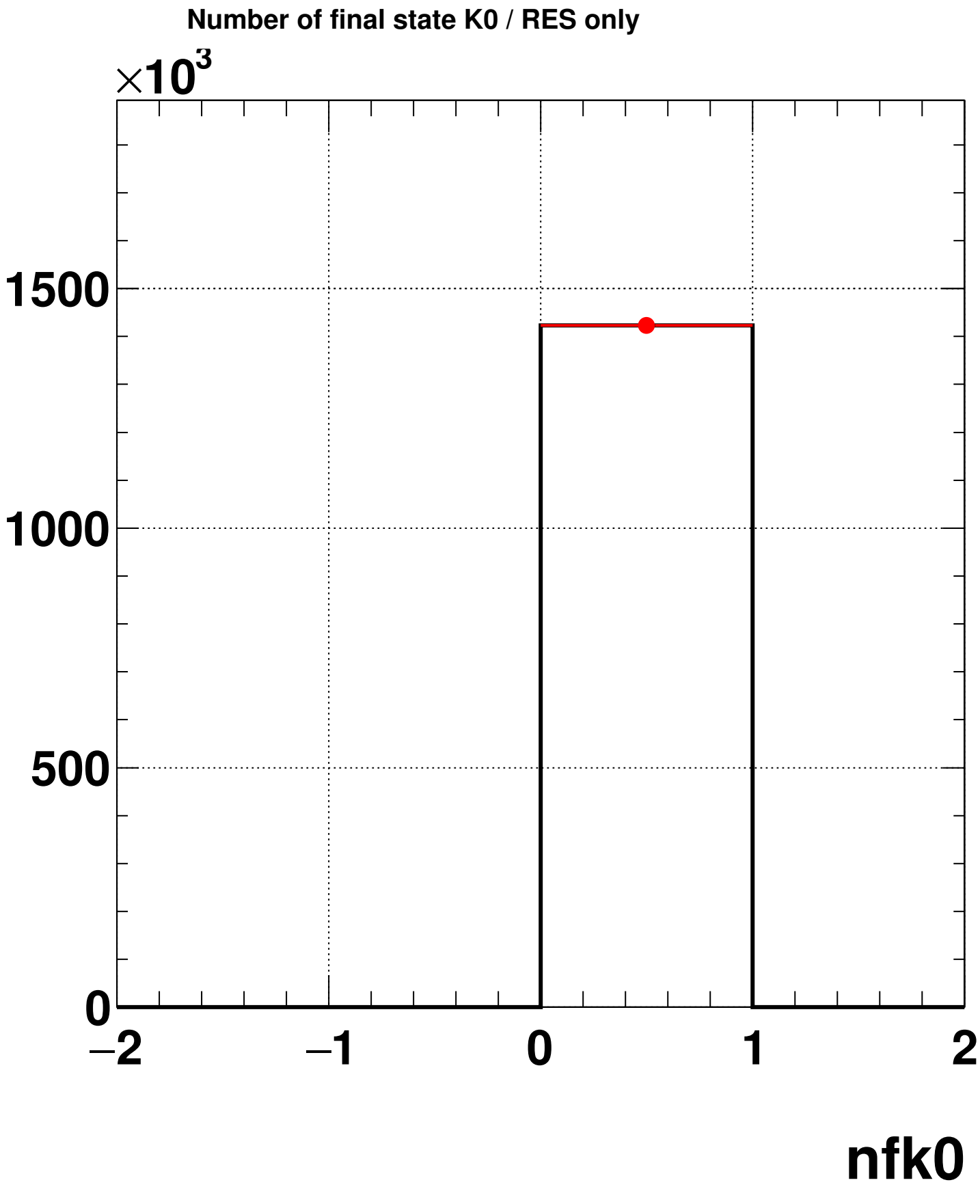

Number of final state pi+ / RES only
×10^3
1500
1000
500
0
0
1
2
3
nfpip


Number of final state pi- / RES only
×10^3
1500
1000
500
0
0
0.5
1
1.5
2
nfpim

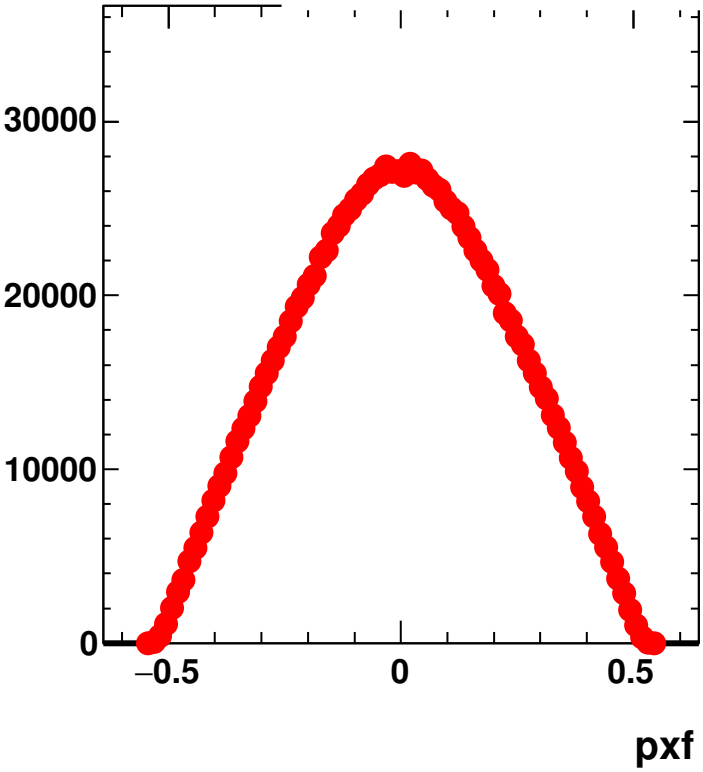

Number of final state pi0 / RES only
×10^3
1500
1000
500
0
0
1
2
3
4
nfpi0

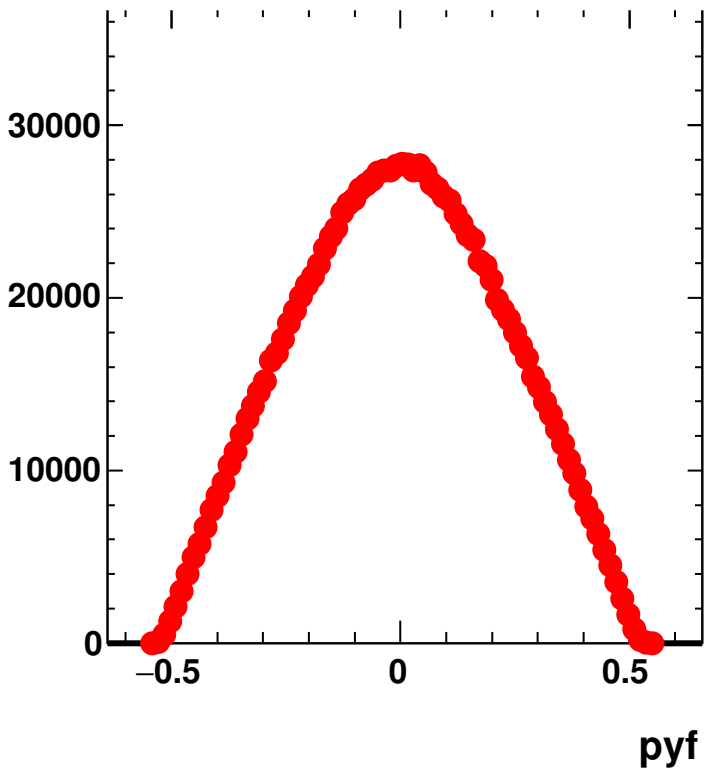

Number of final state K+ / RES only
×10^3
1500
1000
500
0
0
0.5
1
1.5
2
nfkp

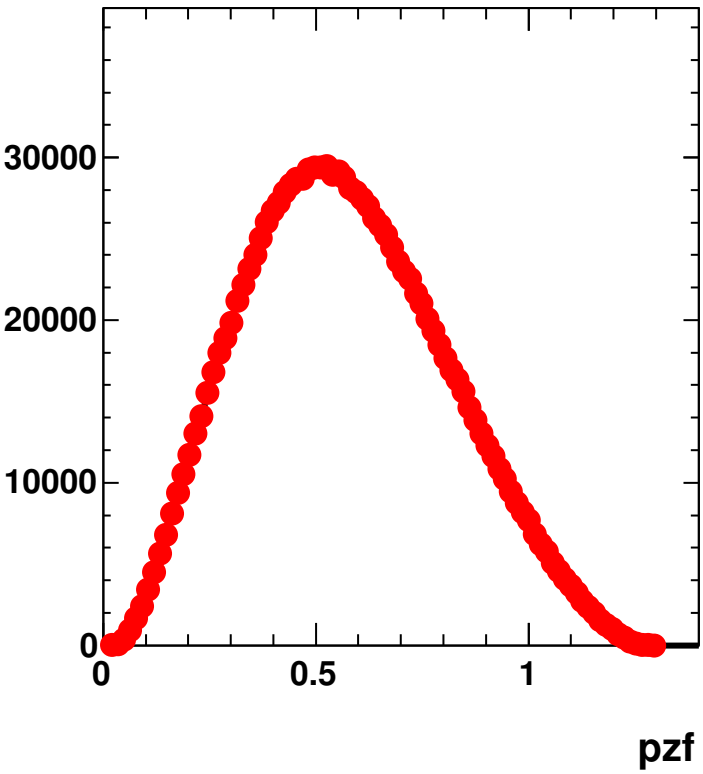

Number of final state K- / RES only
×10^3
1500
1000
500
0
−2
−1
0
1
2
nfkm

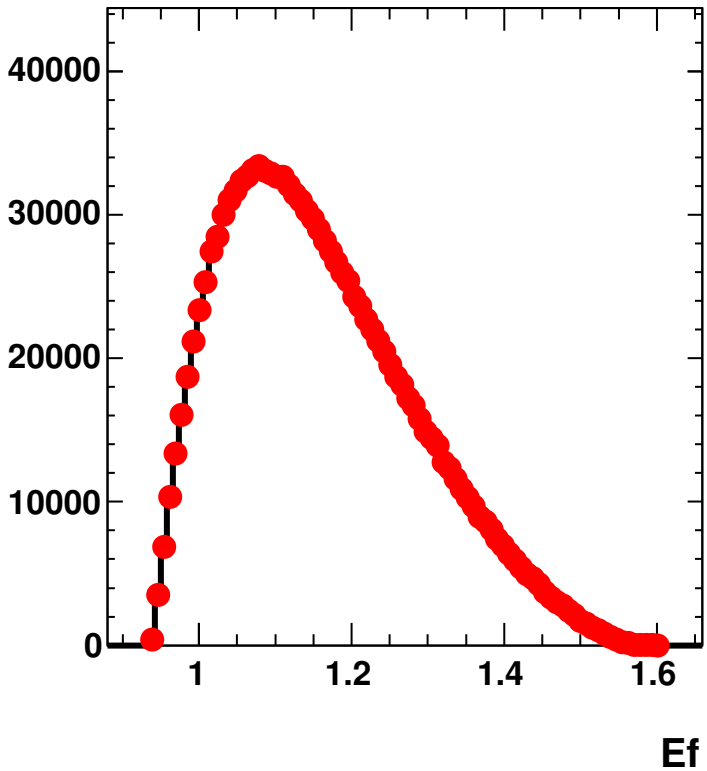

Number of final state K0 / RES only
×10^3
1500
1000
500
0
−2
−1
0
1
2
nfk0

Final state protons 4-momentum / RES only

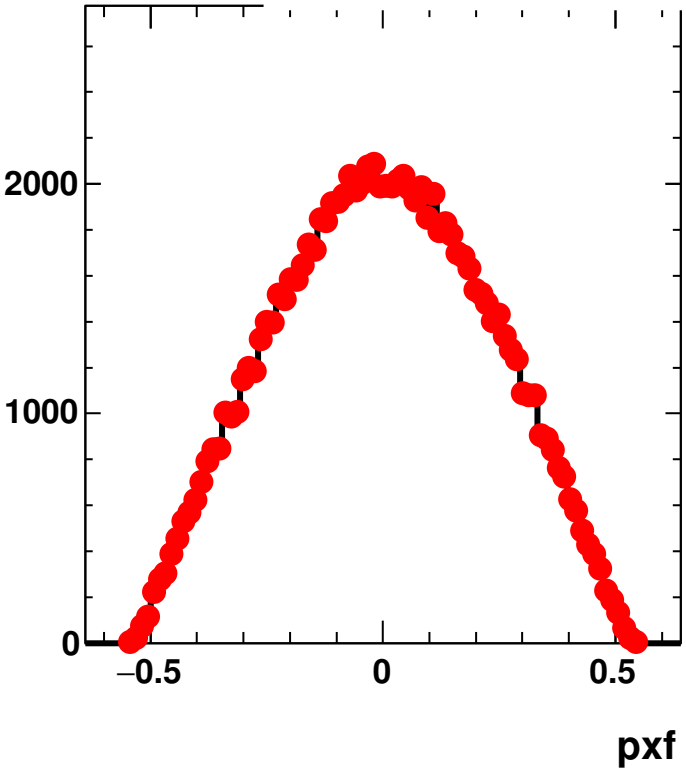


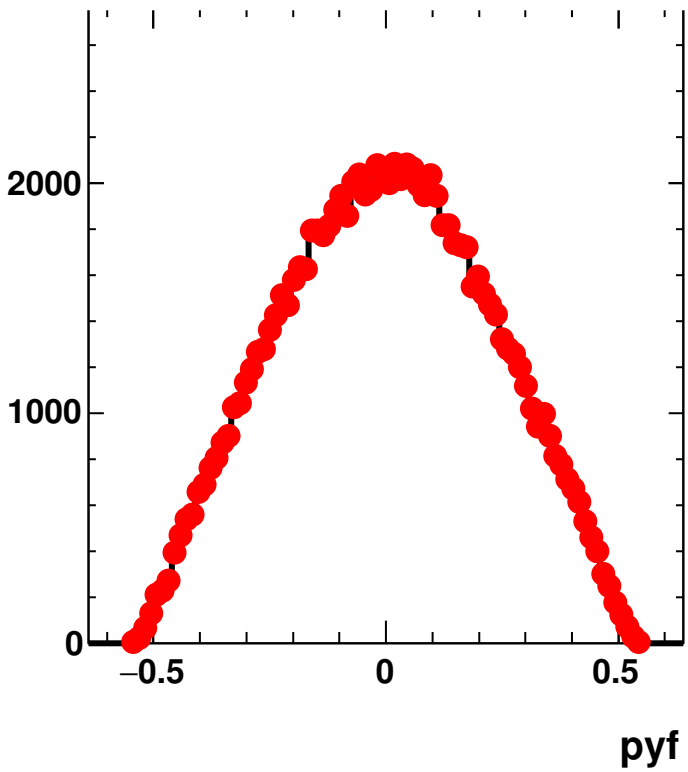


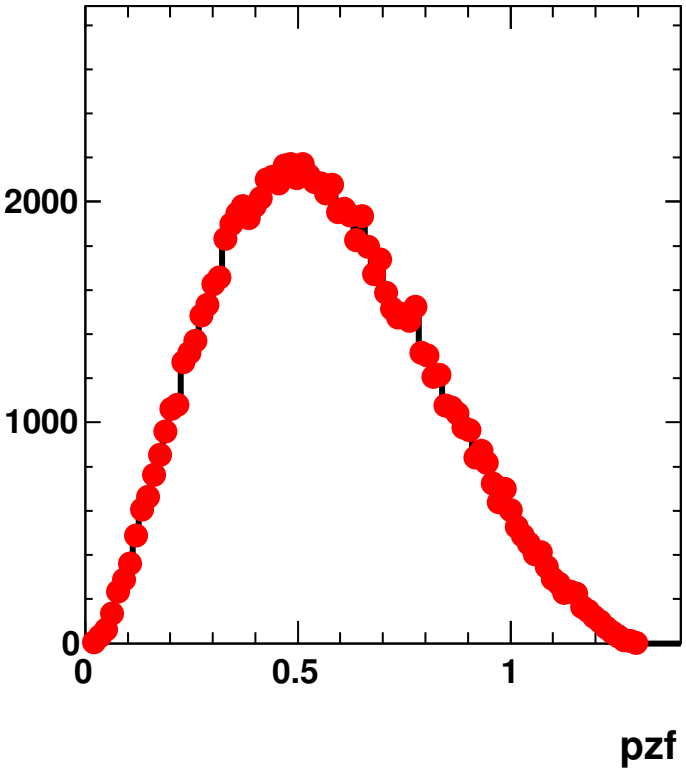


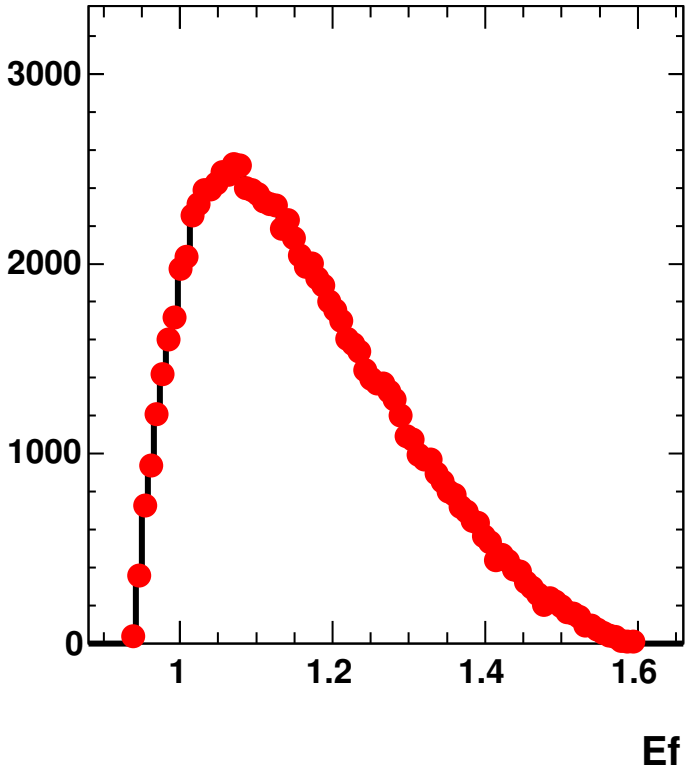


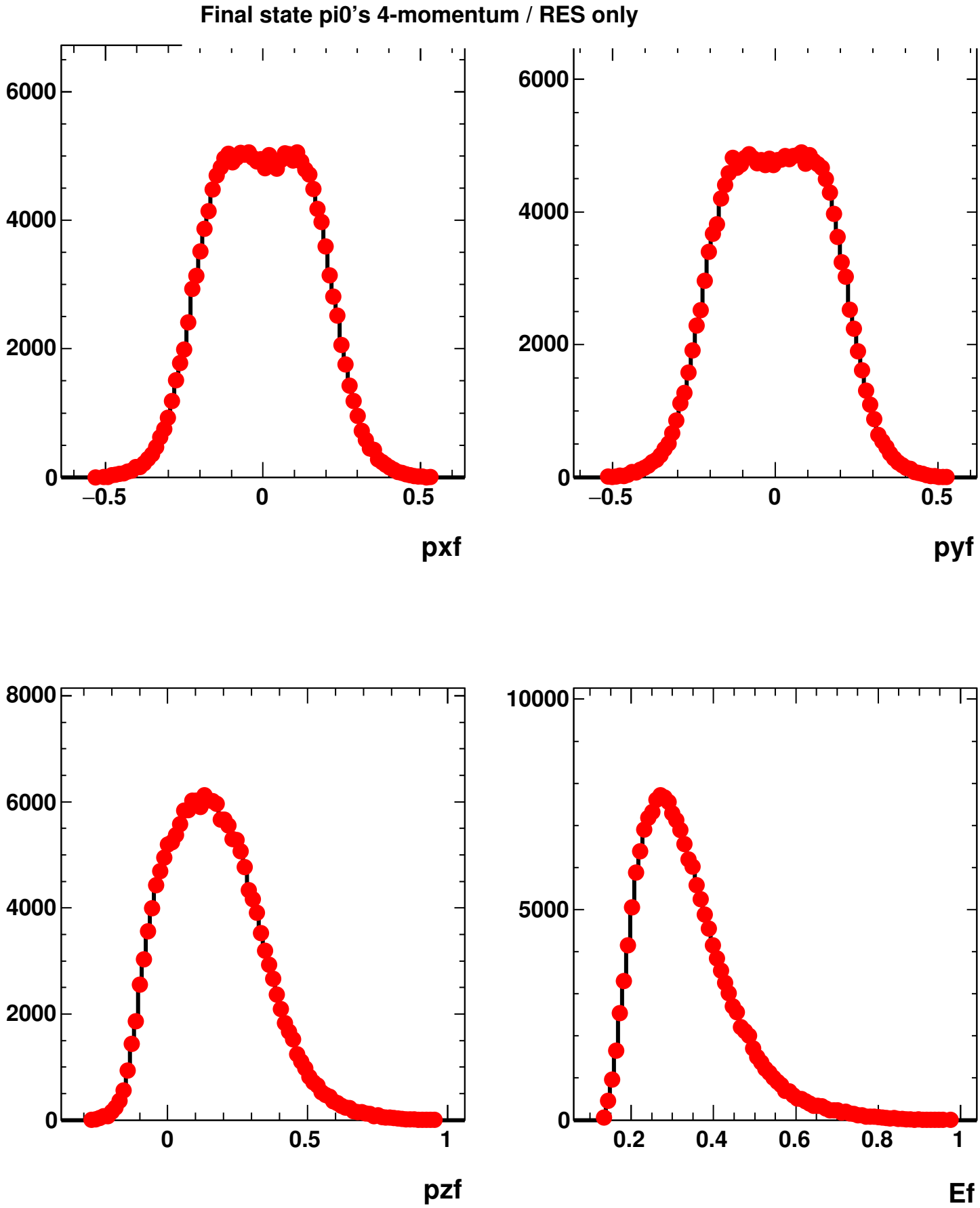
Final state neutrons 4-momentum / RES only



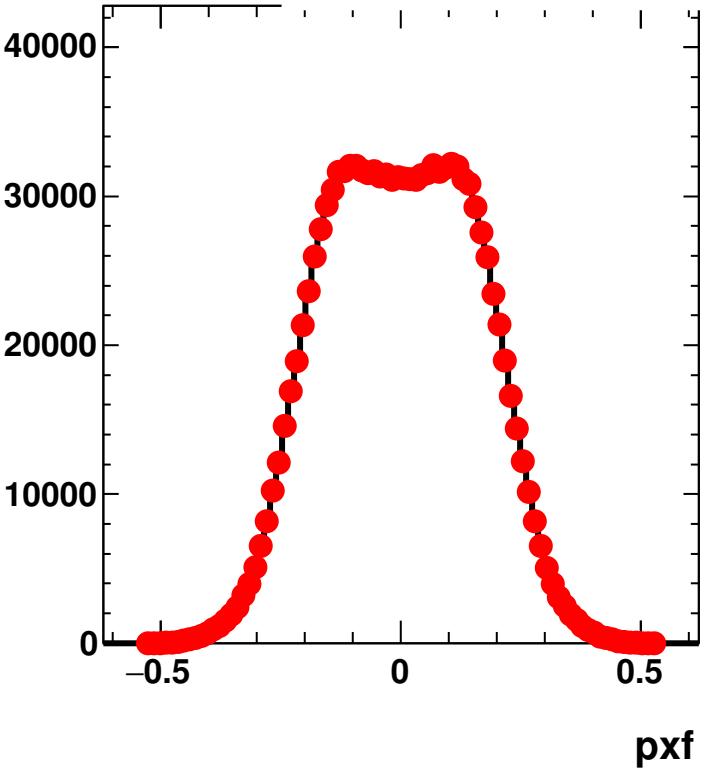


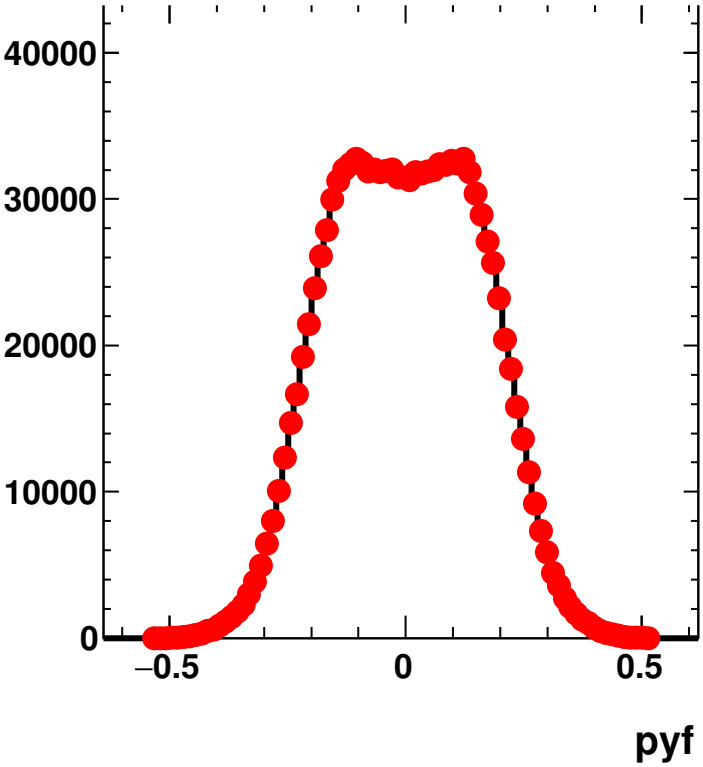


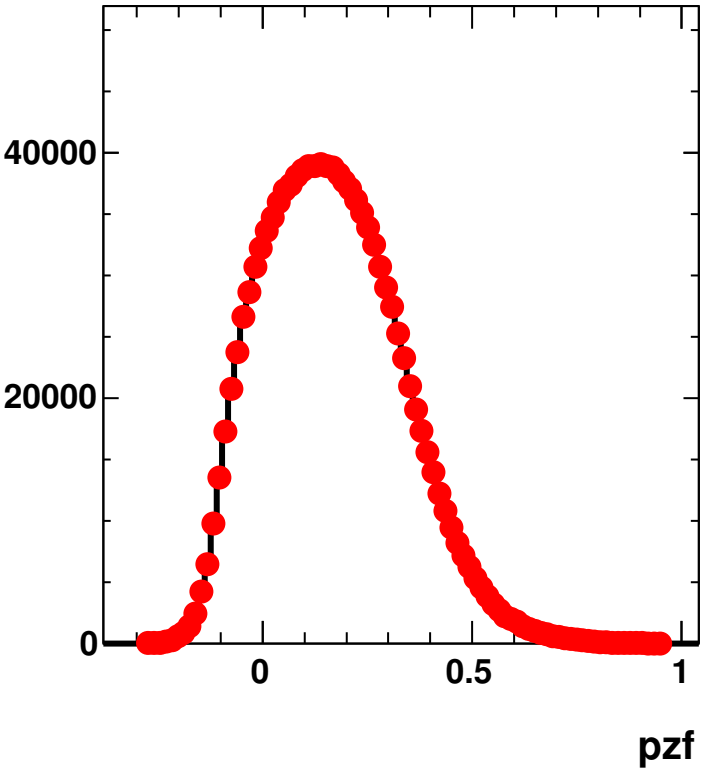


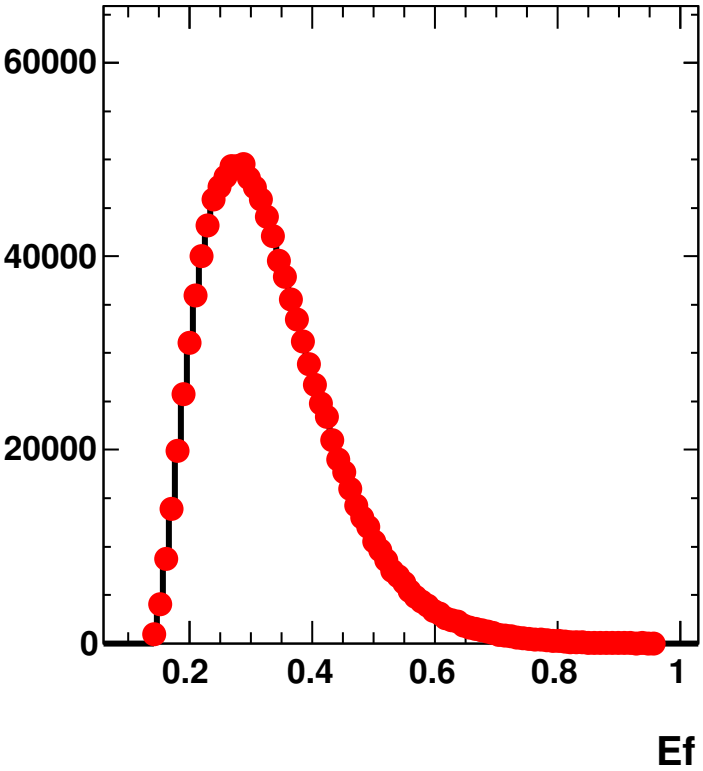

Final state pi0's 4-momentum / RES only
6000
4000
2000
0
−0.5
0
0.5
pxf
6000
4000
2000
0
−0.5
0
0.5
pyf
8000
6000
4000
2000
0
0
0.5
1
pzf
10000
5000
0
0.2
0.4
0.6
0.8
1
Ef

Final state pi+'s 4-momentum / RES only

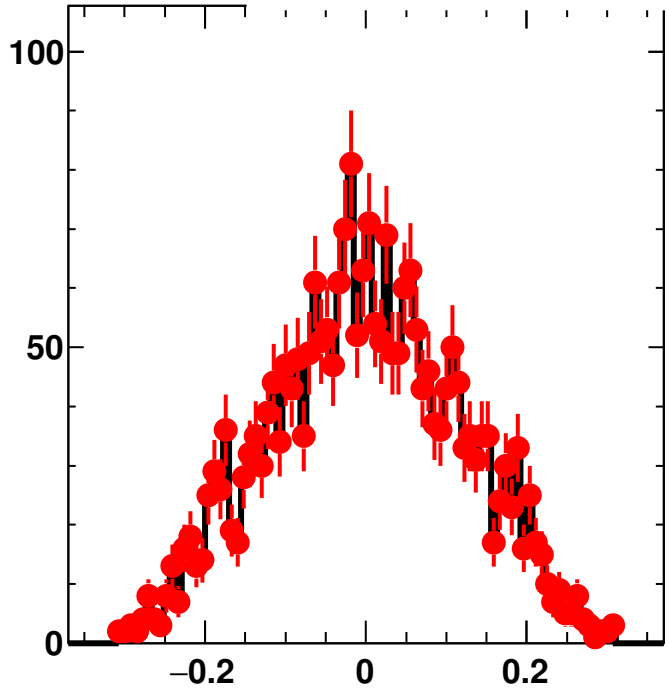




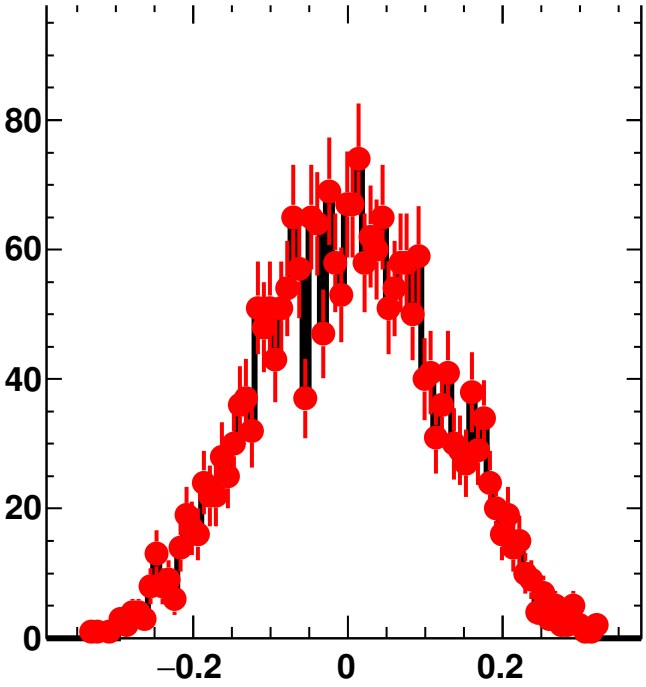




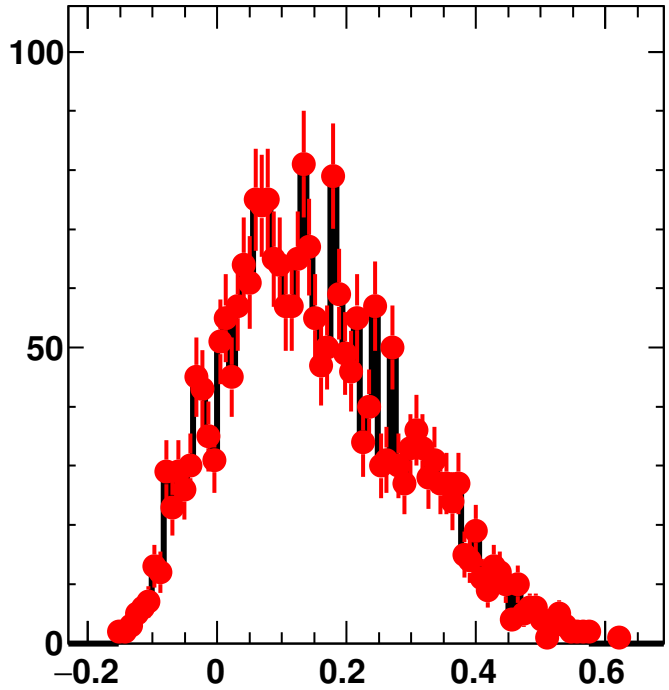
Final state pi-'s 4-momentum/ RES only



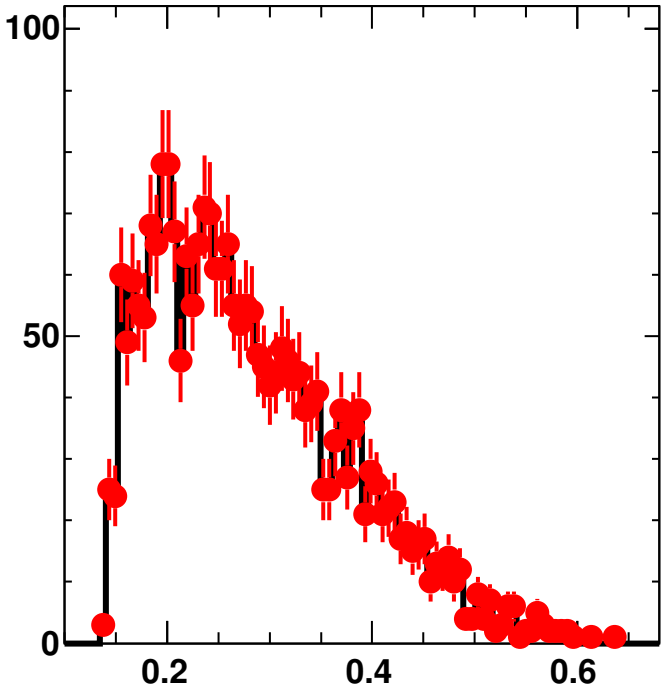
pxf



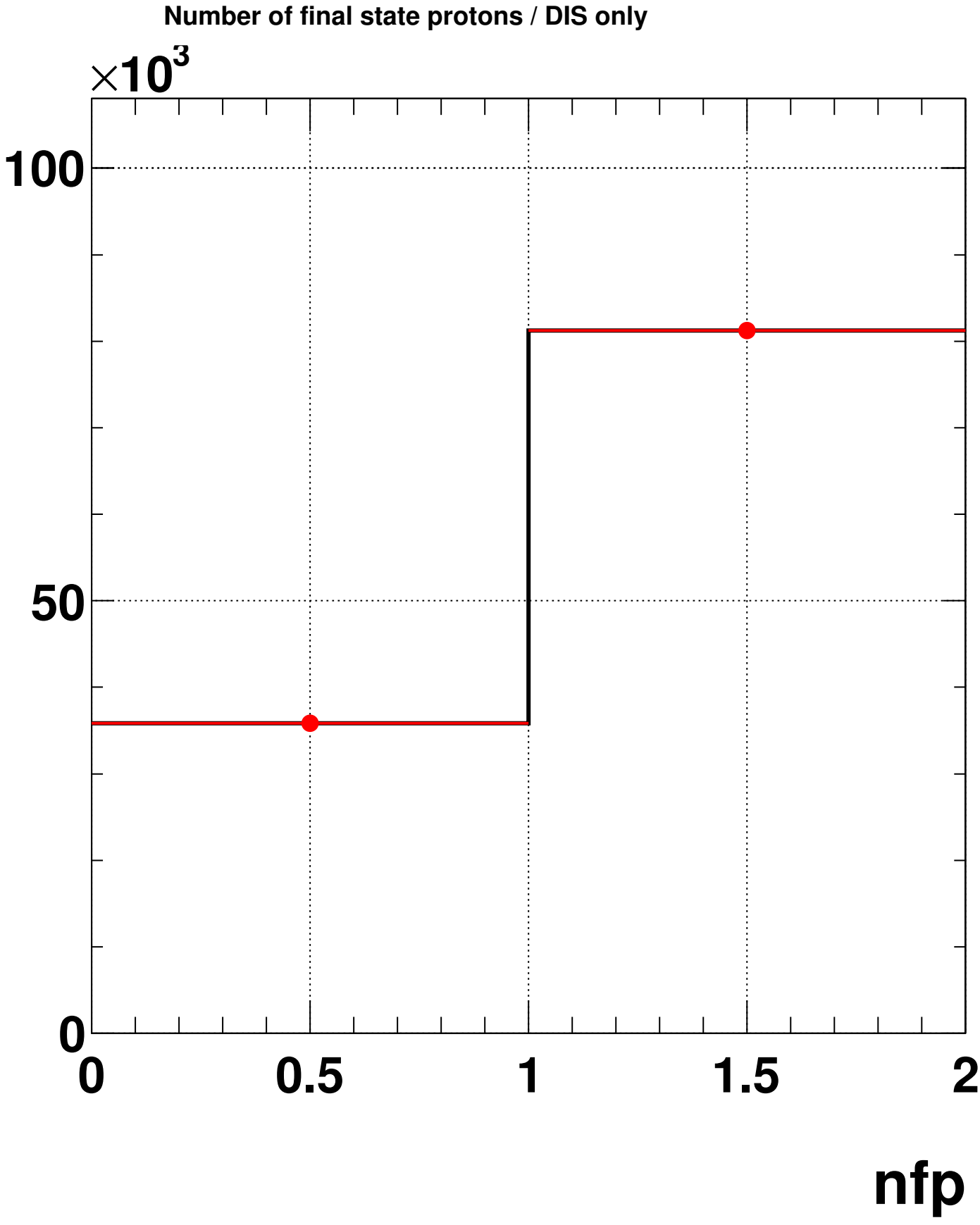
pyf

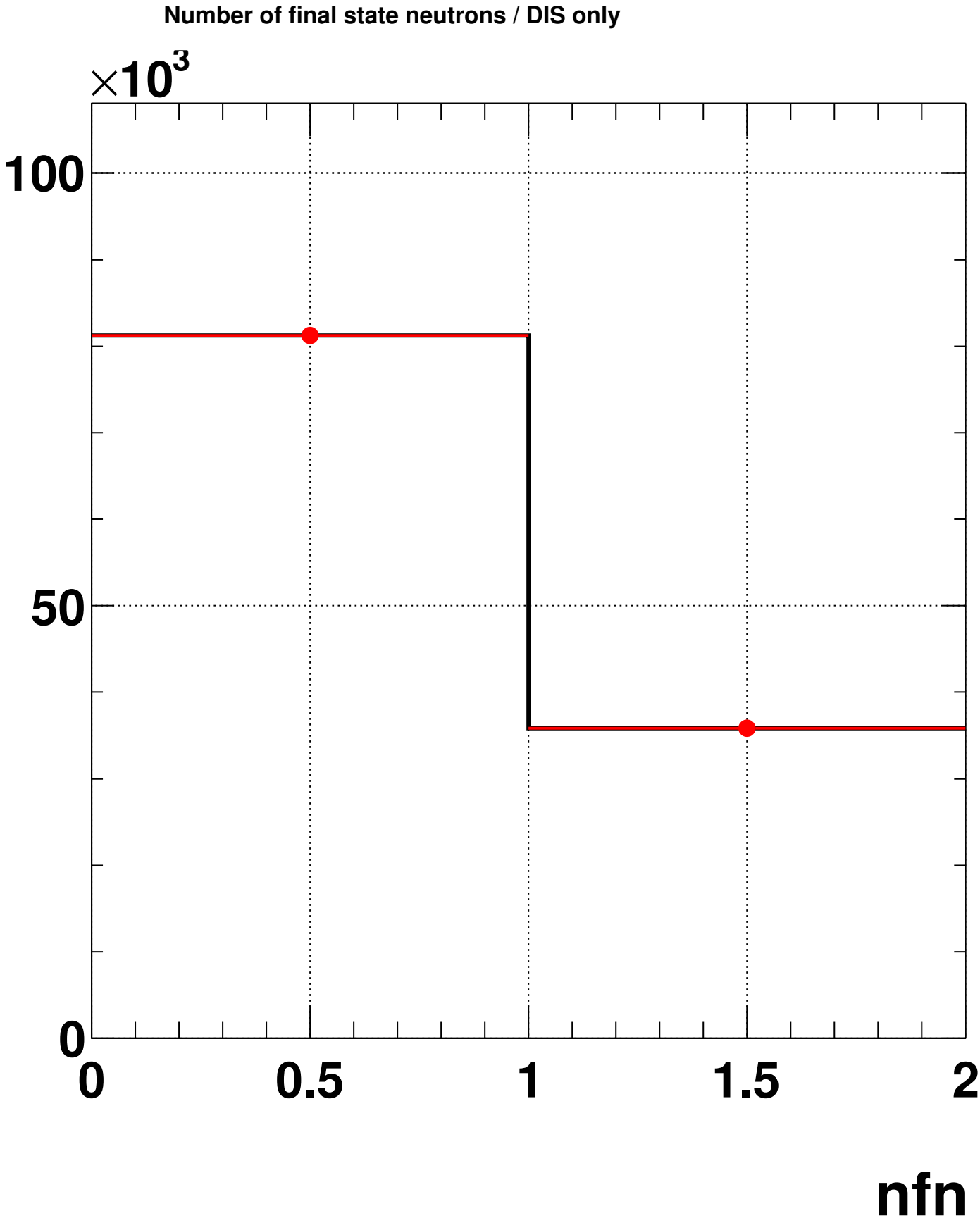


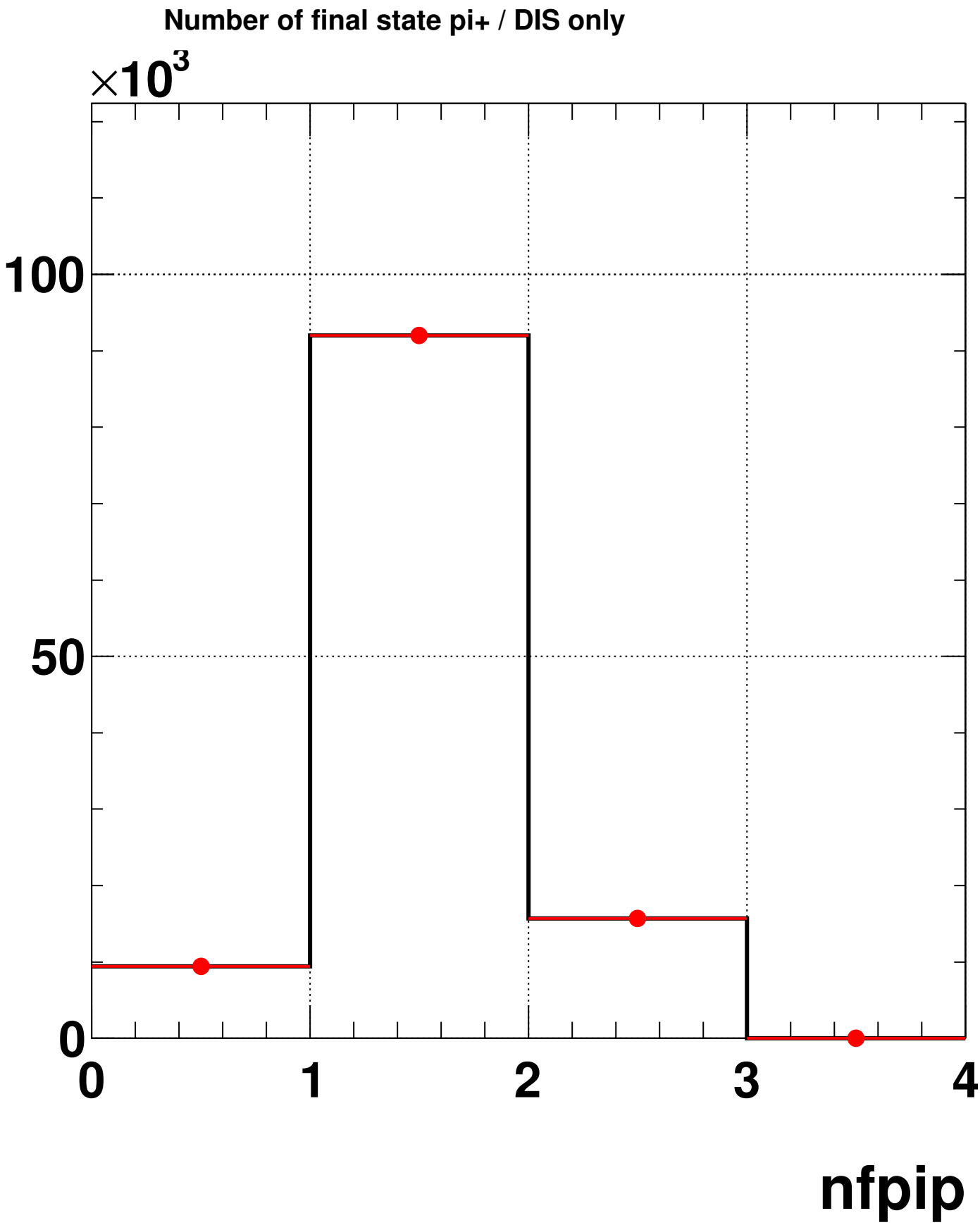
pzf

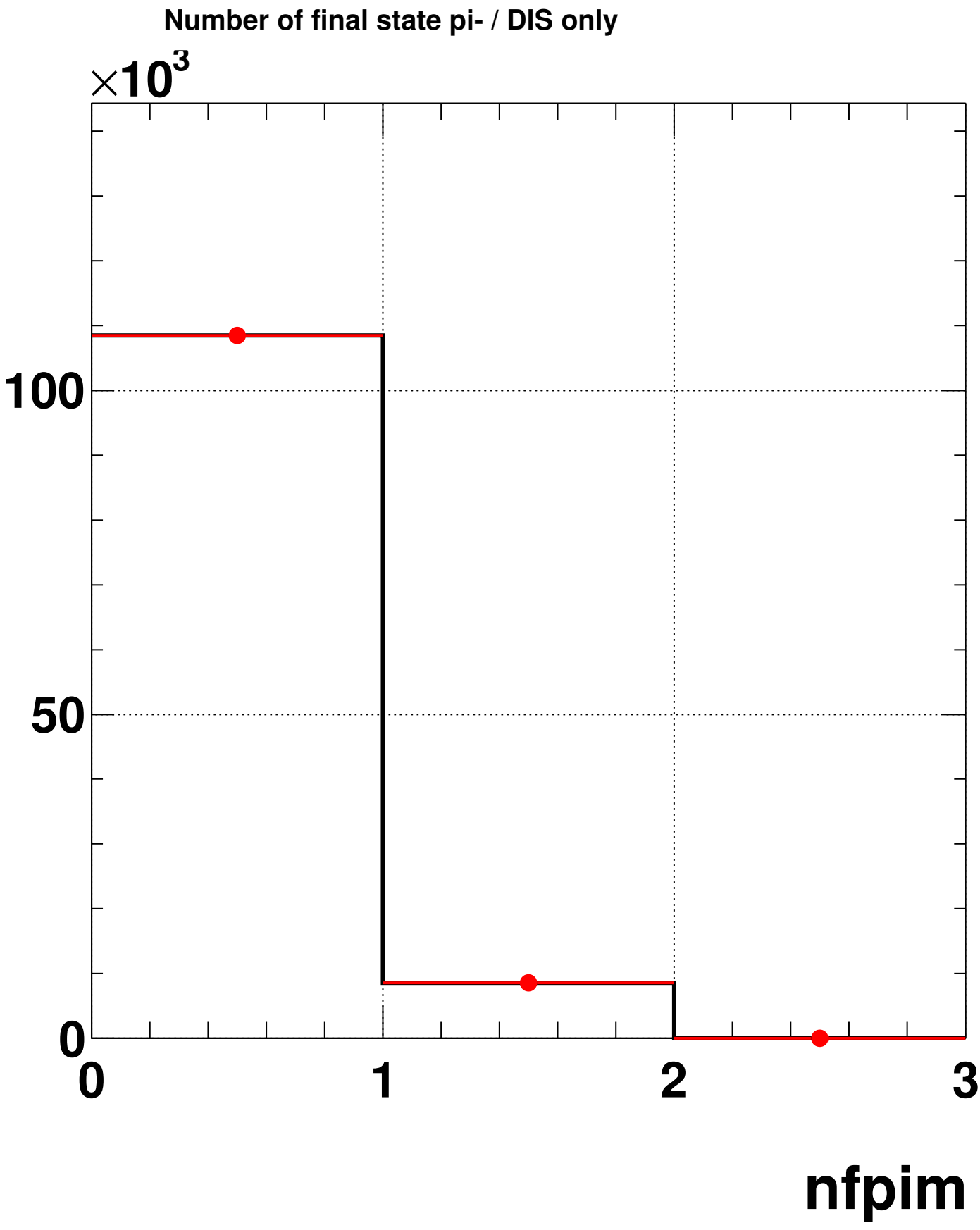


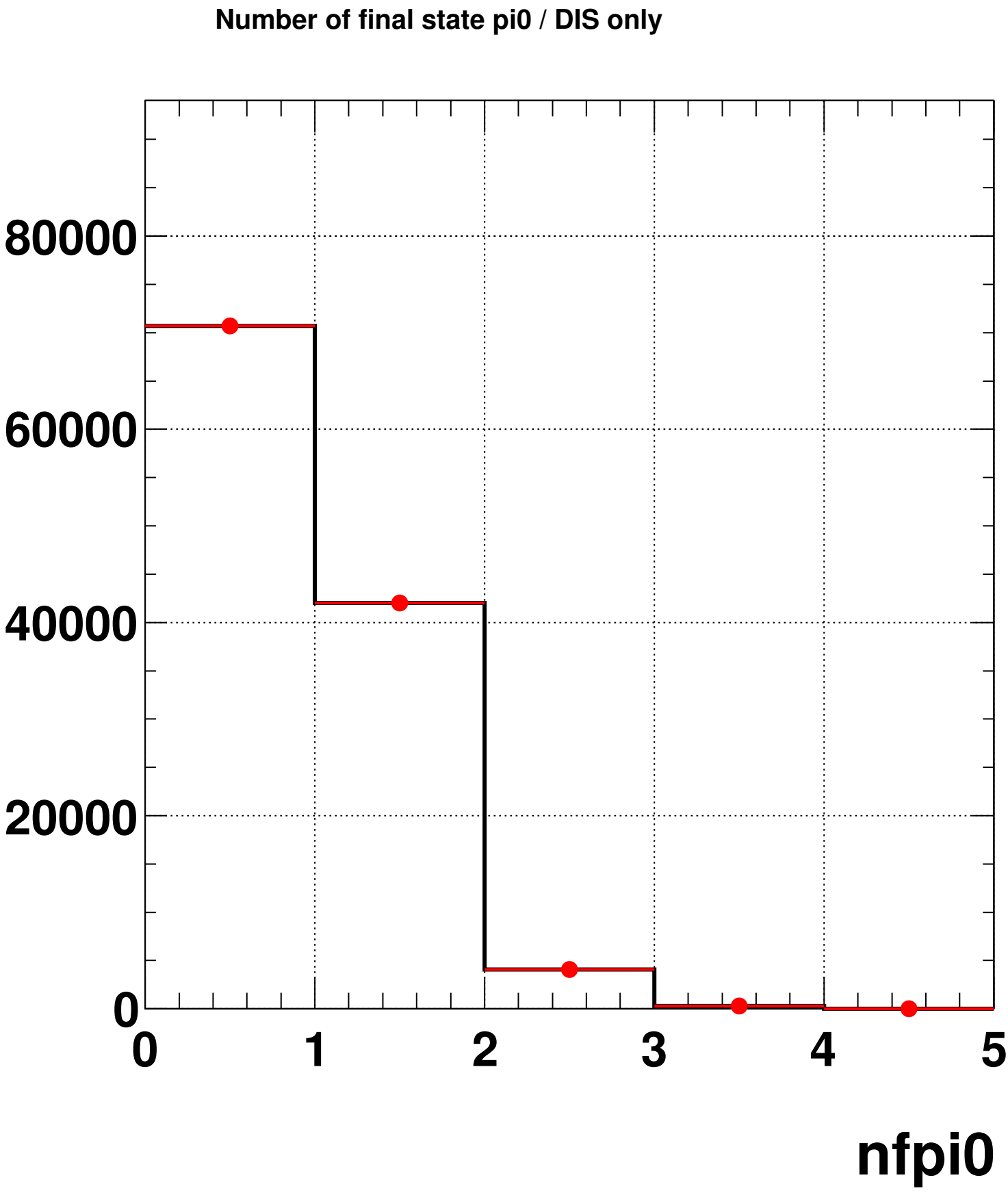
Ef

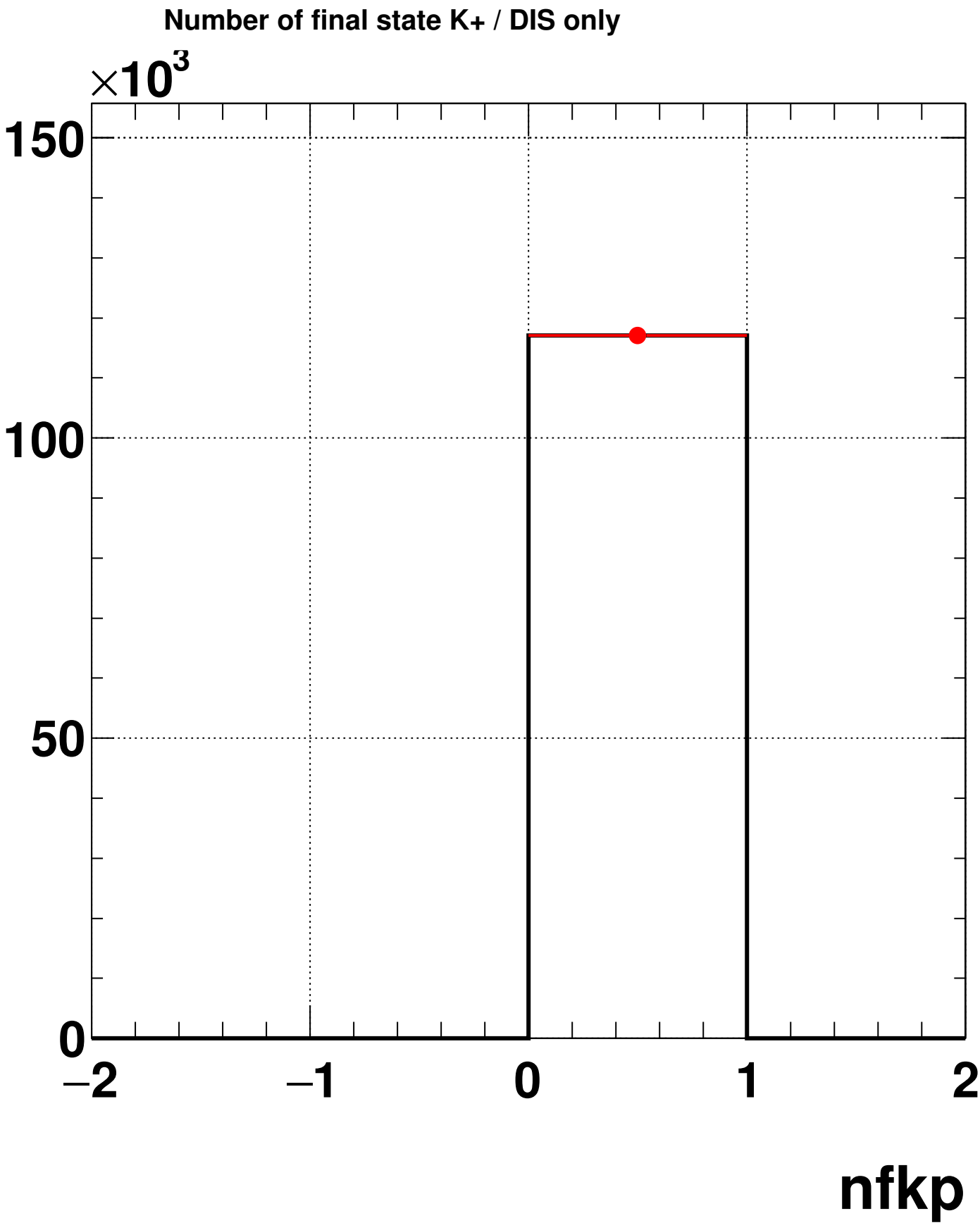

Number of final state protons / DIS only
×10^3
100
50
0
0
0.5
1
1.5
2
nfp

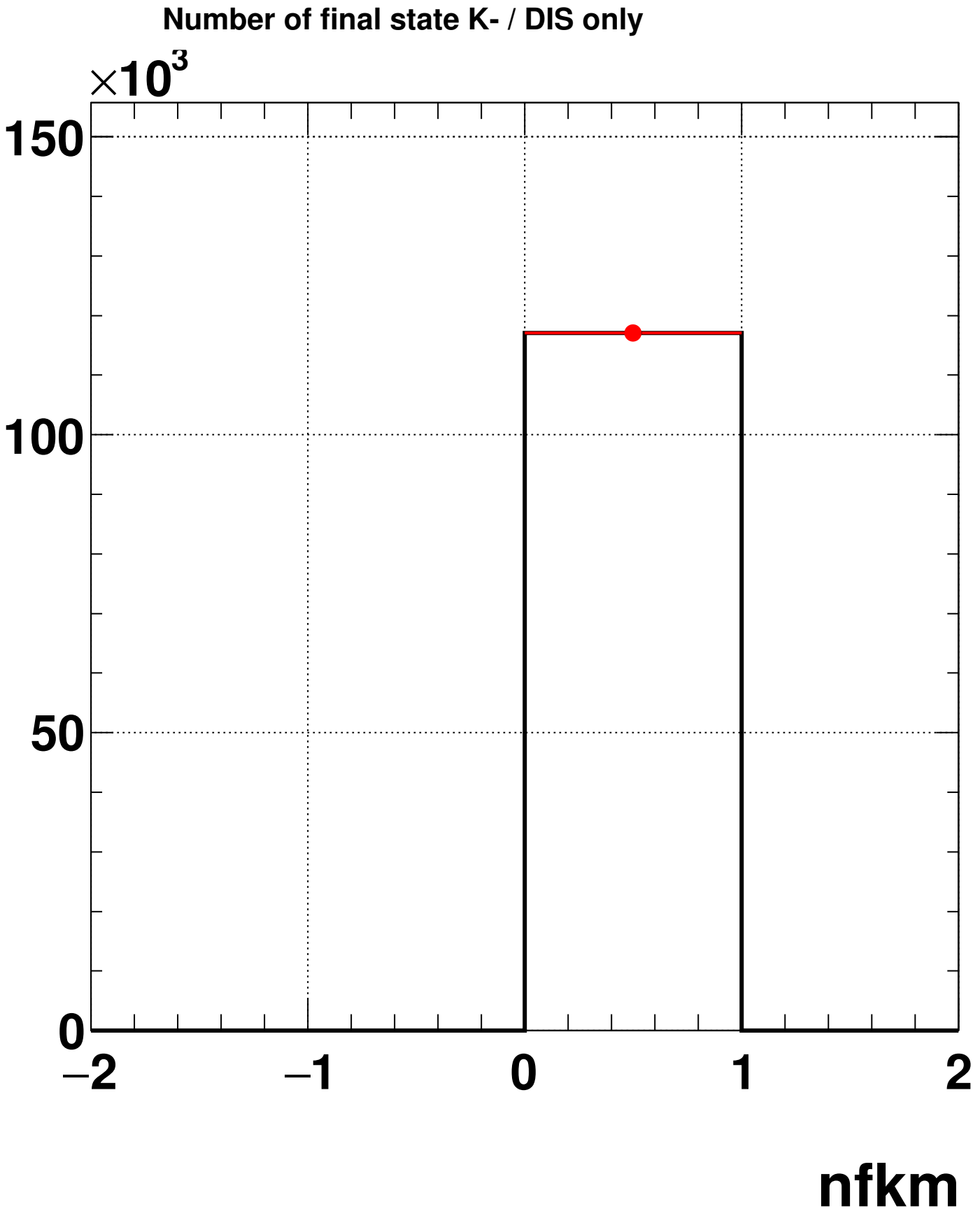

Number of final state neutrons / DIS only
×10^3
100
50
0
0
0.5
1
1.5
2
nfn

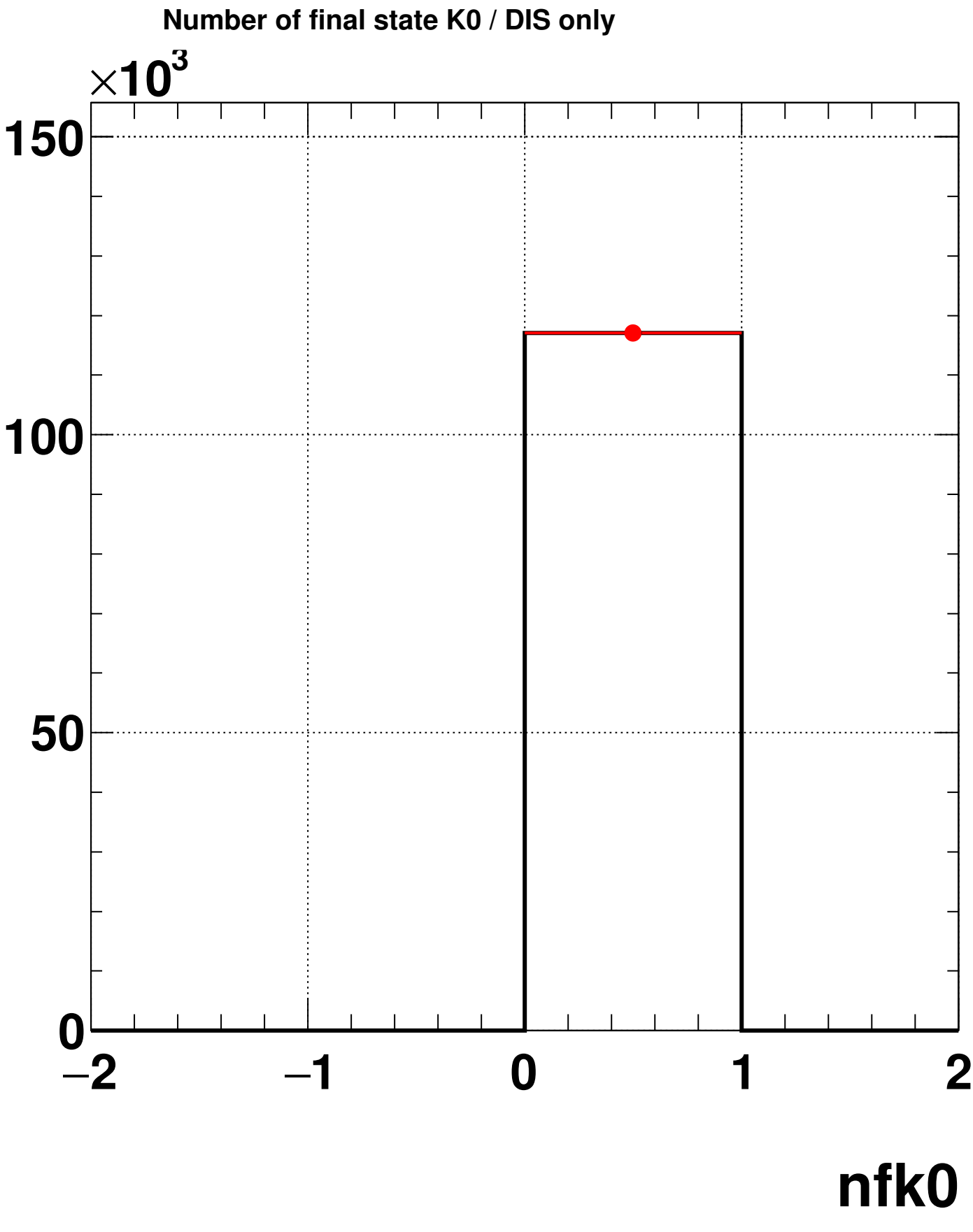

Number of final state pi+ / DIS only
×10^3
100
50
0
0
1
2
3
4
nfpip

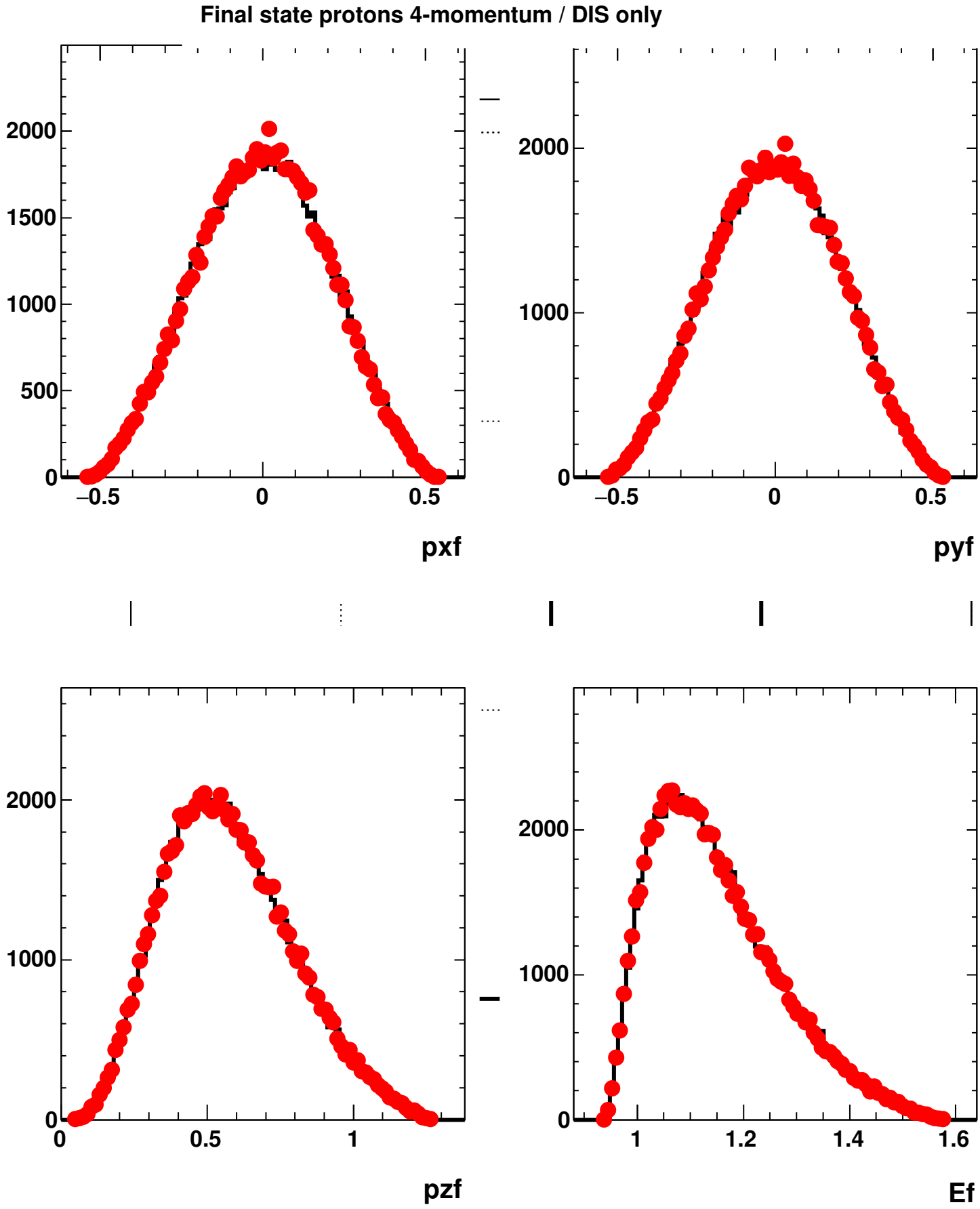

Number of final state pi- / DIS only
×10^3
100
50
0
0
1
2
3
nfpim


Number of final state pi0 / DIS only
80000
60000
40000
20000
0
0
1
2
3
4
5
nfpi0

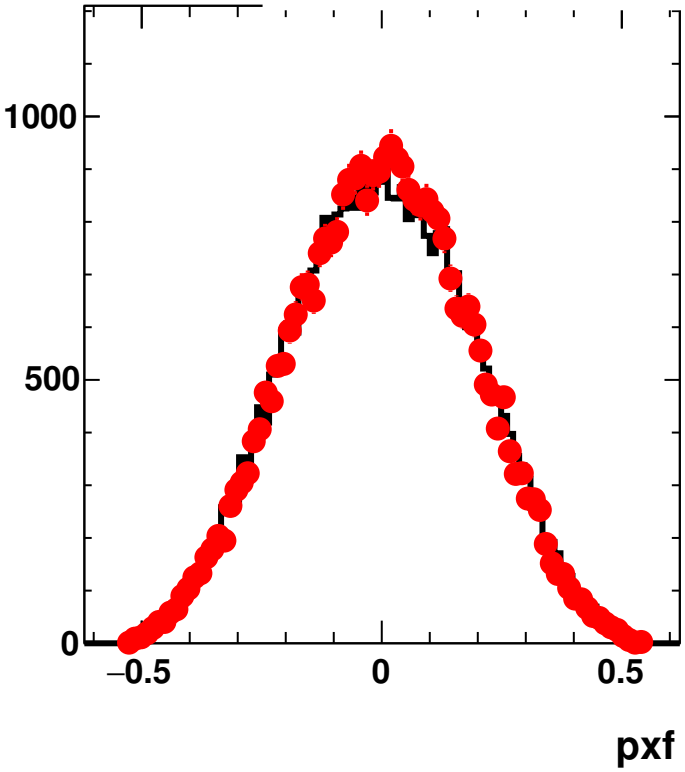

Number of final state K+ / DIS only
×10^3
150
100
50
0
−2
−1
0
1
2
nfkp

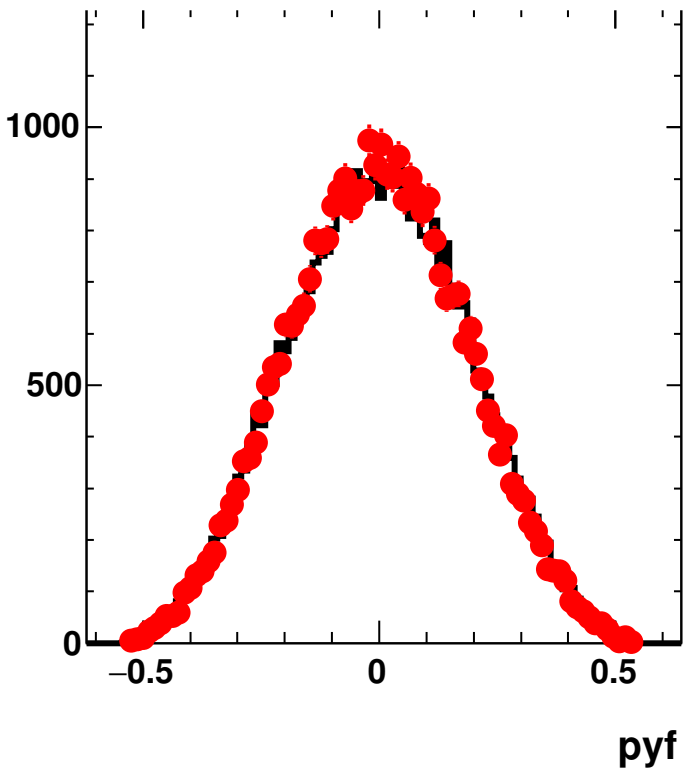

Number of final state K- / DIS only
×10^3
150
100
50
0
−2
−1
0
1
2
nfkm

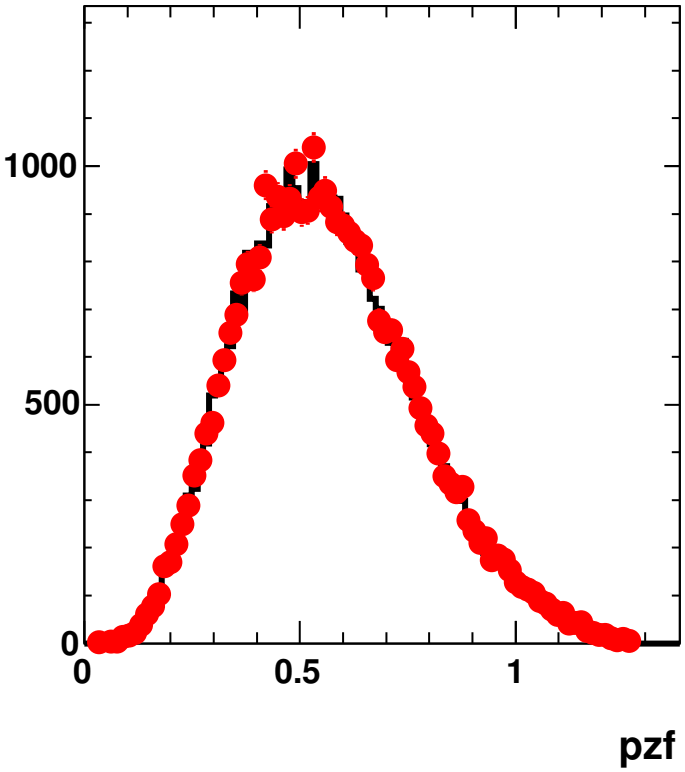

Number of final state K0 / DIS only
×10^3
150
100
50
0
−2
−1
0
1
2
nfk0

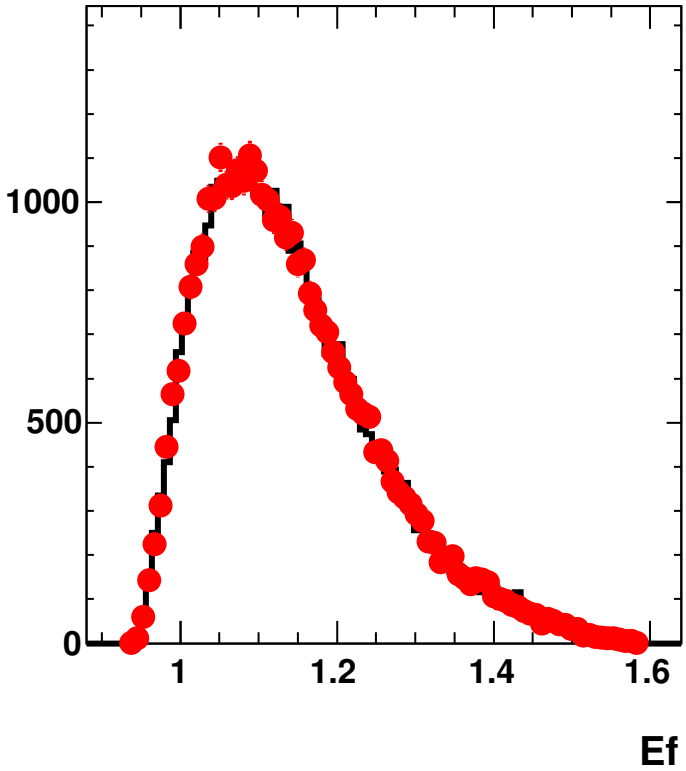

Final state protons 4-momentum / DIS only
2000
1500
1000
500
0
−0.5
0
0.5
pxf
2000
1000
0
−0.5
0
0.5
pyf
2000
1000
0
0
0.5
1
pzf
2000
1000
0
1
1.2
1.4
1.6
Ef

Final state neutrons 4-momentum / DIS only

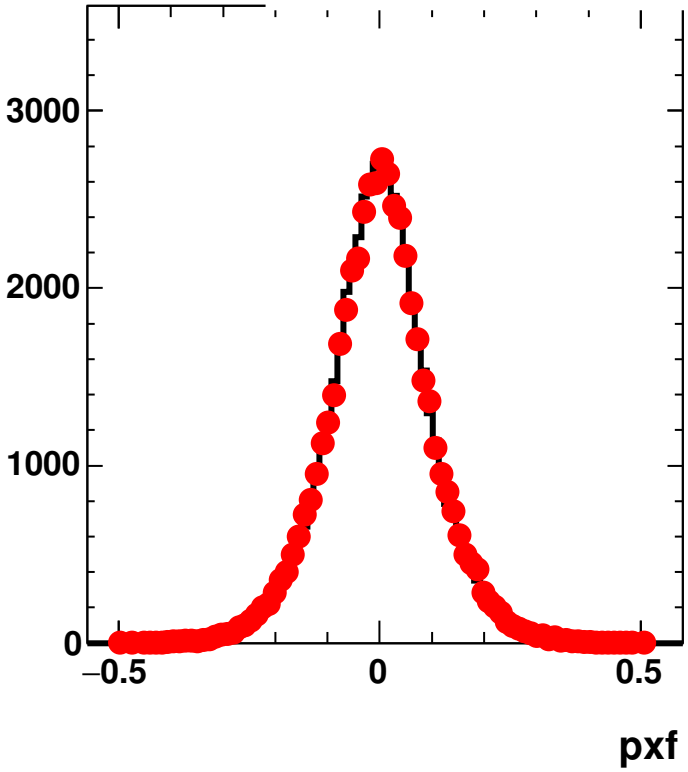


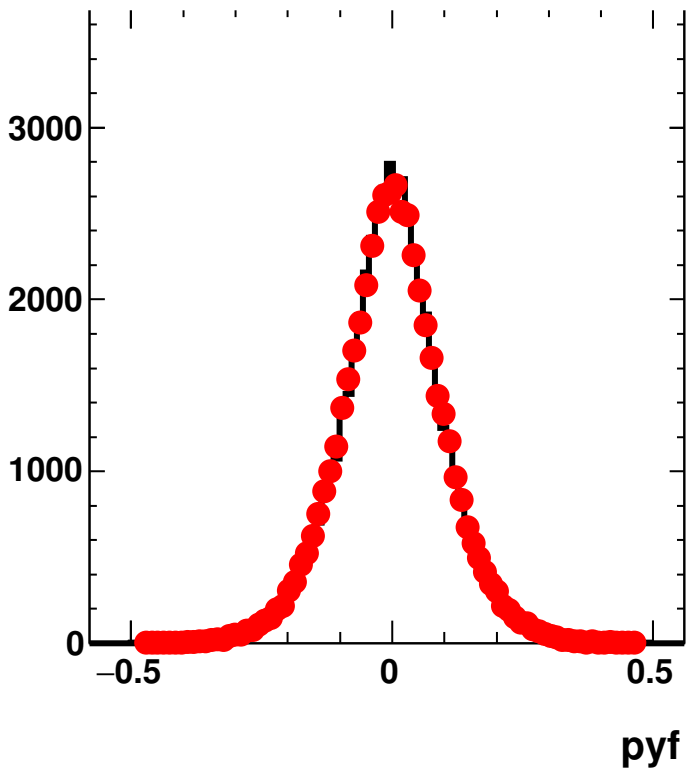


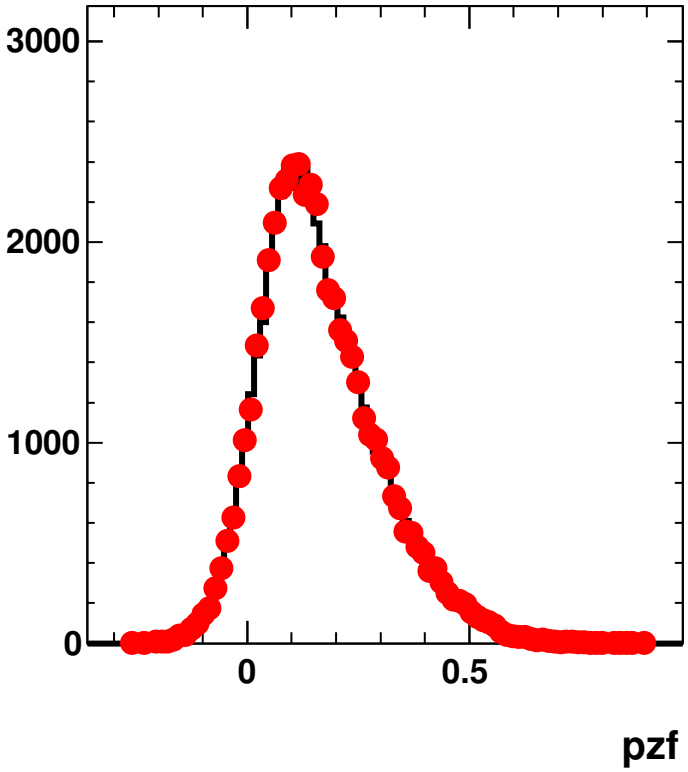


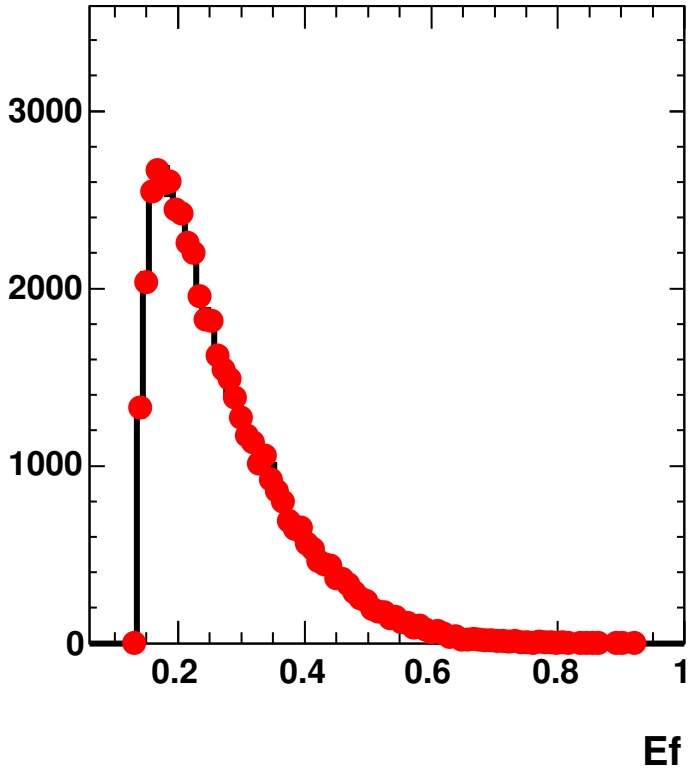


Final state pi0's 4-momentum / DIS only

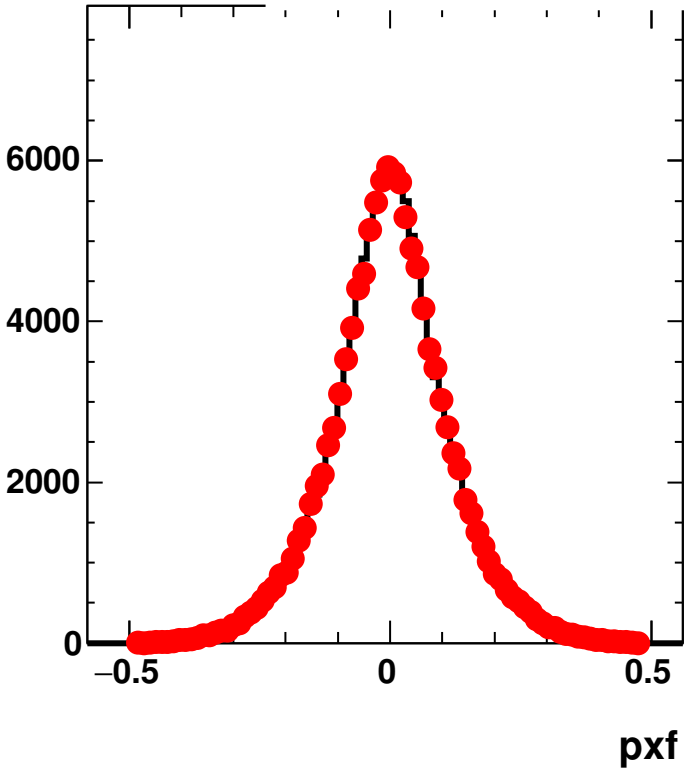


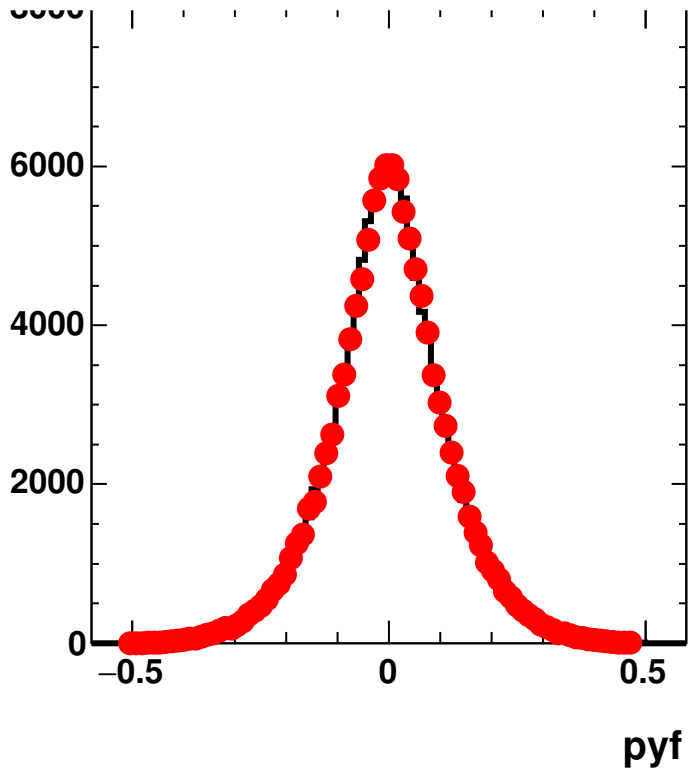


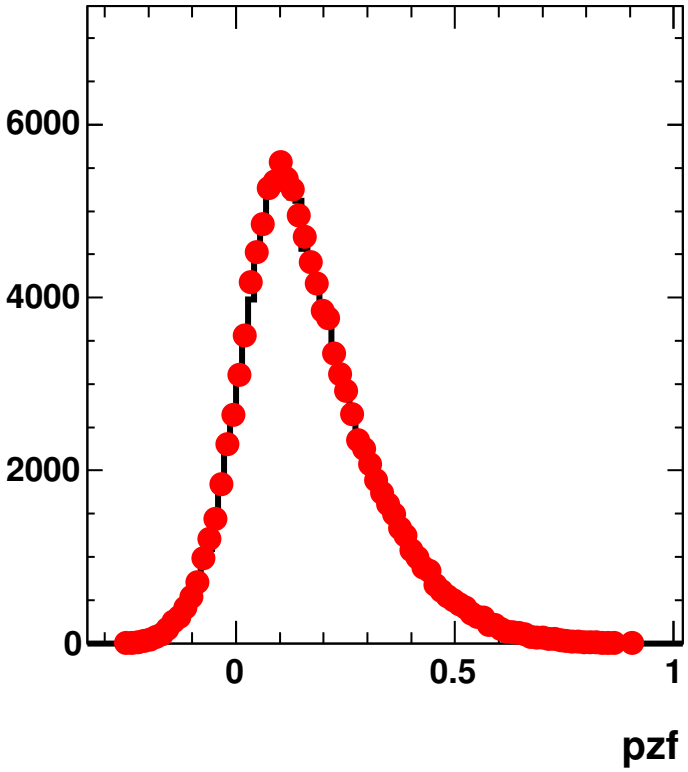


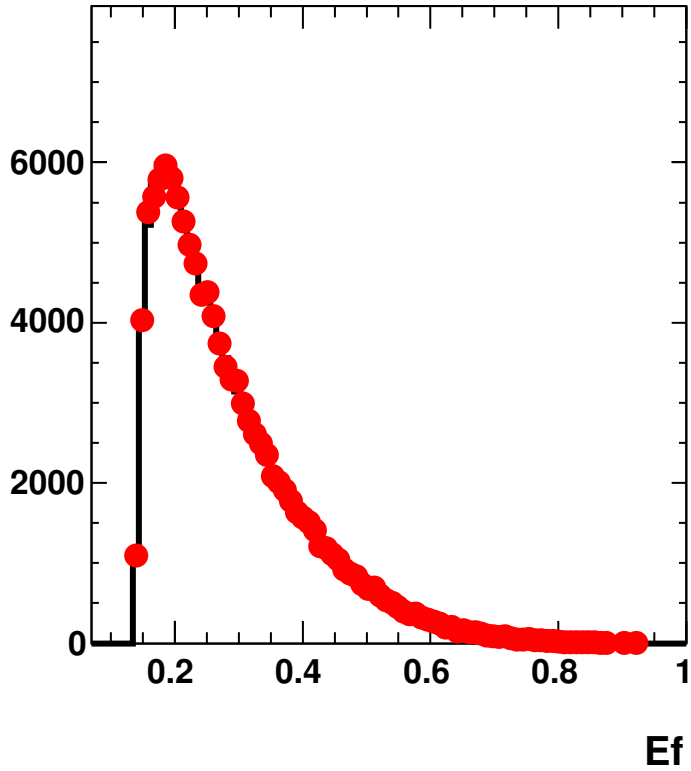


Final state pi+'s 4-momentum / DIS only

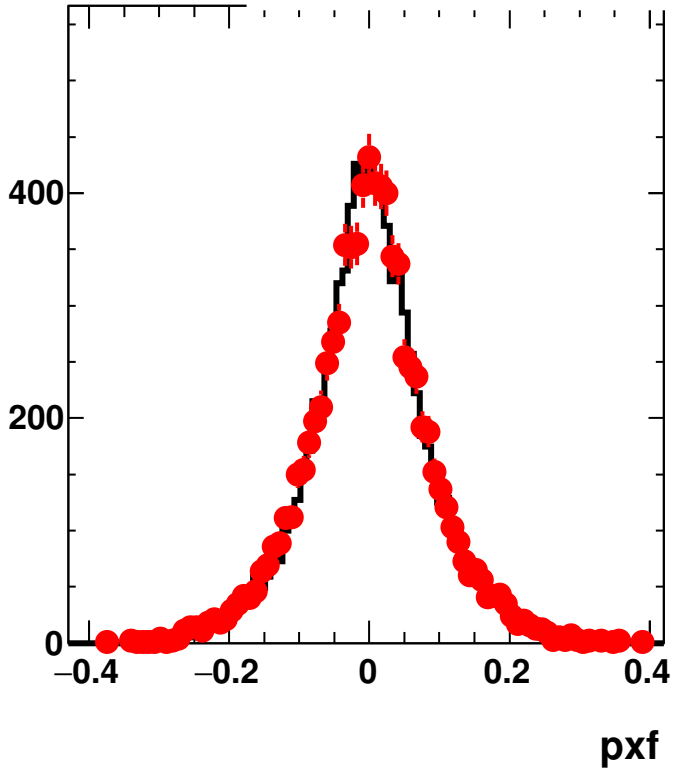


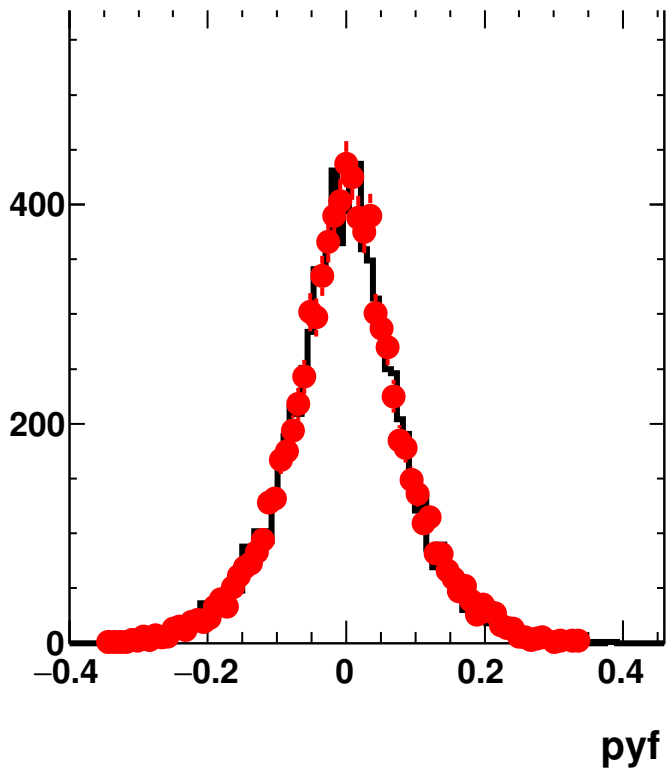


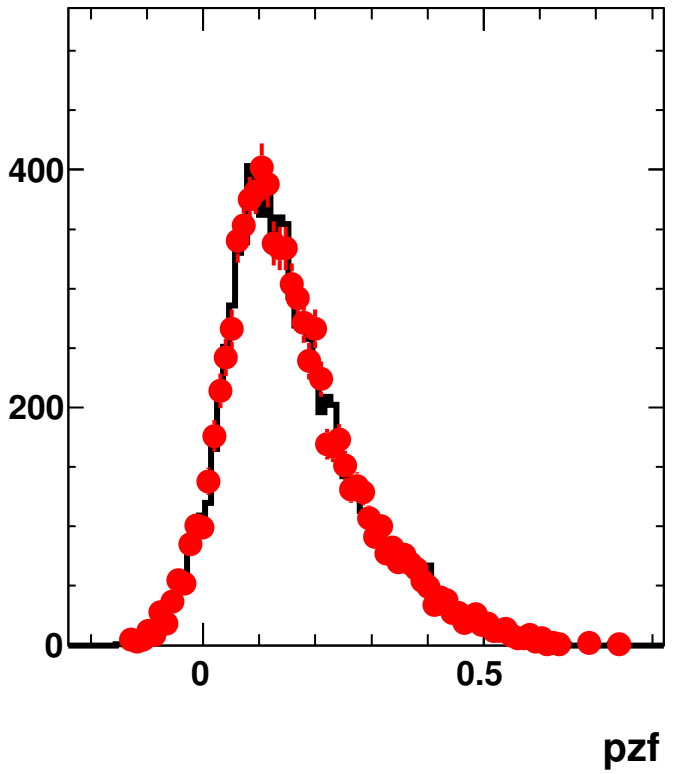


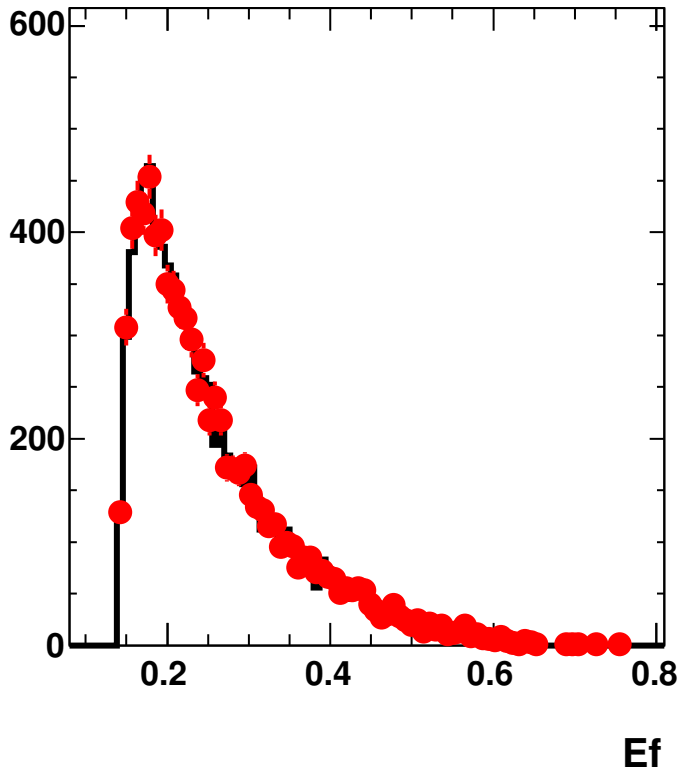


Final state pi-'s 4-momentum/ DIS only







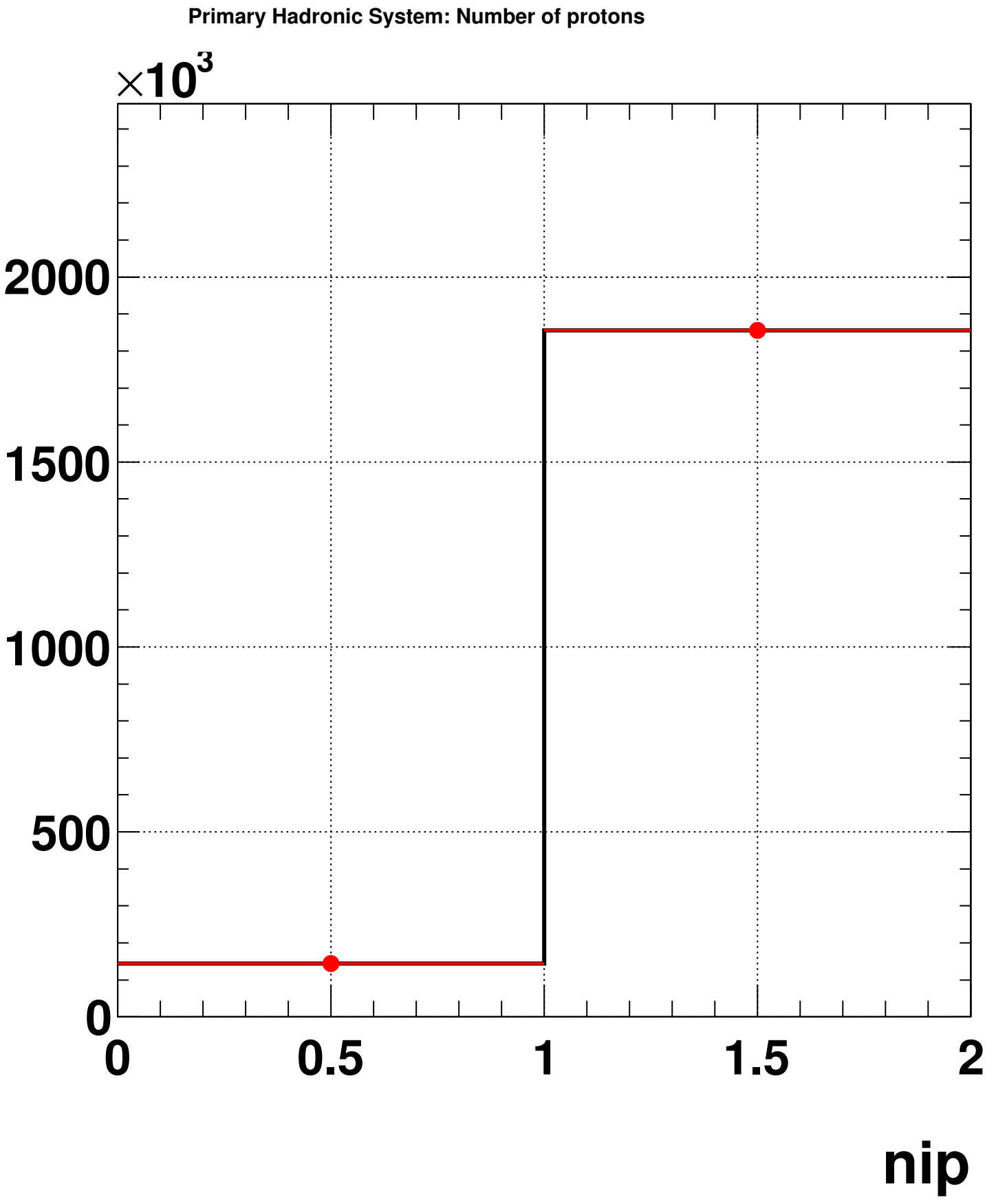


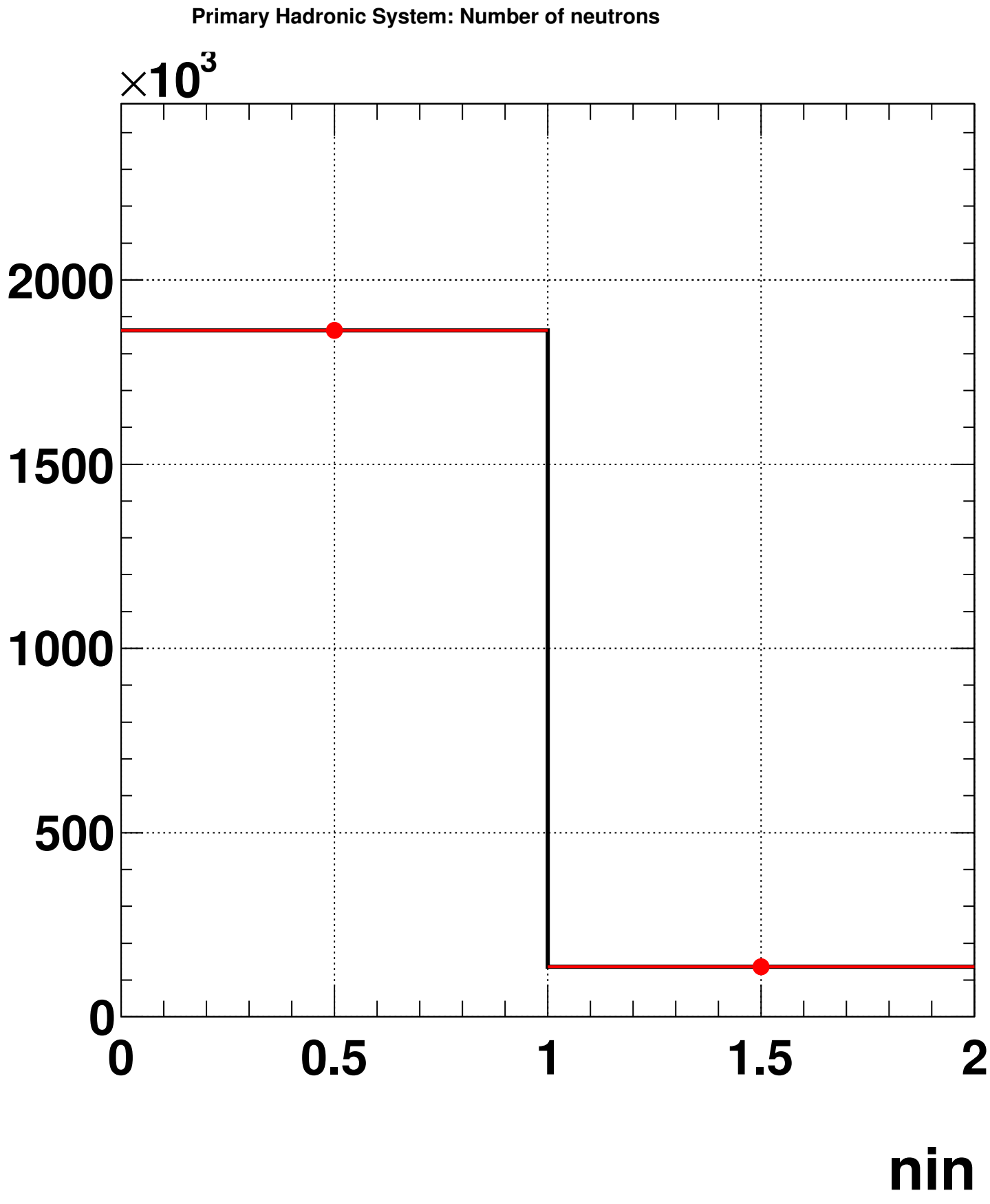
Parimary Hadronic System

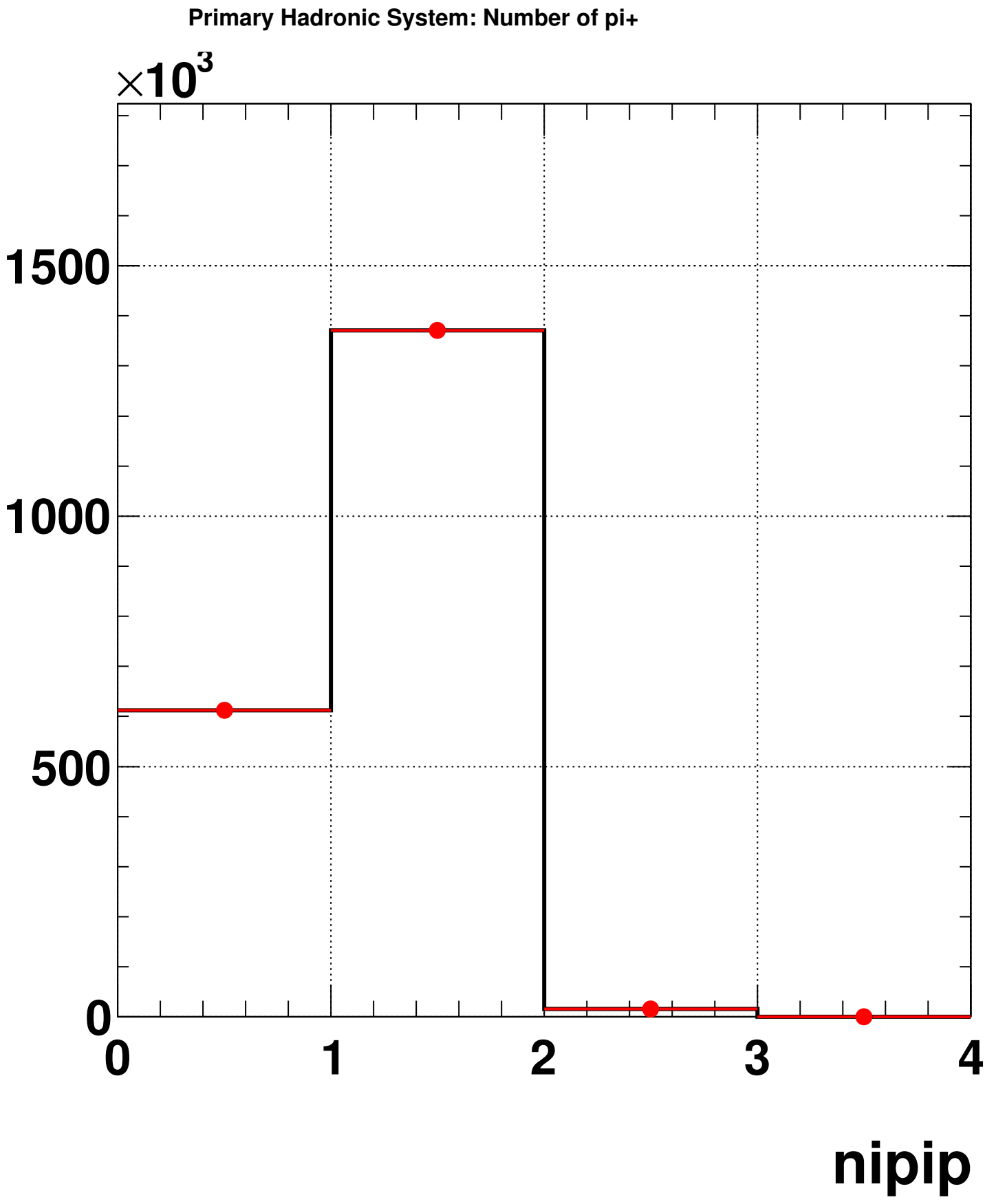
Multiplicities and 4-Momenta

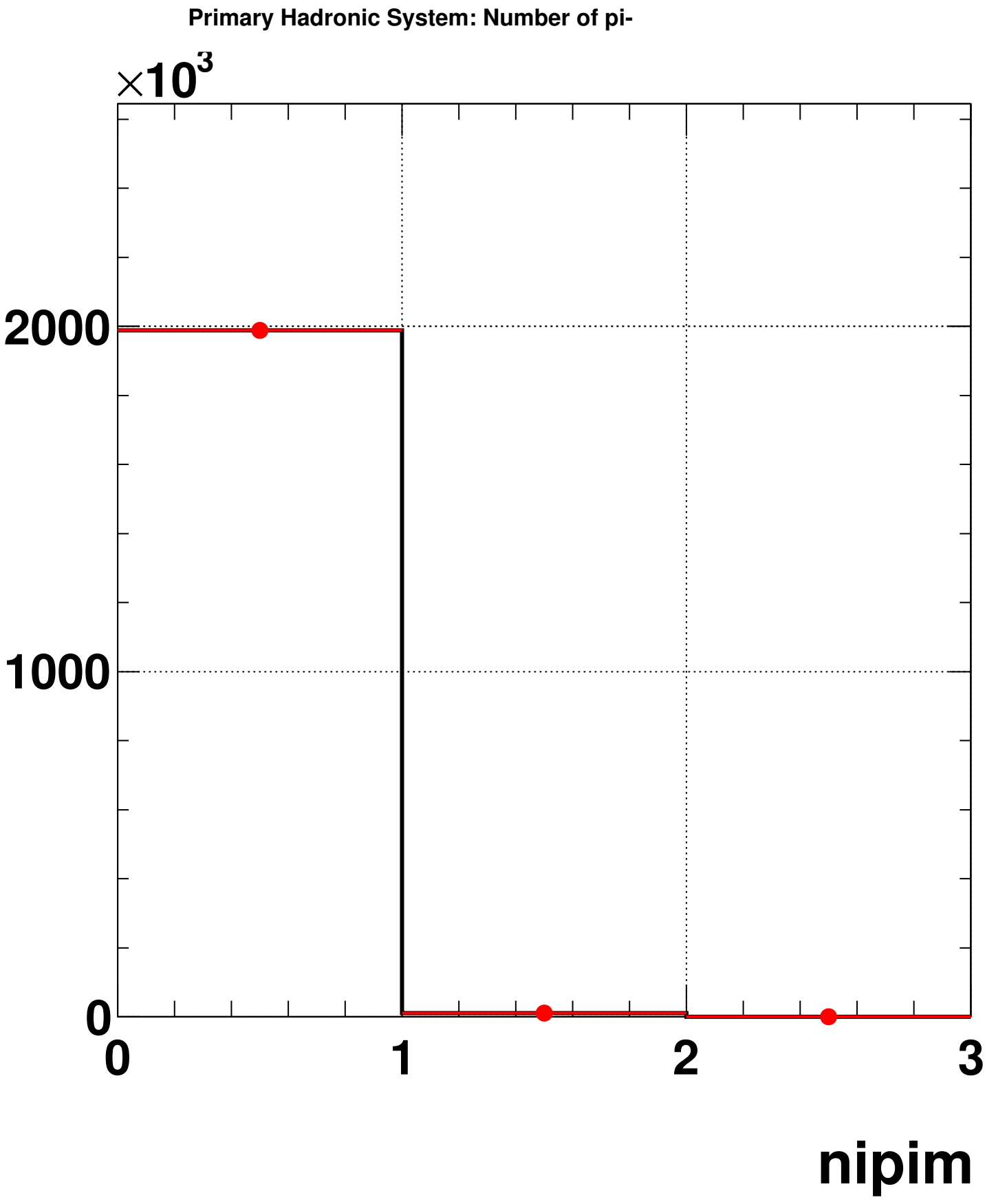
Note:

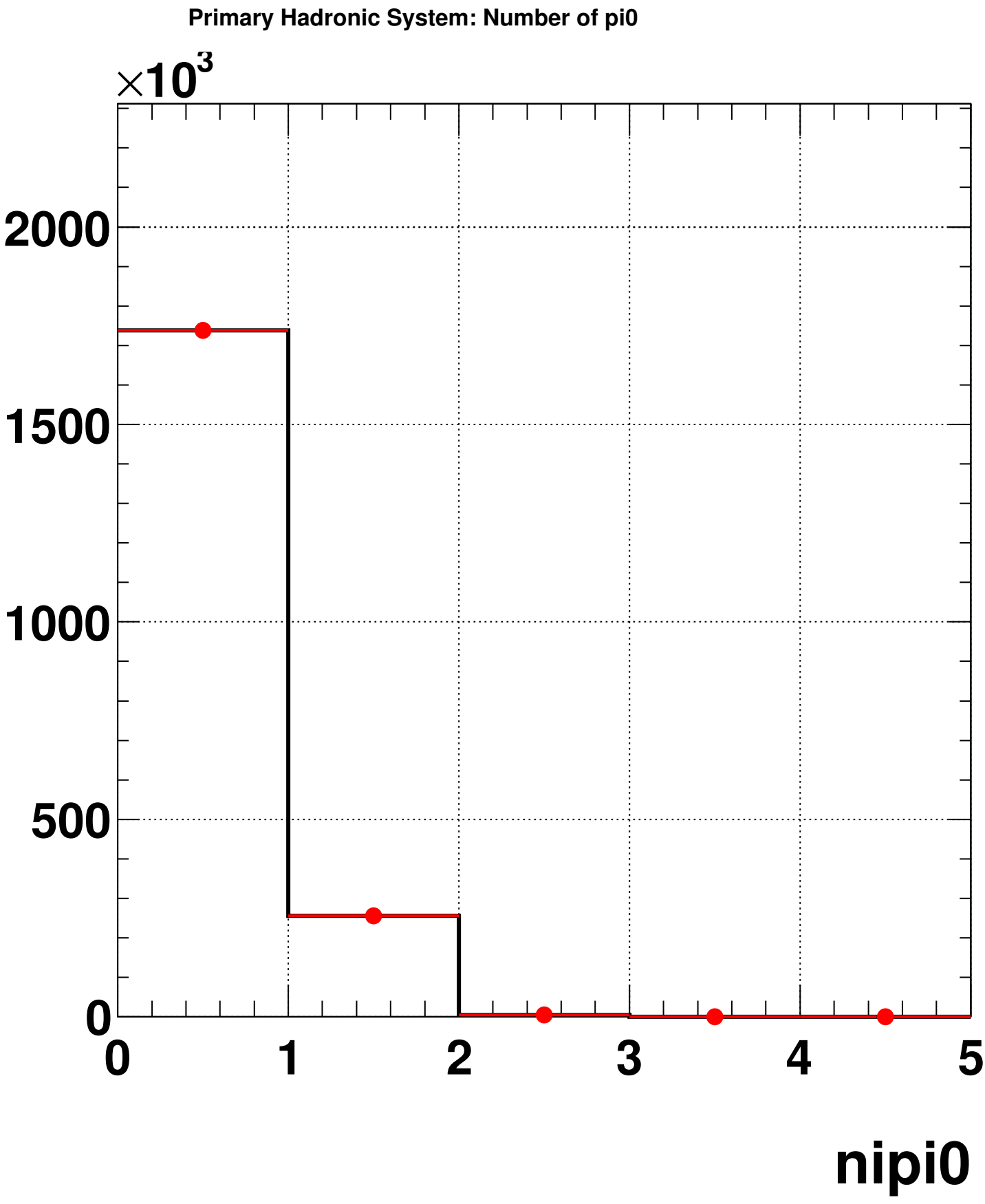
For nuclear targets these plots show the hadronic system BEFORE any intranuclear hadron transport / rescattering

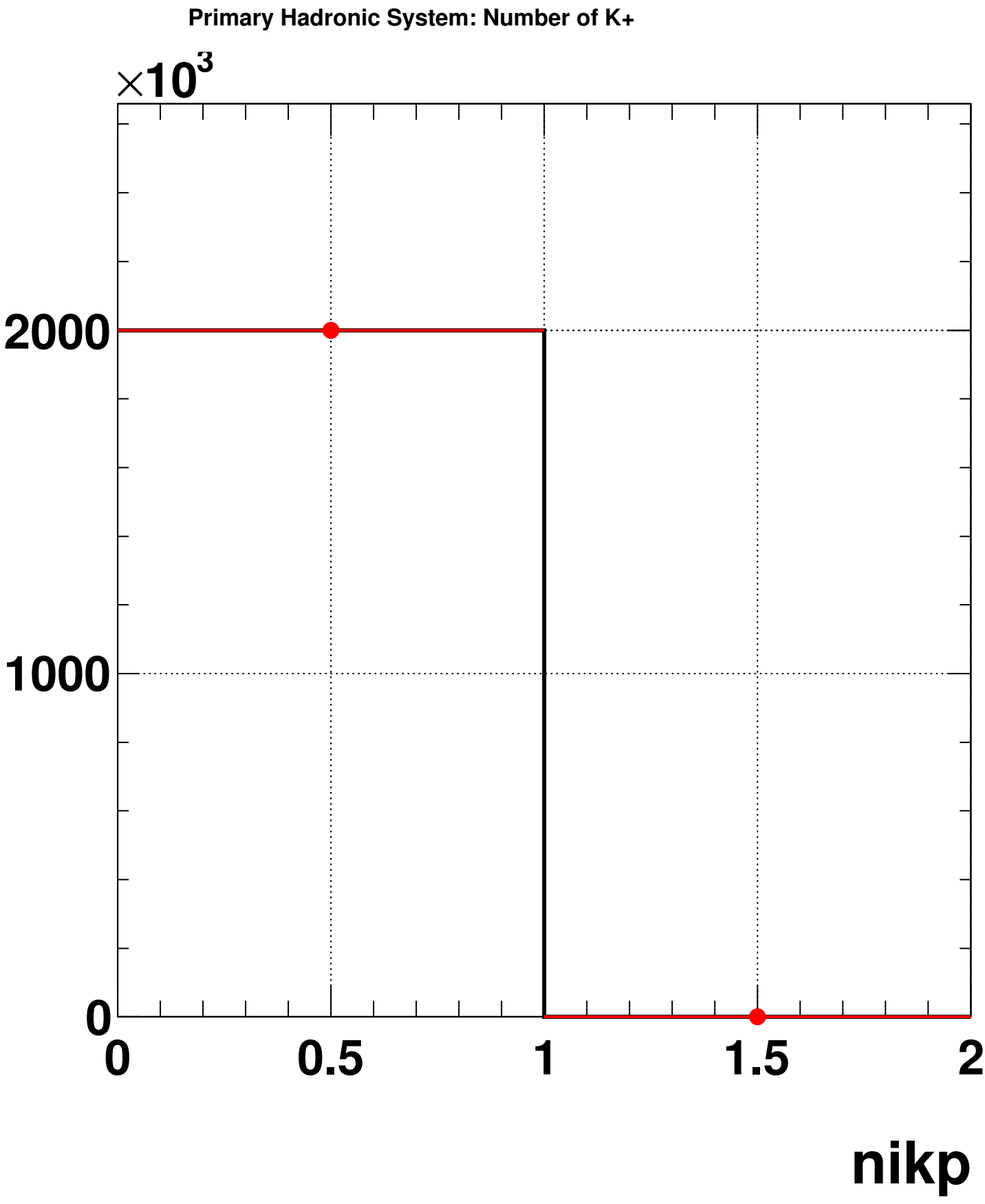

Primary Hadronic System: Number of protons
×10^3
2000
1500
1000
500
0
0
0.5
1
1.5
2
nip

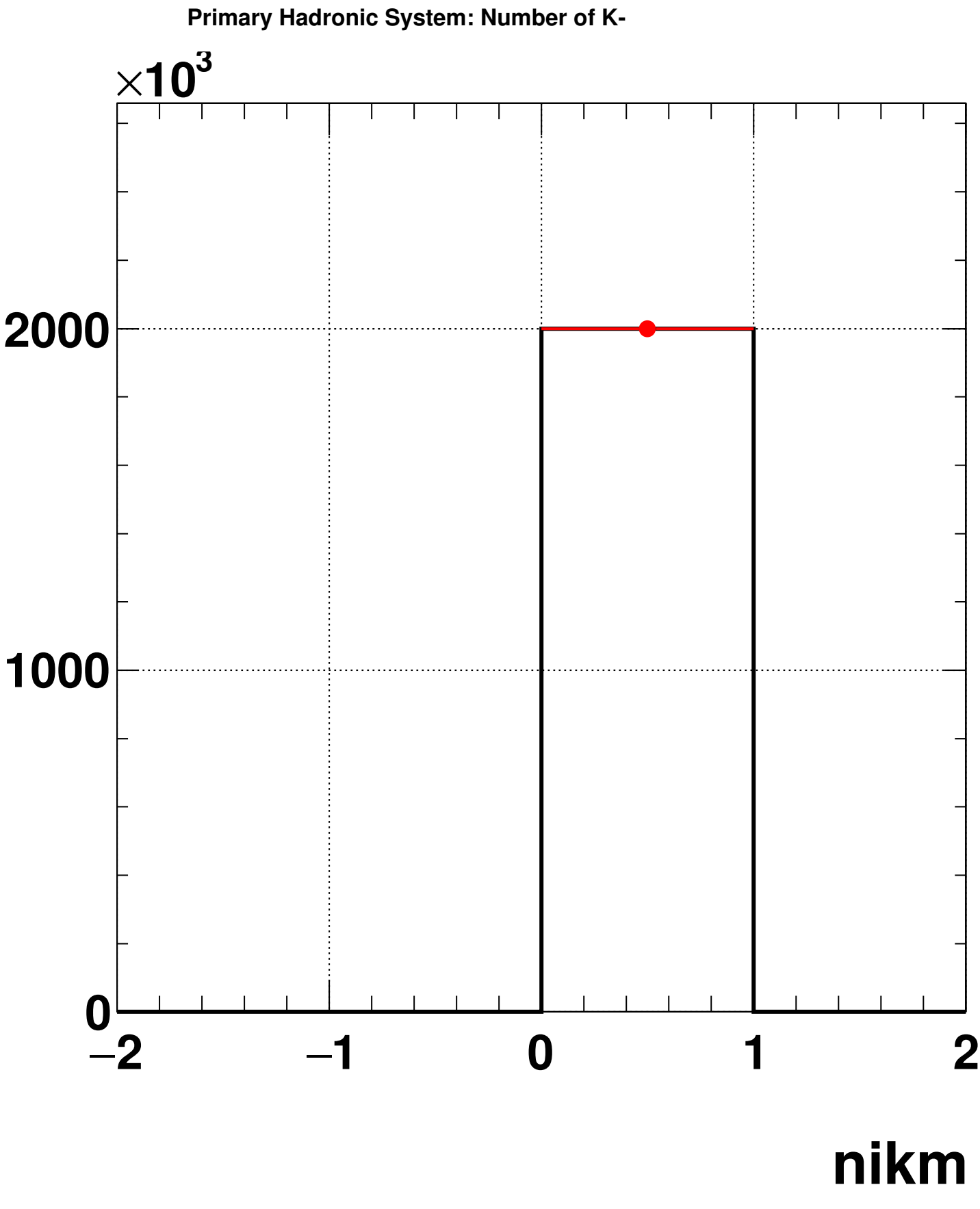

Primary Hadronic System: Number of neutrons
×10^3
2000
1500
1000
500
0
0
0.5
1
1.5
2
nin

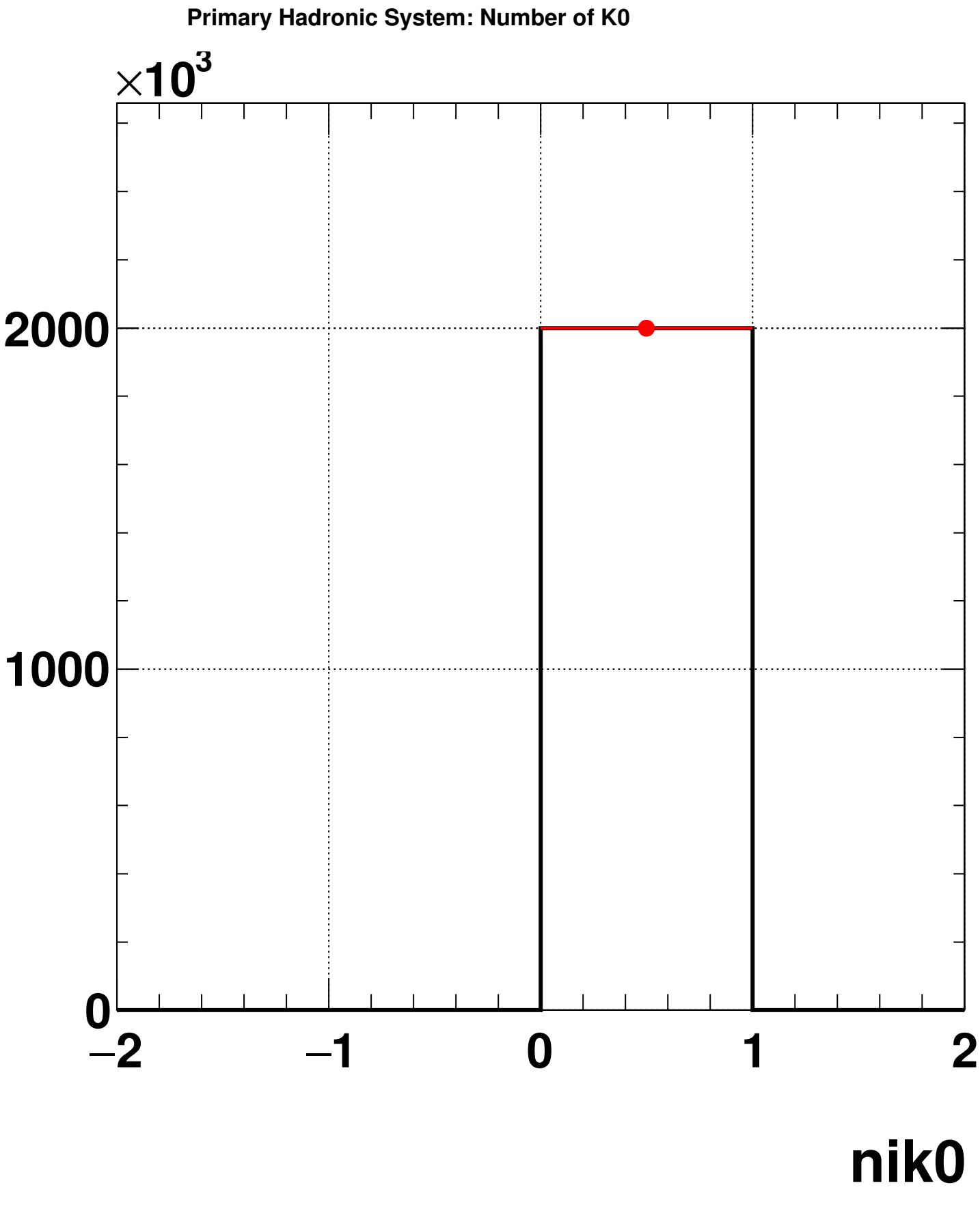

Primary Hadronic System: Number of pi+
×10^3
1500
1000
500
0
0
1
2
3
4
nipip


Primary Hadronic System: Number of pi-
×10^3
2000
1000
0
0
1
2
3
nipim

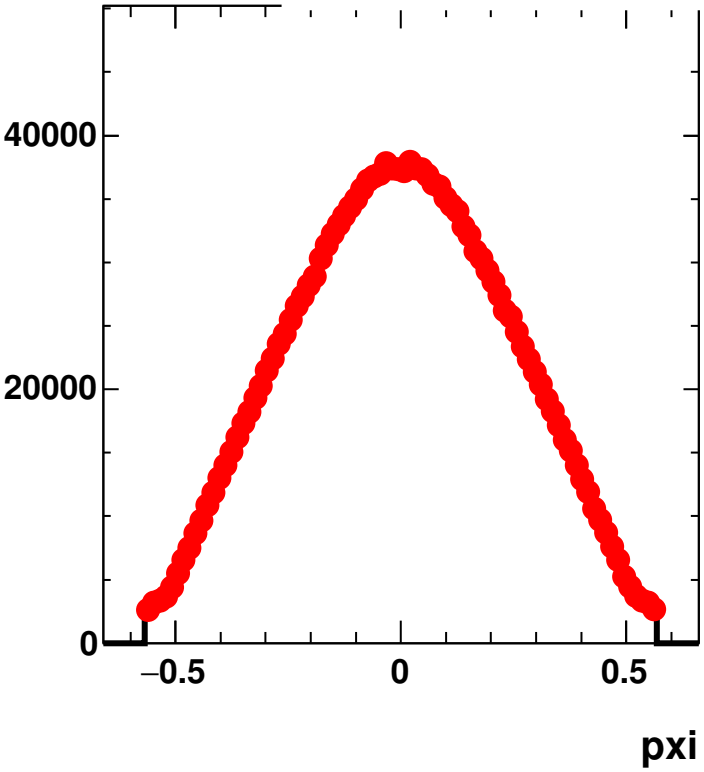

Primary Hadronic System: Number of pi0
×10^3
2000
1500
1000
500
0
0
1
2
3
4
5
nipi0

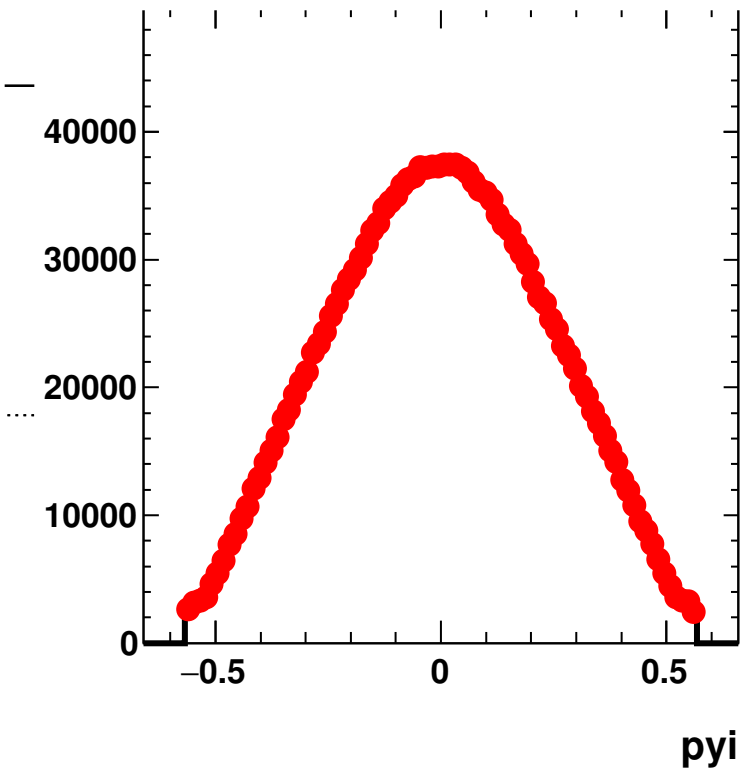

Primary Hadronic System: Number of K+
×10^3
2000
1000
0
0
0.5
1
1.5
2
nikp

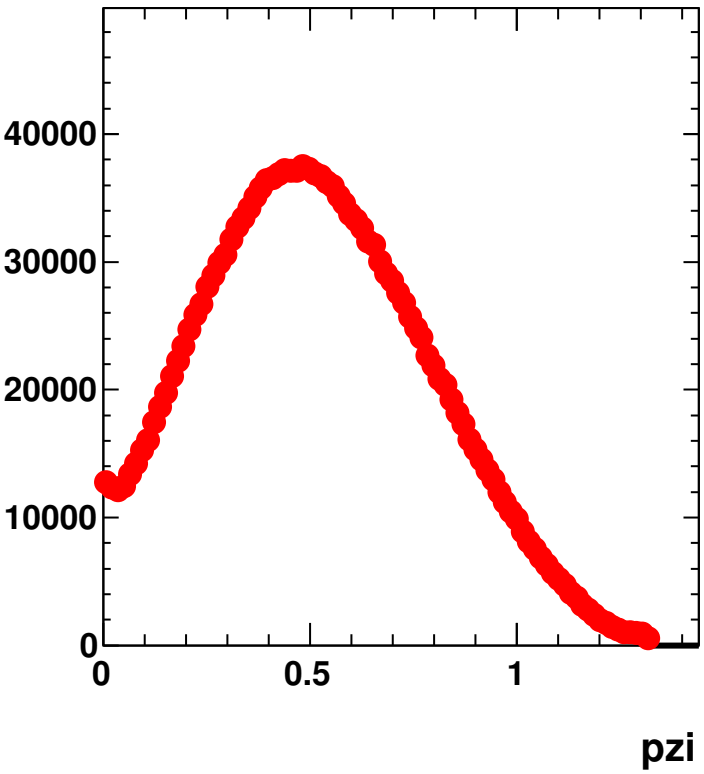

Primary Hadronic System: Number of K-
×10^3
2000
1000
0
−2
−1
0
1
2
nikm

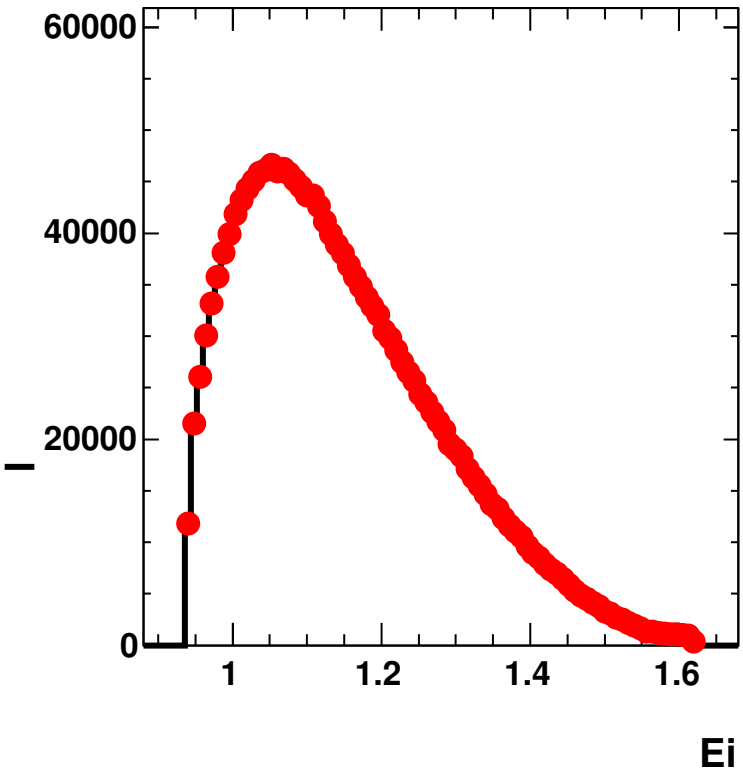

Primary Hadronic System: Number of K0
×10^3
2000
1000
0
−2
−1
0
1
2
nik0

Primary Hadronic System: proton 4-momentum

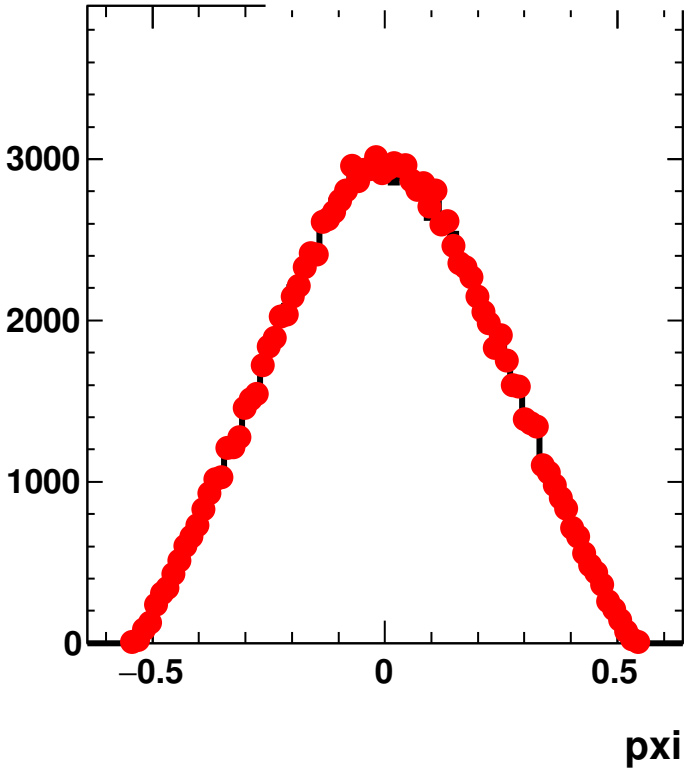


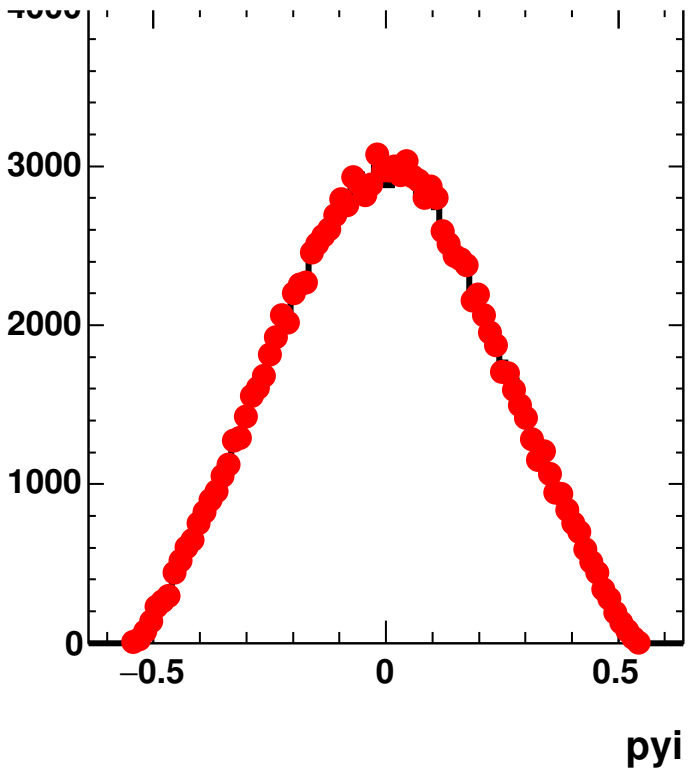


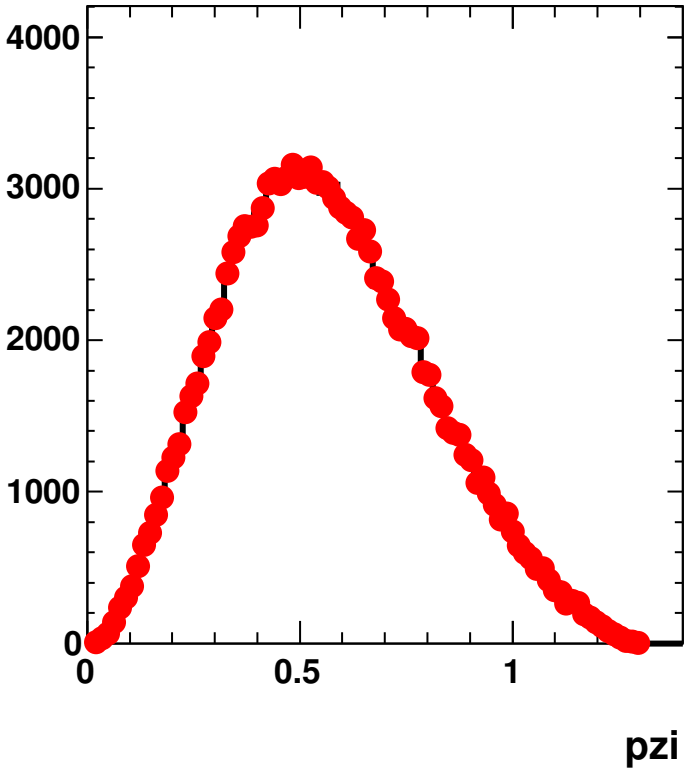


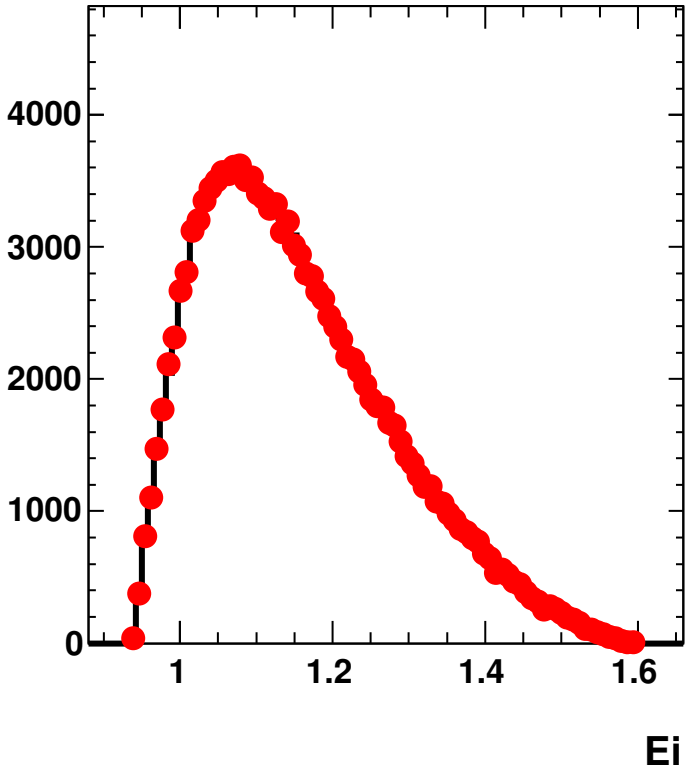


Primary Hadronic System: neutron 4-momentum

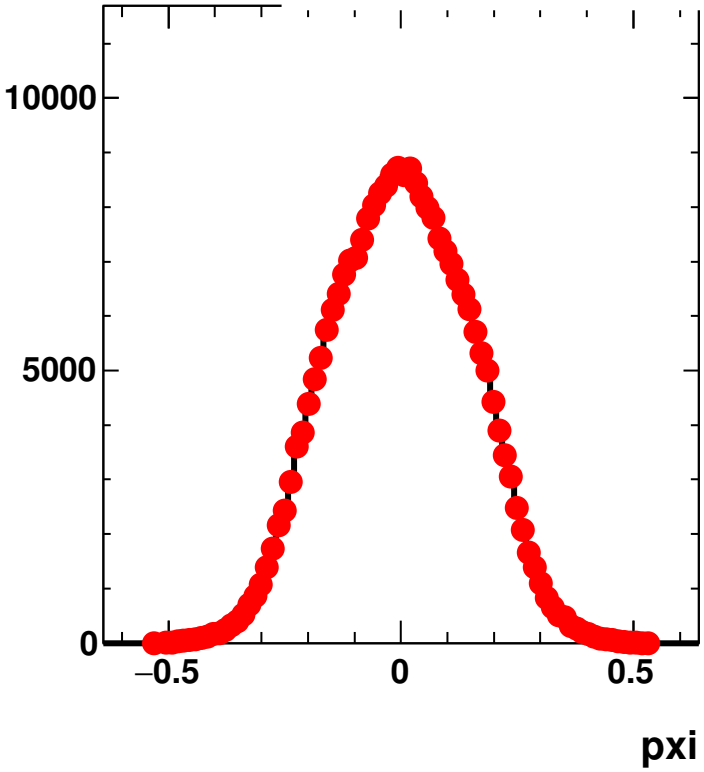


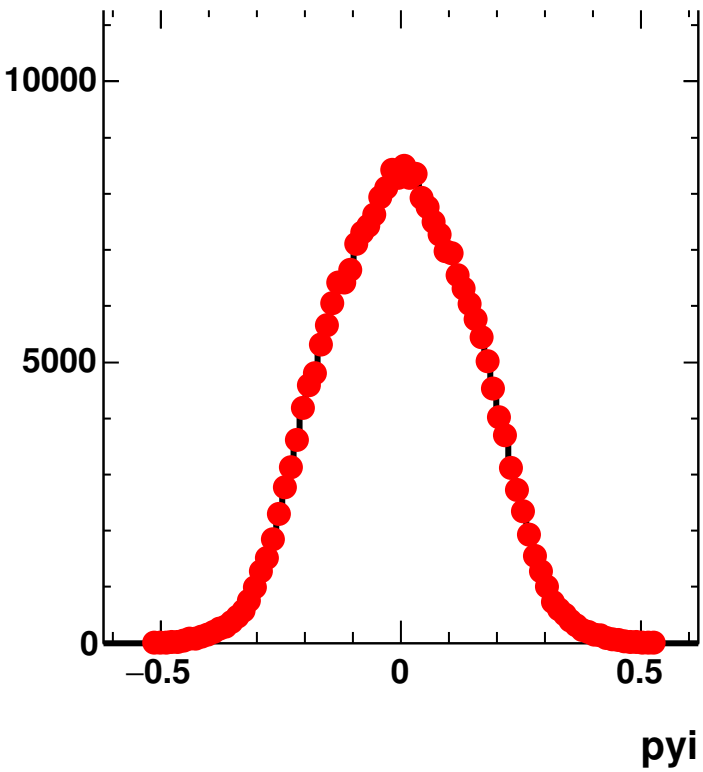


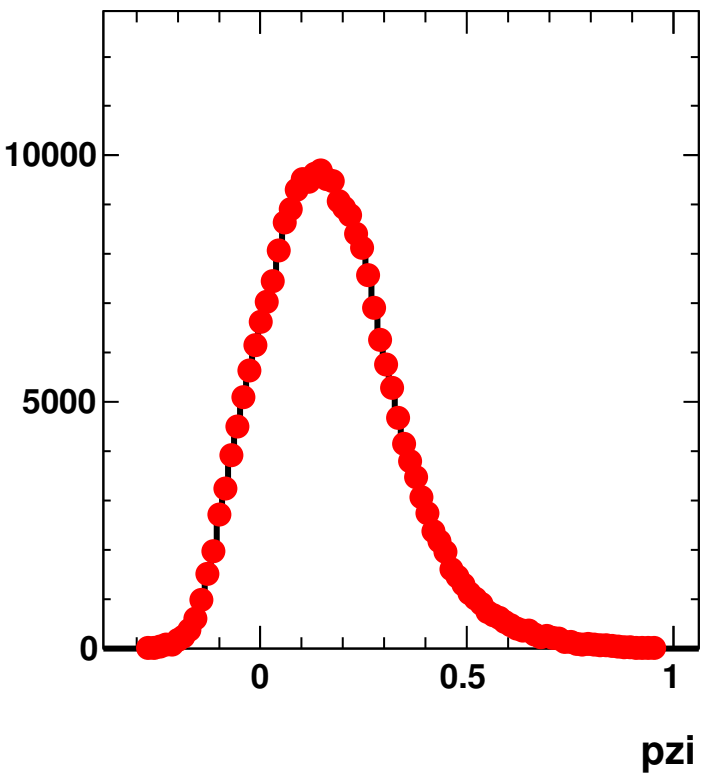


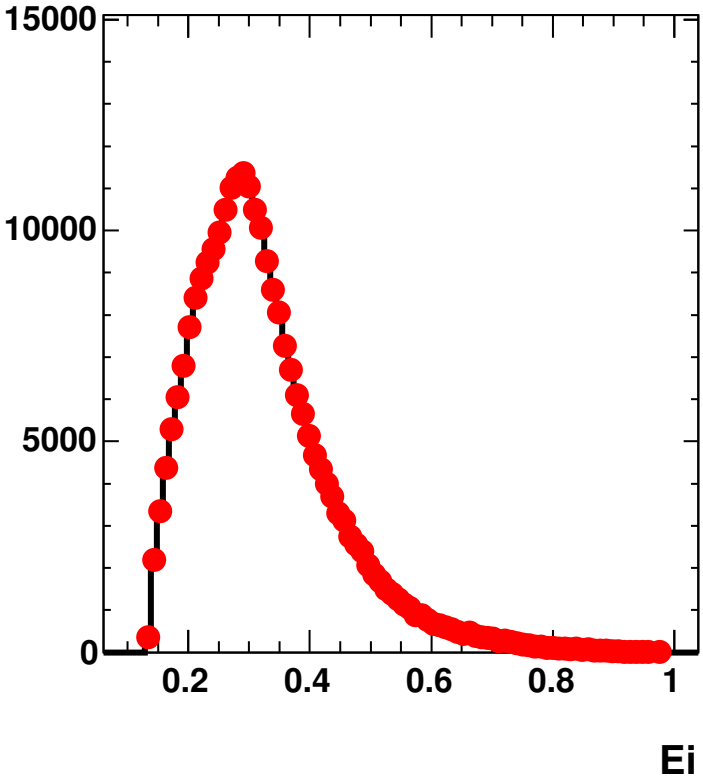


Primary Hadronic System: pi0's 4-momentum

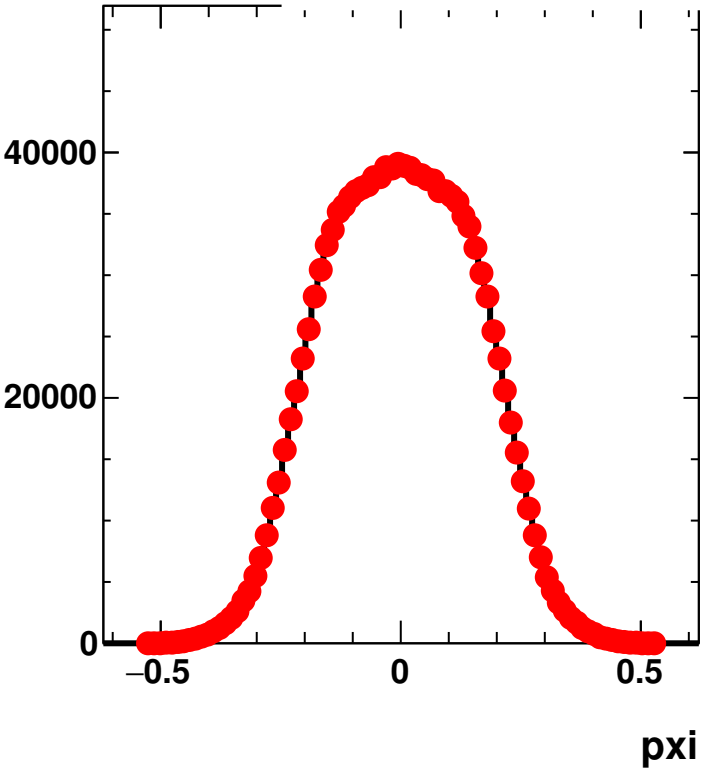


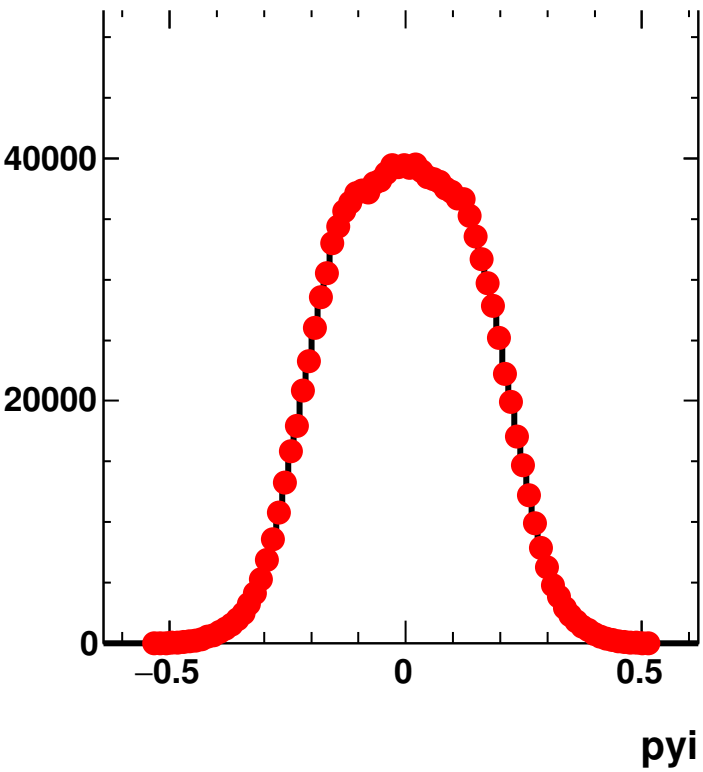


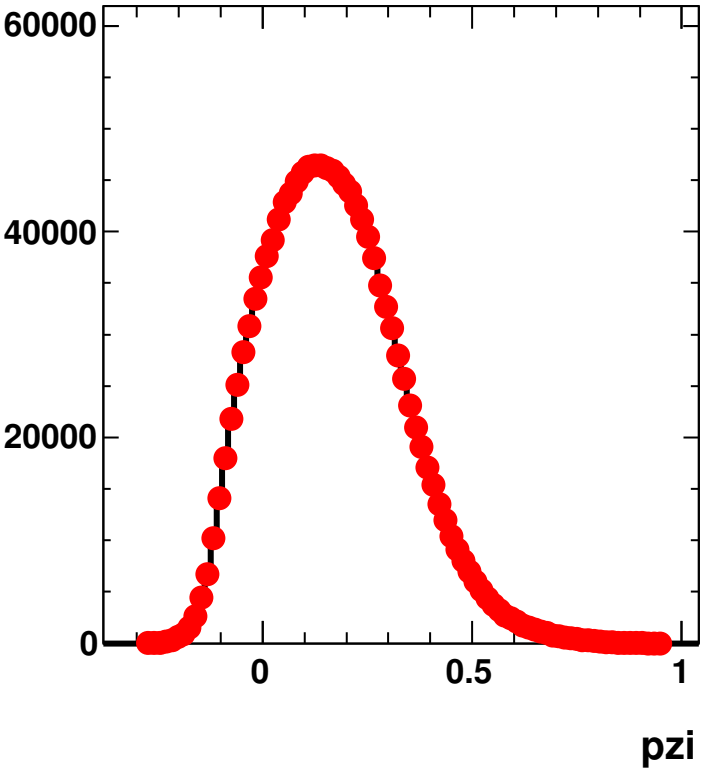


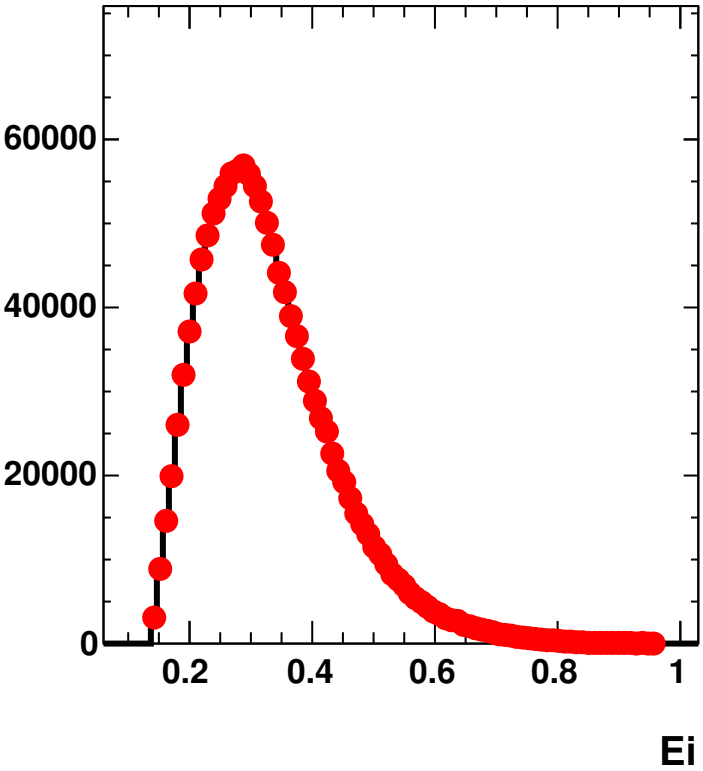
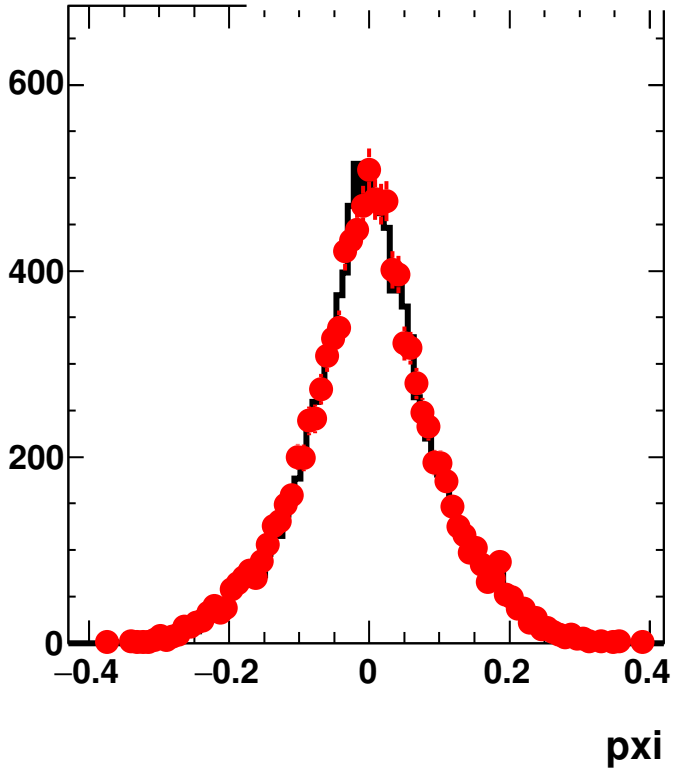
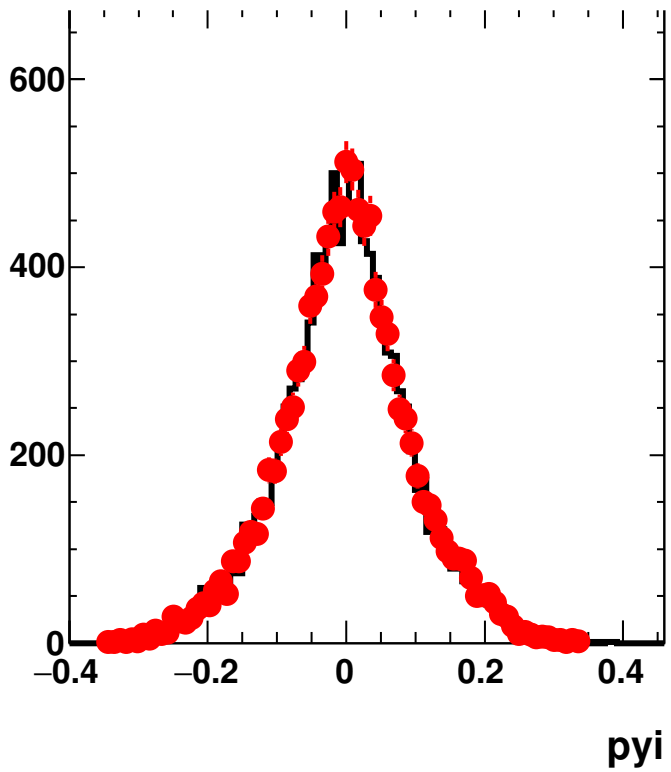
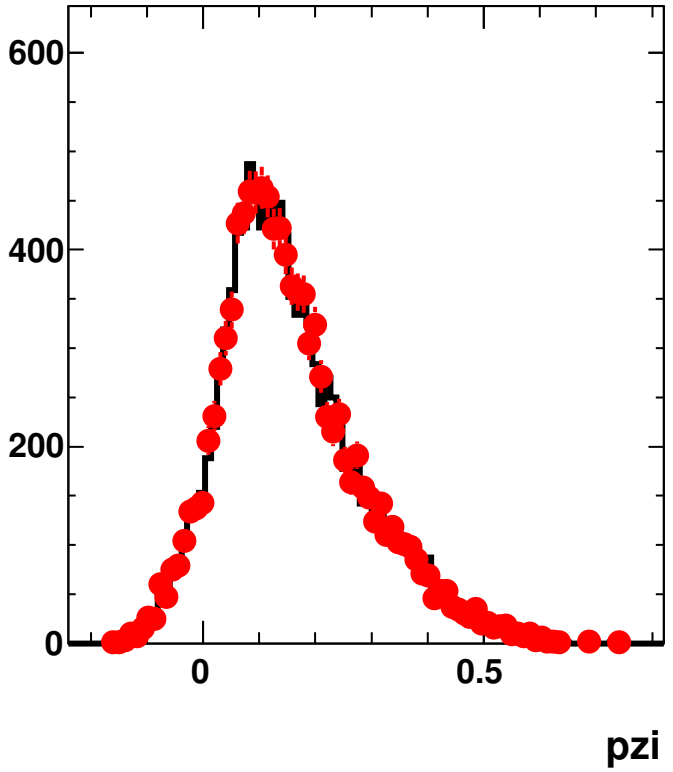
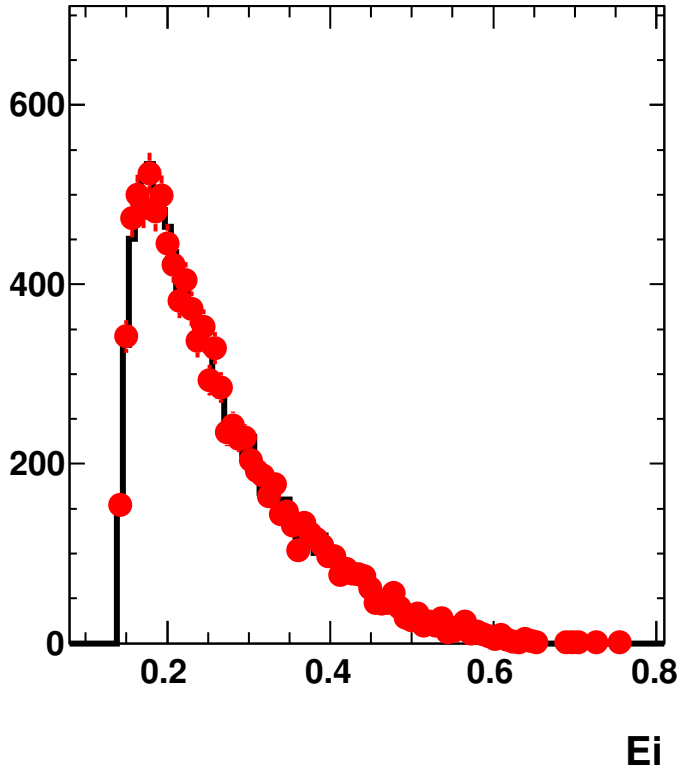


Primary Hadronic System:pi+'s 4-momentum









Primary Hadronic System: pi-'s 4-momentum