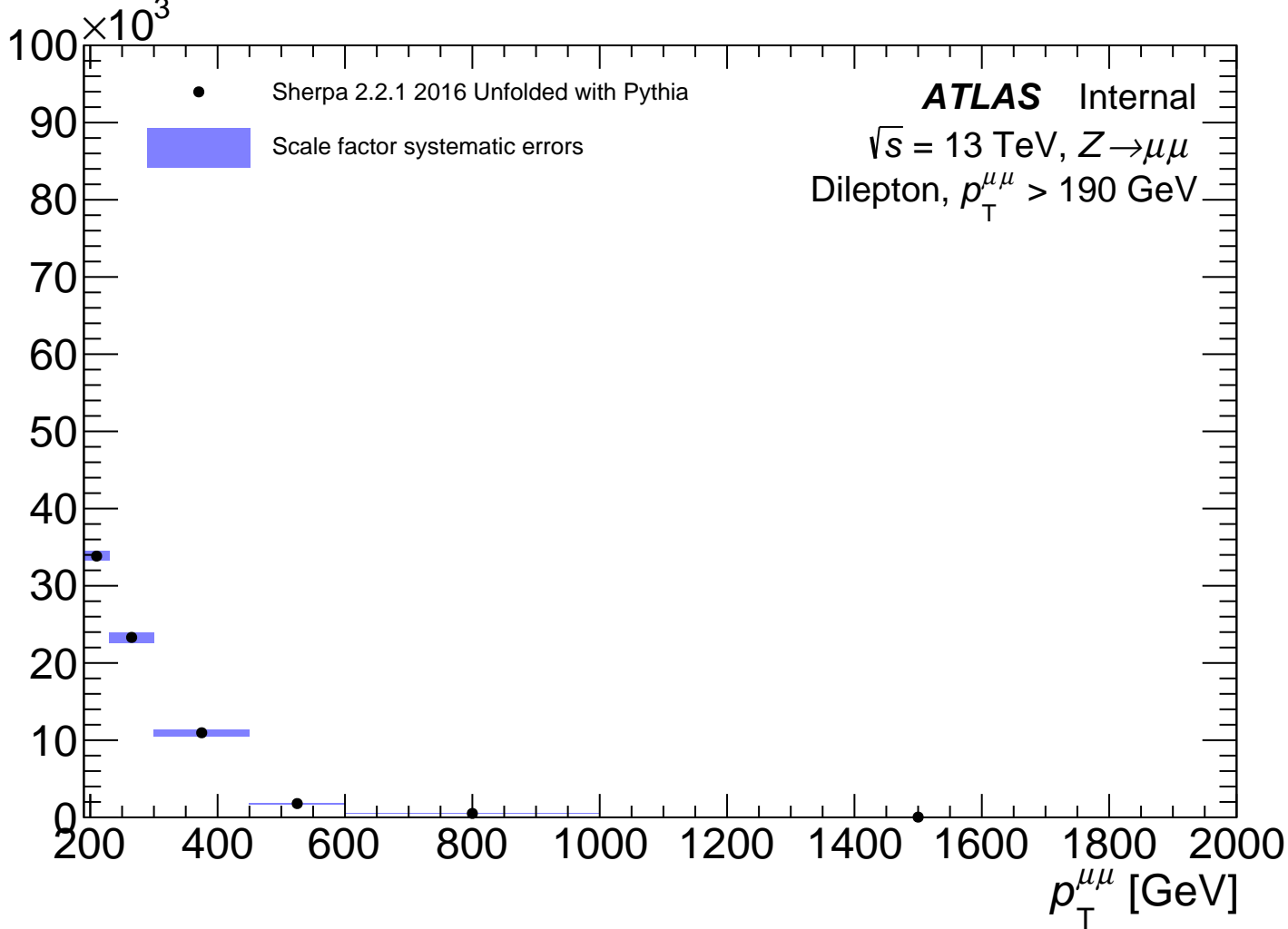
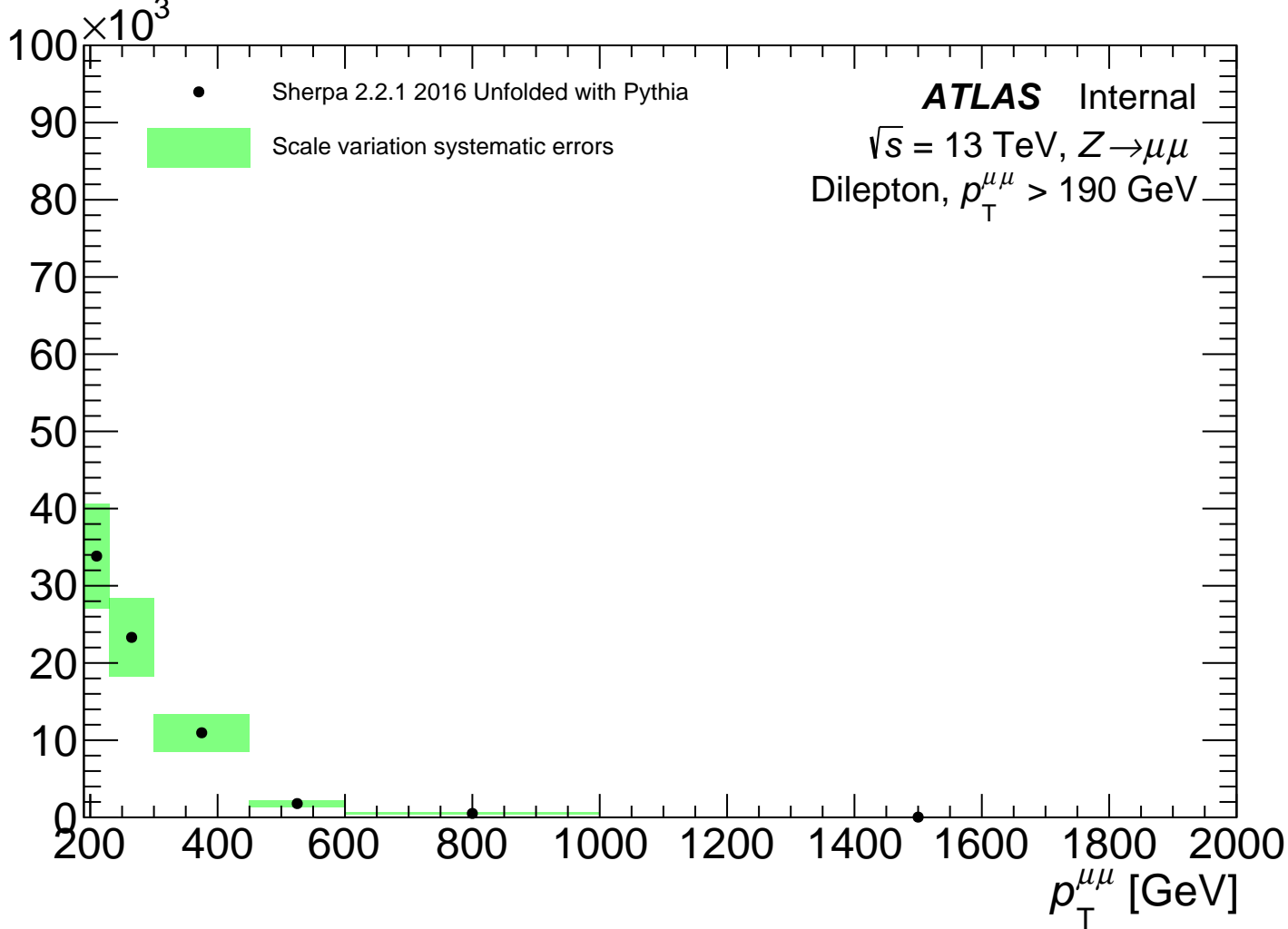


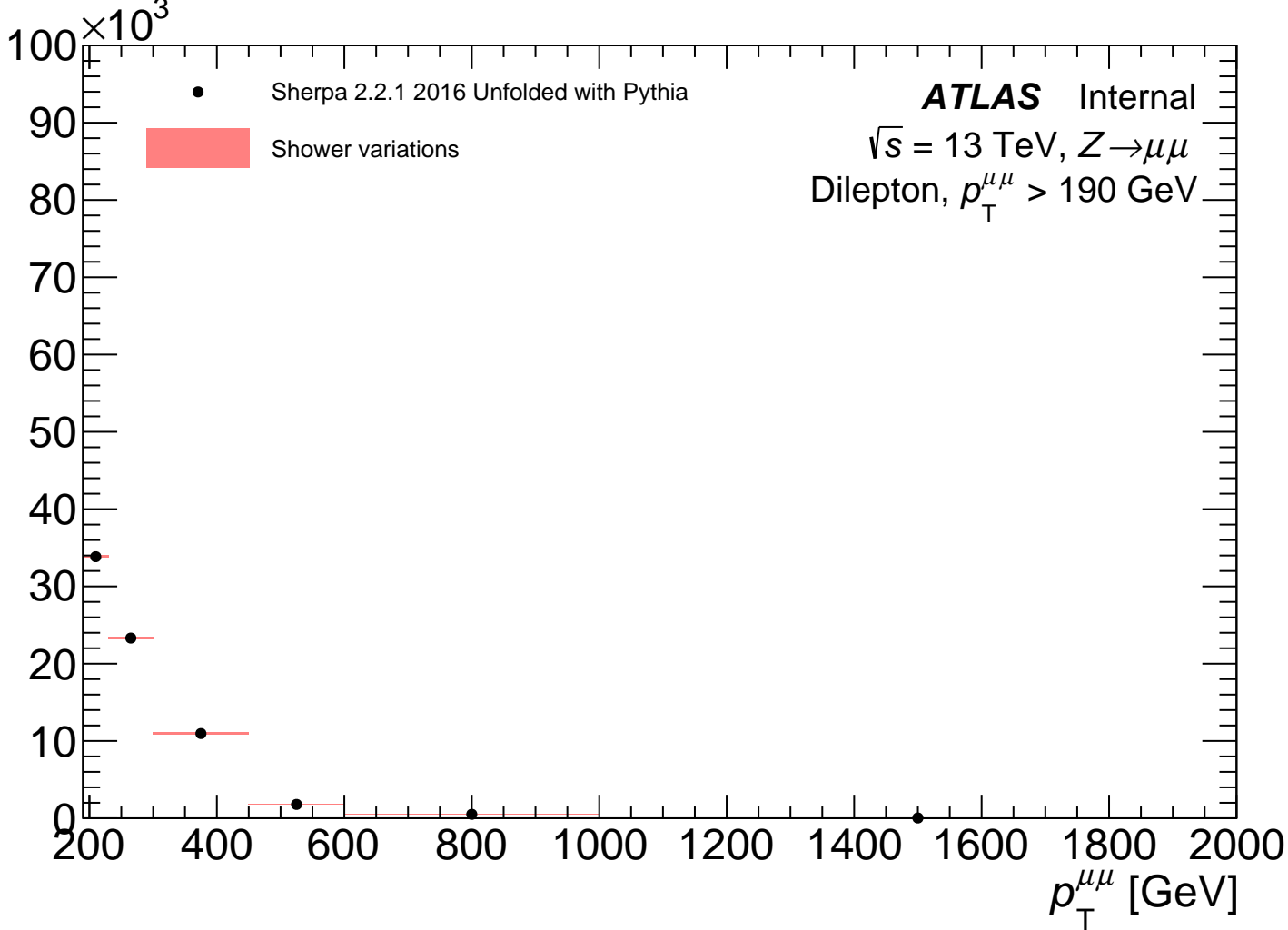
Events



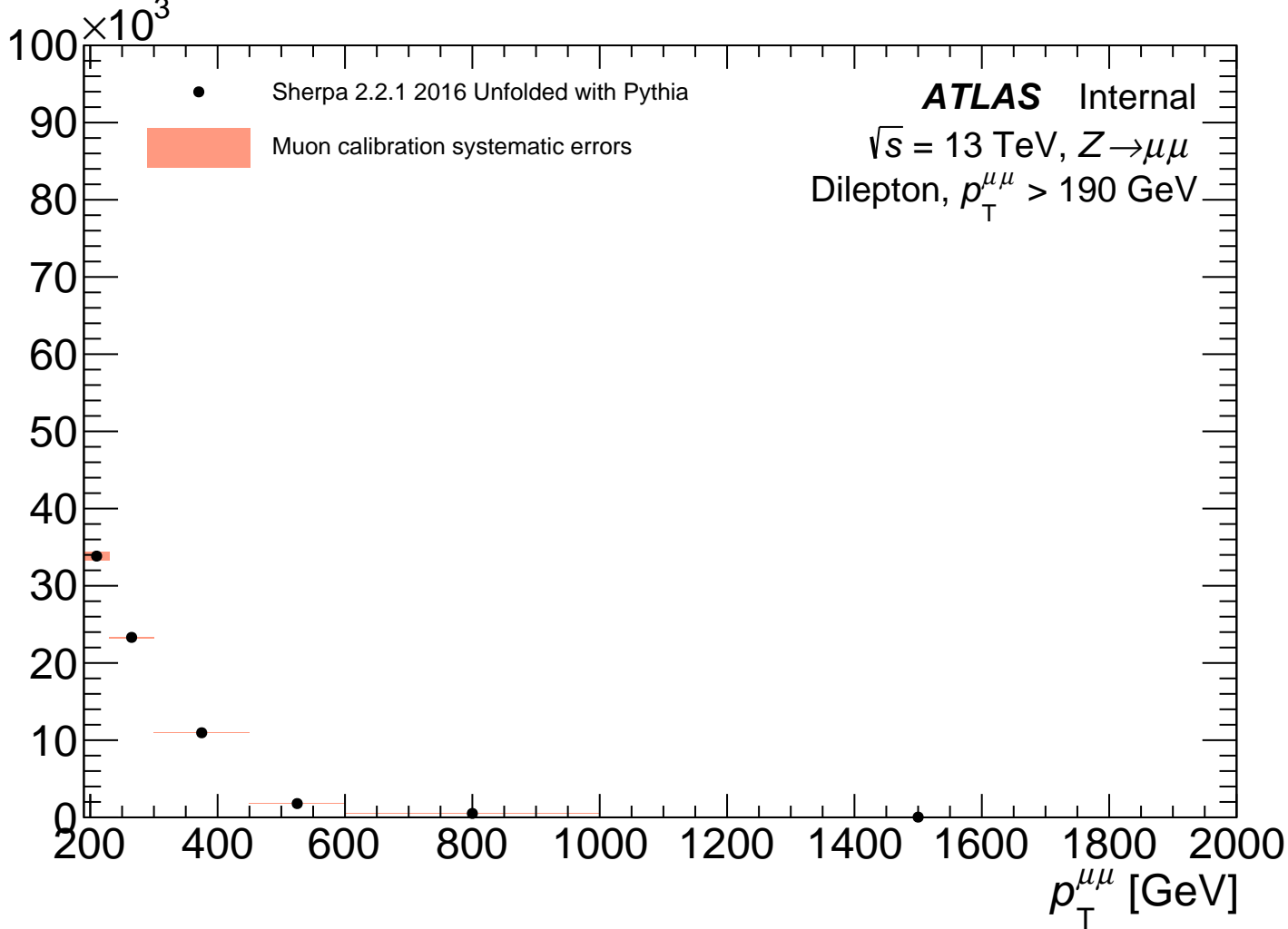
Events



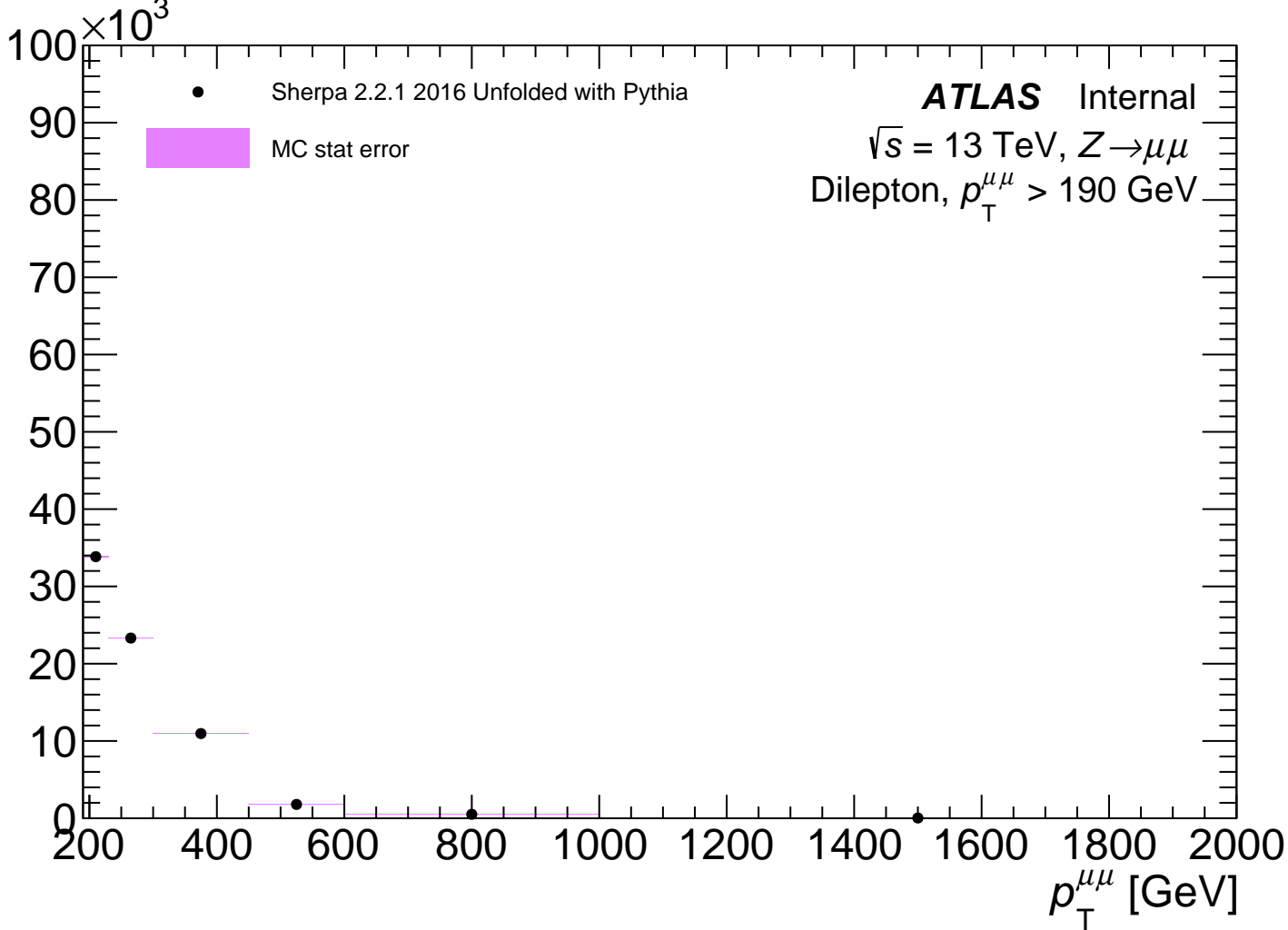
Events



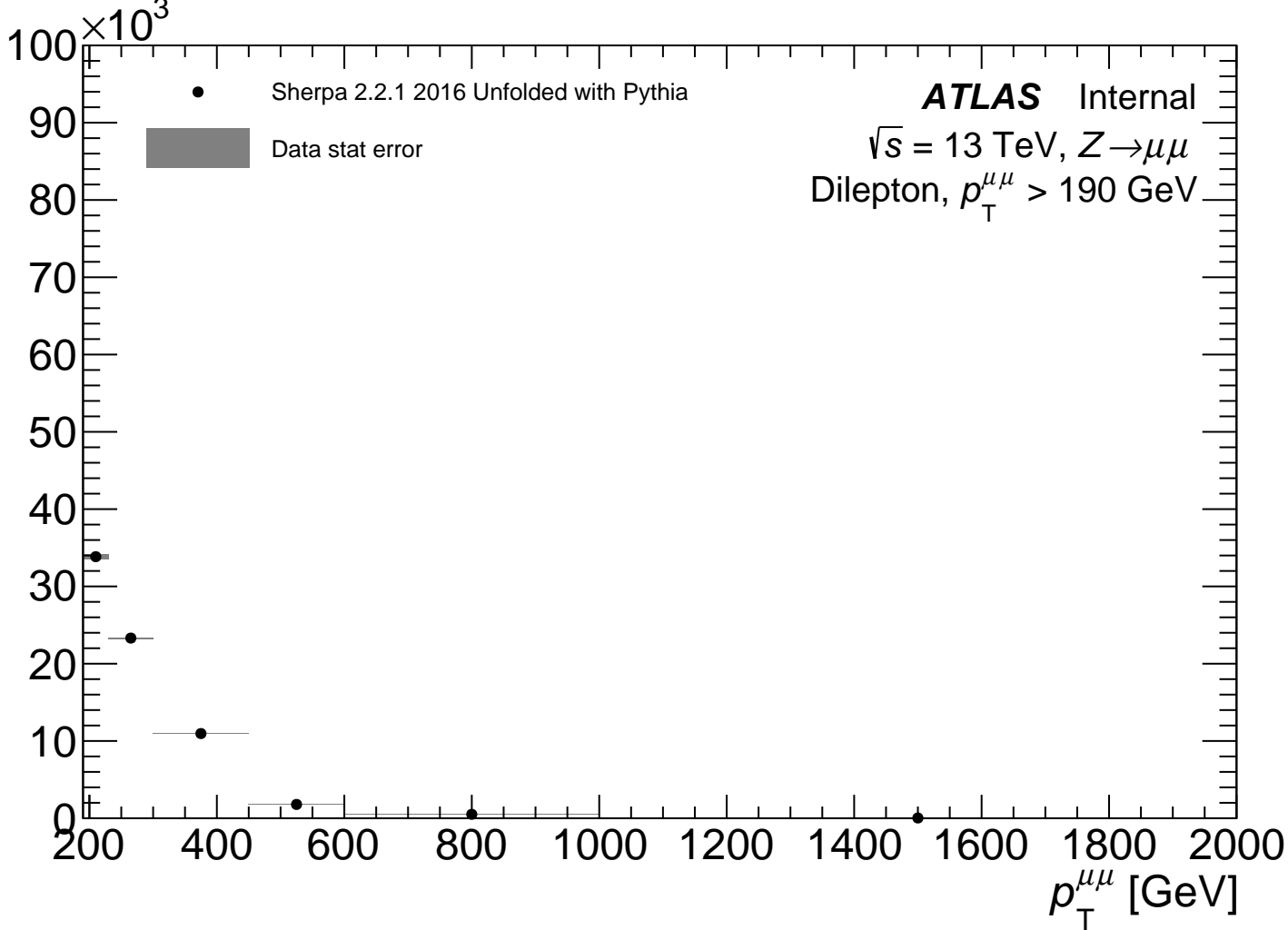
Events



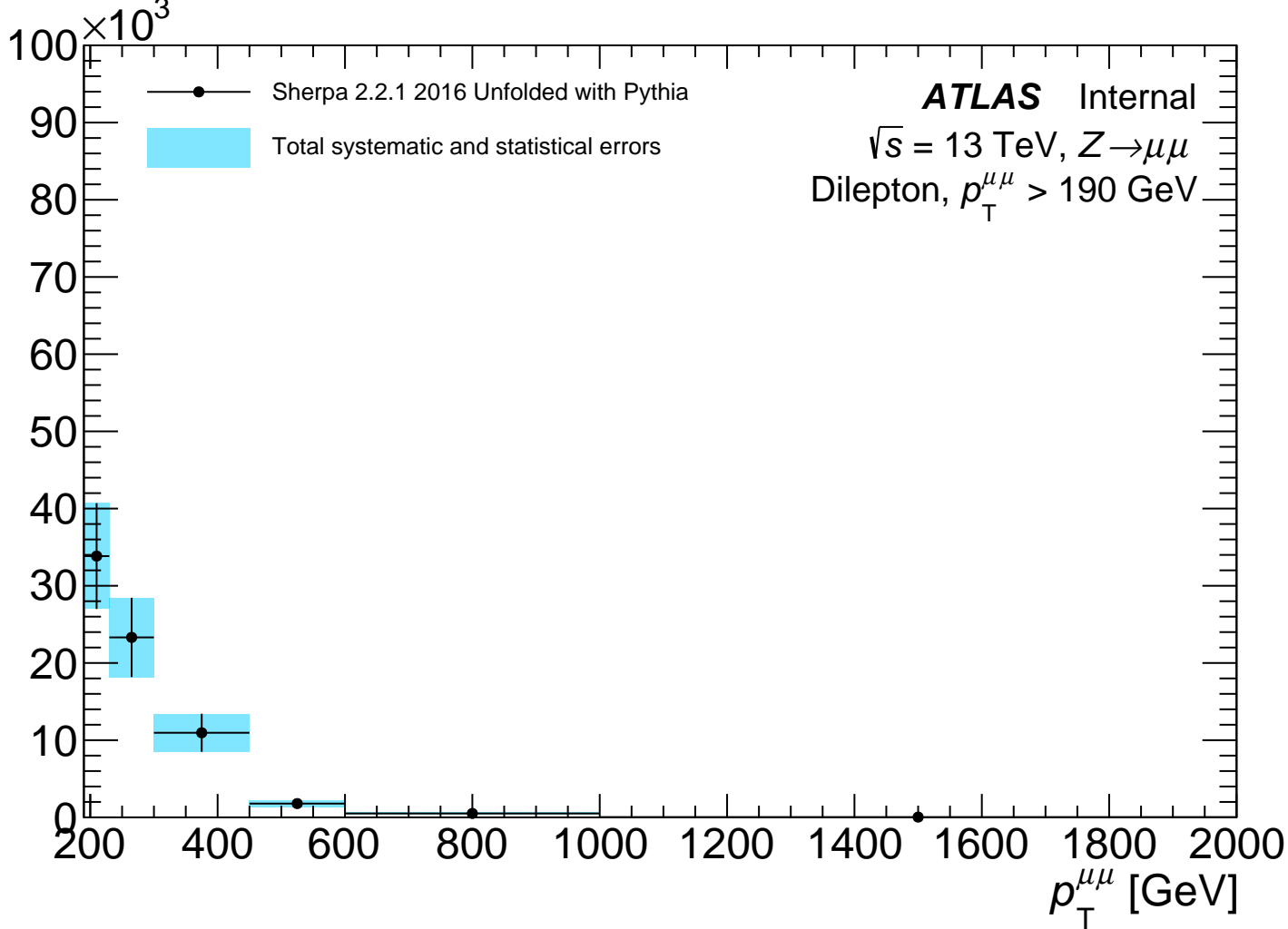
Events



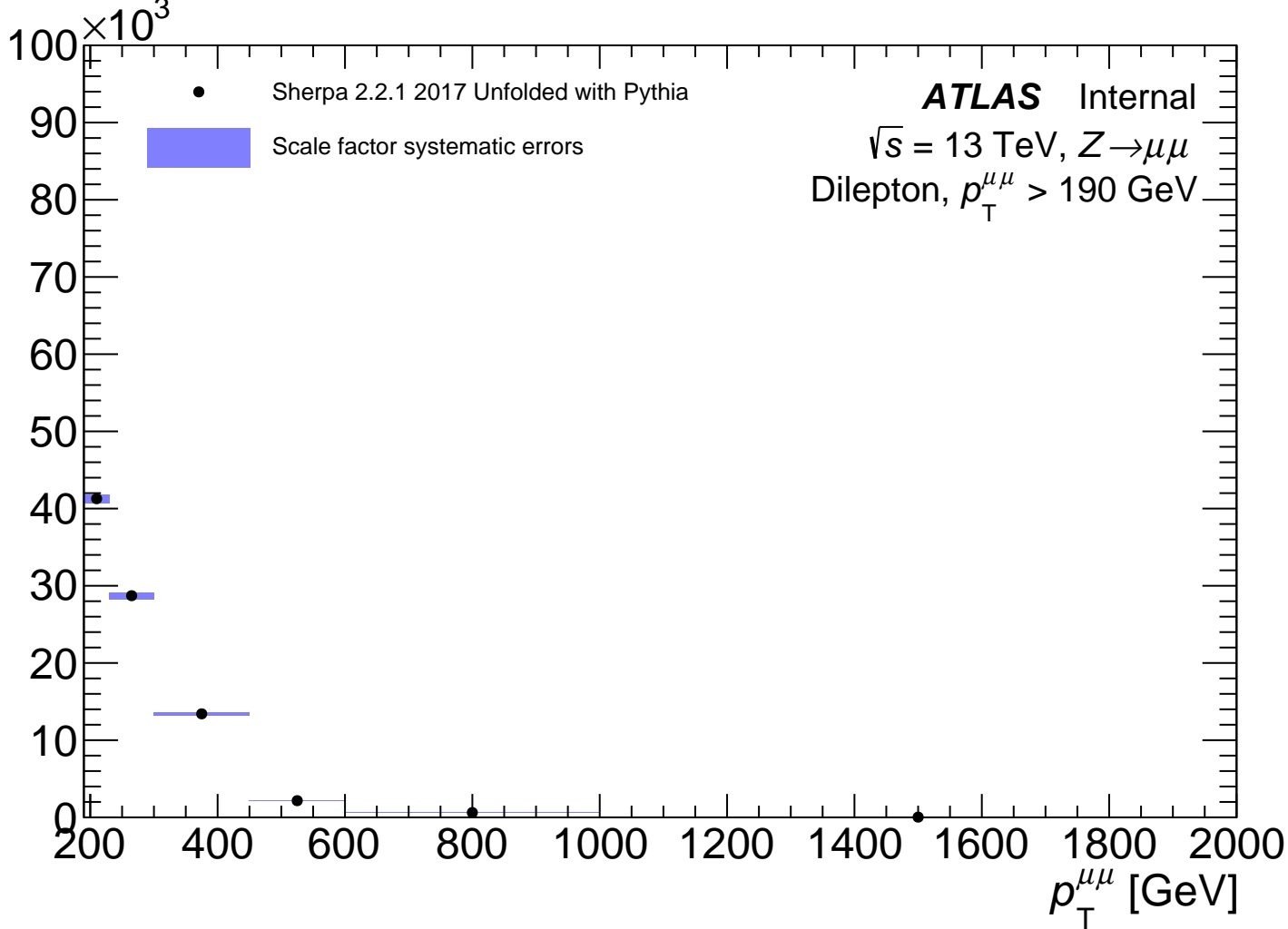
Events



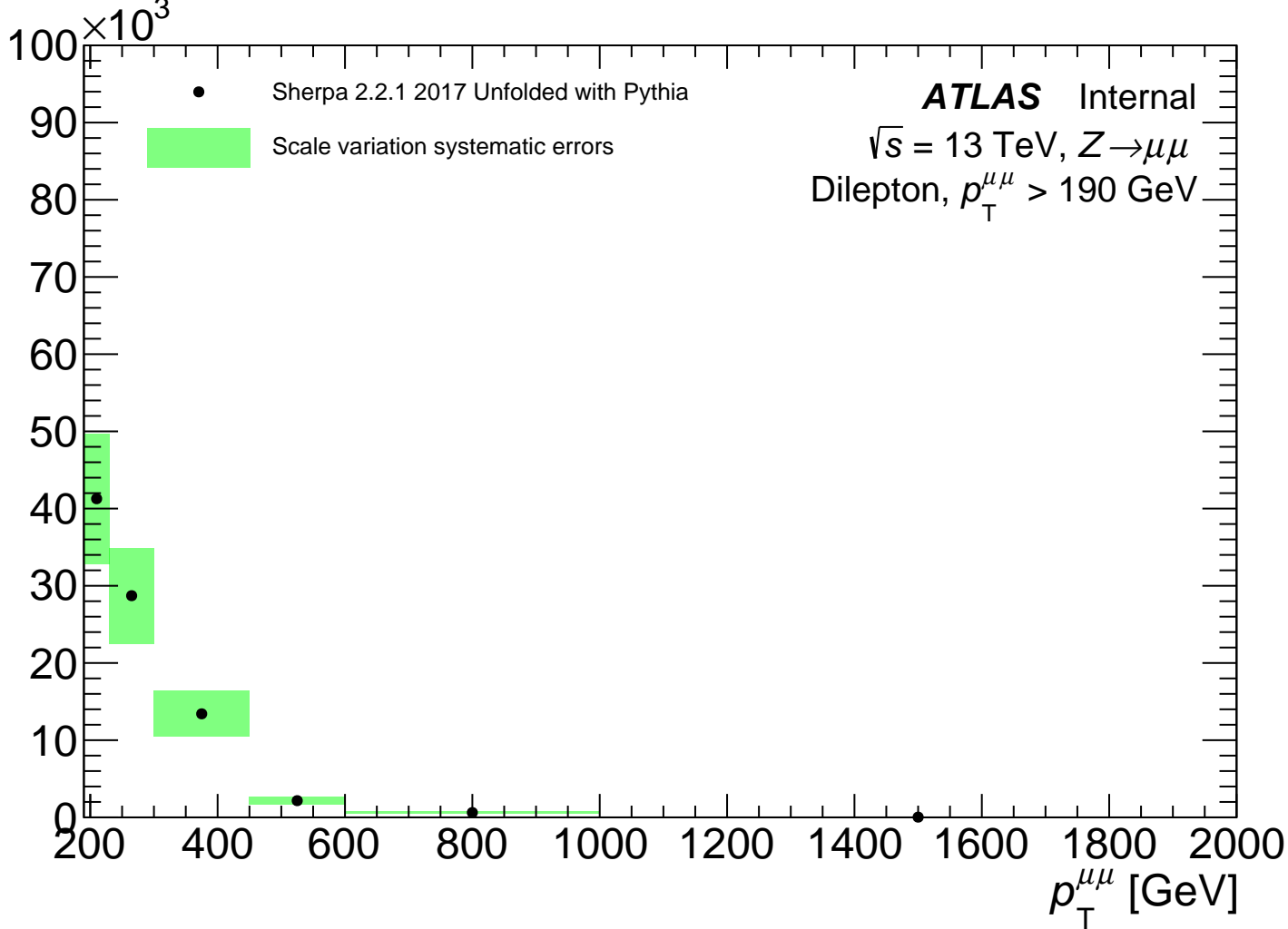
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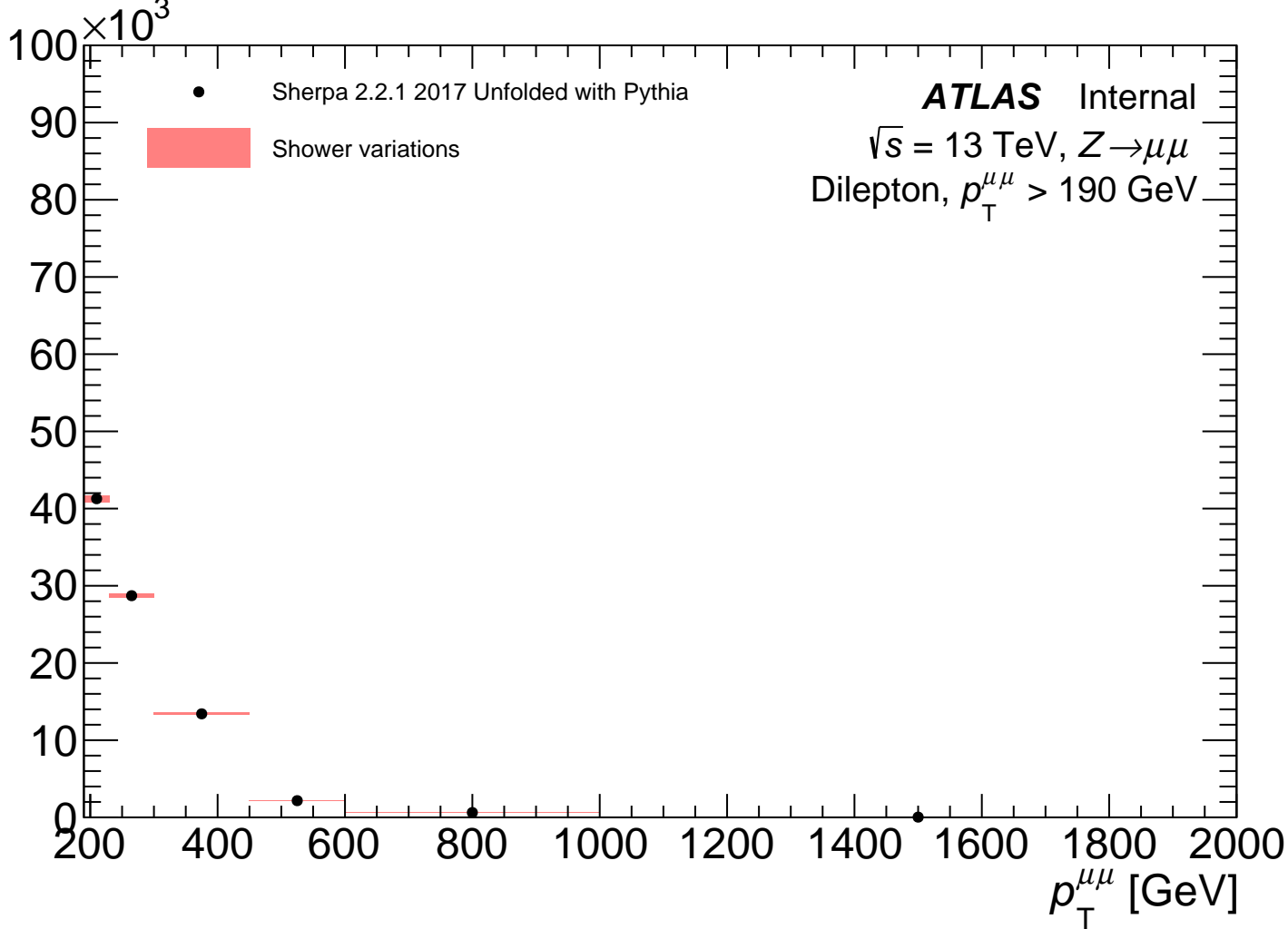
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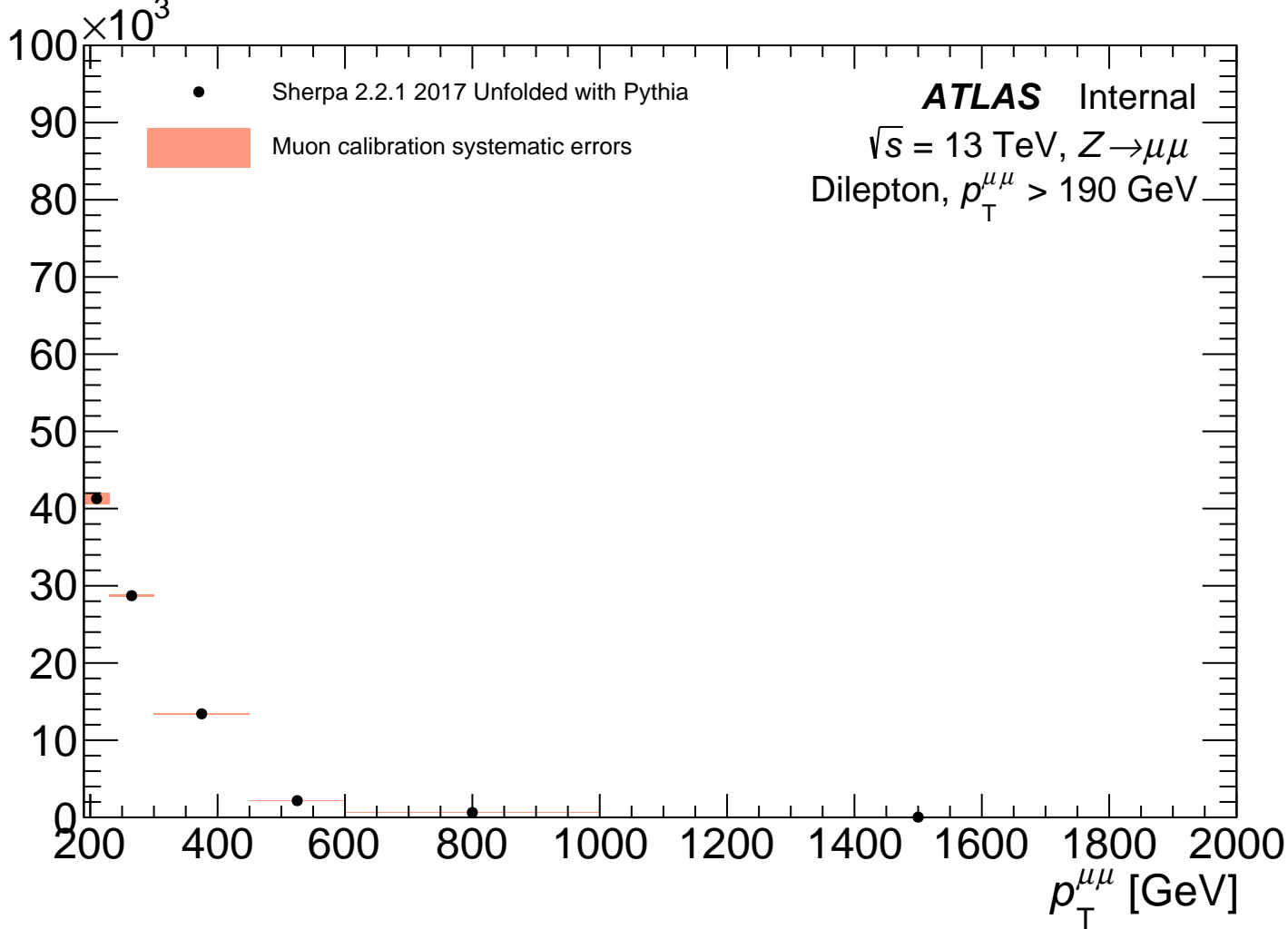
Events



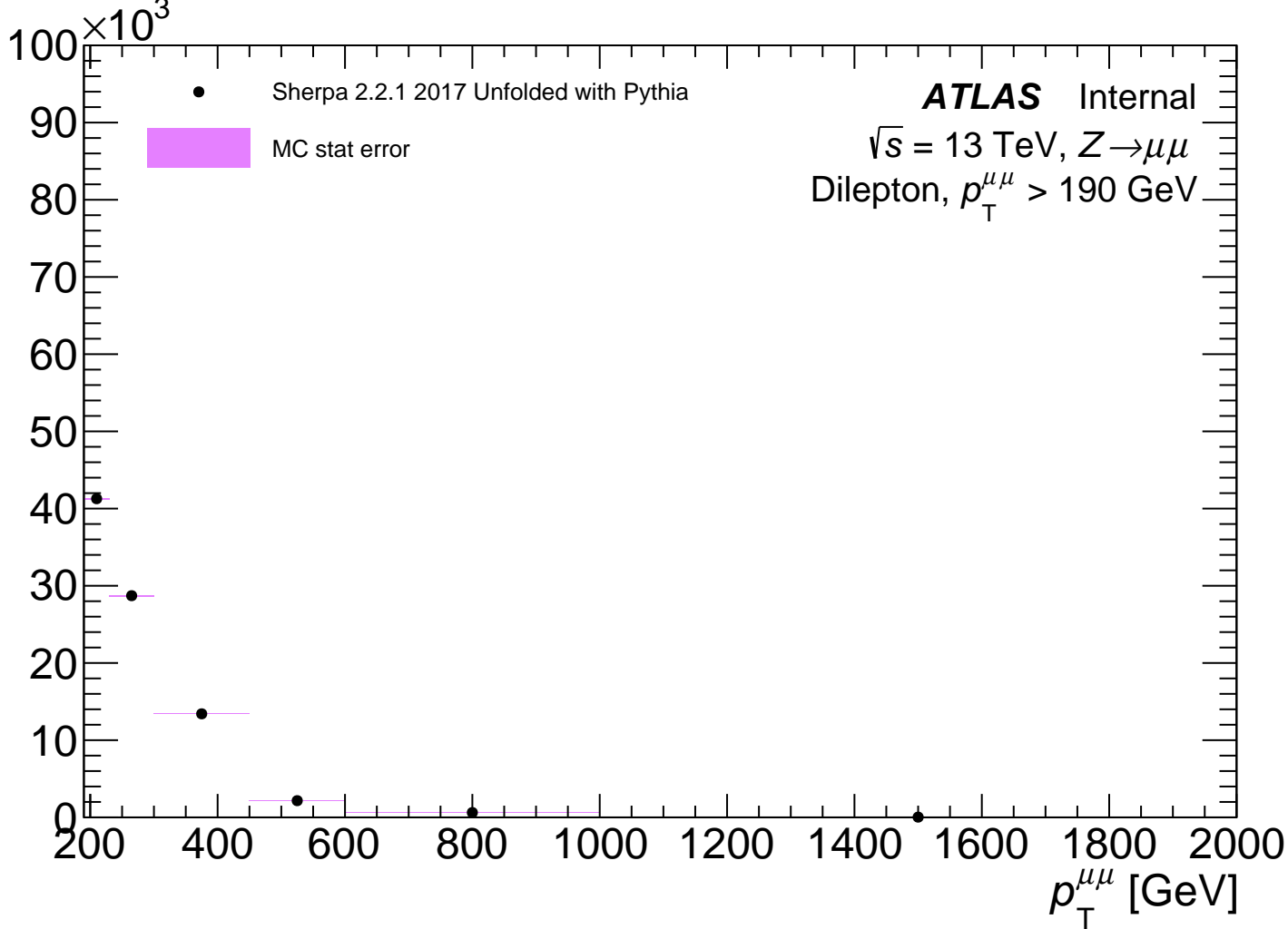
Events



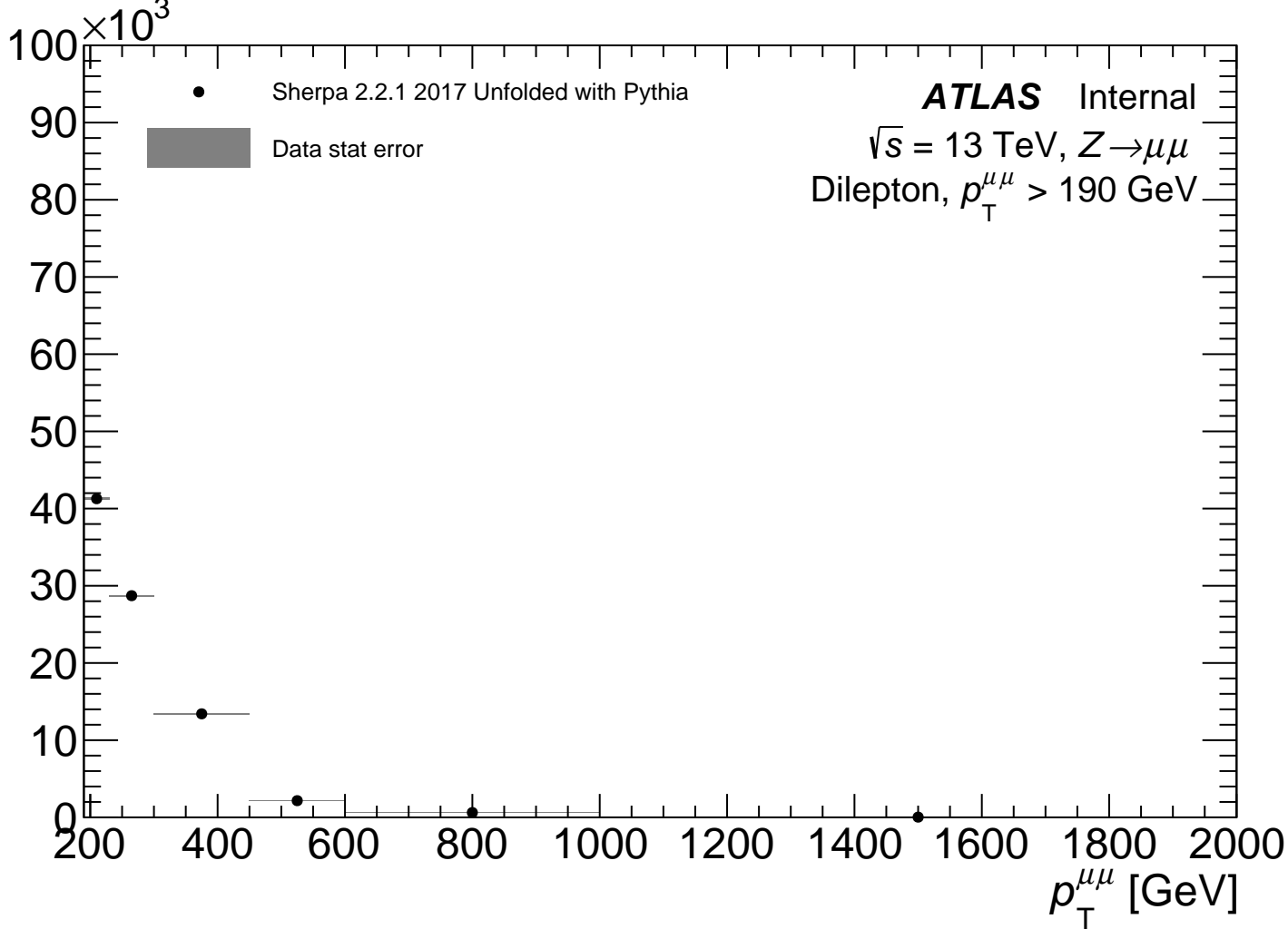
Events



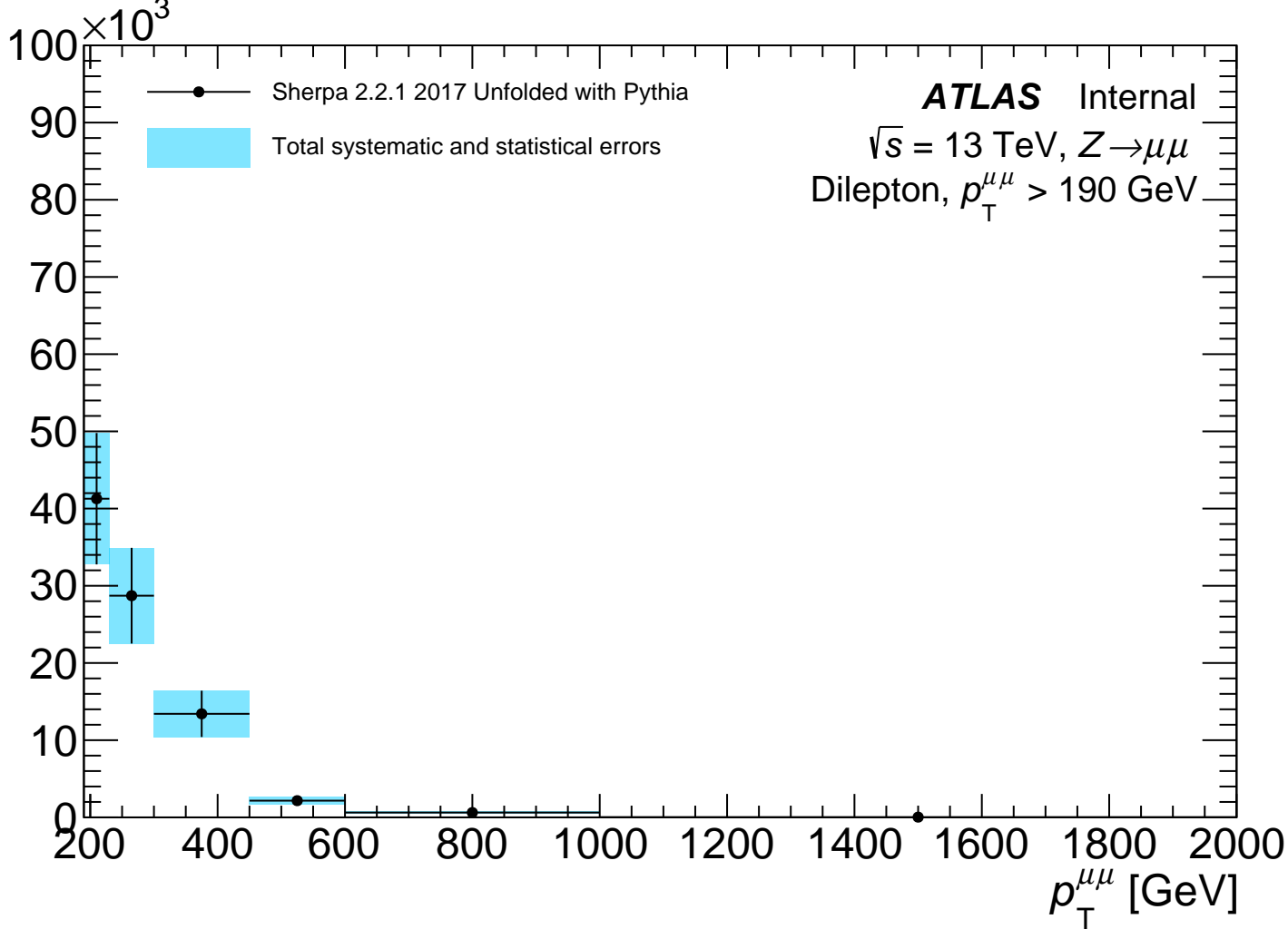
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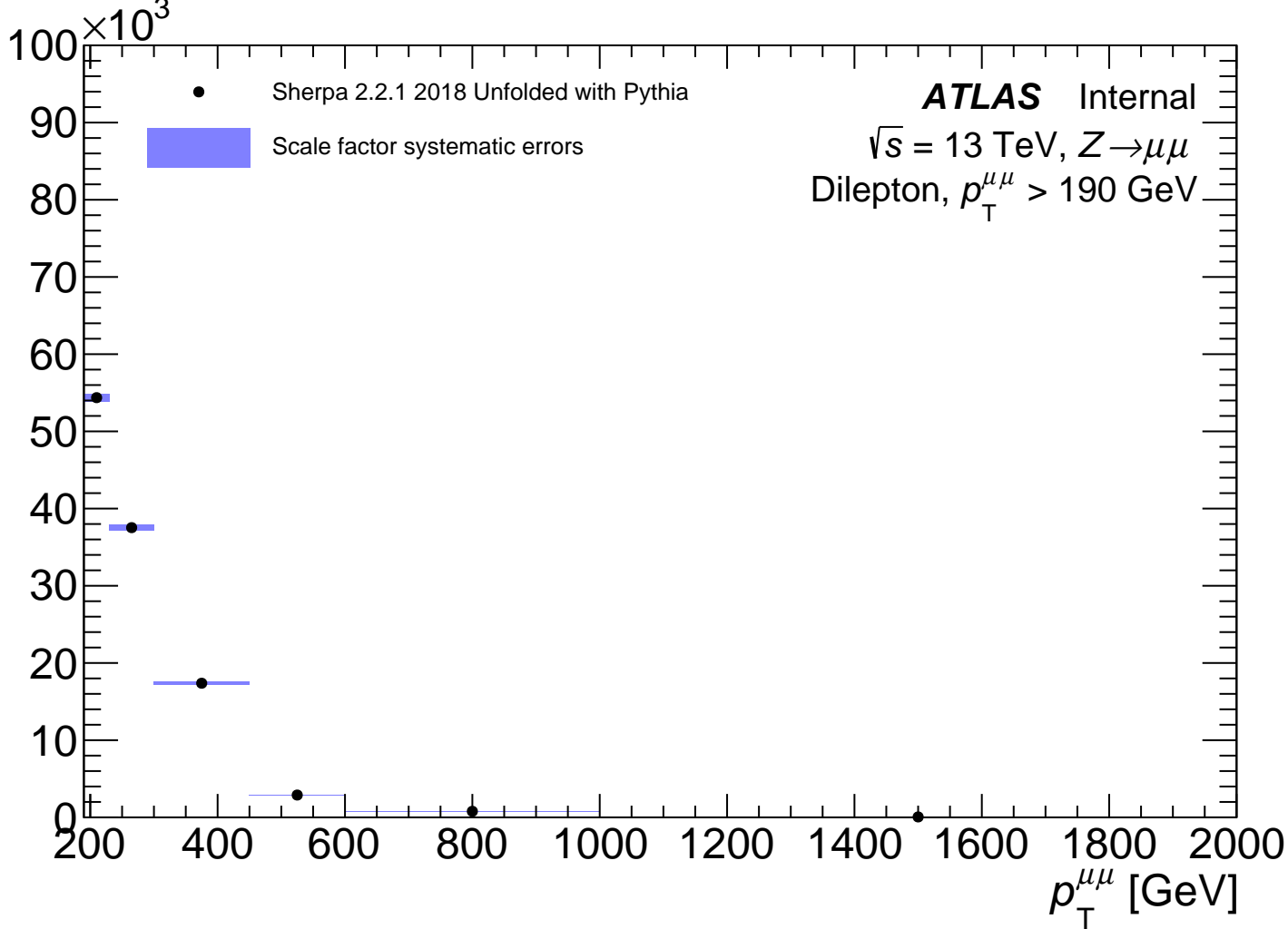
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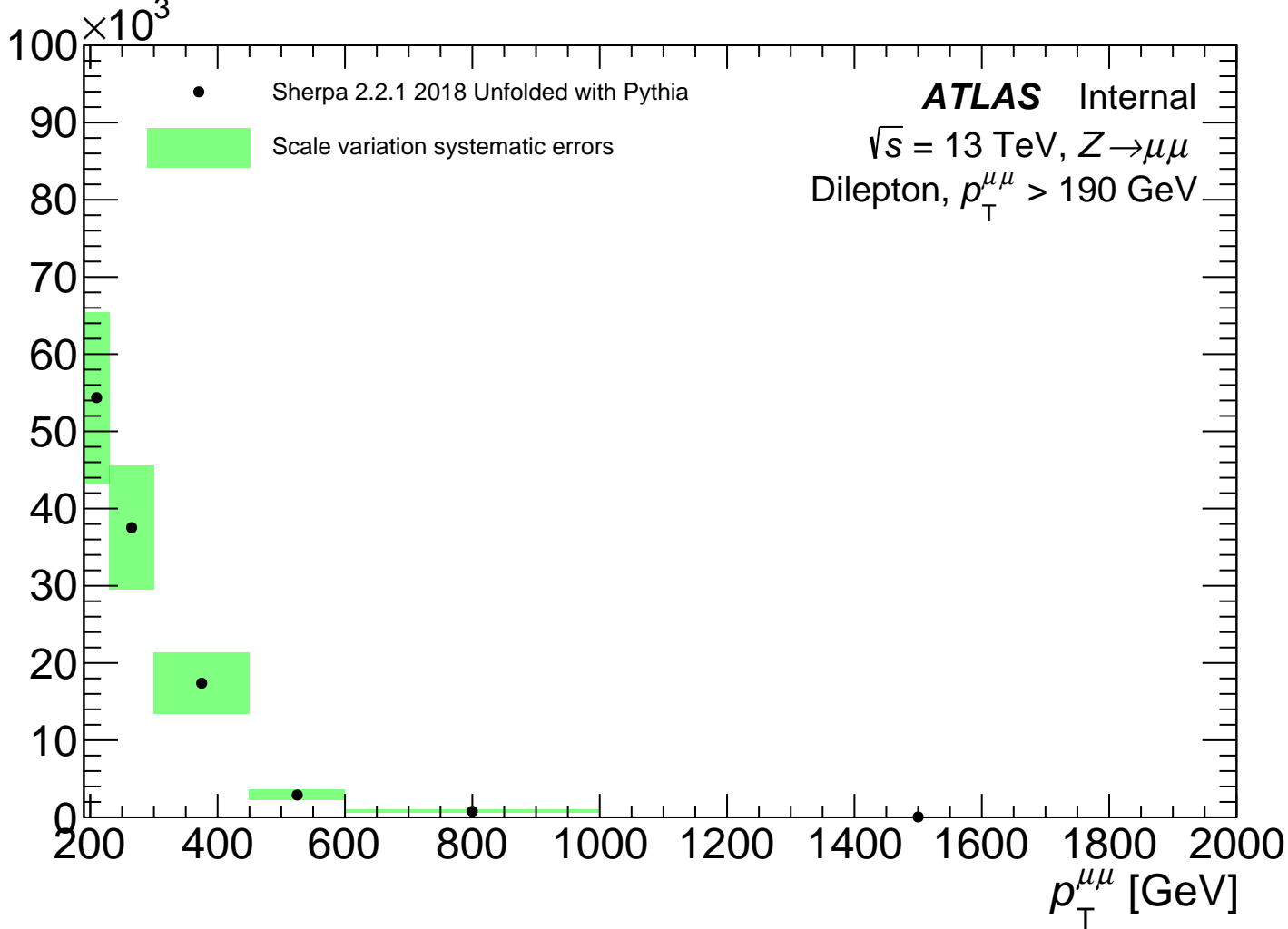
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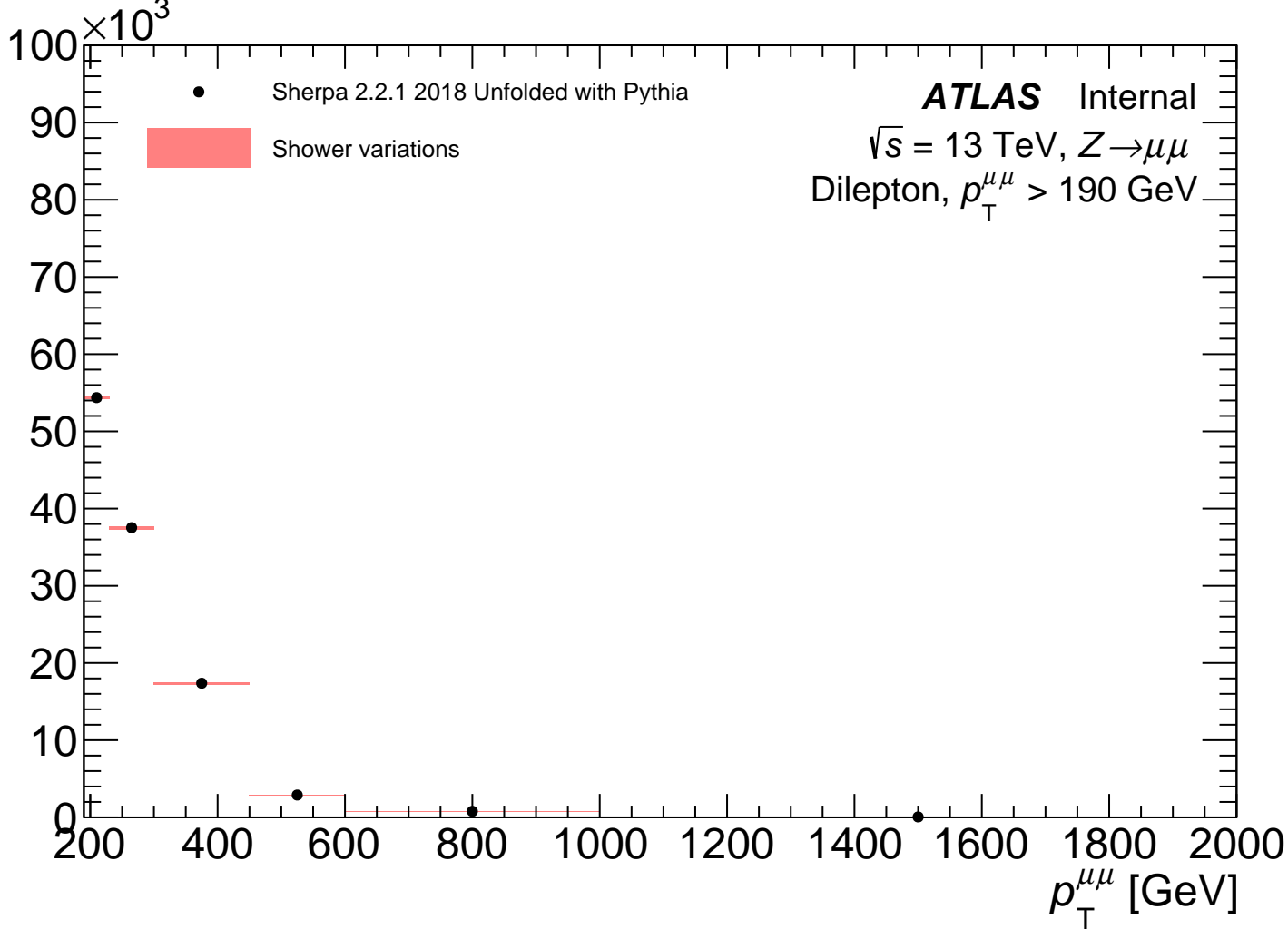
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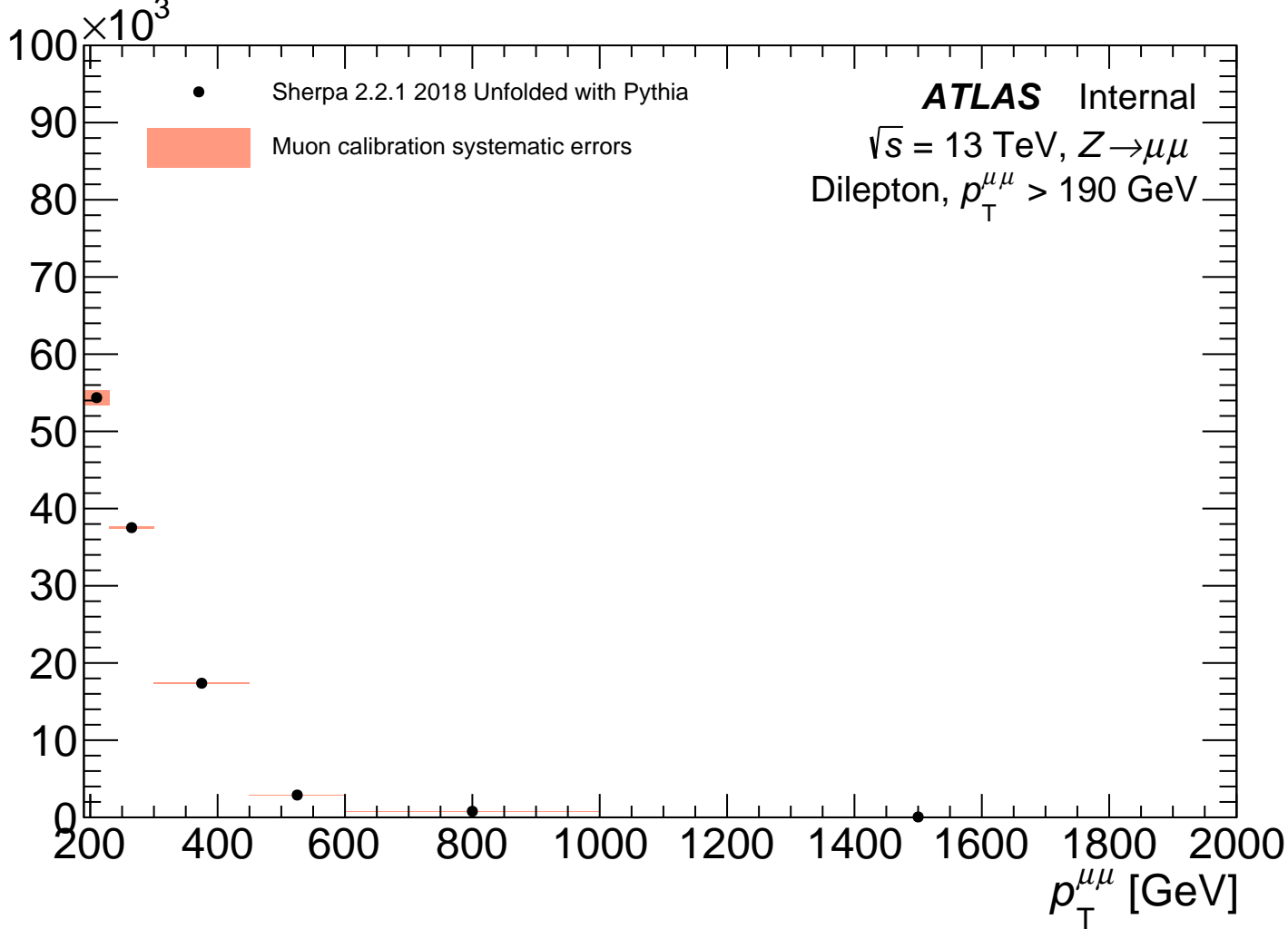
Events



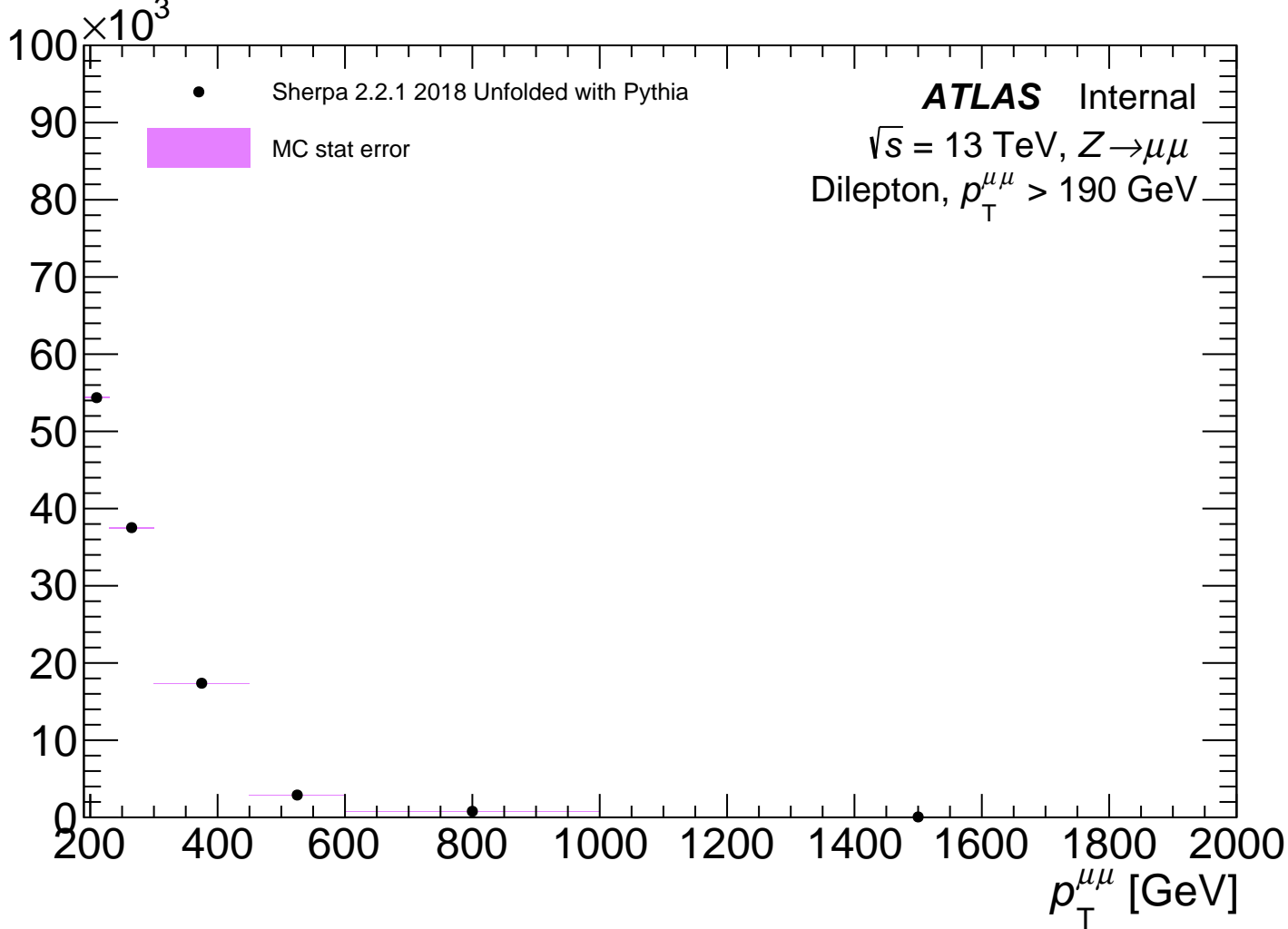
Events



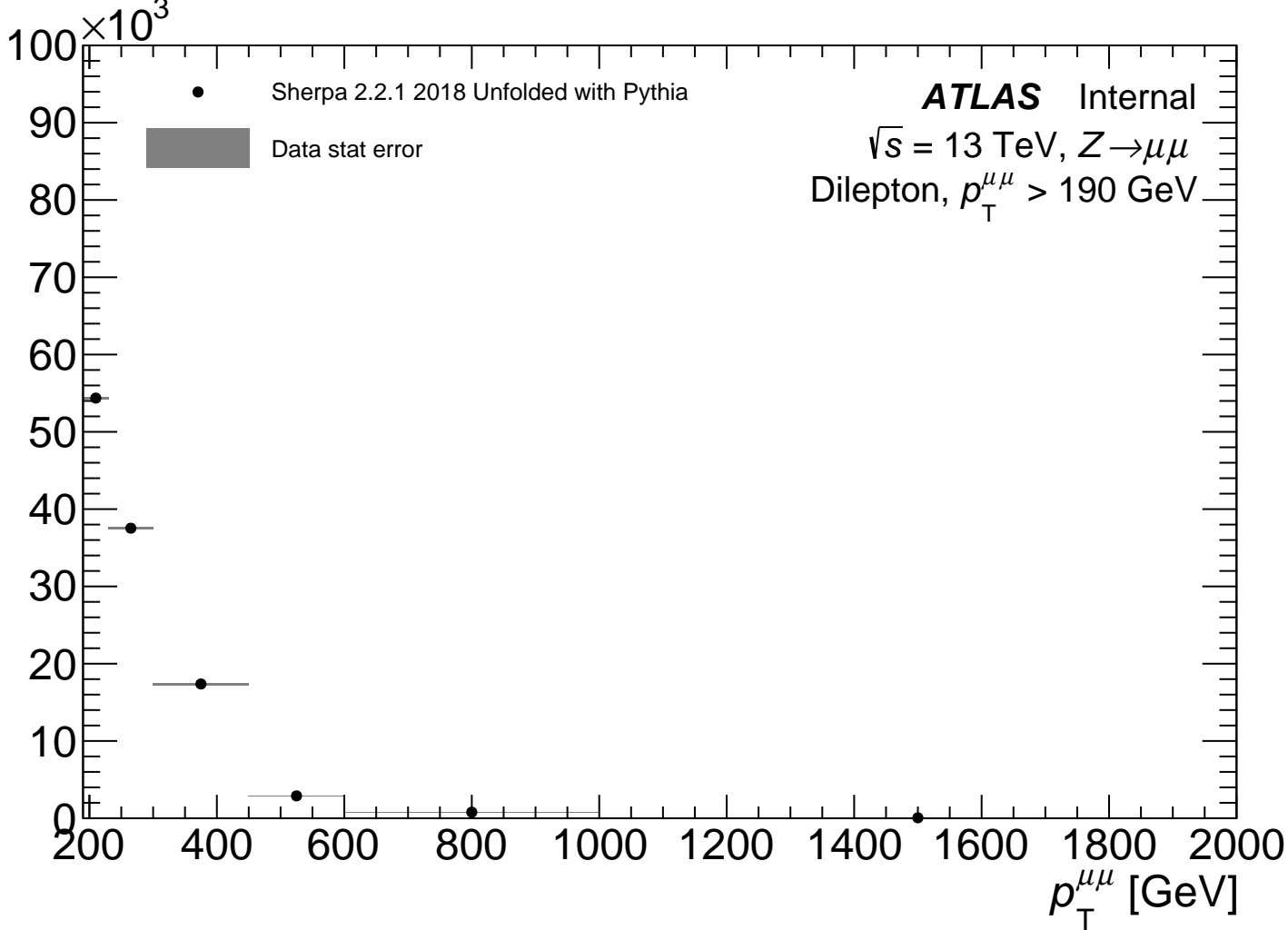
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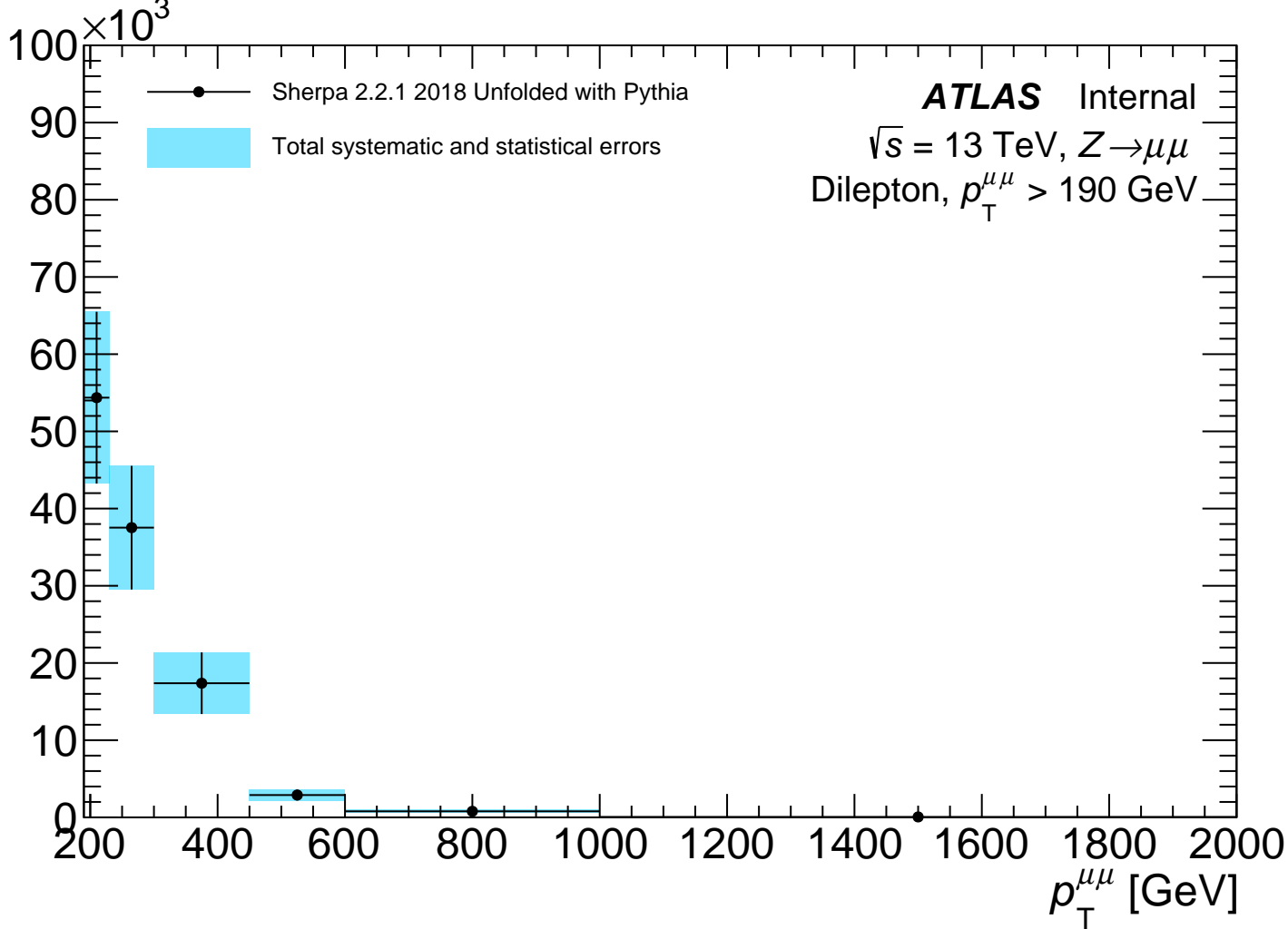
Events



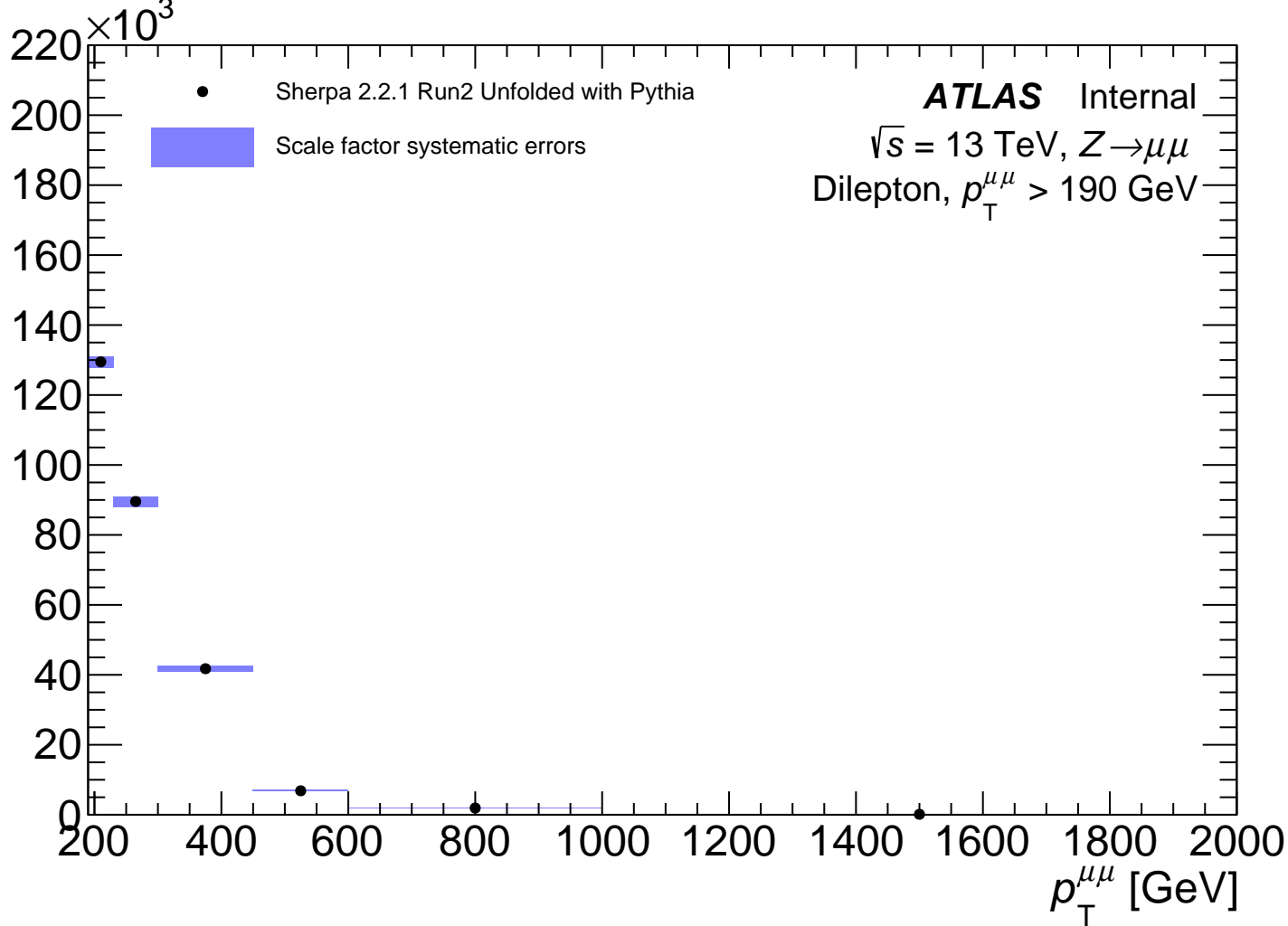
Events



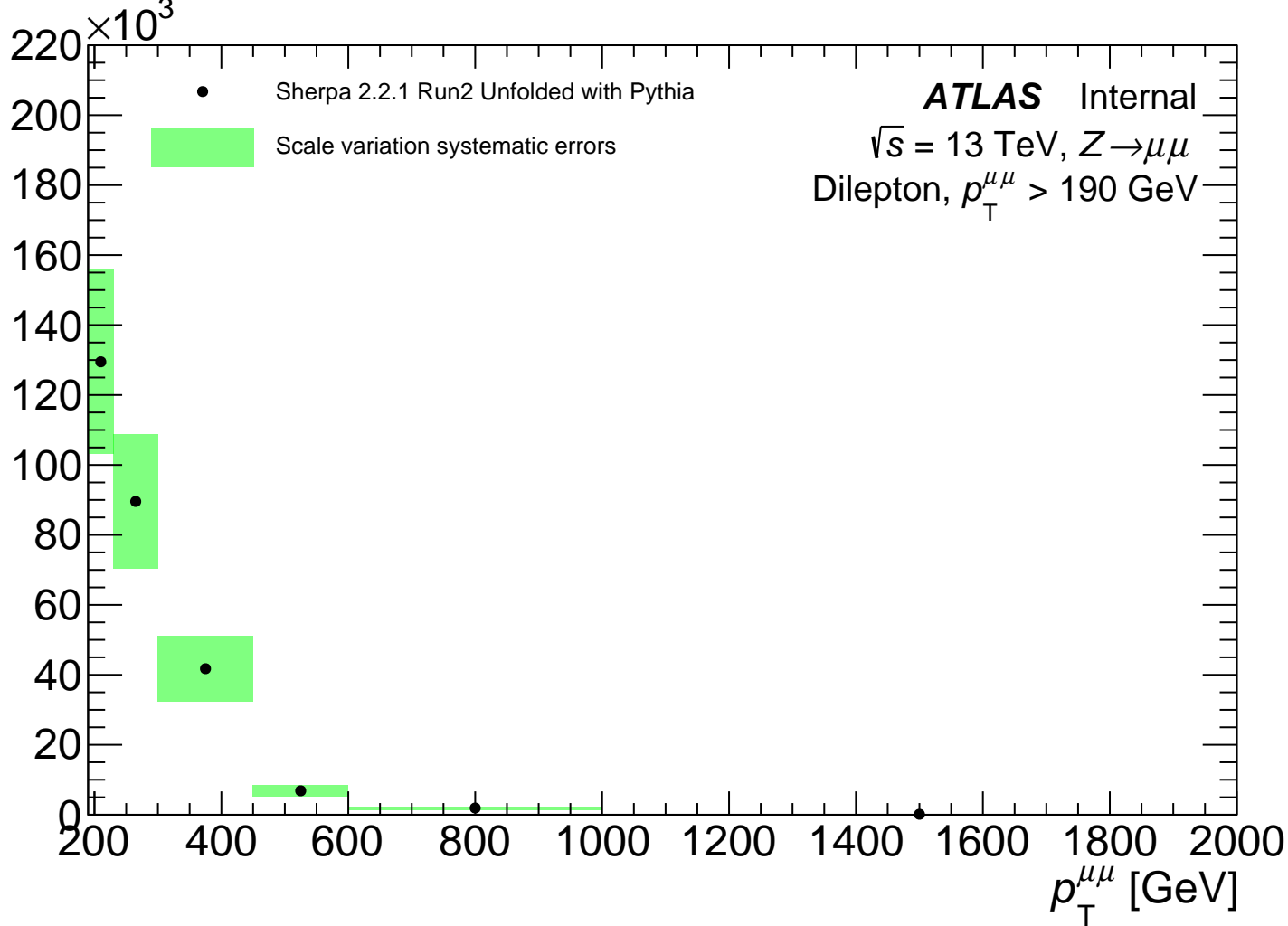
Events



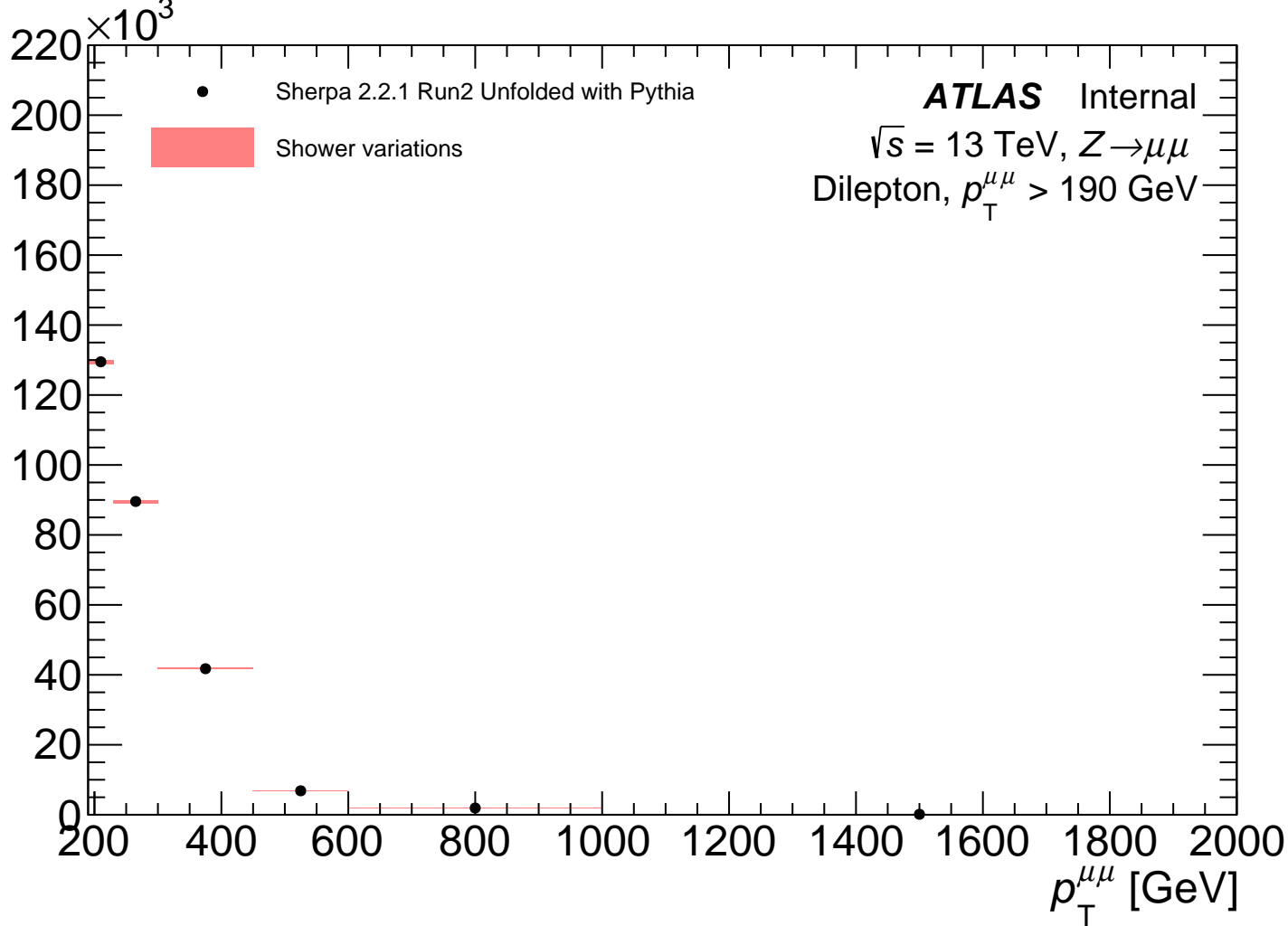
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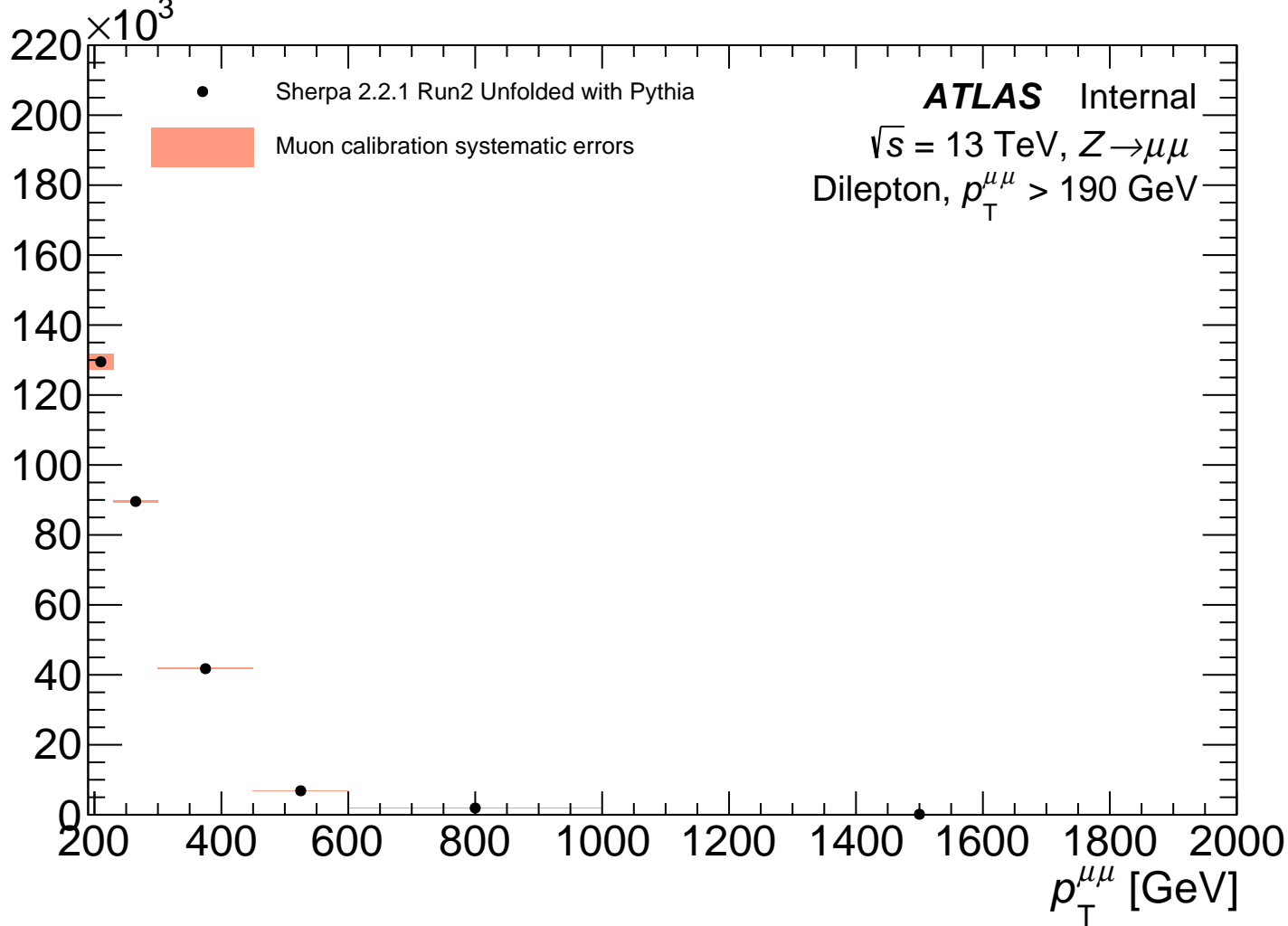
Events



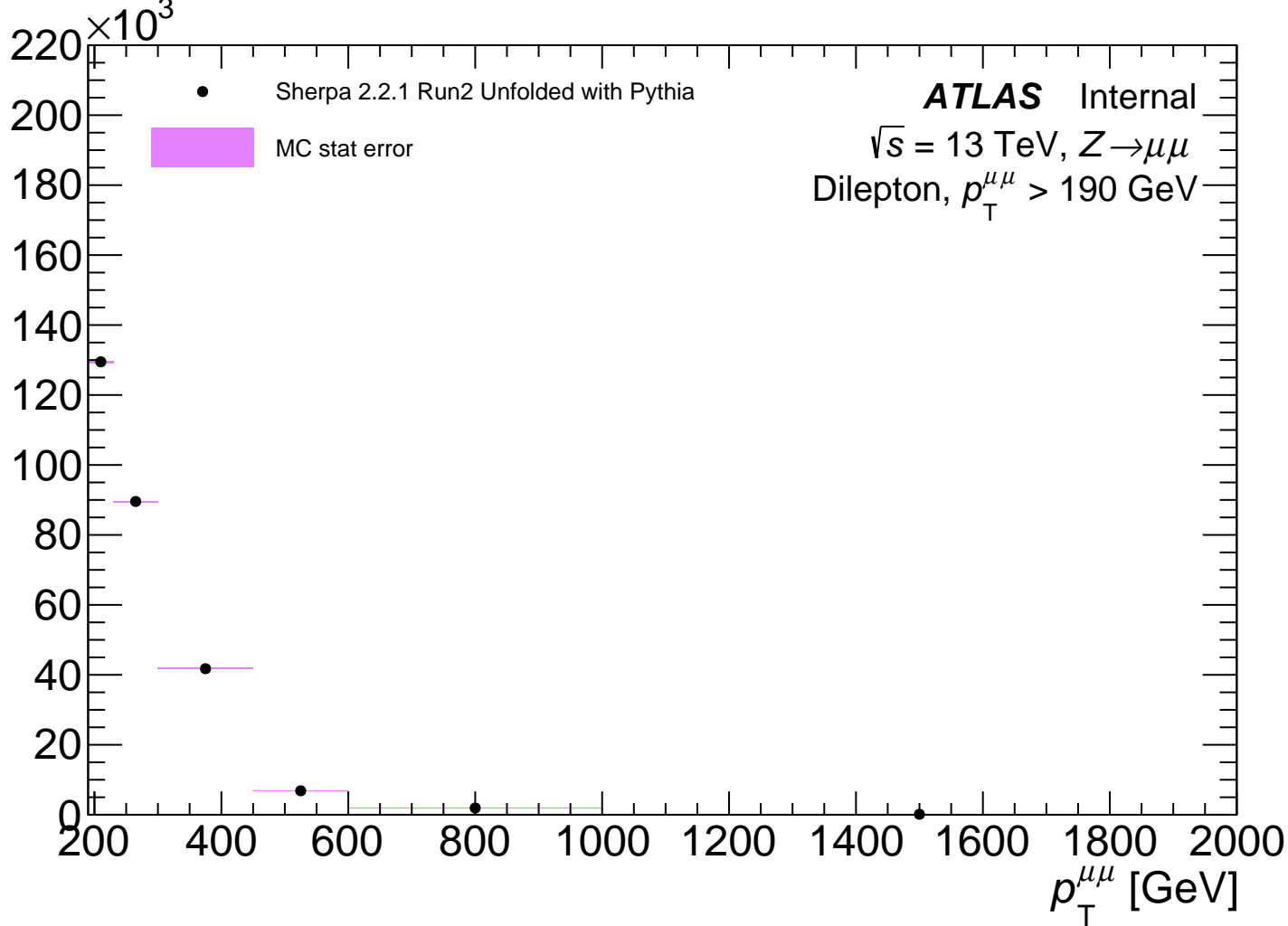
Events



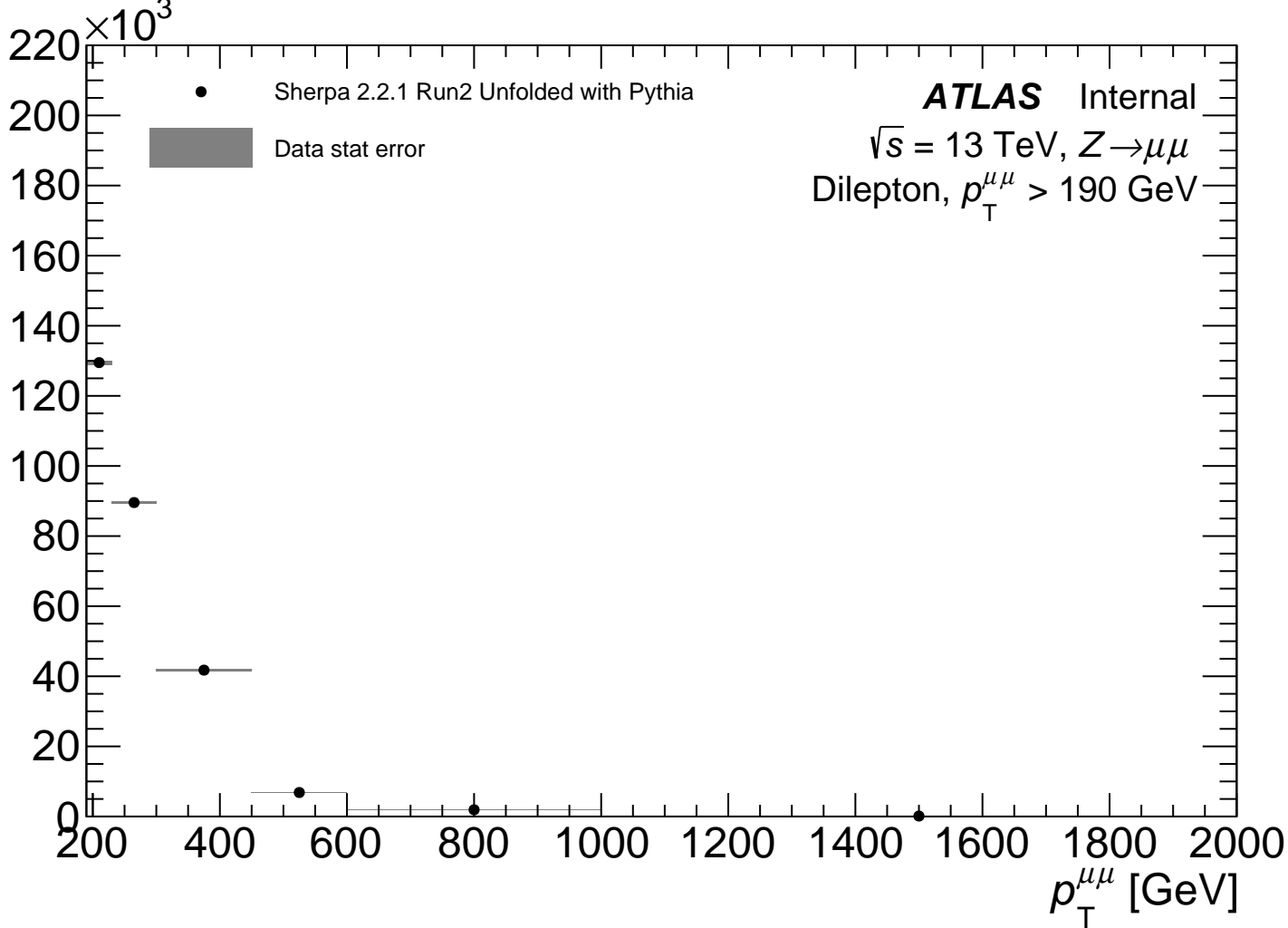
Events



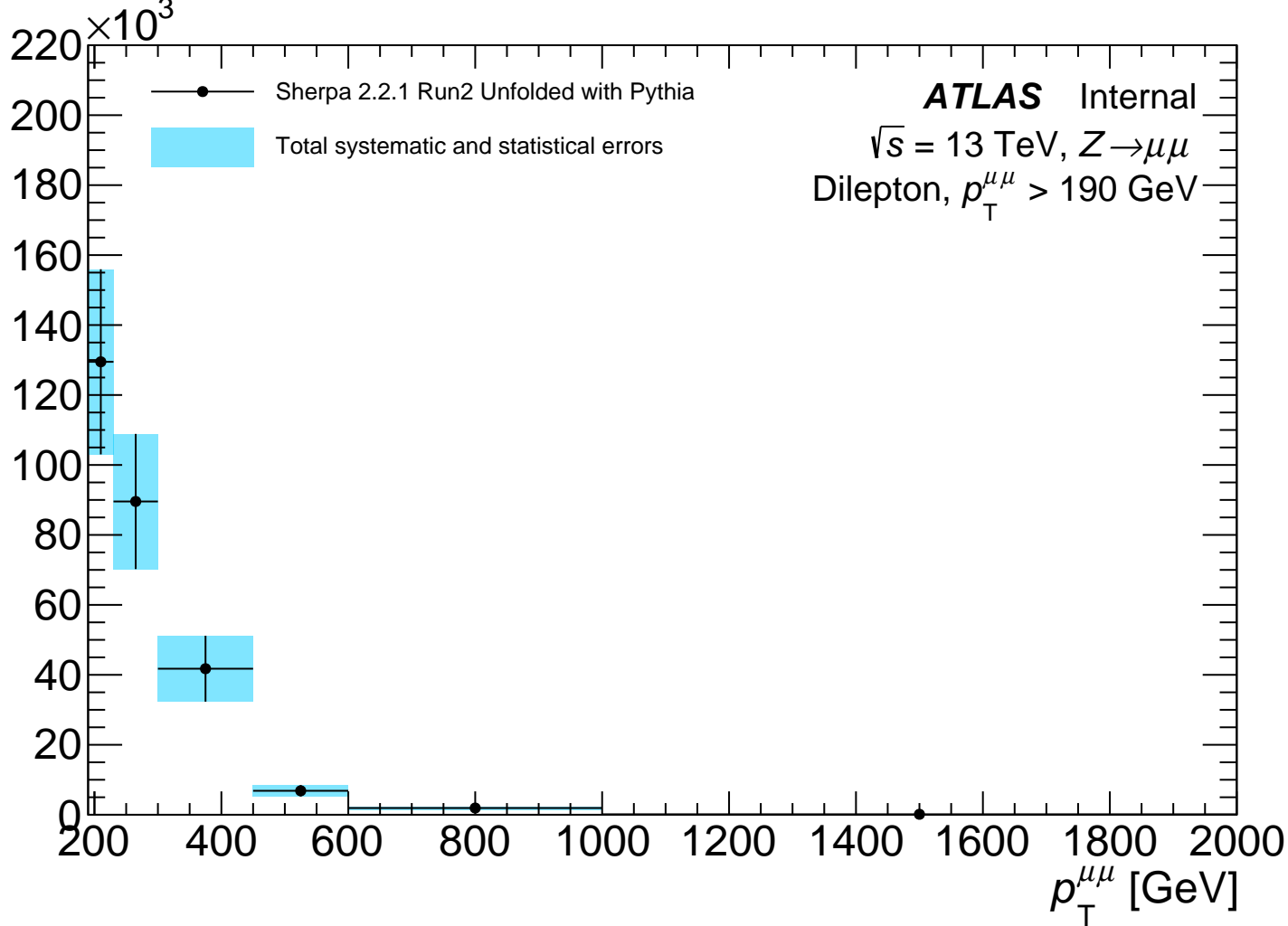
Events



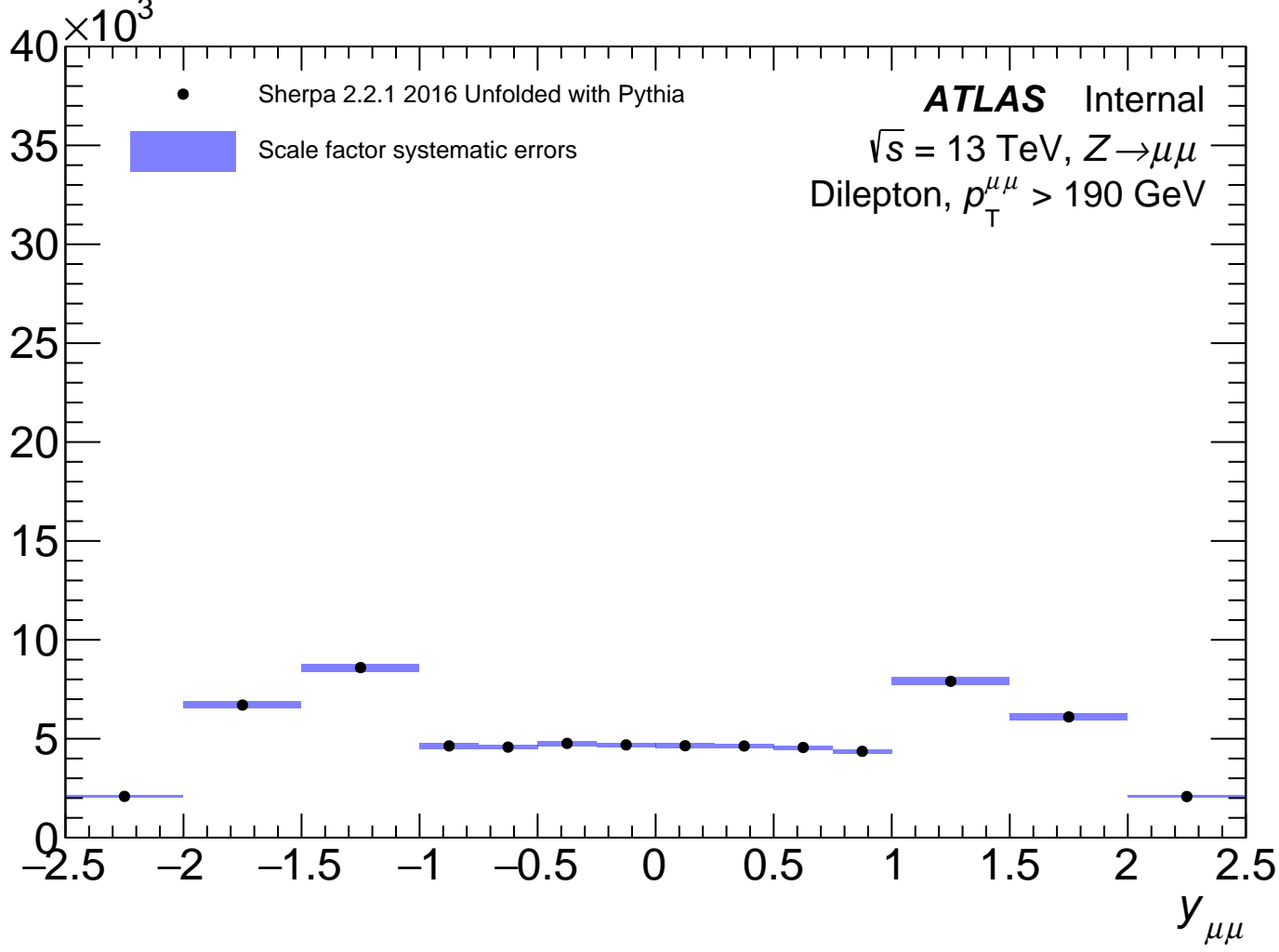
Events



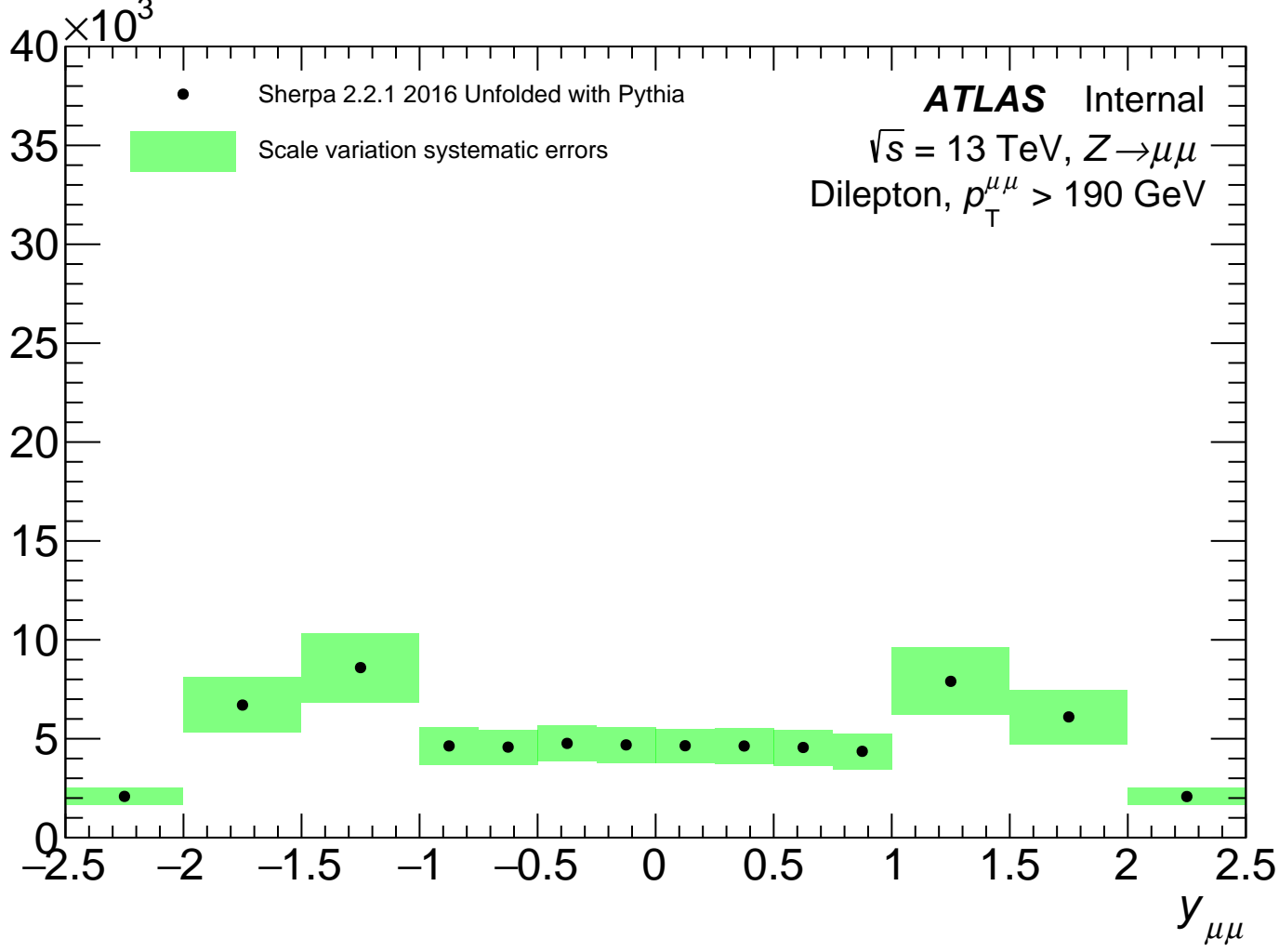
Events



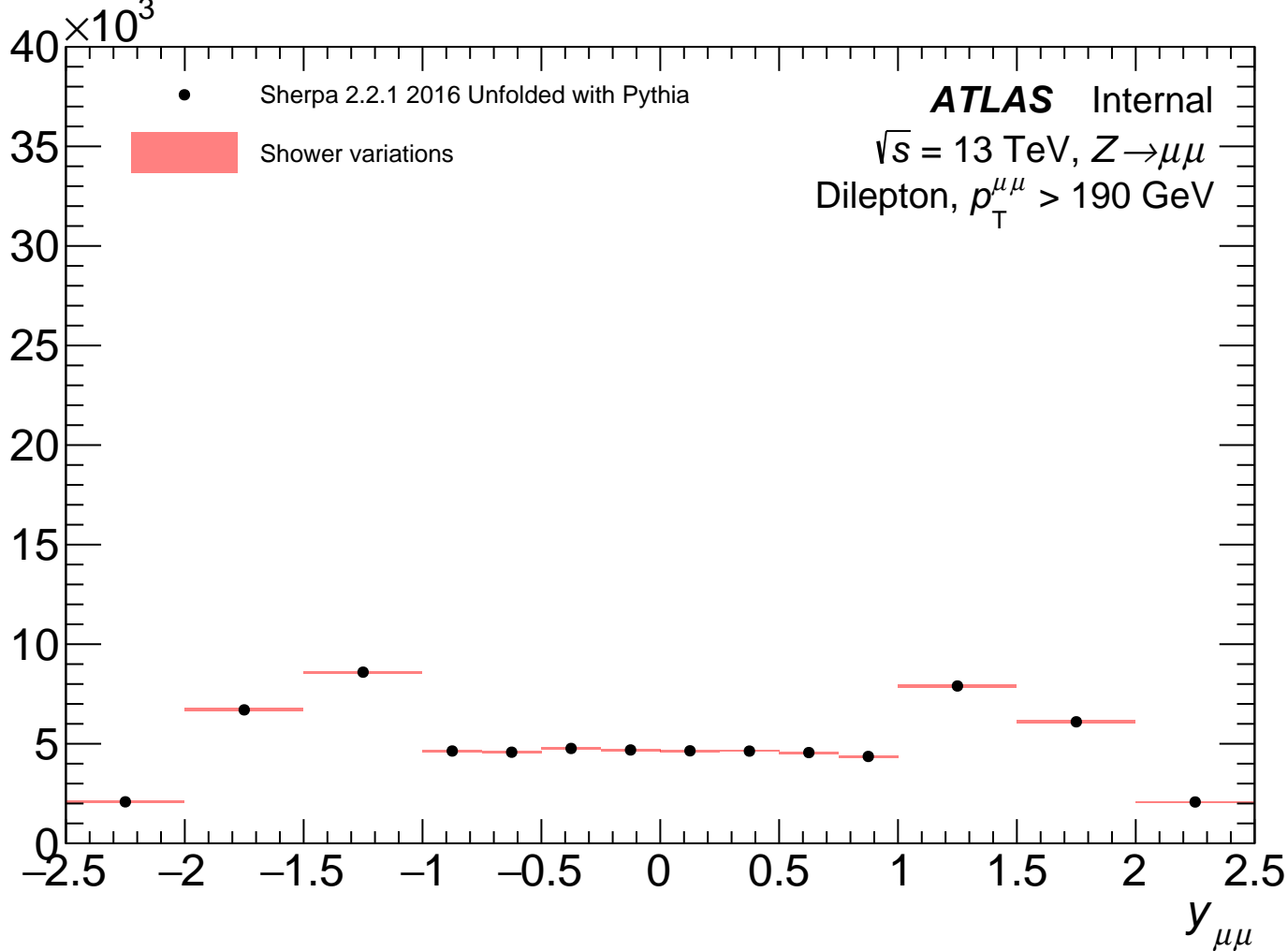
Events



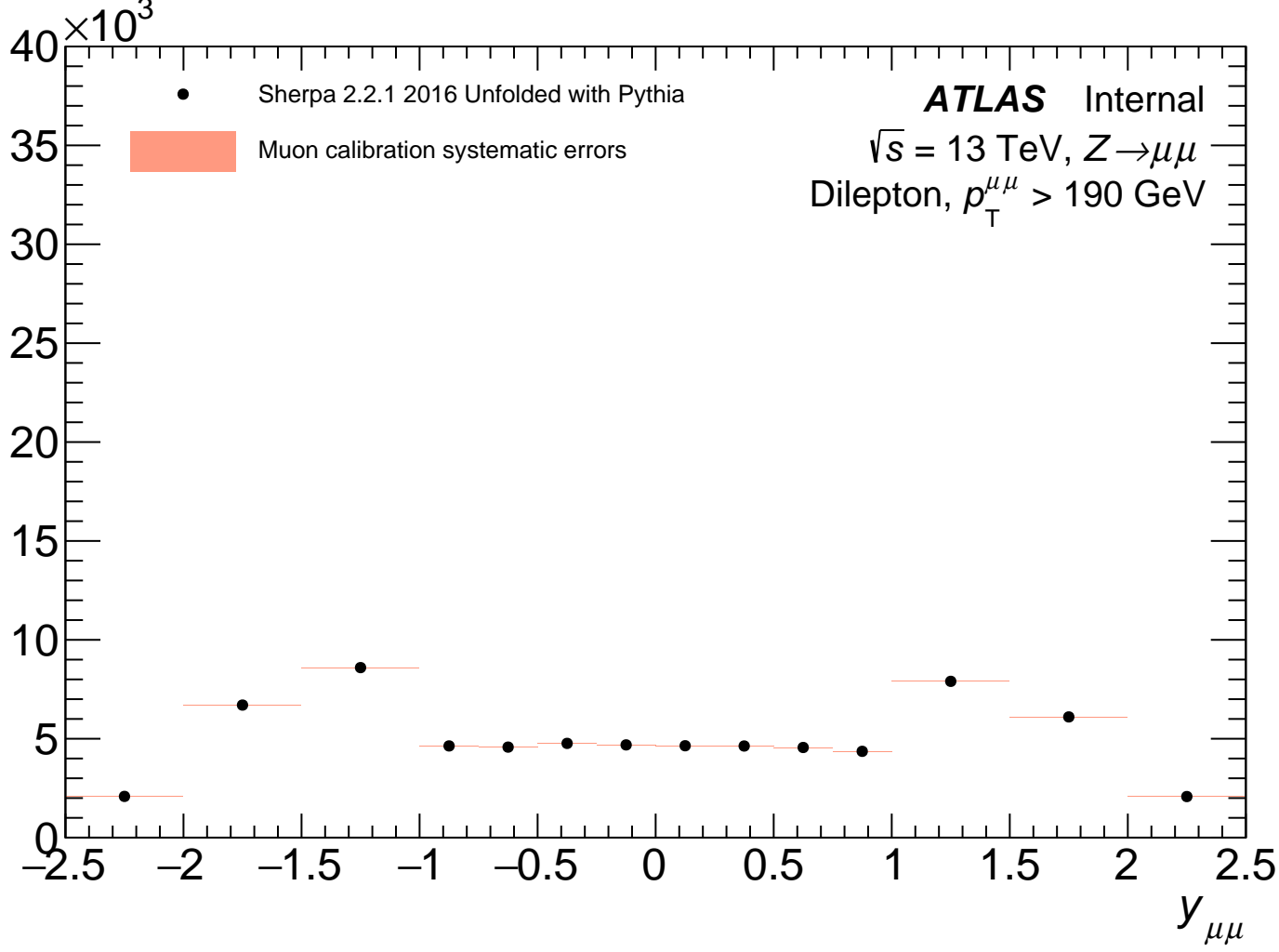
Events



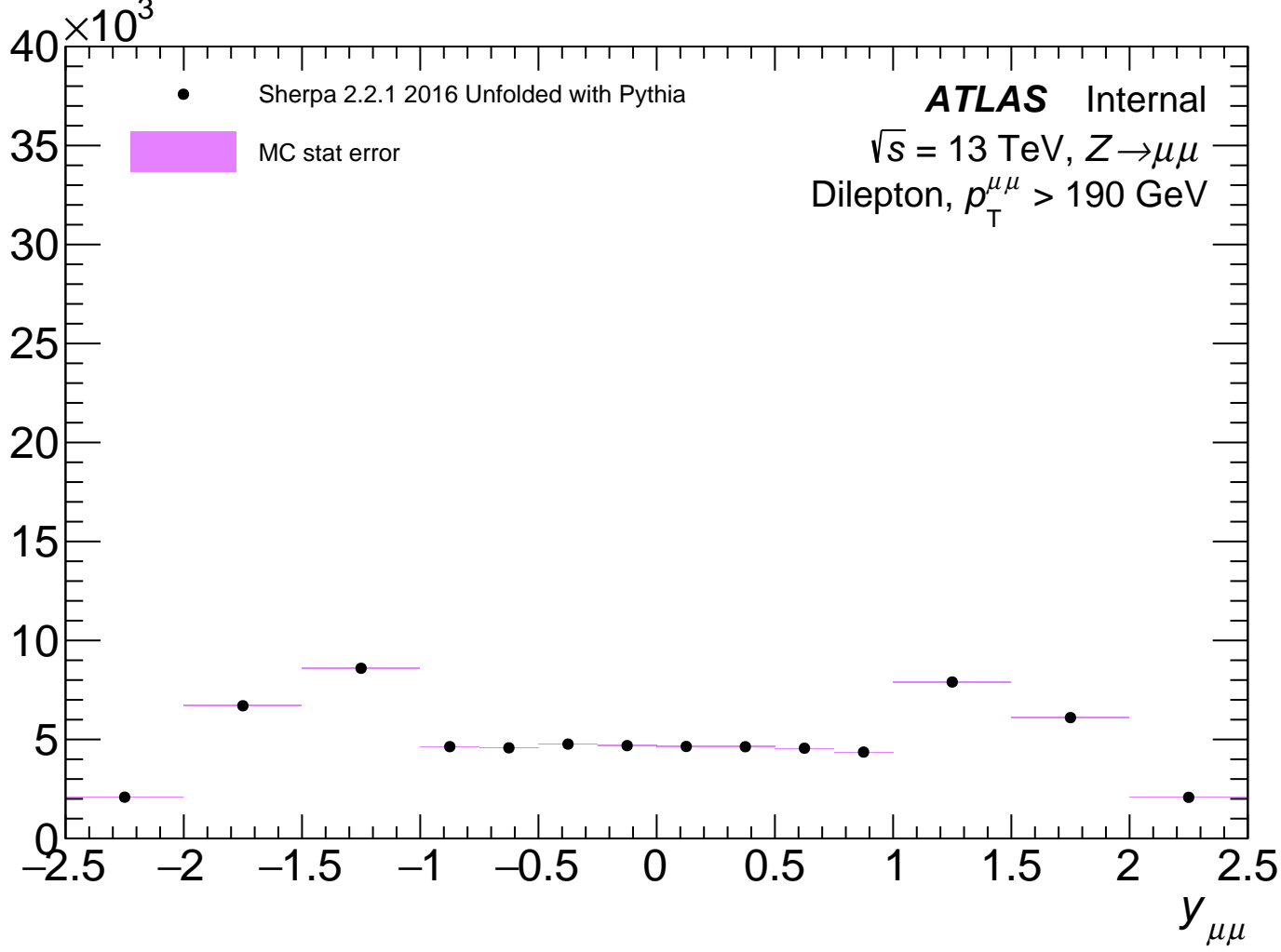
Events



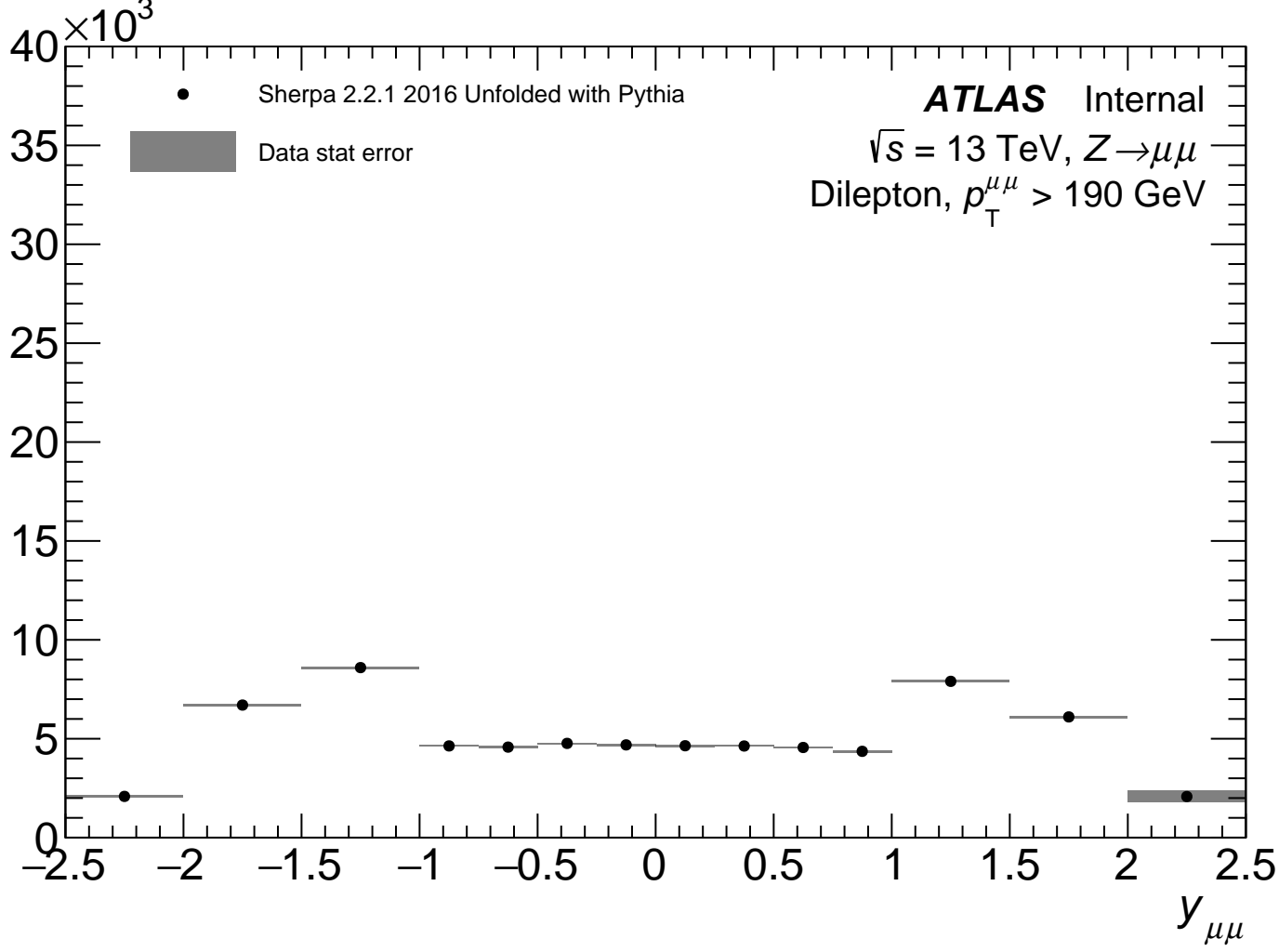
Events



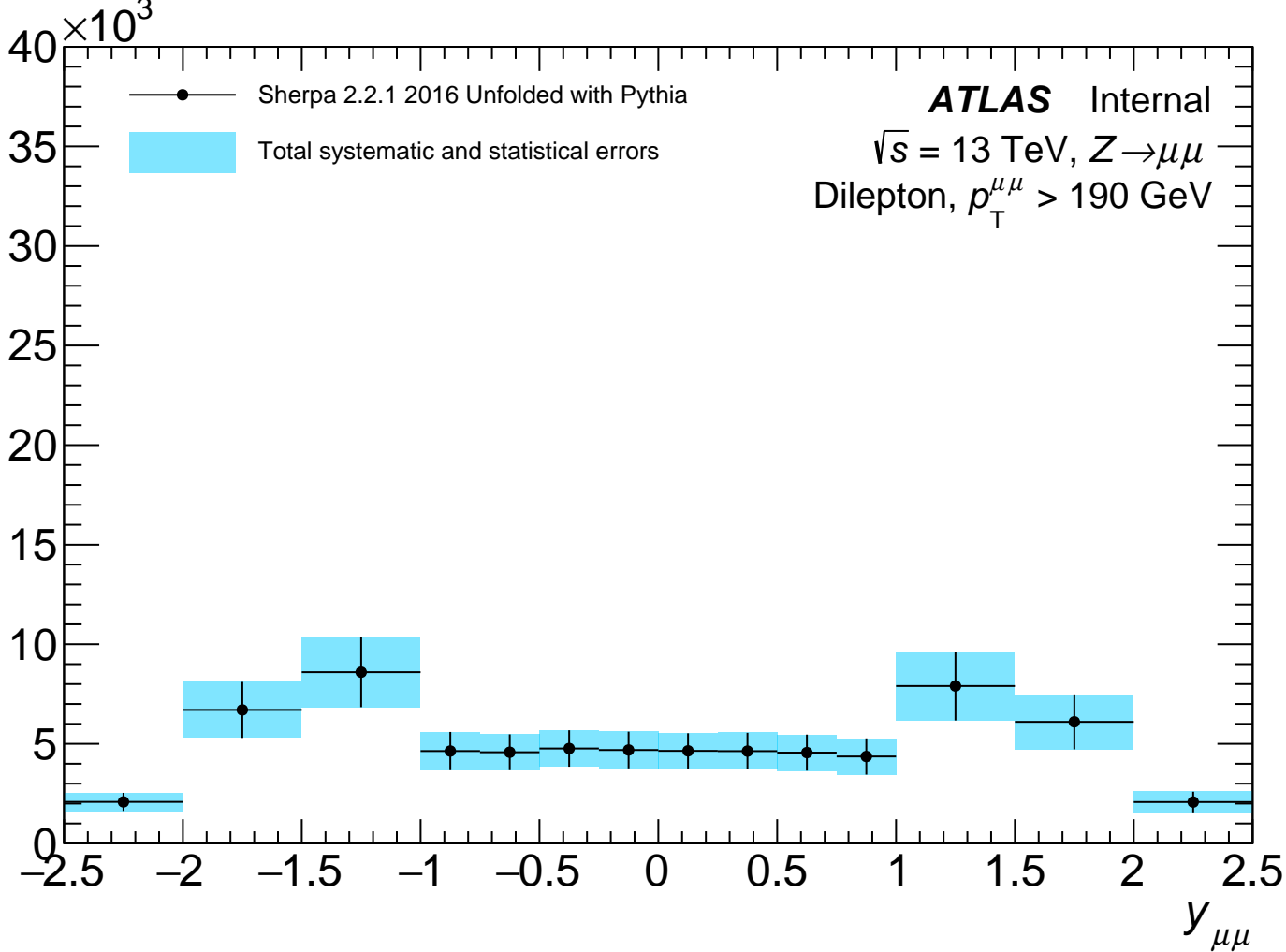
Events



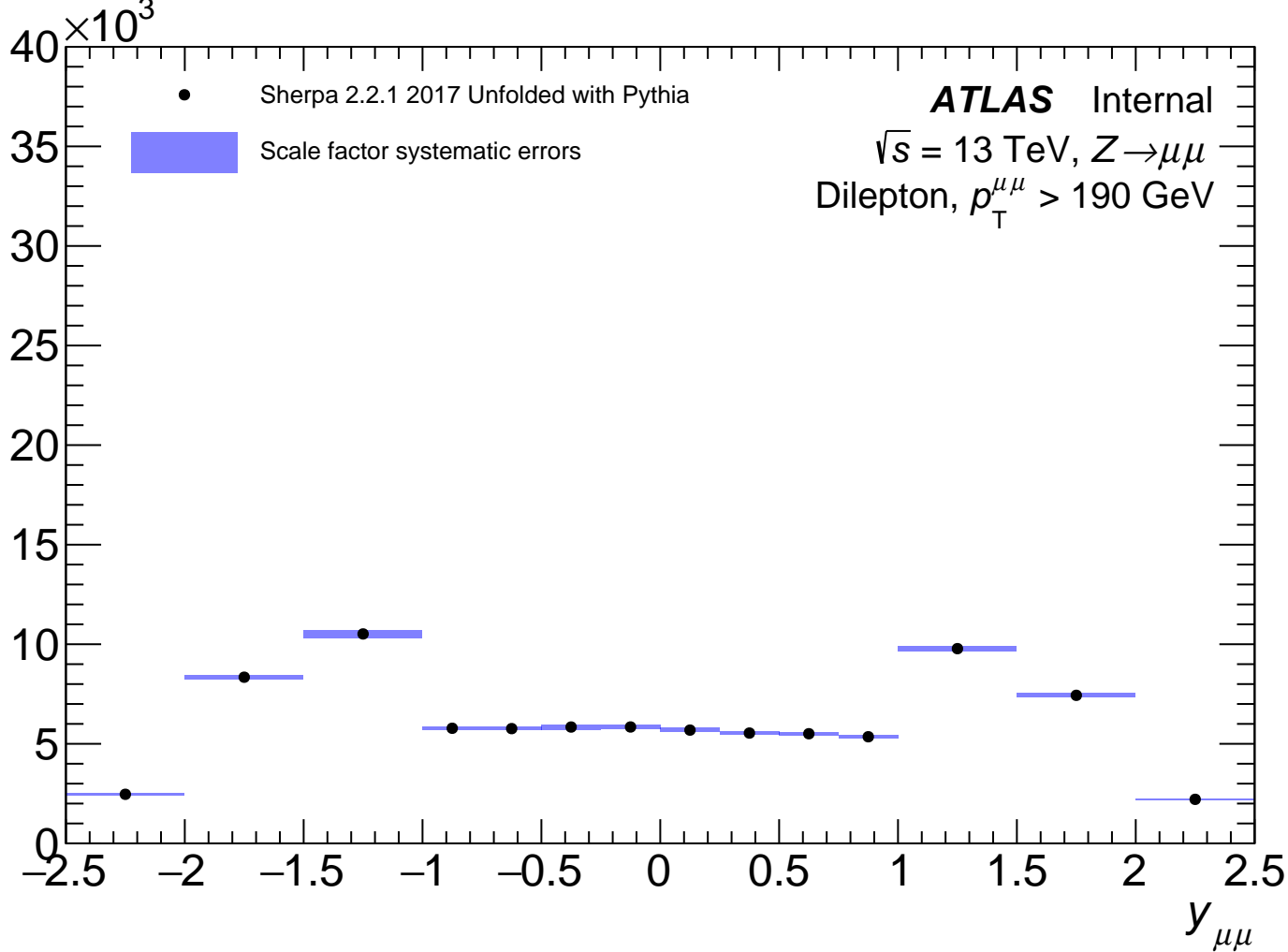
Events



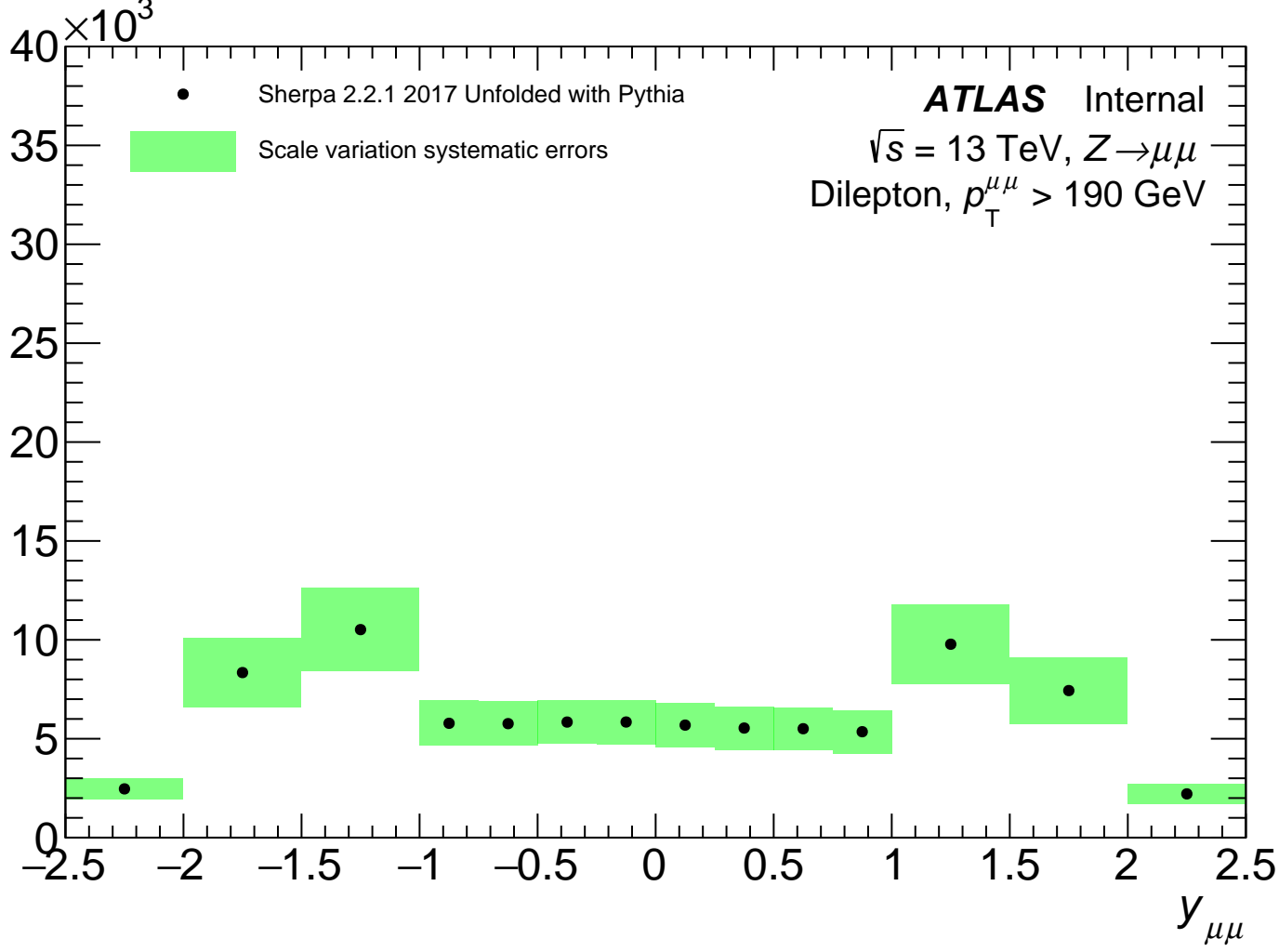
Events



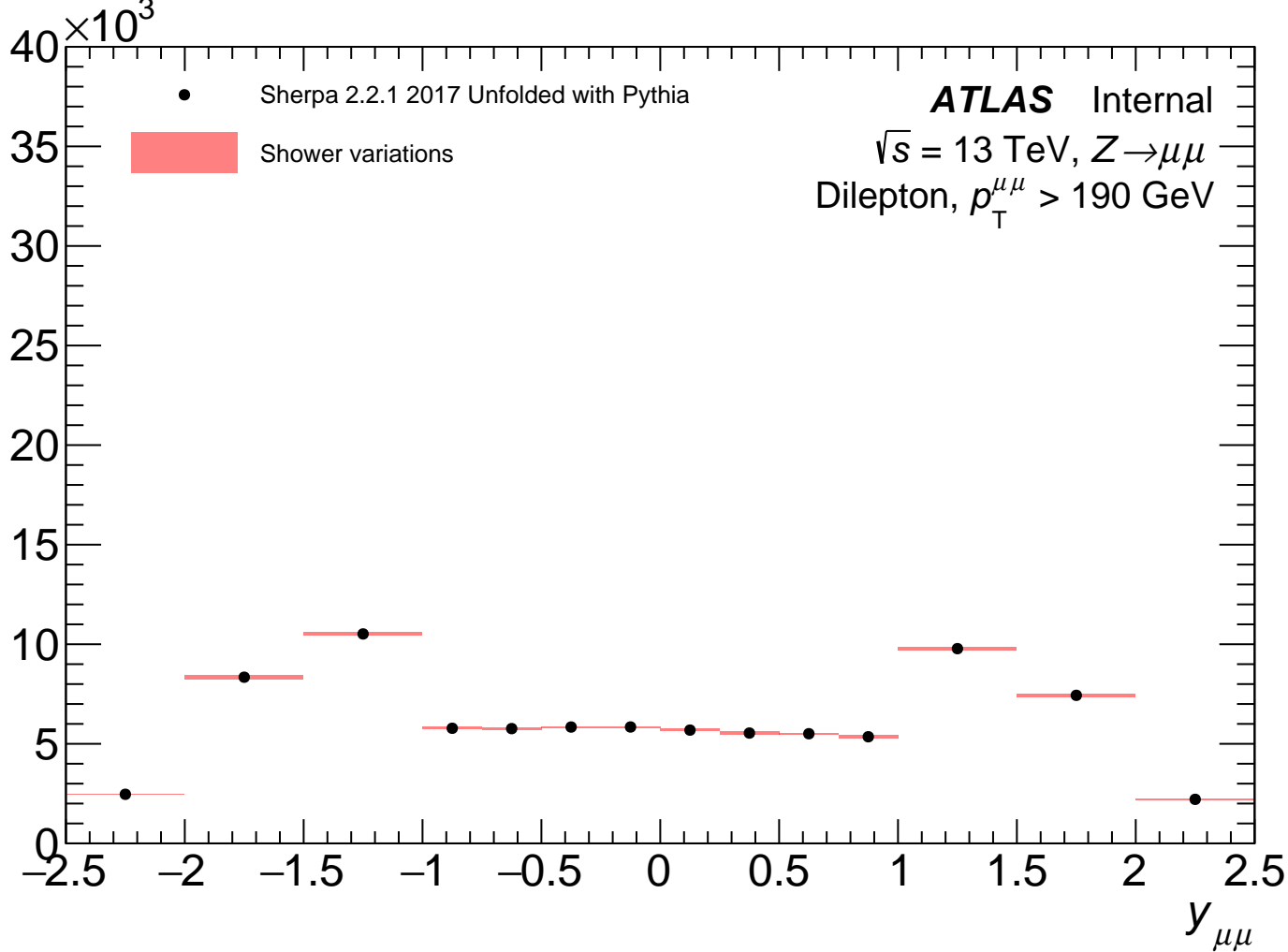
Events



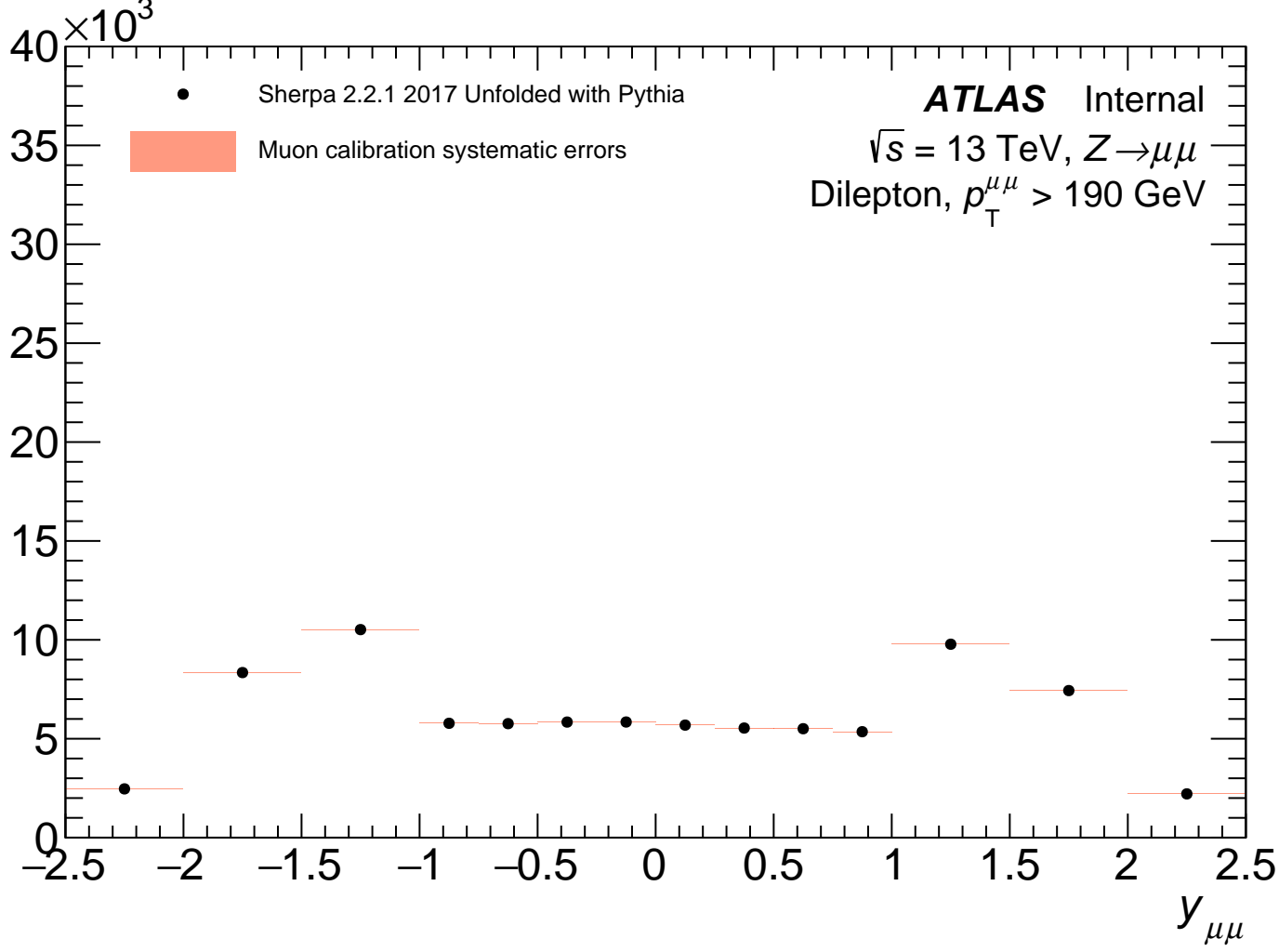
Events



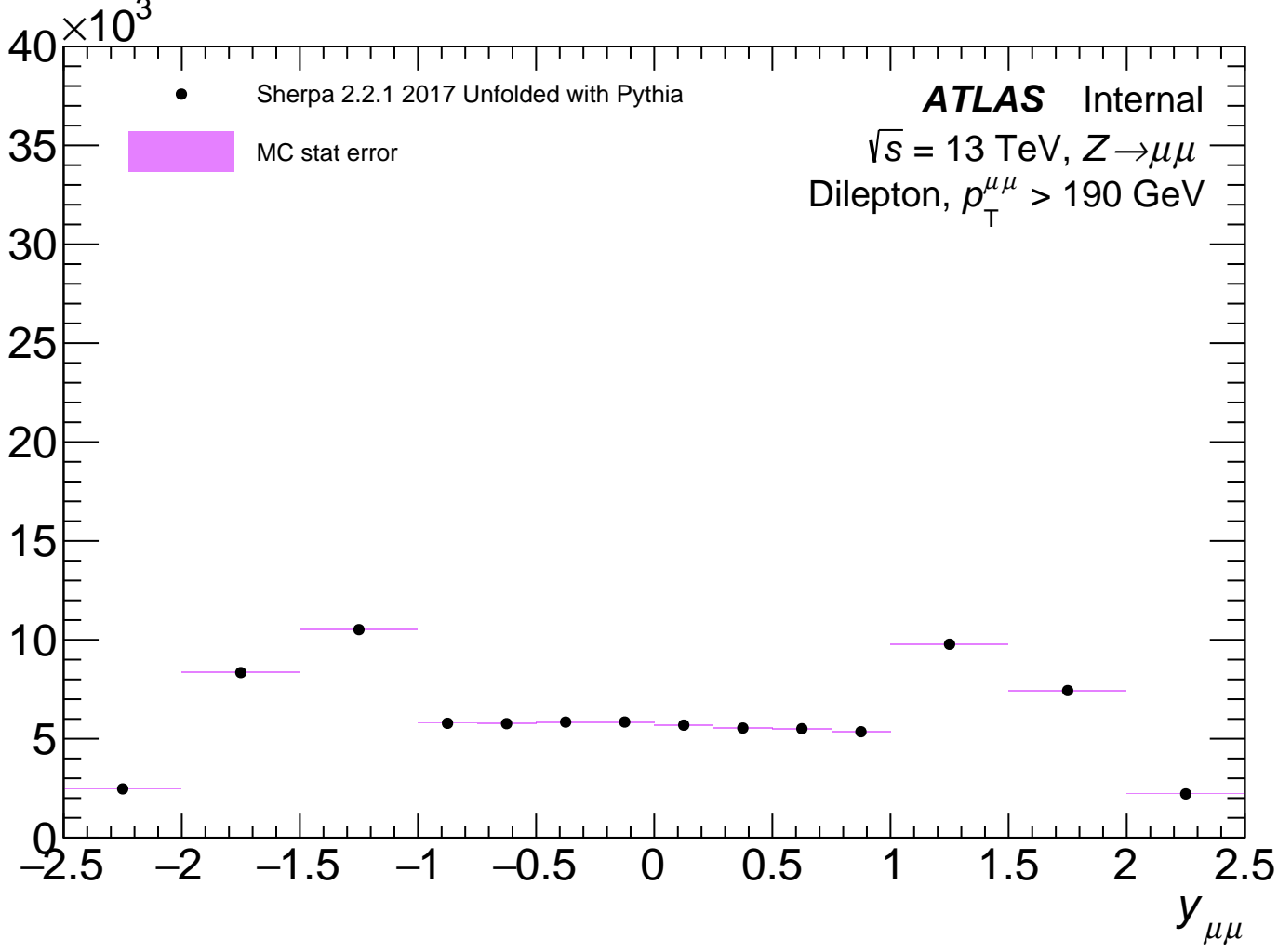
Events



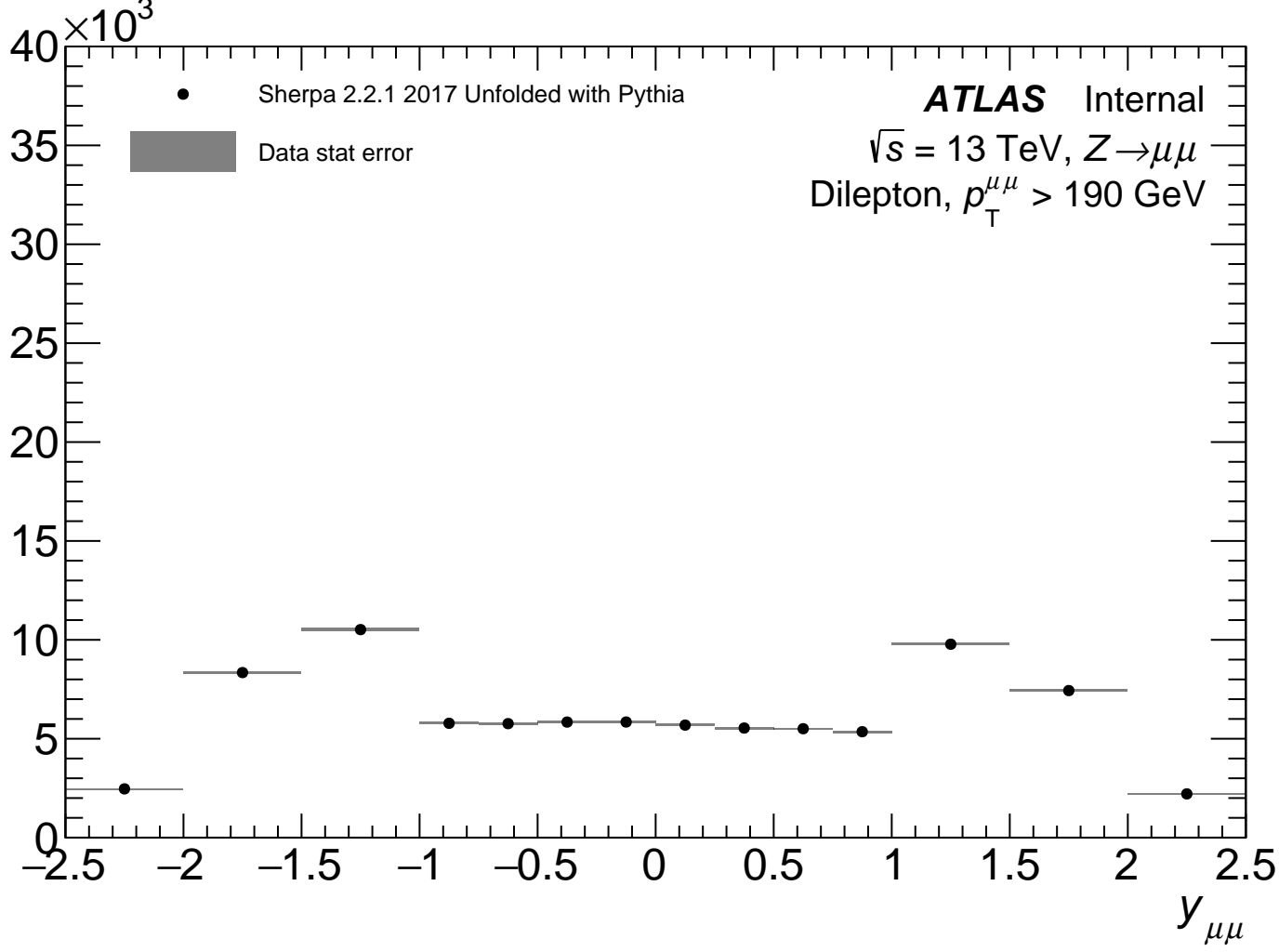
Events



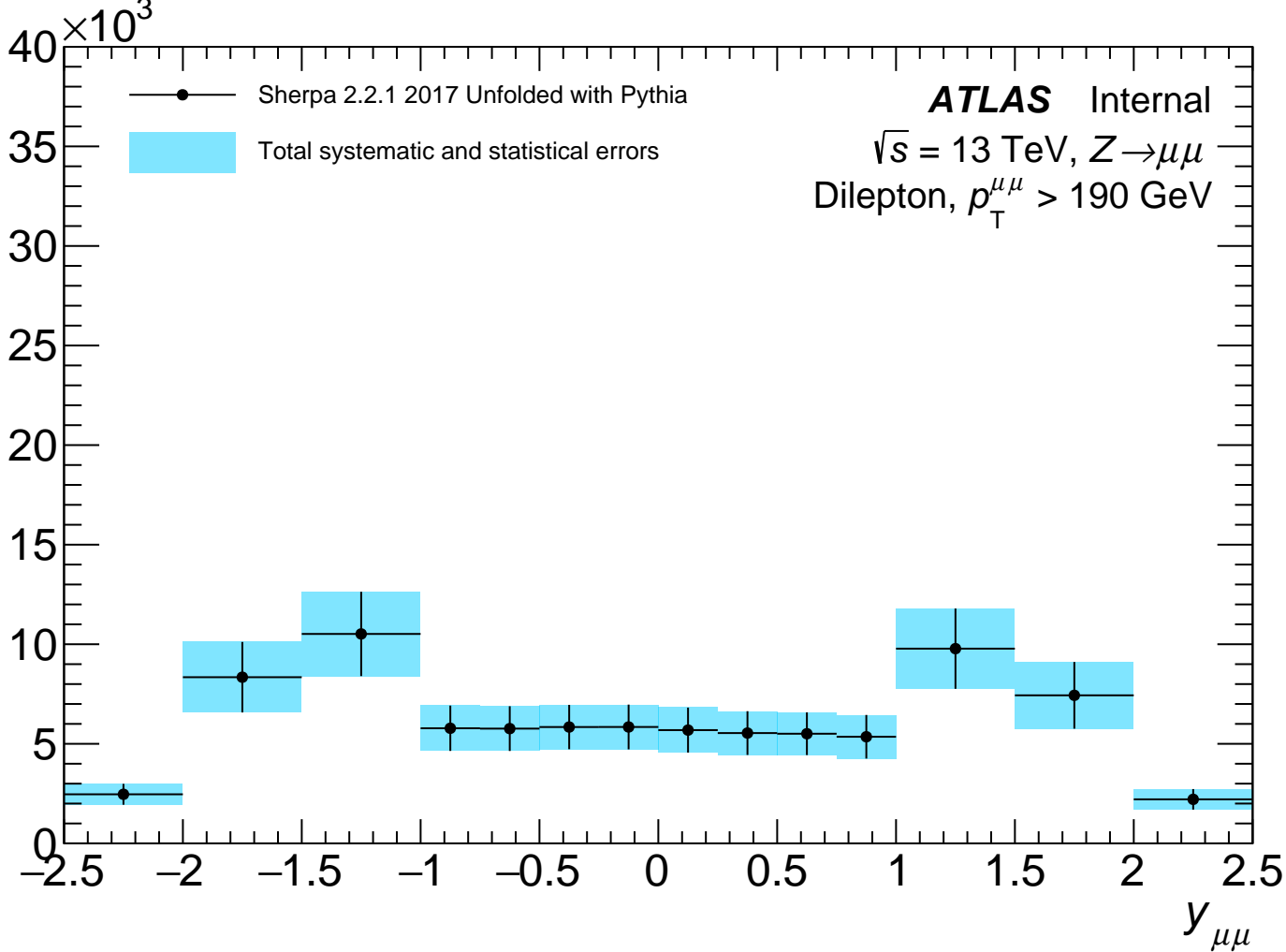
Events



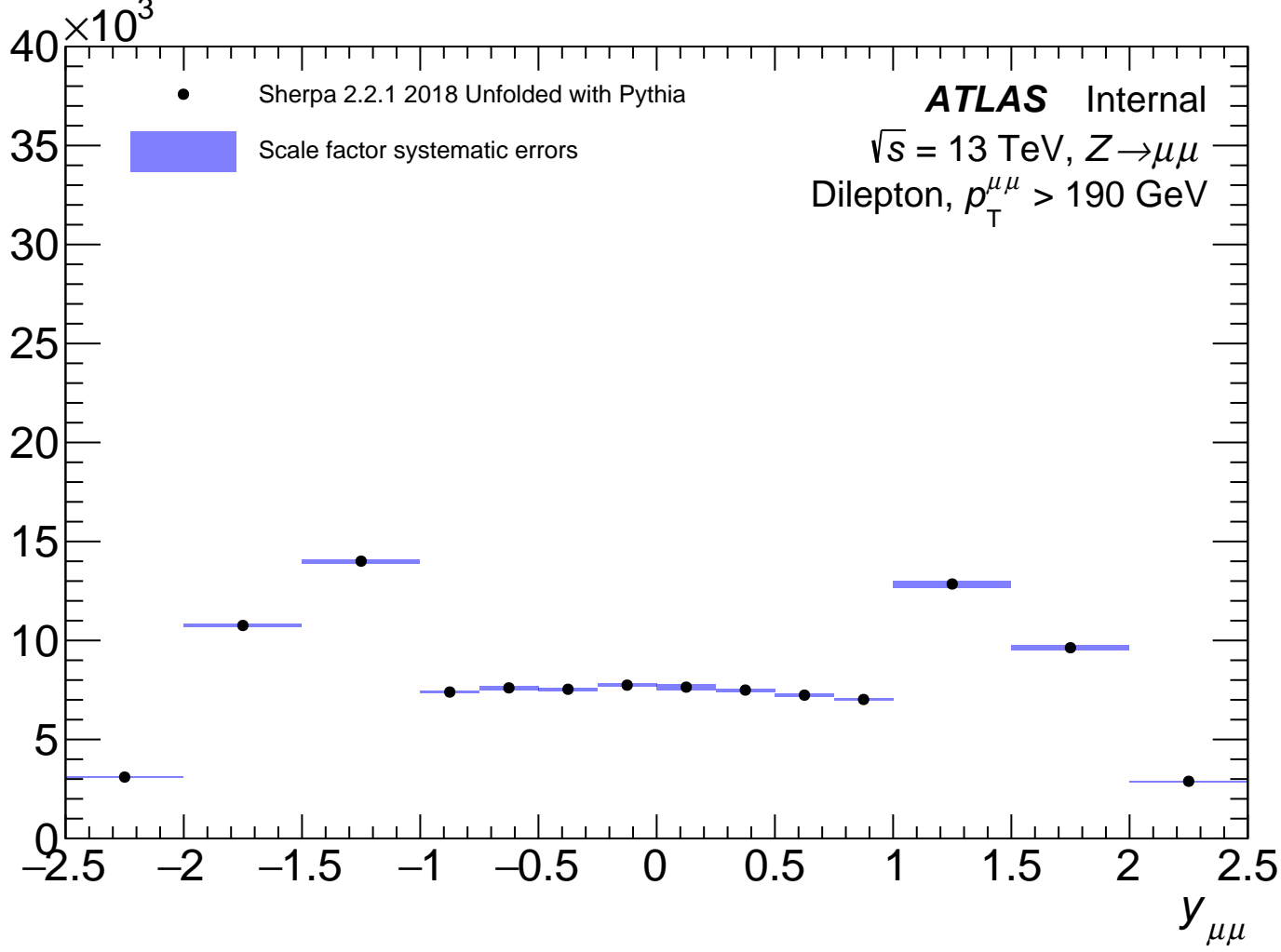
Events



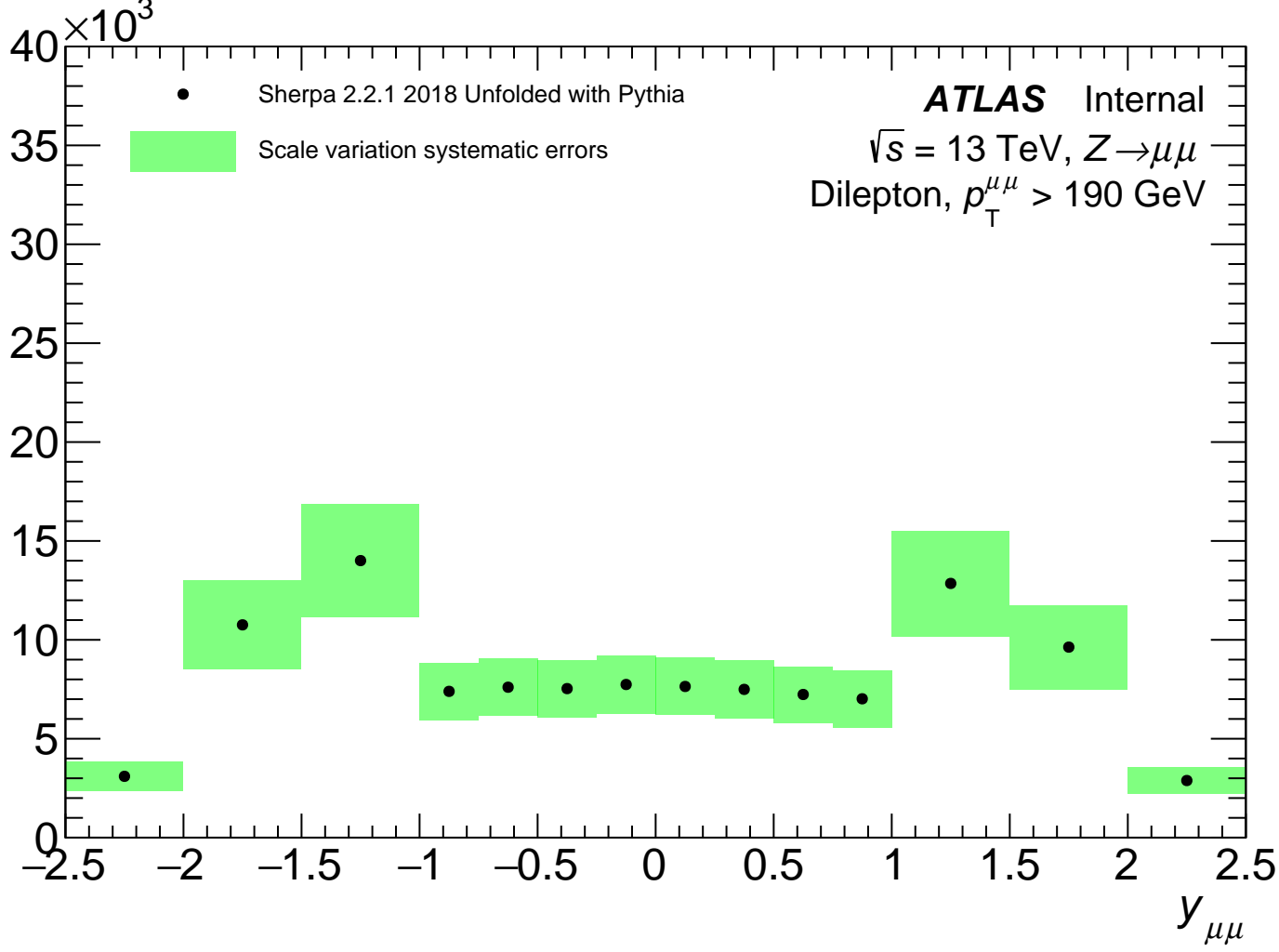
Events



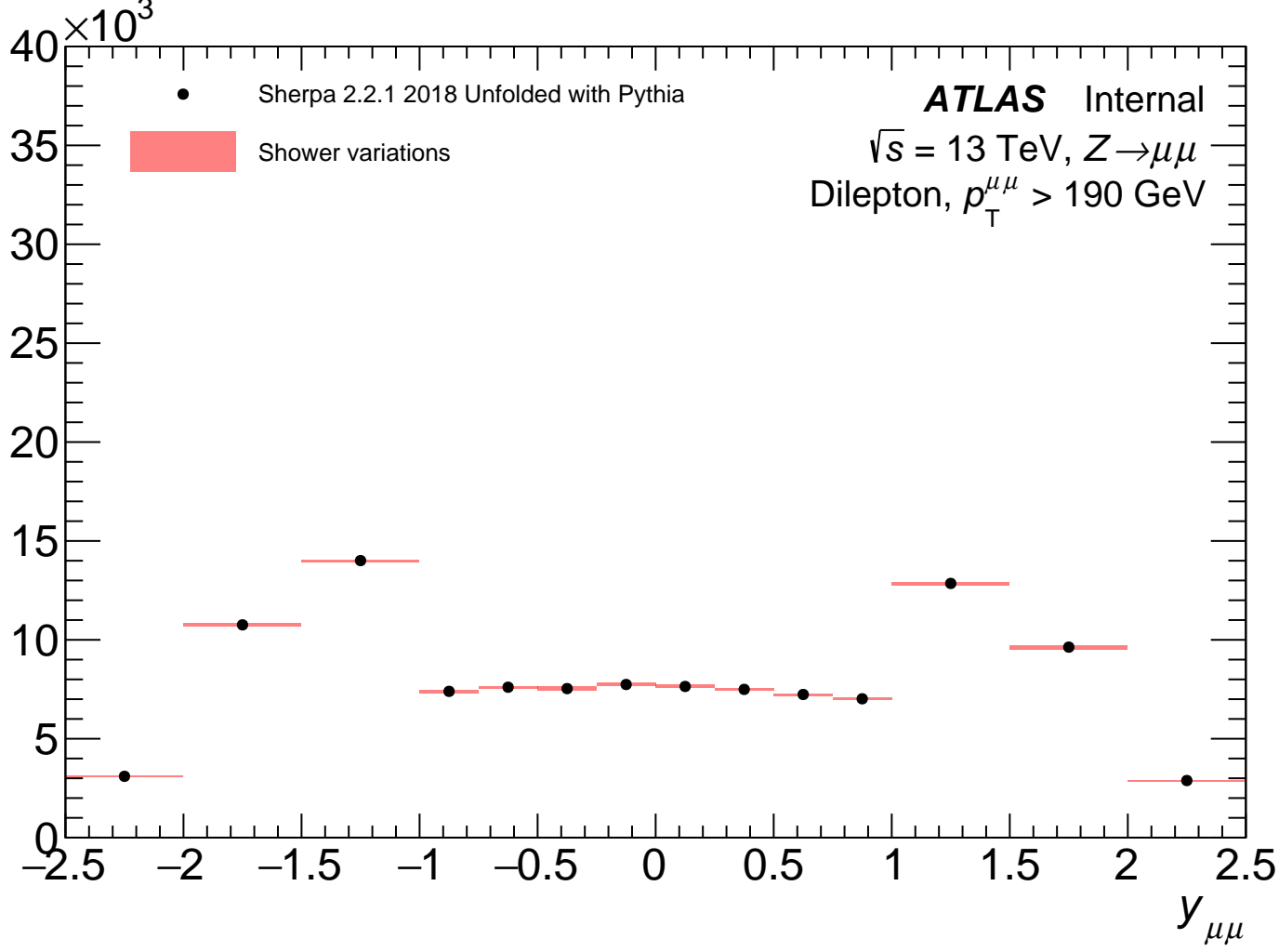
Events



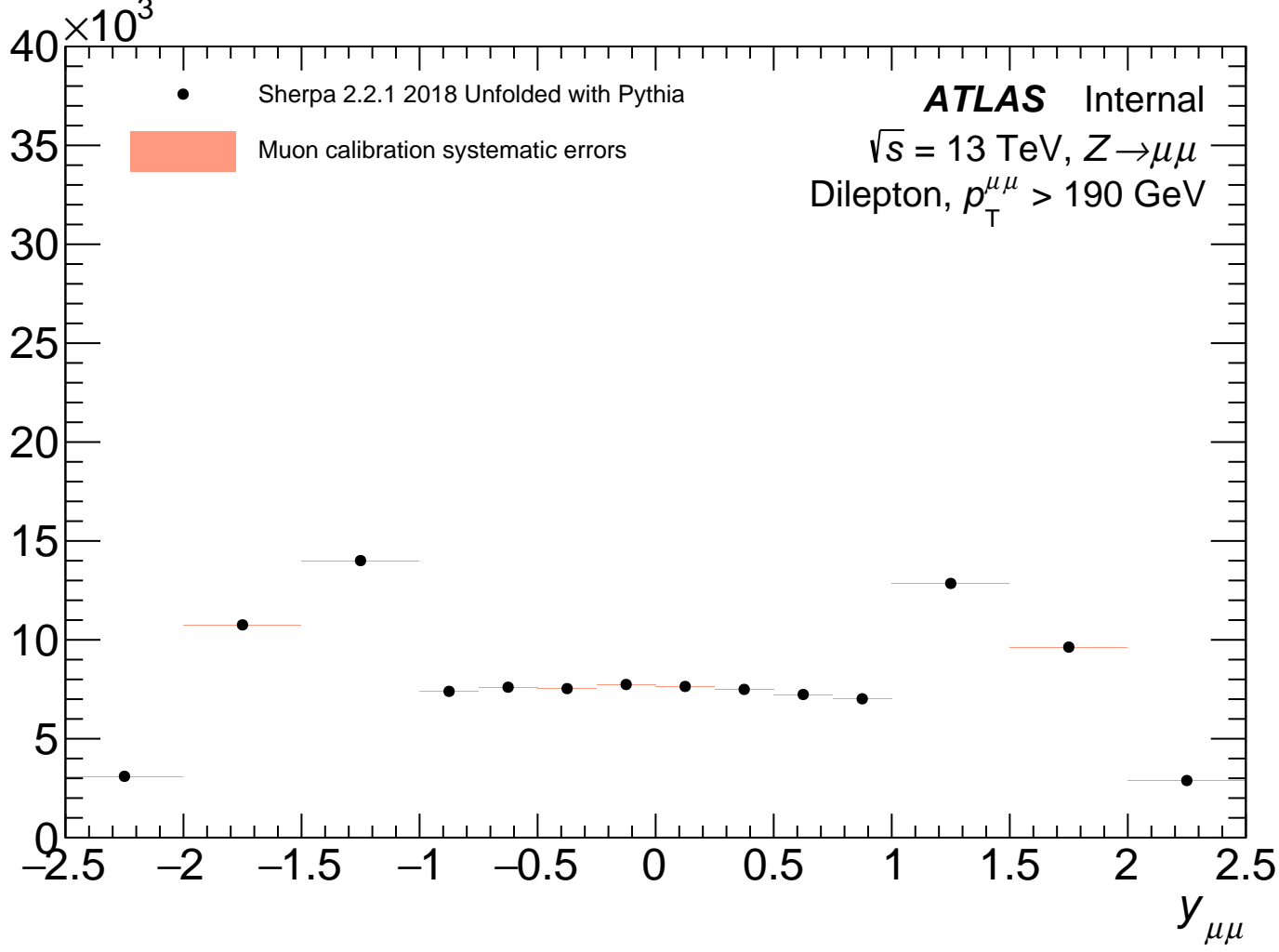
Events



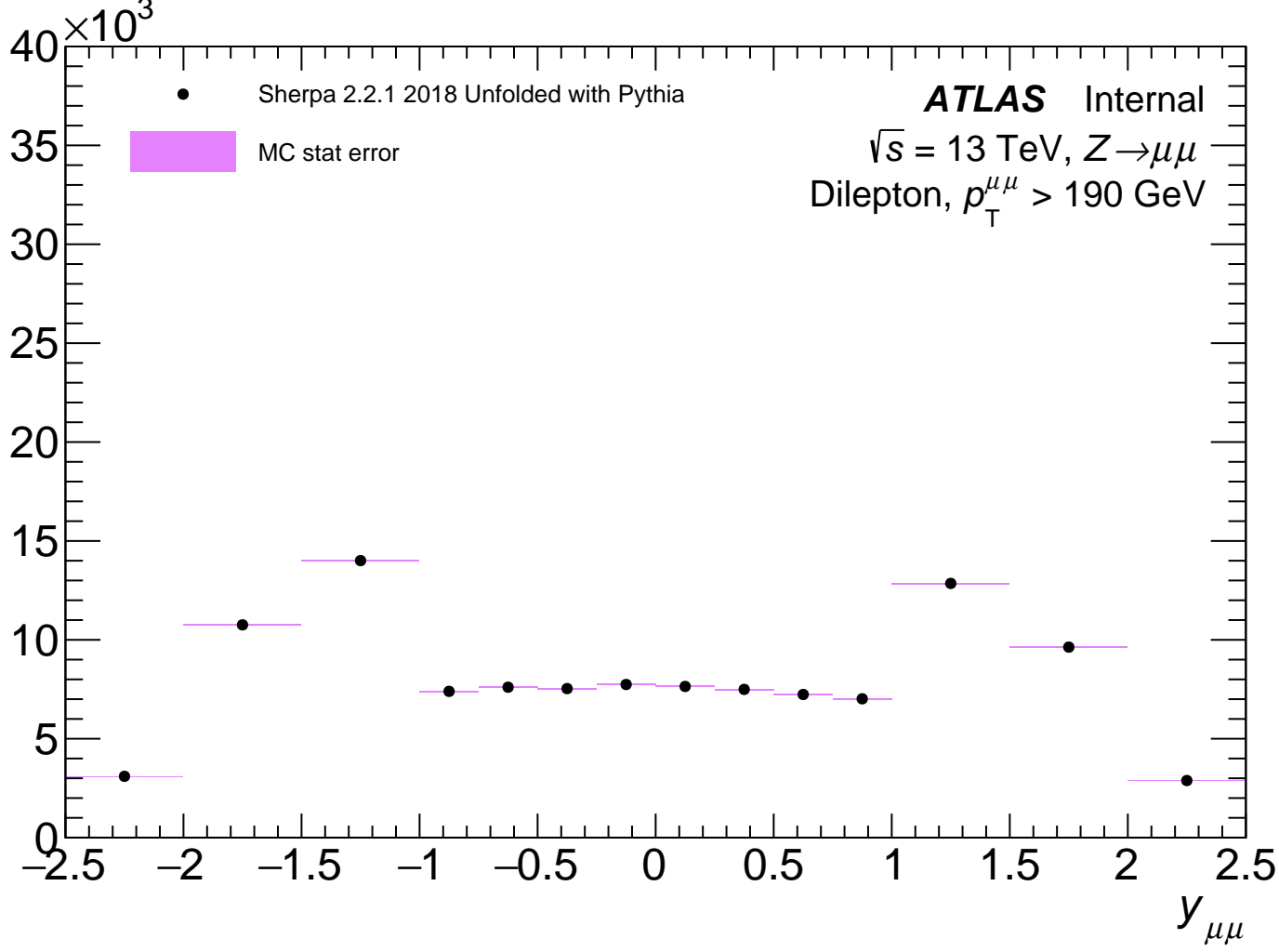
Events



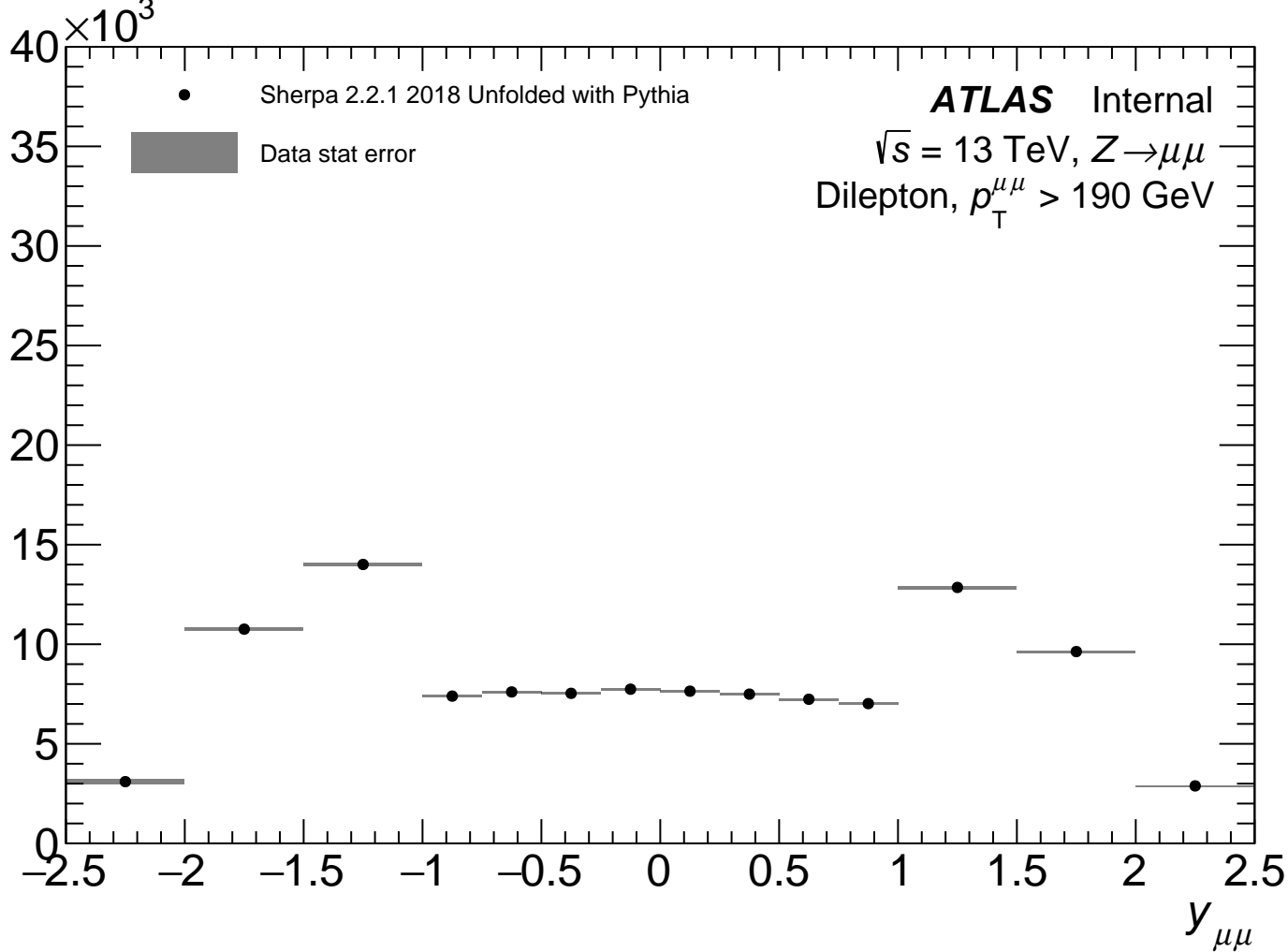
Events



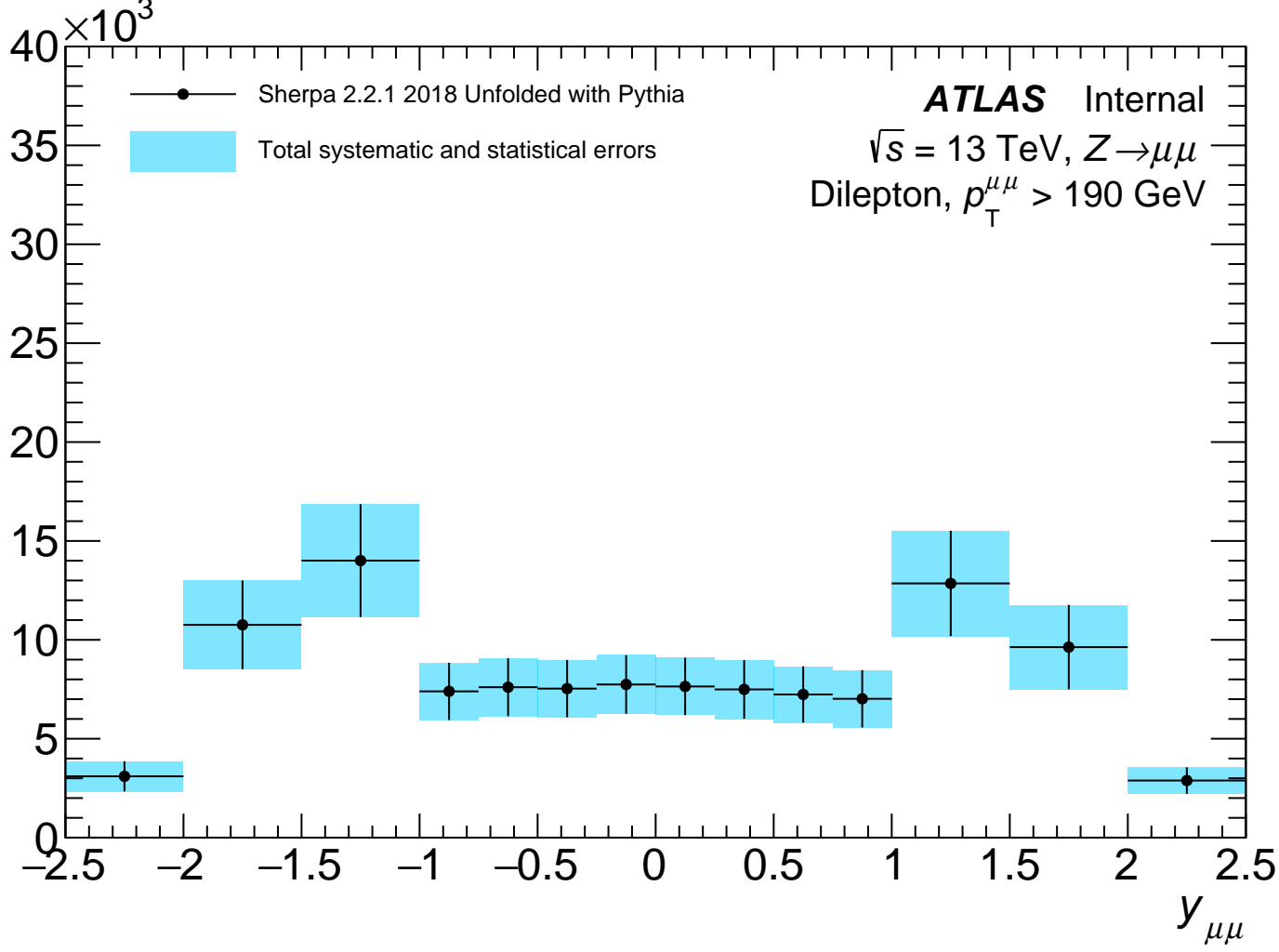
Events



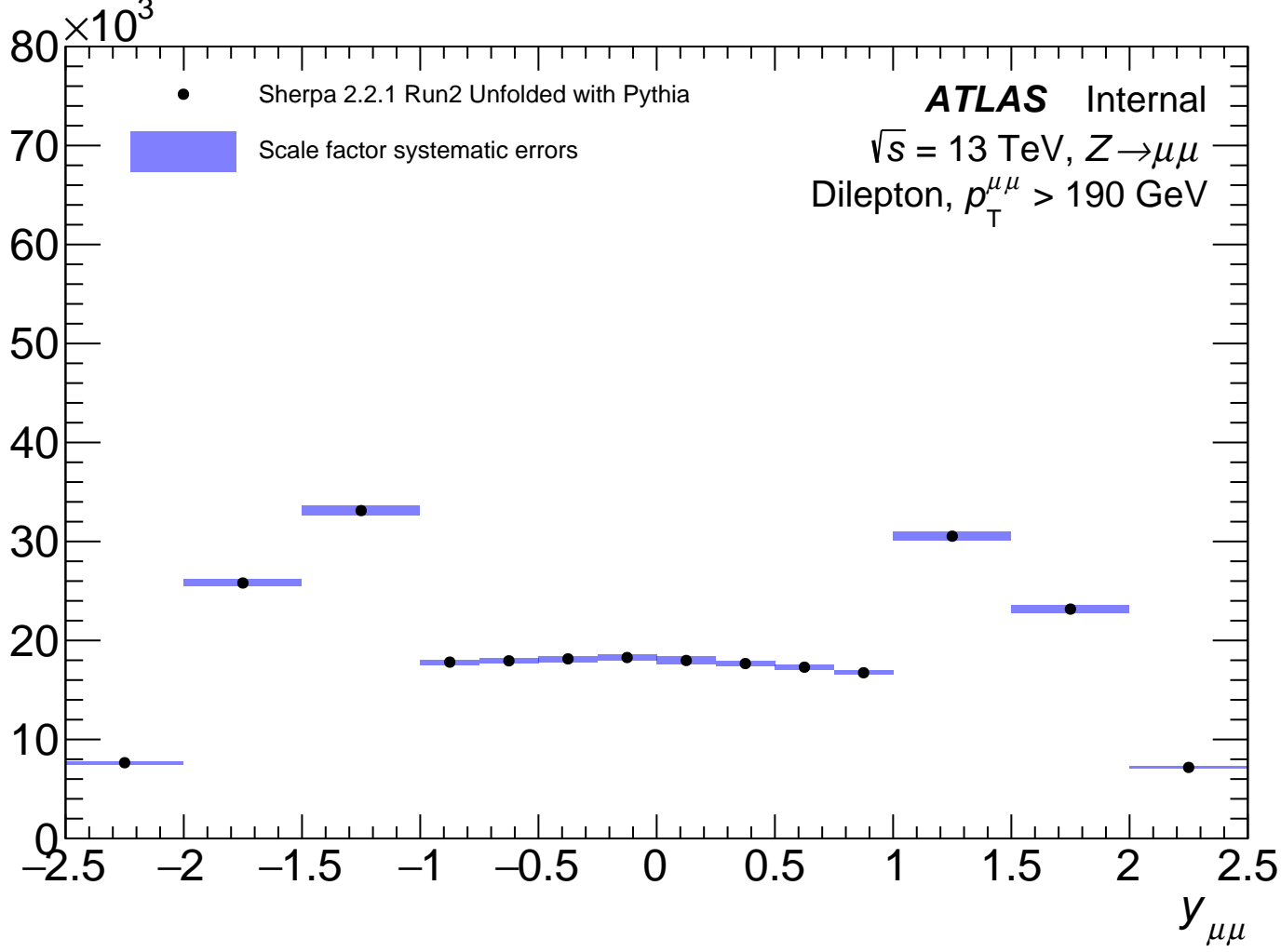
Events



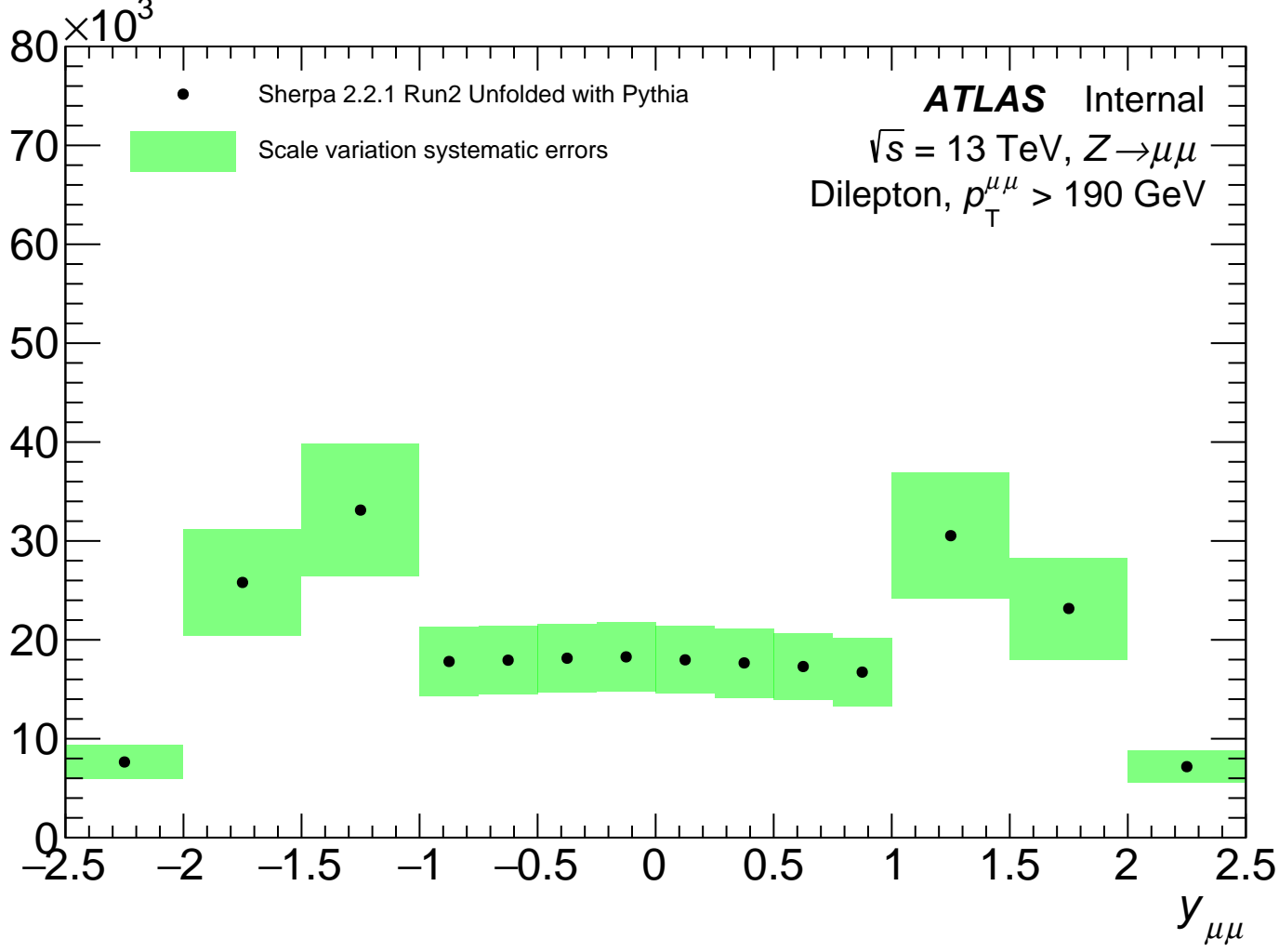
Events



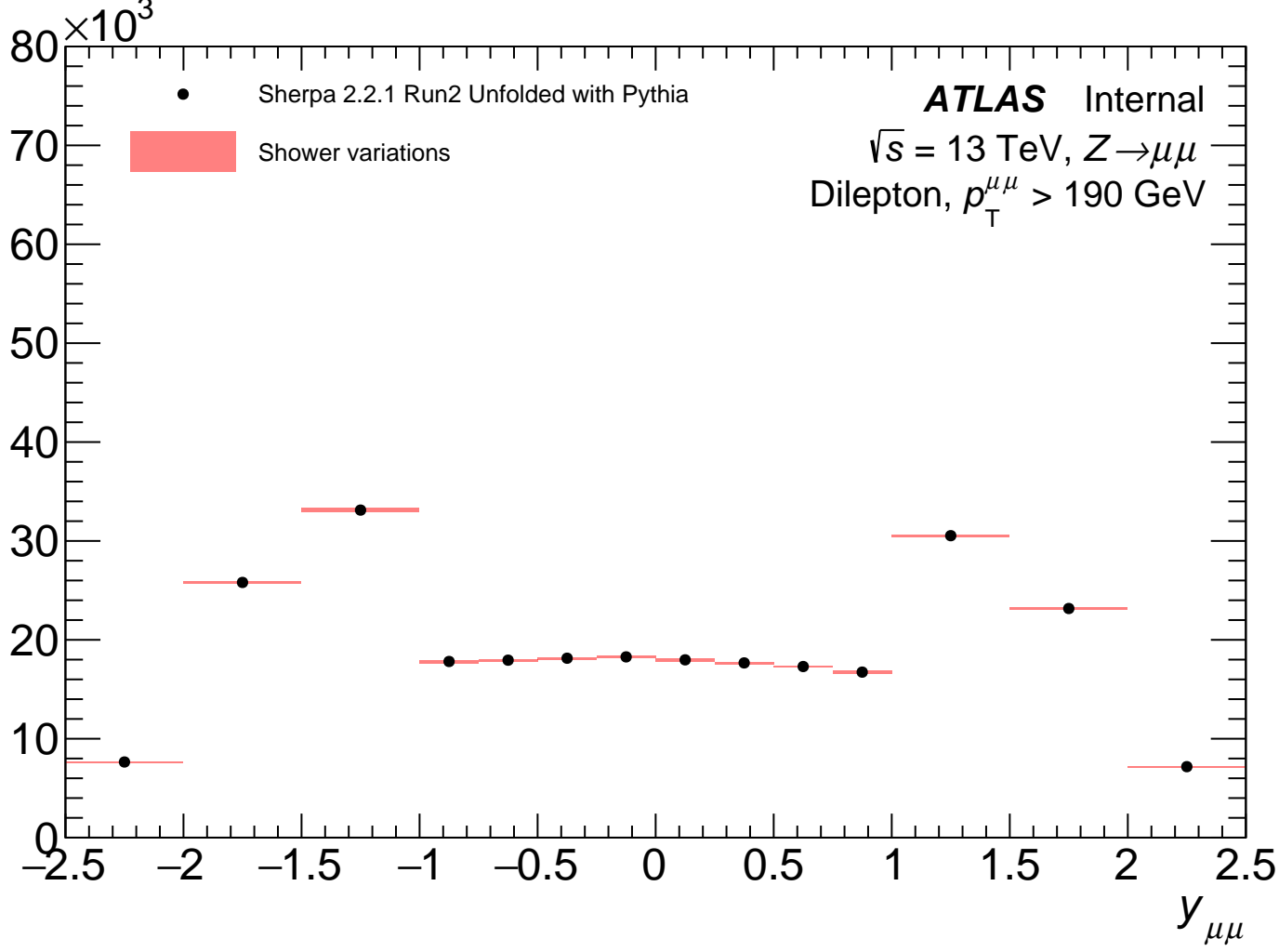
Events



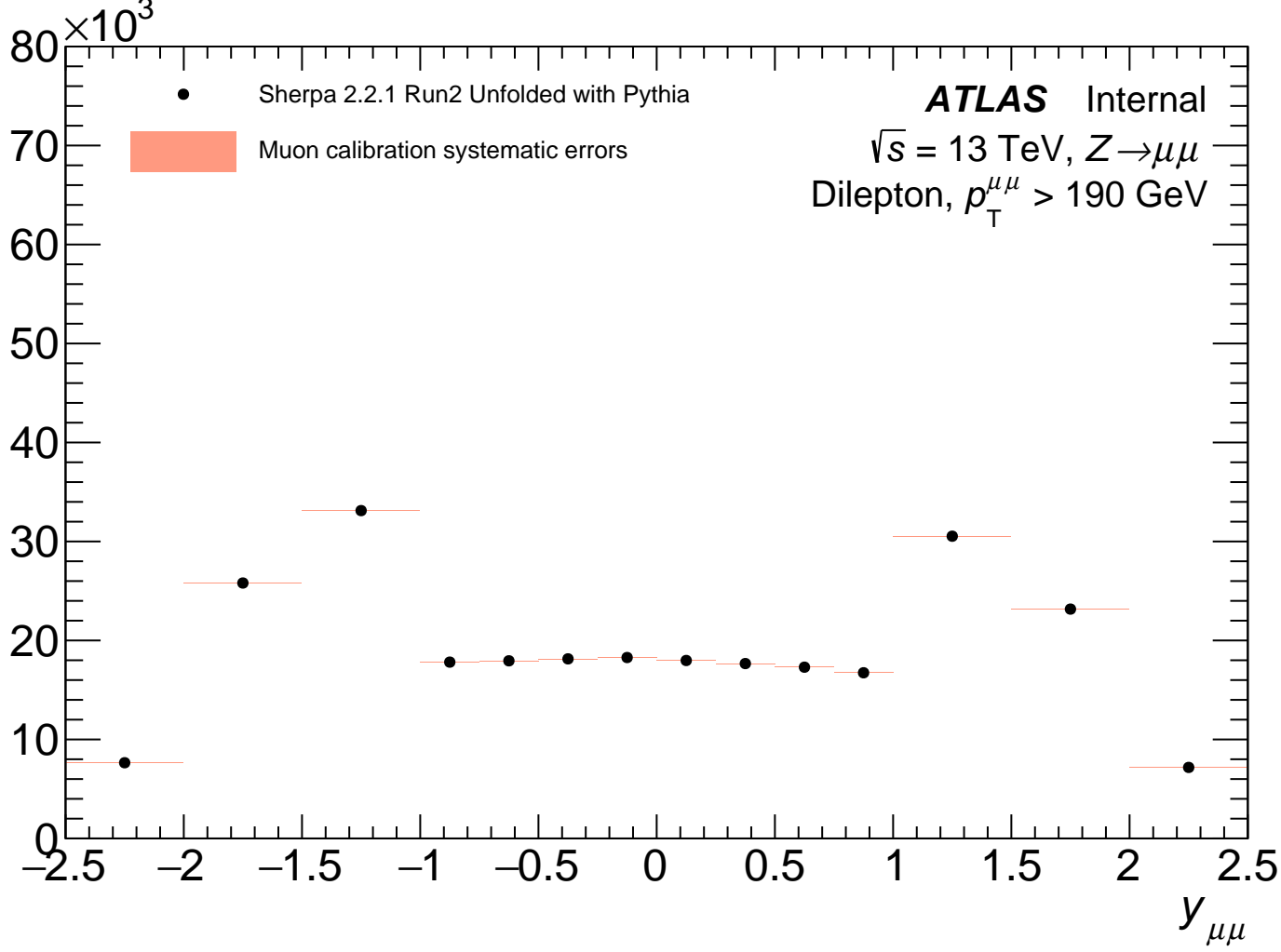
Events



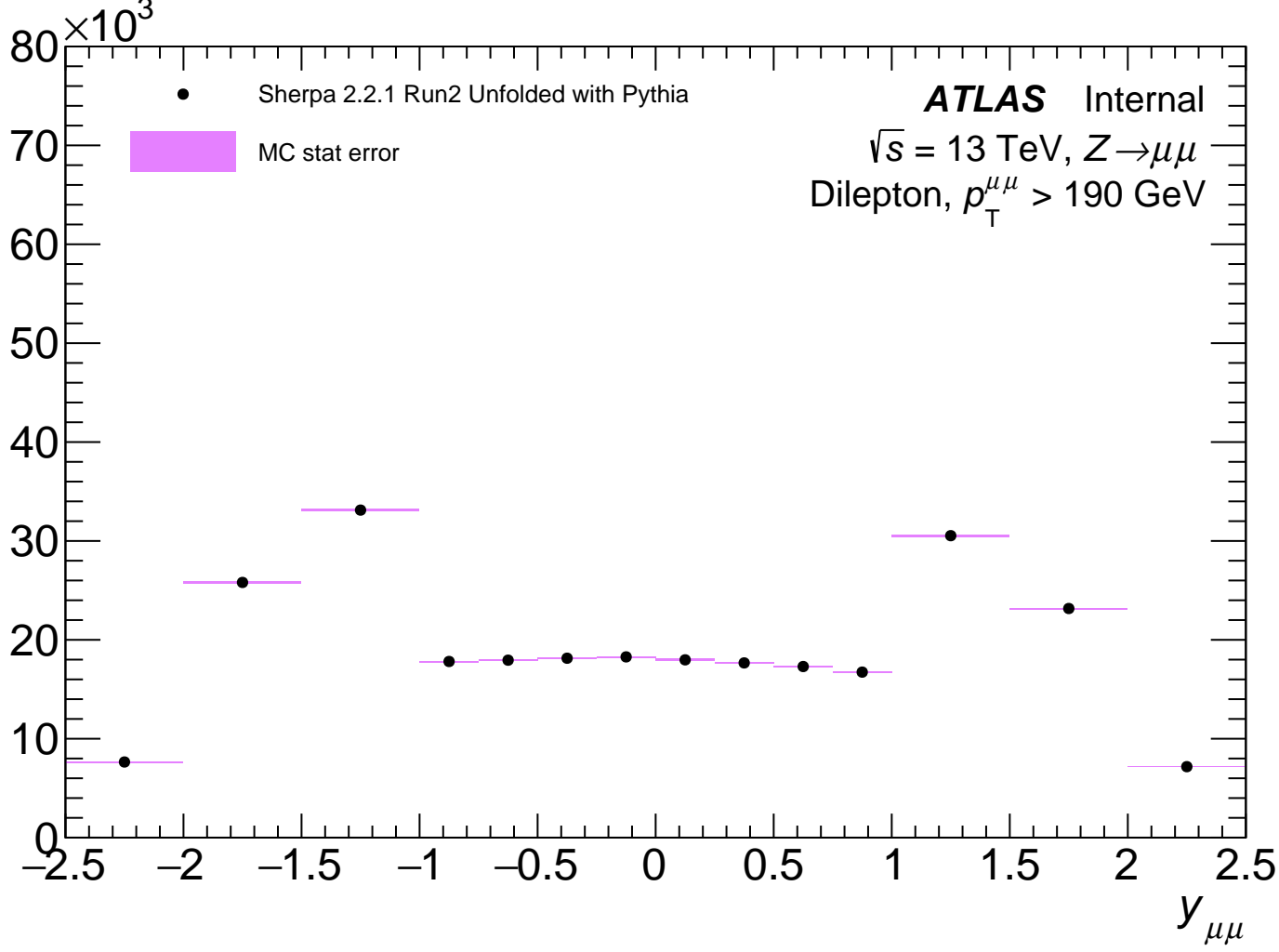
Events



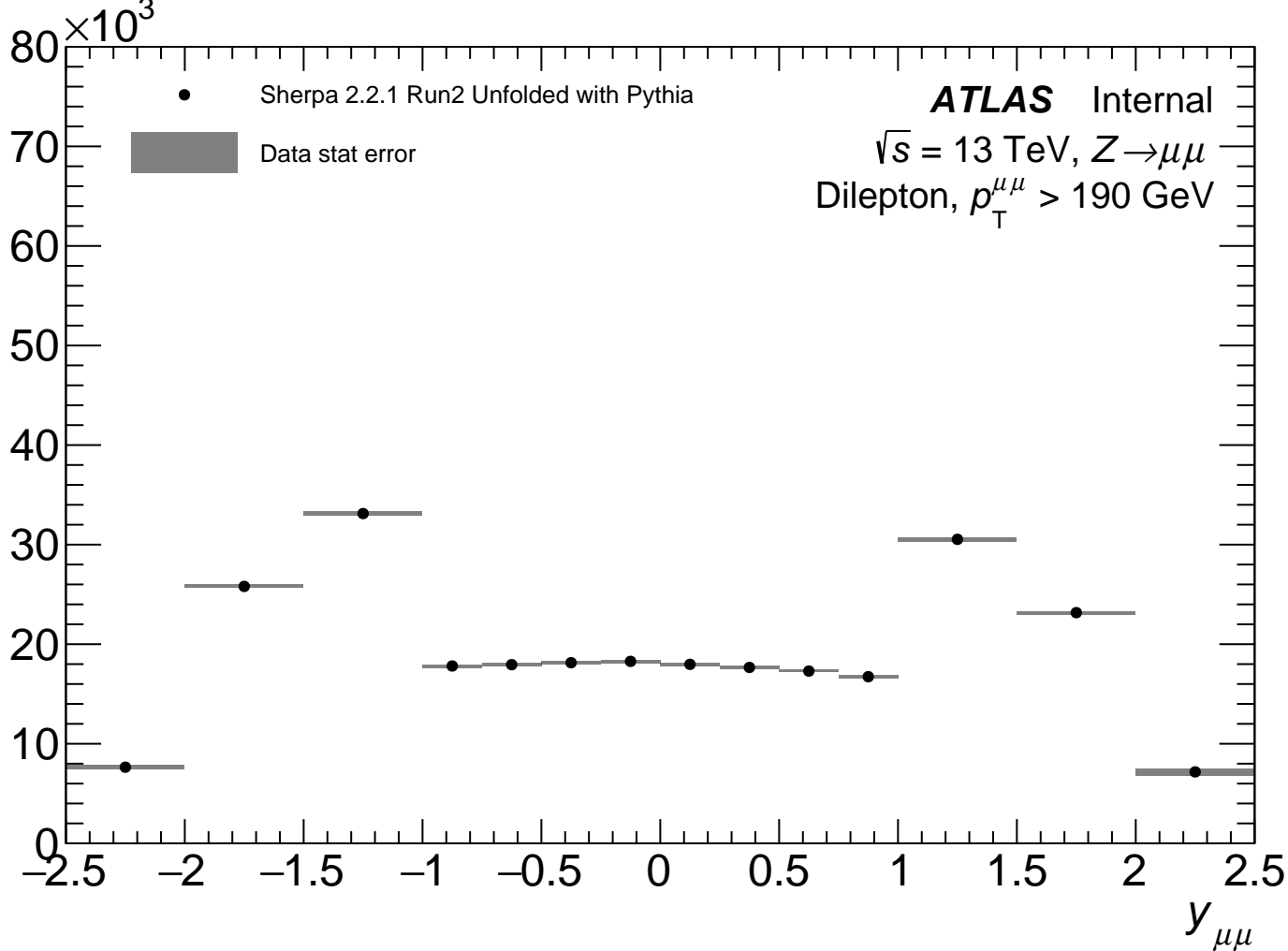
Events



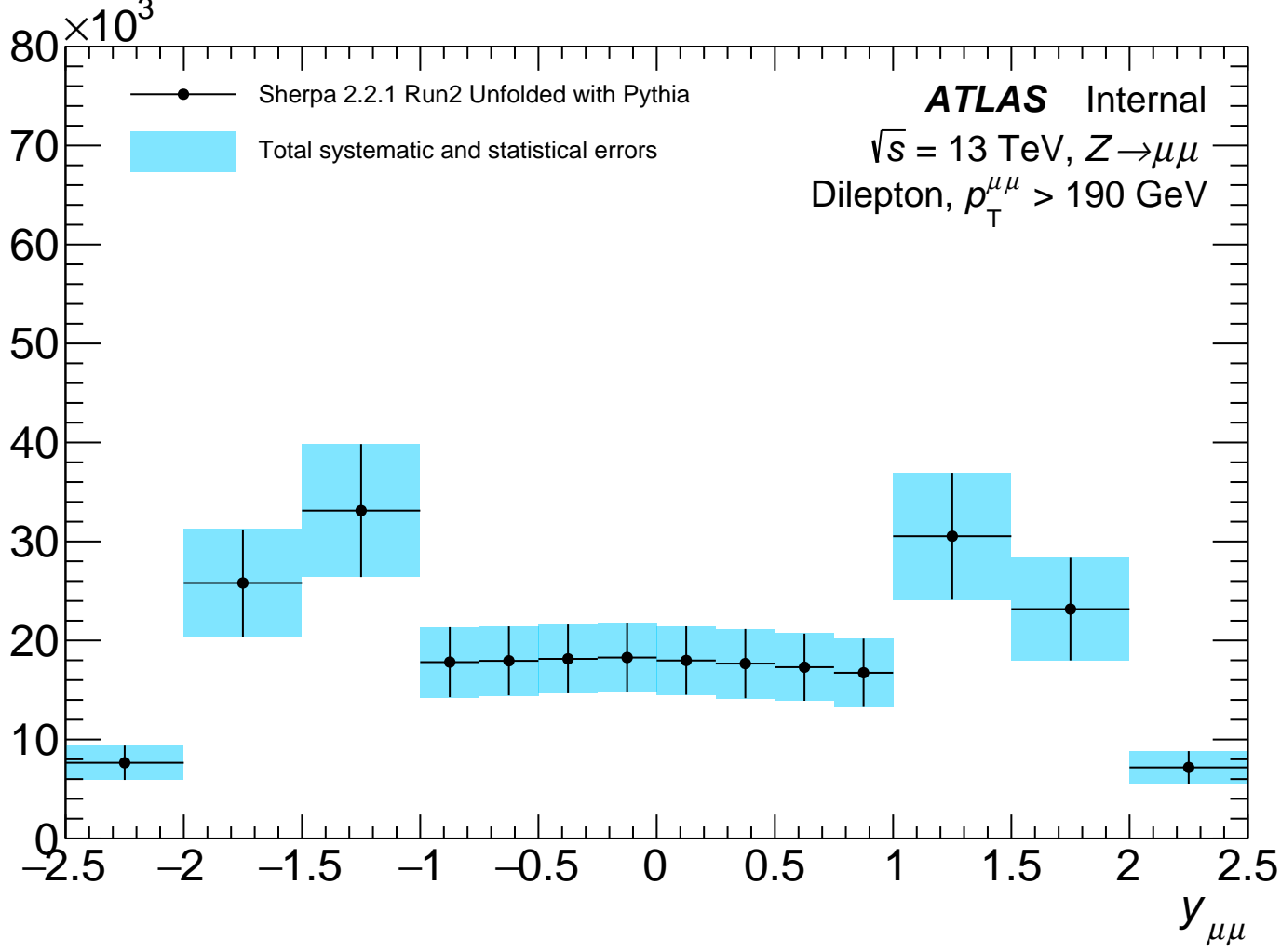
Events



Events



Events



Events

$\times 10^3$

• Sherpa 2.2.1 2016 Unfolded with Pythia

■ Scale factor systematic errors

ATLAS Internal

$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

100

80

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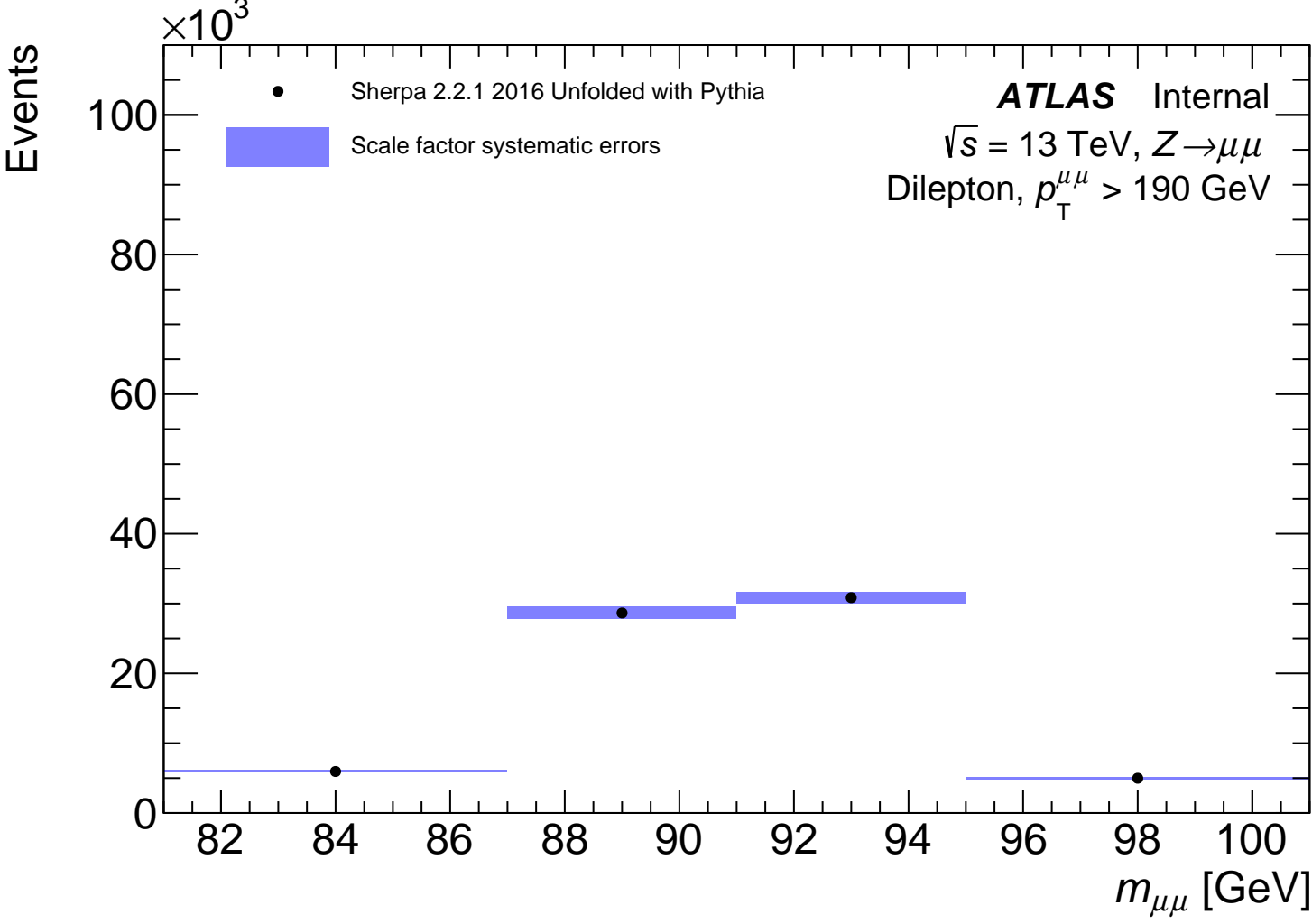
94

96

98

100

$m_{\mu\mu}$ [GeV]



Events

$\times 10^3$

• Sherpa 2.2.1 2016 Unfolded with Pythia

■ Scale variation systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

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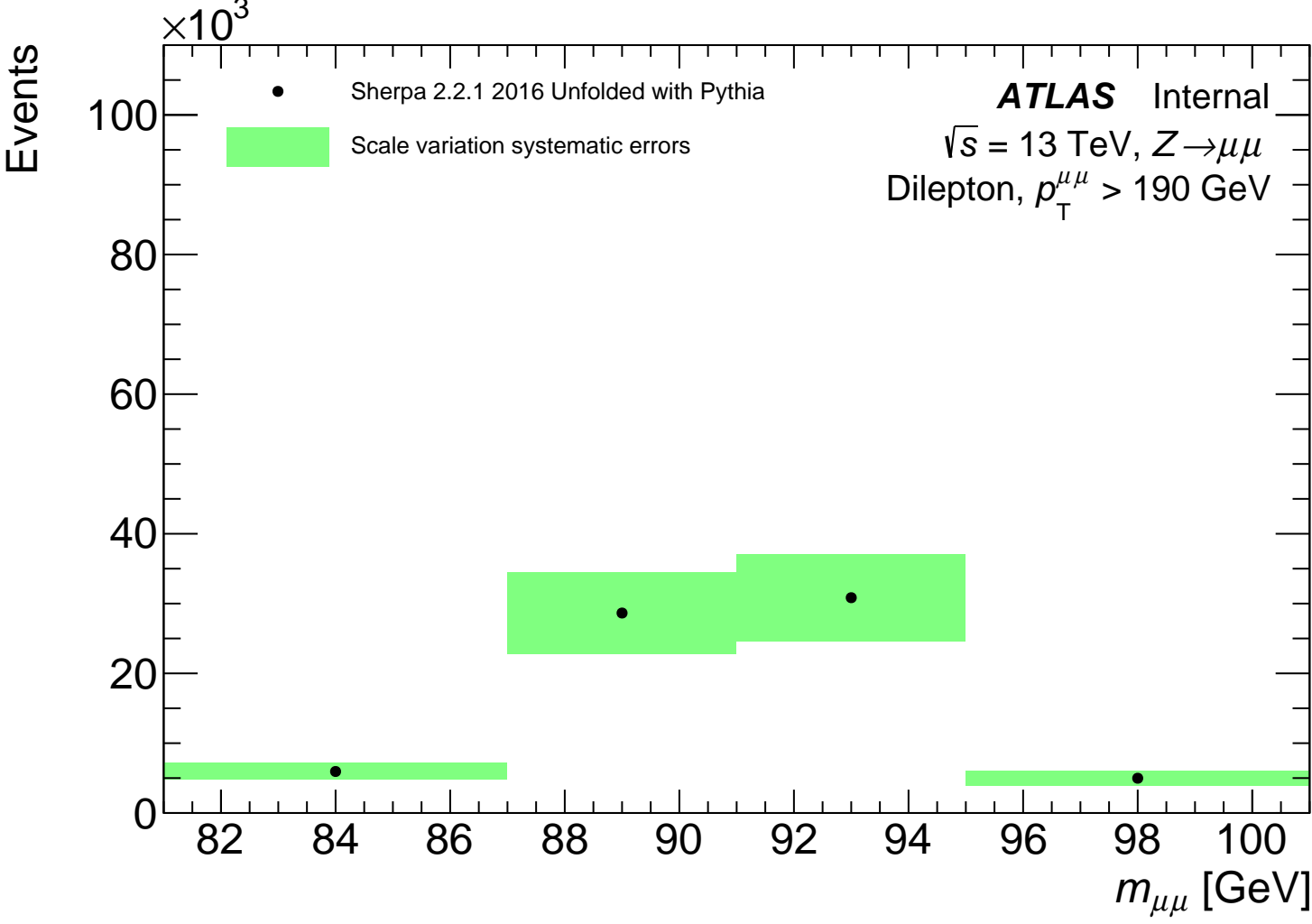
94

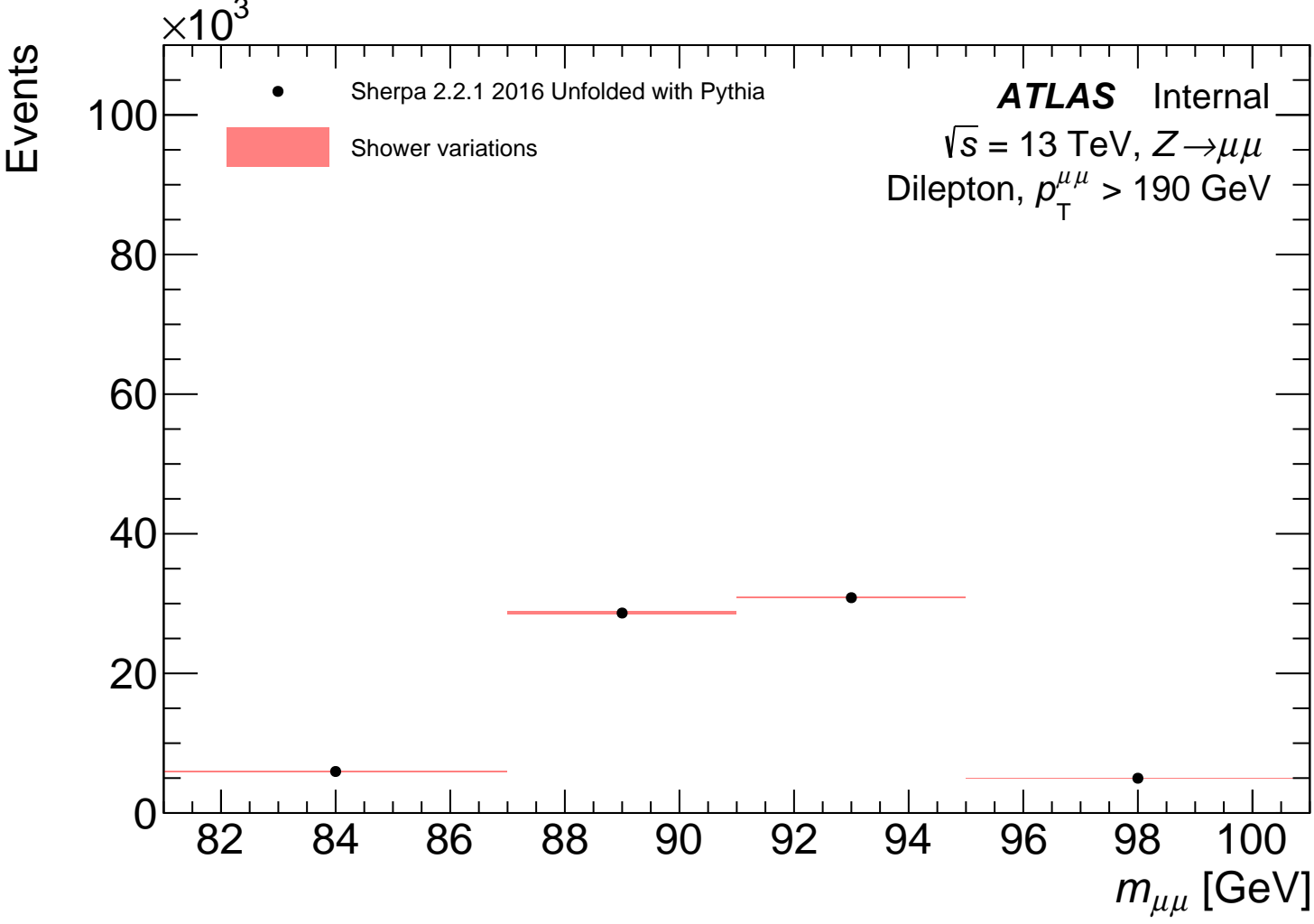
96

98

100

$m_{\mu\mu} [\text{GeV}]$





Events

$\times 10^3$

• Sherpa 2.2.1 2016 Unfolded with Pythia

■ Muon calibration systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

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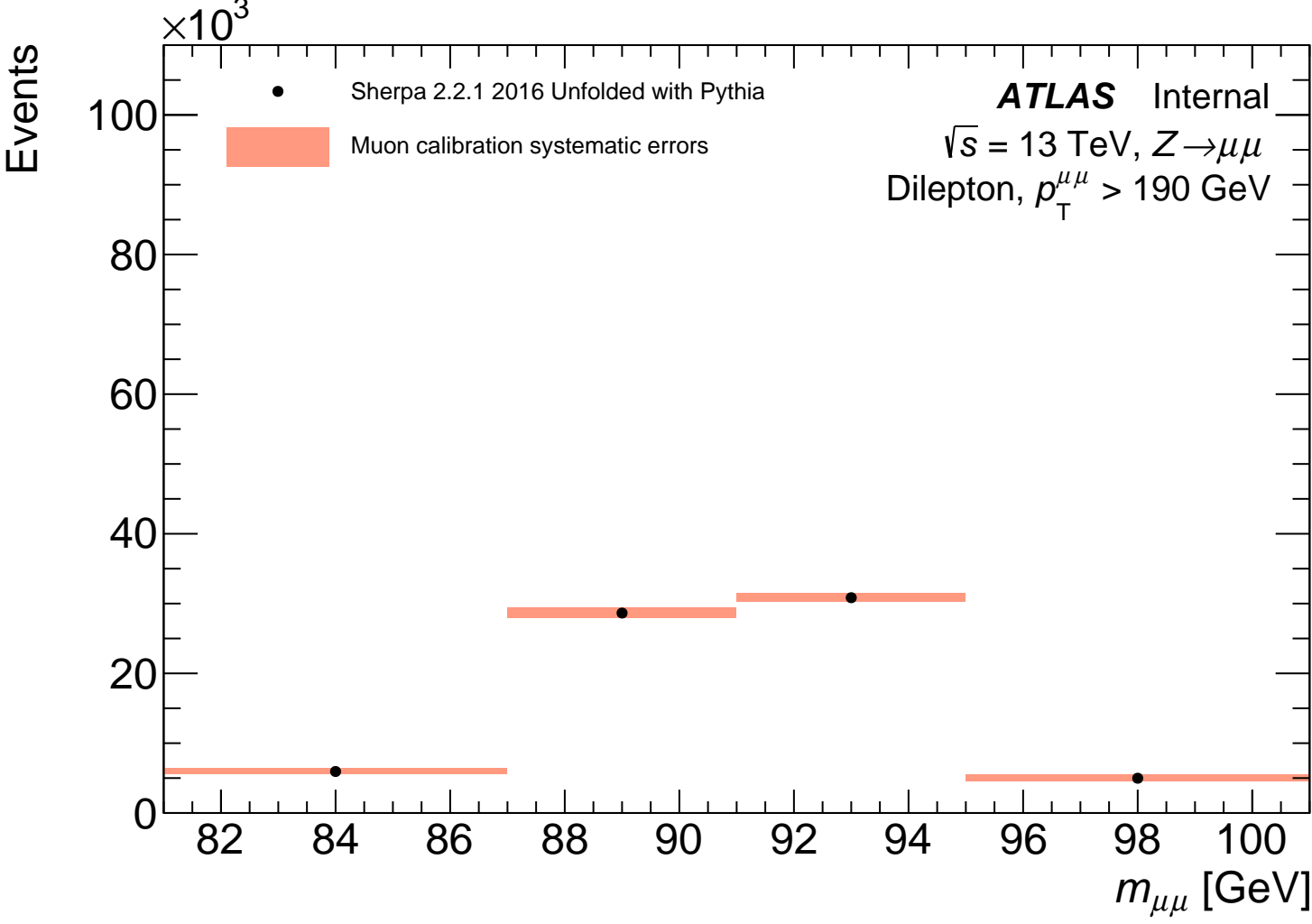
94

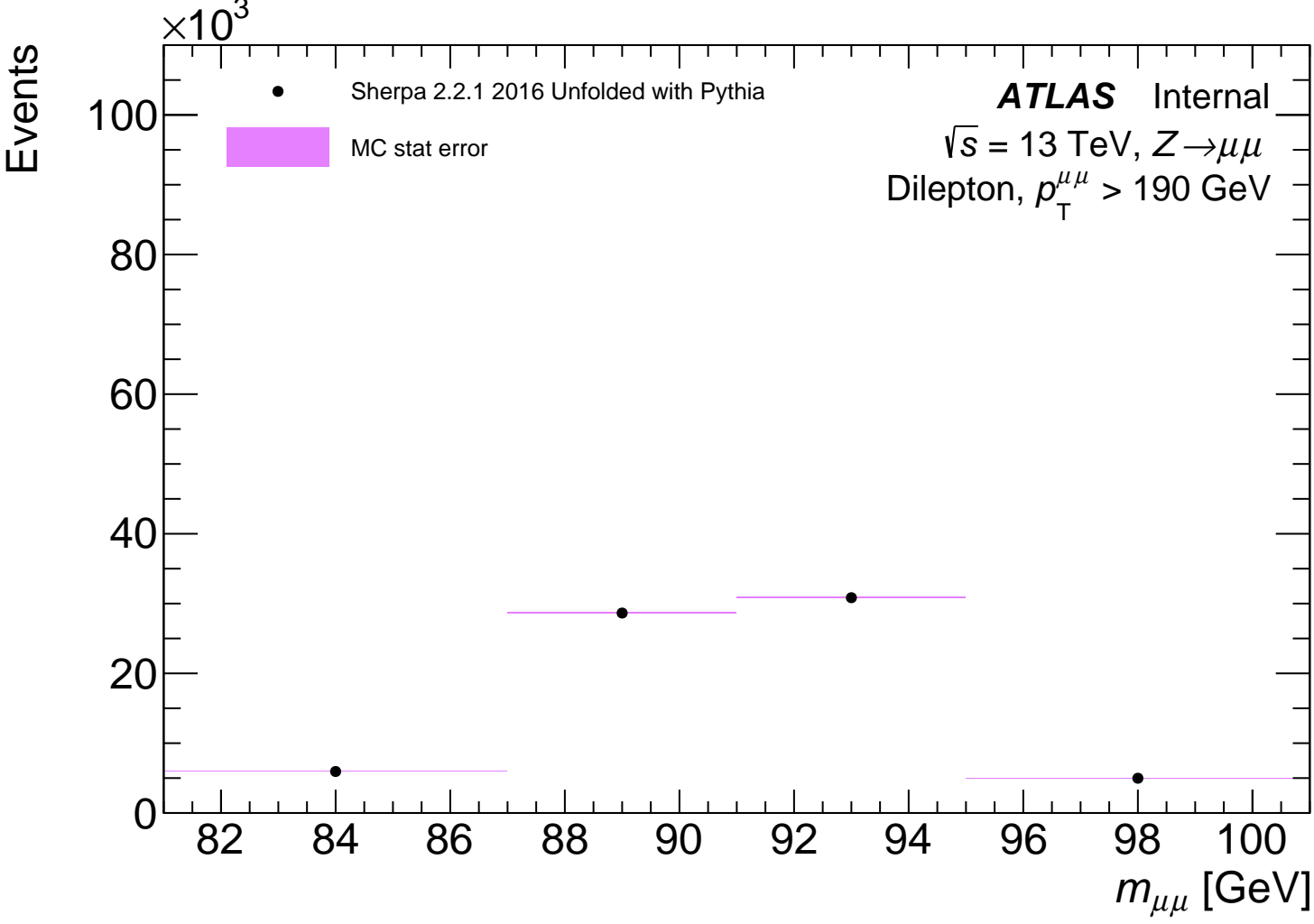
96

98

100

$m_{\mu\mu} [\text{GeV}]$





Events

$\times 10^3$

• Sherpa 2.2.1 2016 Unfolded with Pythia

■ Data stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

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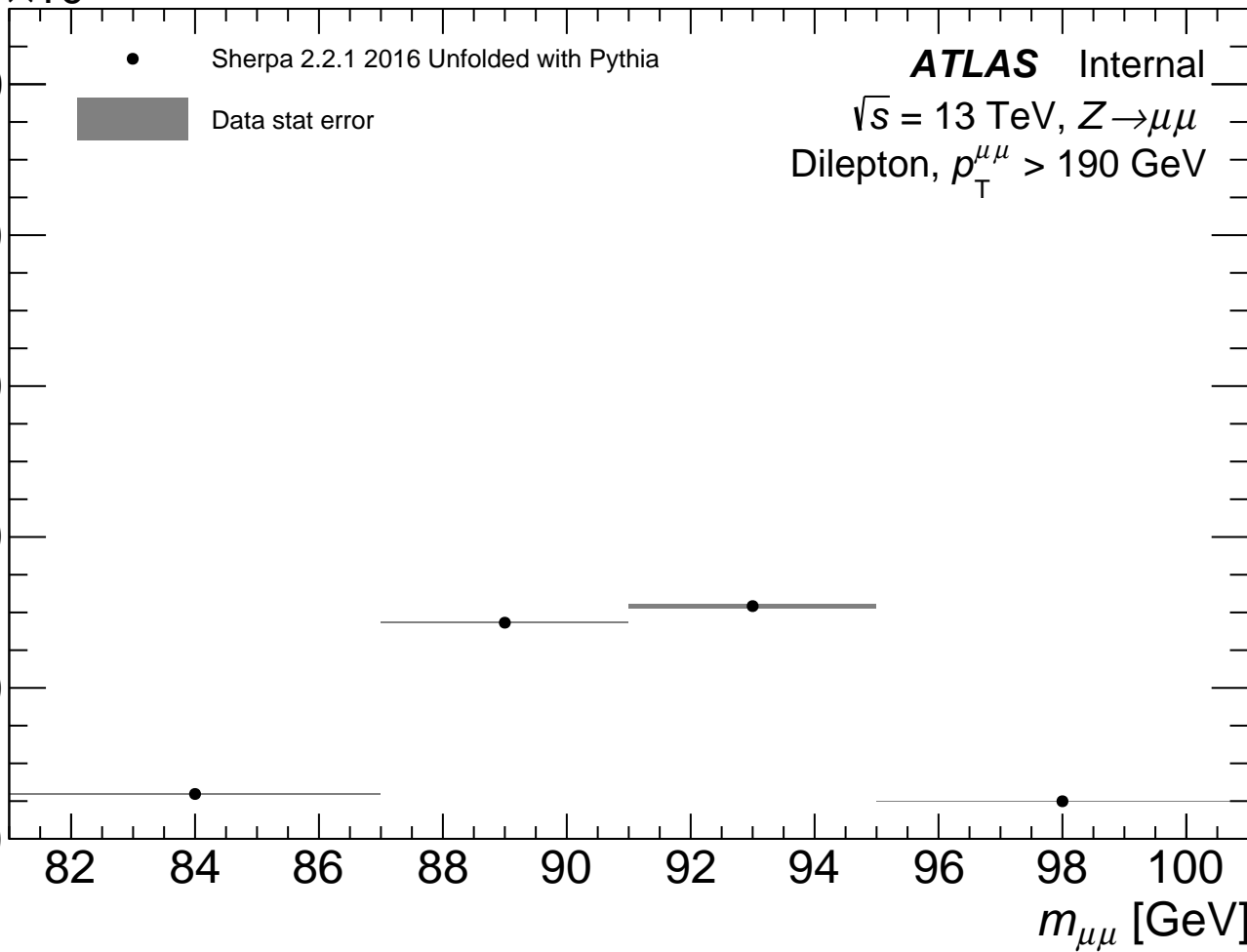
94

96

98

100

$m_{\mu\mu} [\text{GeV}]$



Events

$\times 10^3$

—●— Sherpa 2.2.1 2016 Unfolded with Pythia

■ Total systematic and statistical errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

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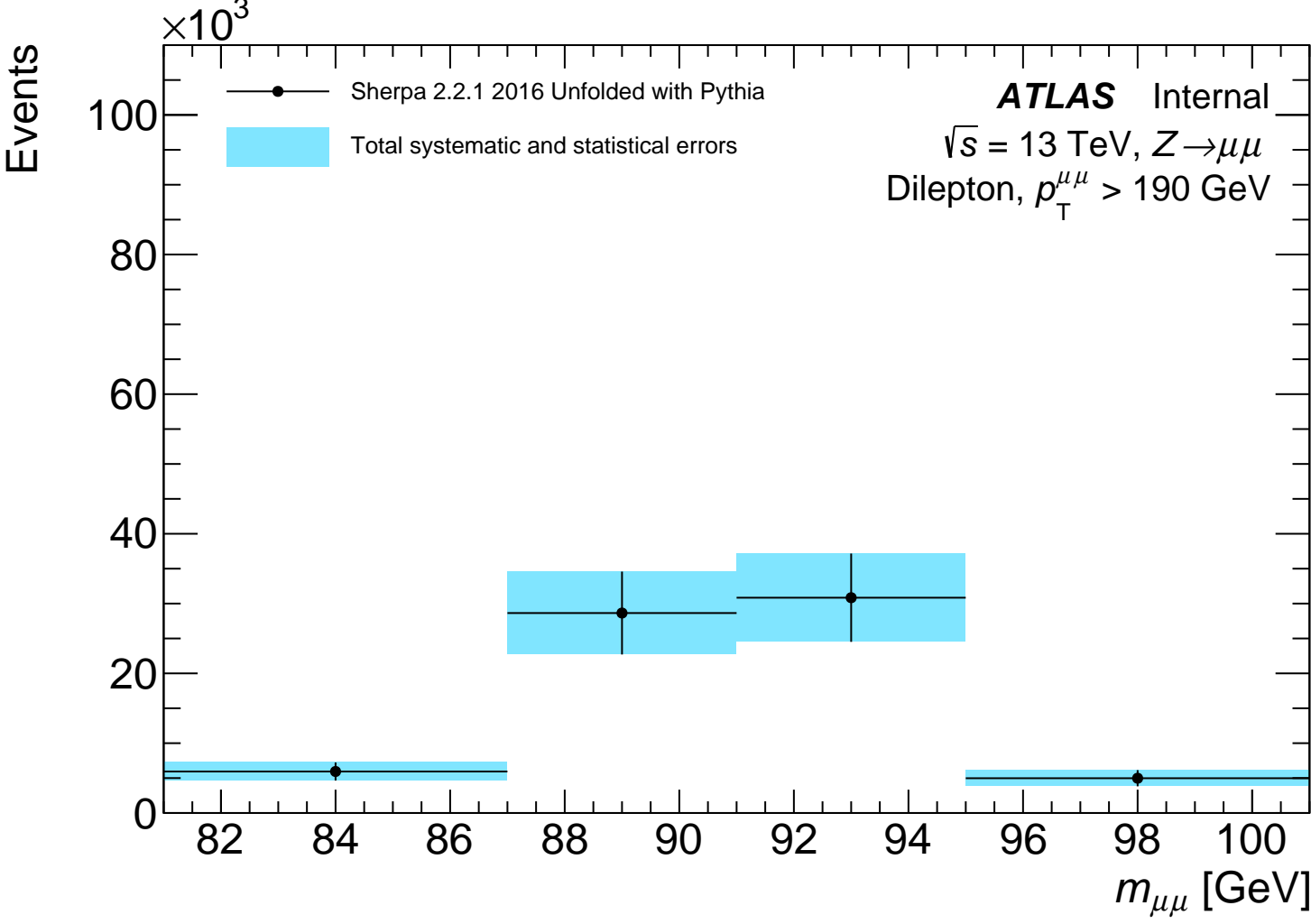
94

96

98

100

$m_{\mu\mu} [\text{GeV}]$



Events

$\times 10^3$

• Sherpa 2.2.1 2017 Unfolded with Pythia

■ Scale factor systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

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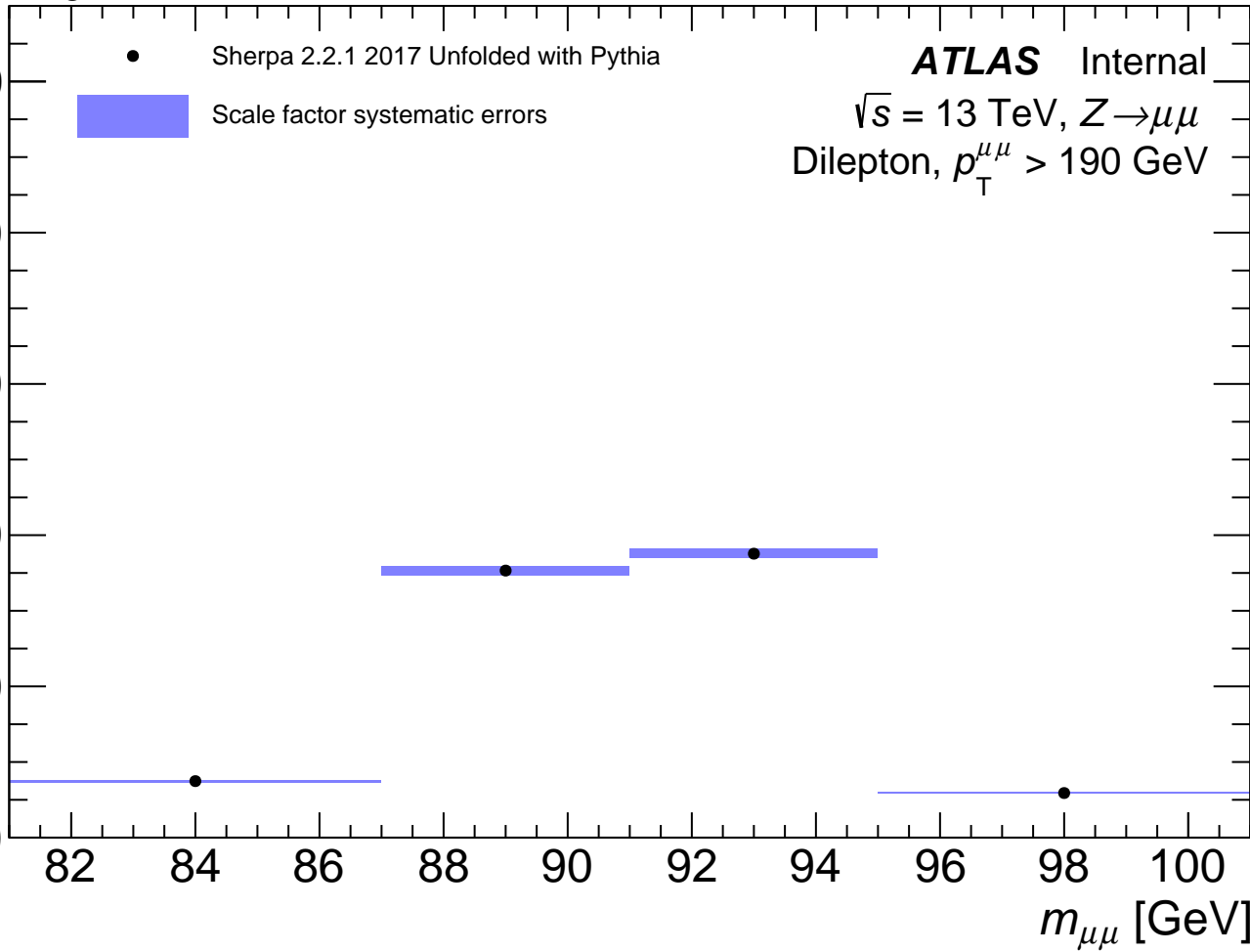
94

96

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100

$m_{\mu\mu} [\text{GeV}]$



Events

$\times 10^3$

• Sherpa 2.2.1 2017 Unfolded with Pythia

■ Scale variation systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

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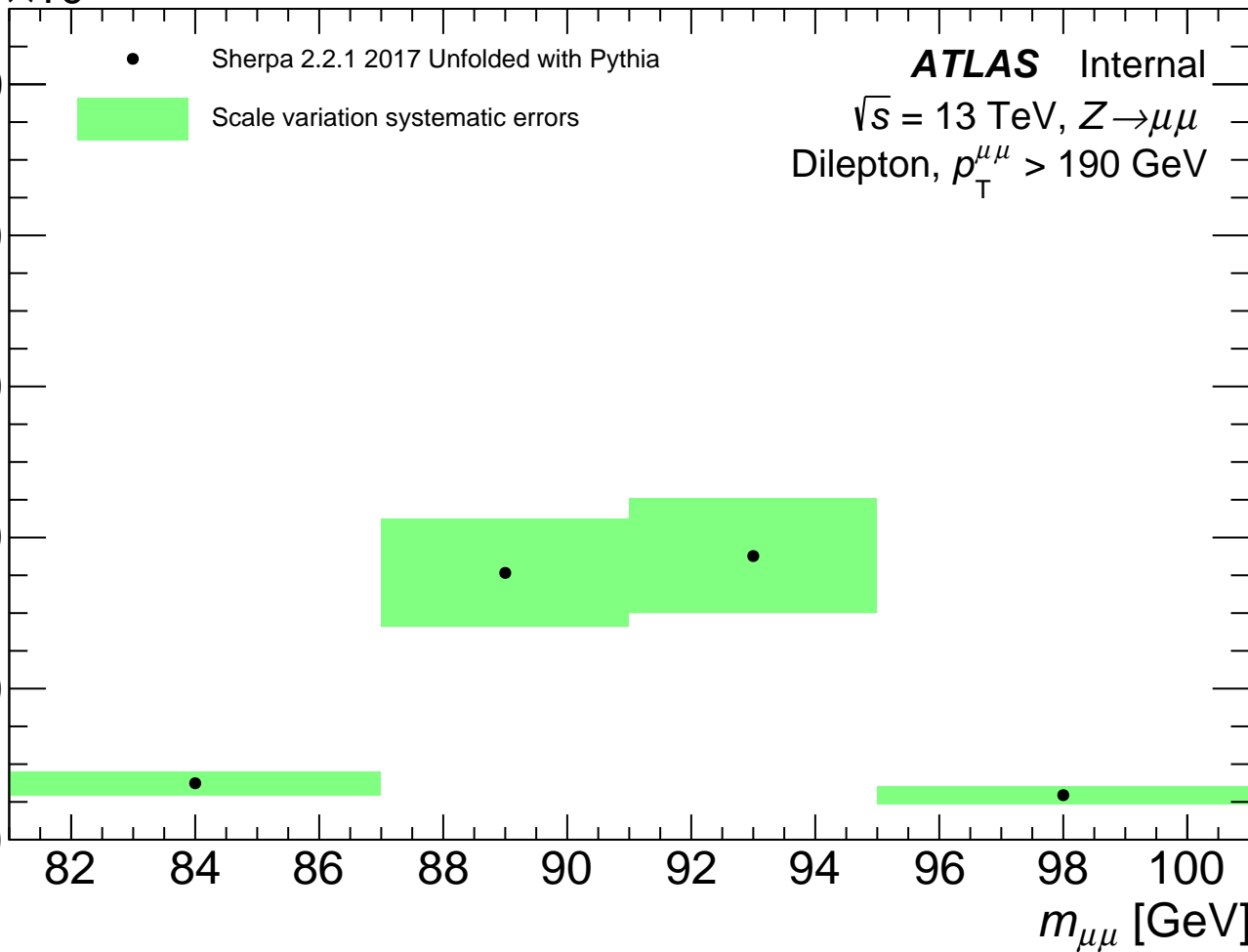
94

96

98

100

$m_{\mu\mu} [\text{GeV}]$



Events

$\times 10^3$

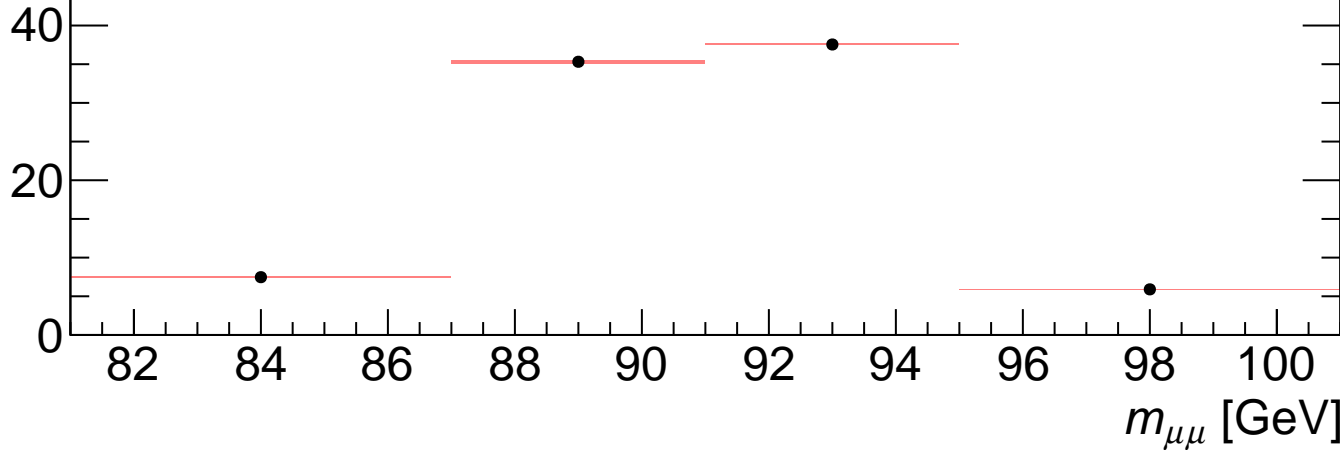
• Sherpa 2.2.1 2017 Unfolded with Pythia

Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Events

$\times 10^3$

• Sherpa 2.2.1 2017 Unfolded with Pythia

■ Muon calibration systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

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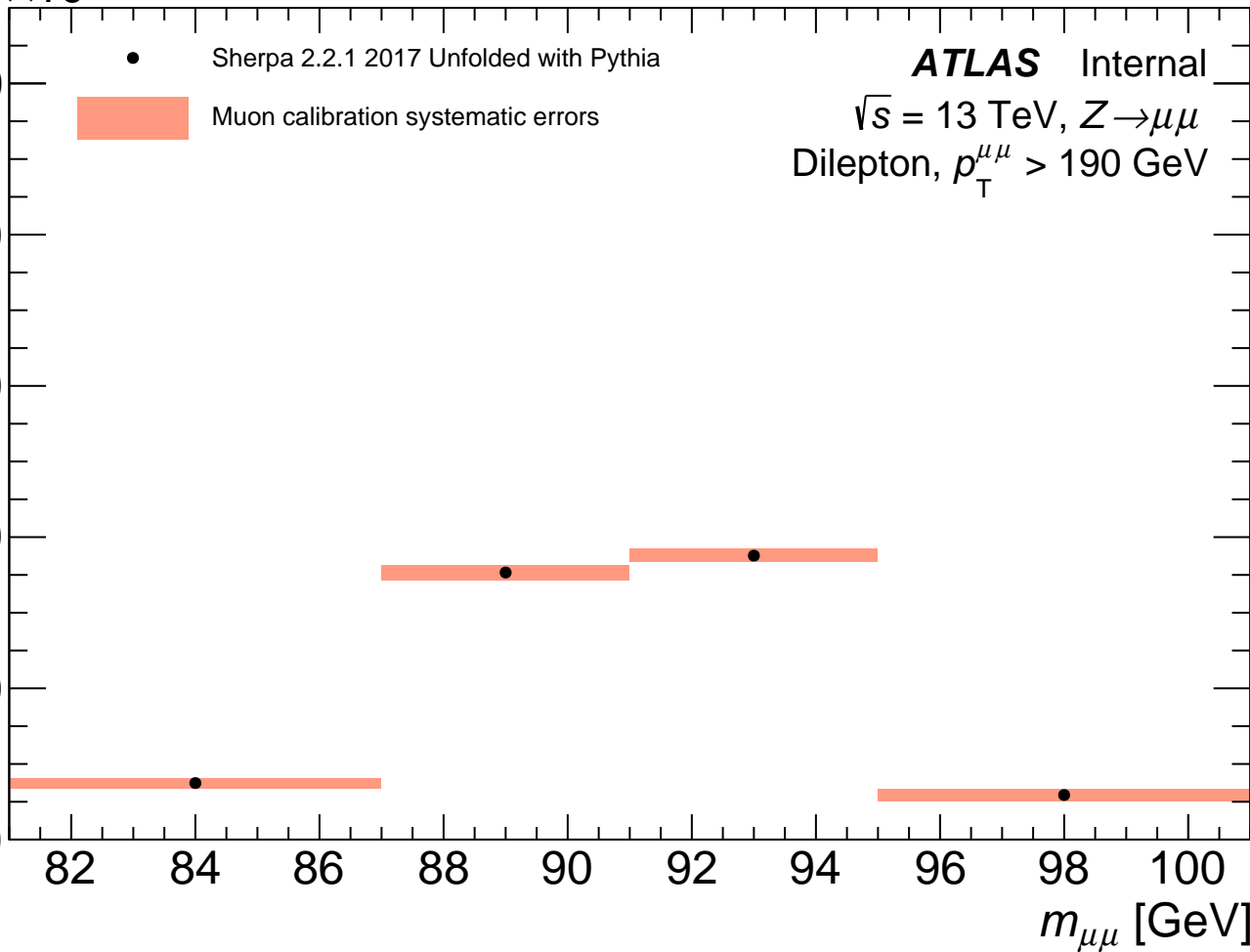
94

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$m_{\mu\mu} [\text{GeV}]$



Events

$\times 10^3$

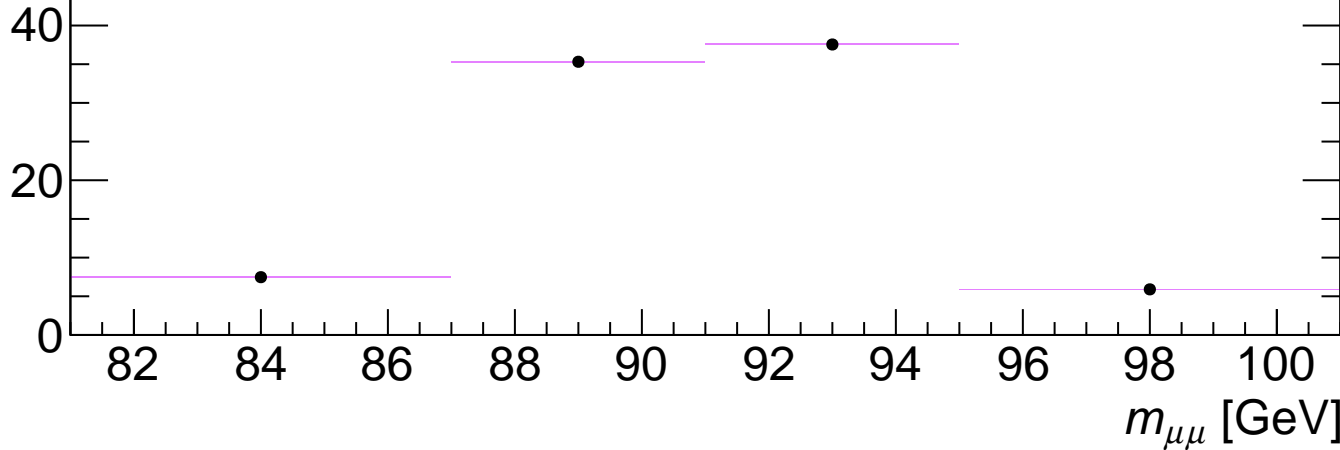
• Sherpa 2.2.1 2017 Unfolded with Pythia

MC stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Events

$\times 10^3$

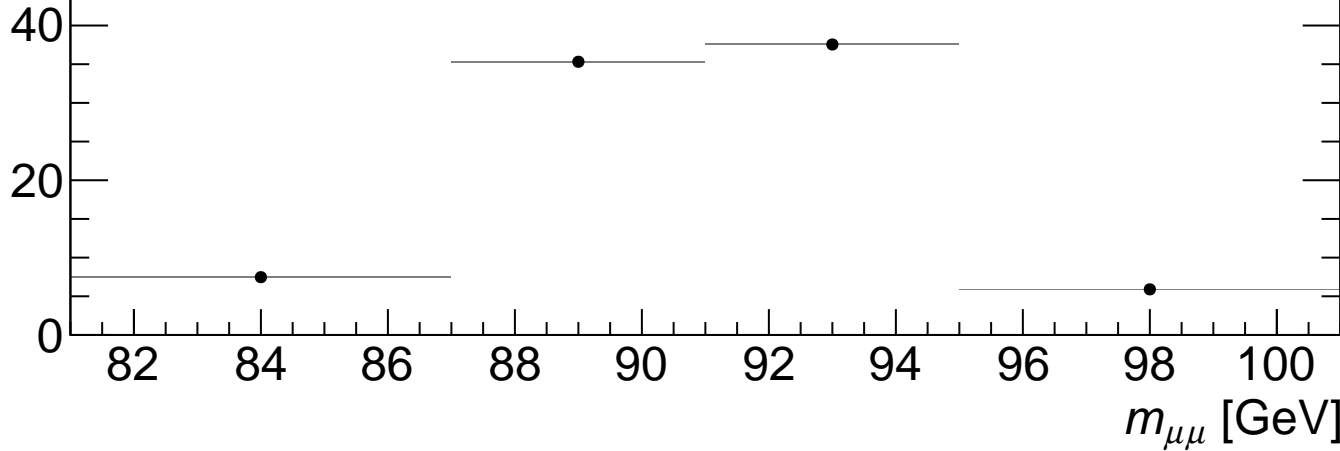
• Sherpa 2.2.1 2017 Unfolded with Pythia

■ Data stat error

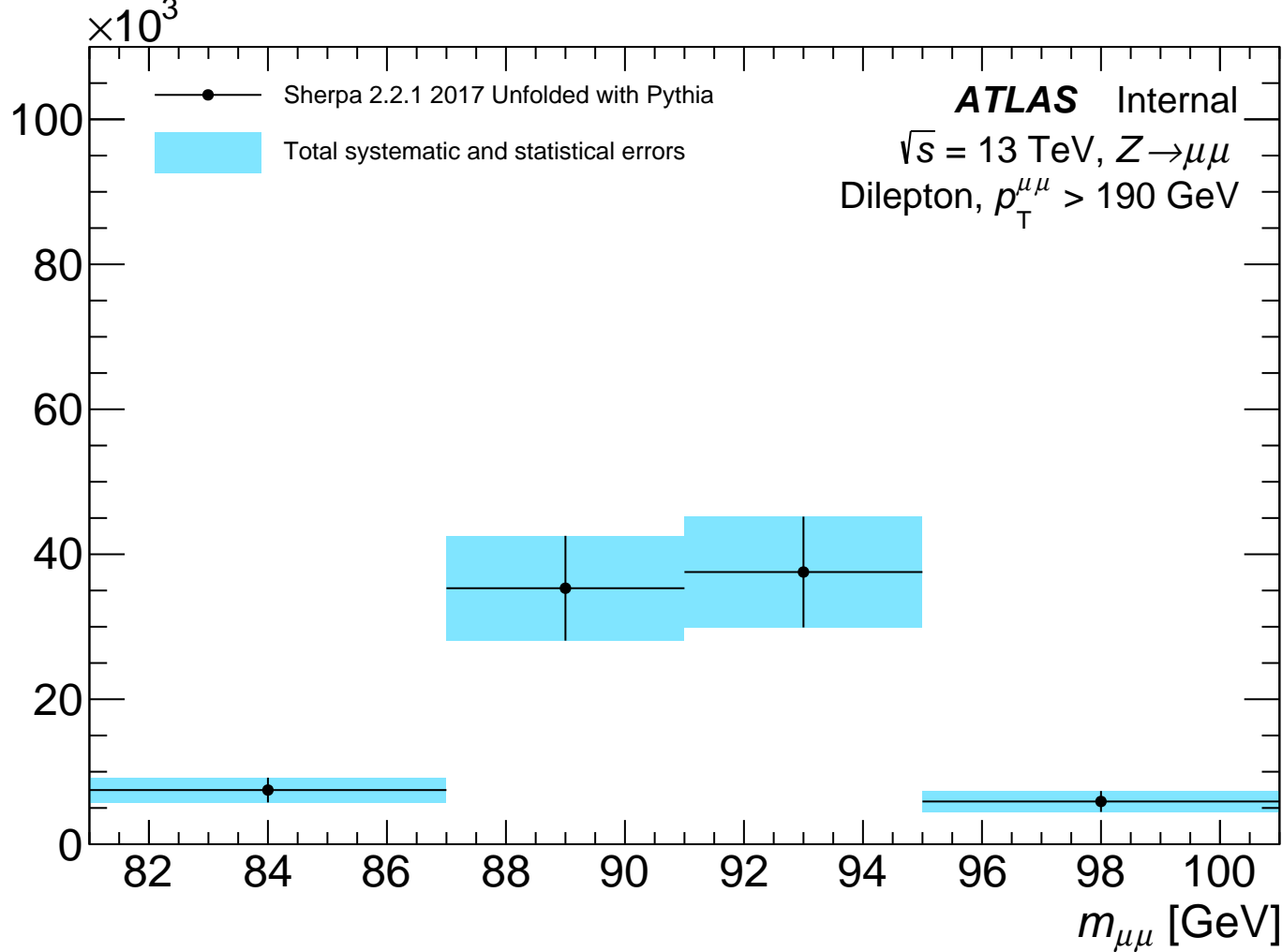
ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Events



Events

$\times 10^3$

• Sherpa 2.2.1 2018 Unfolded with Pythia

■ Scale factor systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

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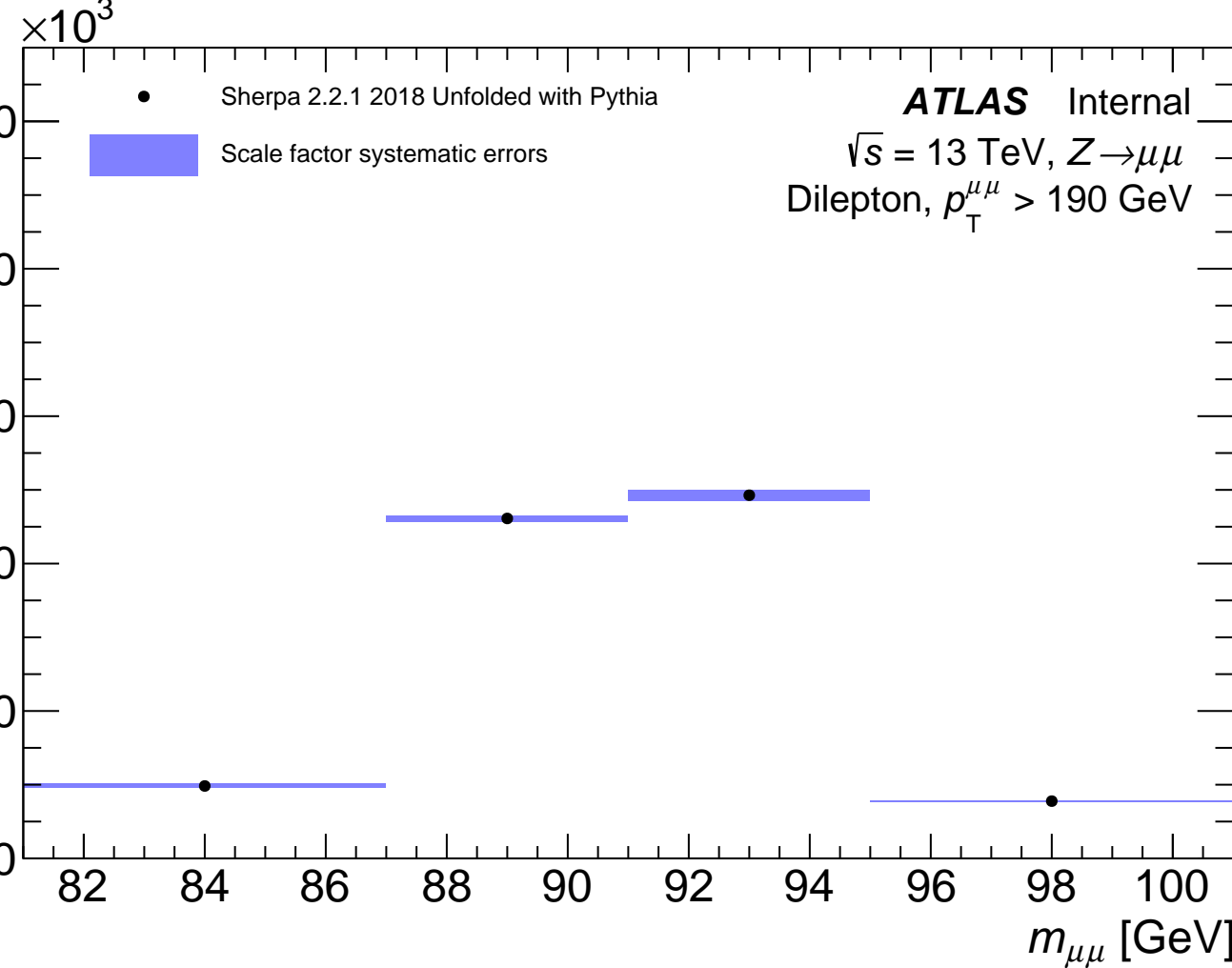
94

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98

100

$m_{\mu\mu} [\text{GeV}]$



Events

$\times 10^3$

• Sherpa 2.2.1 2018 Unfolded with Pythia

■ Scale variation systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

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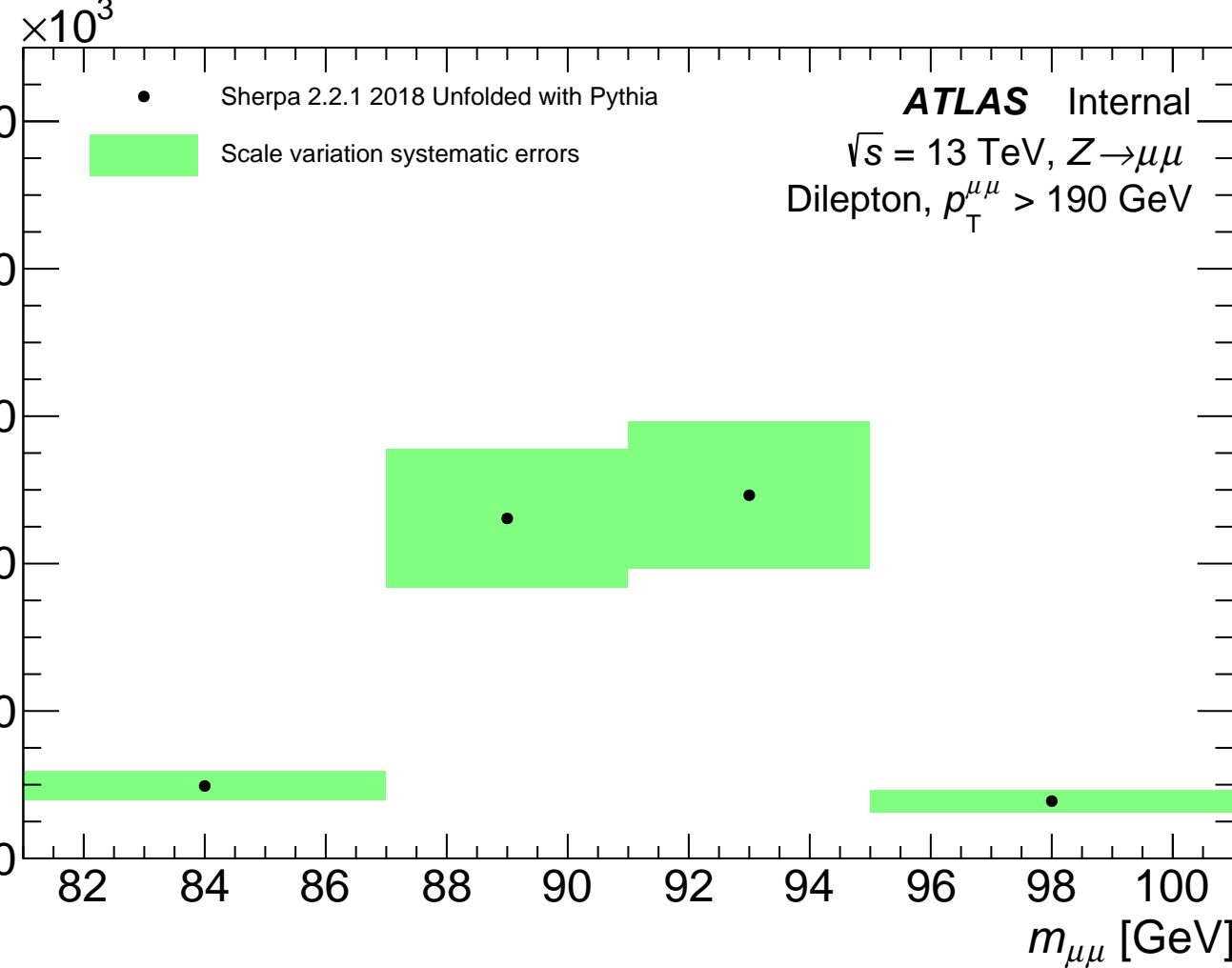
94

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100

$m_{\mu\mu} [\text{GeV}]$



Events

$\times 10^3$

•

Sherpa 2.2.1 2018 Unfolded with Pythia



Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

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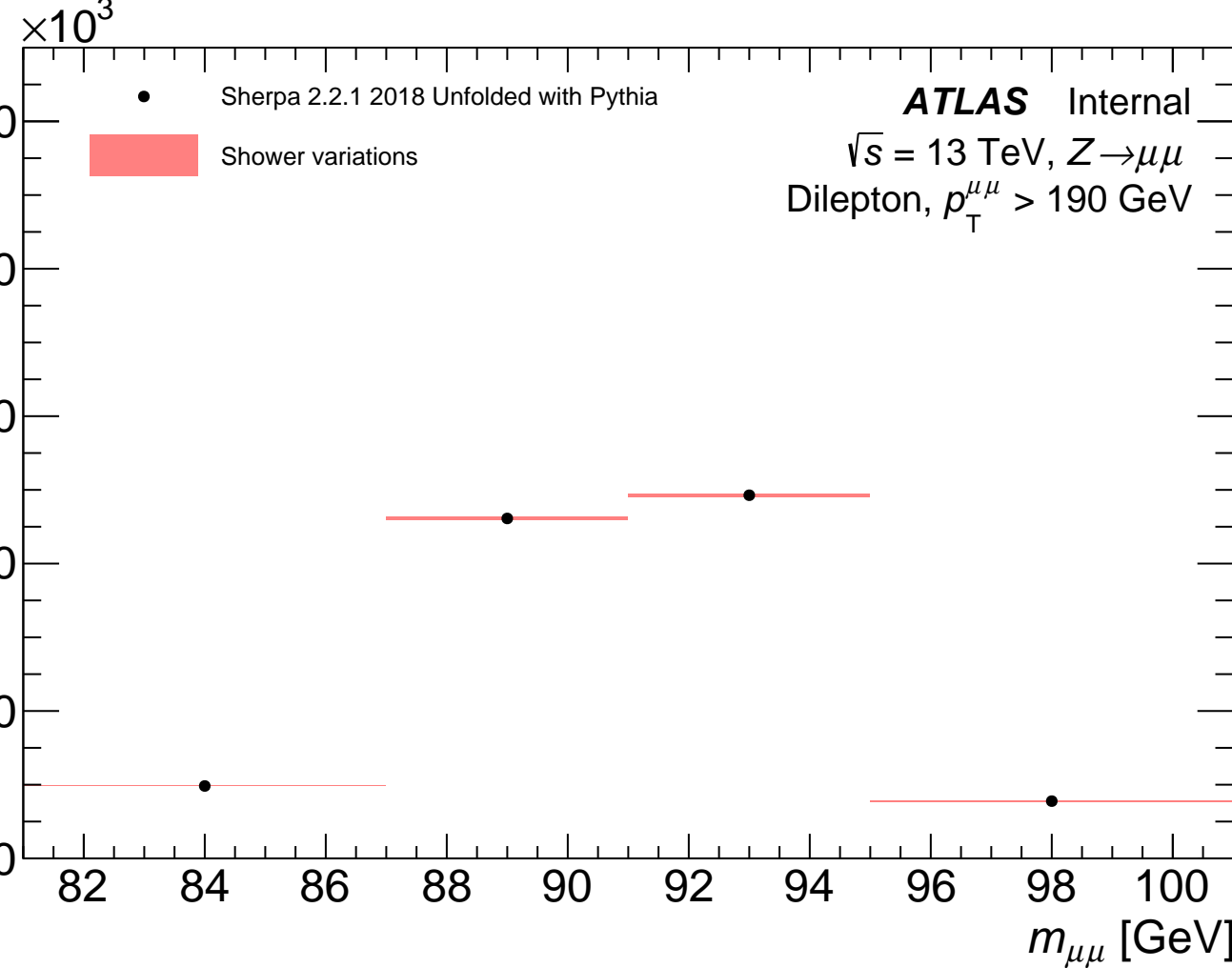
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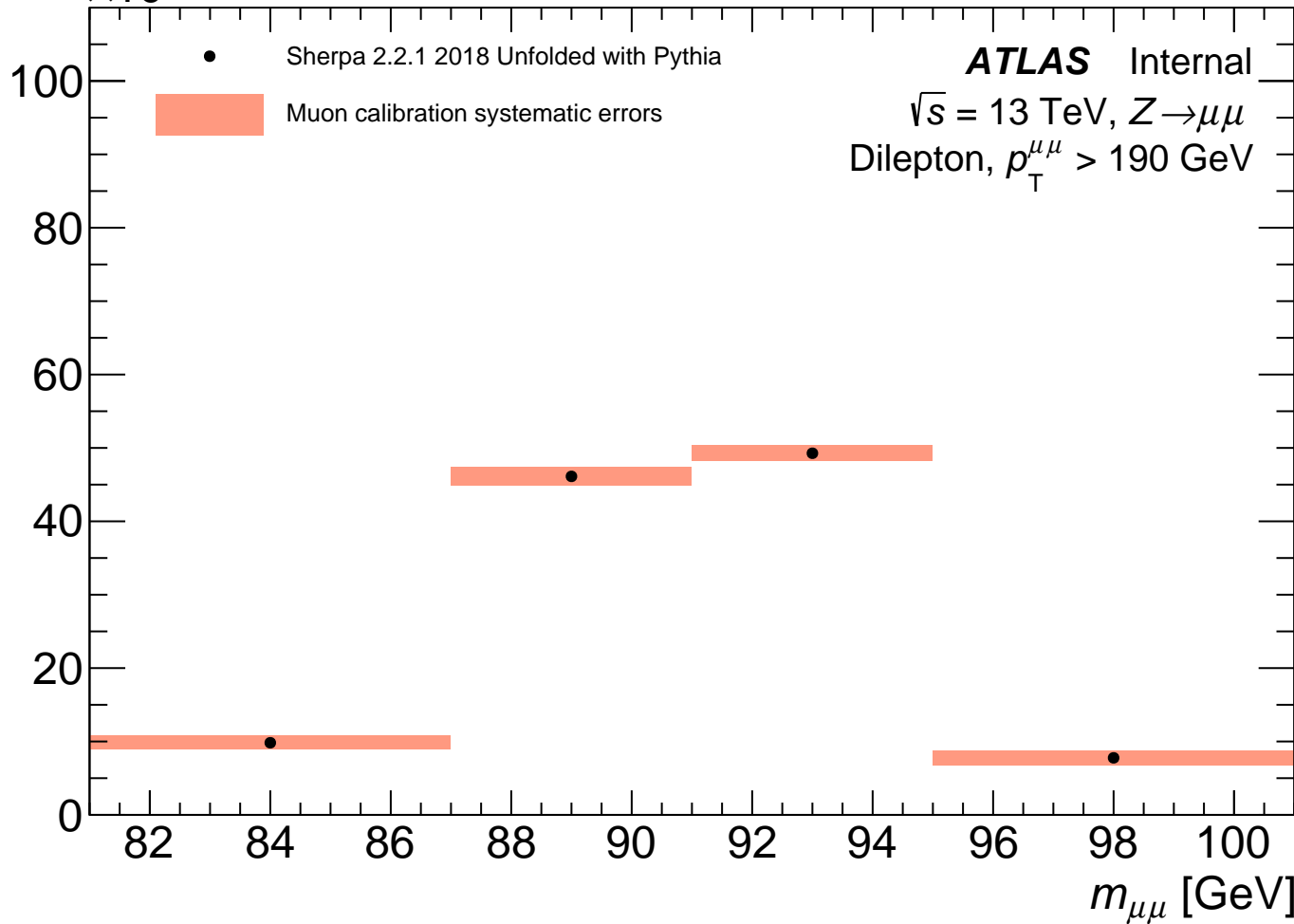
100

$m_{\mu\mu} [\text{GeV}]$



Events

$\times 10^3$



Events

$\times 10^3$

• Sherpa 2.2.1 2018 Unfolded with Pythia

MC stat error

ATLAS Internal

$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

100

80

60

40

20

0

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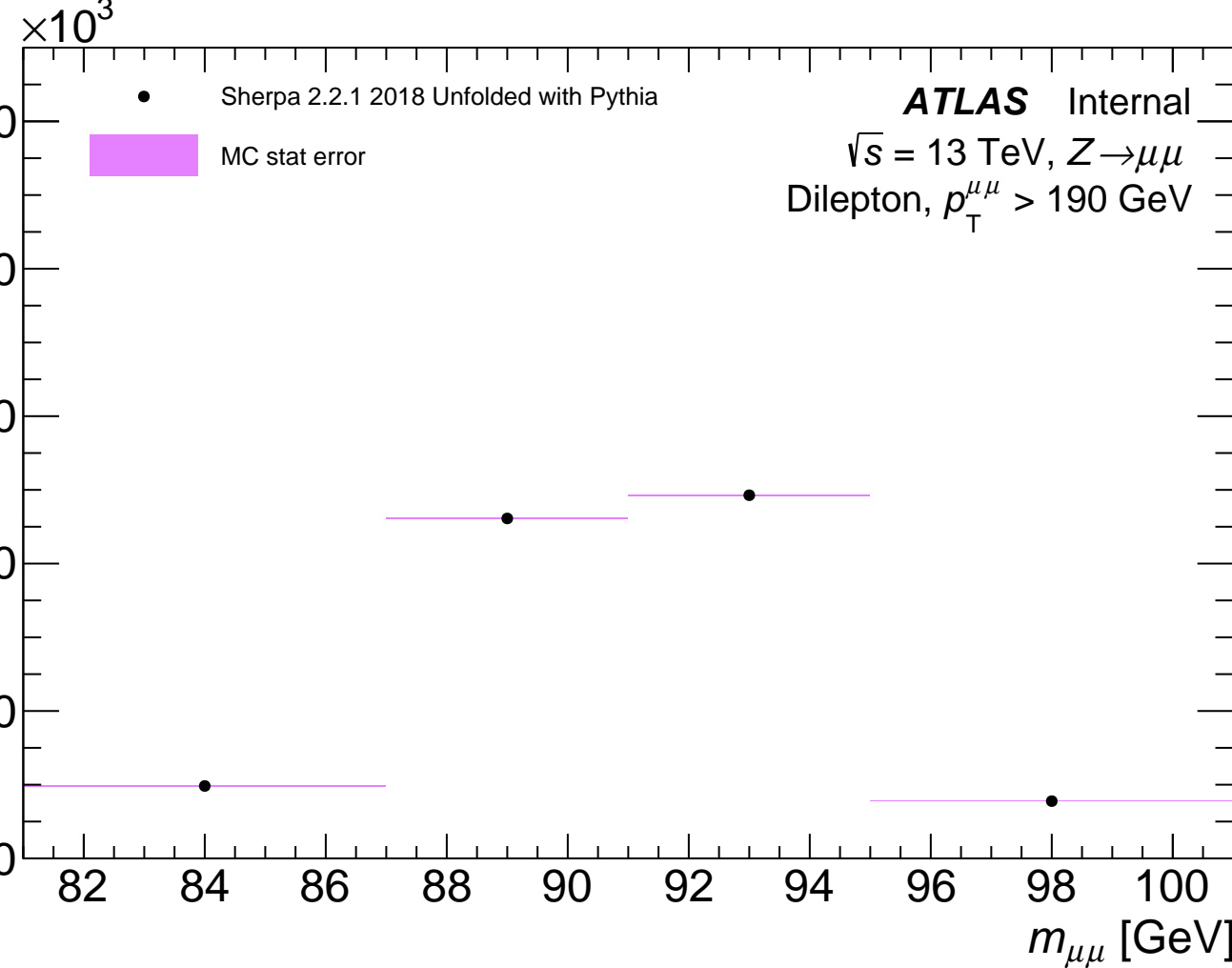
94

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$m_{\mu\mu}$ [GeV]



Events

$\times 10^3$

• Sherpa 2.2.1 2018 Unfolded with Pythia

■ Data stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

100

80

60

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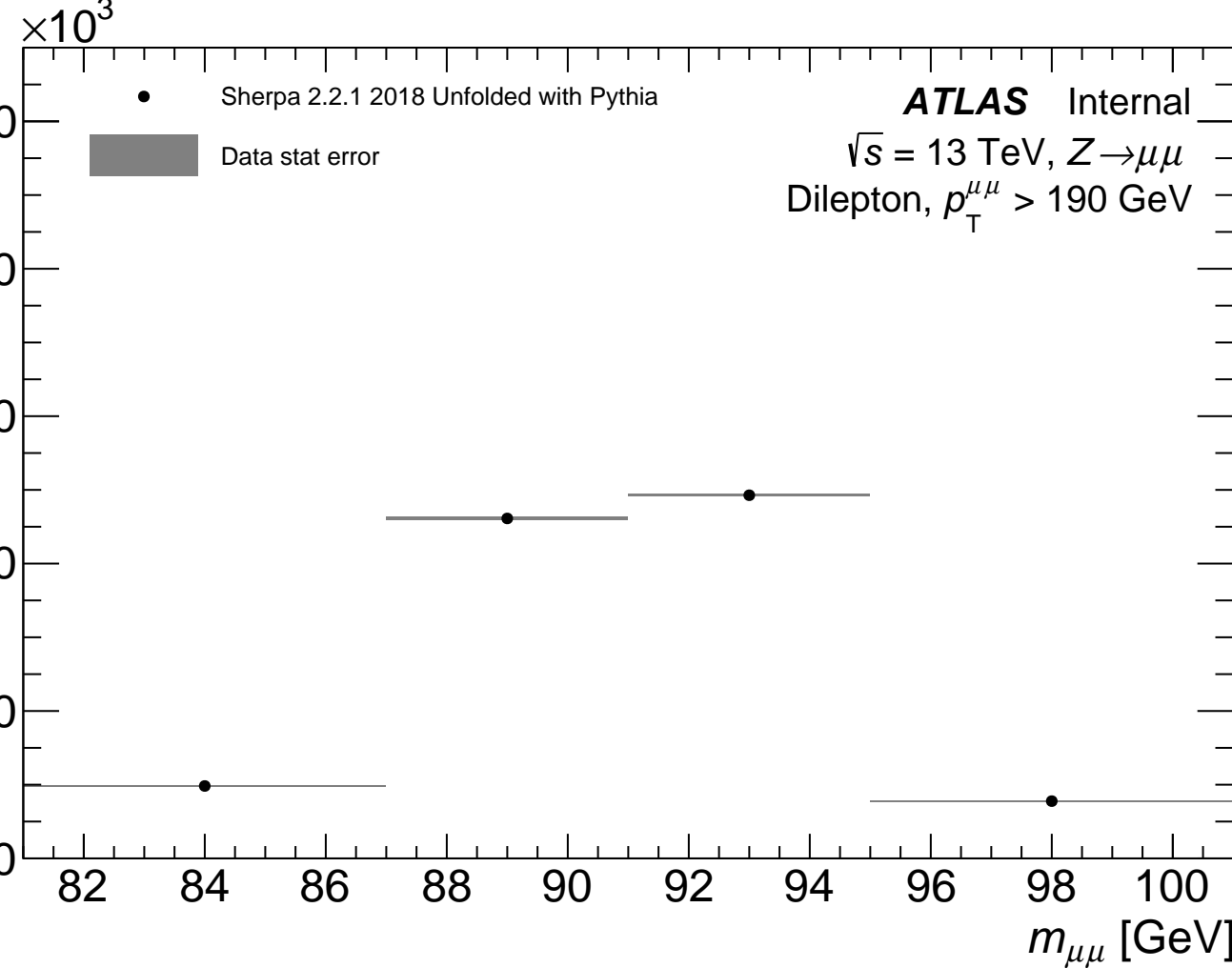
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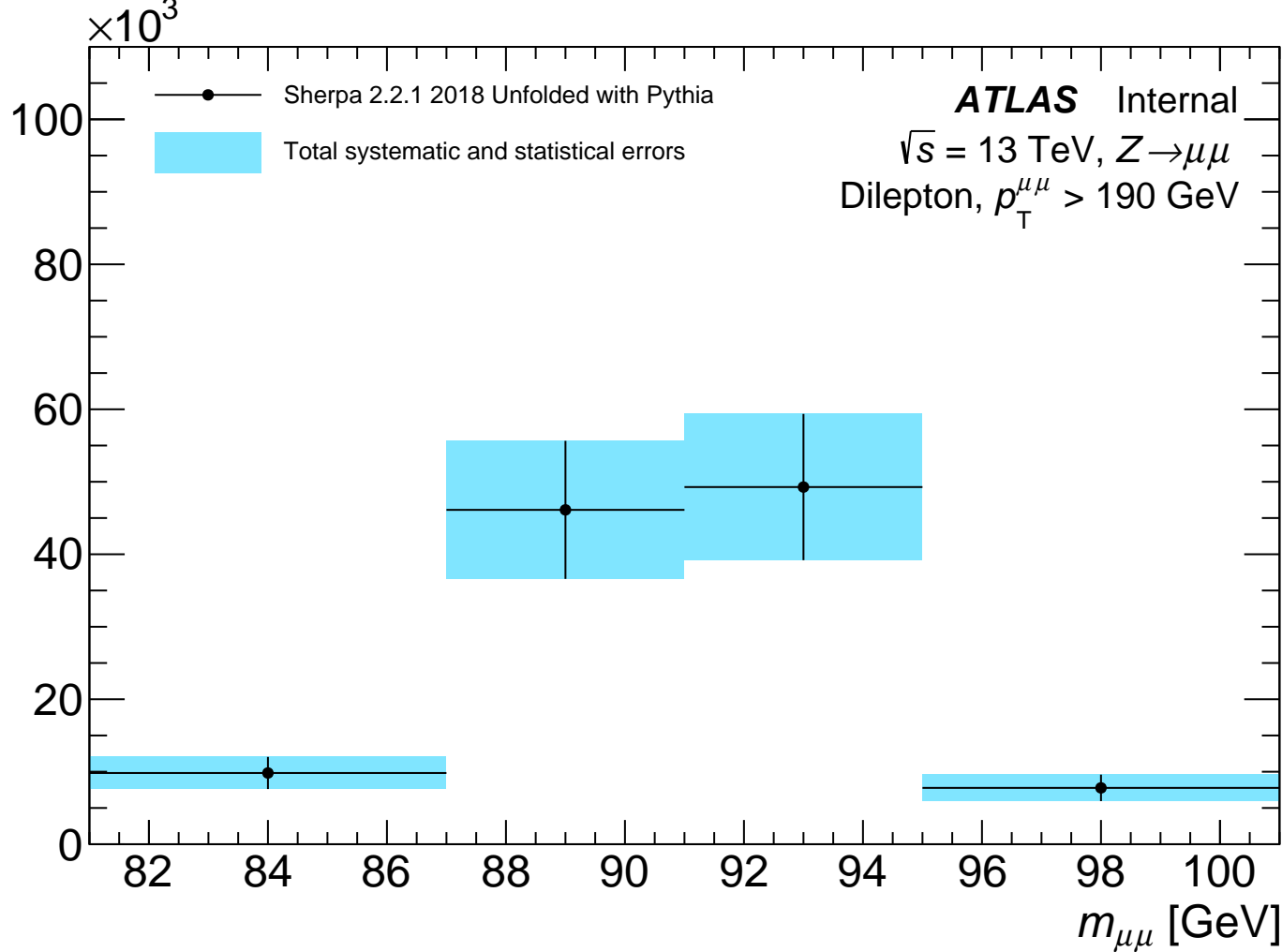
98

100

$m_{\mu\mu} [\text{GeV}]$

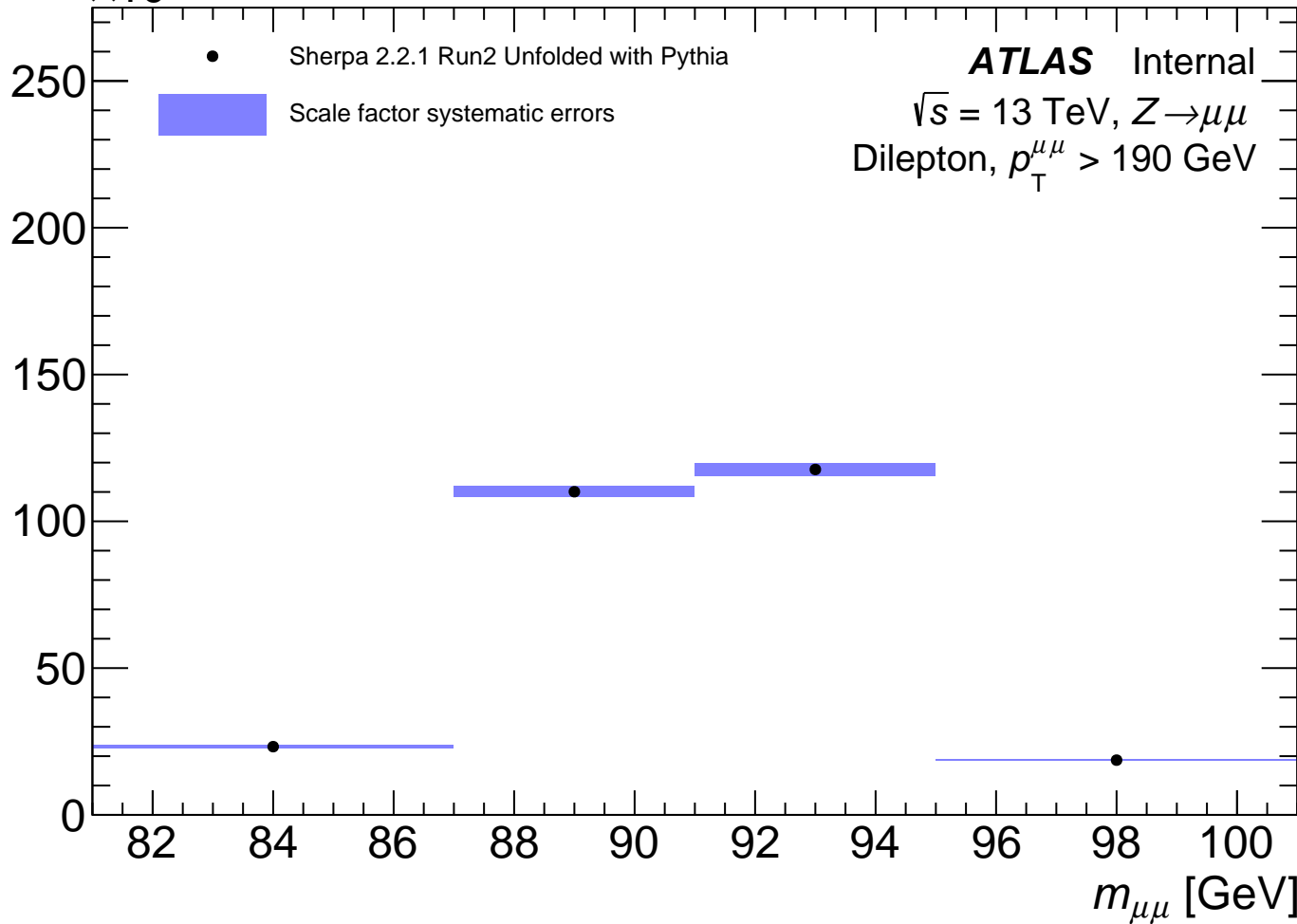


Events

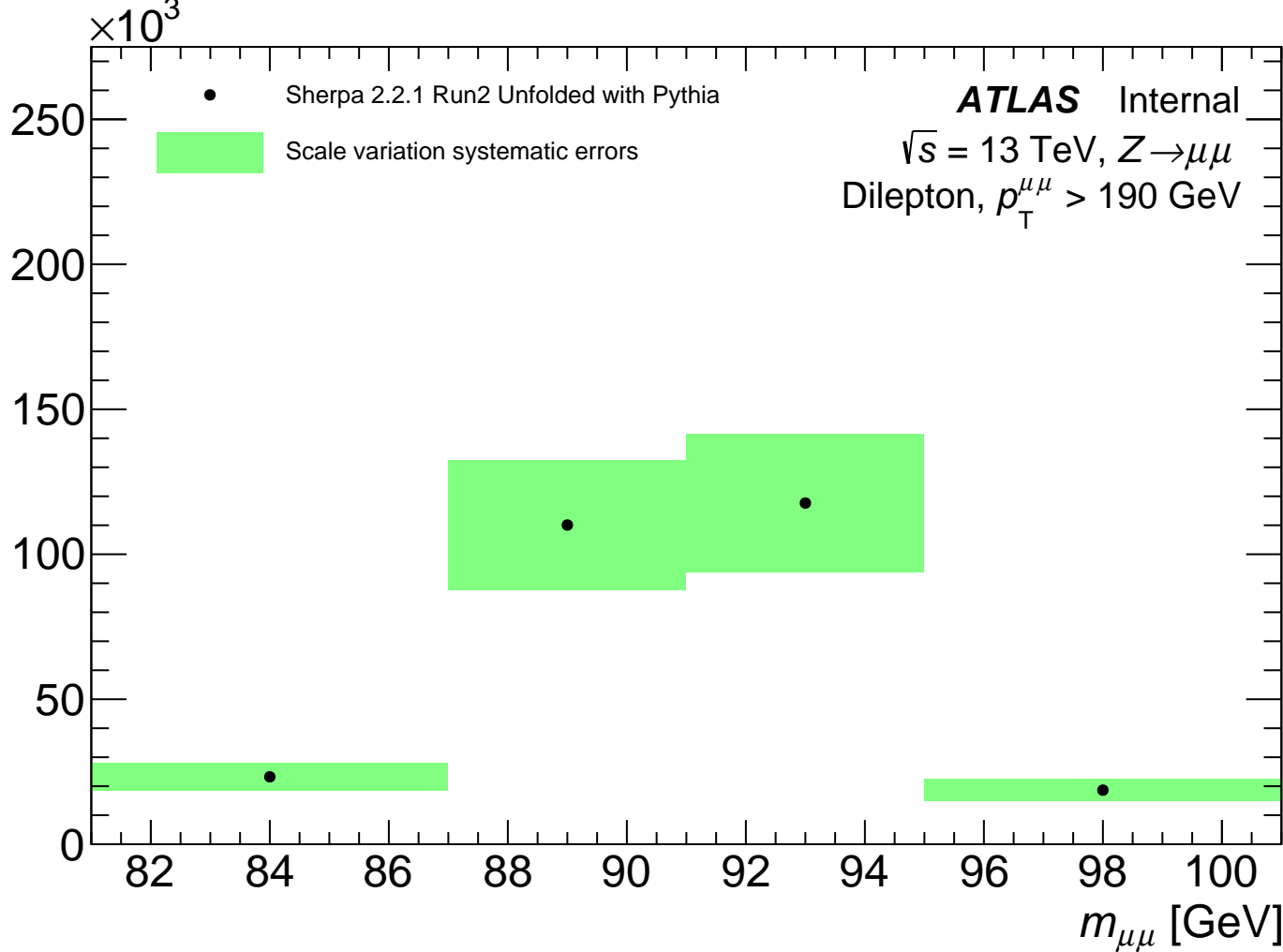


Events

$\times 10^3$



Events



Events

$\times 10^3$

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Sherpa 2.2.1 Run2 Unfolded with Pythia

Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

250

200

150

100

50

0

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100

$m_{\mu\mu} [\text{GeV}]$

250

200

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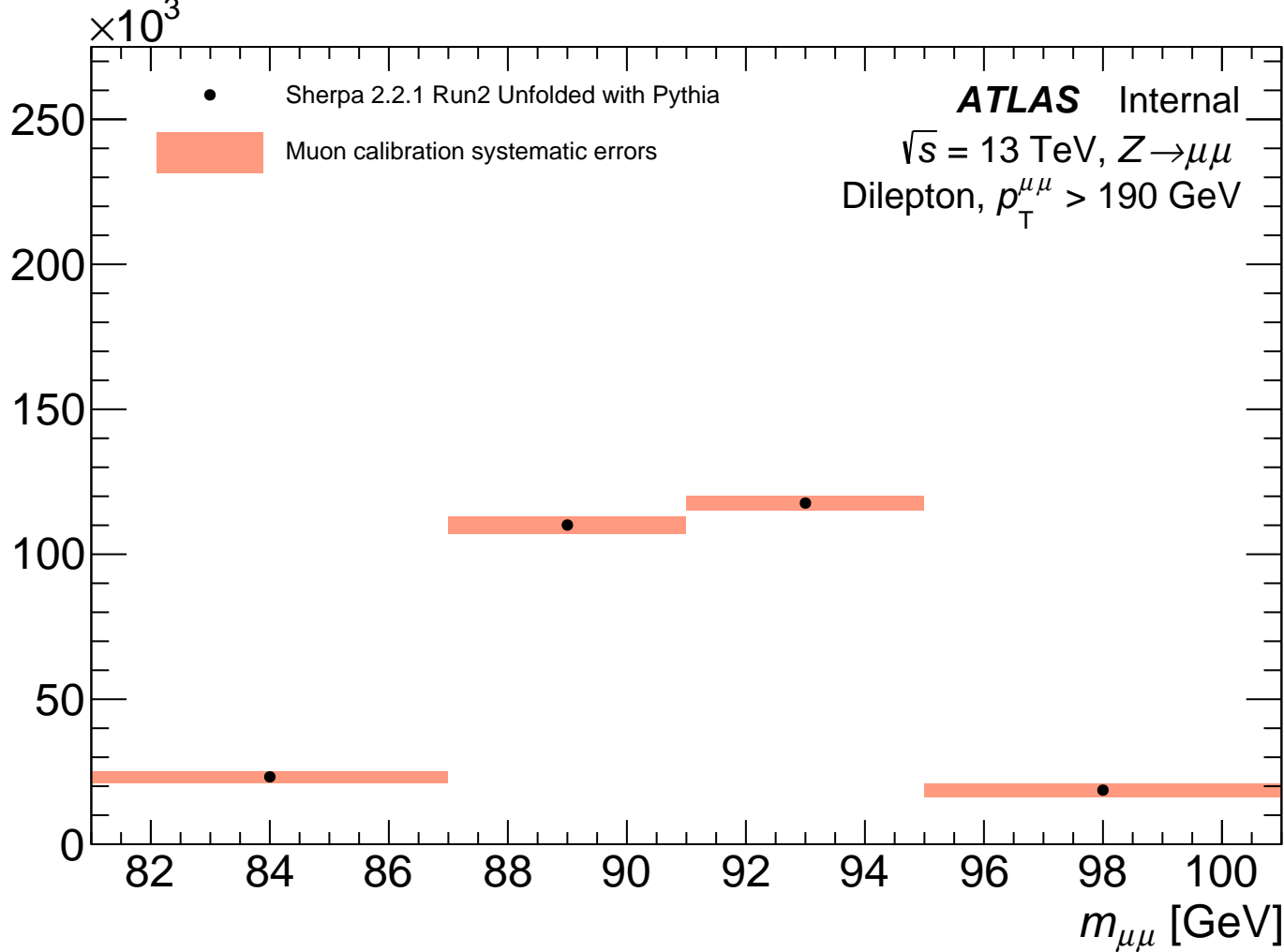
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Events



Events

$\times 10^3$

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Sherpa 2.2.1 Run2 Unfolded with Pythia

MC stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

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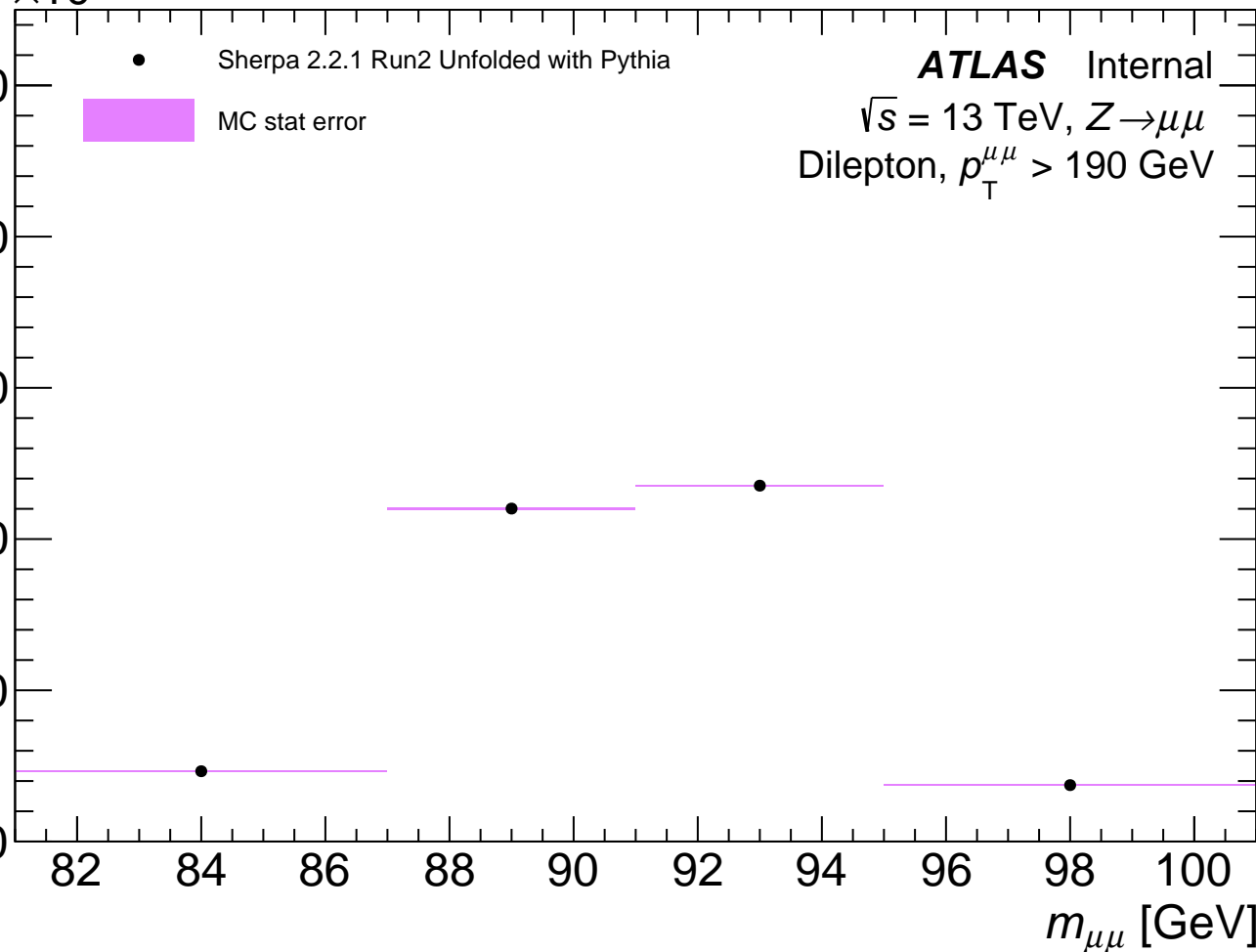
96

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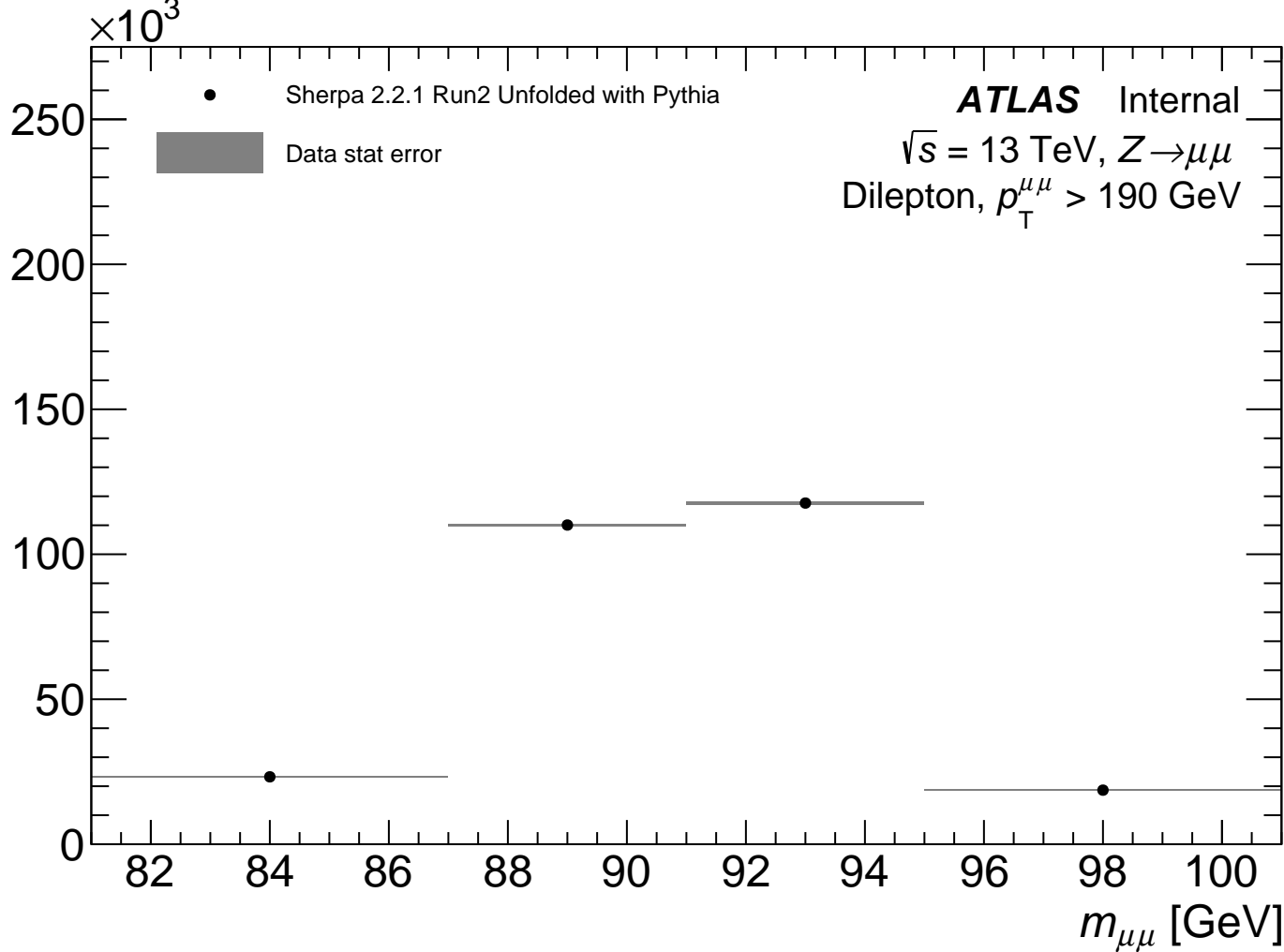
100

$m_{\mu\mu} [\text{GeV}]$

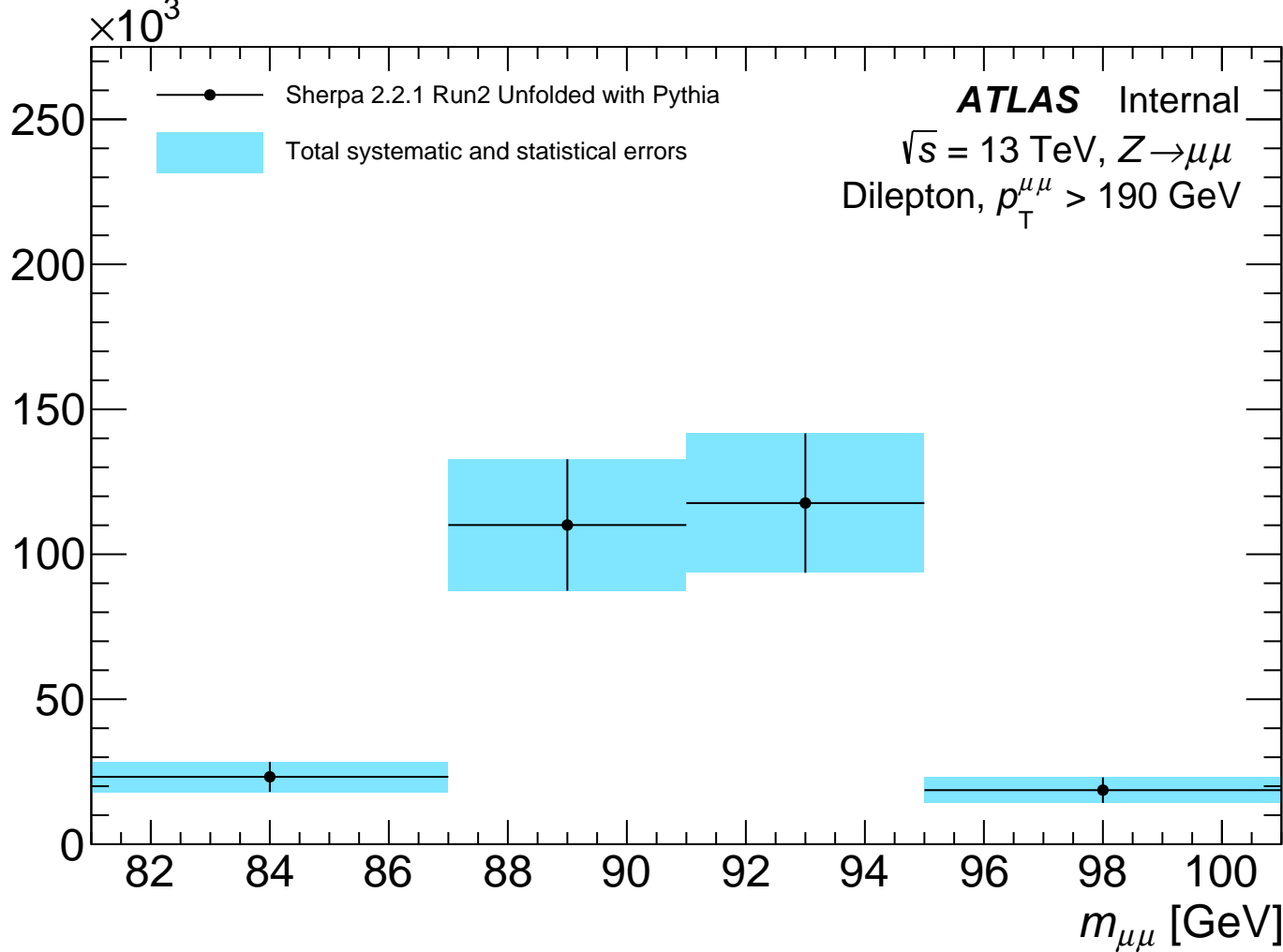
MC stat error



Events



Events



Events

$\times 10^3$

160

140

120

100

80

60

40

20

0

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Sherpa 2.2.1 2016 Unfolded with Pythia



Scale factor systematic errors

ATLAS Internal

$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

200

400

600

800

1000

1200

200

400

600

800

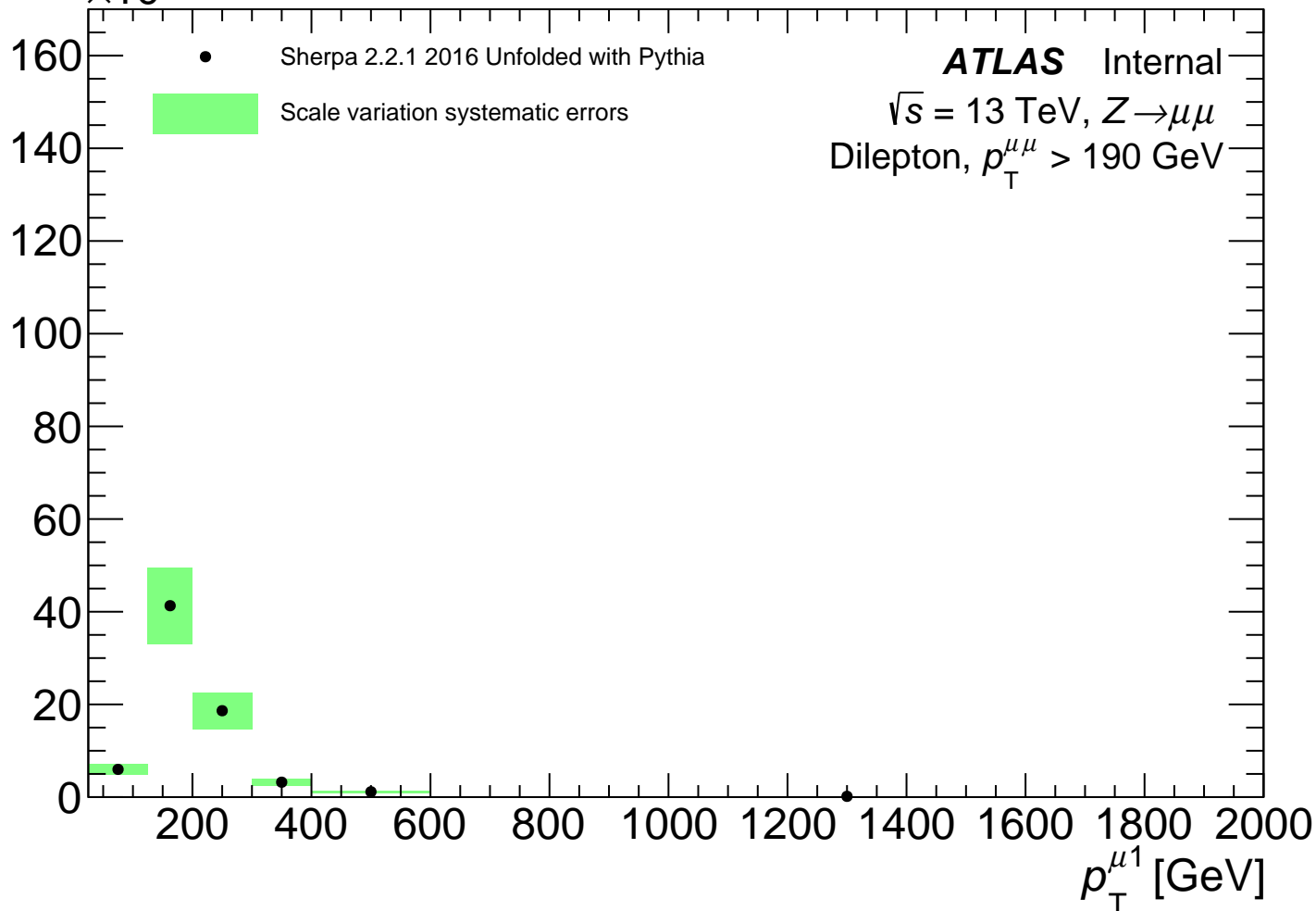
1000

1200

$p_{\text{T}}^{\mu 1}$ [GeV]

Events

$\times 10^3$



Events

$\times 10^3$

160

140

120

100

80

60

40

20

0

•

Sherpa 2.2.1 2016 Unfolded with Pythia



Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

200

400

600

800

1000

1200

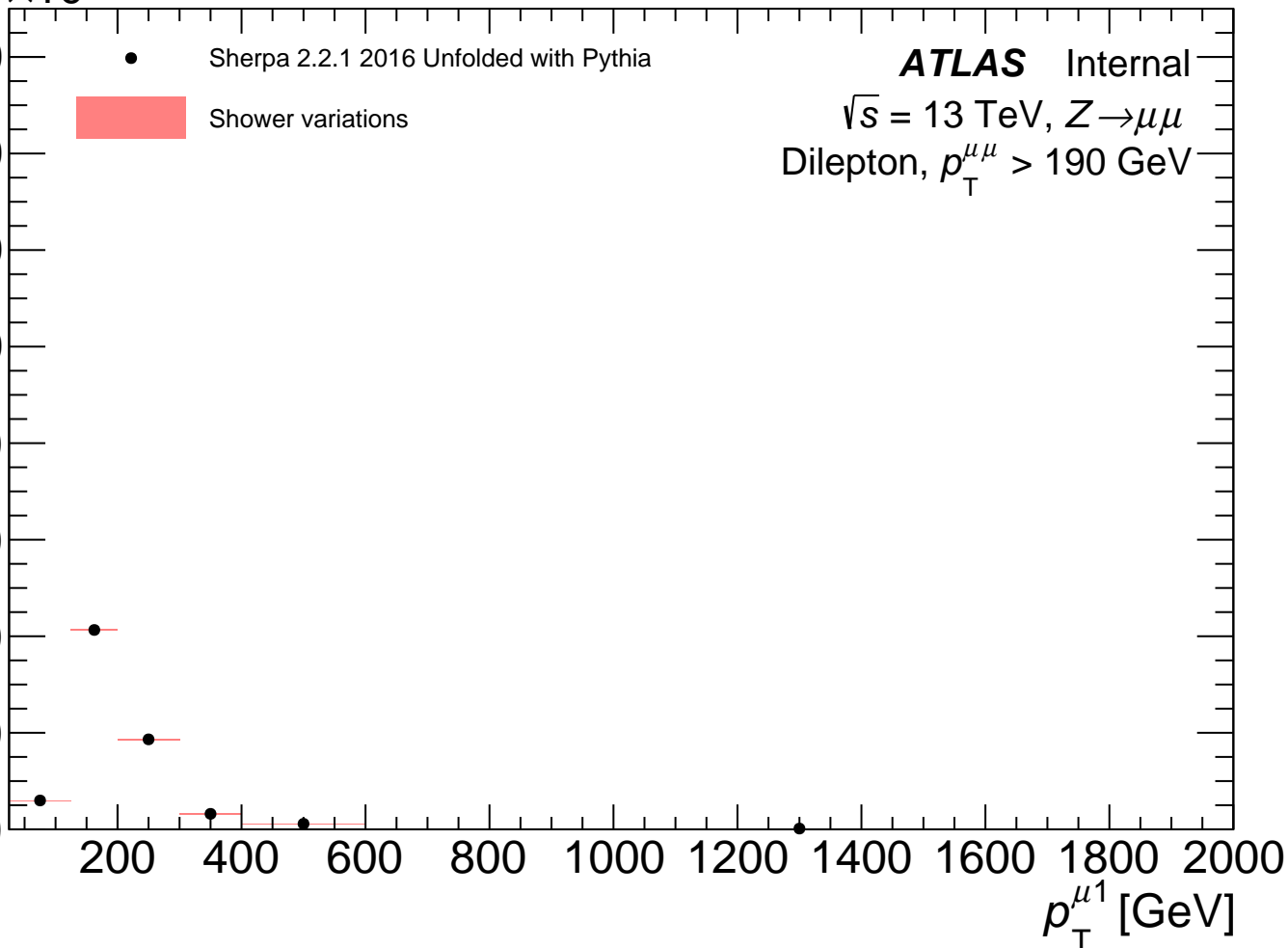
1400

1600

1800

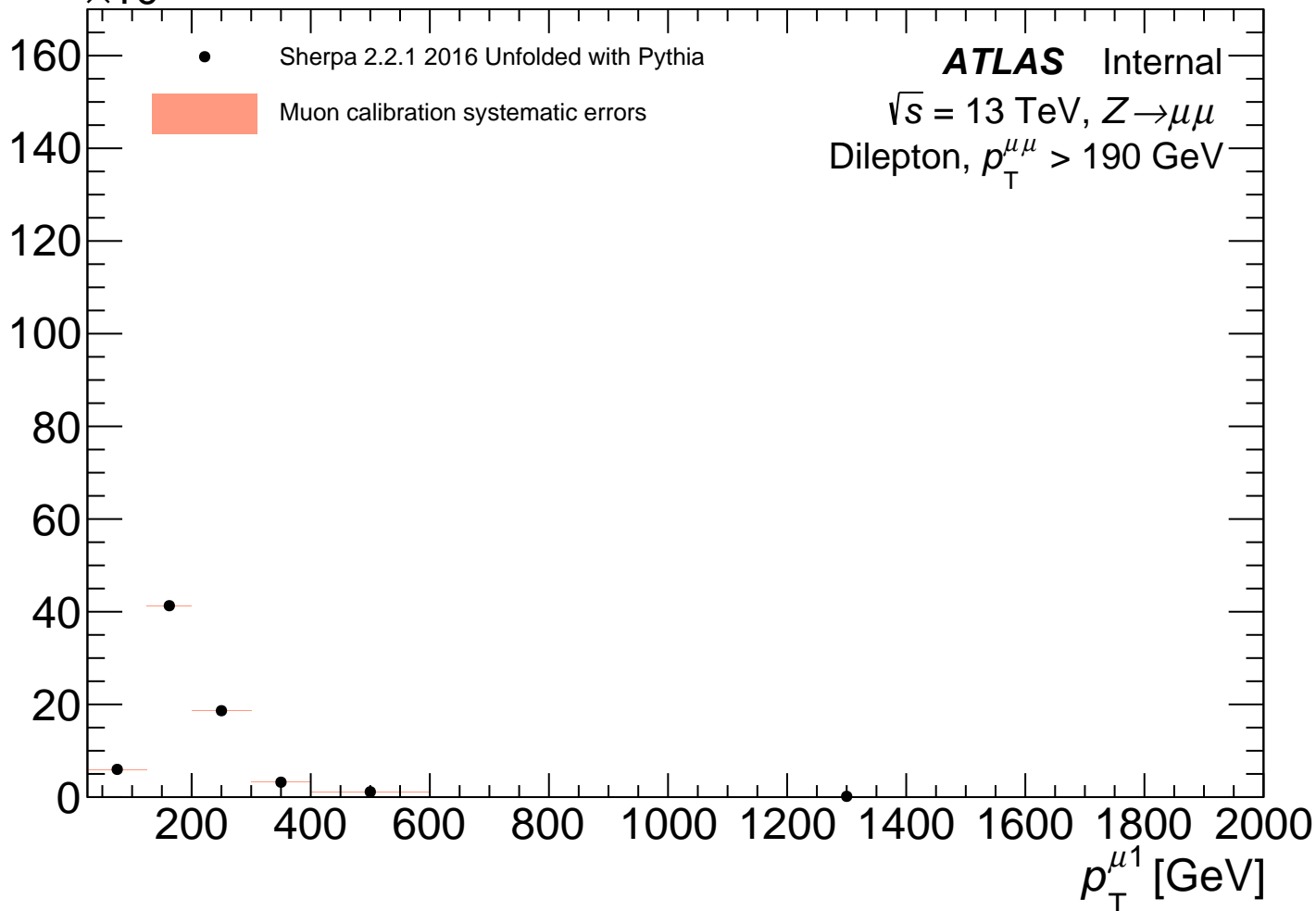
2000

$p_{\text{T}}^{\mu 1} [\text{GeV}]$



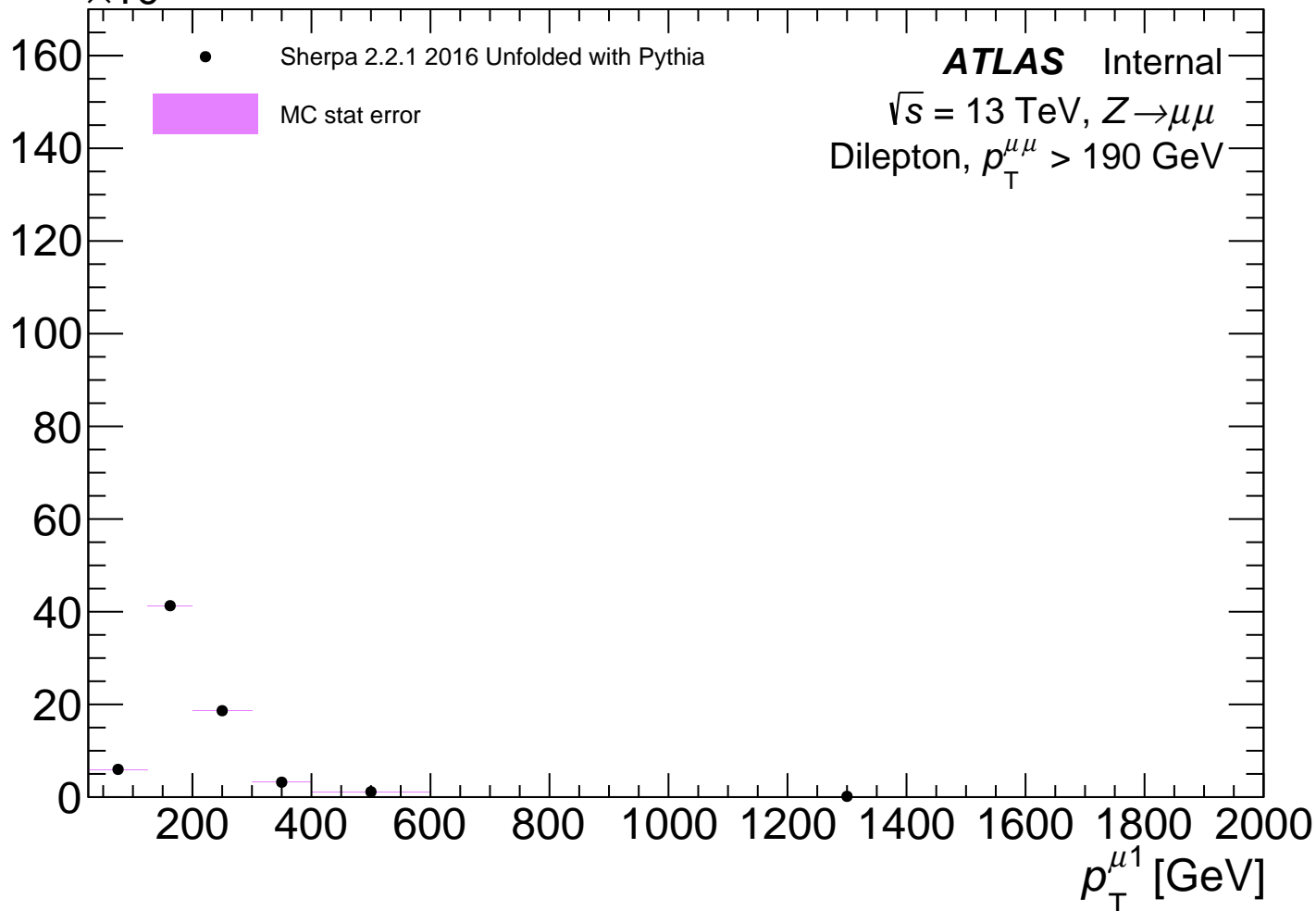
Events

$\times 10^3$



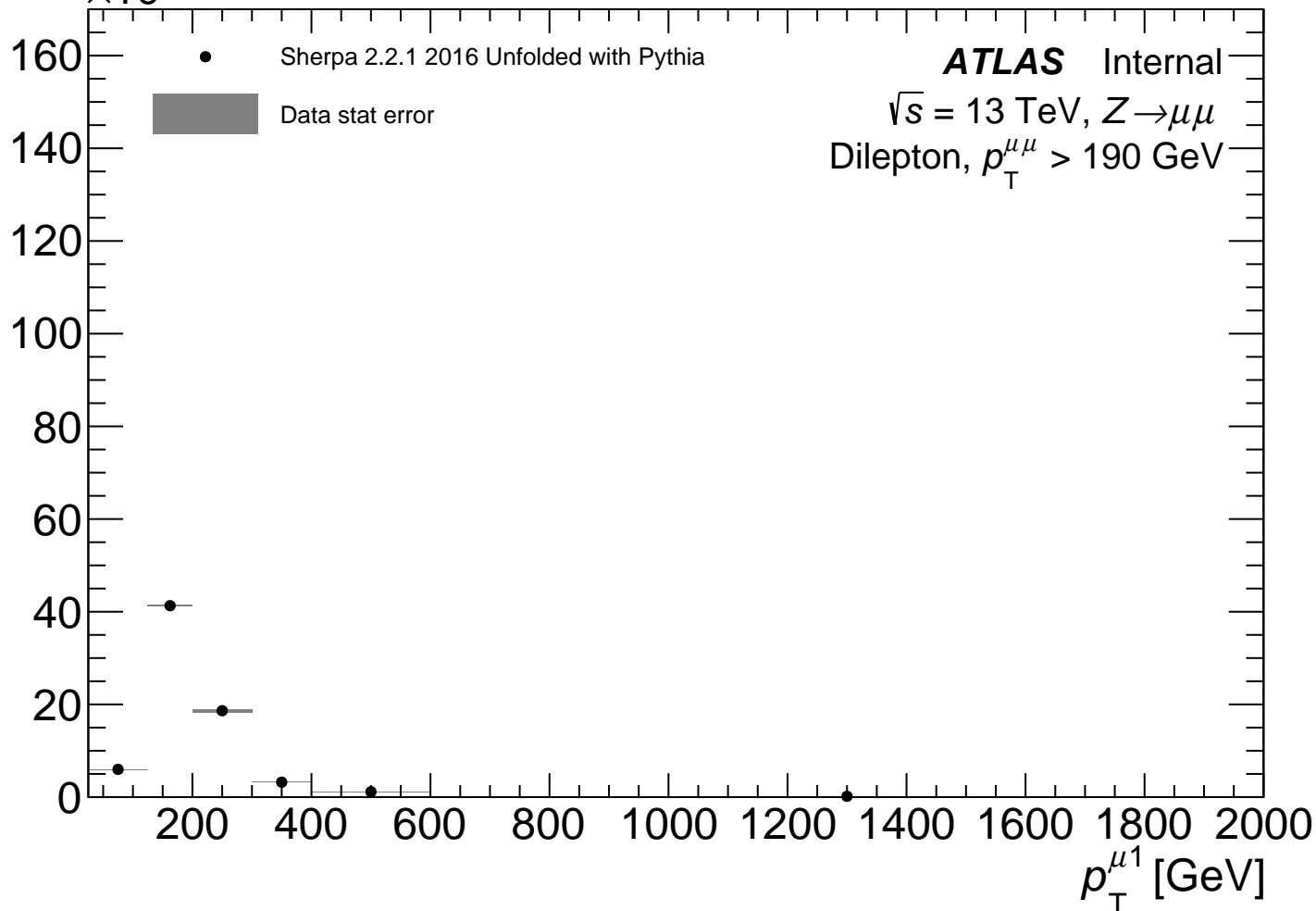
Events

$\times 10^3$



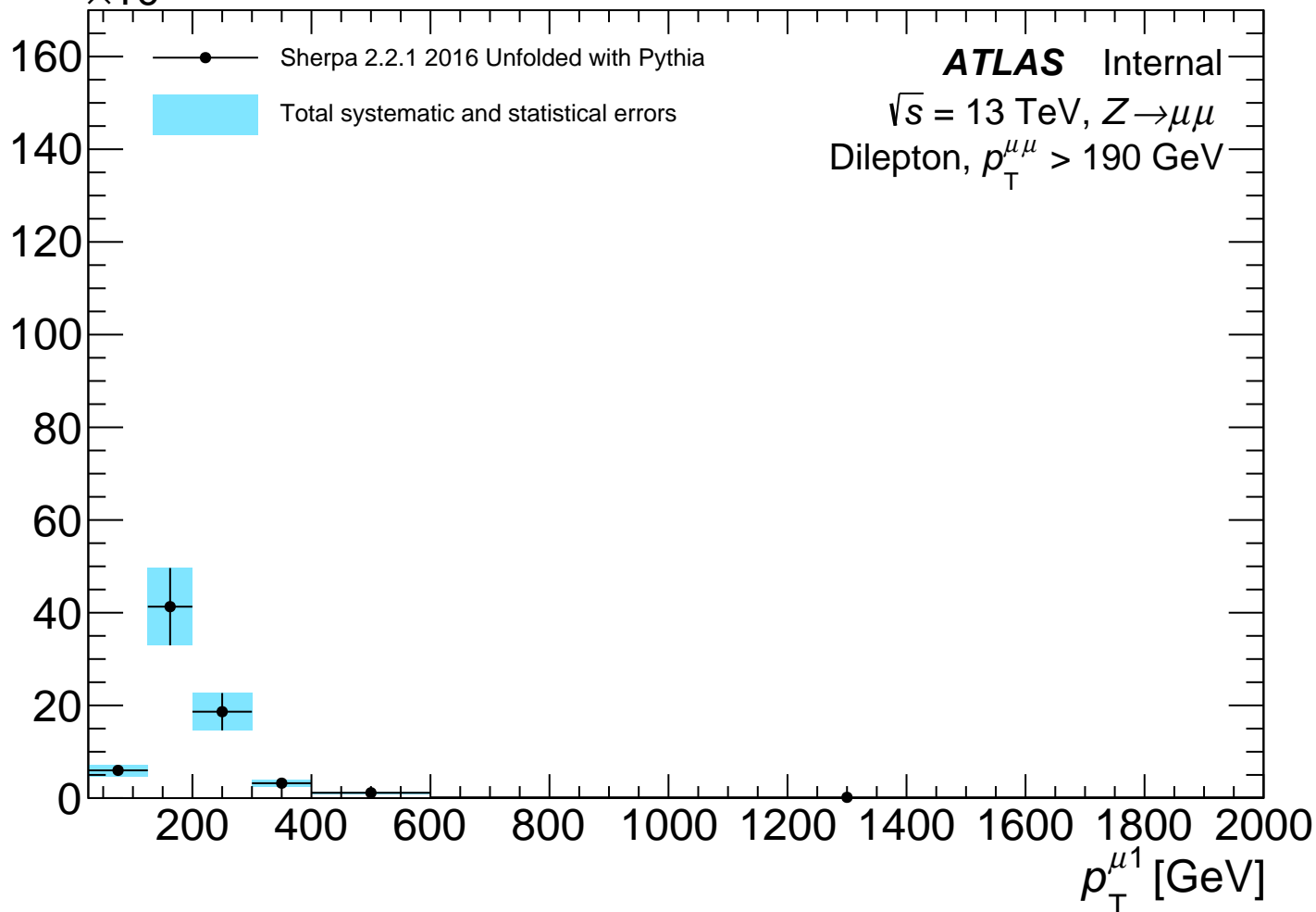
Events

$\times 10^3$



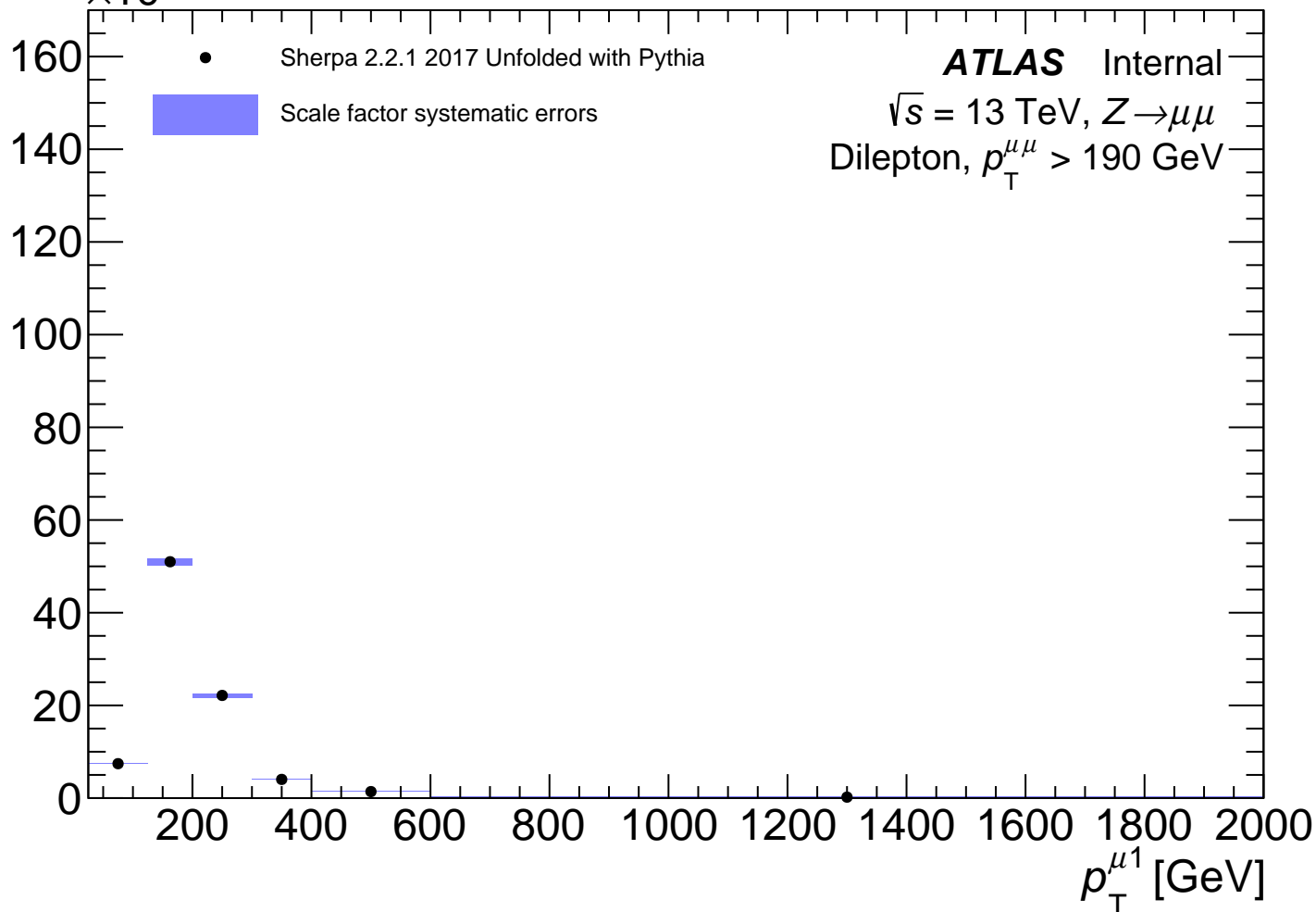
Events

$\times 10^3$



Events

$\times 10^3$



Events

$\times 10^3$

160

140

120

100

80

60

40

20

0

Sherpa 2.2.1 2017 Unfolded with Pythia

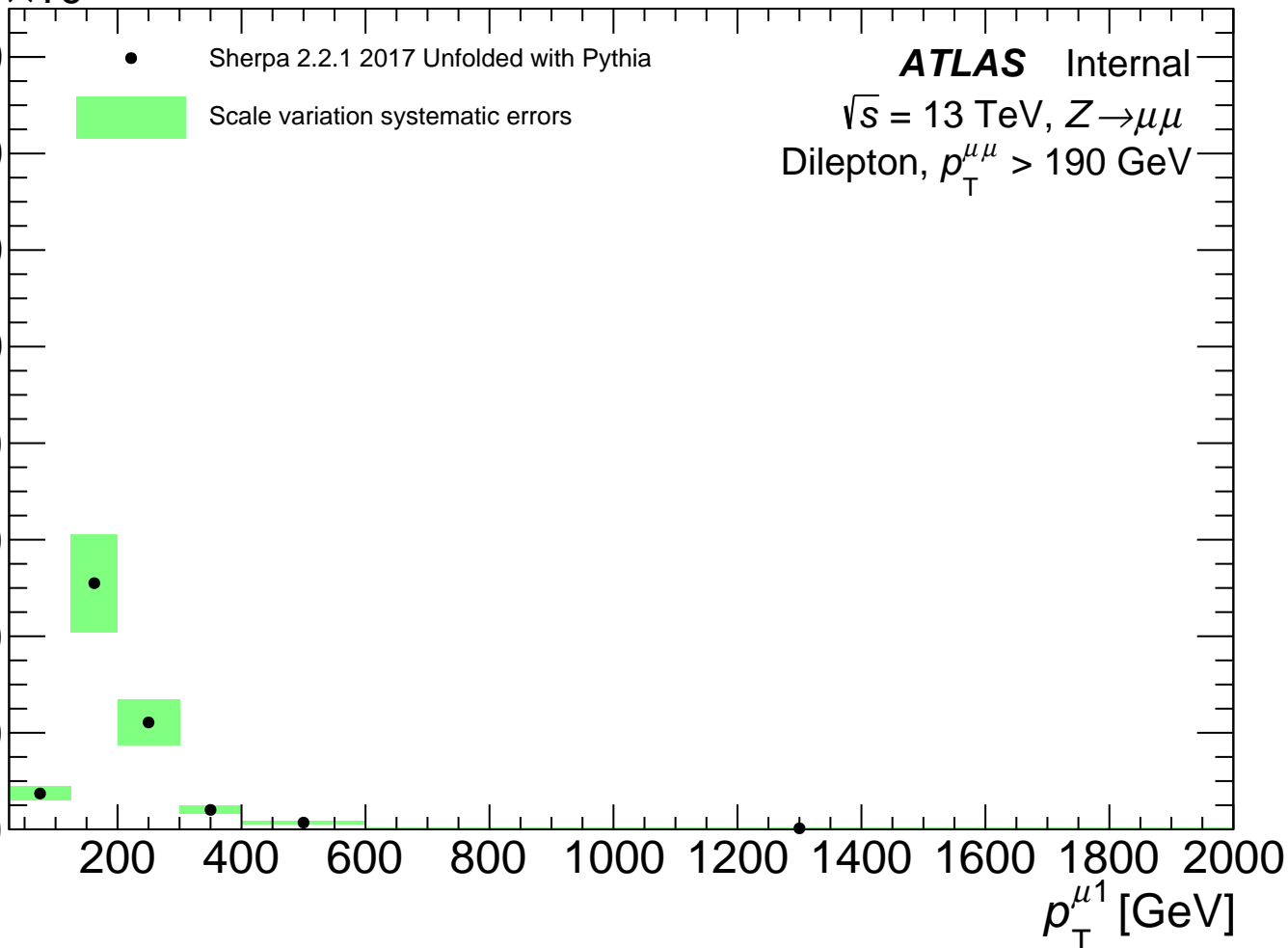
Scale variation systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

$p_{\text{T}}^{\mu 1} [\text{GeV}]$



Events

$\times 10^3$

160

140

120

100

80

60

40

20

0

•

Sherpa 2.2.1 2017 Unfolded with Pythia

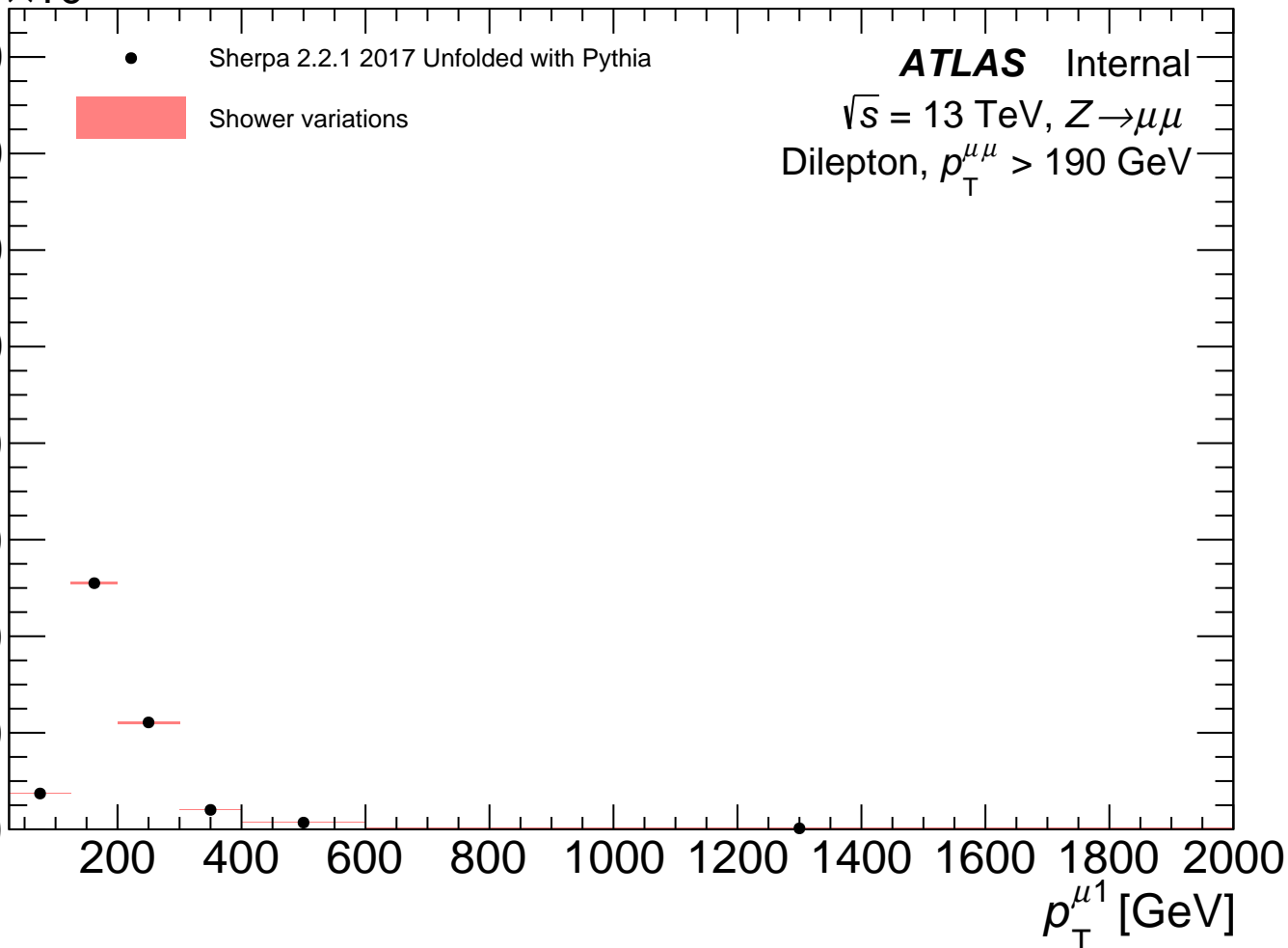
Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

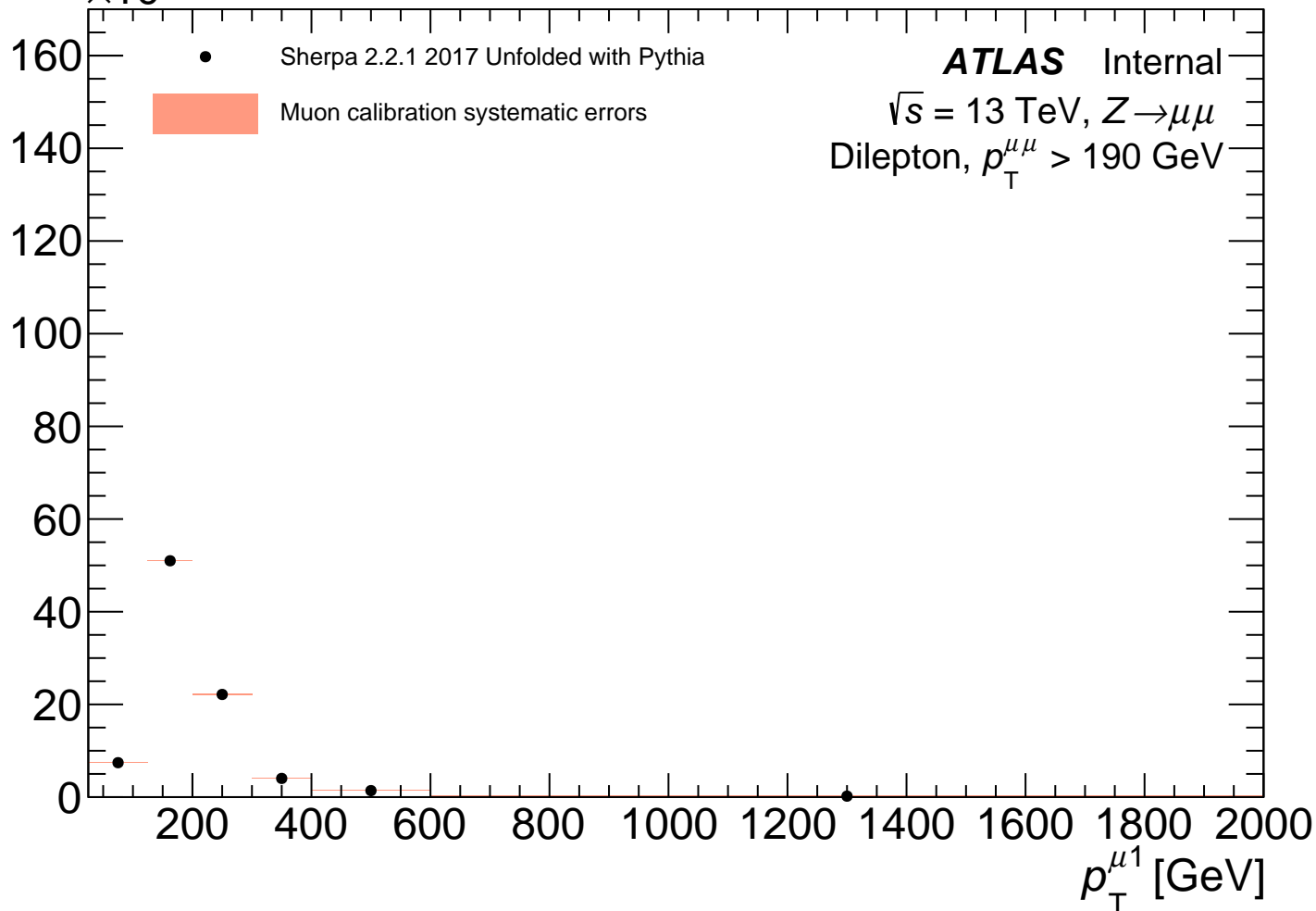
Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

$p_{\text{T}}^{\mu 1} [\text{GeV}]$



Events

$\times 10^3$



Events

$\times 10^3$

160

140

120

100

80

60

40

20

0

• Sherpa 2.2.1 2017 Unfolded with Pythia

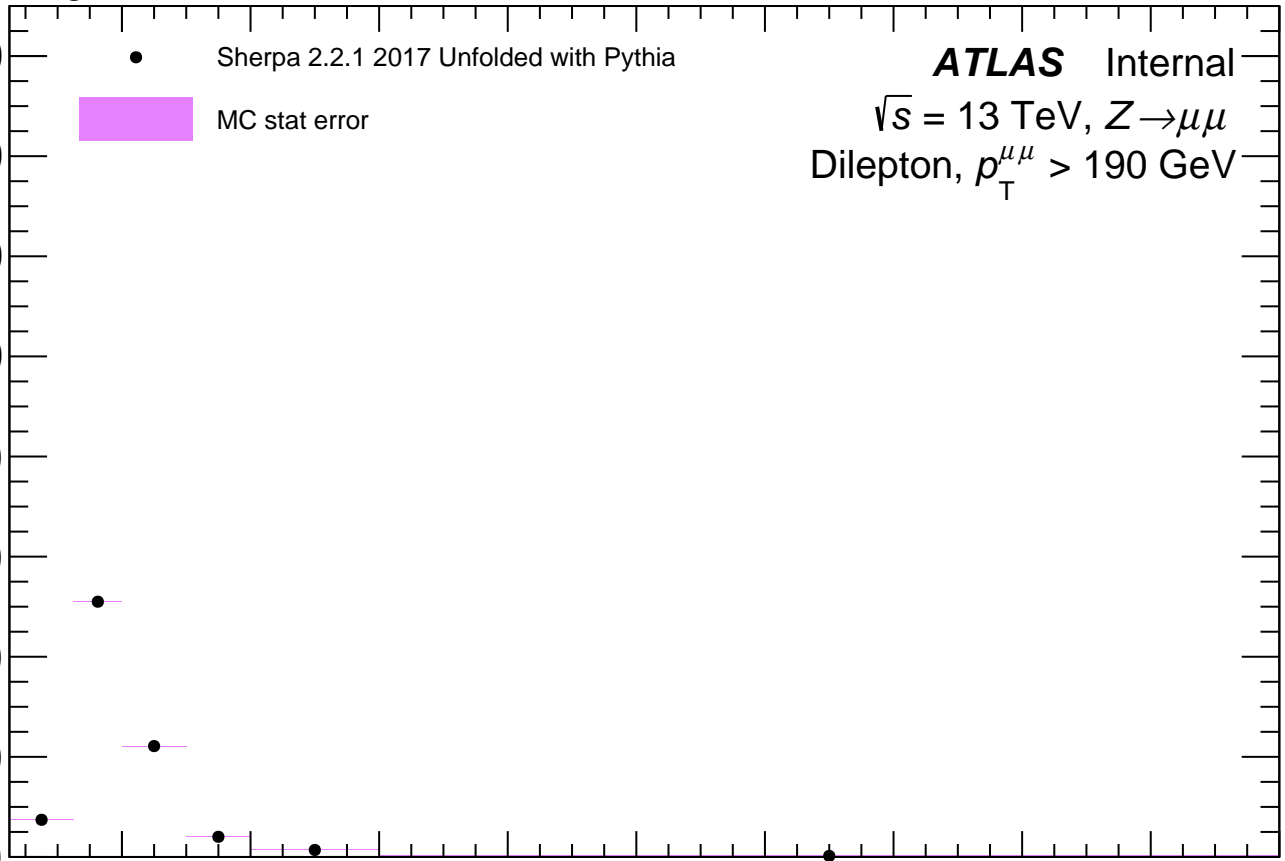
MC stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

$p_{\text{T}}^{\mu 1} [\text{GeV}]$



Events

$\times 10^3$

160

140

120

100

80

60

40

20

0



Sherpa 2.2.1 2017 Unfolded with Pythia



Data stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

200

400

600

800

1000

1200

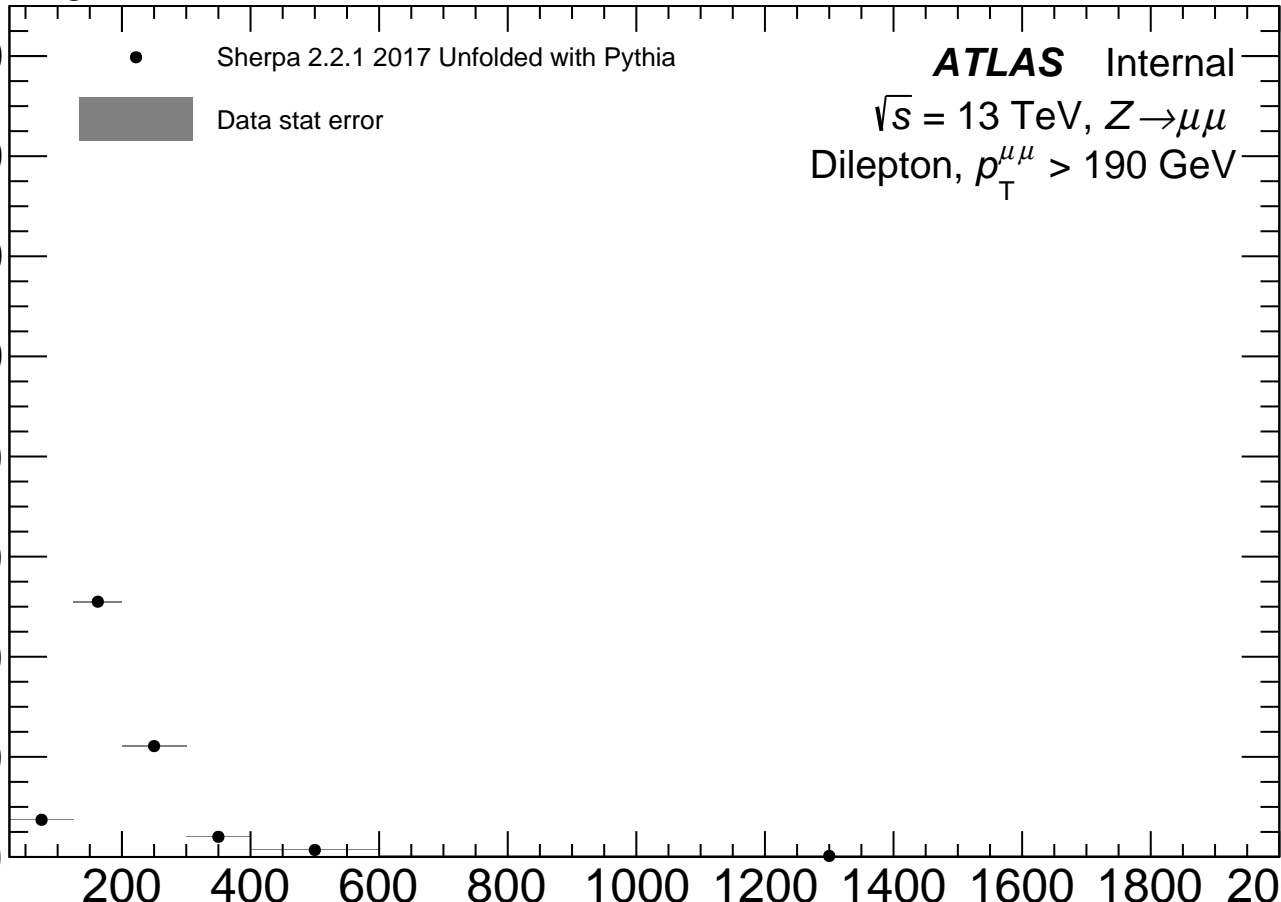
1400

1600

1800

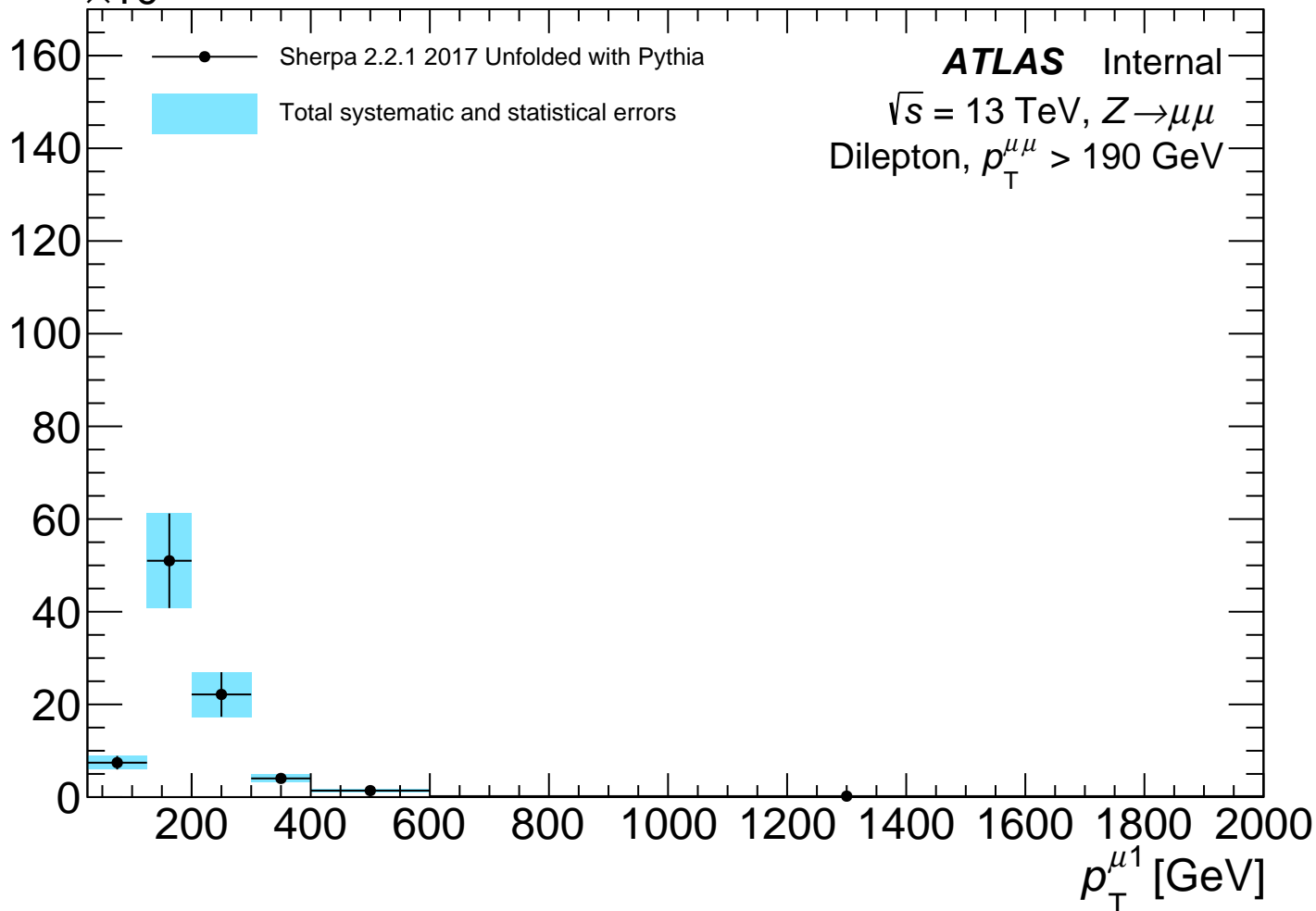
2000

$p_{\text{T}}^{\mu 1} [\text{GeV}]$



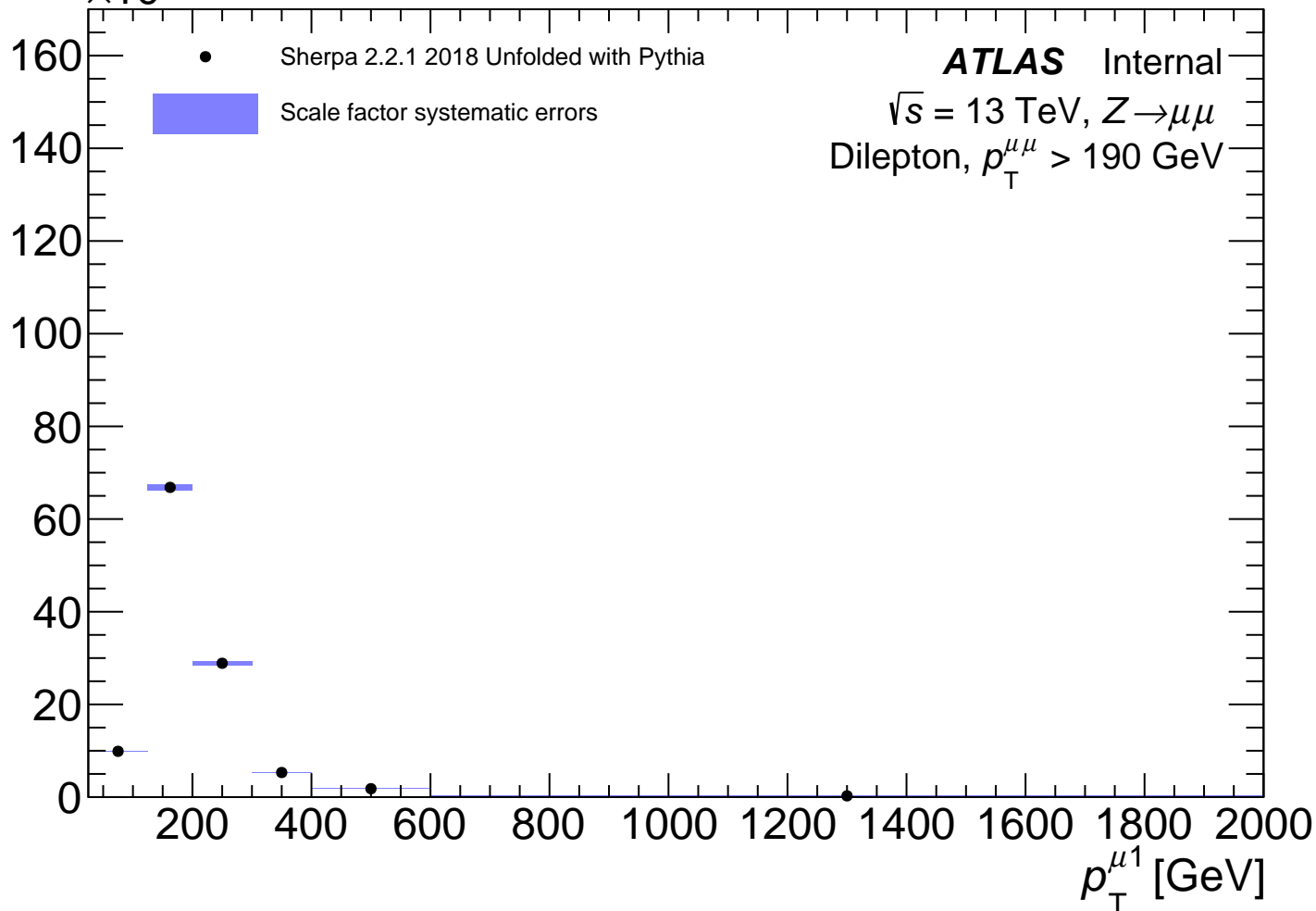
Events

$\times 10^3$



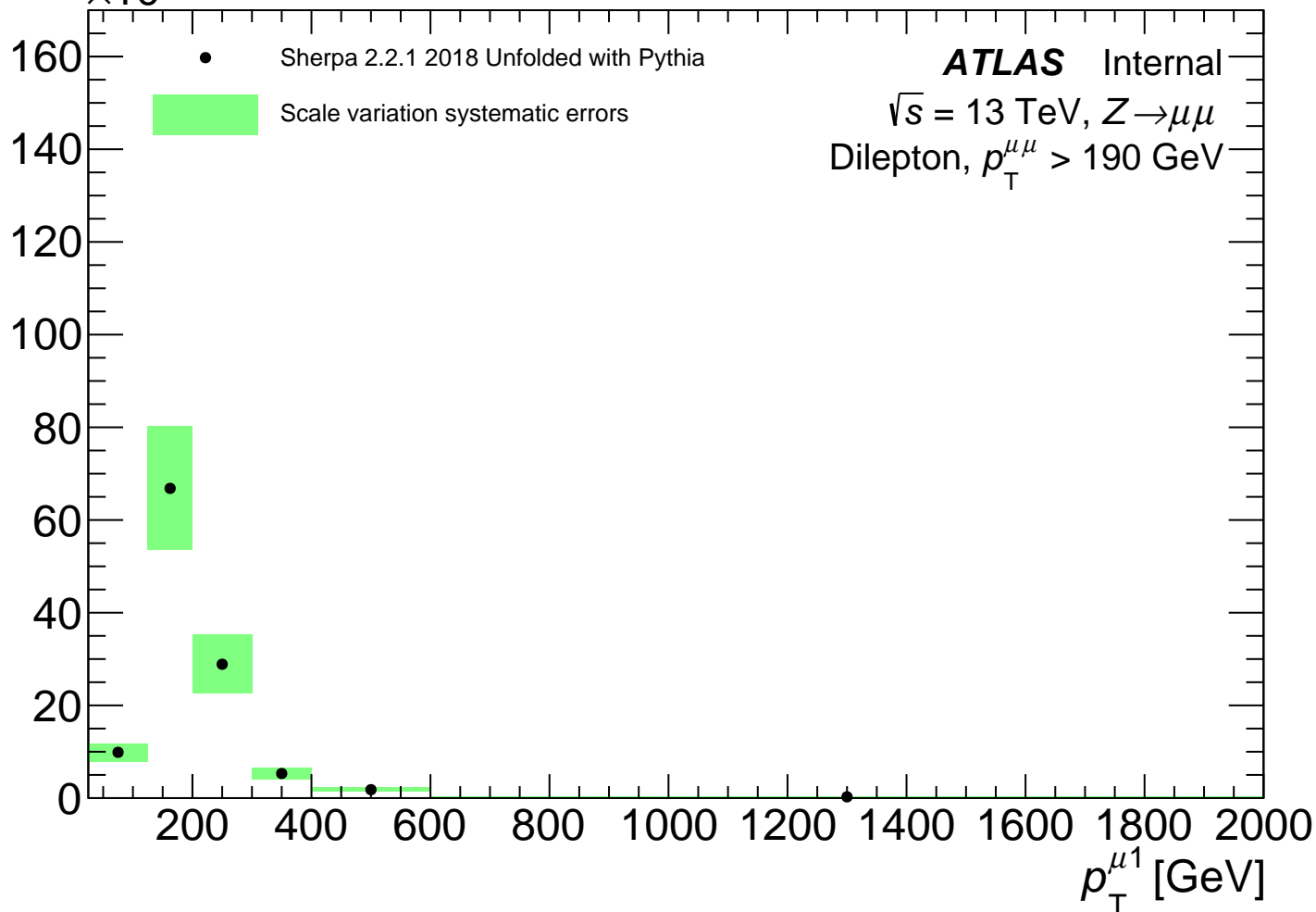
Events

$\times 10^3$



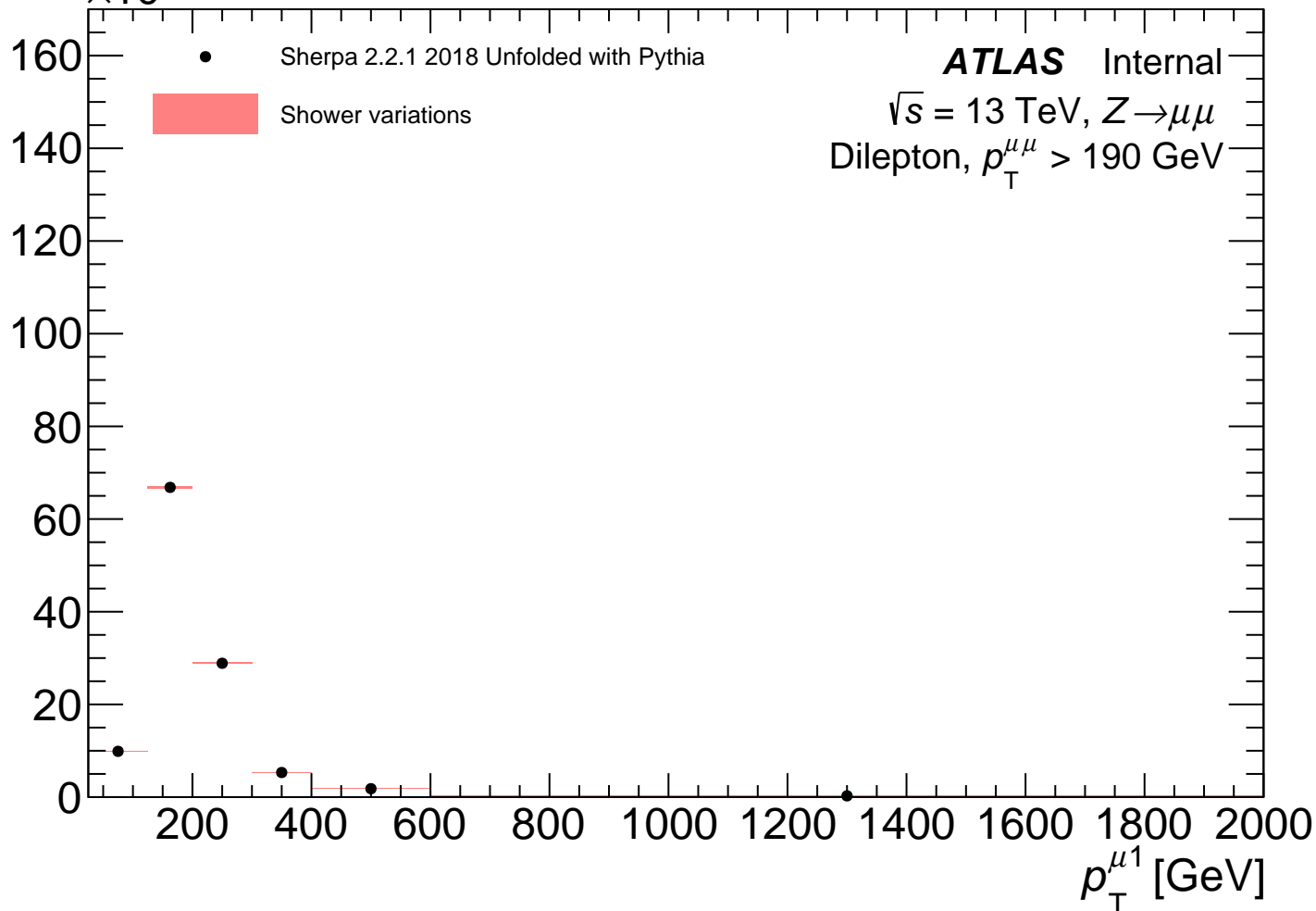
Events

$\times 10^3$



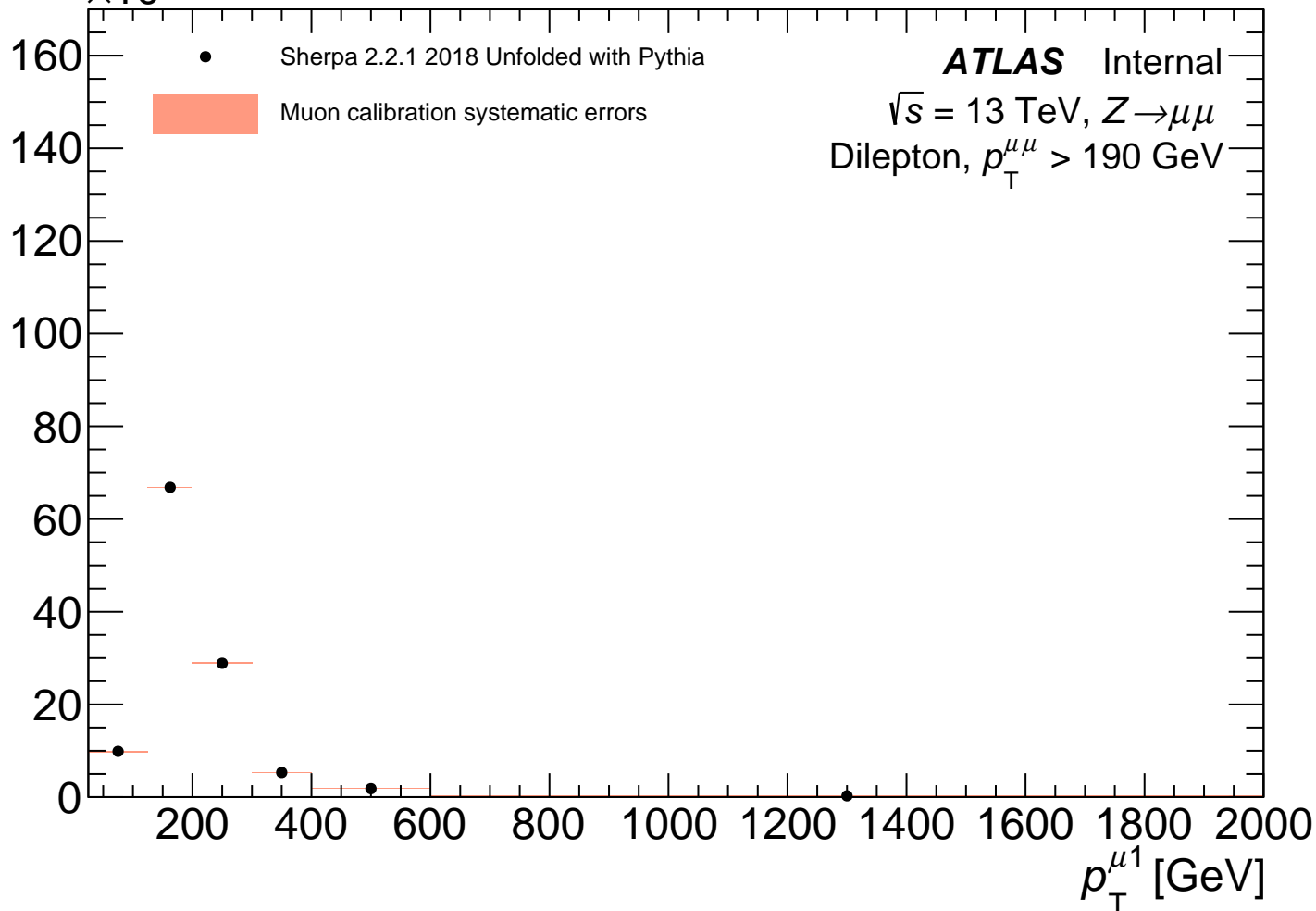
Events

$\times 10^3$



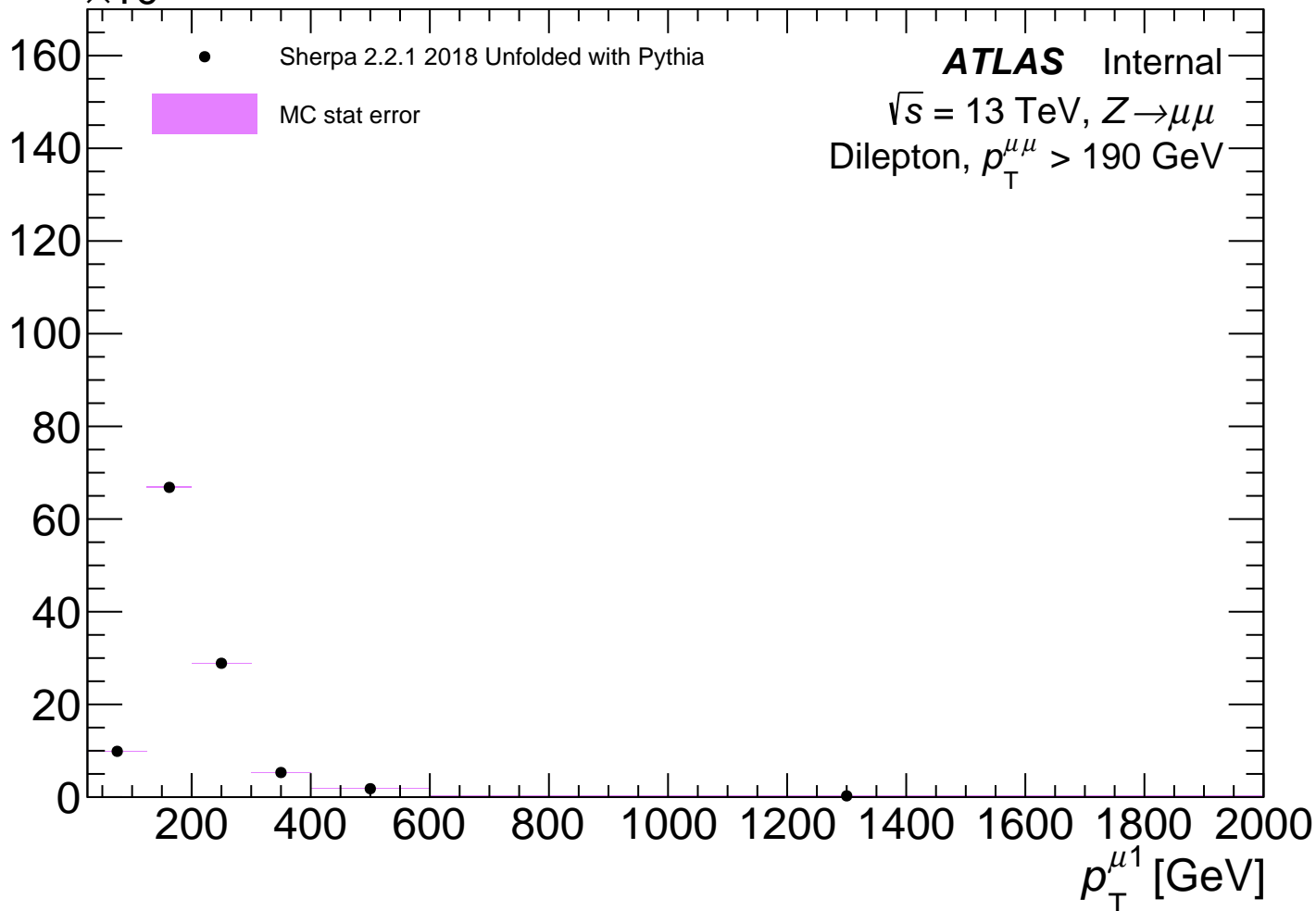
Events

$\times 10^3$



Events

$\times 10^3$



Events

$\times 10^3$

160

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Sherpa 2.2.1 2018 Unfolded with Pythia

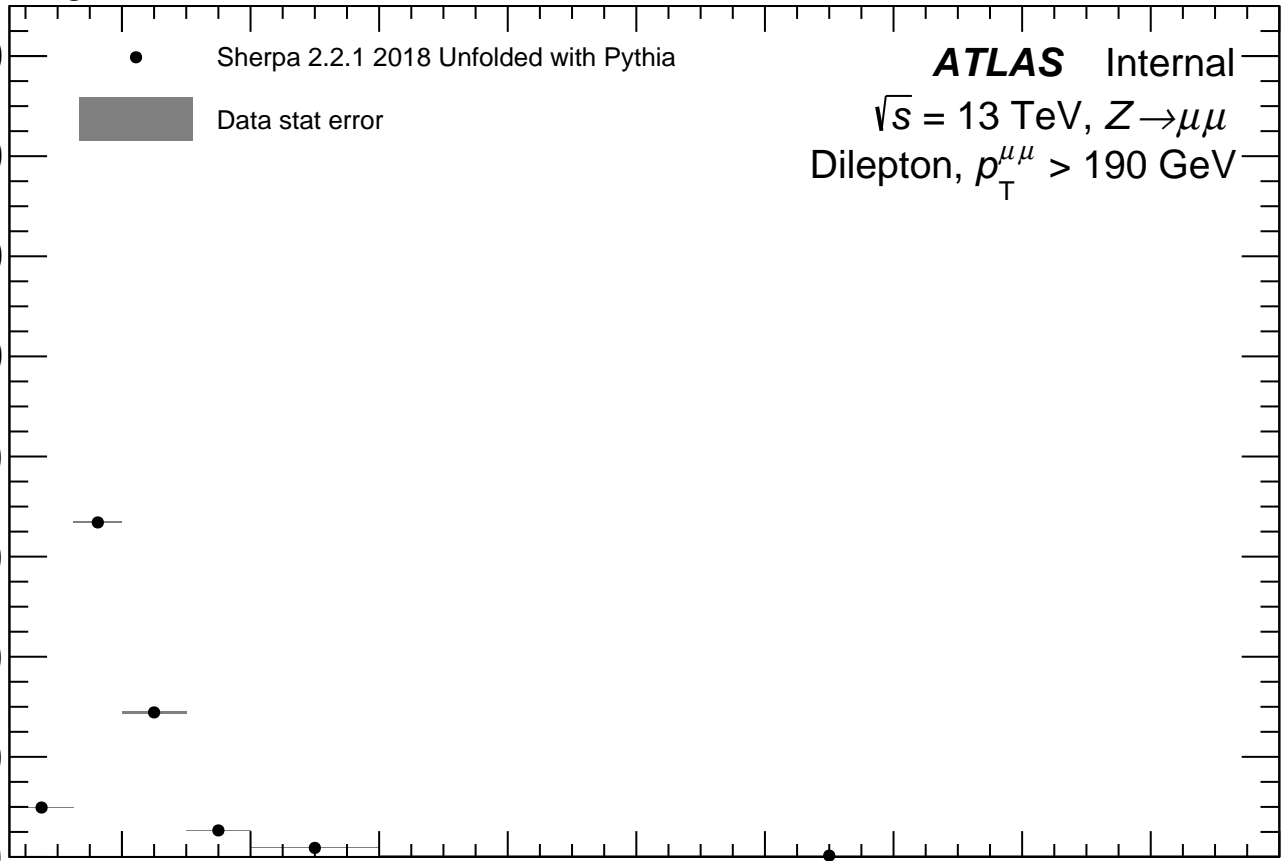
Data stat error

ATLAS Internal

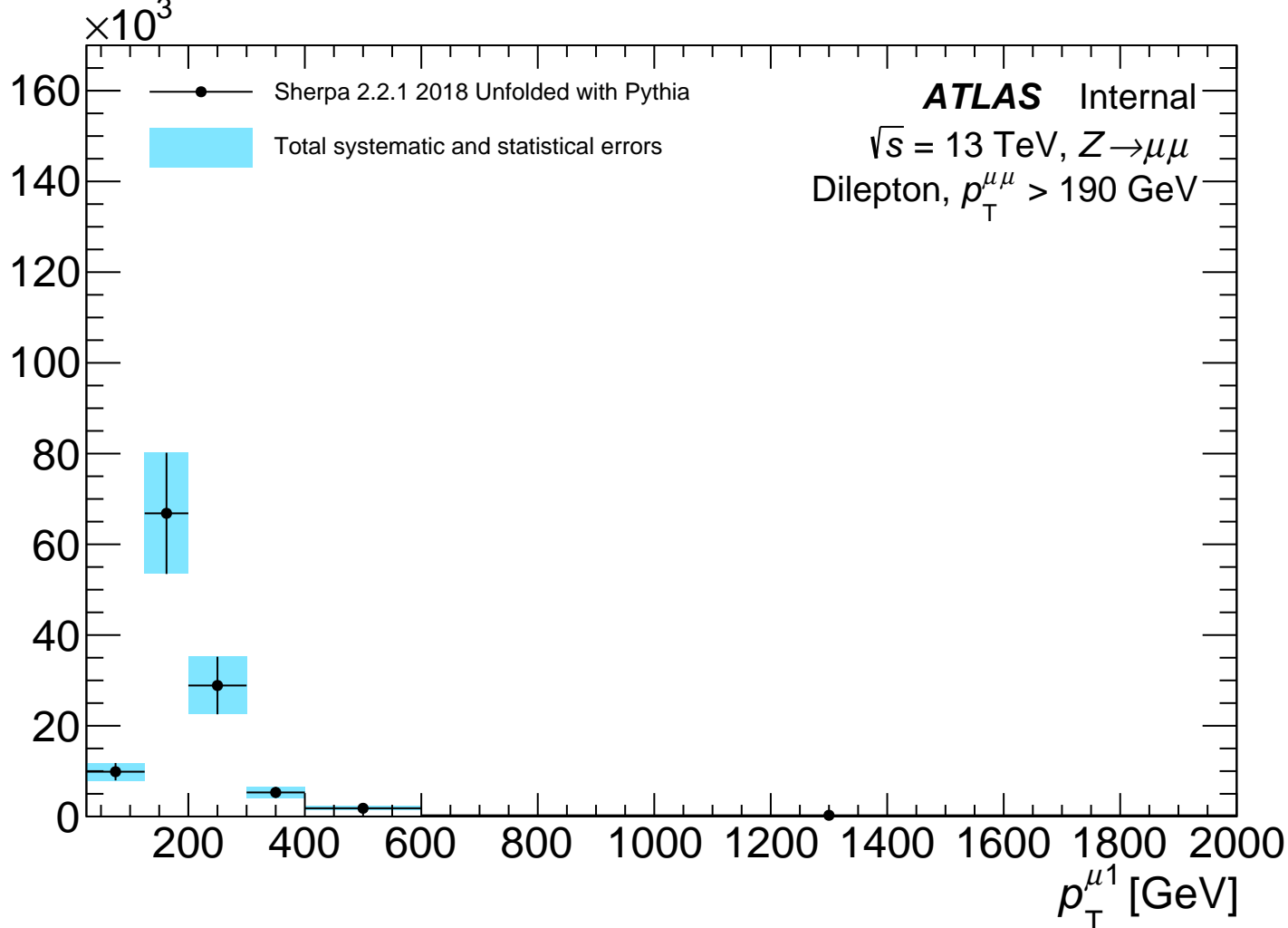
$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

$p_{\text{T}}^{\mu 1} [\text{GeV}]$

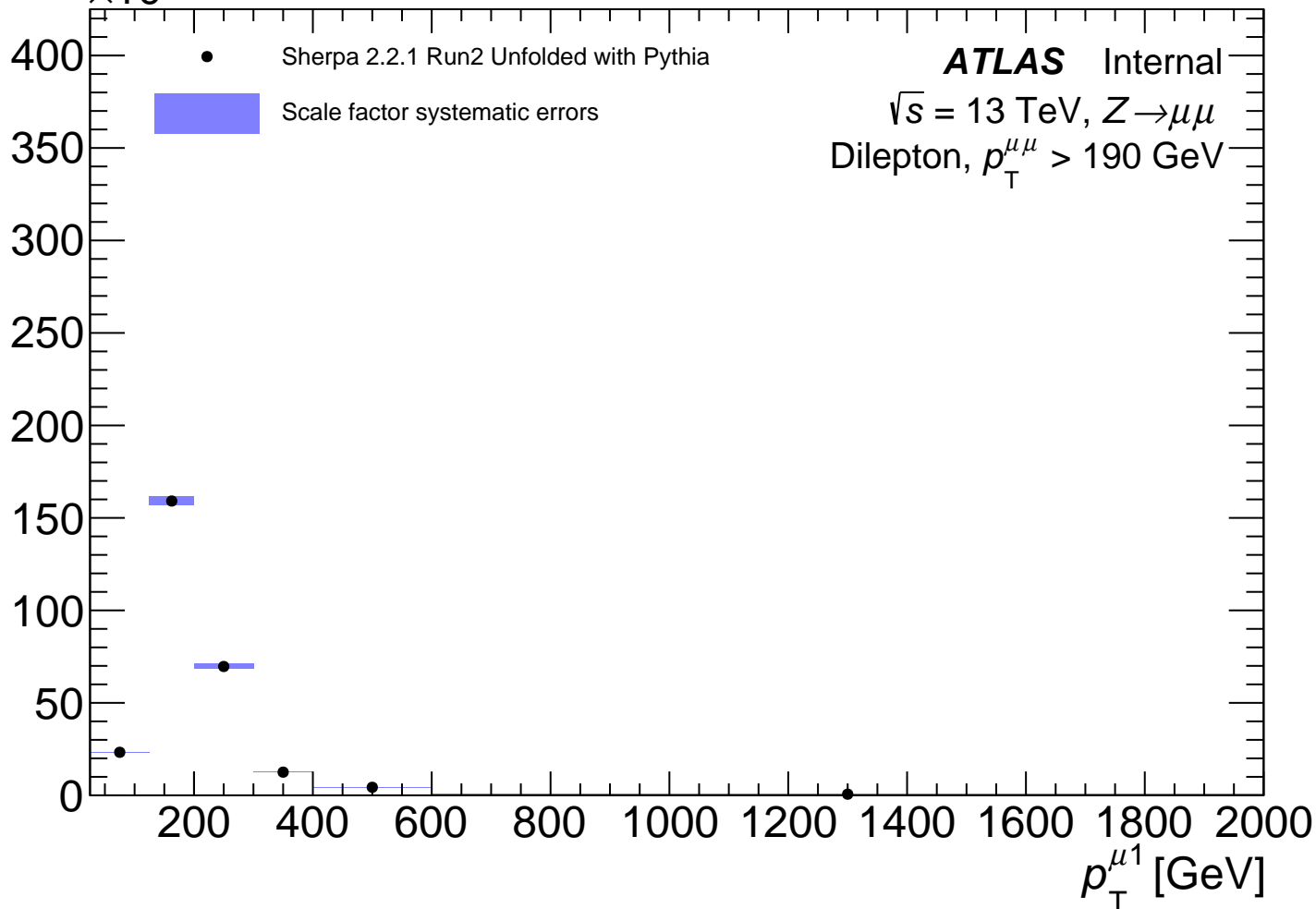


Events

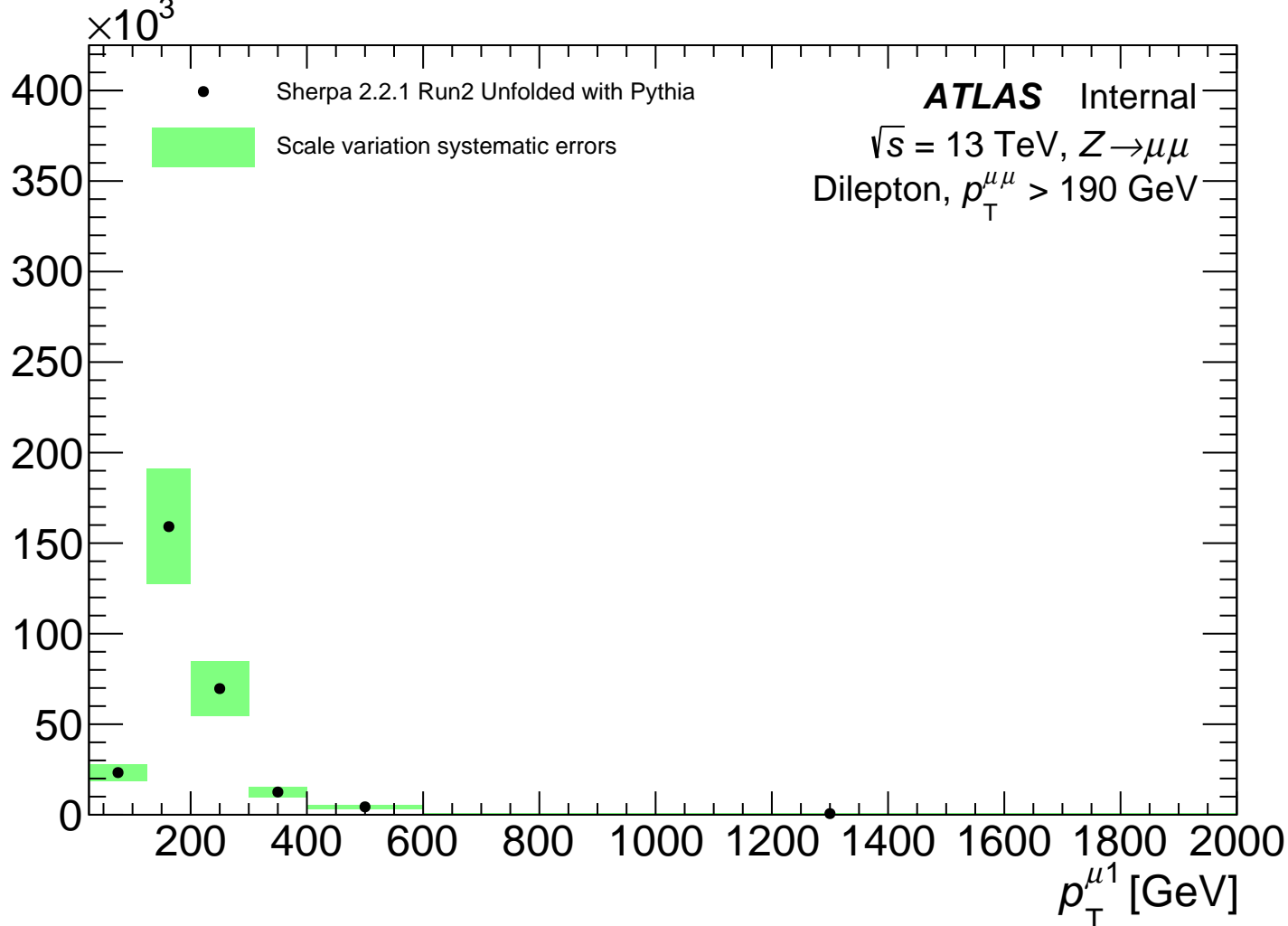


Events

$\times 10^3$

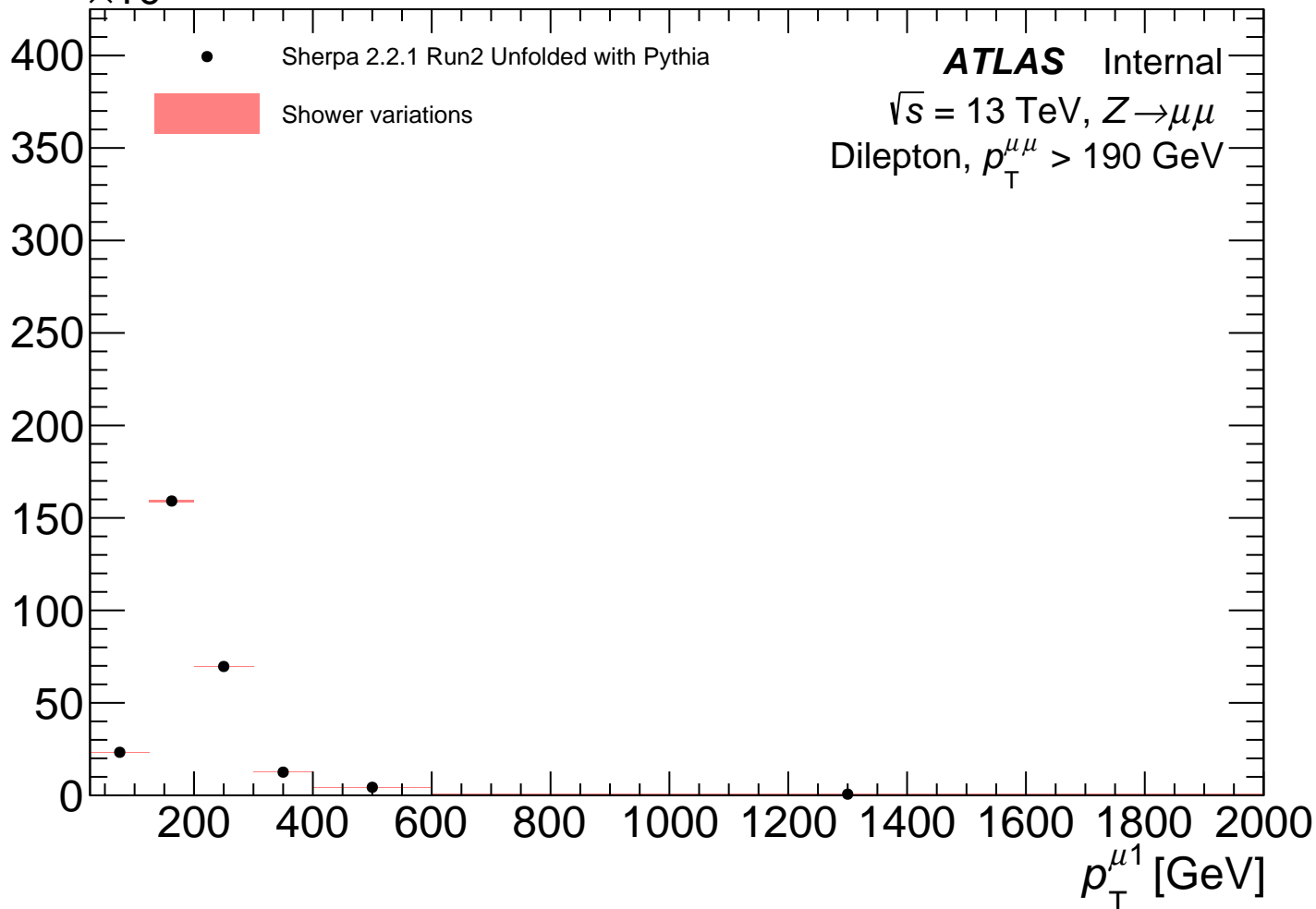


Events



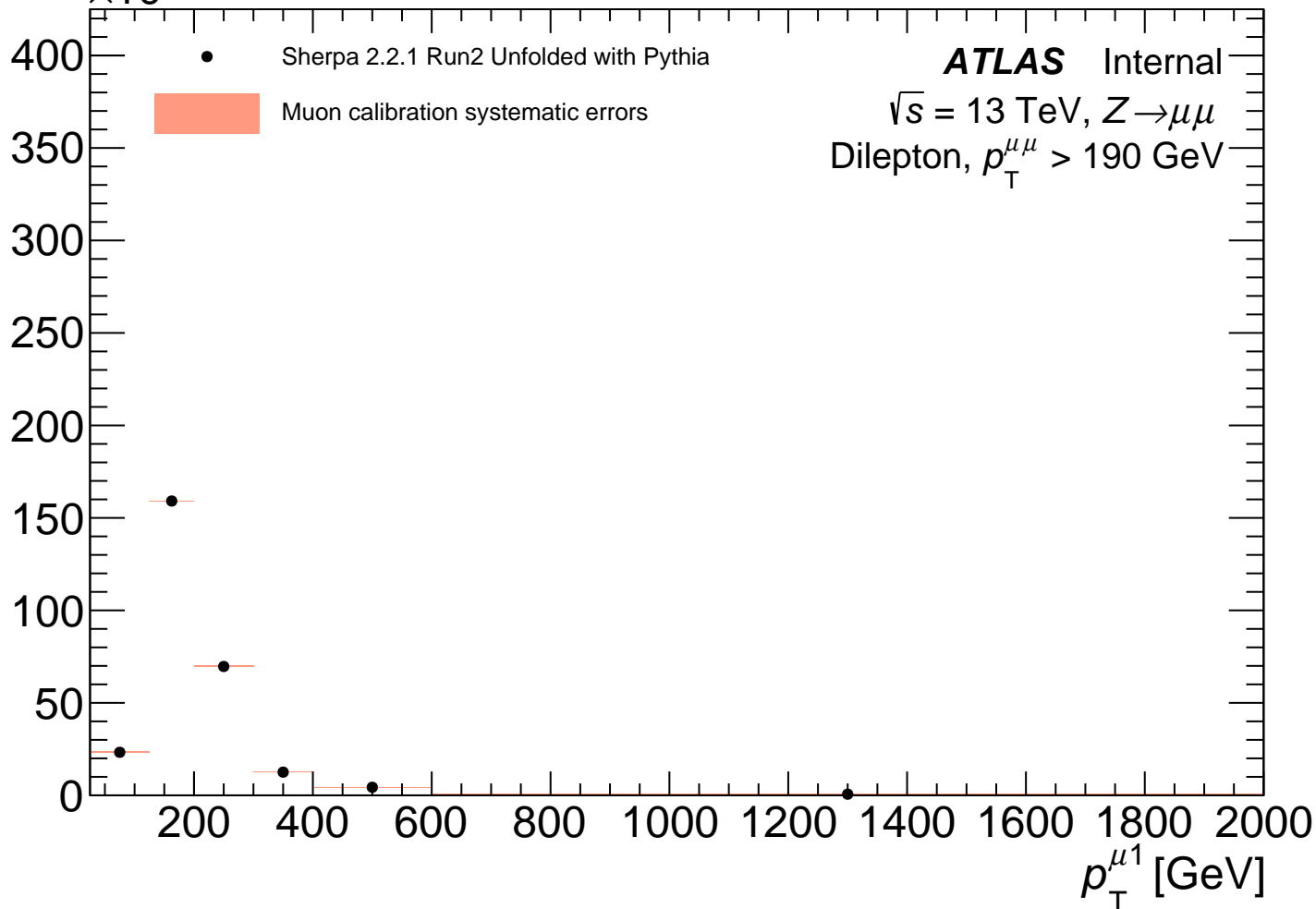
Events

$\times 10^3$

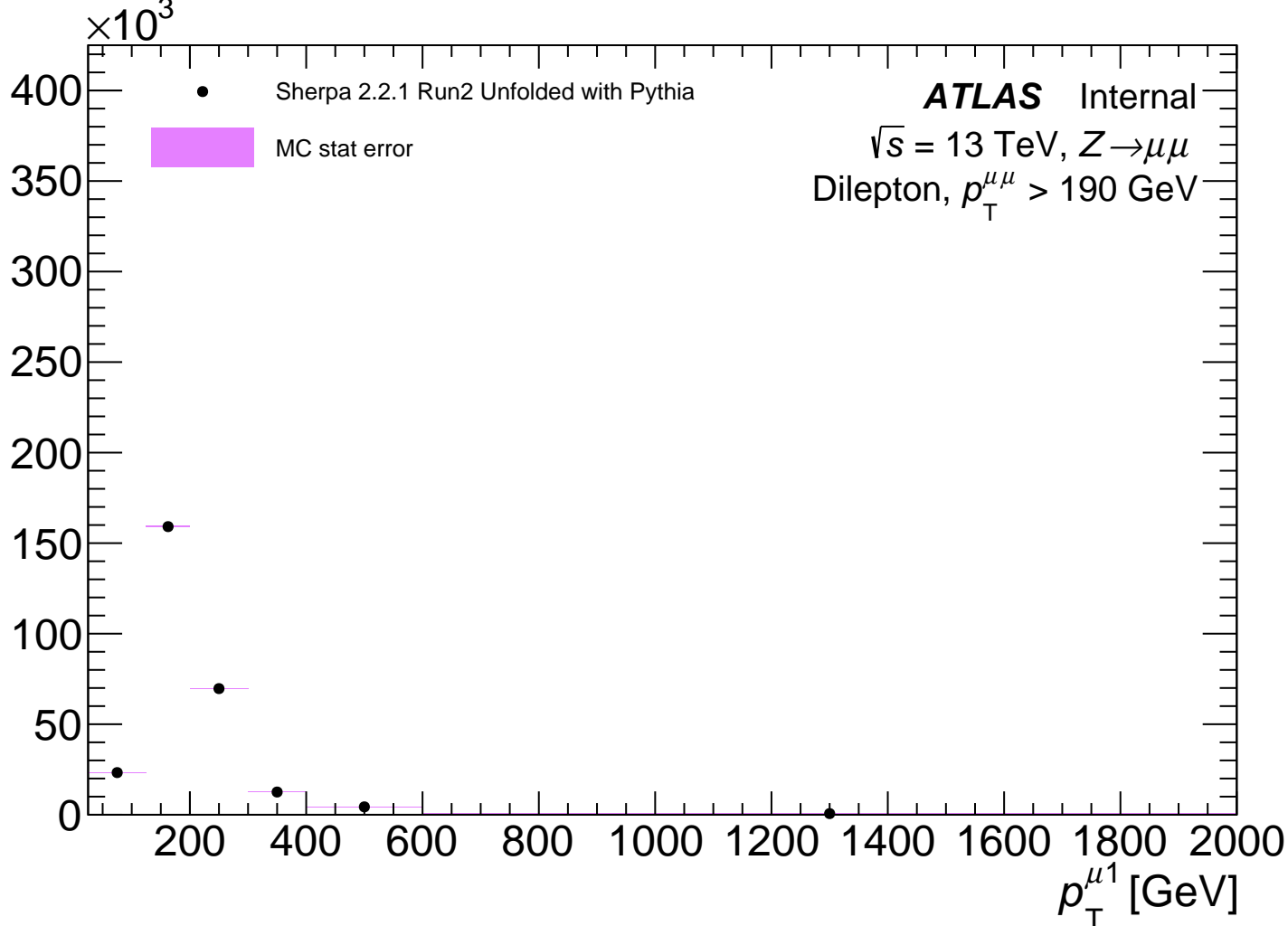


Events

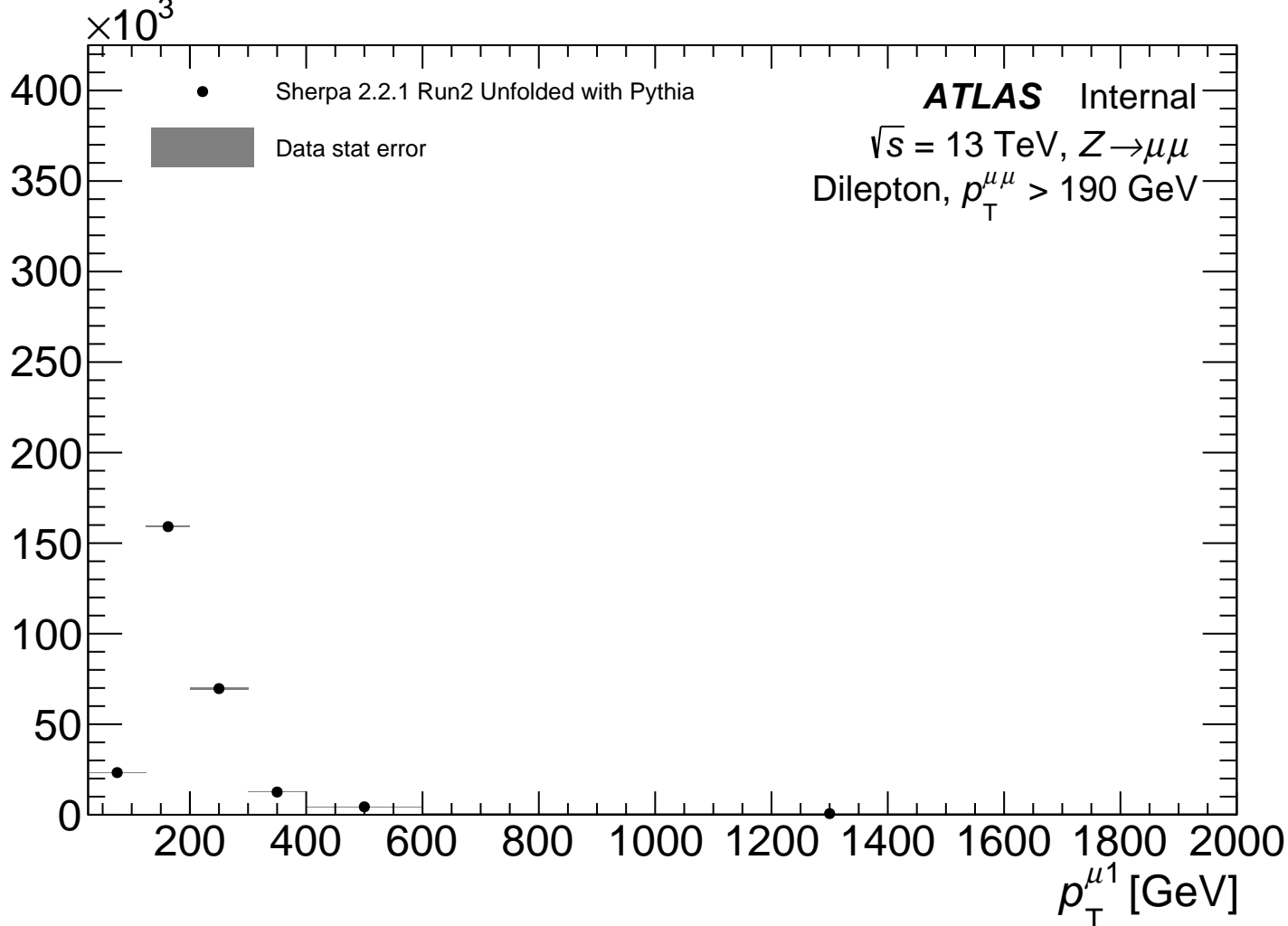
$\times 10^3$



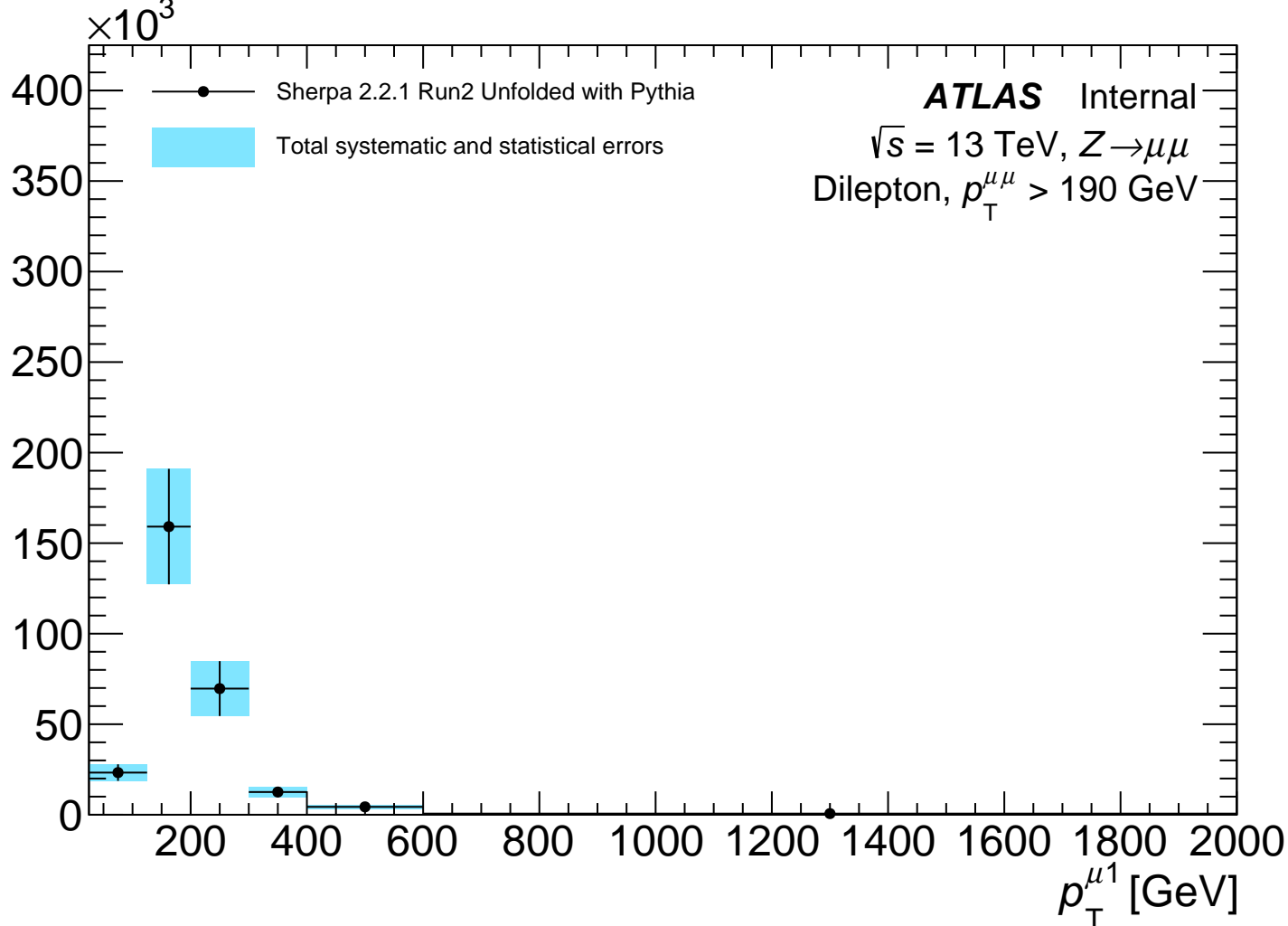
Events



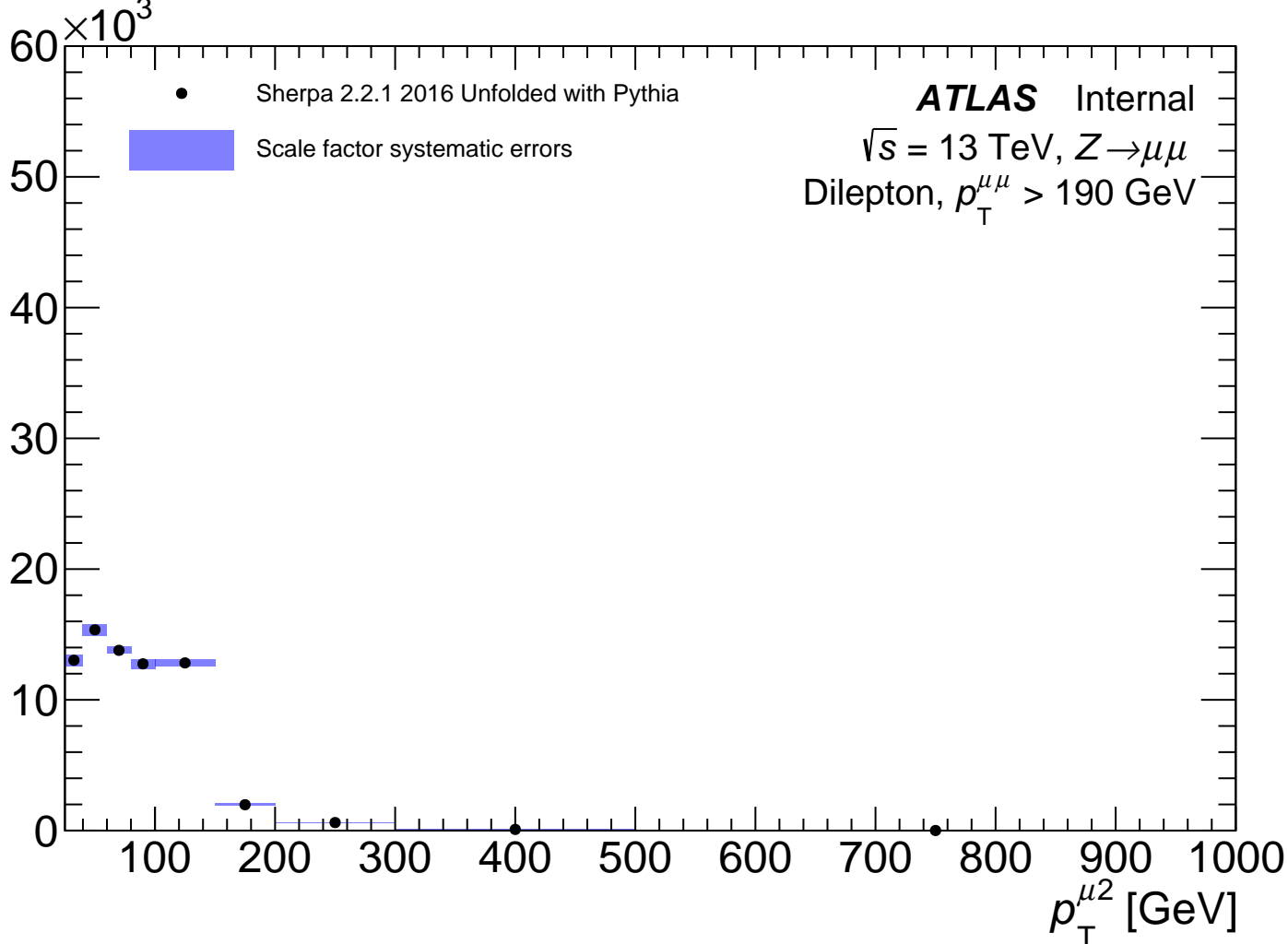
Events



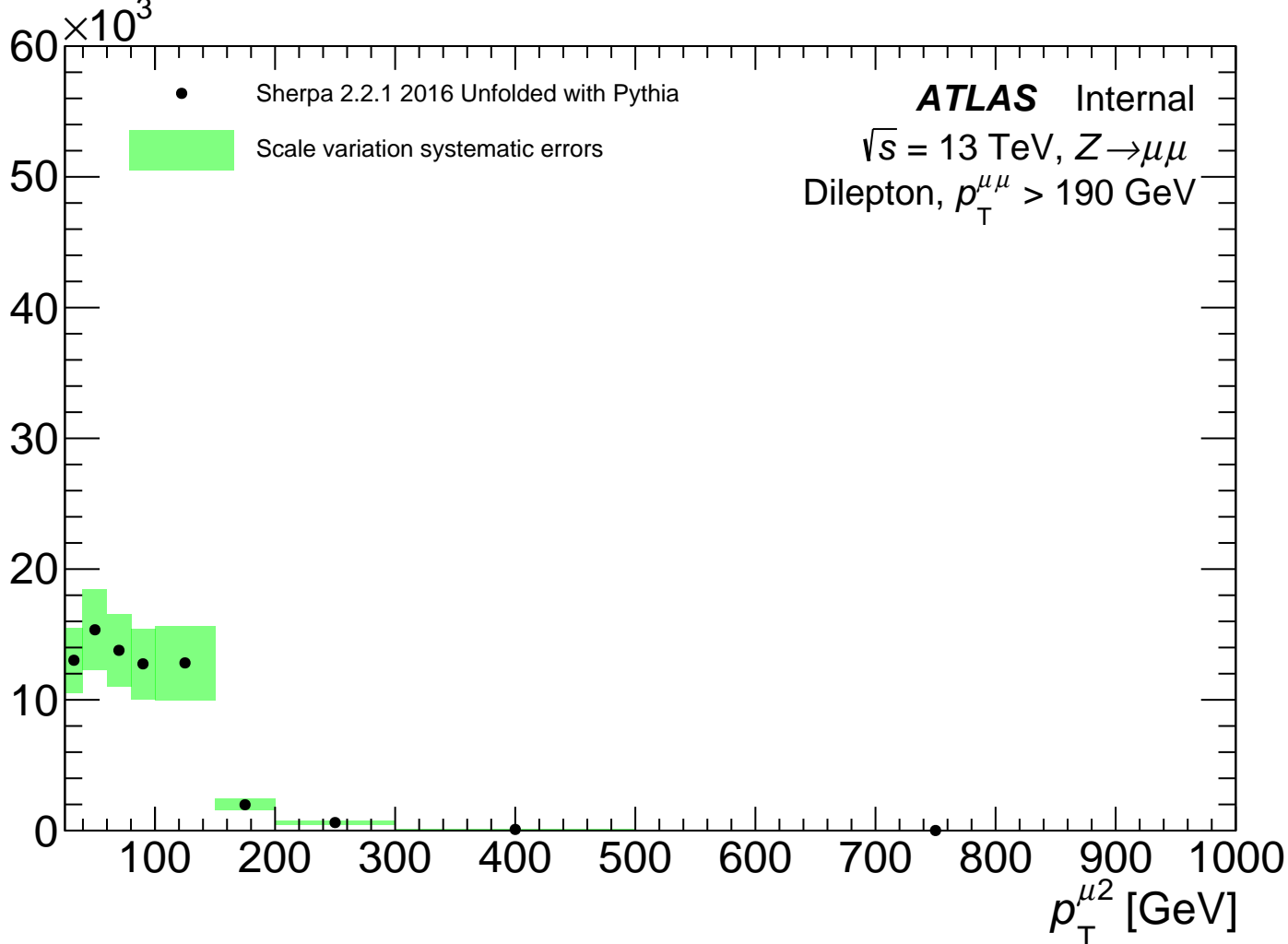
Events



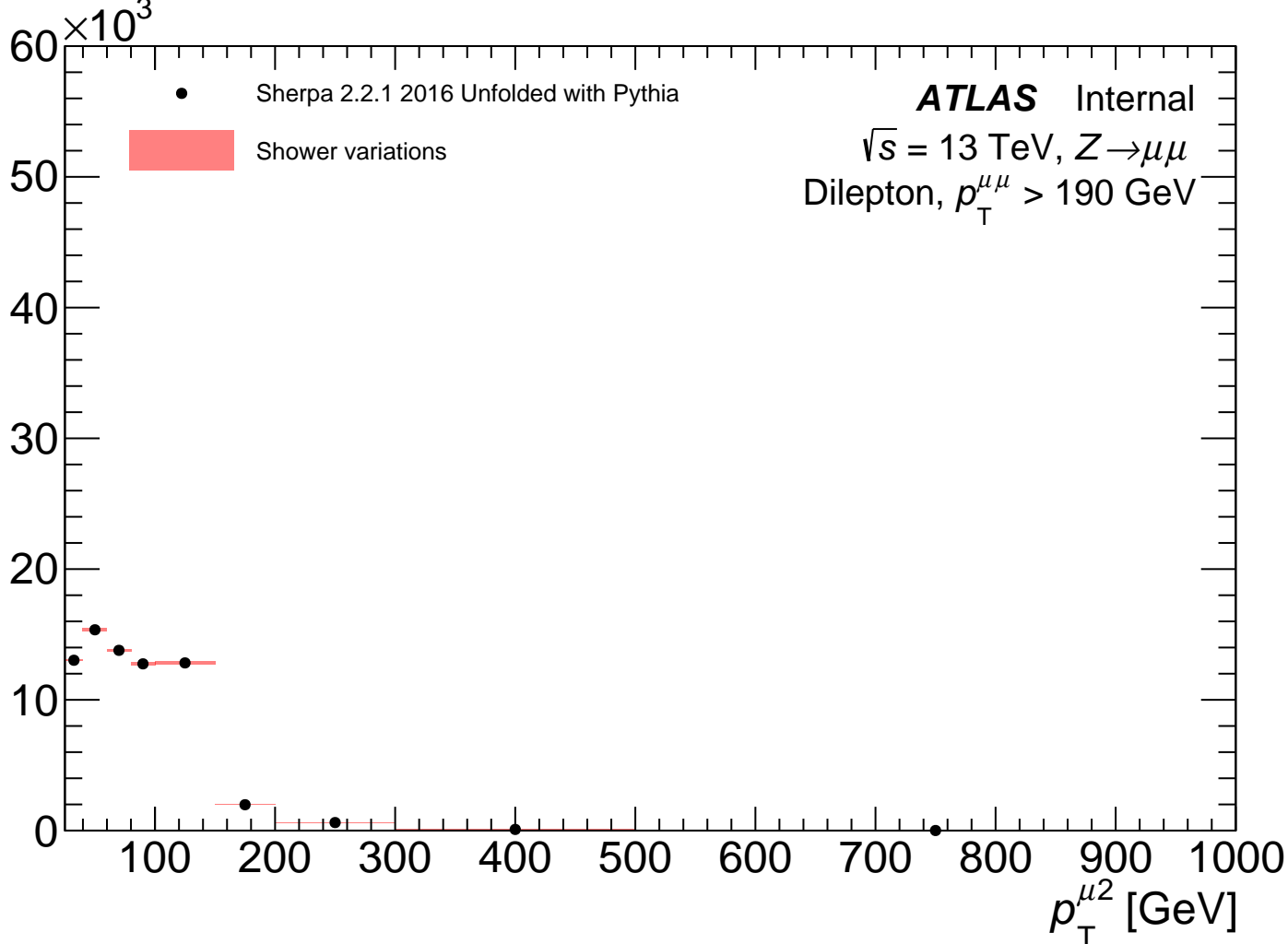
Events



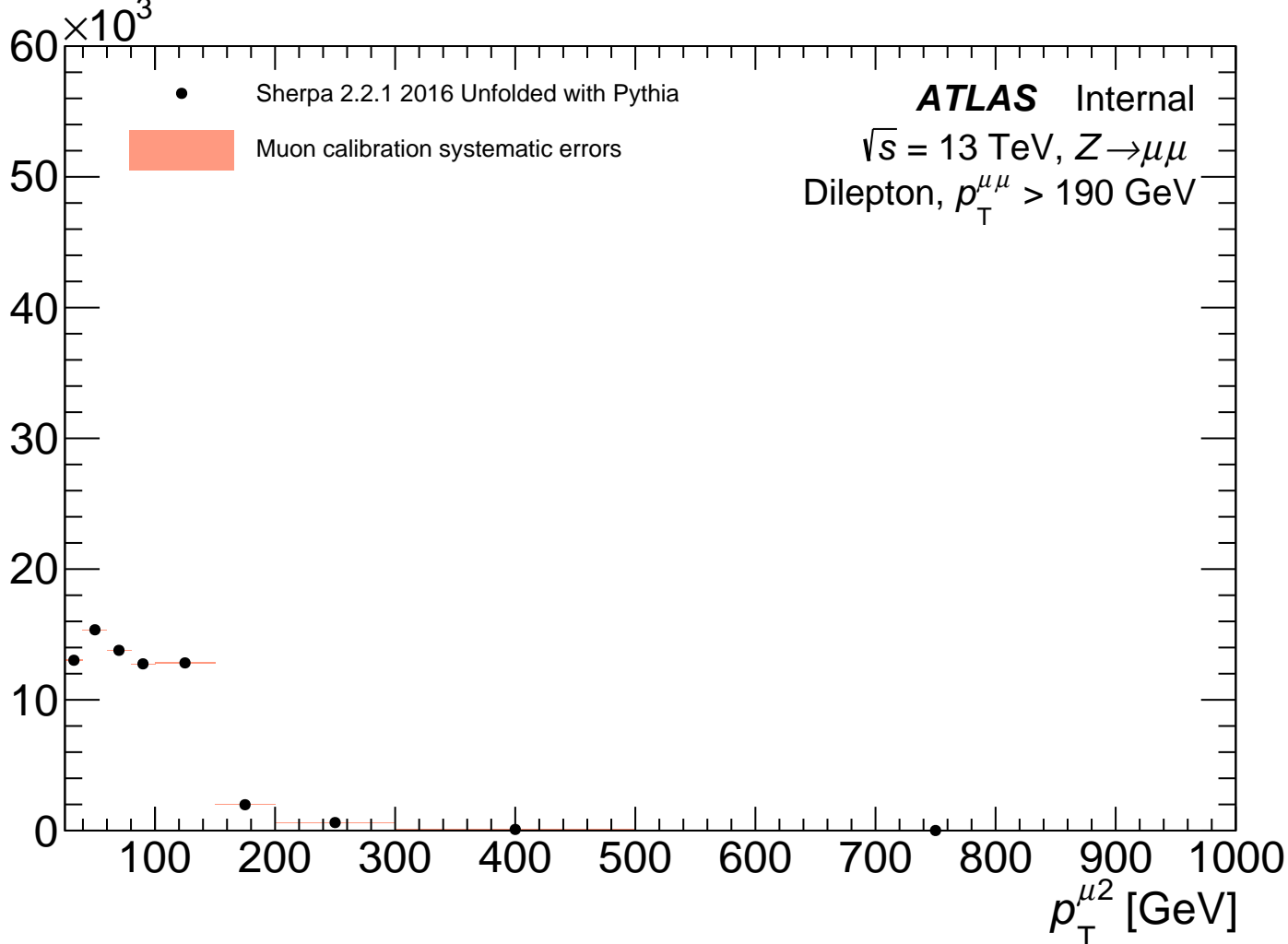
Events



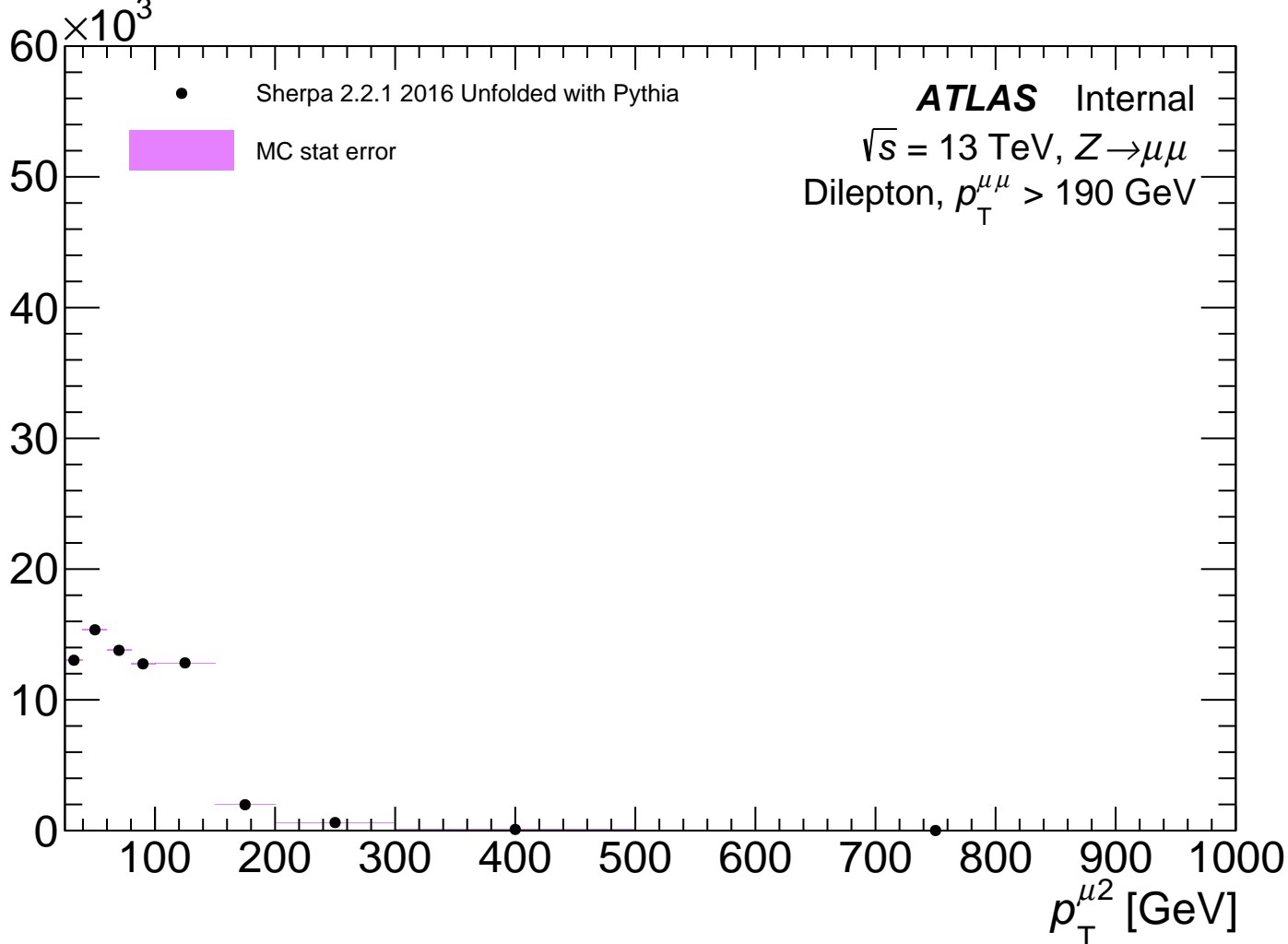
Events



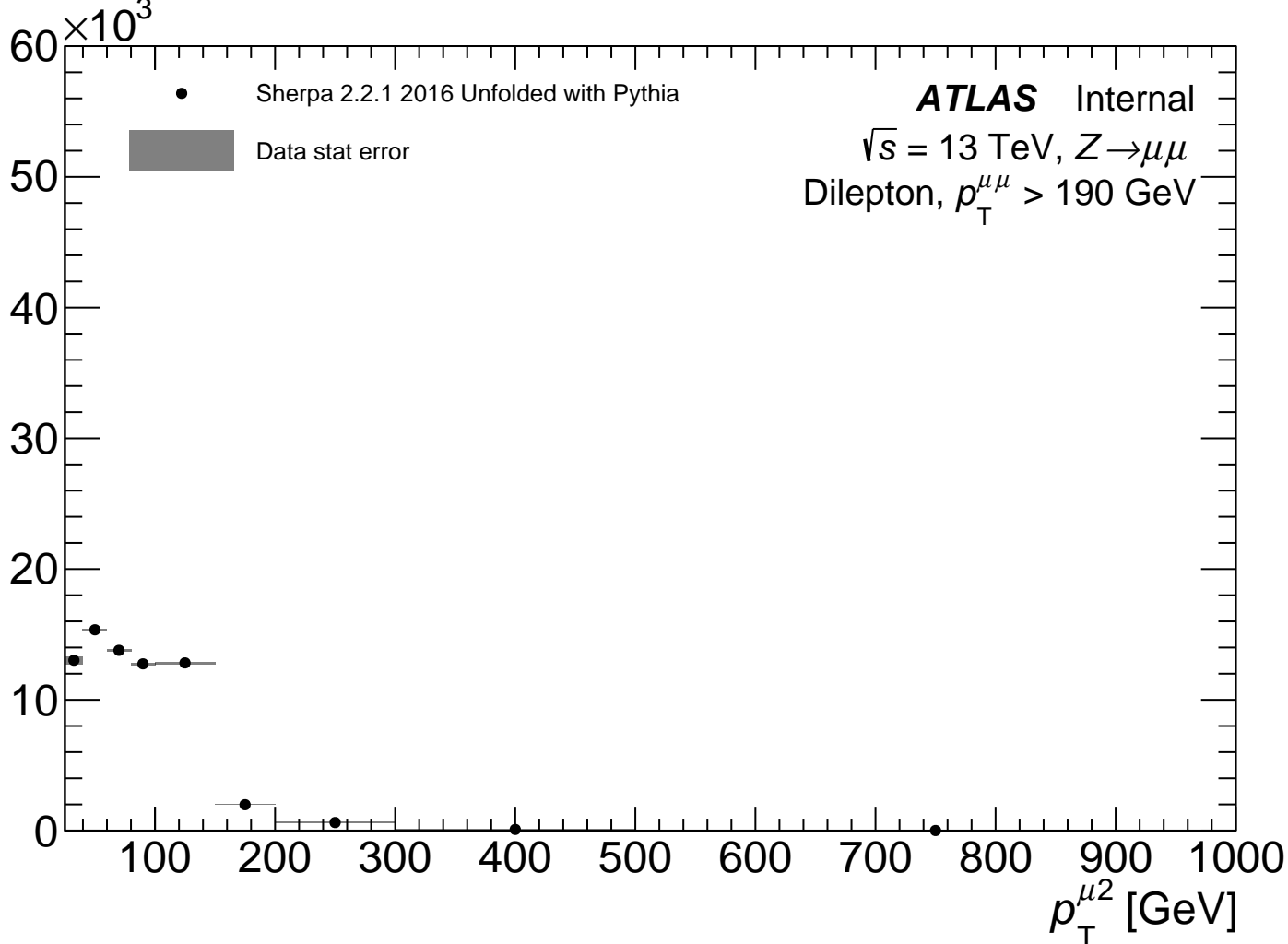
Events



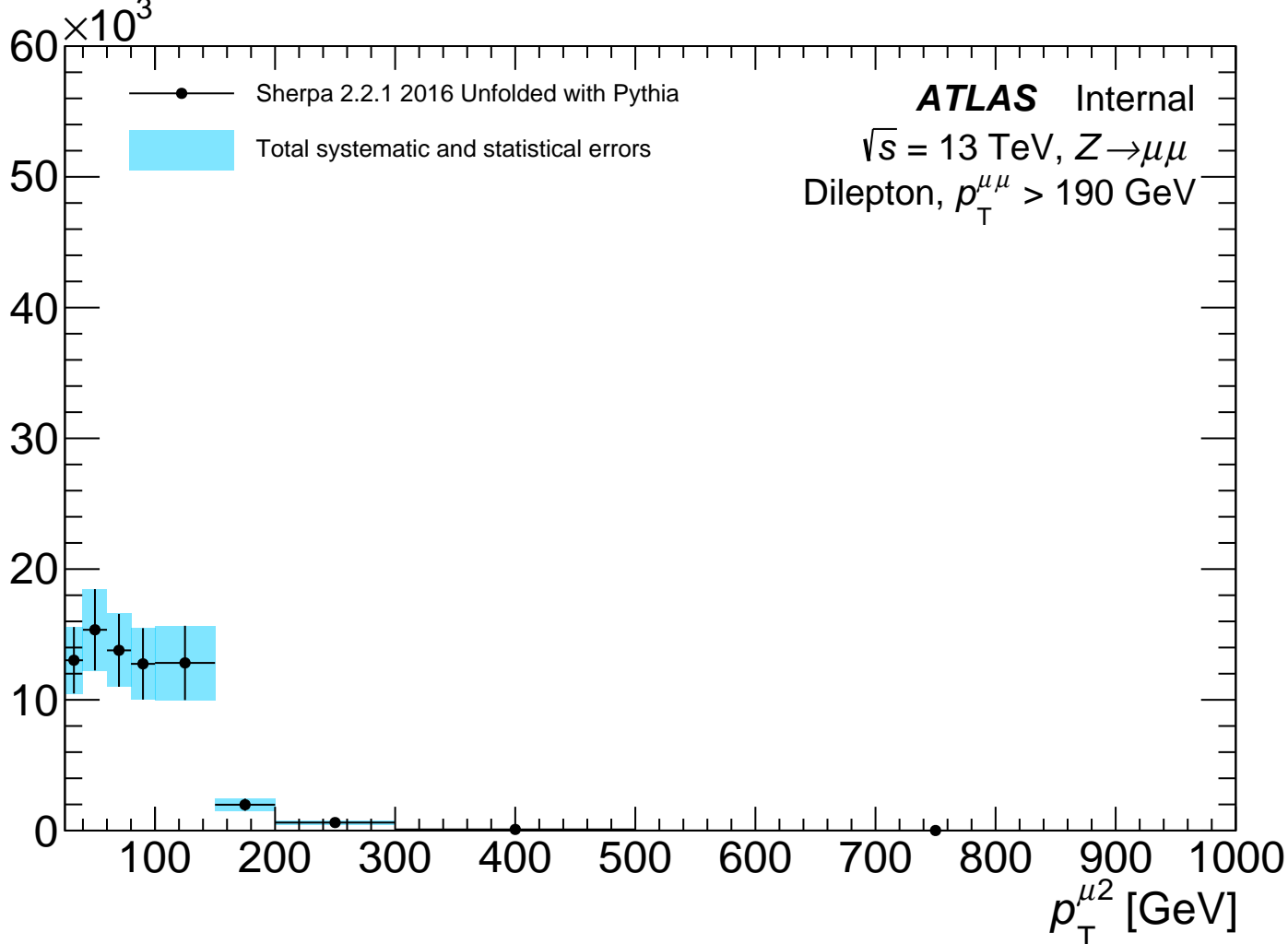
Events



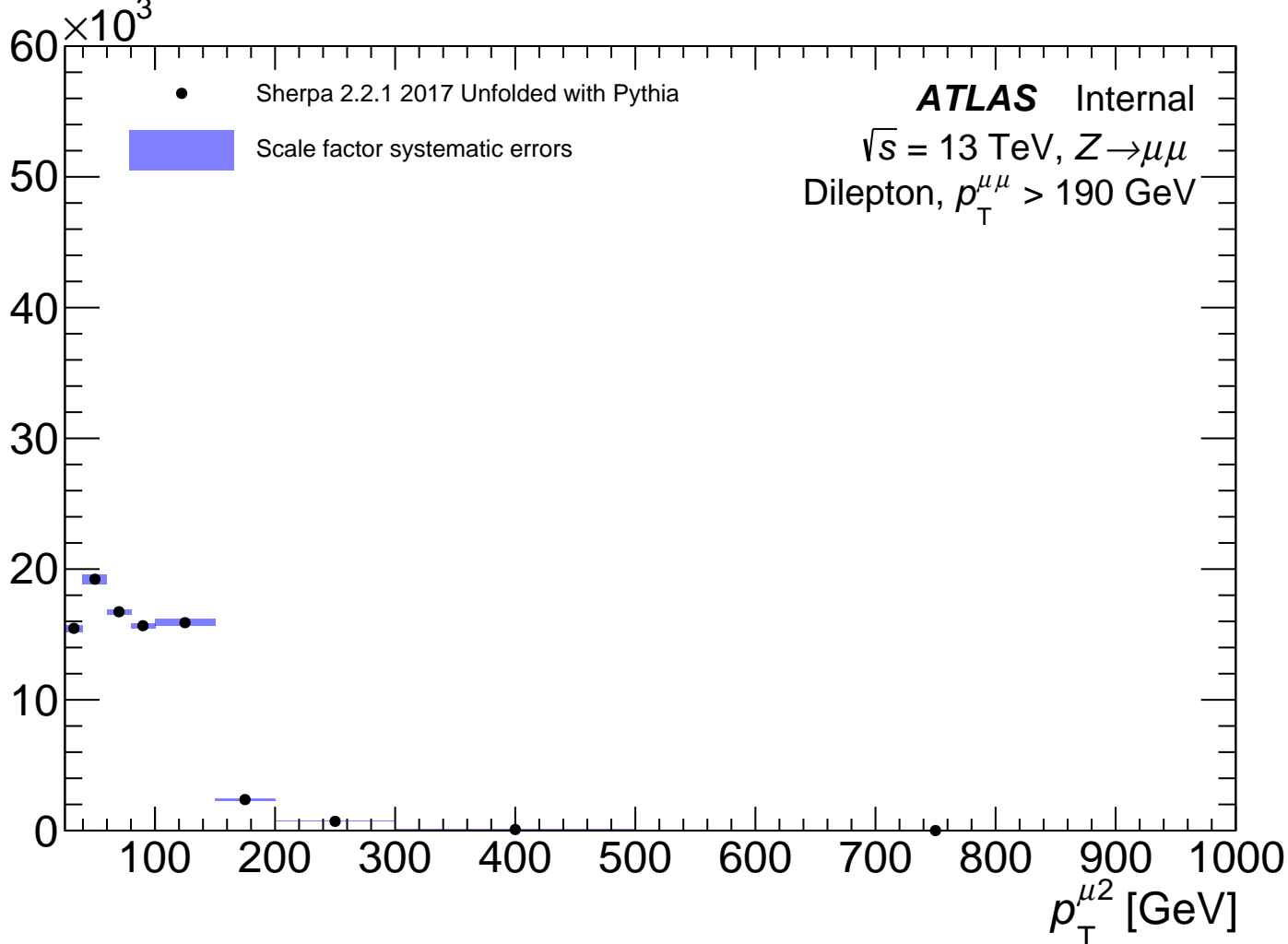
Events



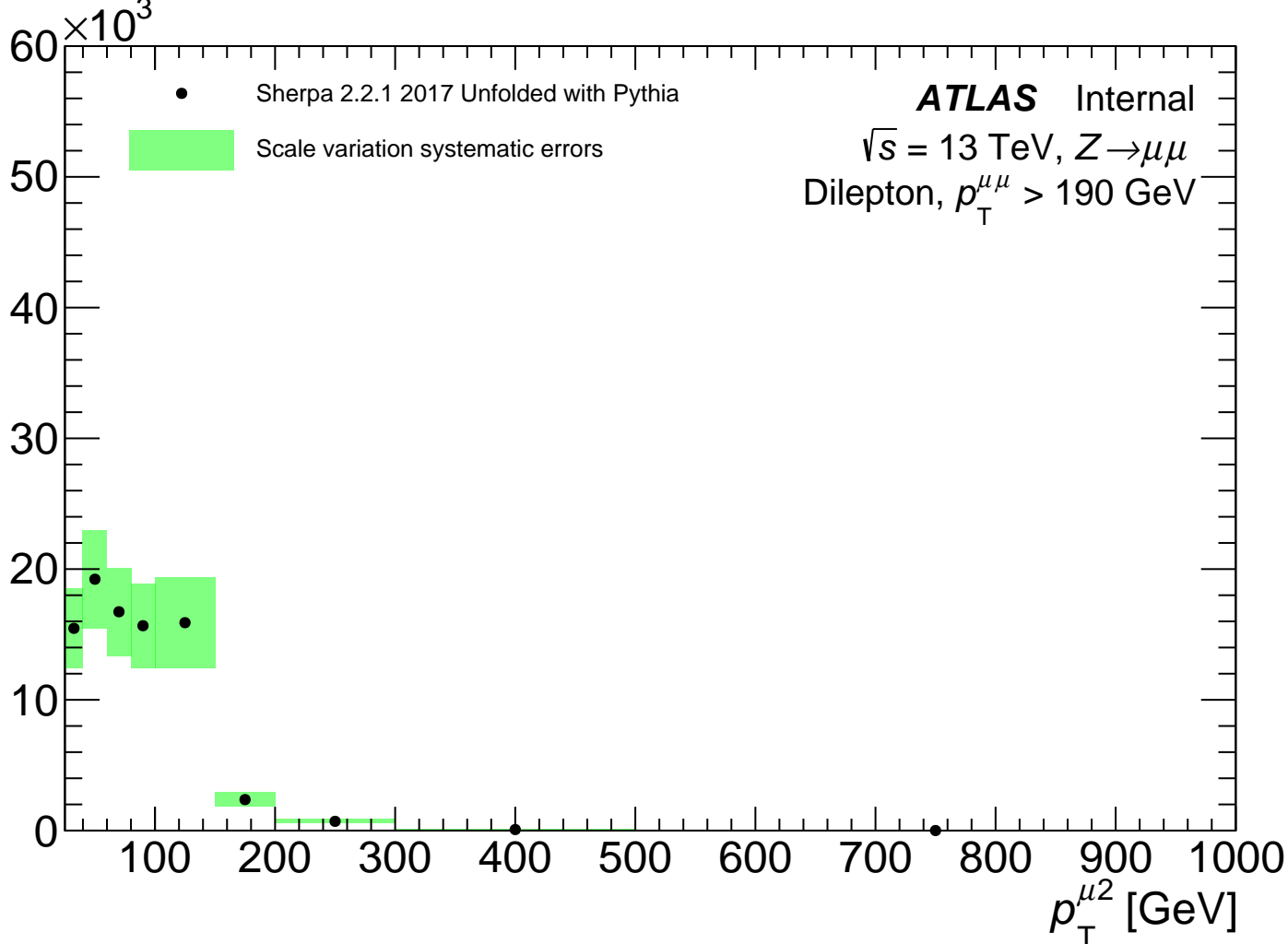
Events



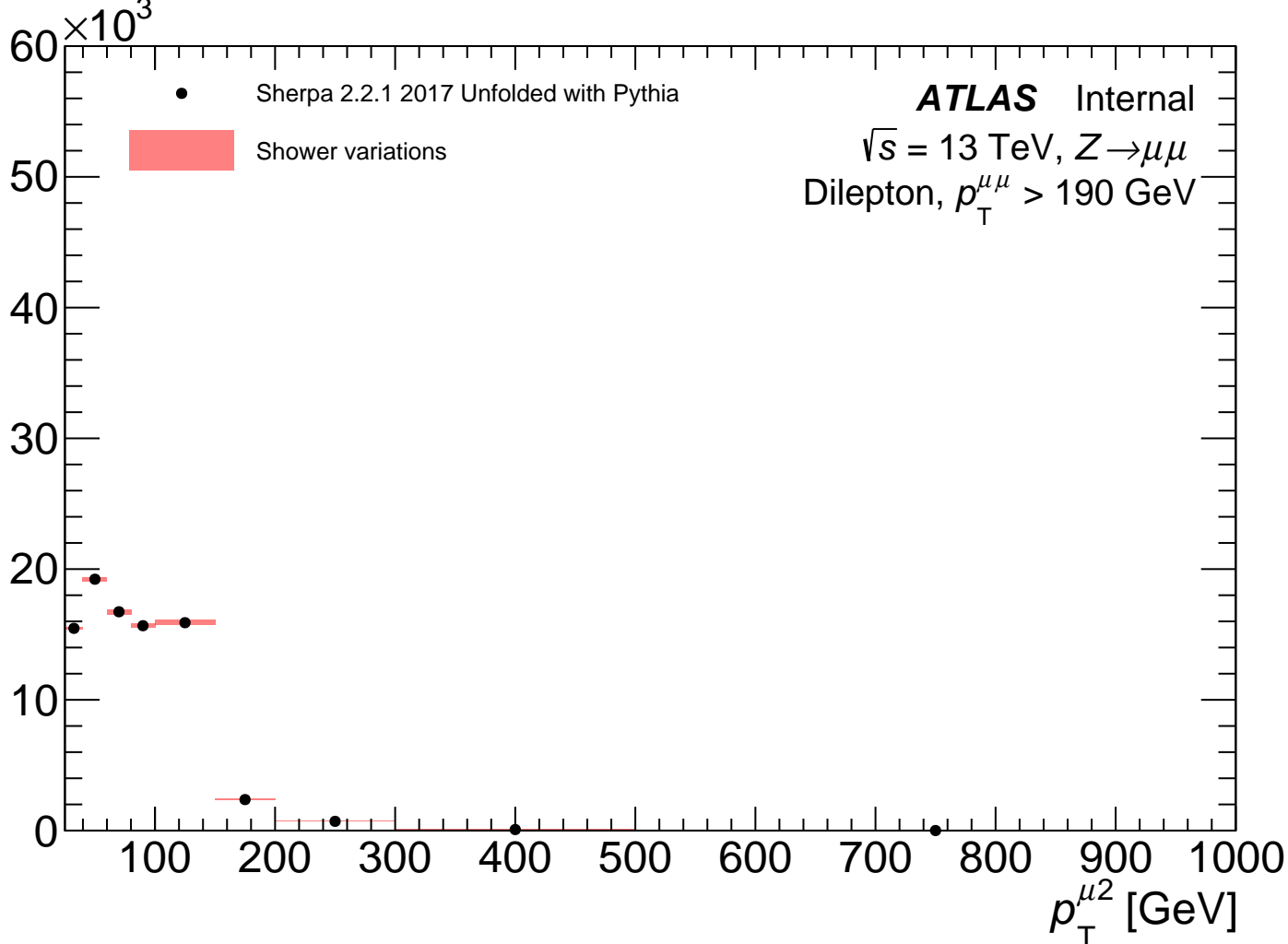
Events



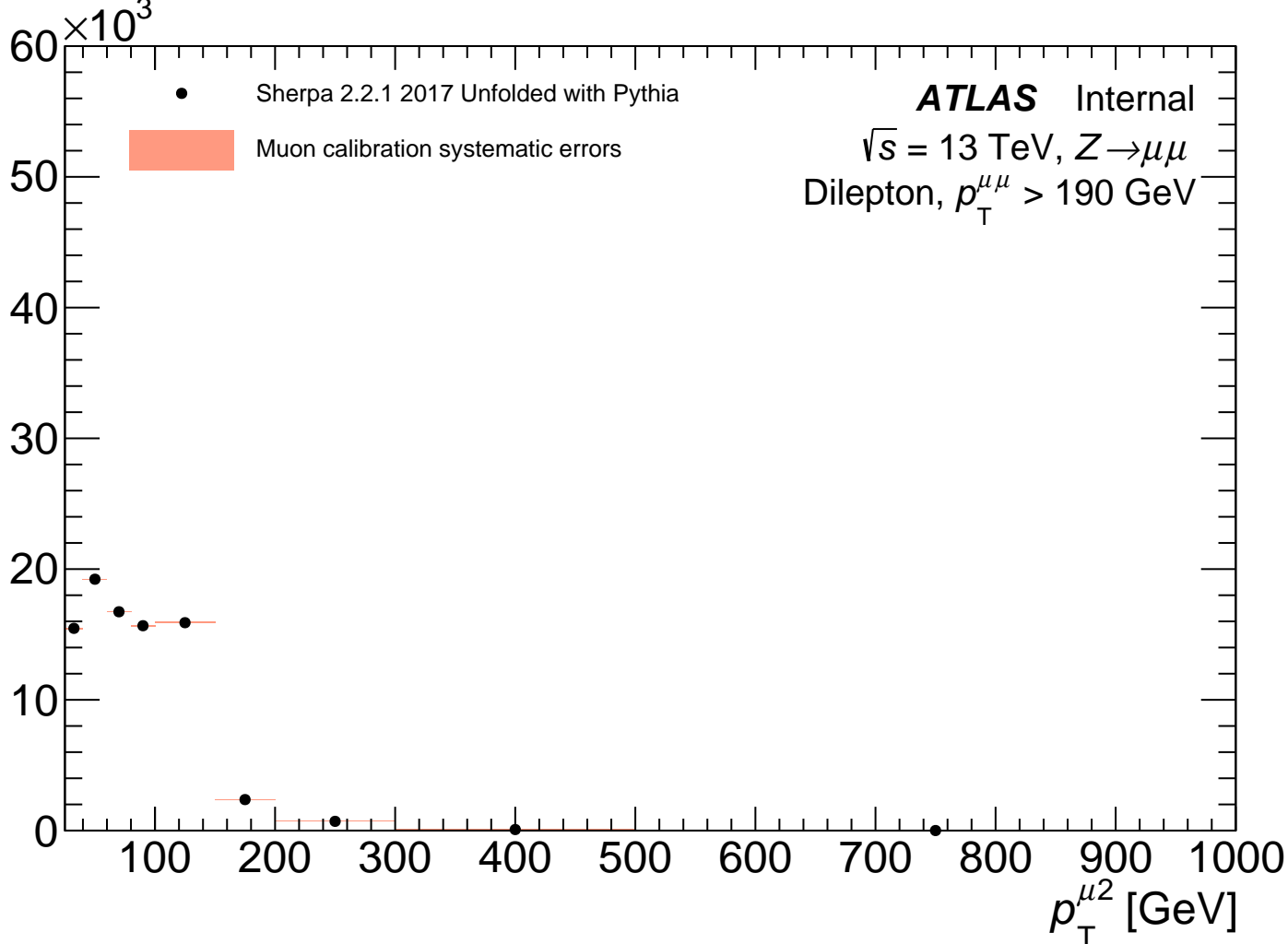
Events



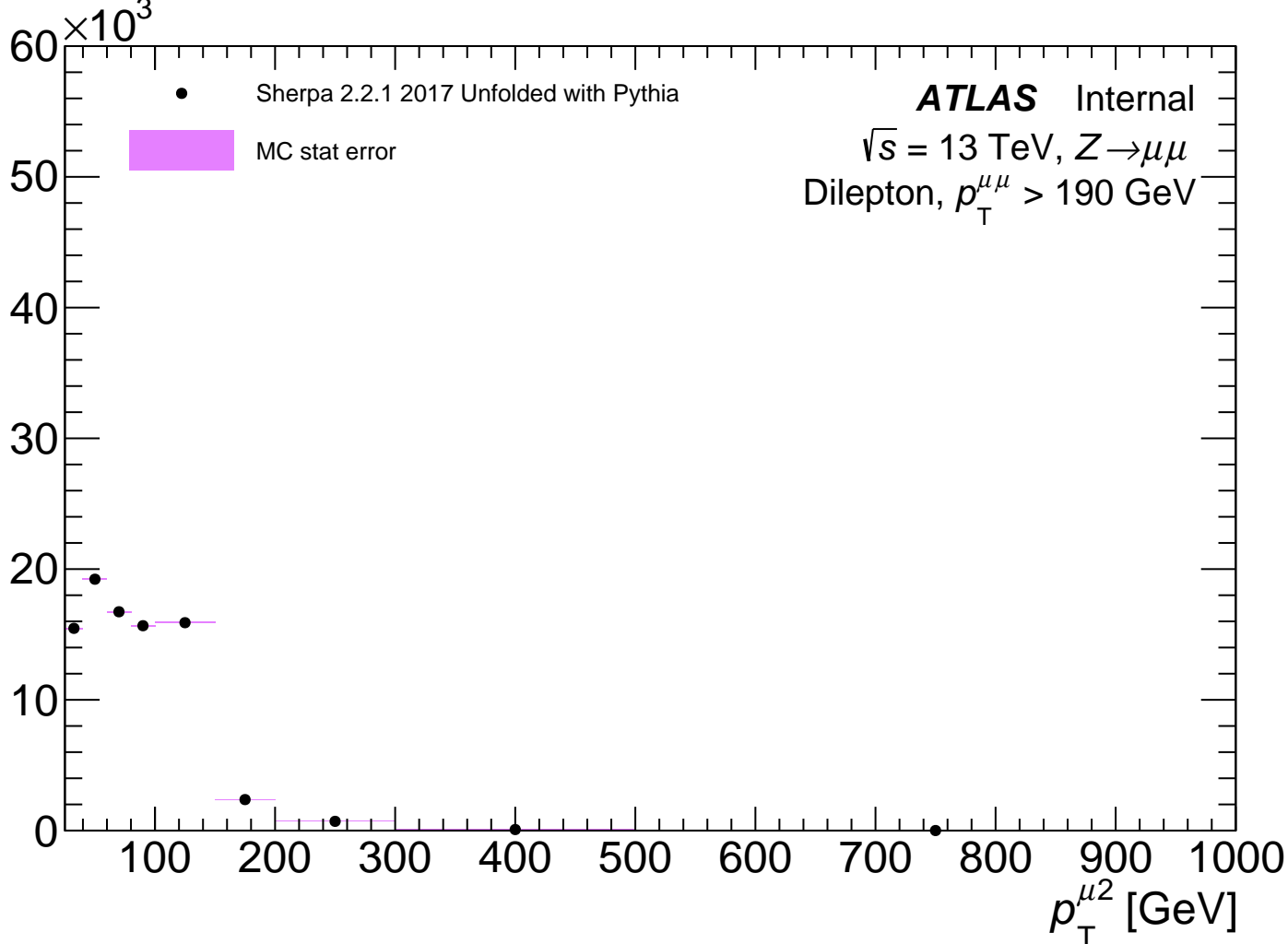
Events



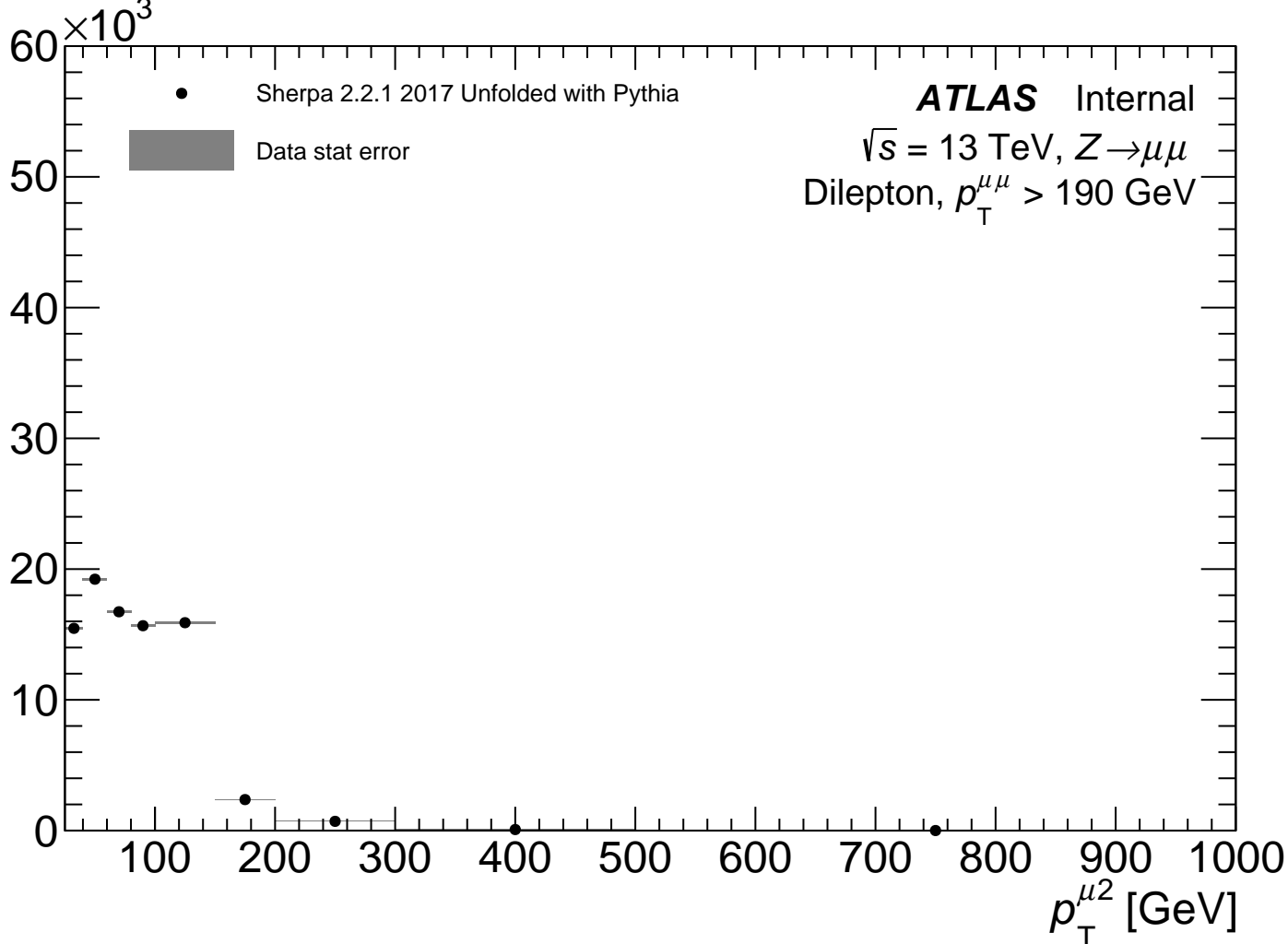
Events



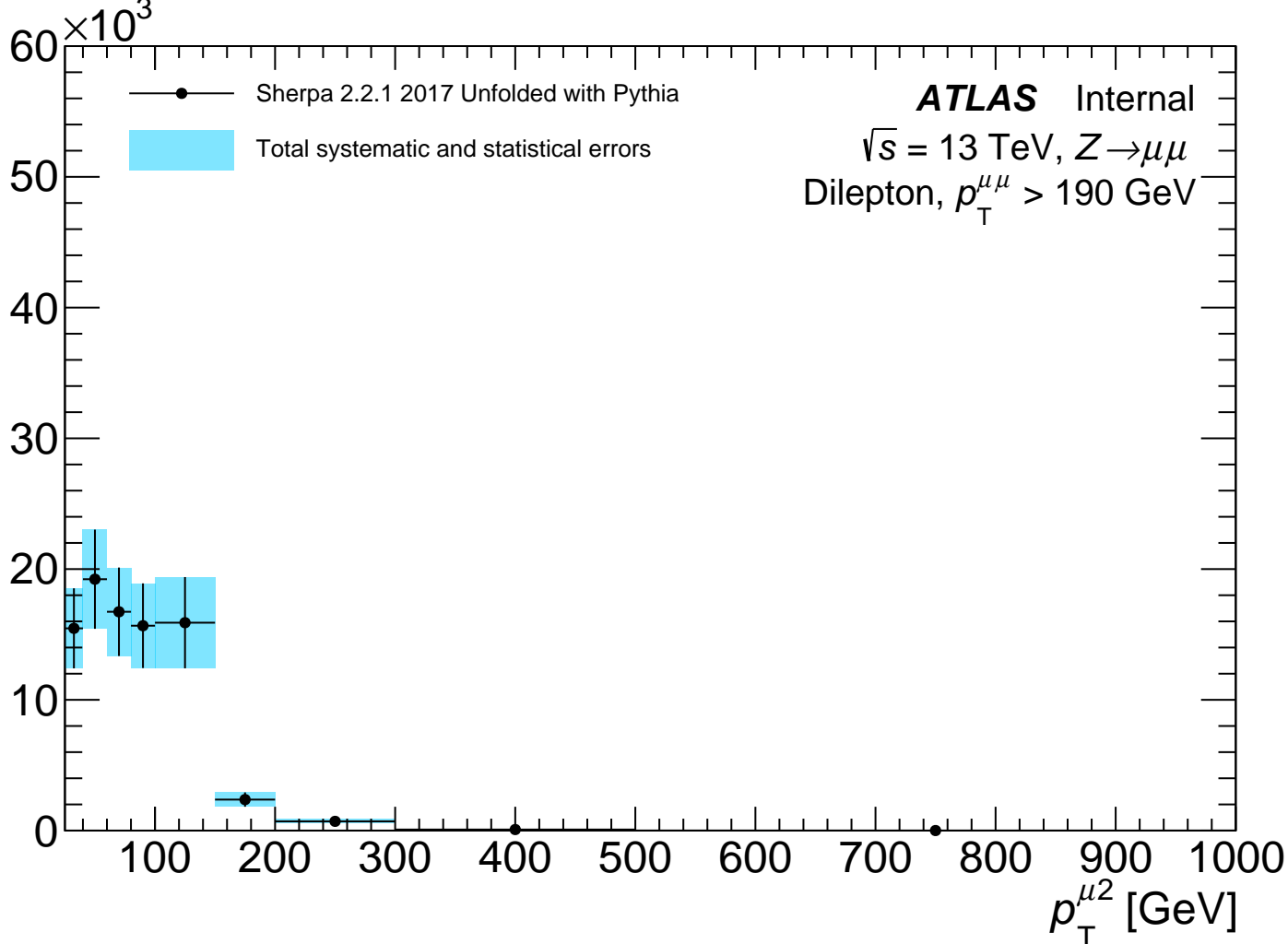
Events



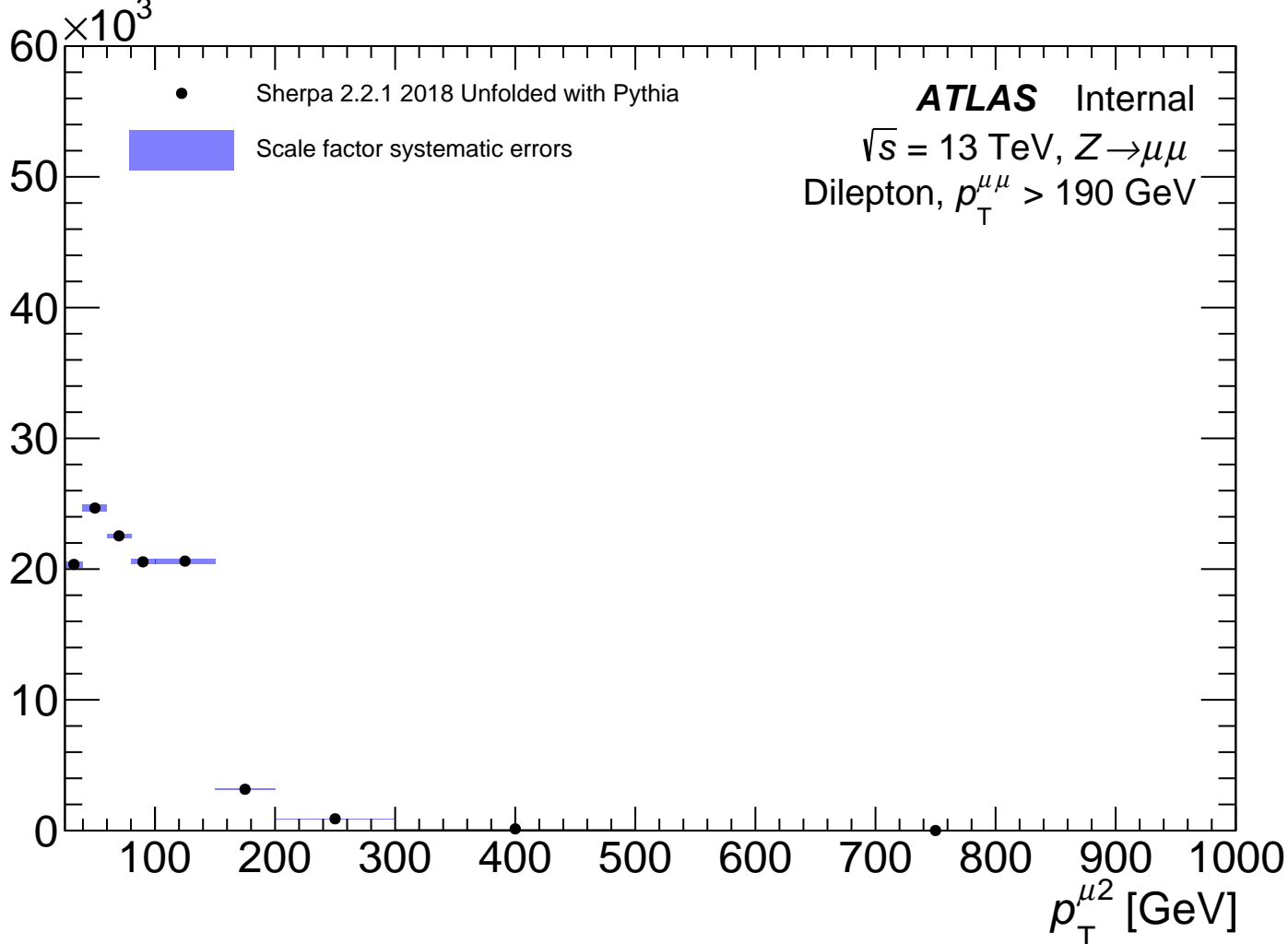
Events



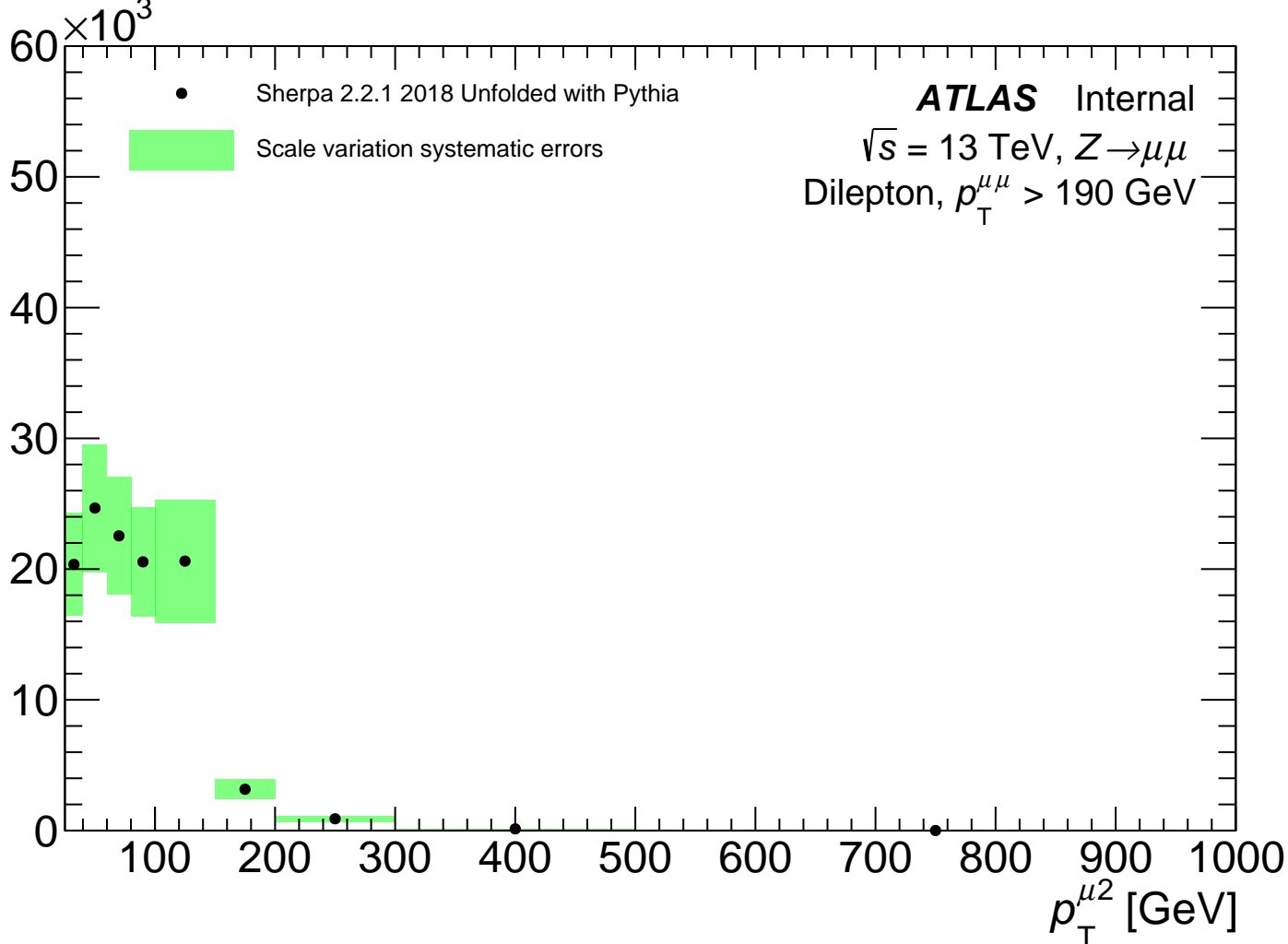
Events



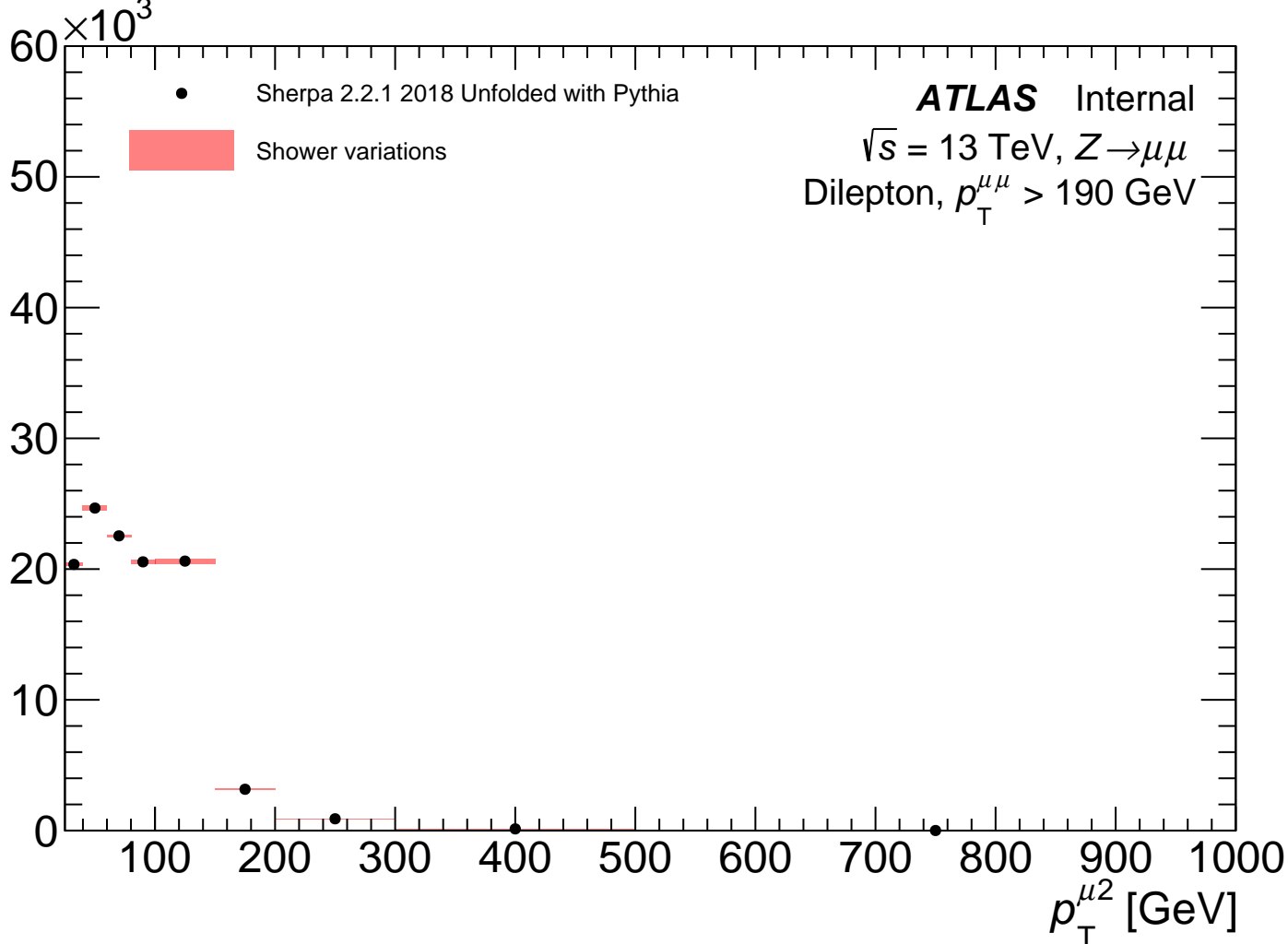
Events



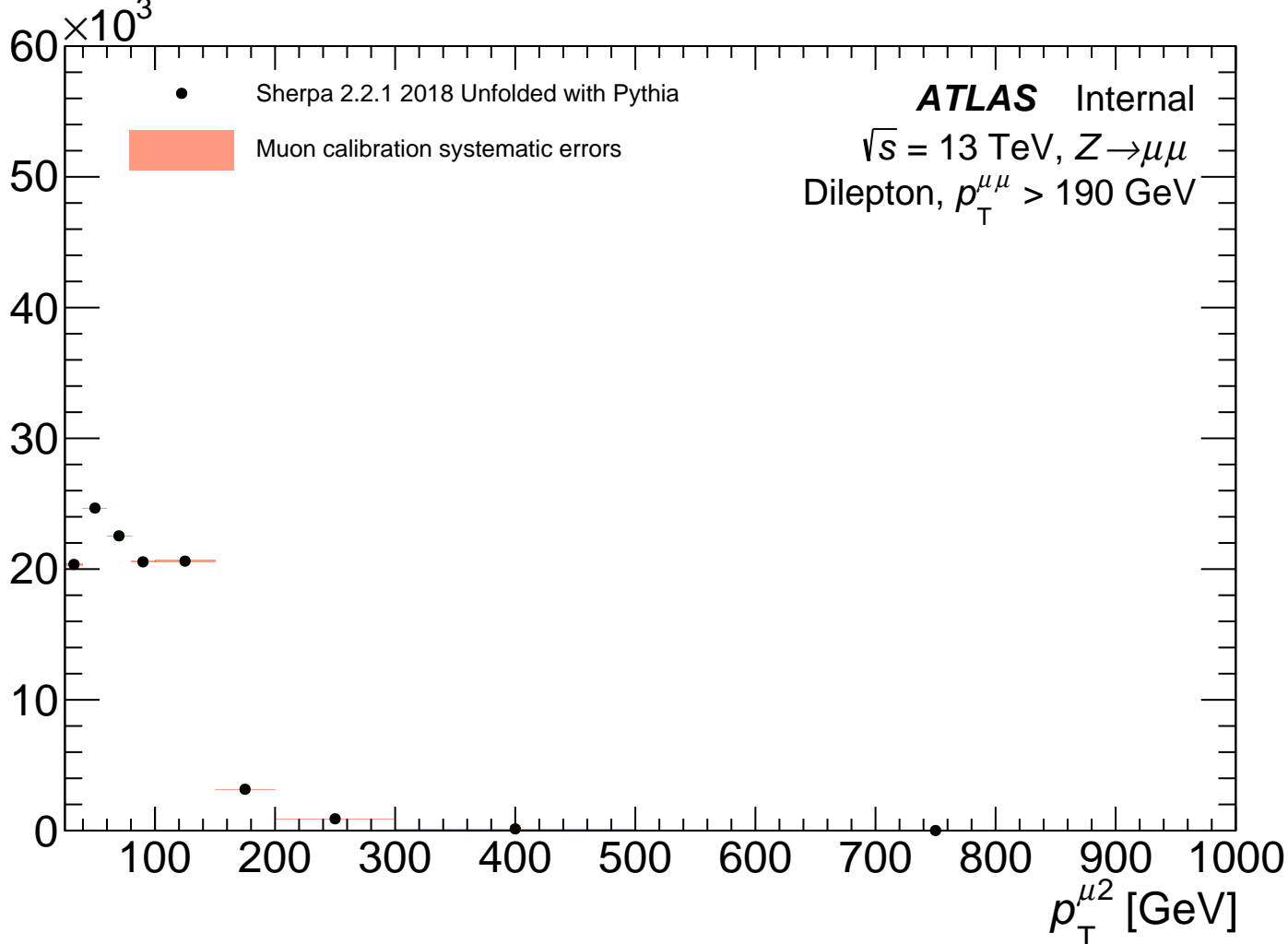
Events



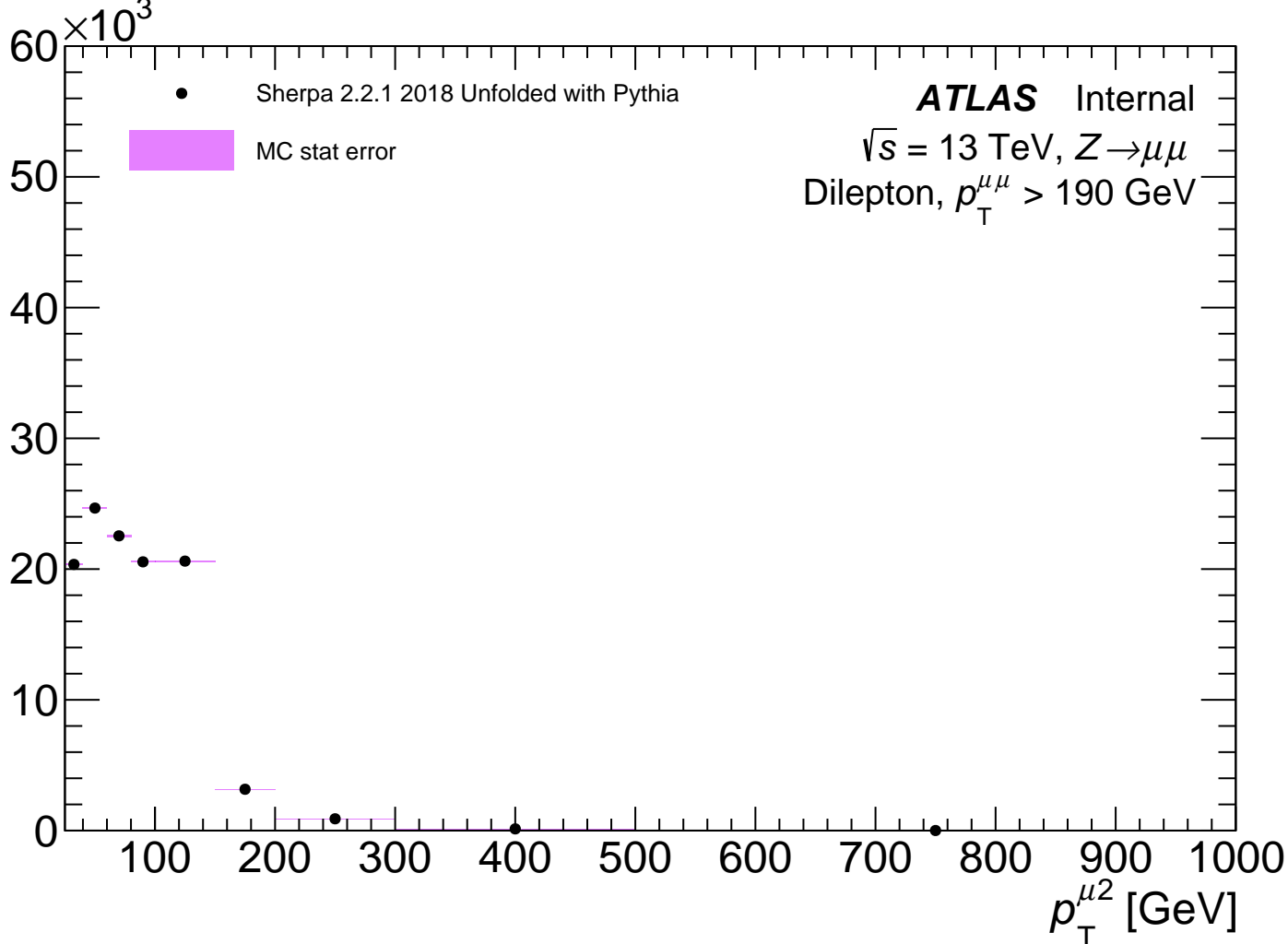
Events



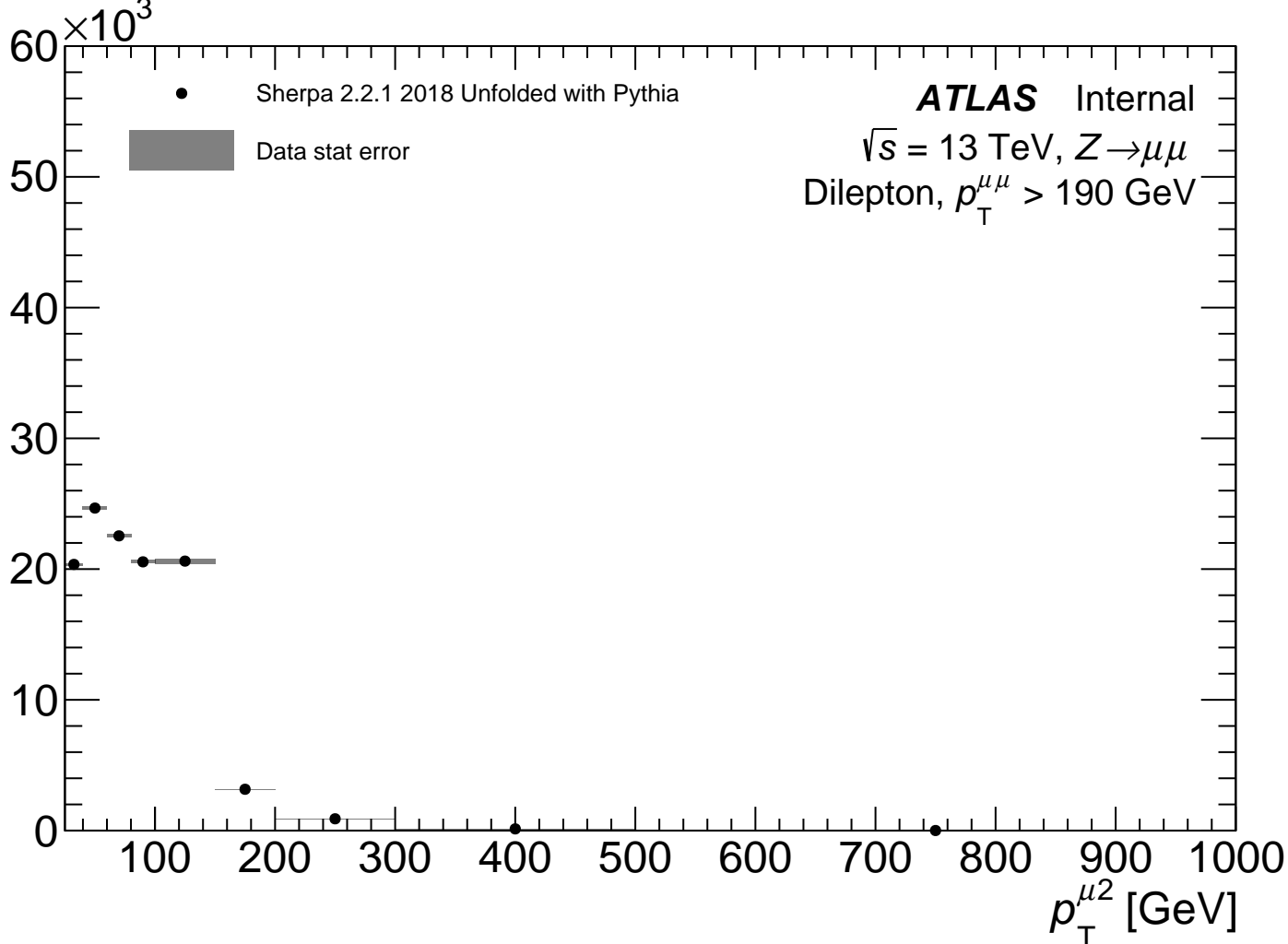
Events



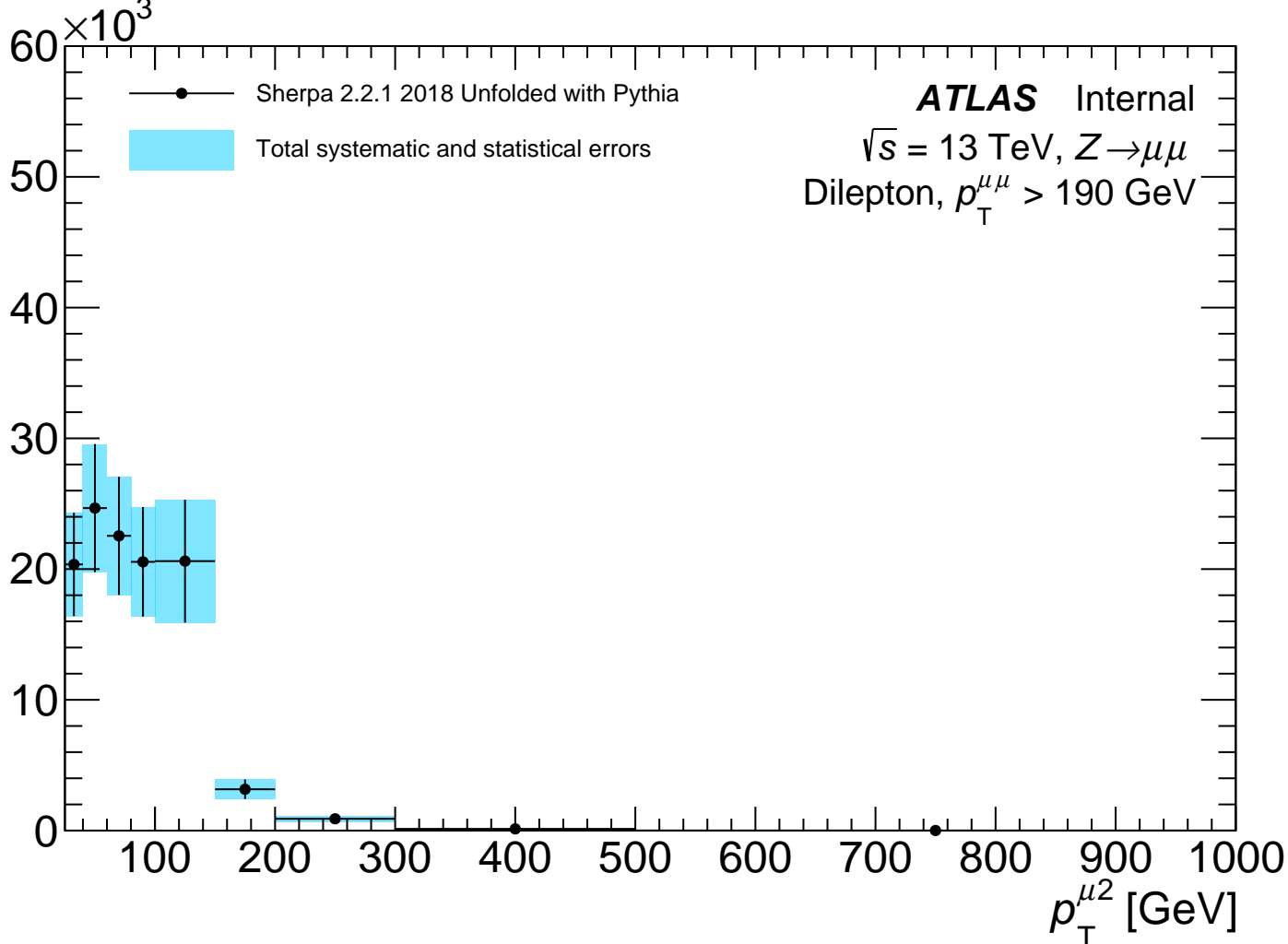
Events



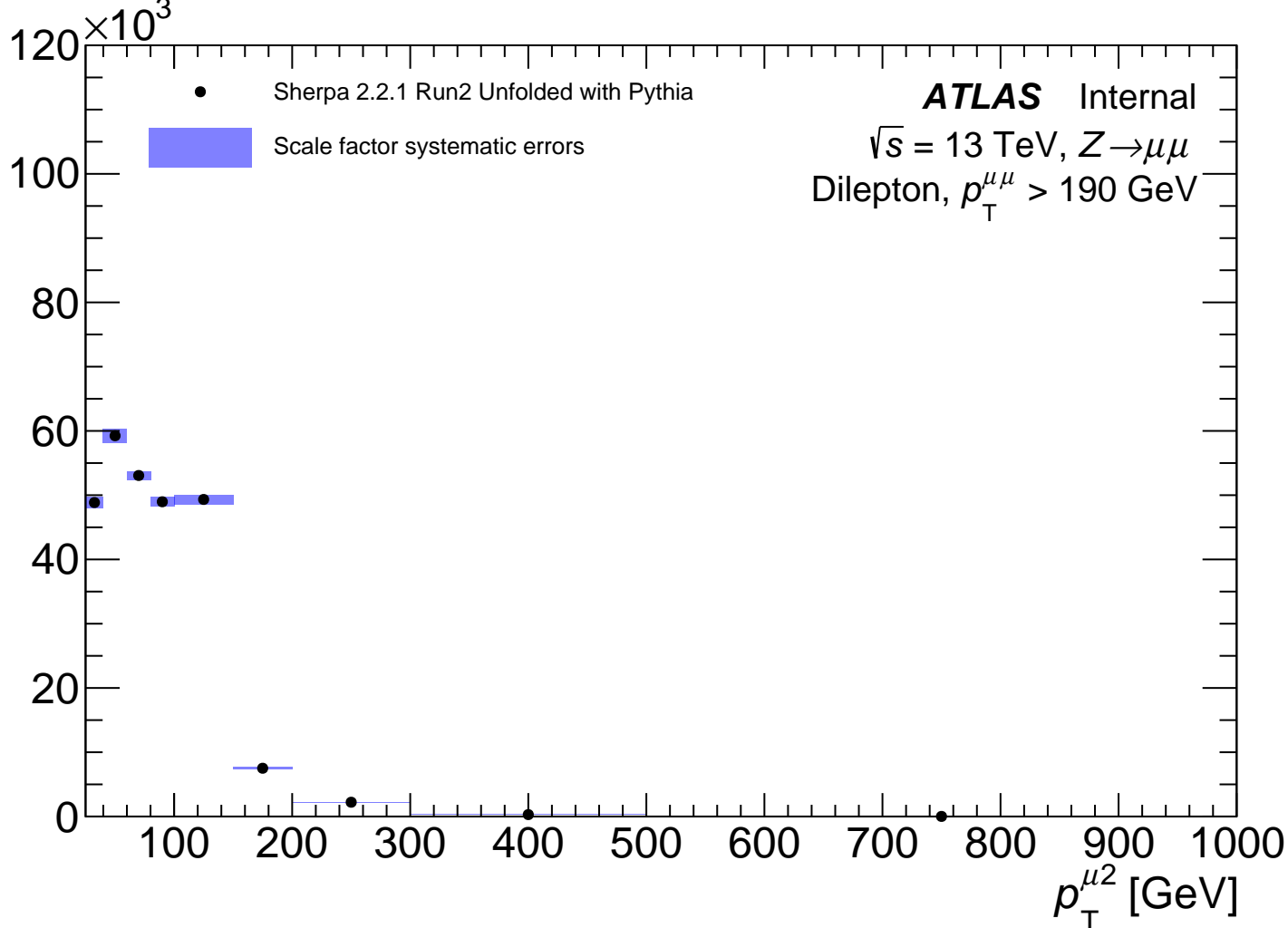
Events



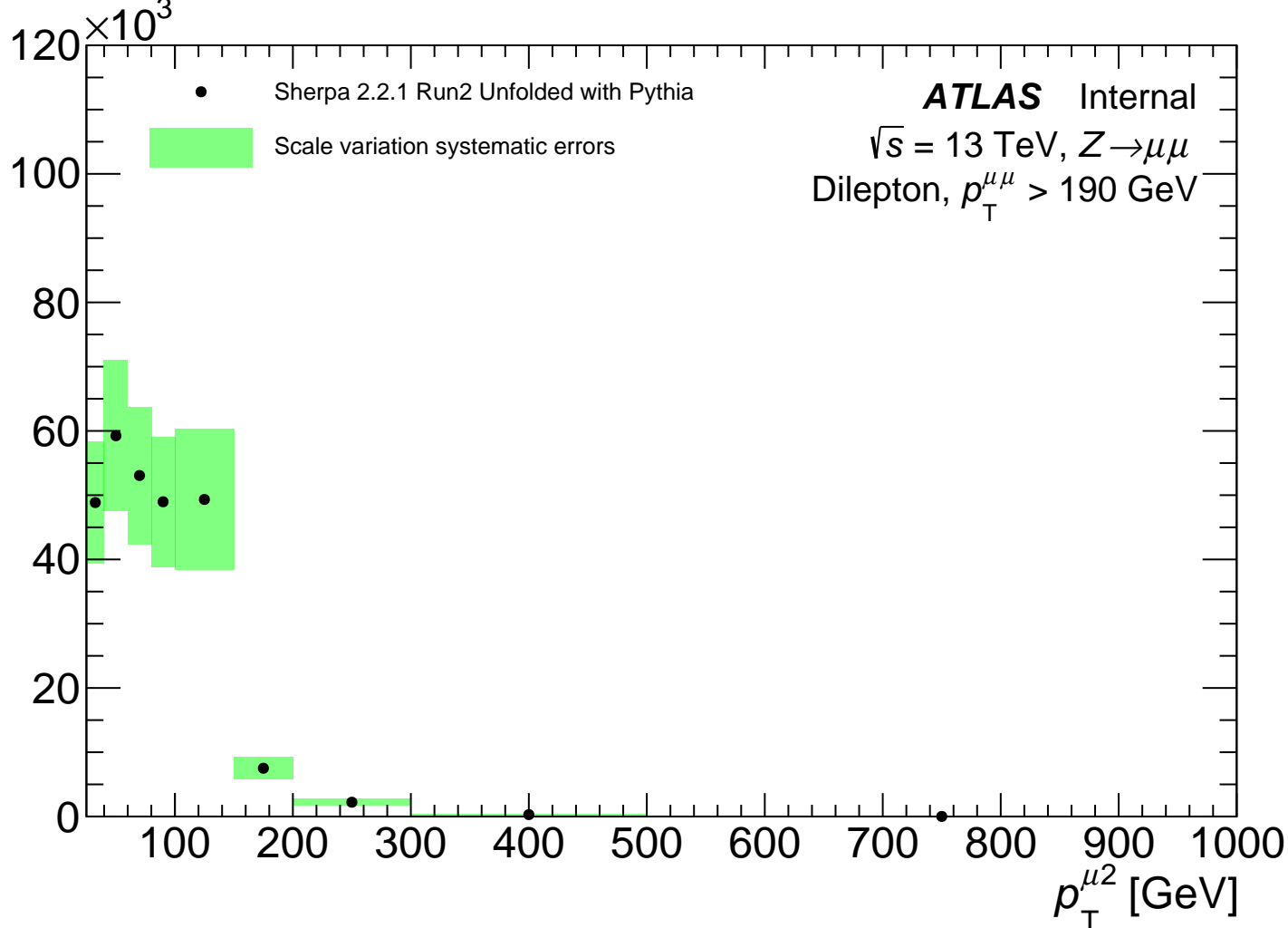
Events



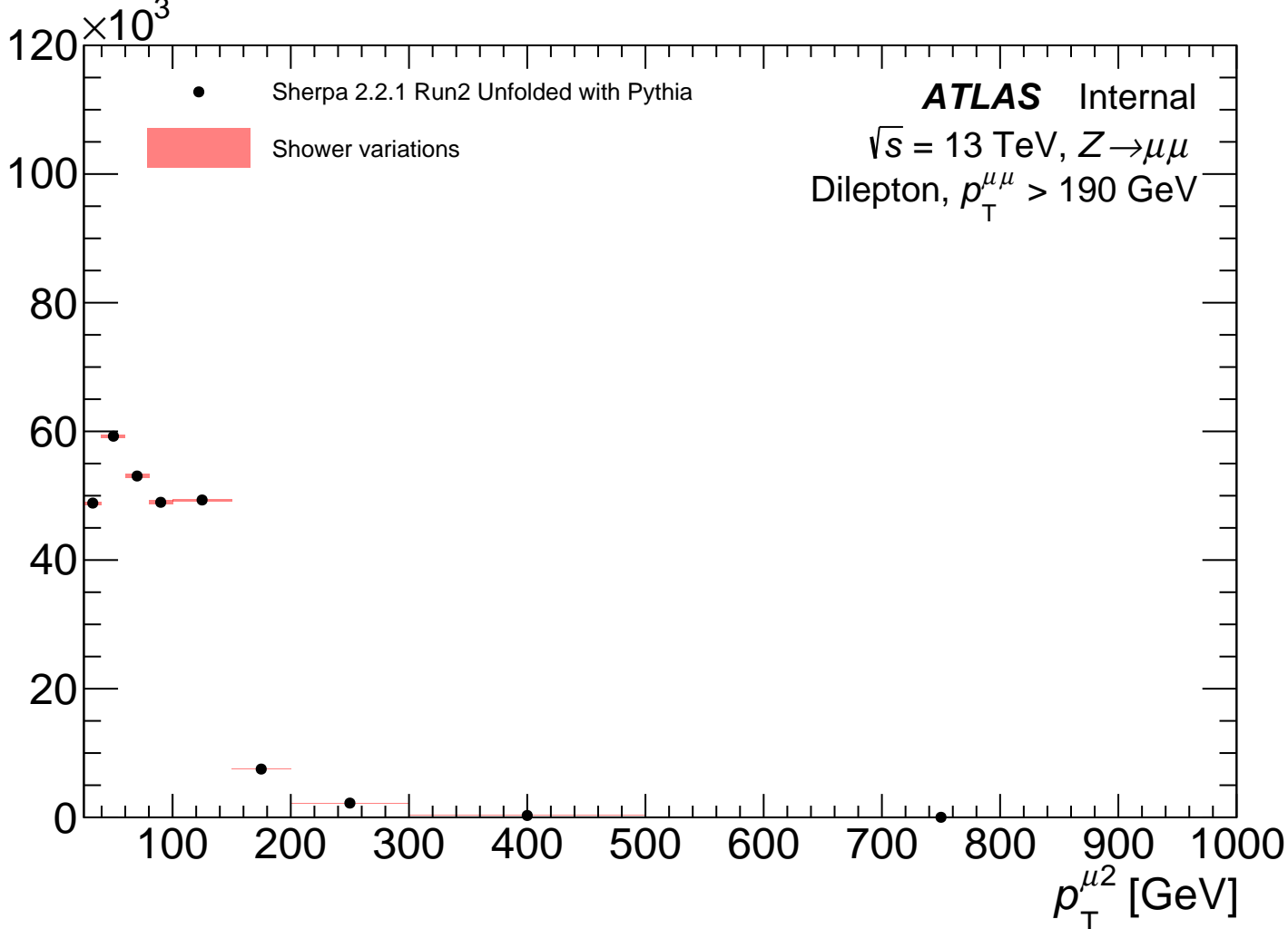
Events



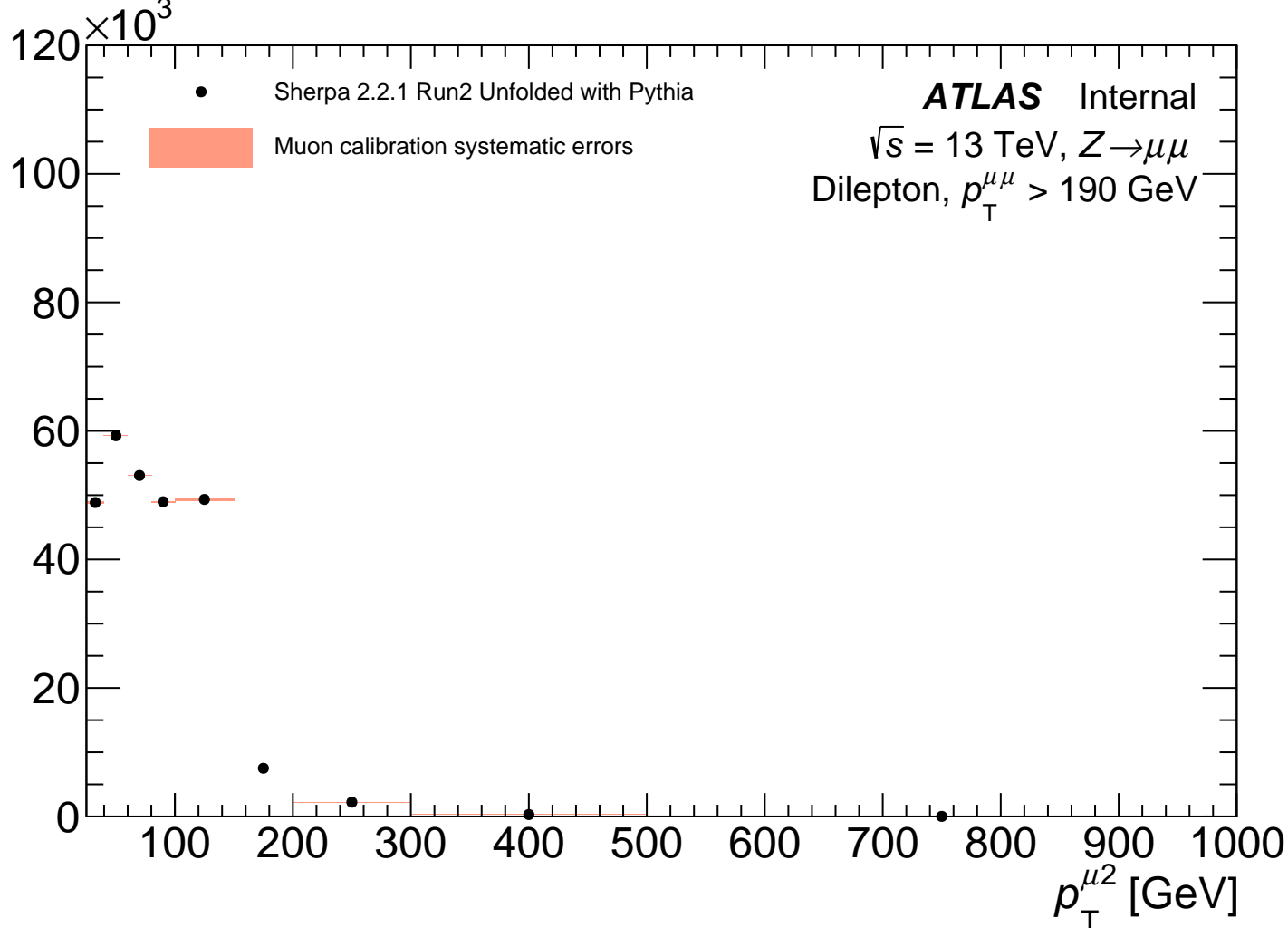
Events



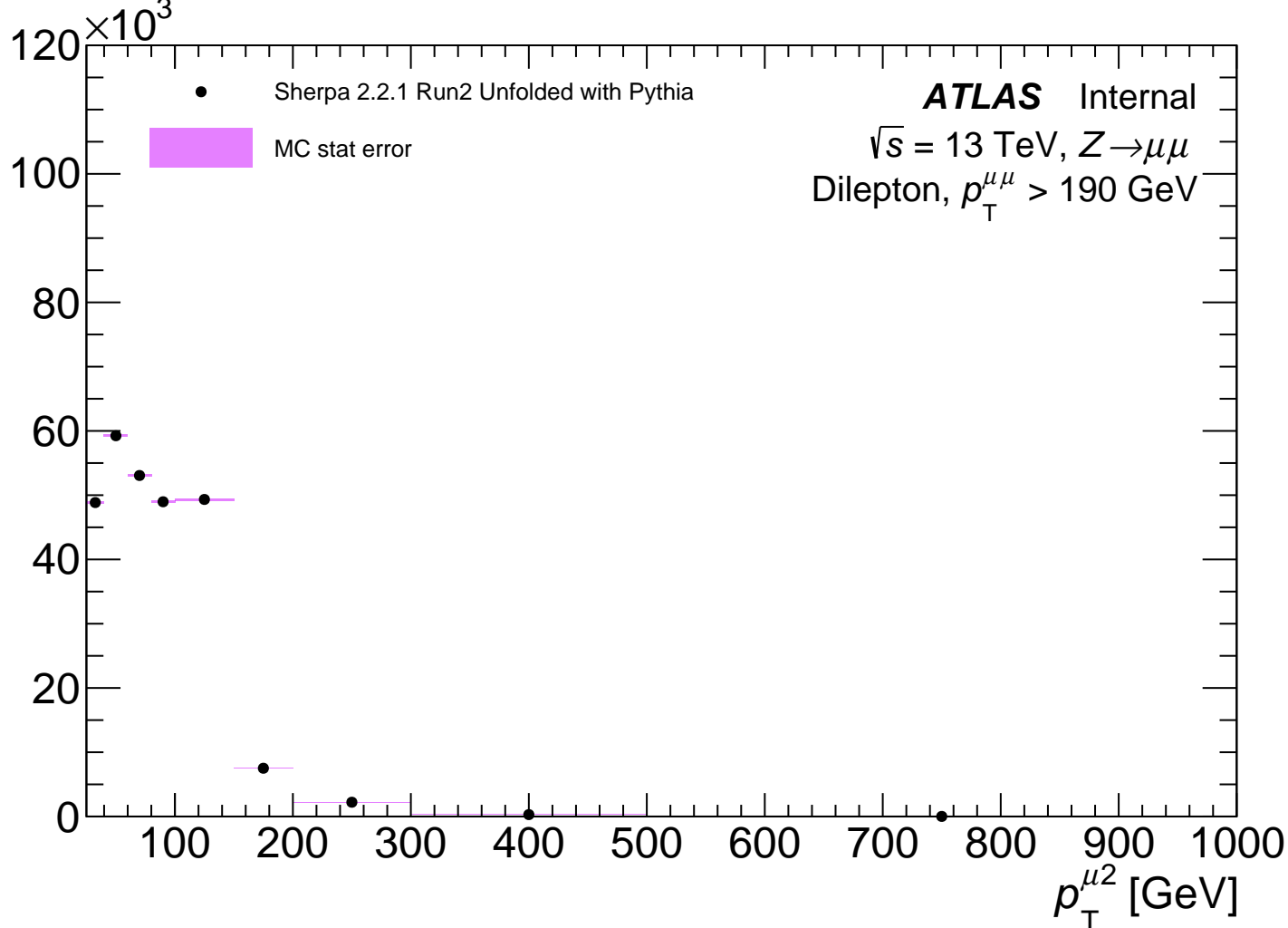
Events



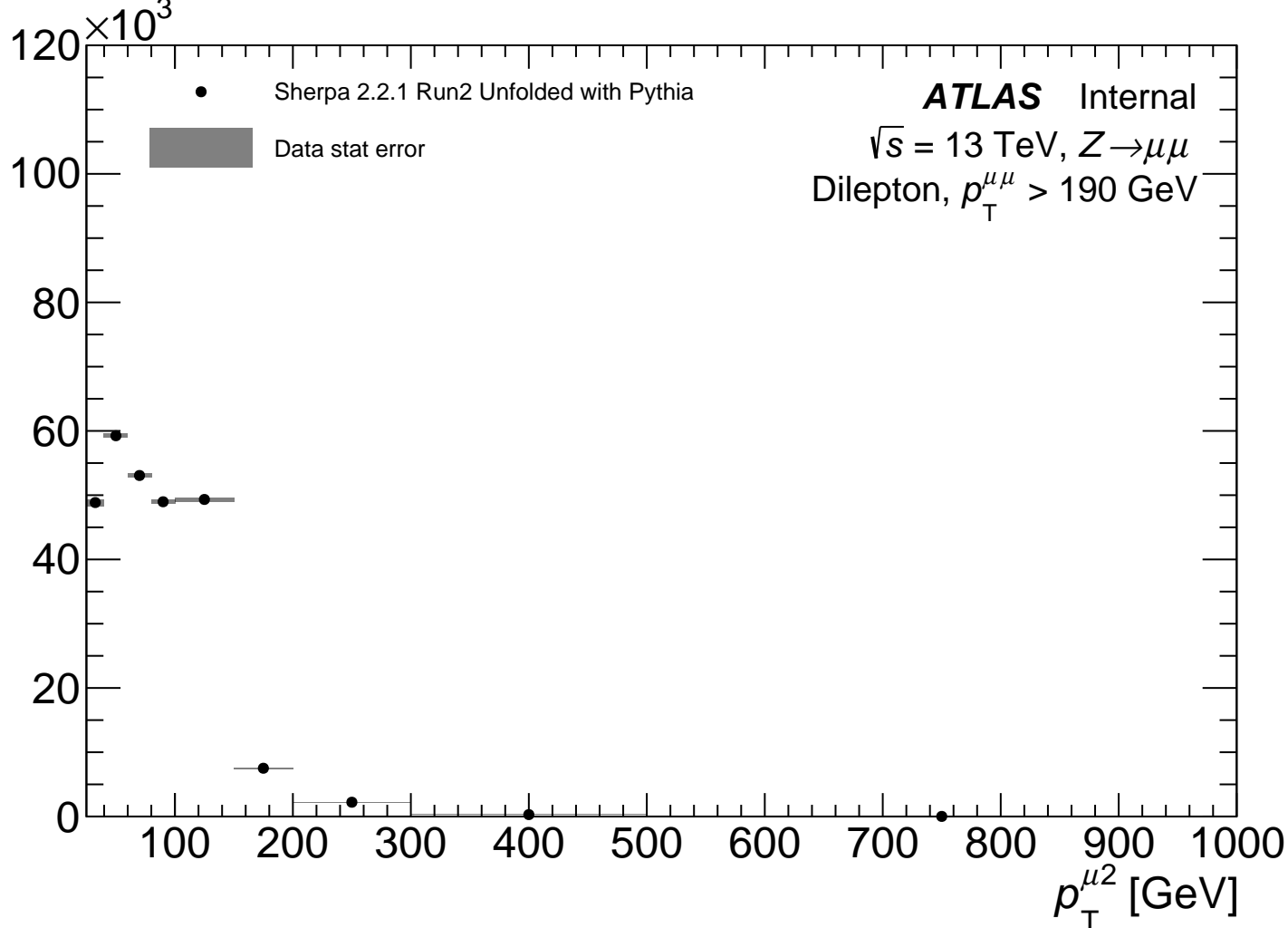
Events



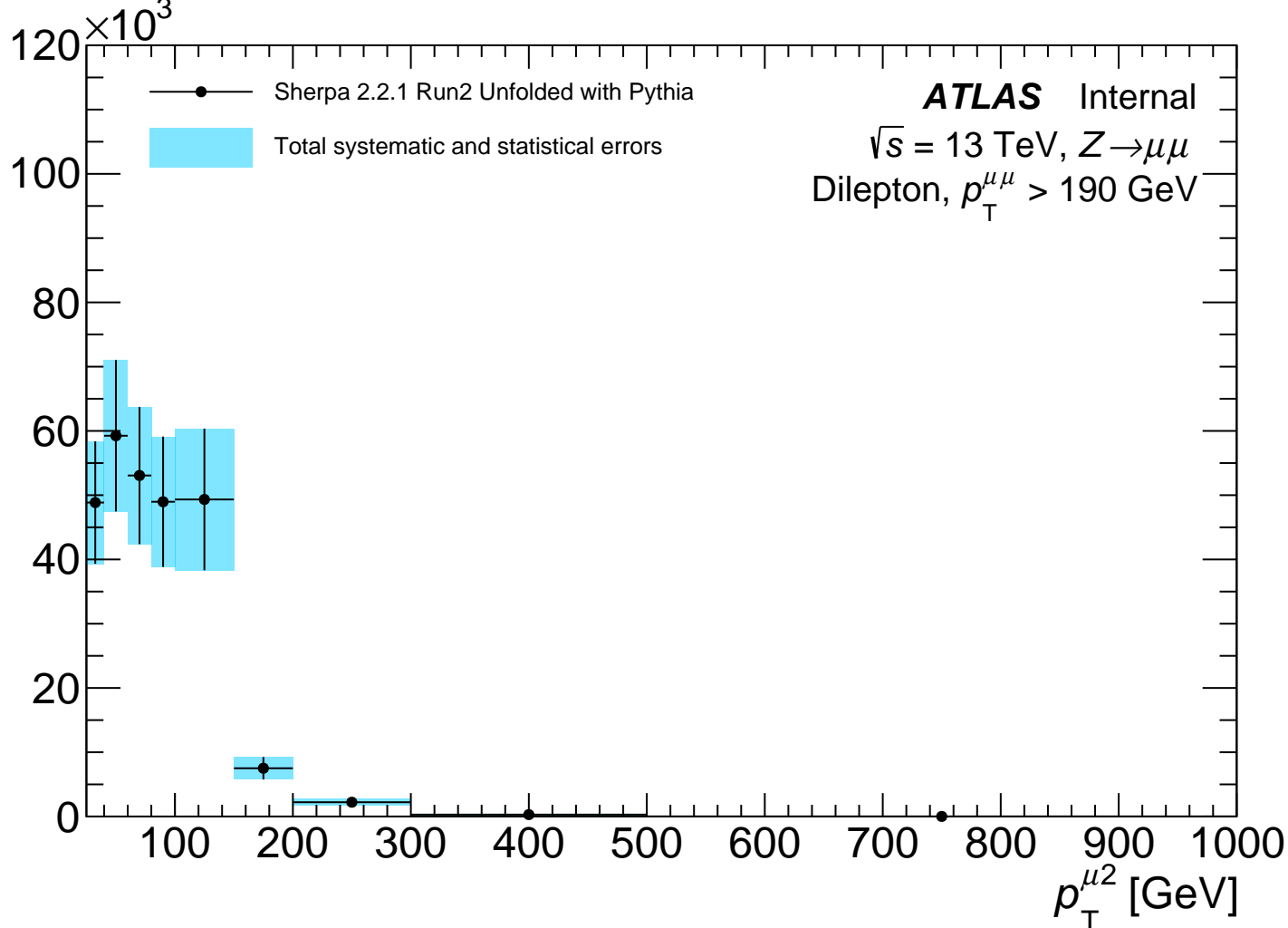
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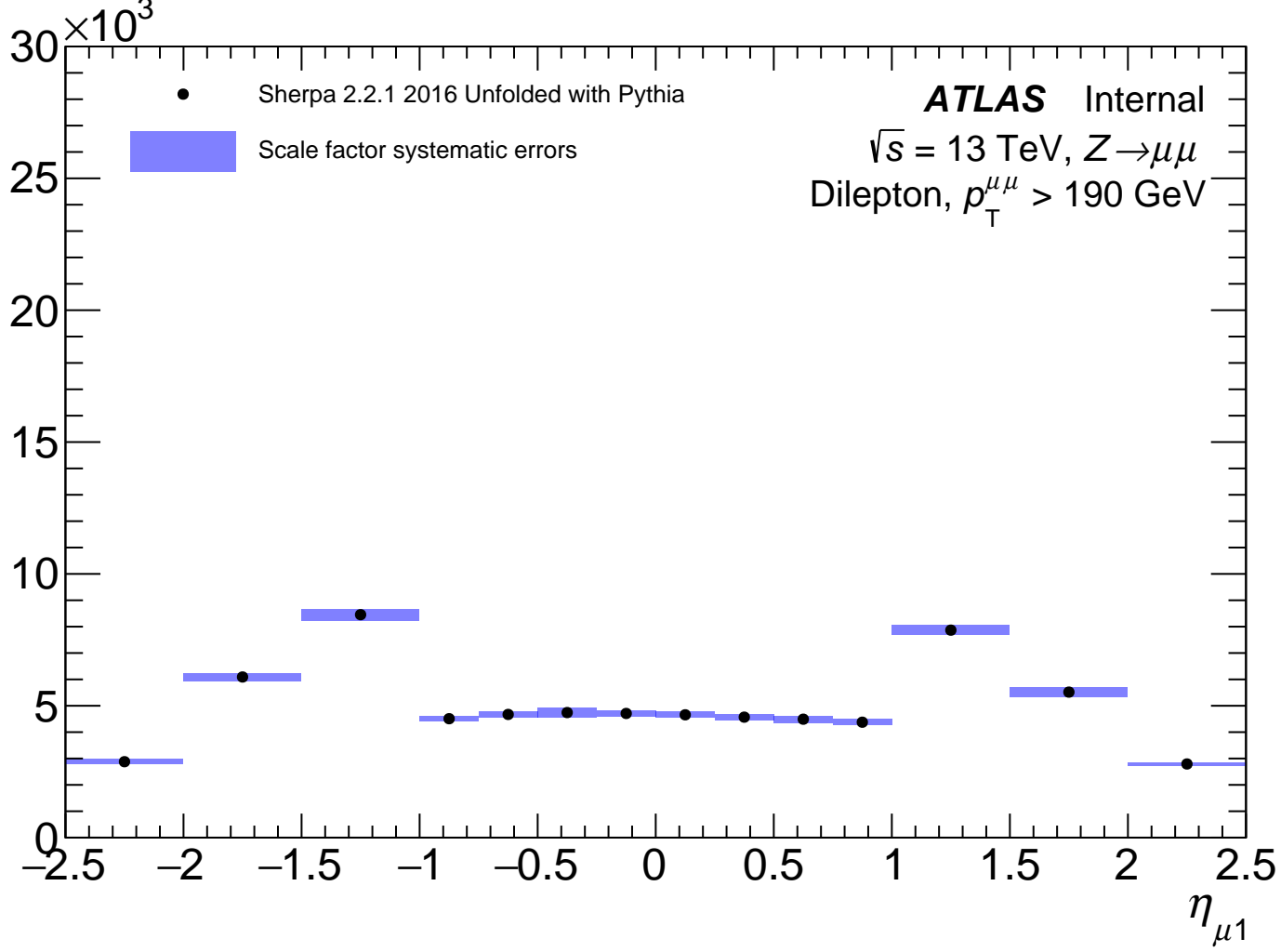
Events



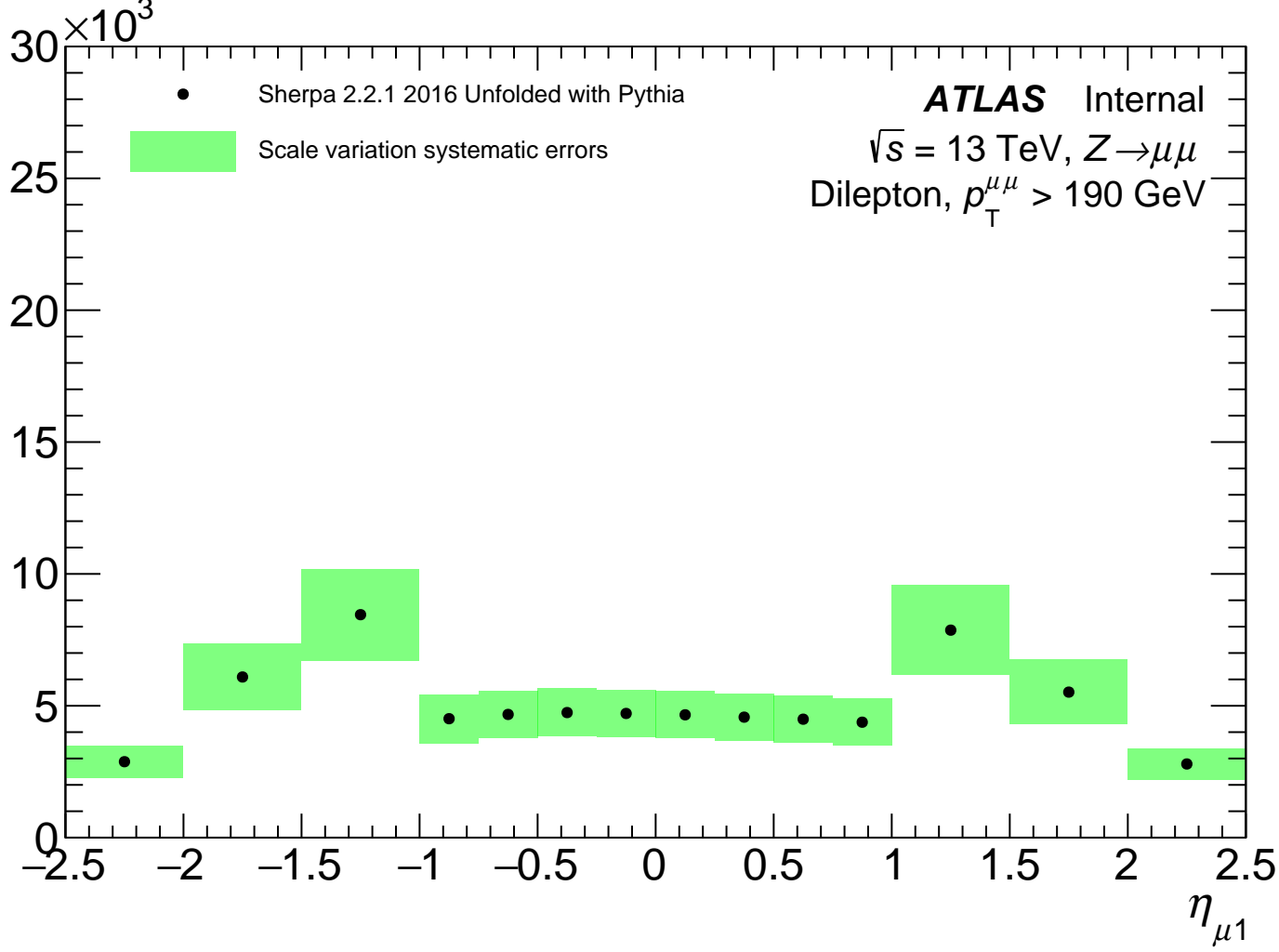
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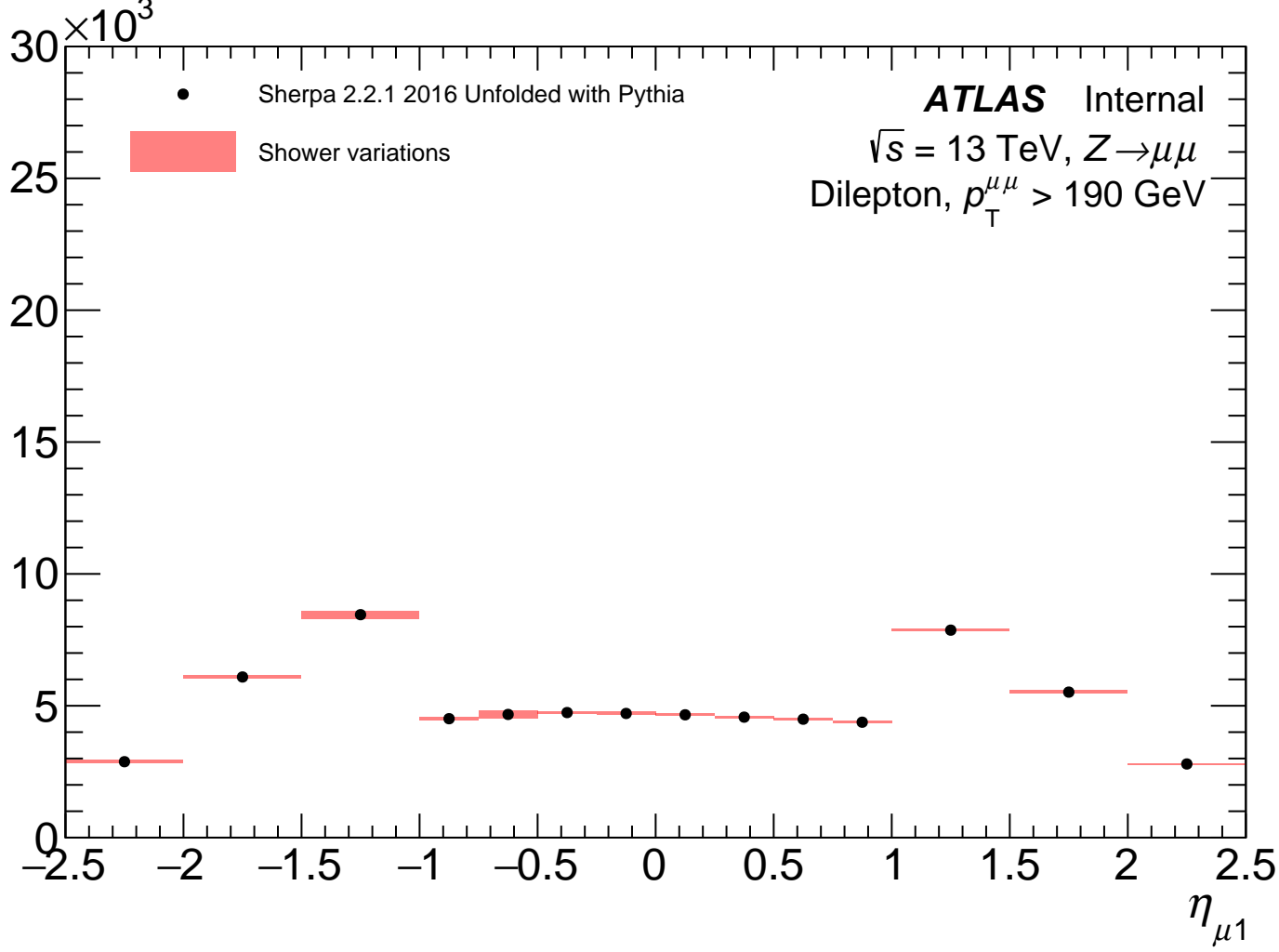
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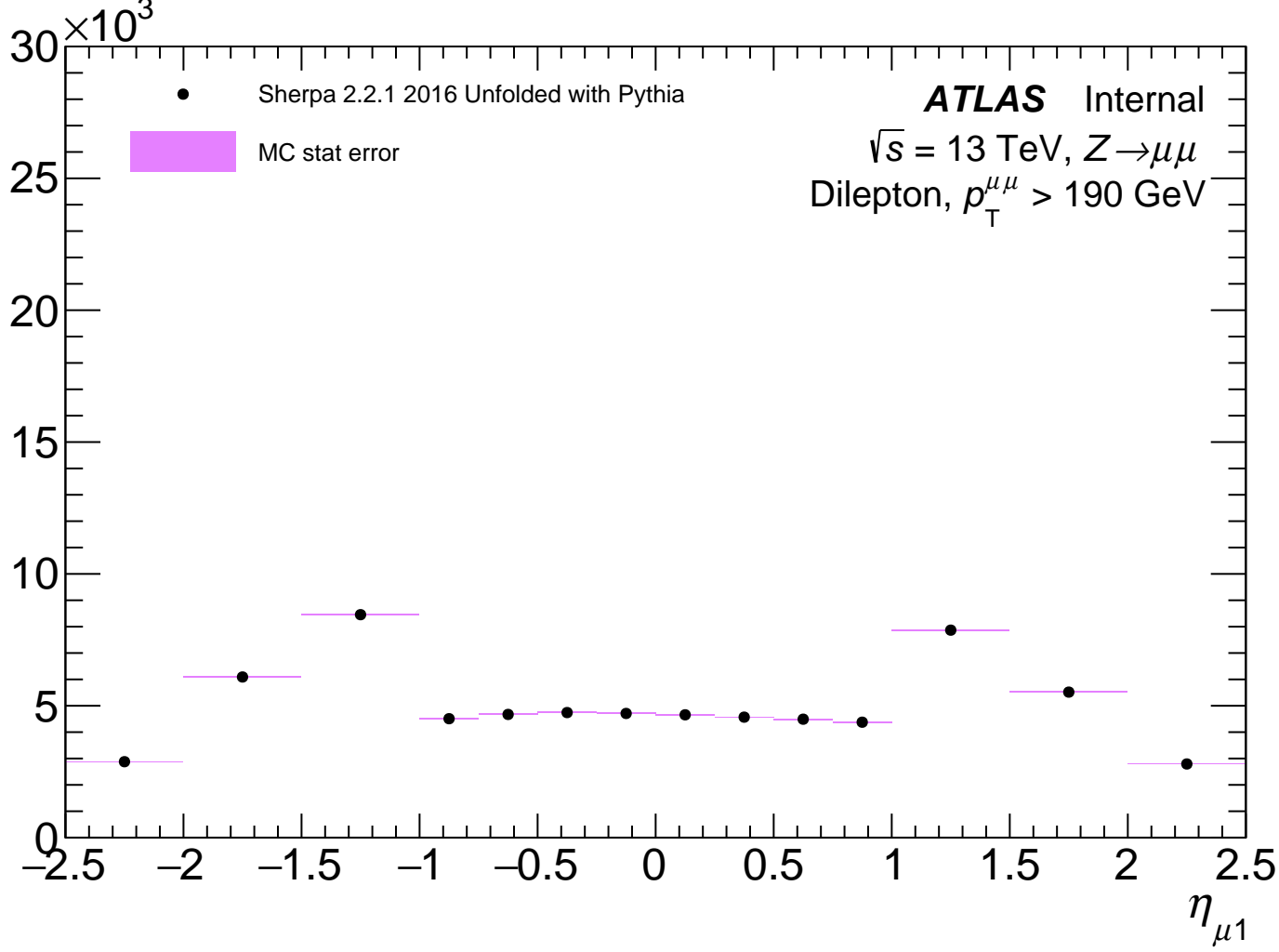
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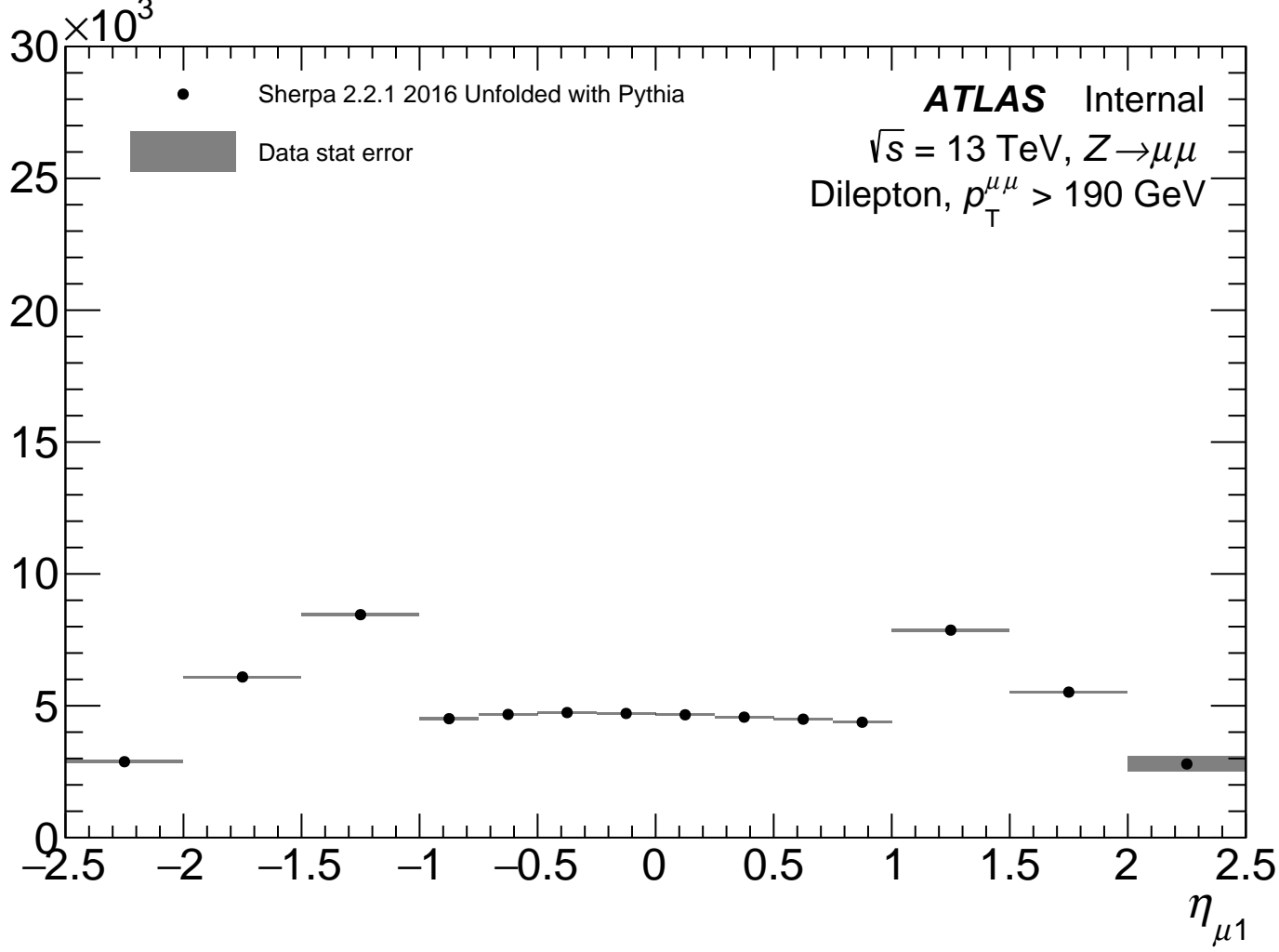
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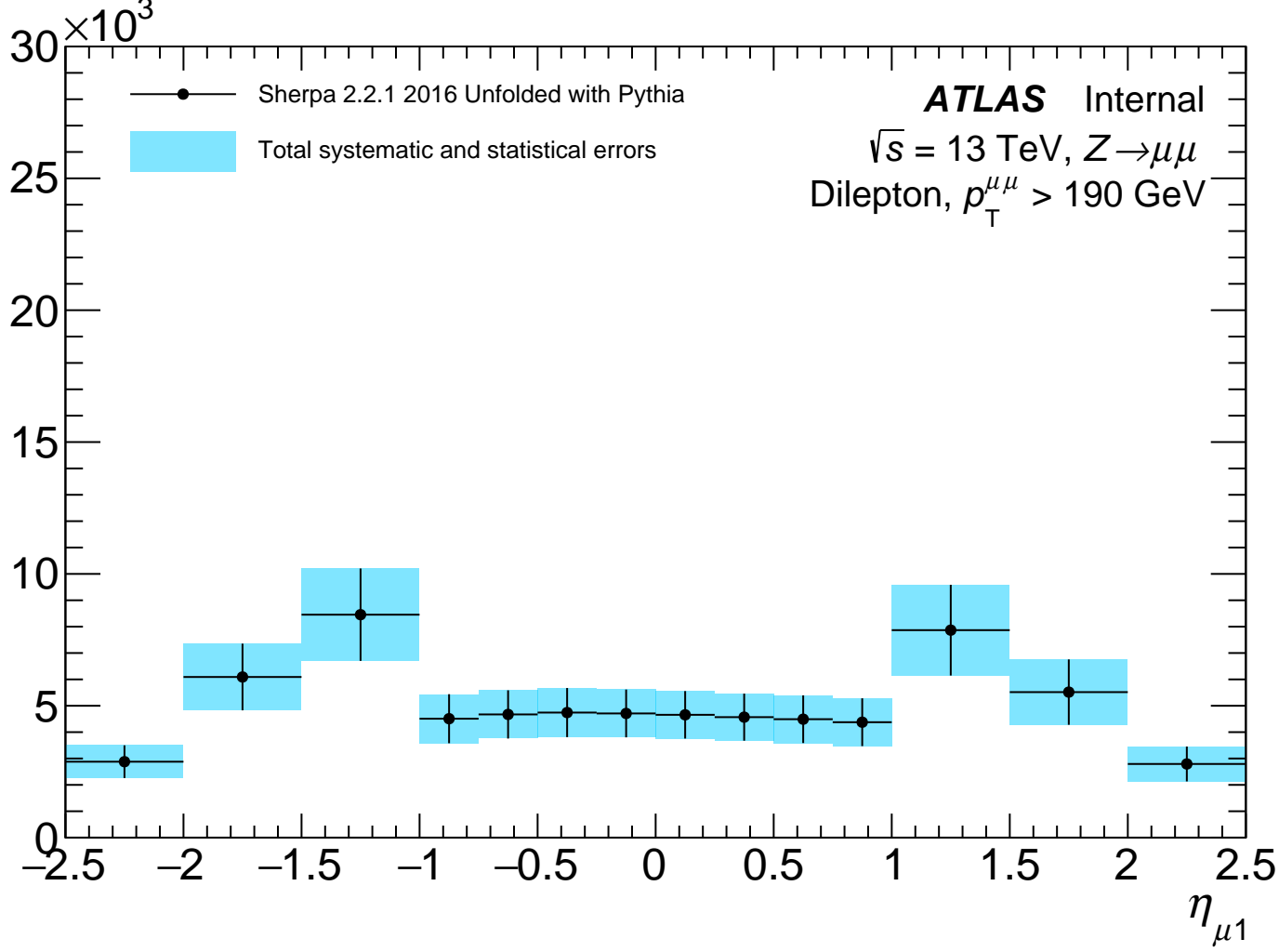
Events



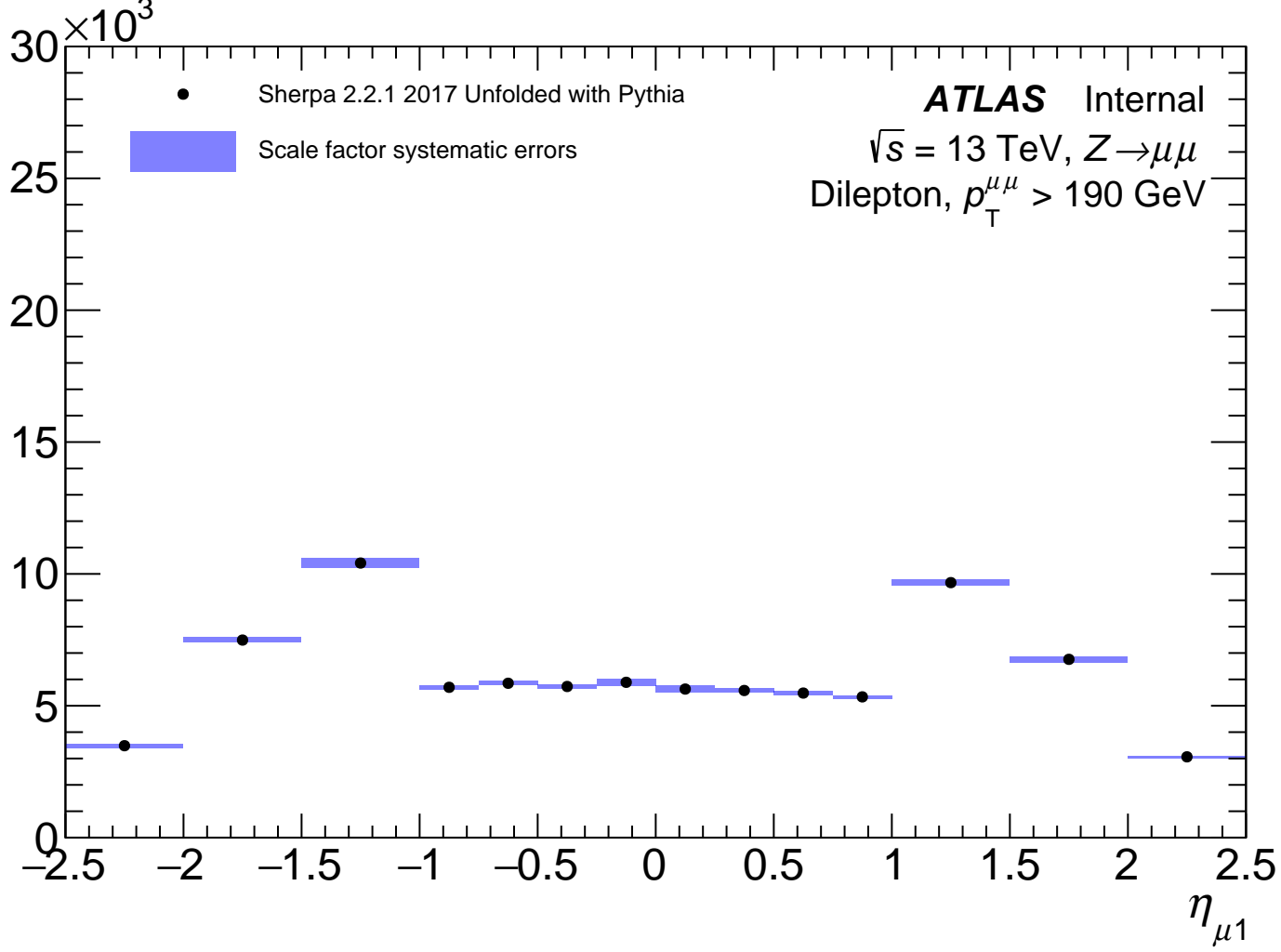
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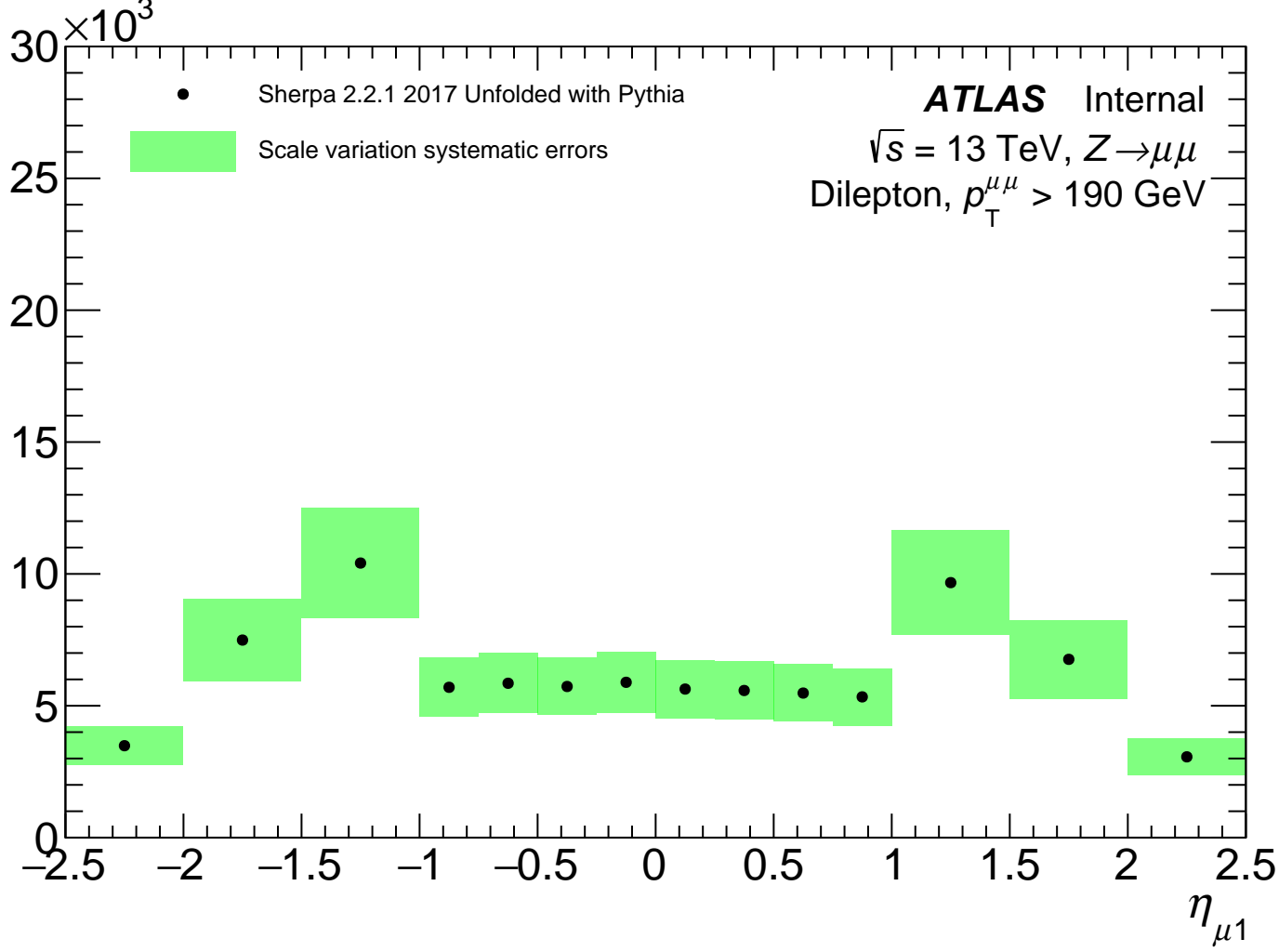
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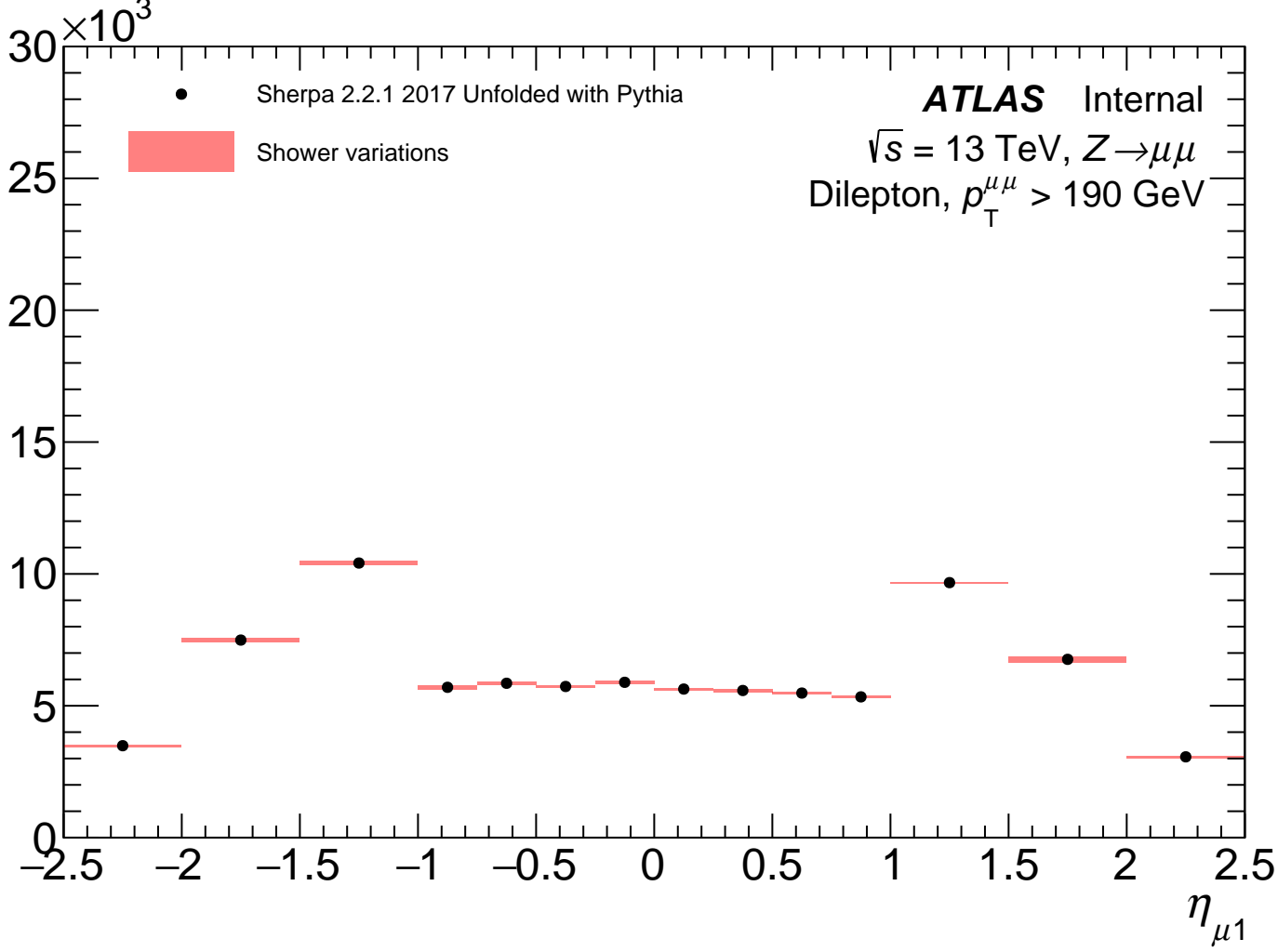
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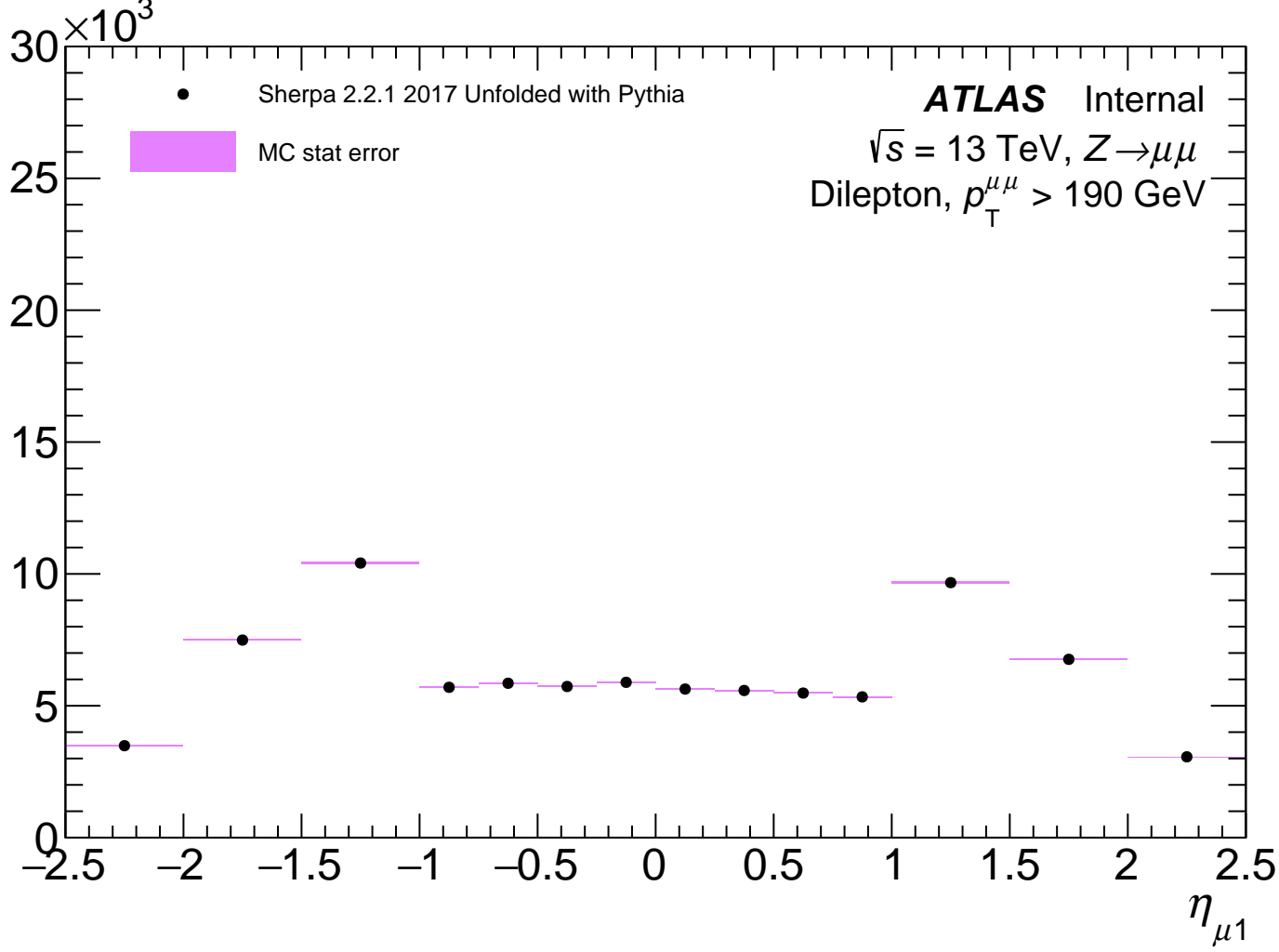
Events



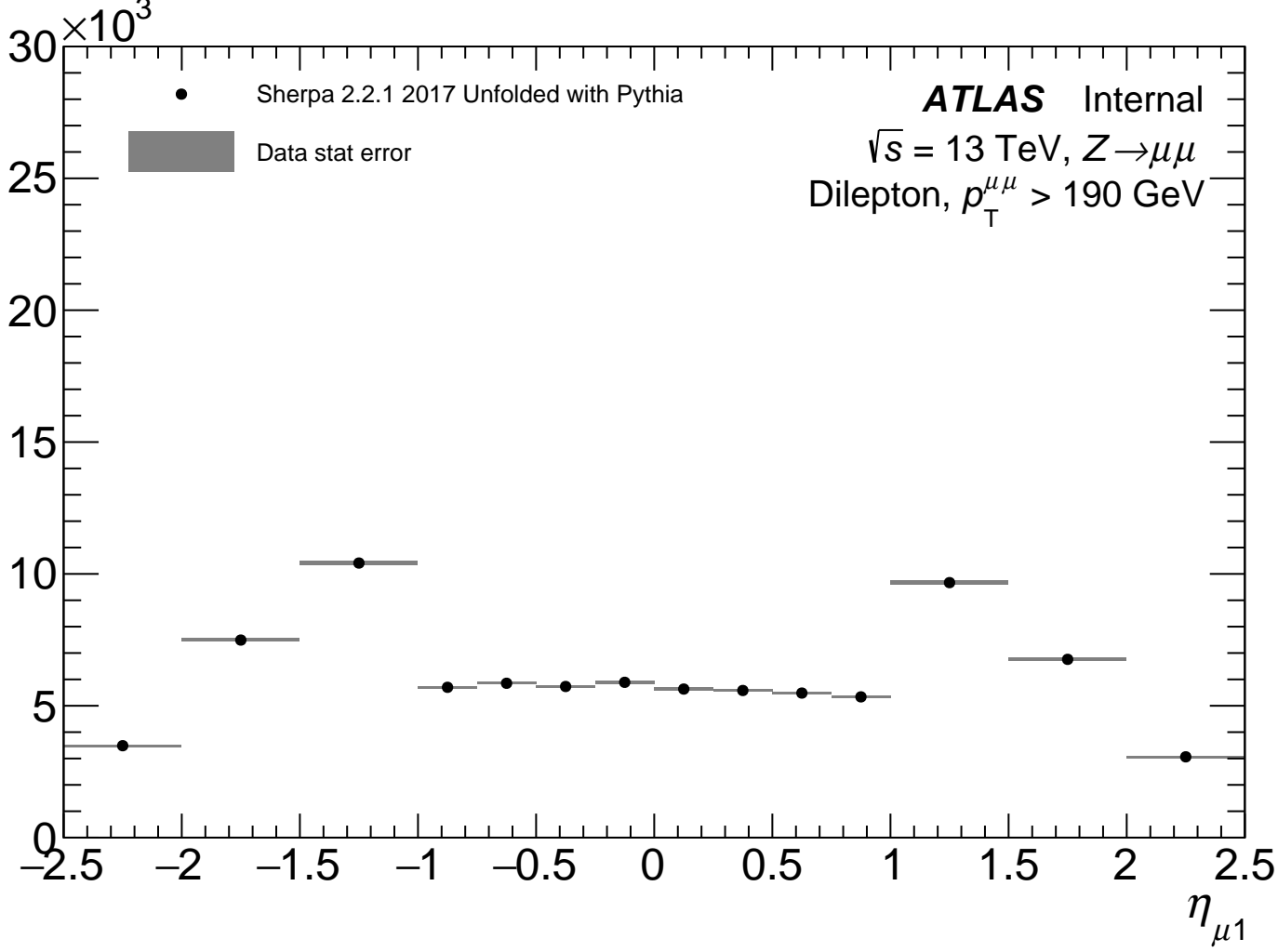
Events



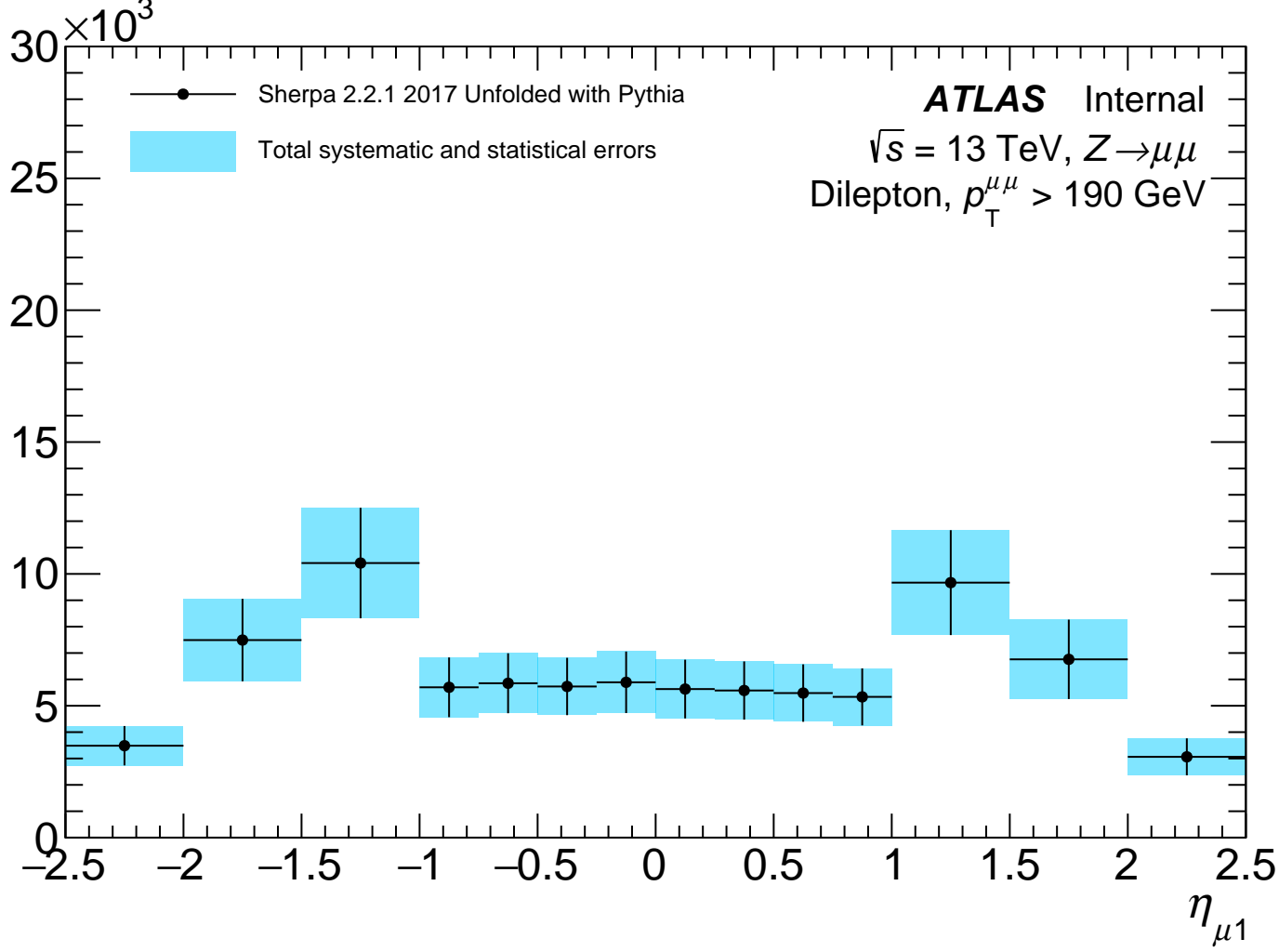
Events



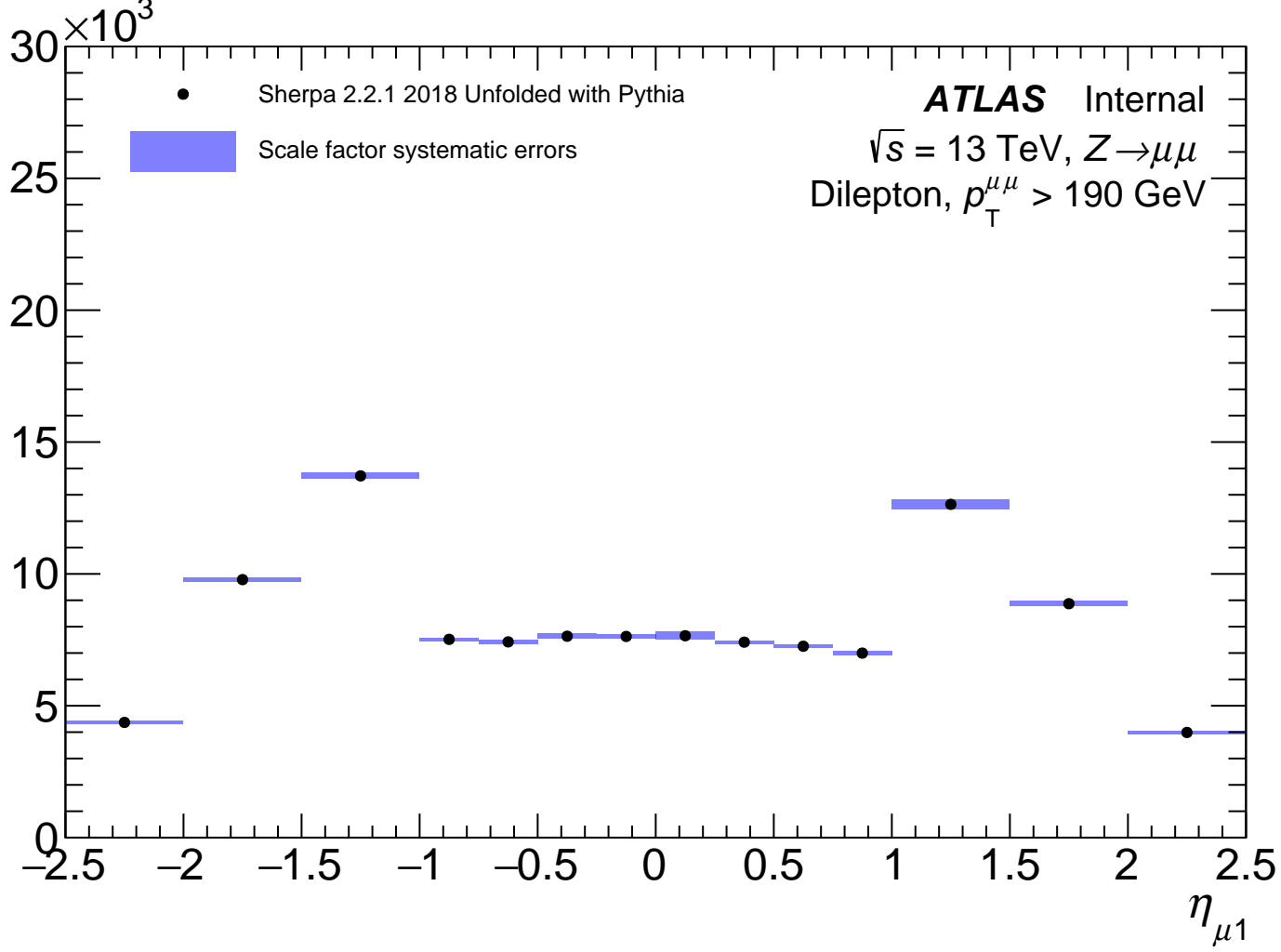
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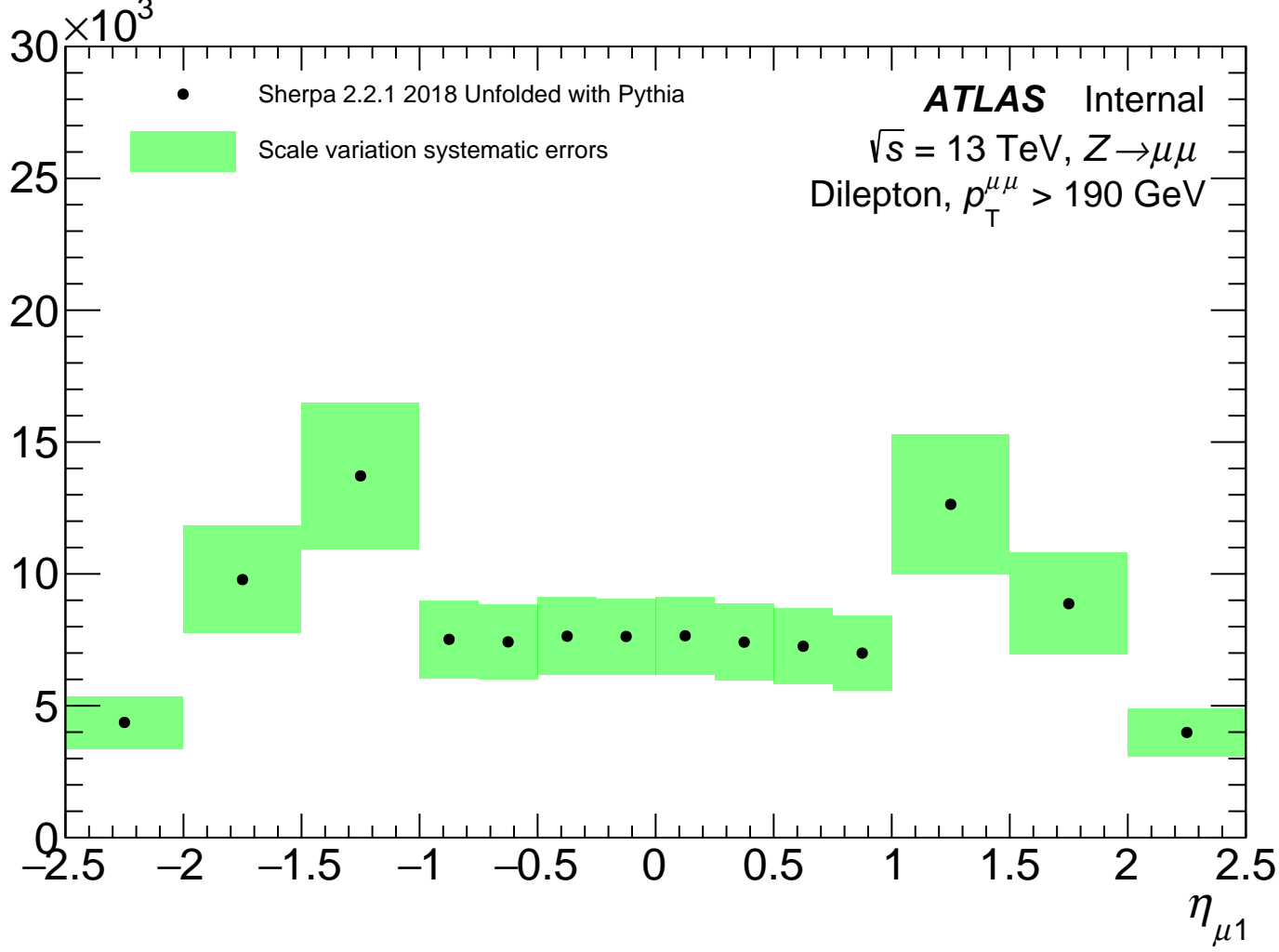
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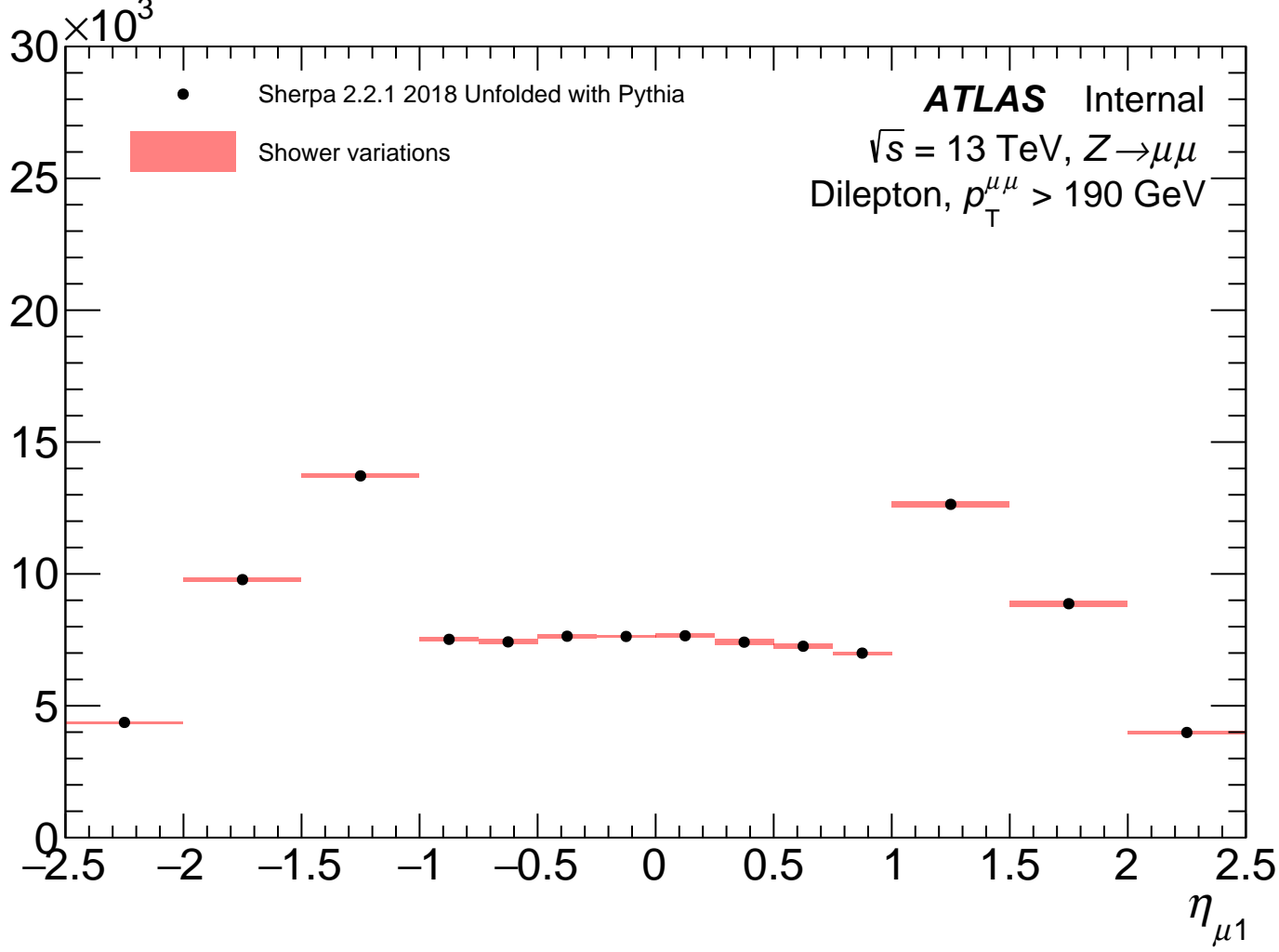
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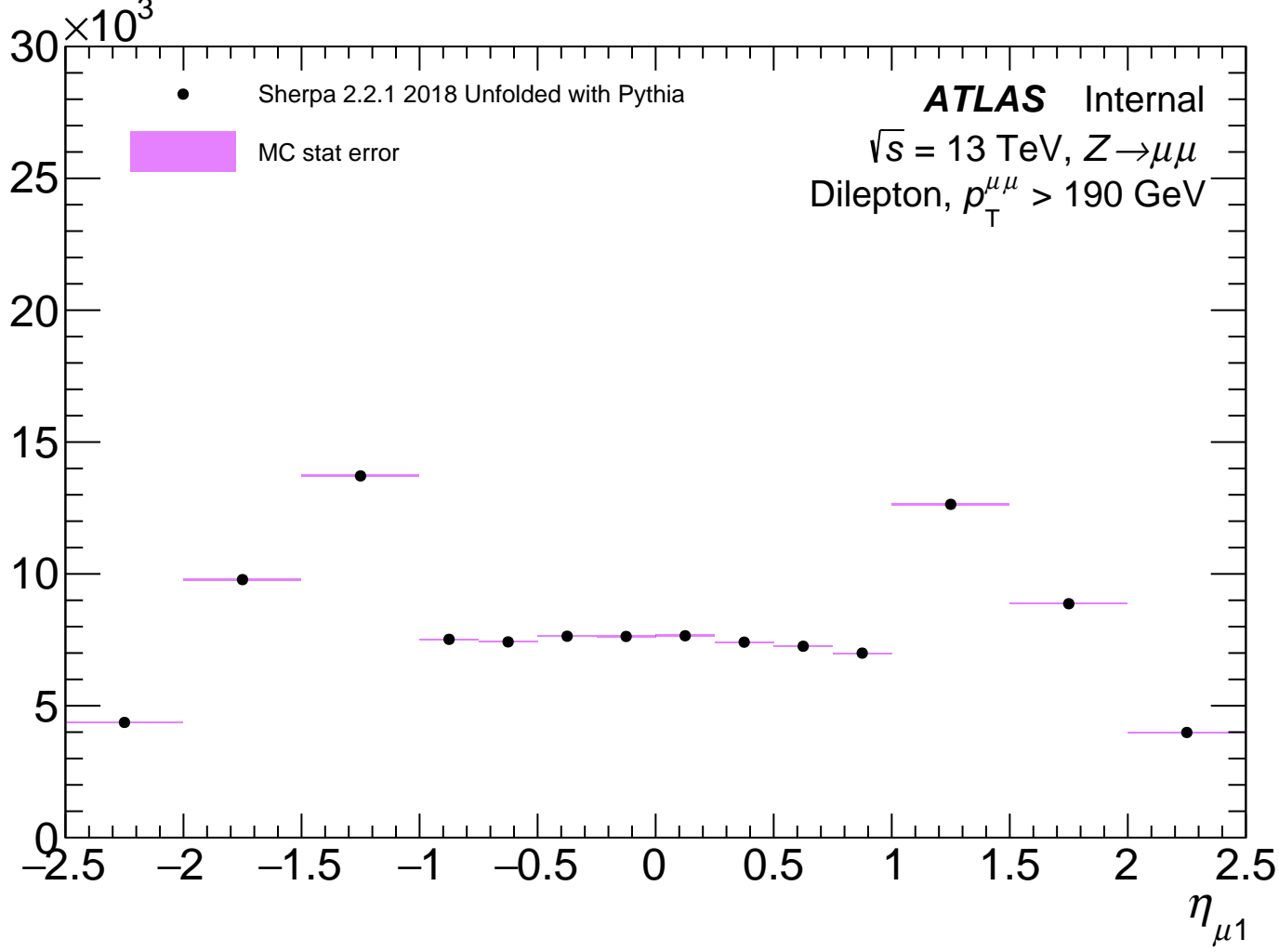
Events



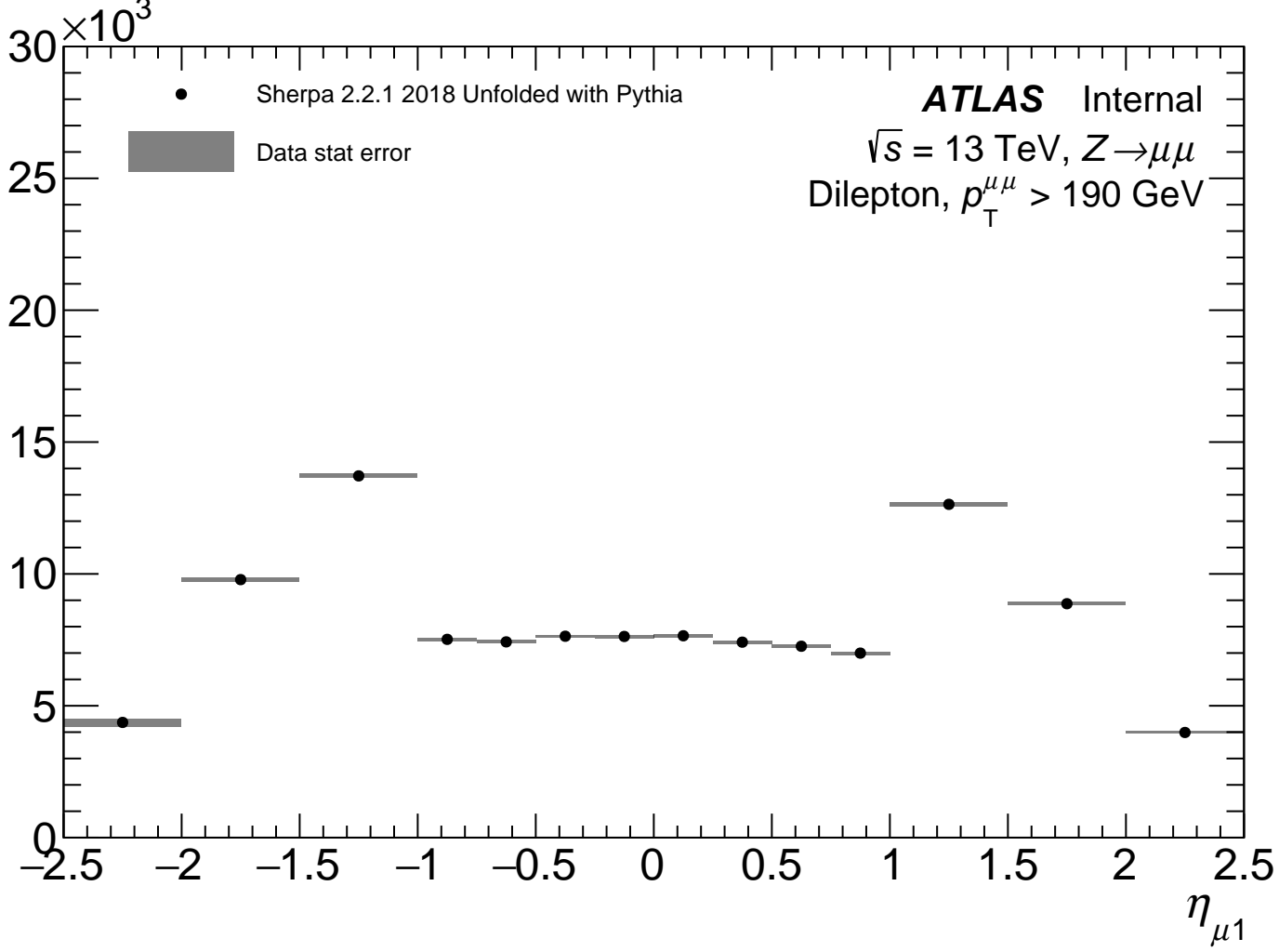
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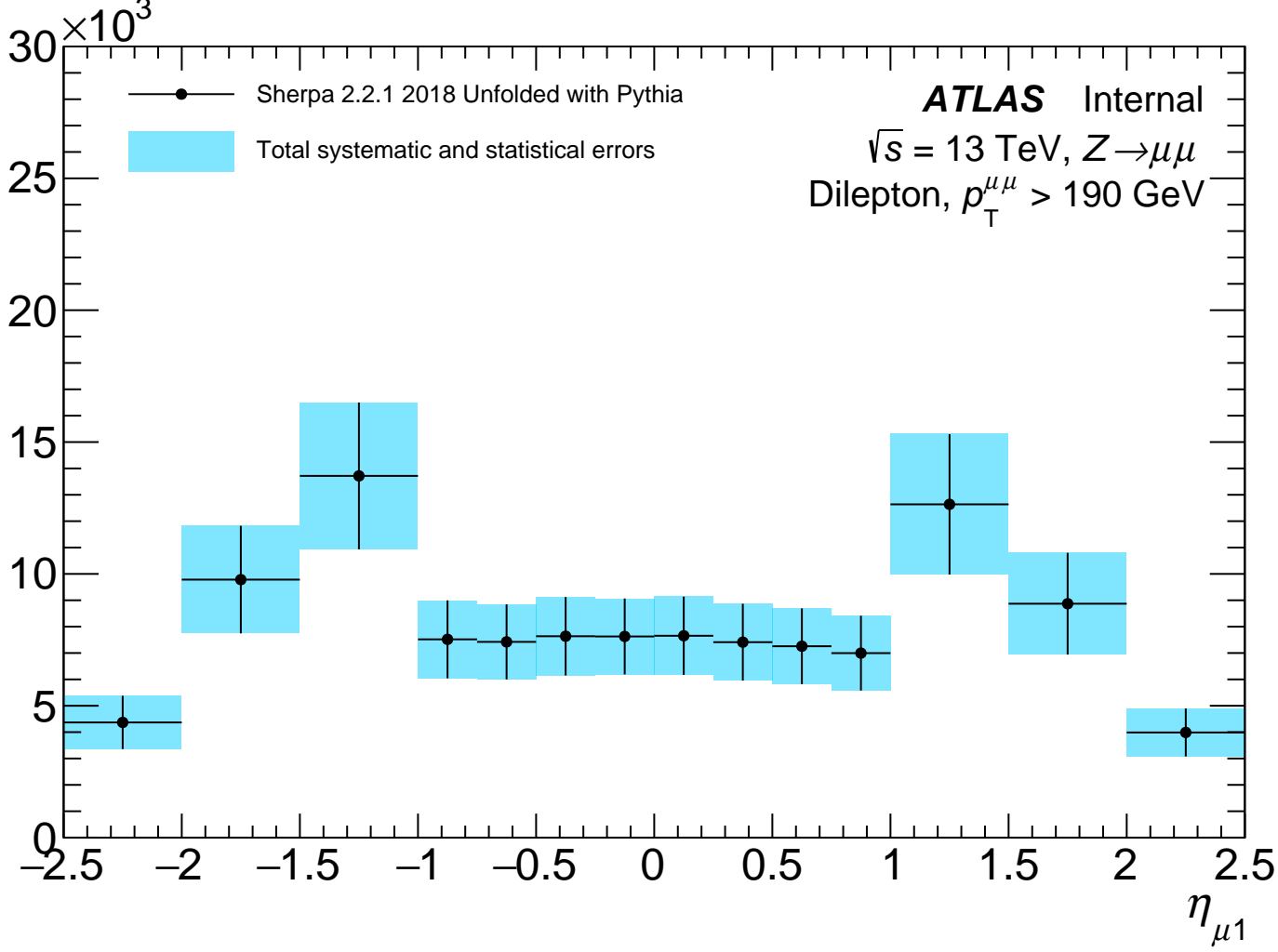
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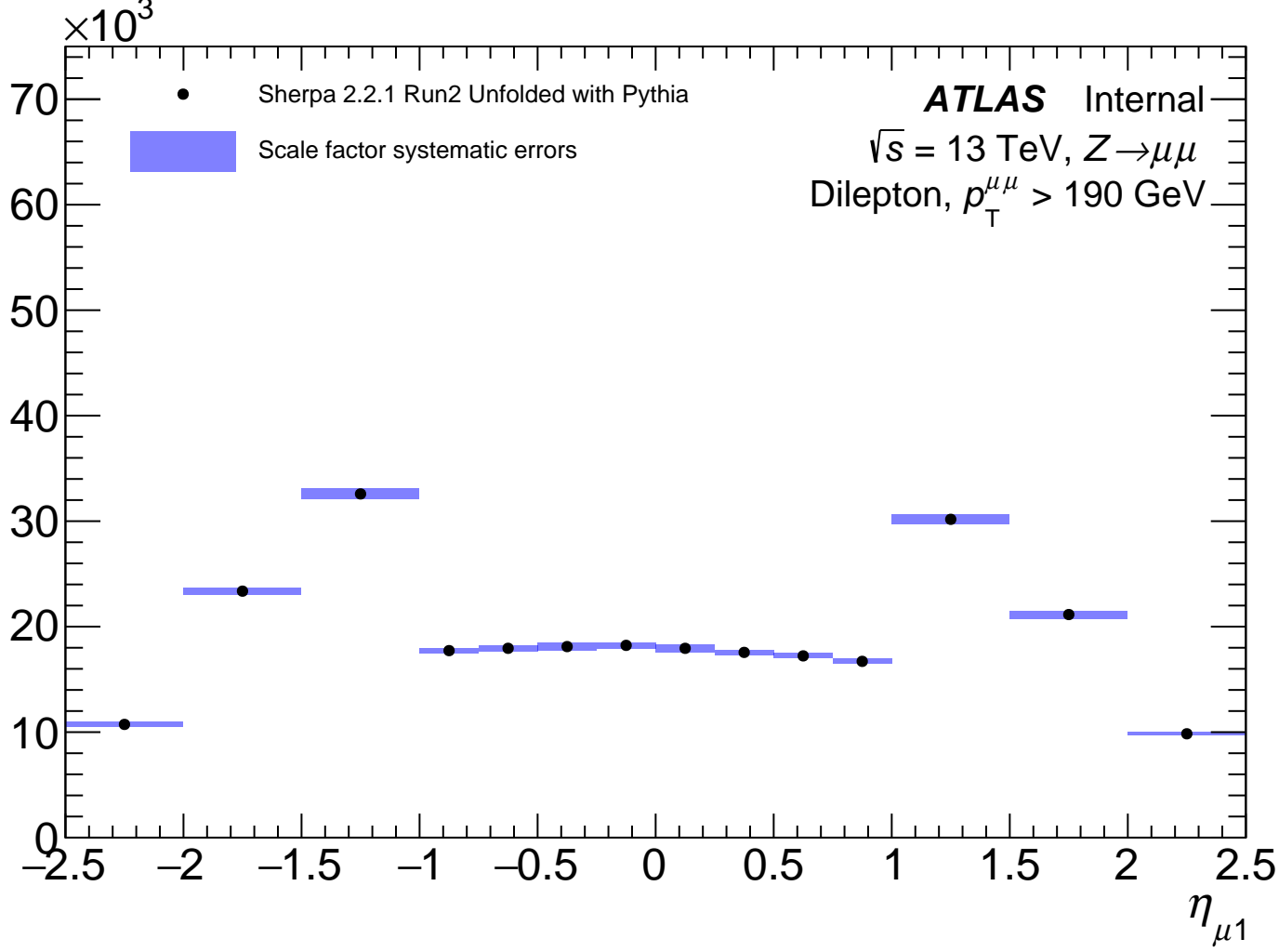
Events



Events

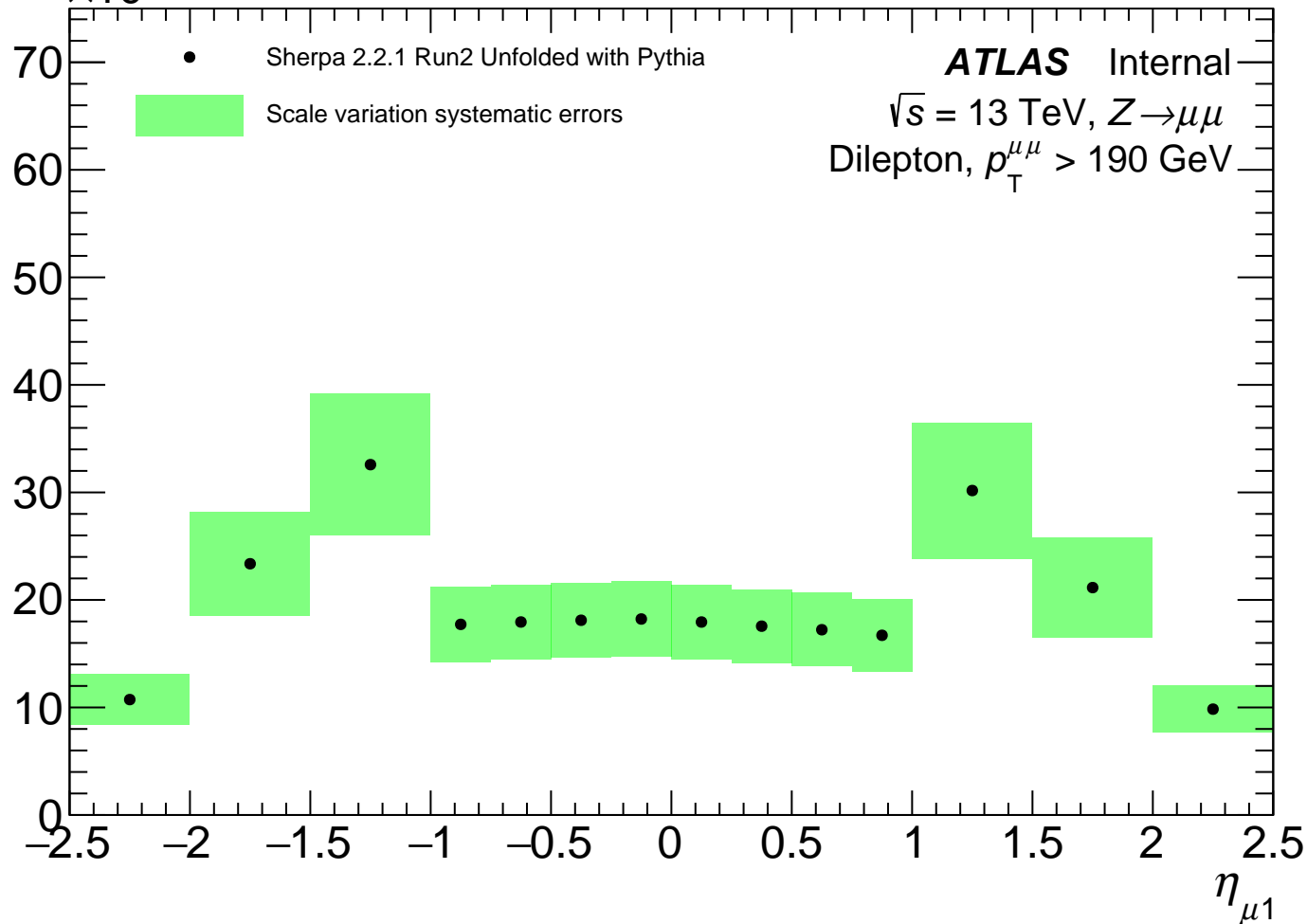


Events

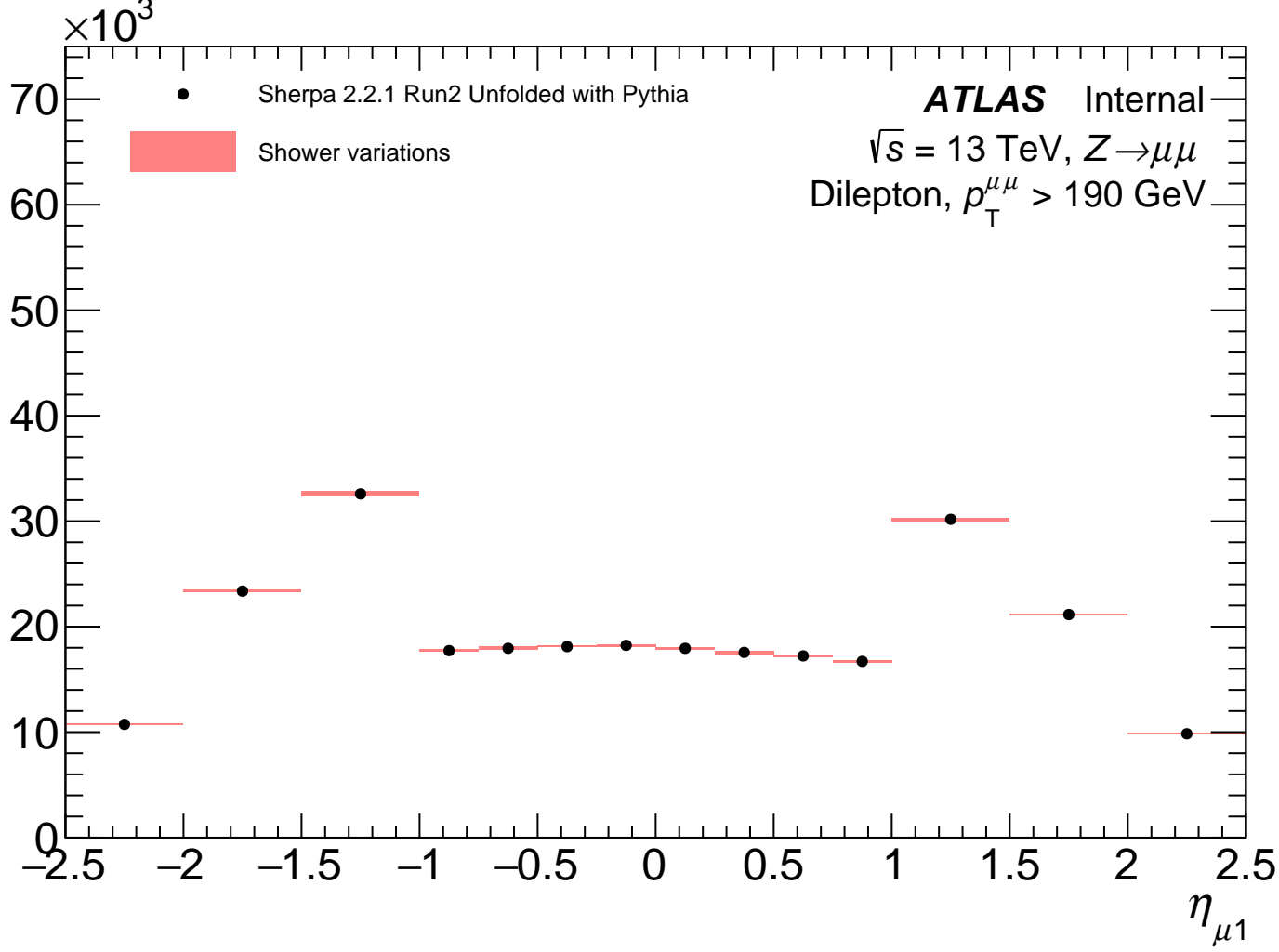


Events

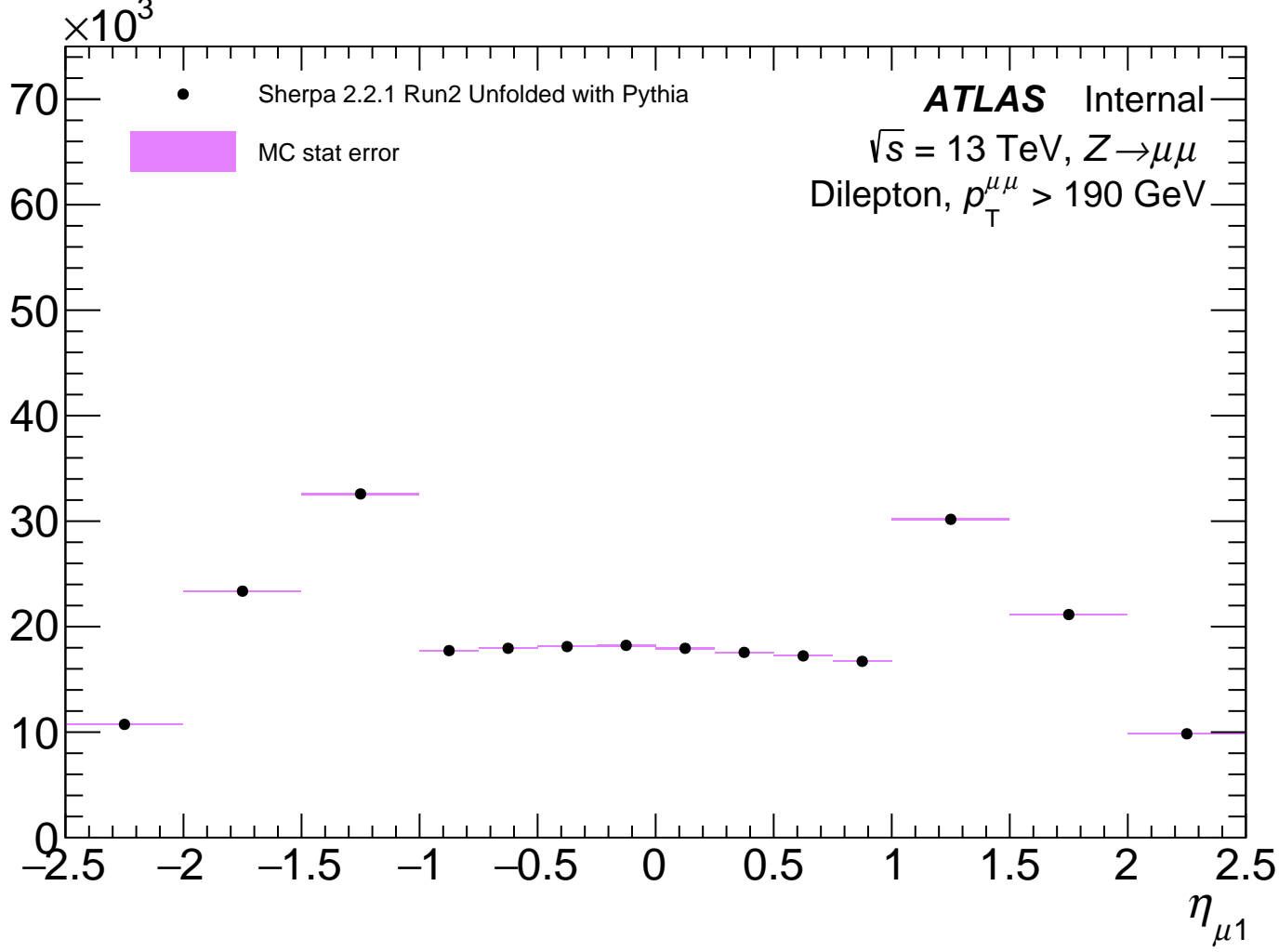
$\times 10^3$



Events

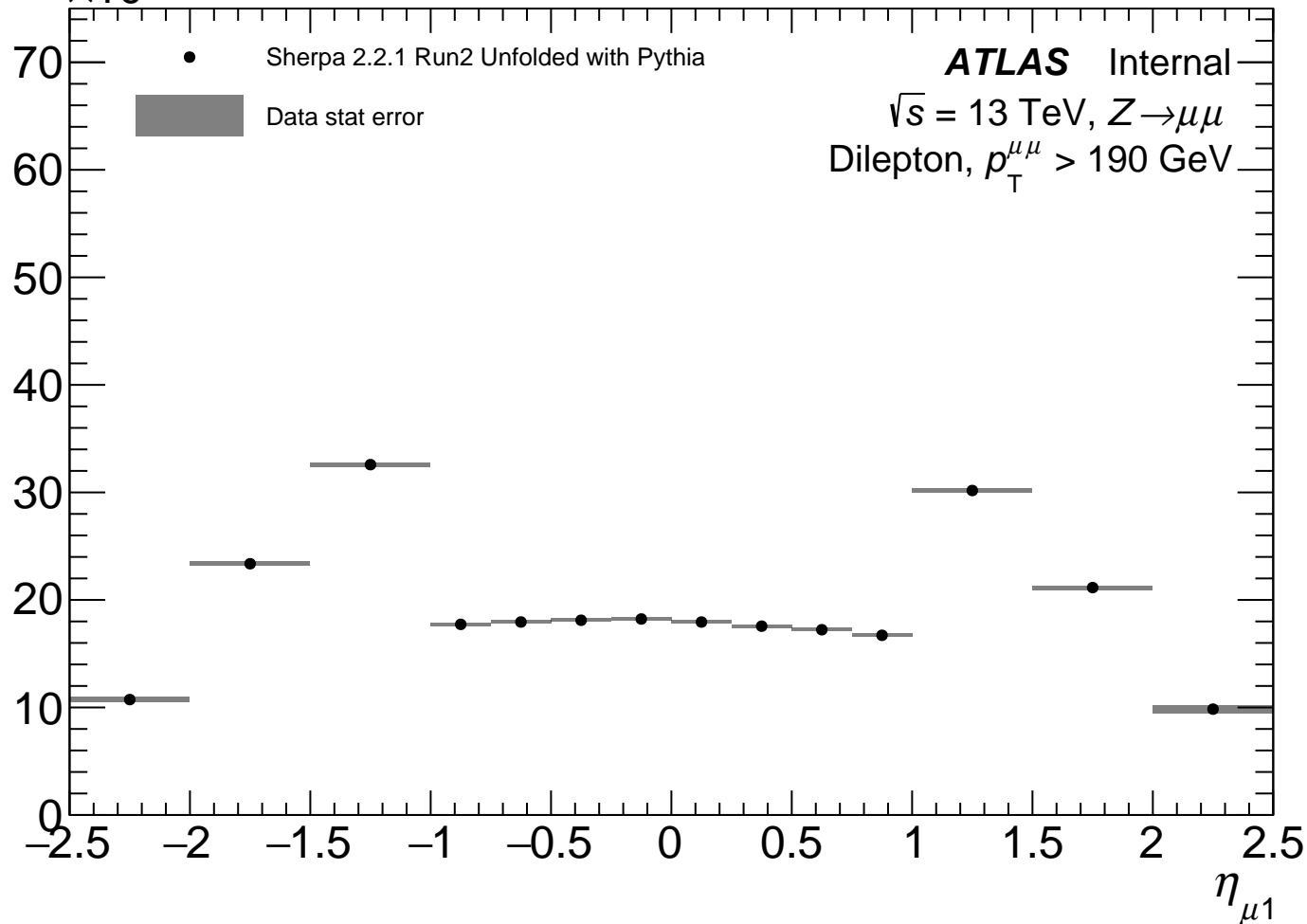


Events

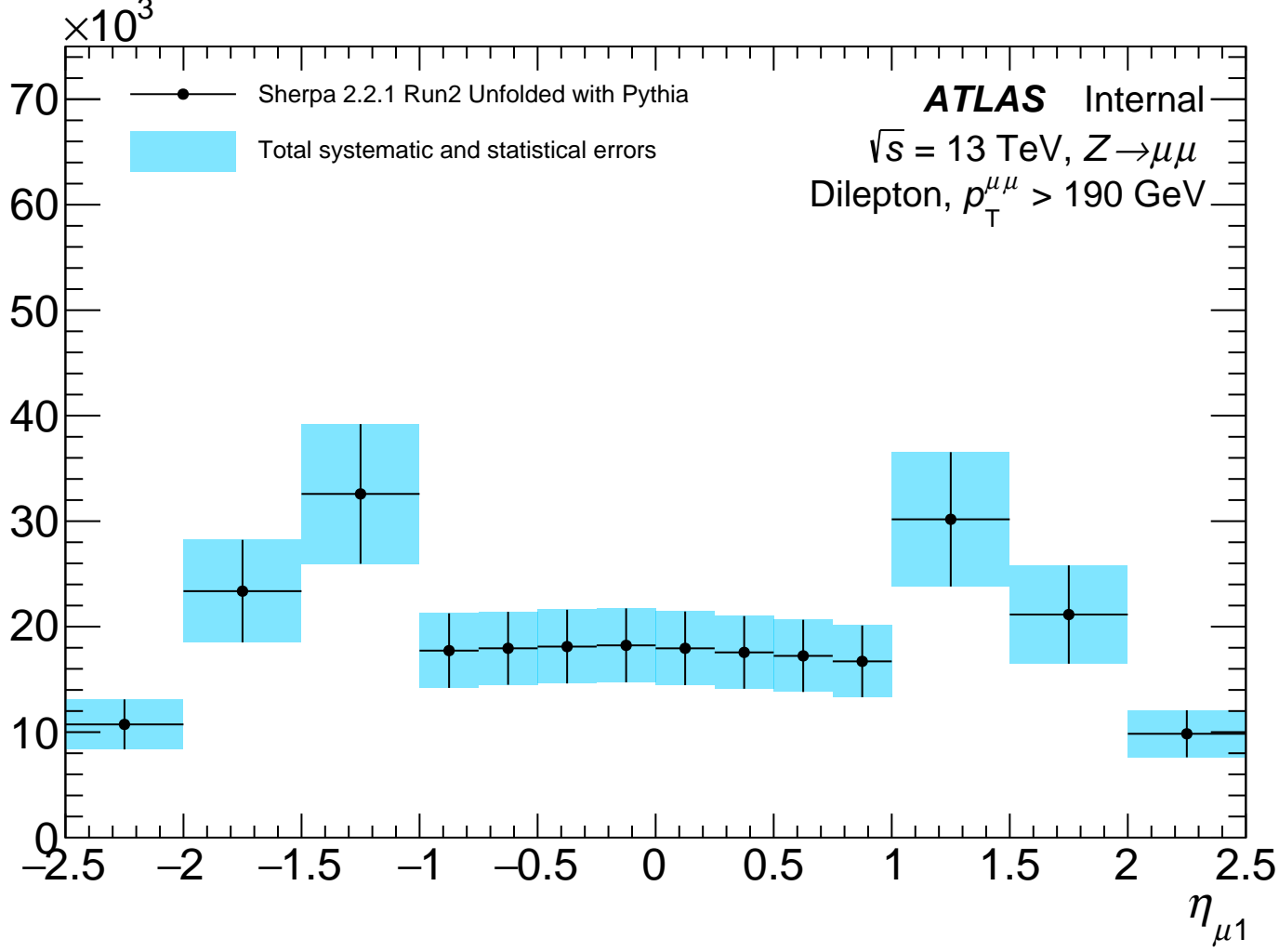


Events

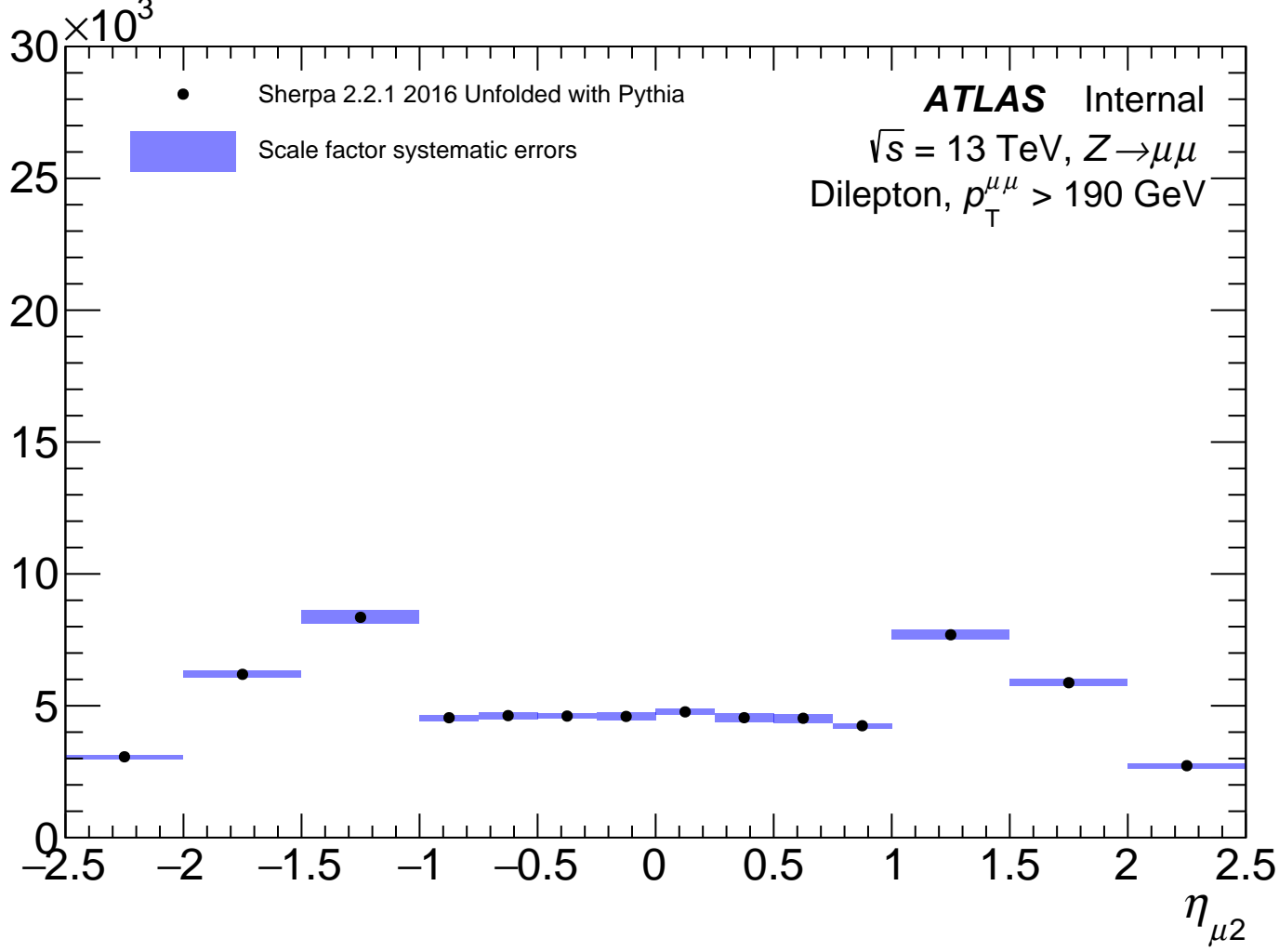
$\times 10^3$



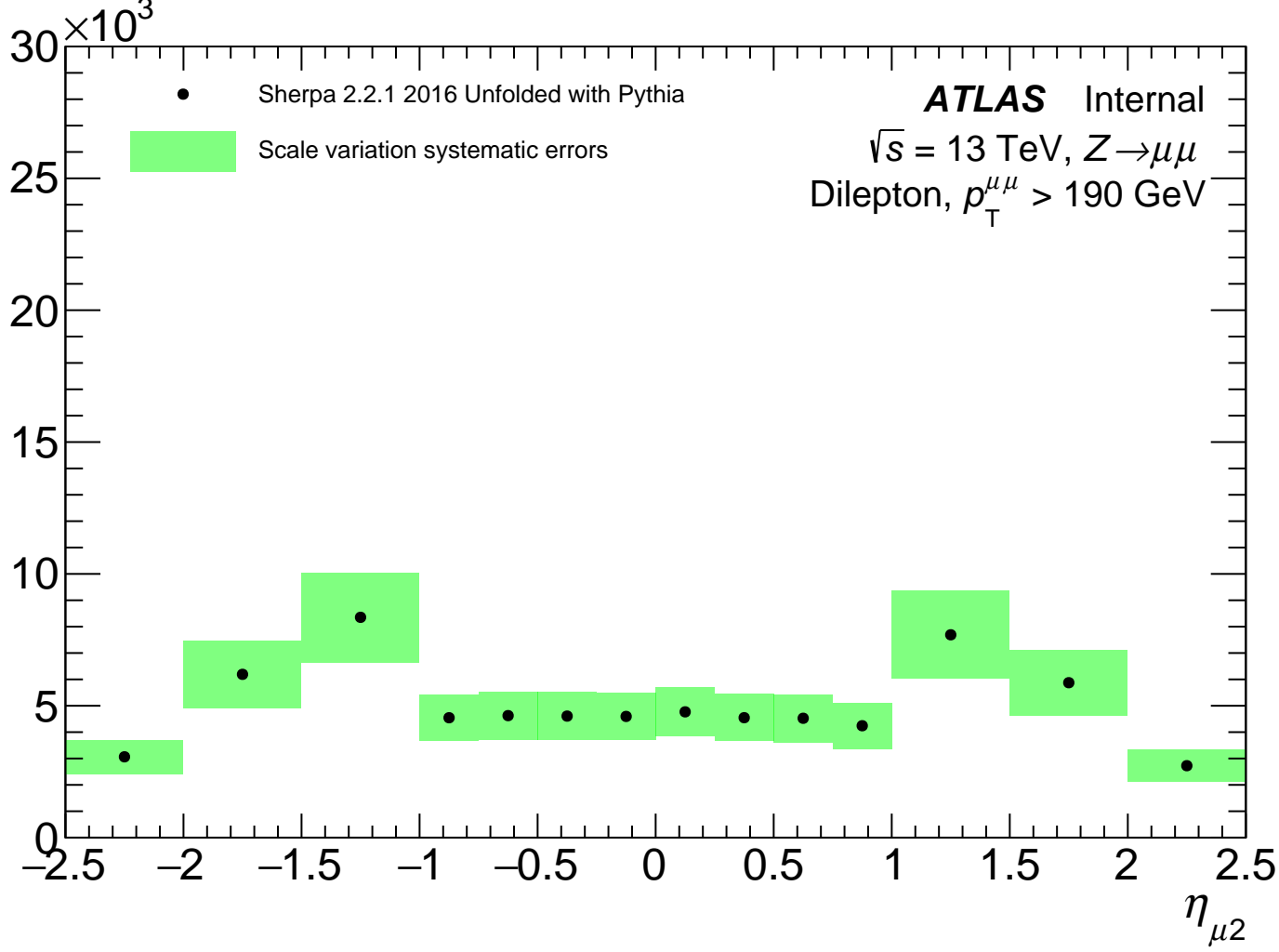
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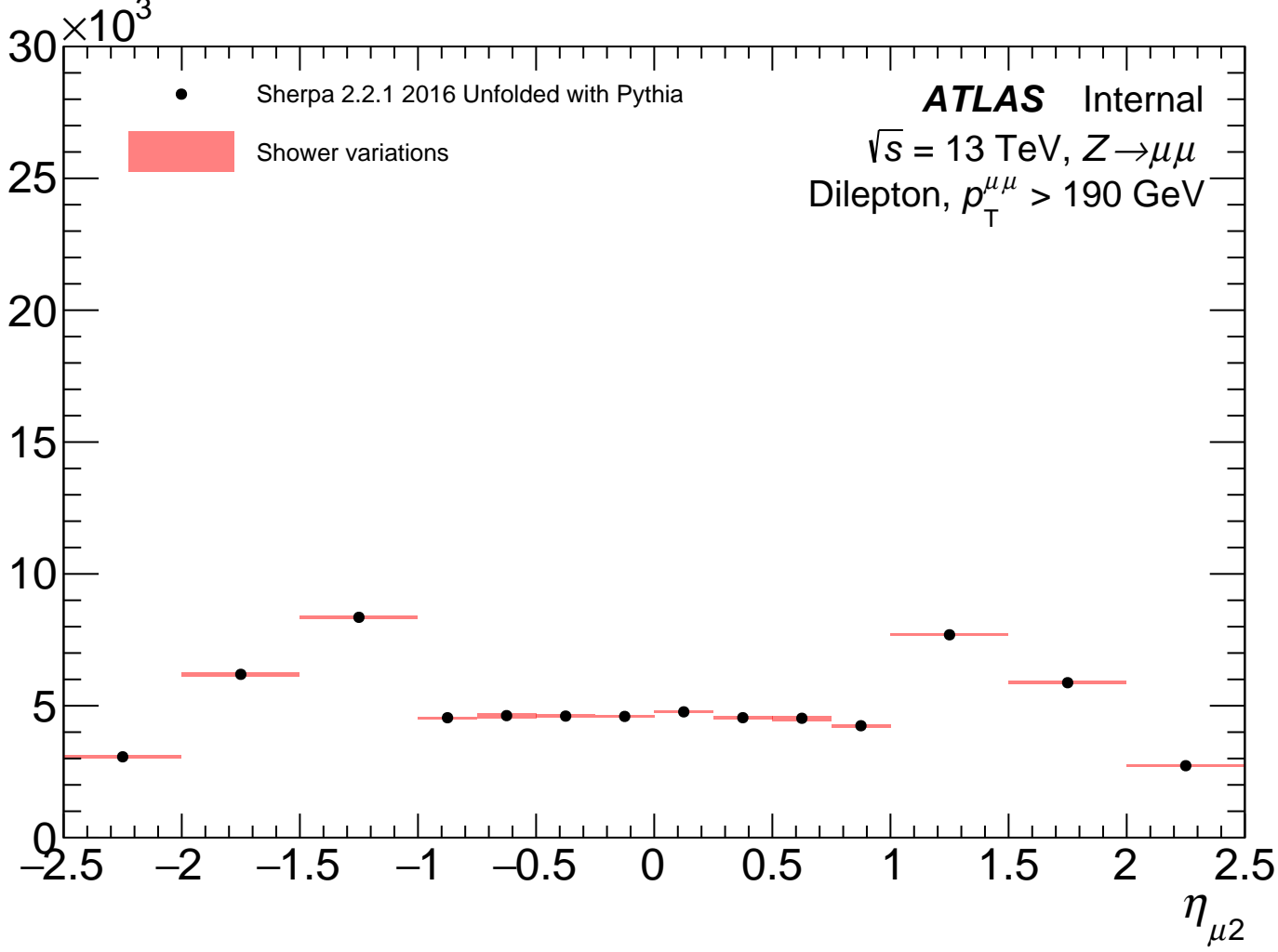
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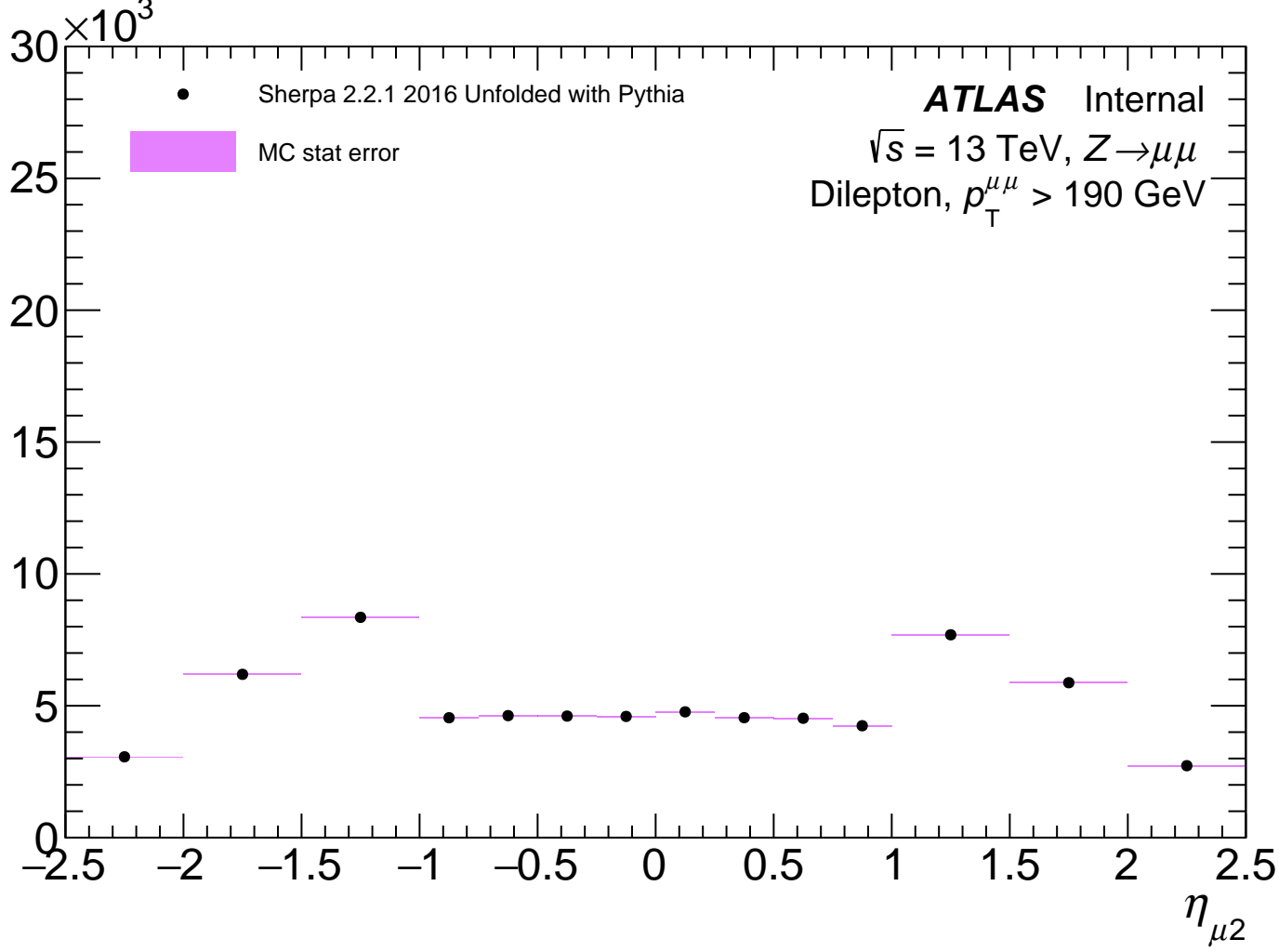
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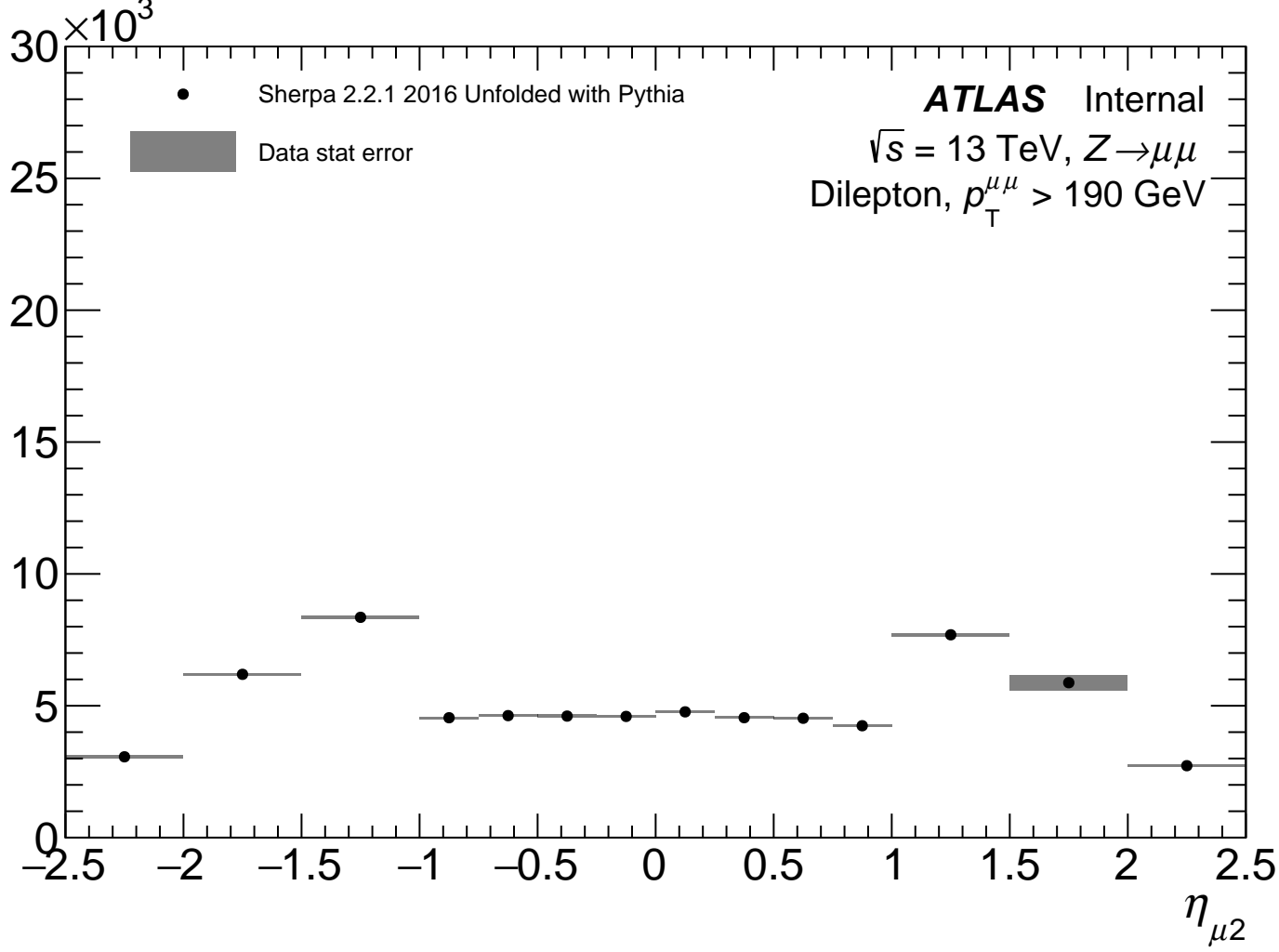
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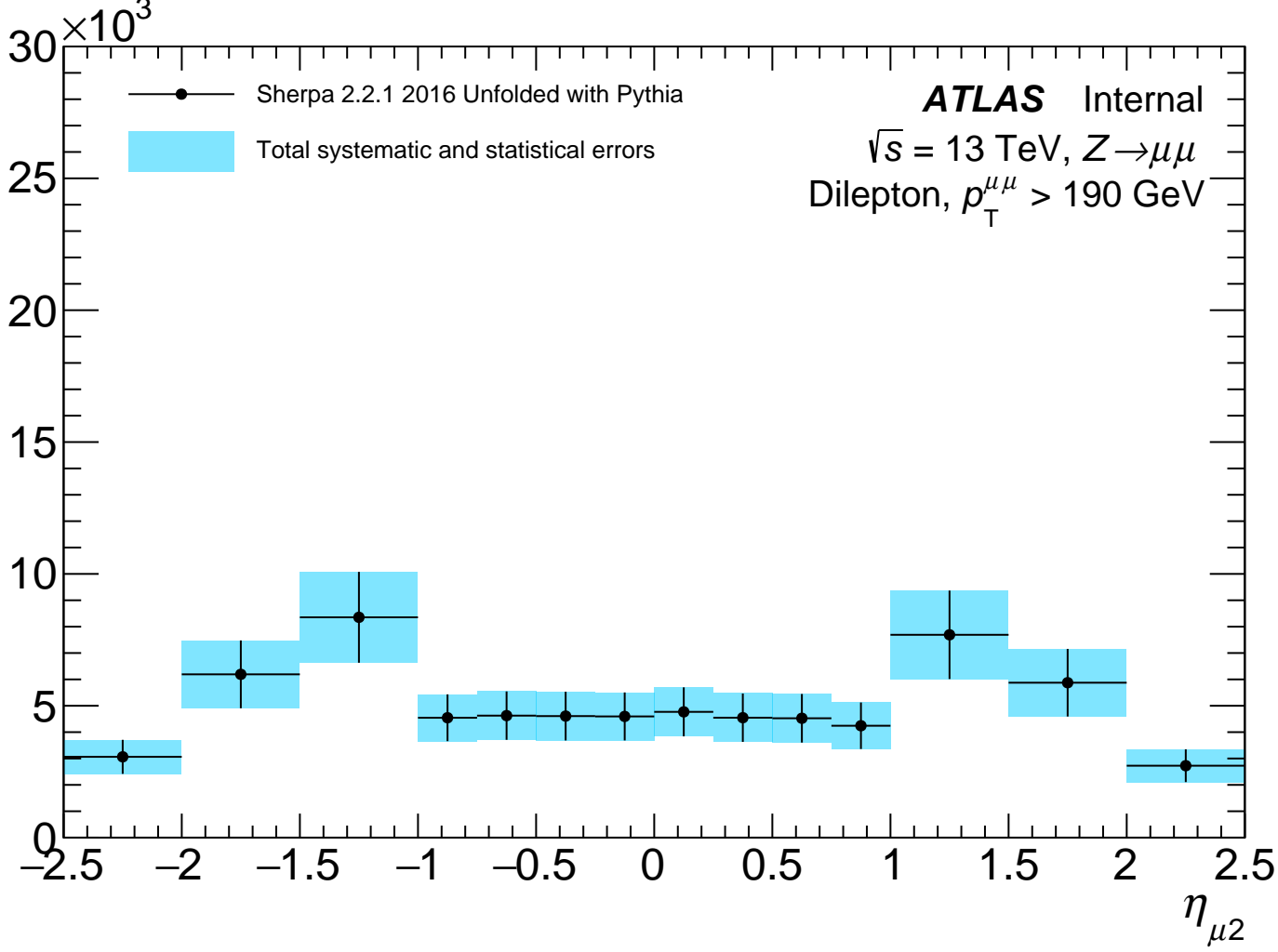
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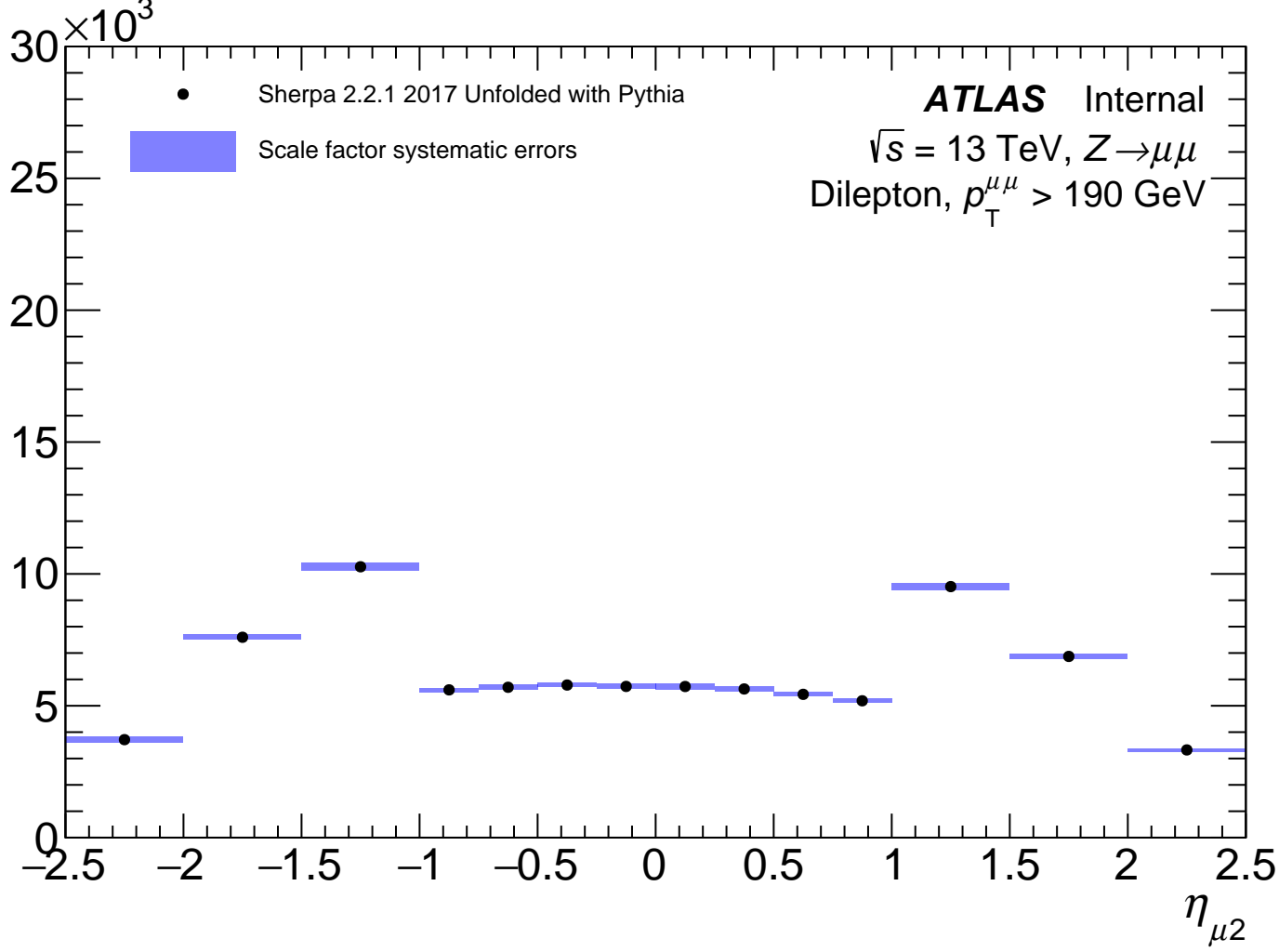
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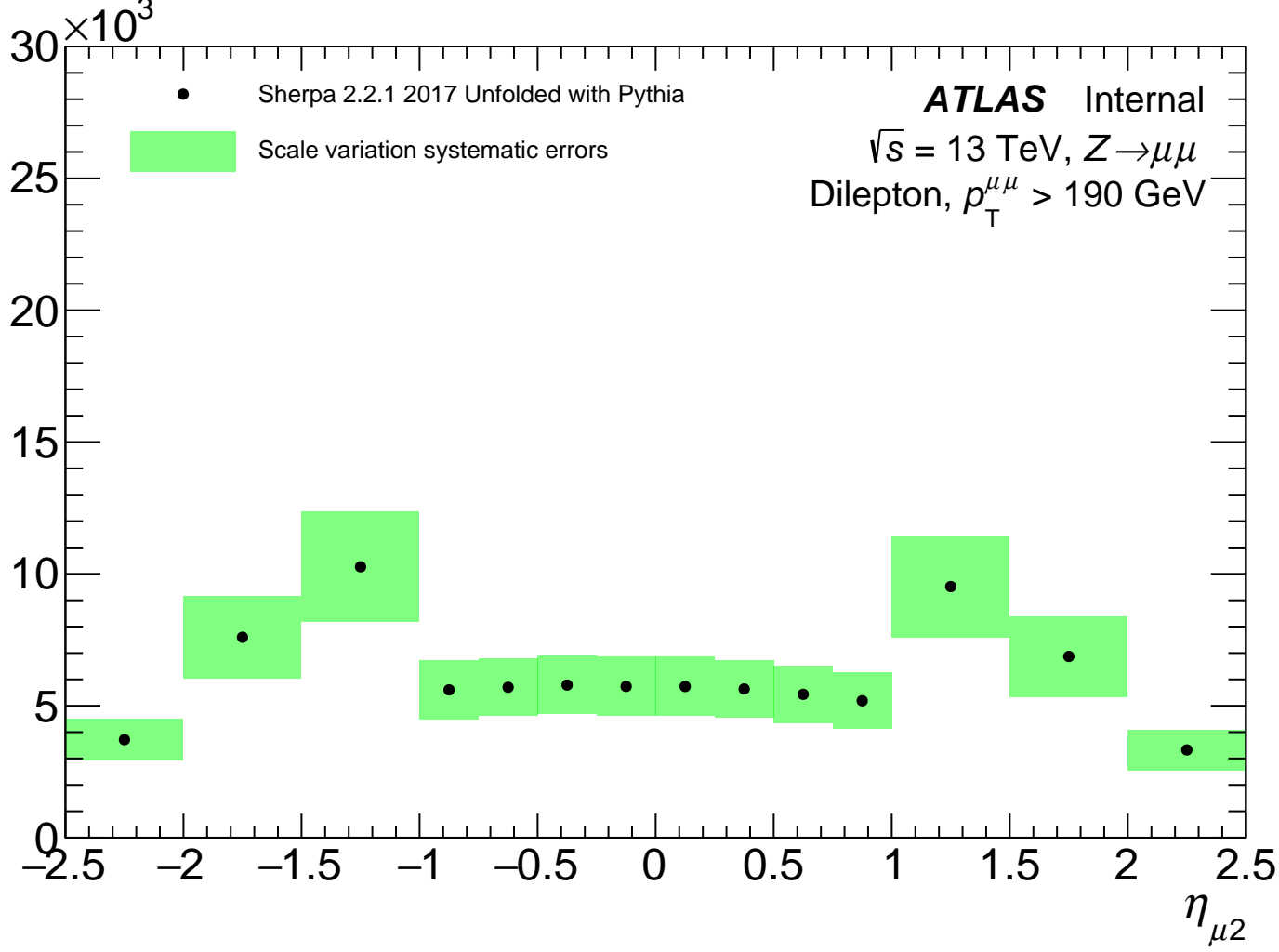
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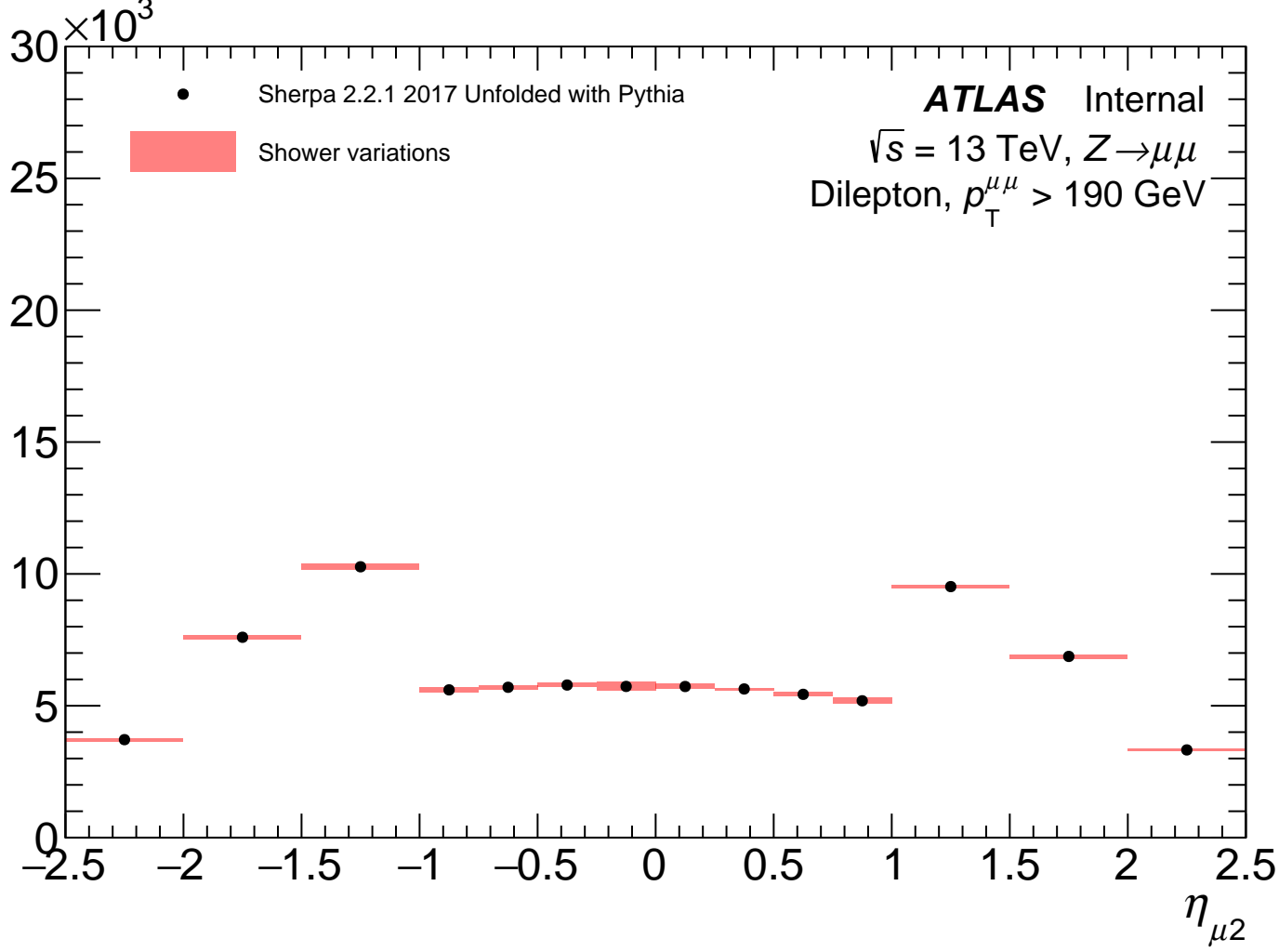
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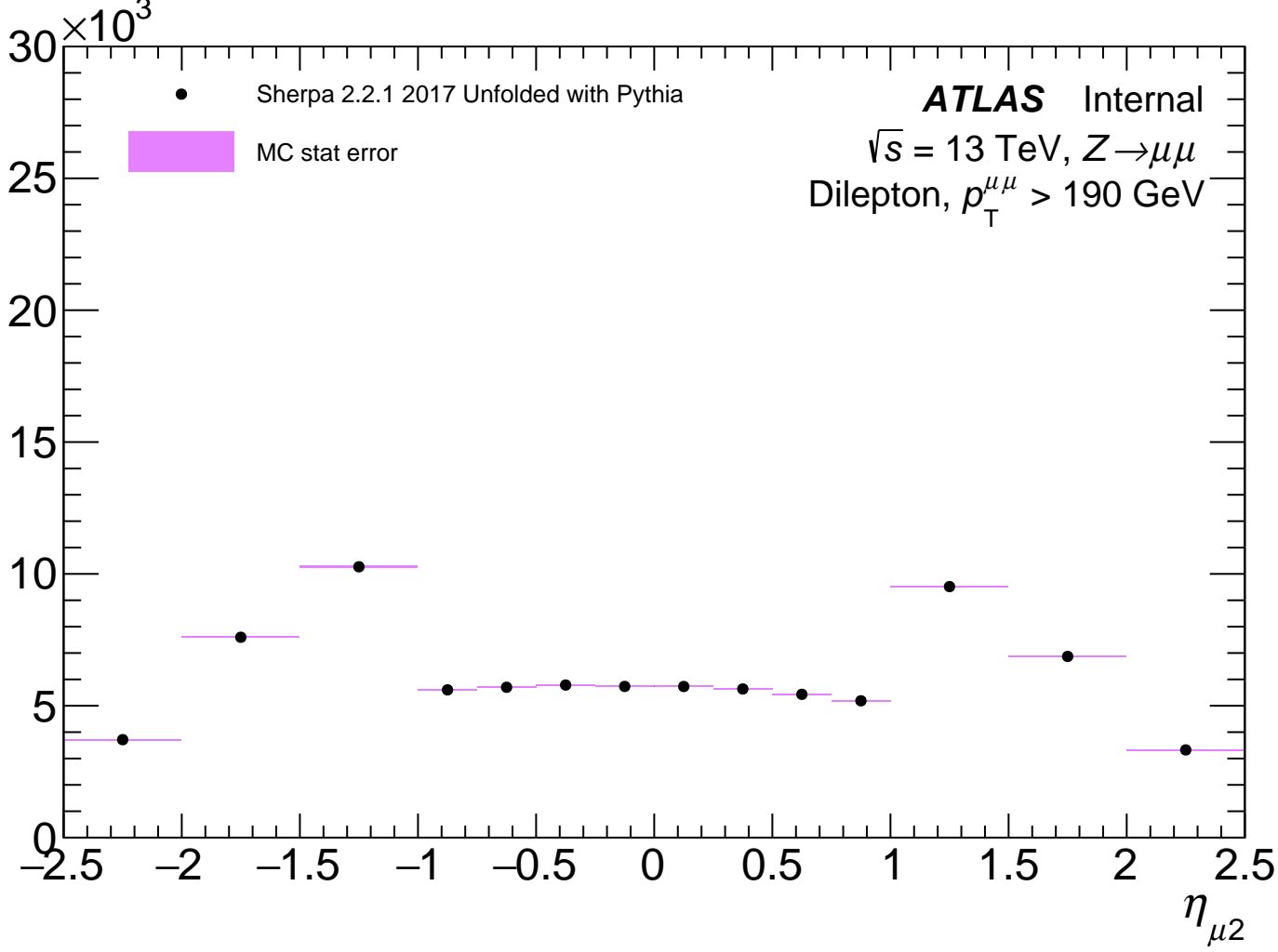
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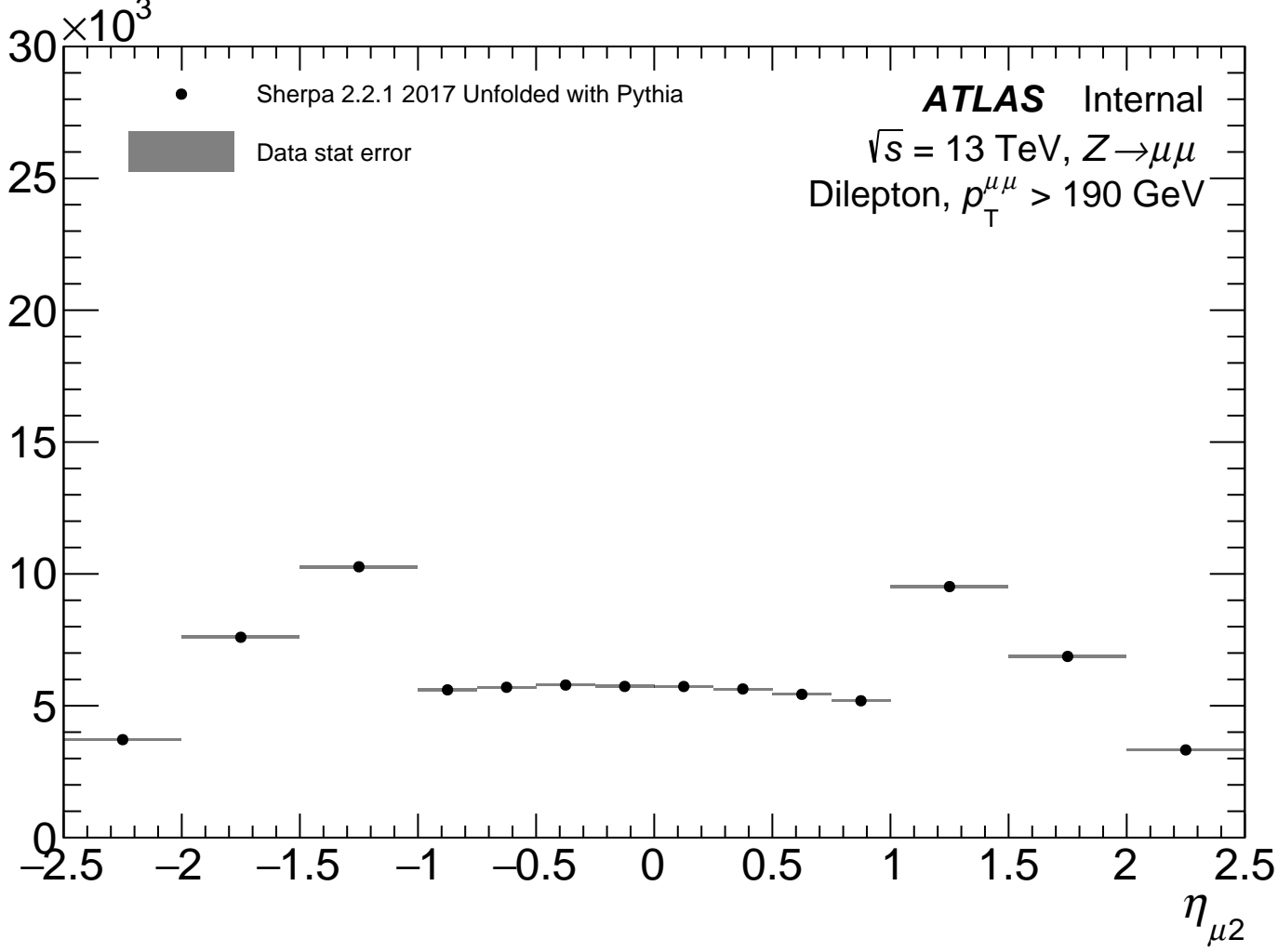
Events



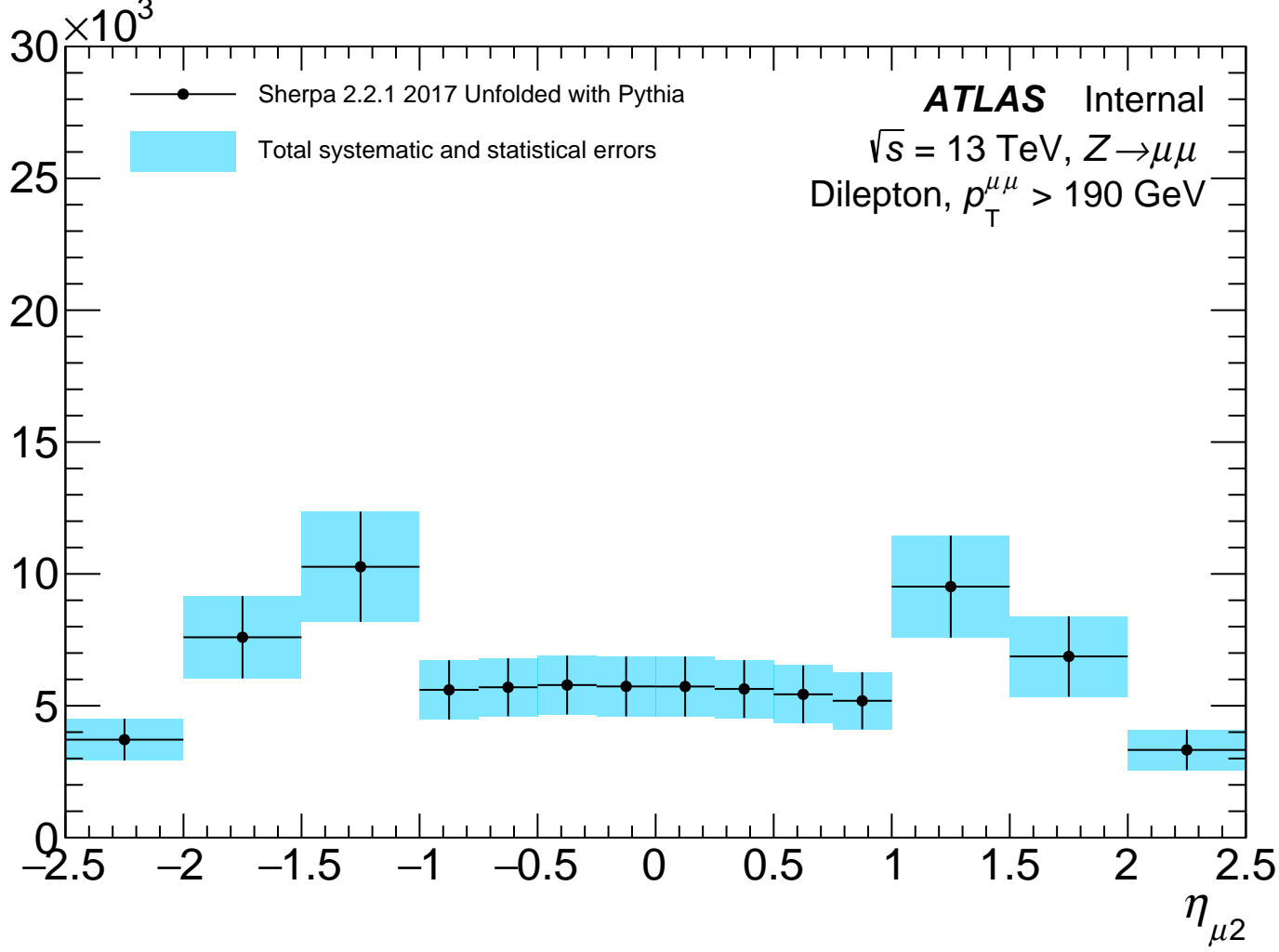
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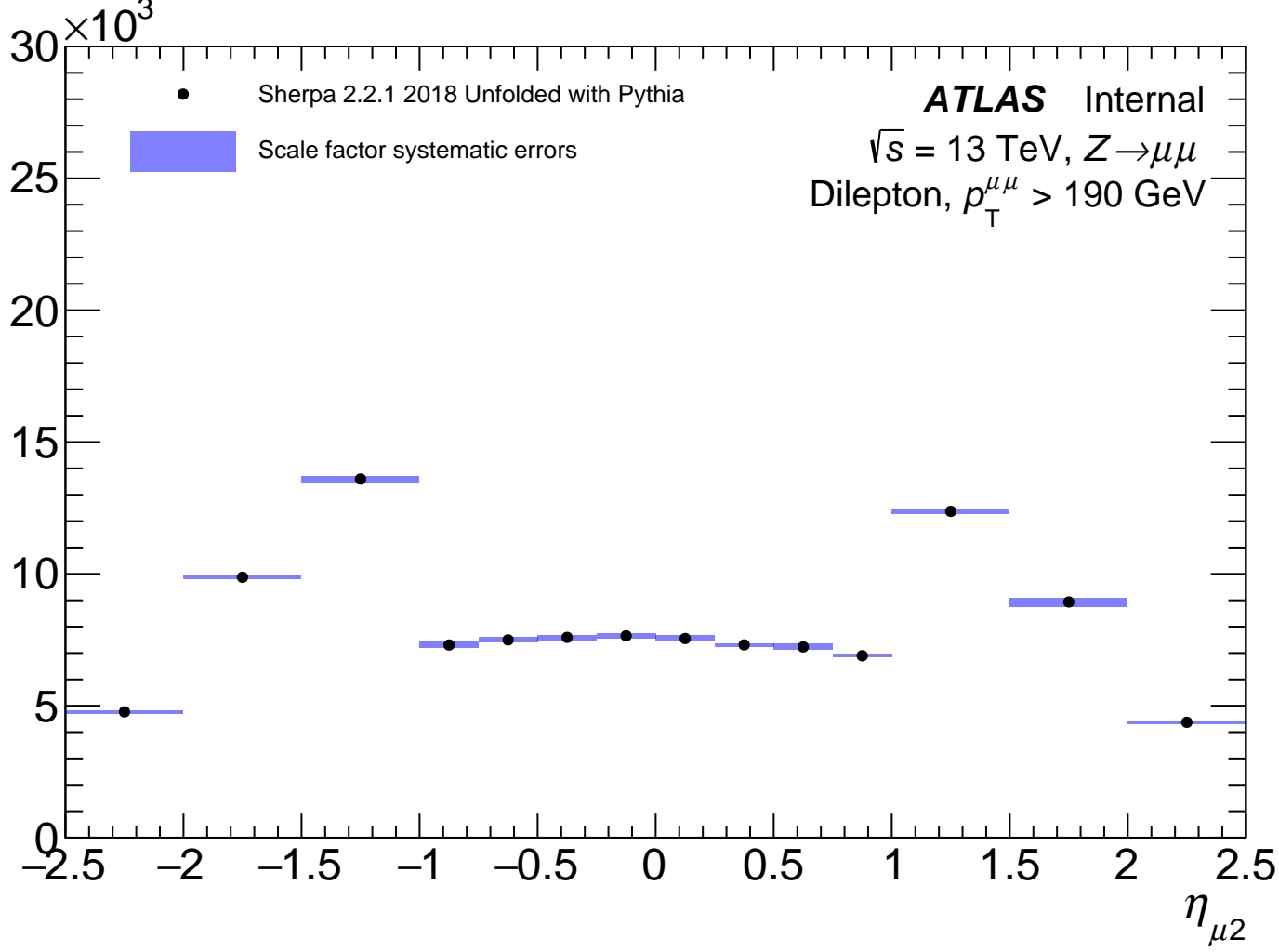
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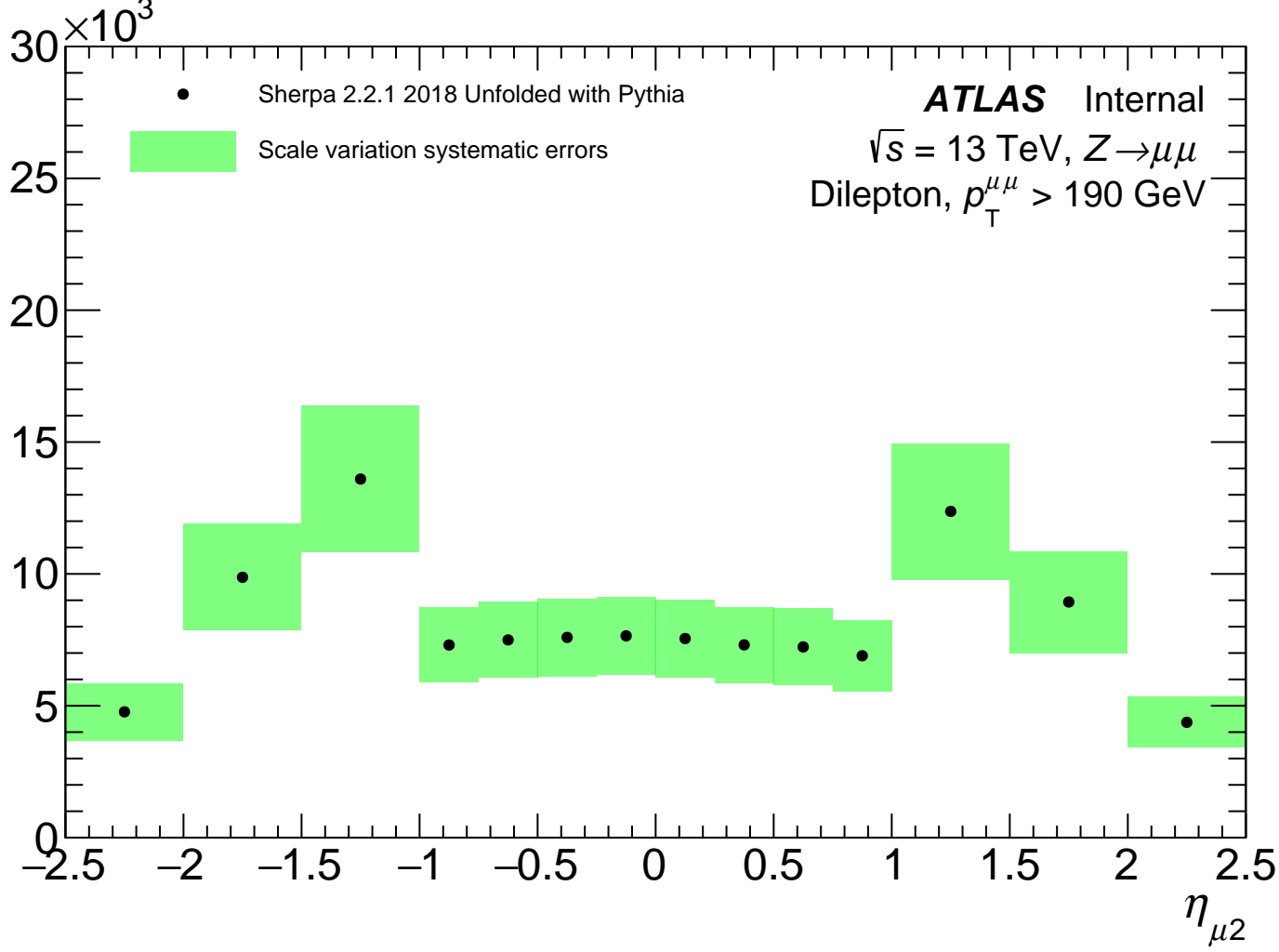
Events



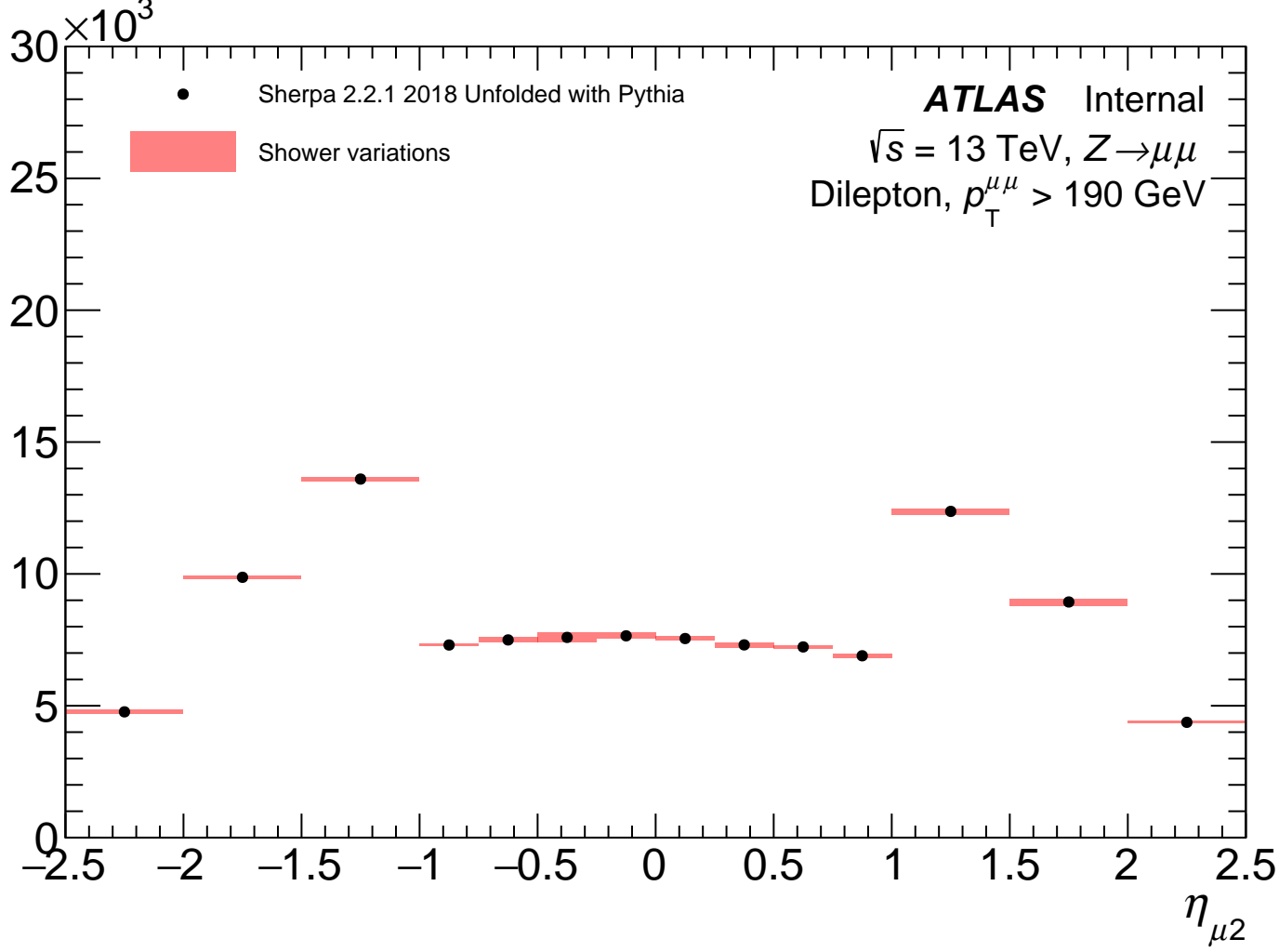
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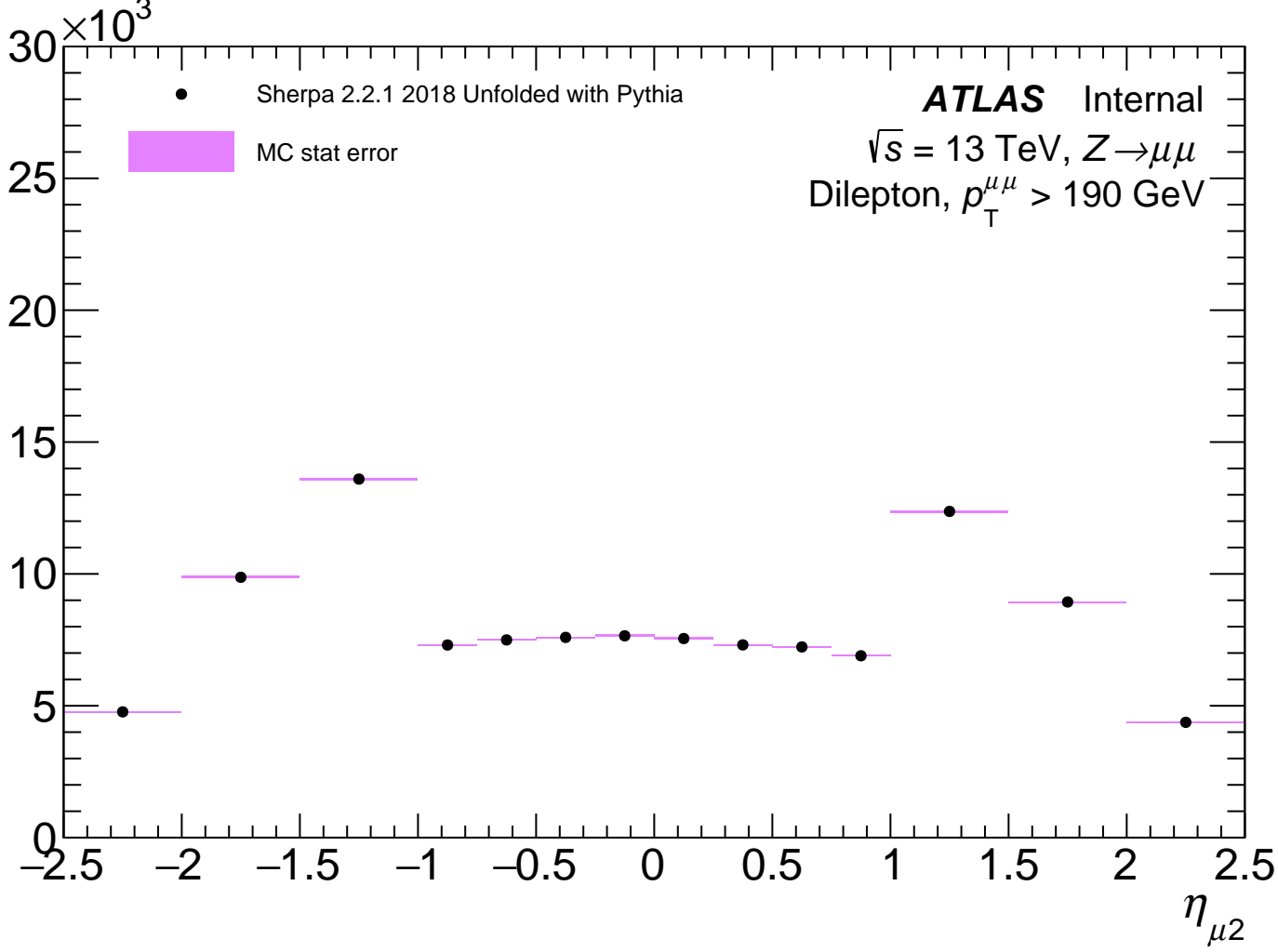
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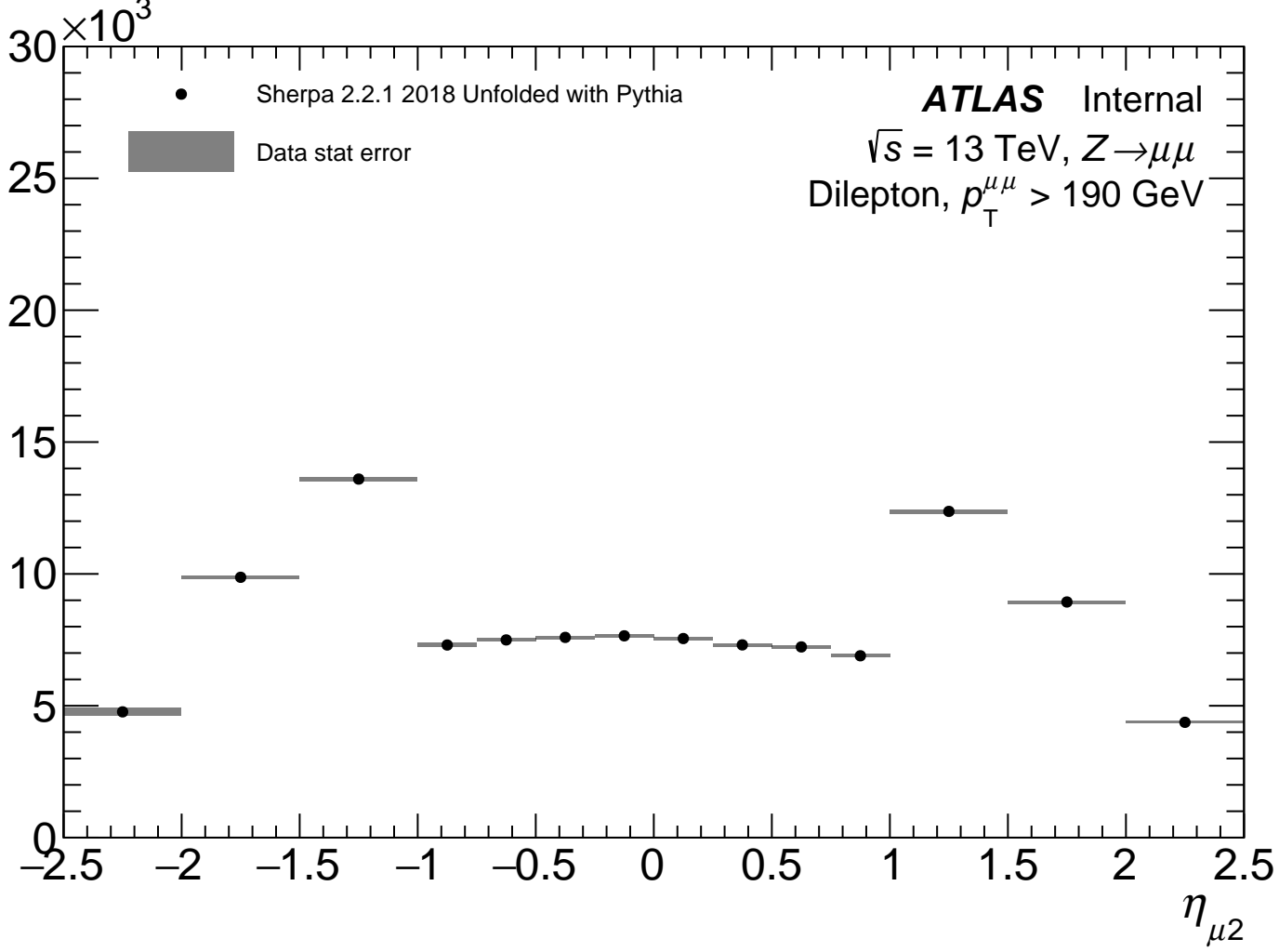
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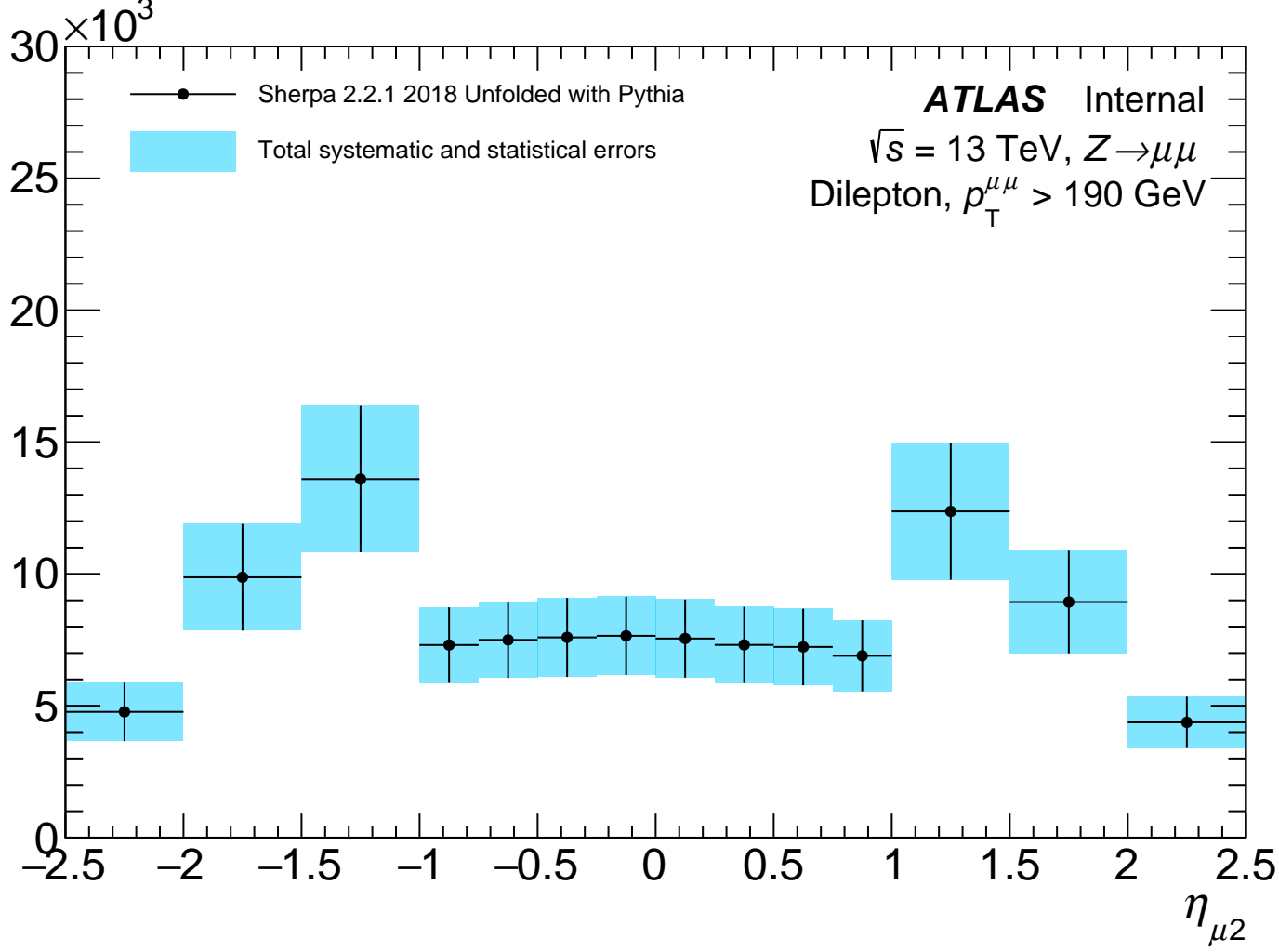
Events



Events

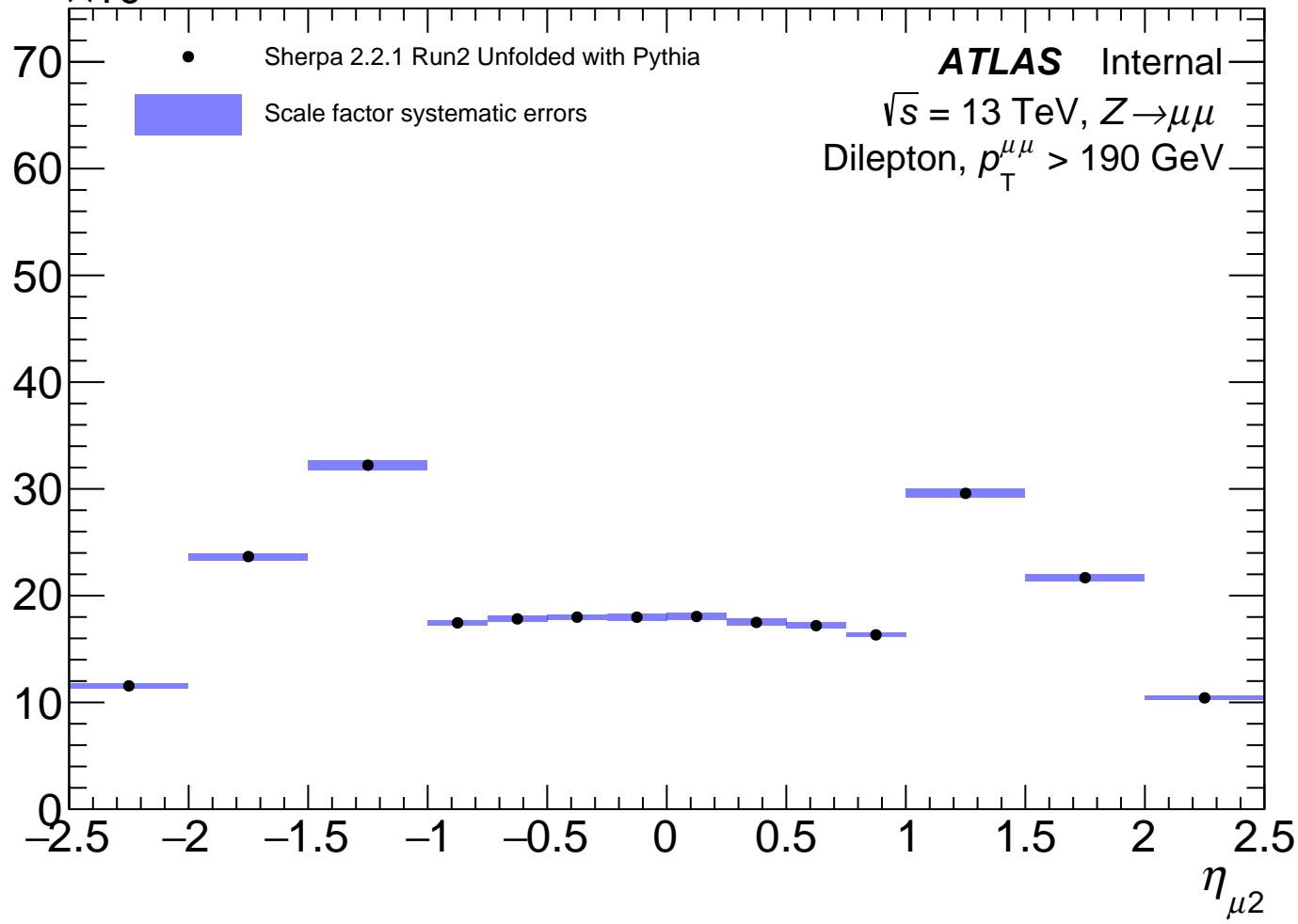


Events



Events

$\times 10^3$



Events

$\times 10^3$

70

60

50

40

30

20

10

0

• Sherpa 2.2.1 Run2 Unfolded with Pythia

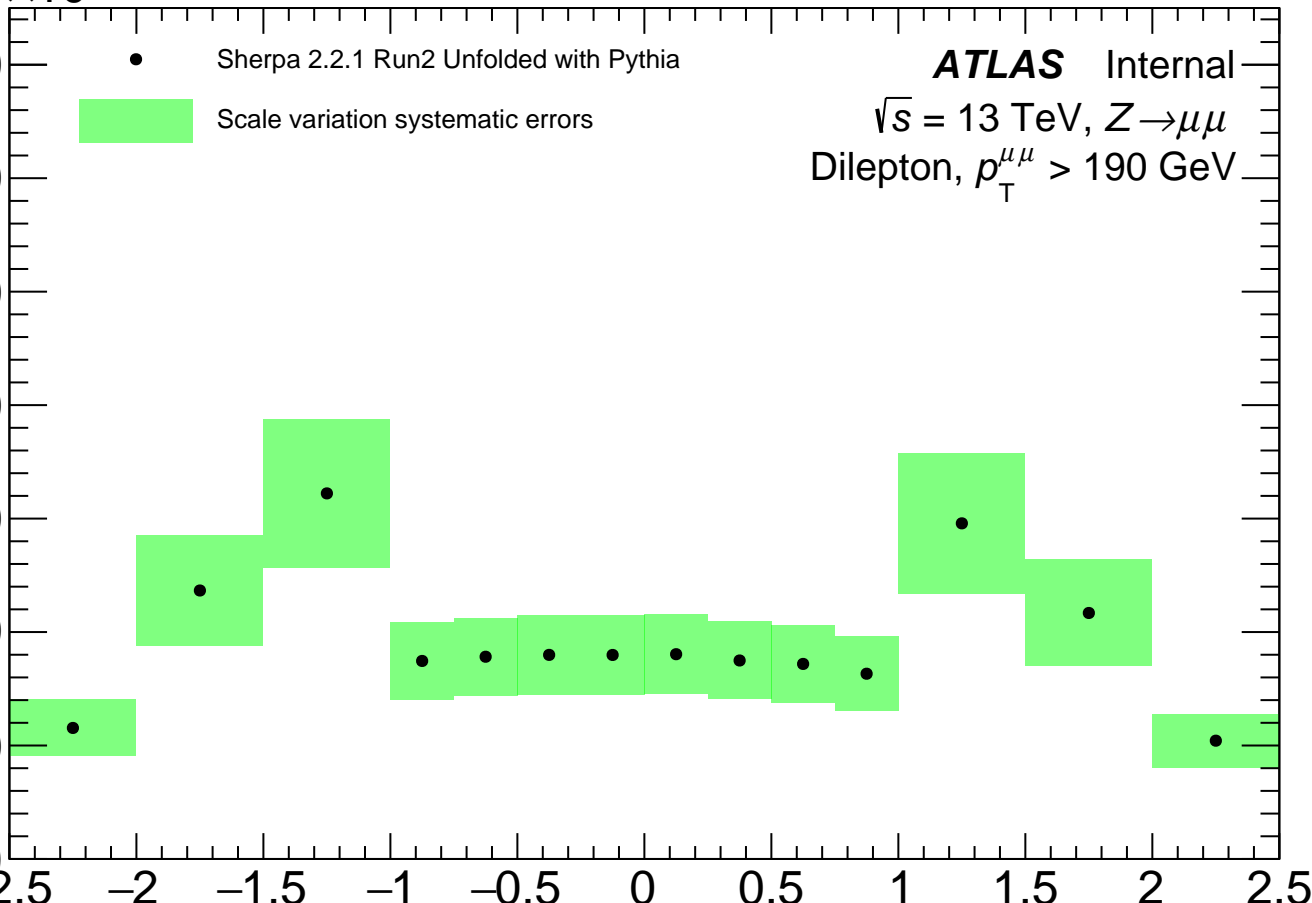
Scale variation systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

$\eta_{\mu 2}$



Events

$\times 10^3$

70

60

50

40

30

20

10

0

•

Sherpa 2.2.1 Run2 Unfolded with Pythia



Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

-2.5

-2

-1.5

-1

-0.5

0

0.5

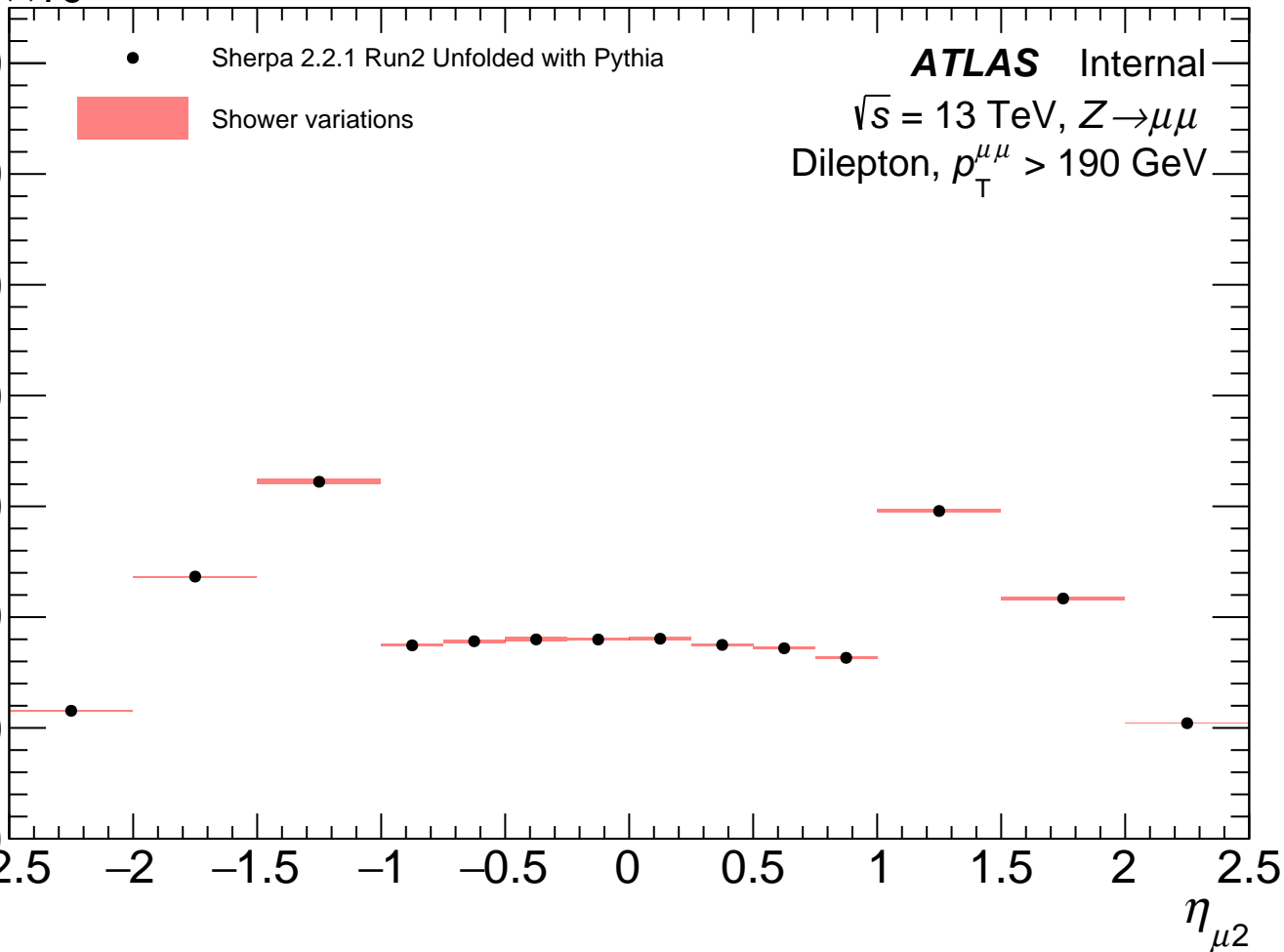
1

1.5

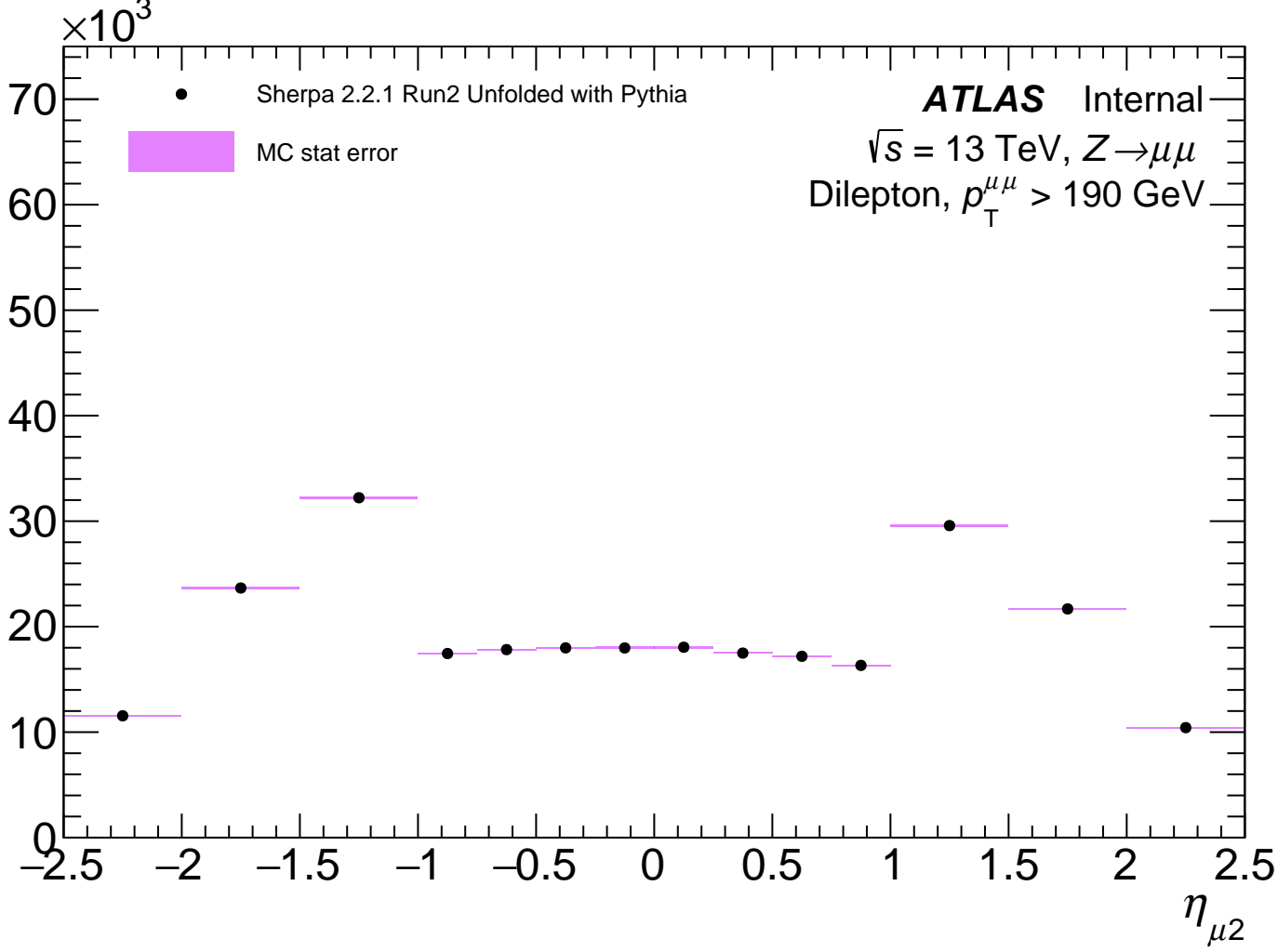
2

2.5

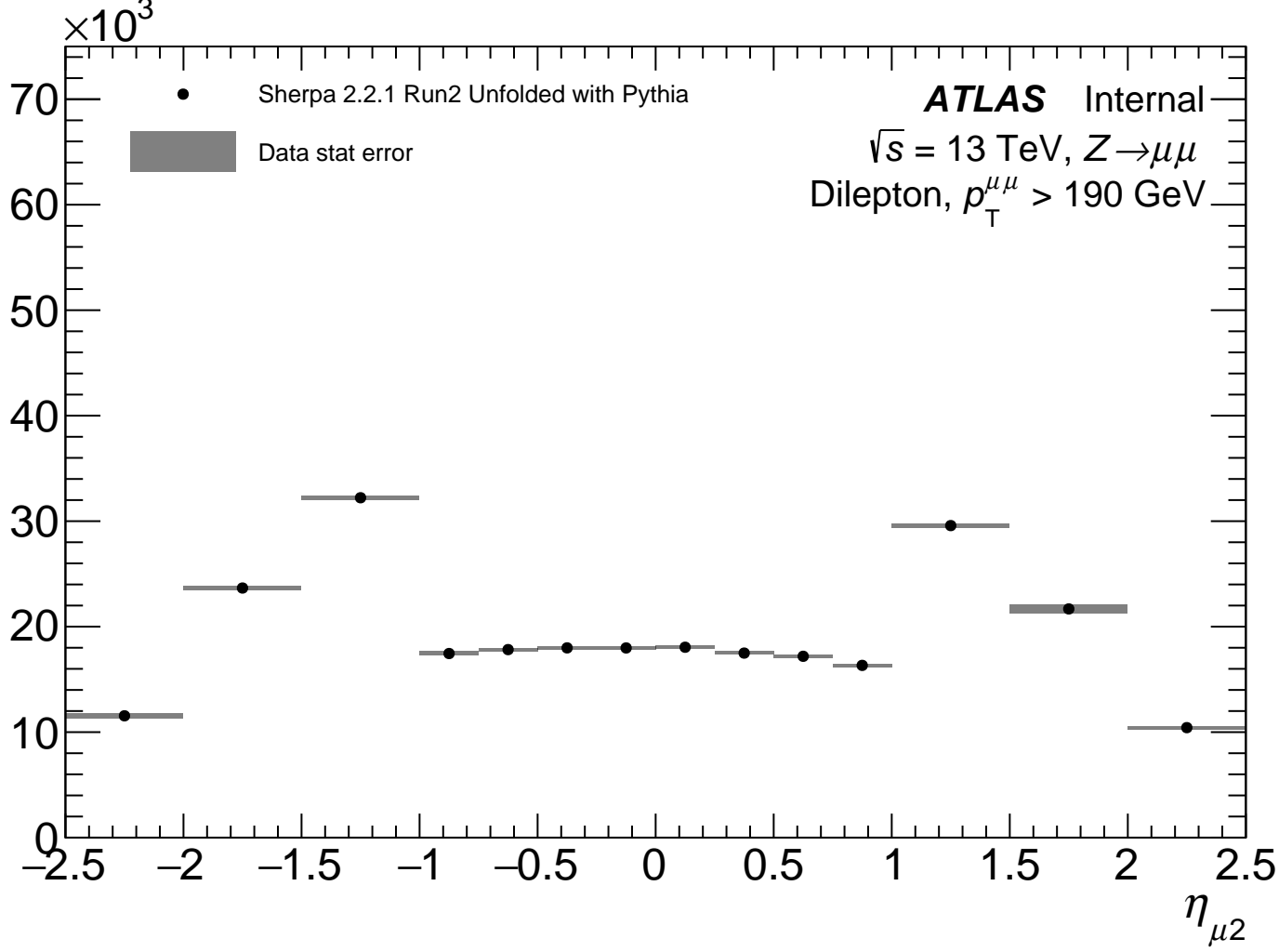
$\eta_{\mu 2}$



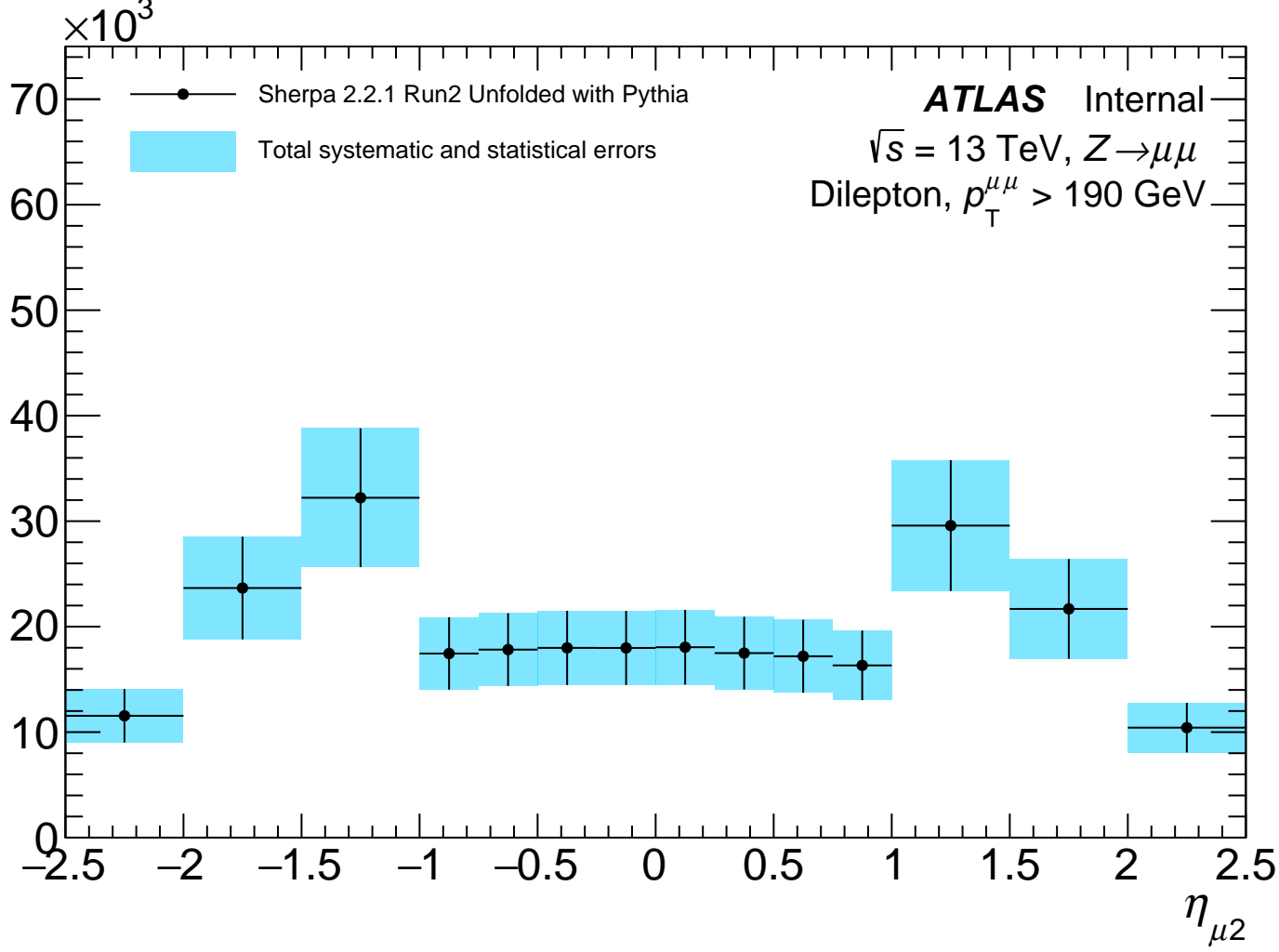
Events



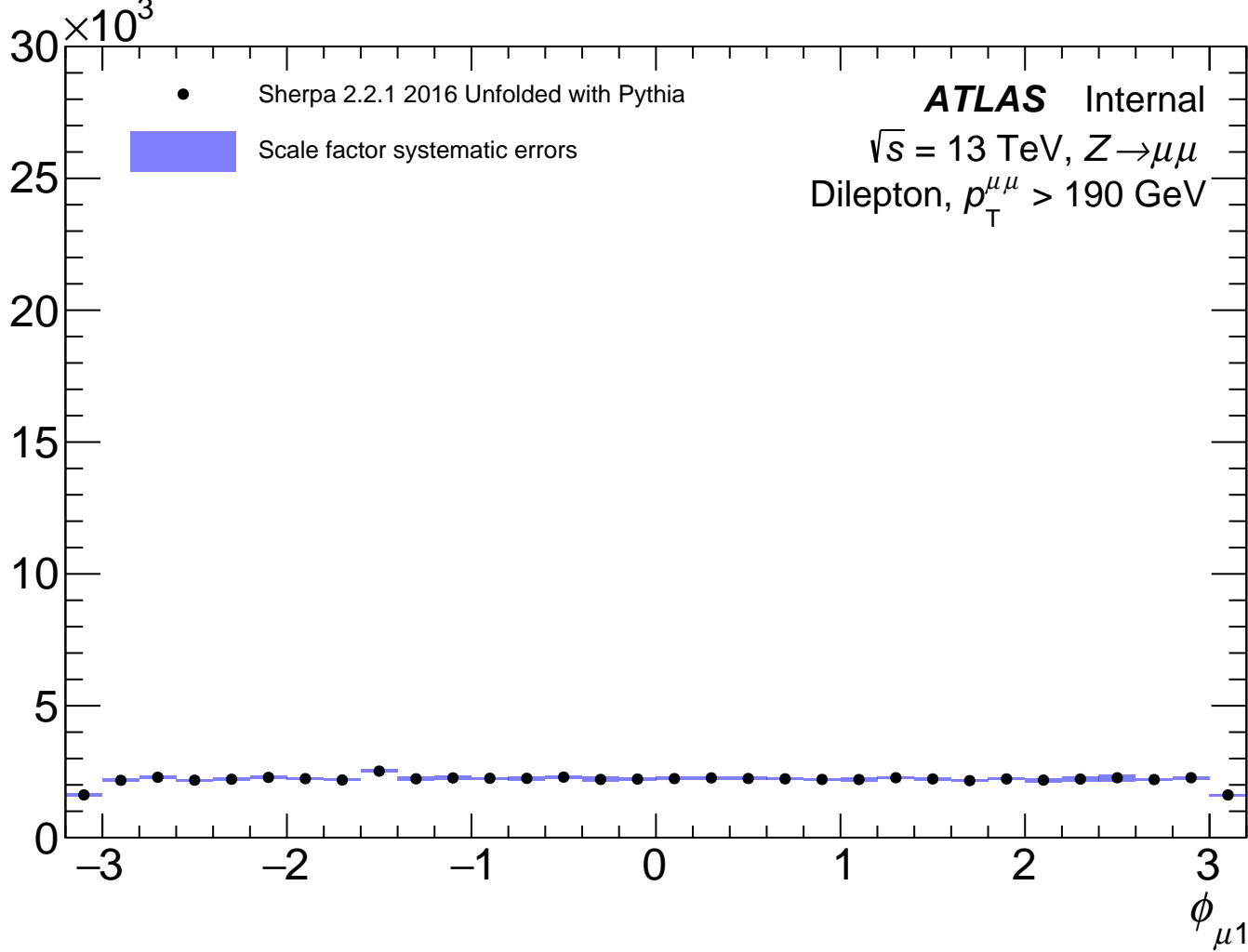
Events



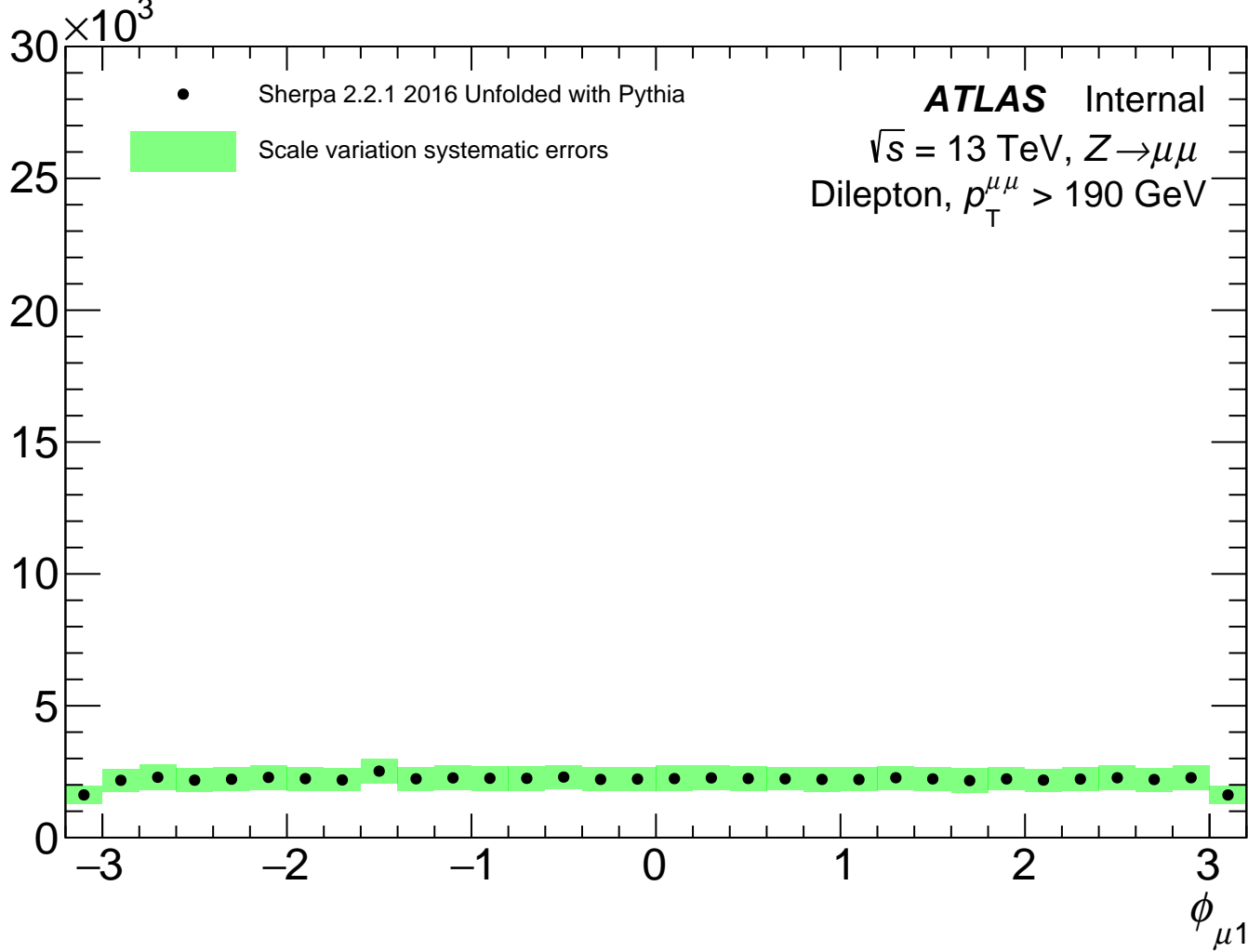
Events



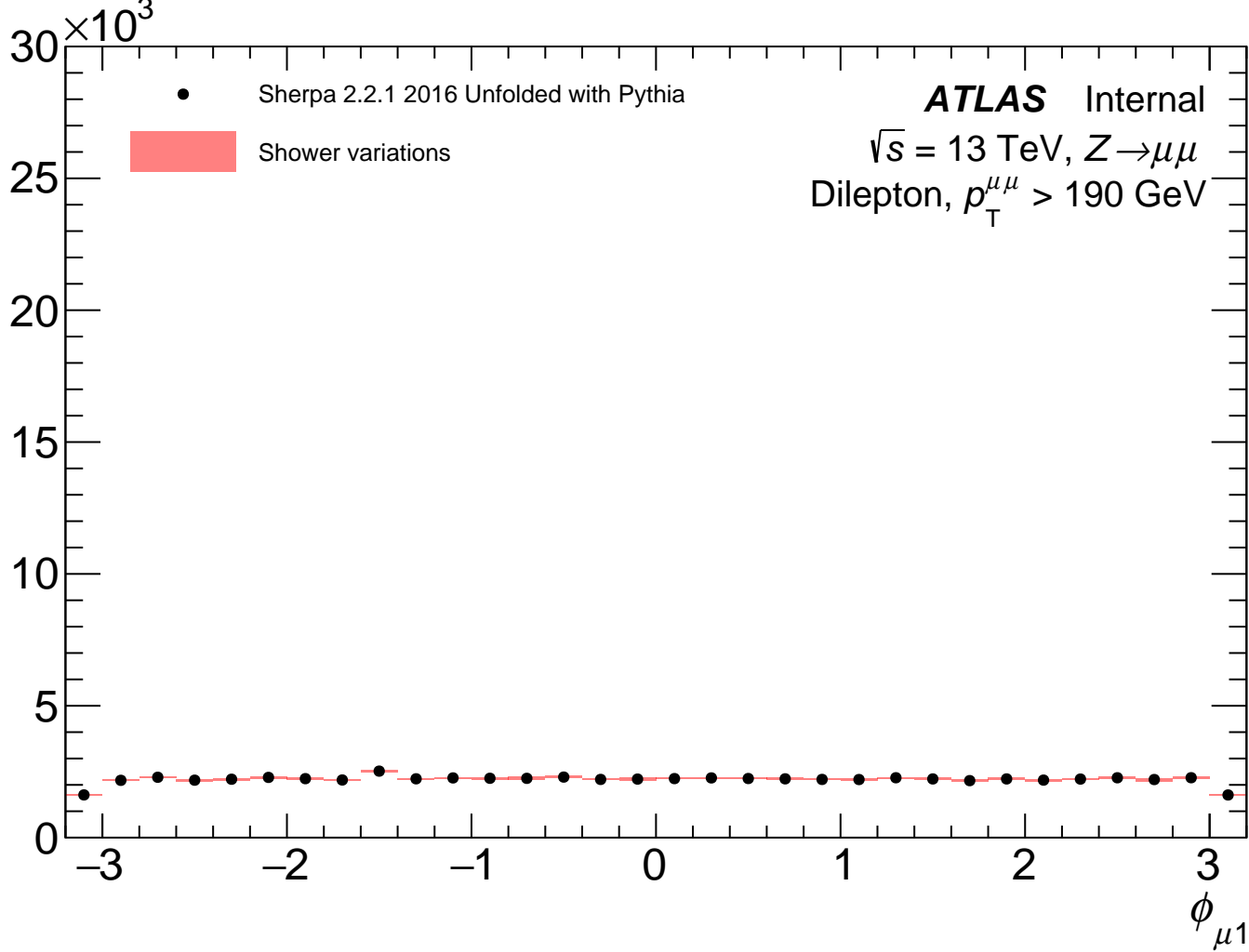
Events



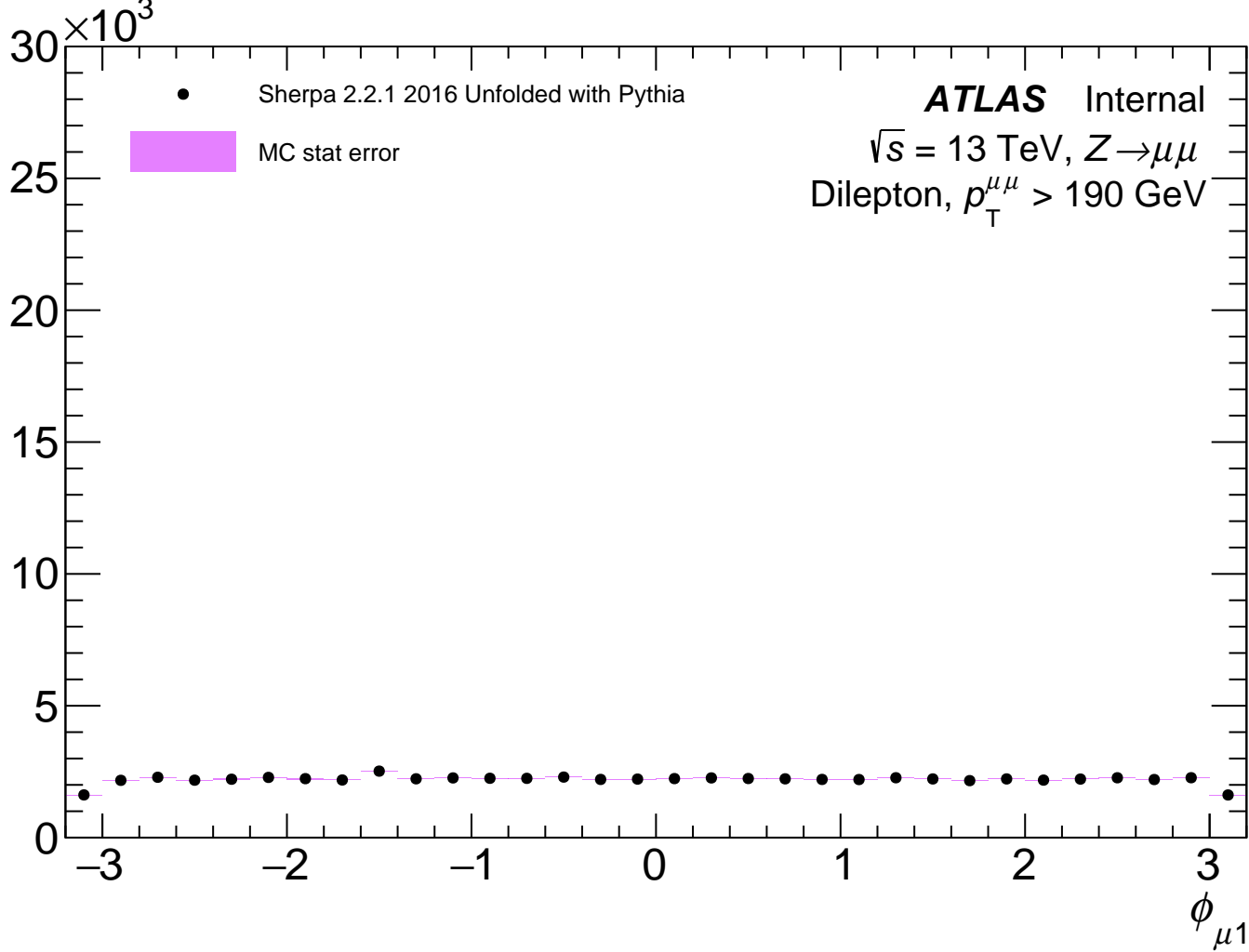
Events



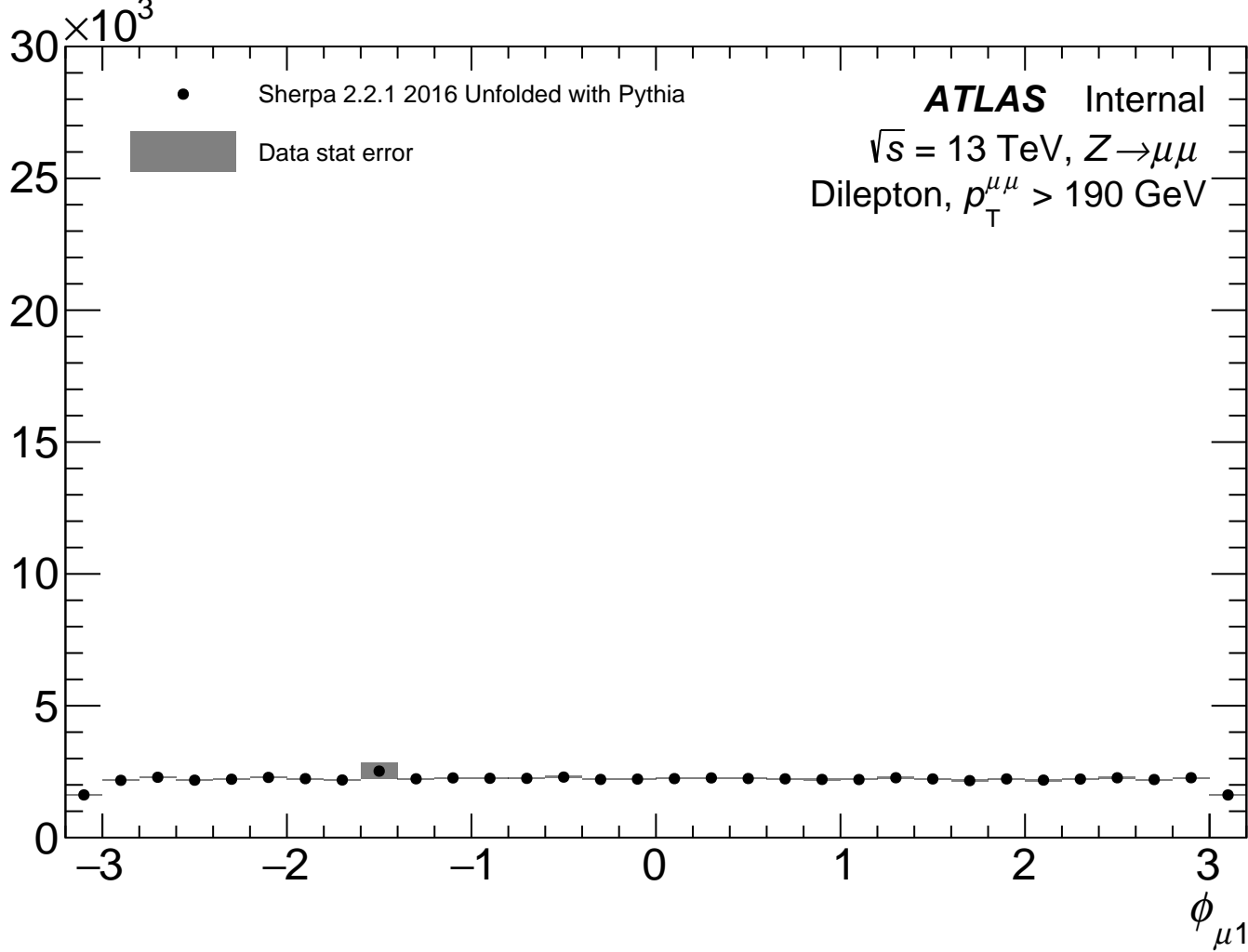
Events



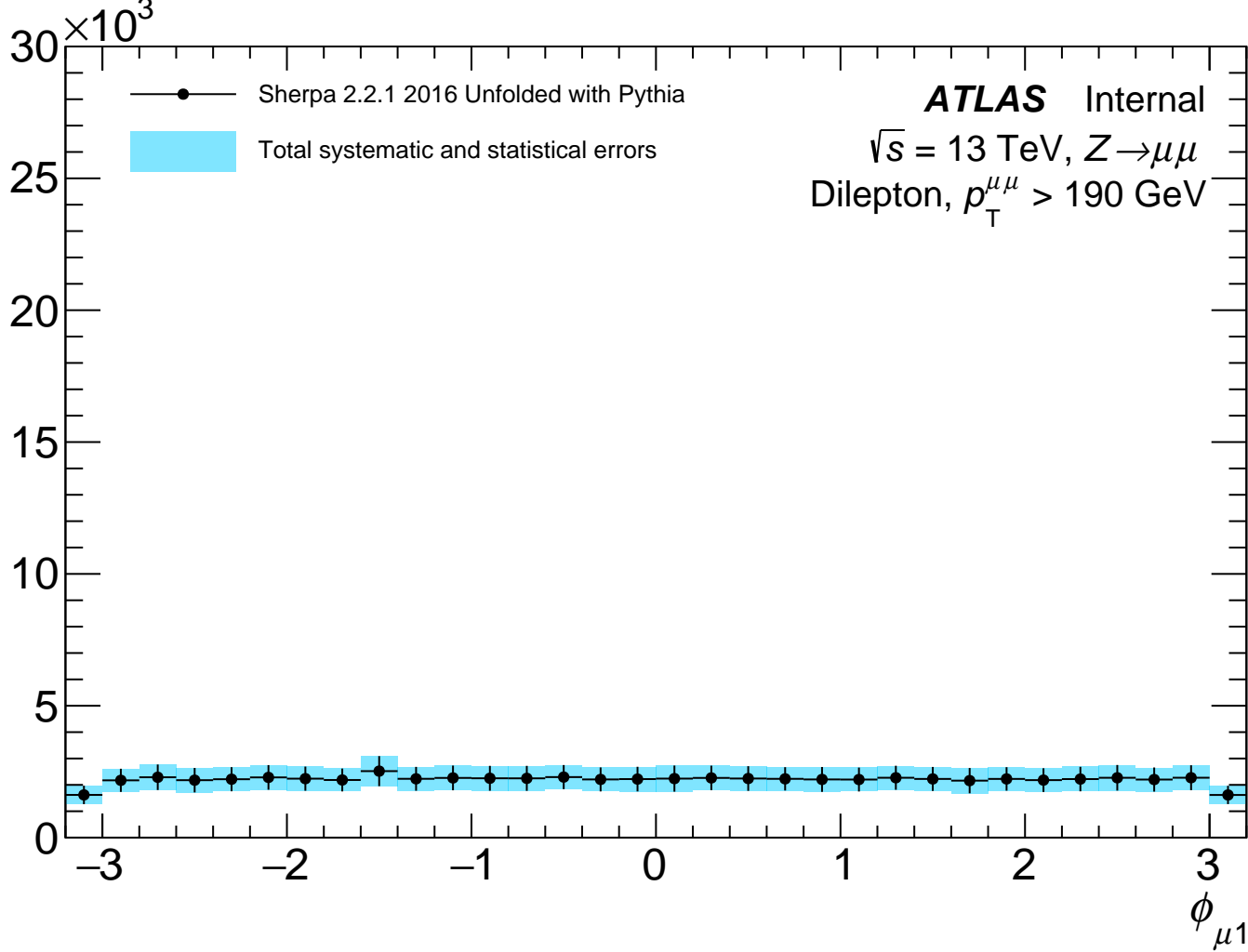
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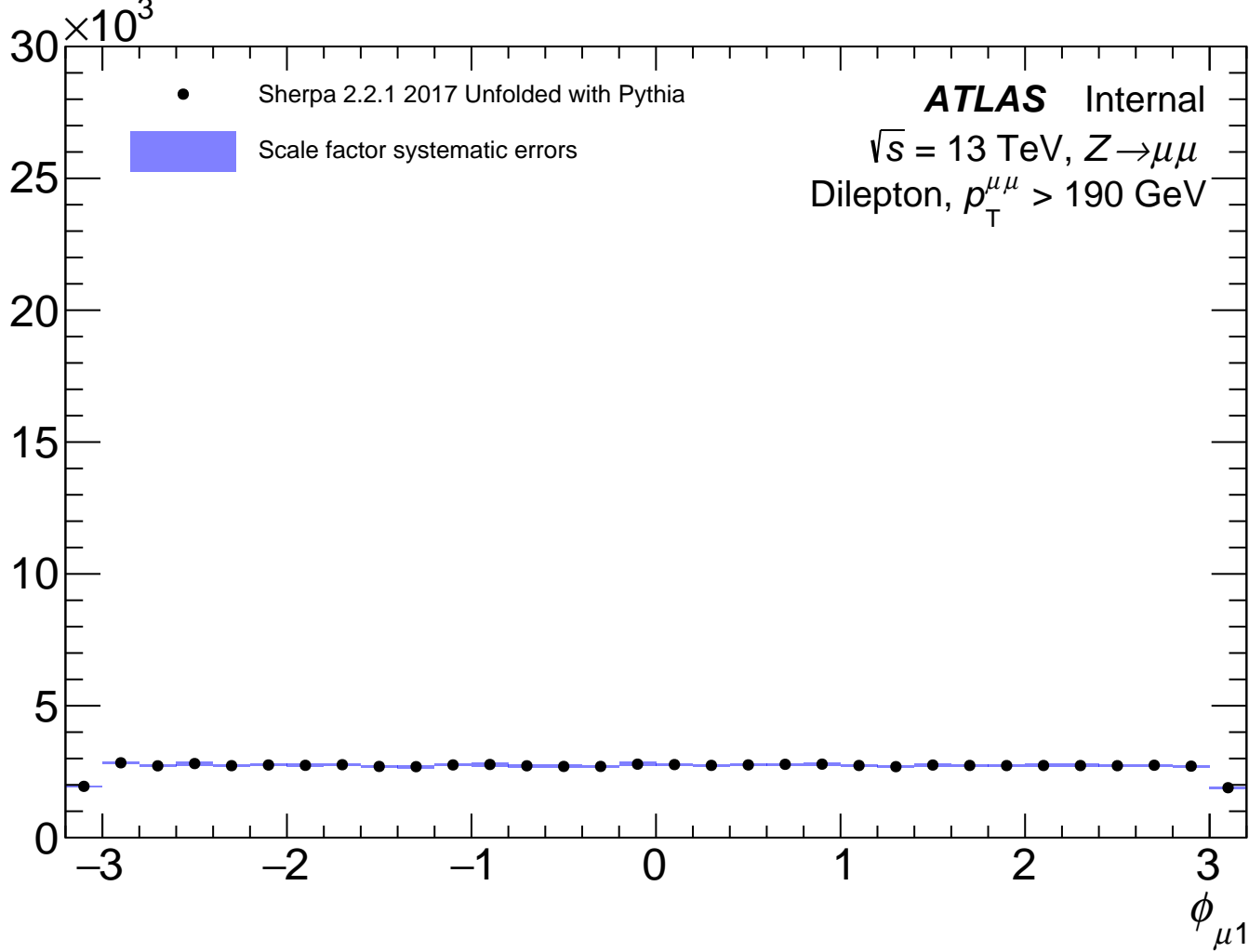
Events



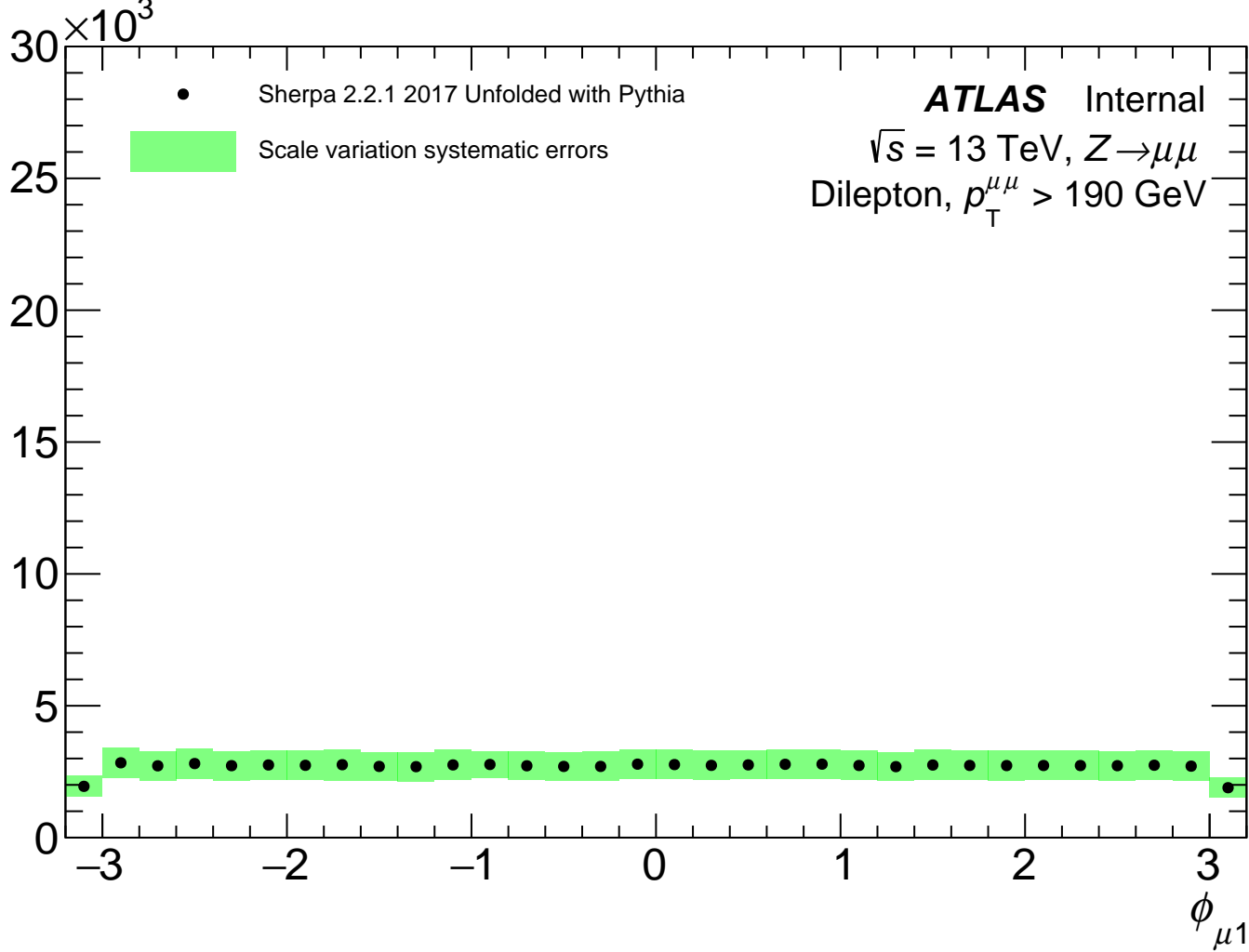
Events



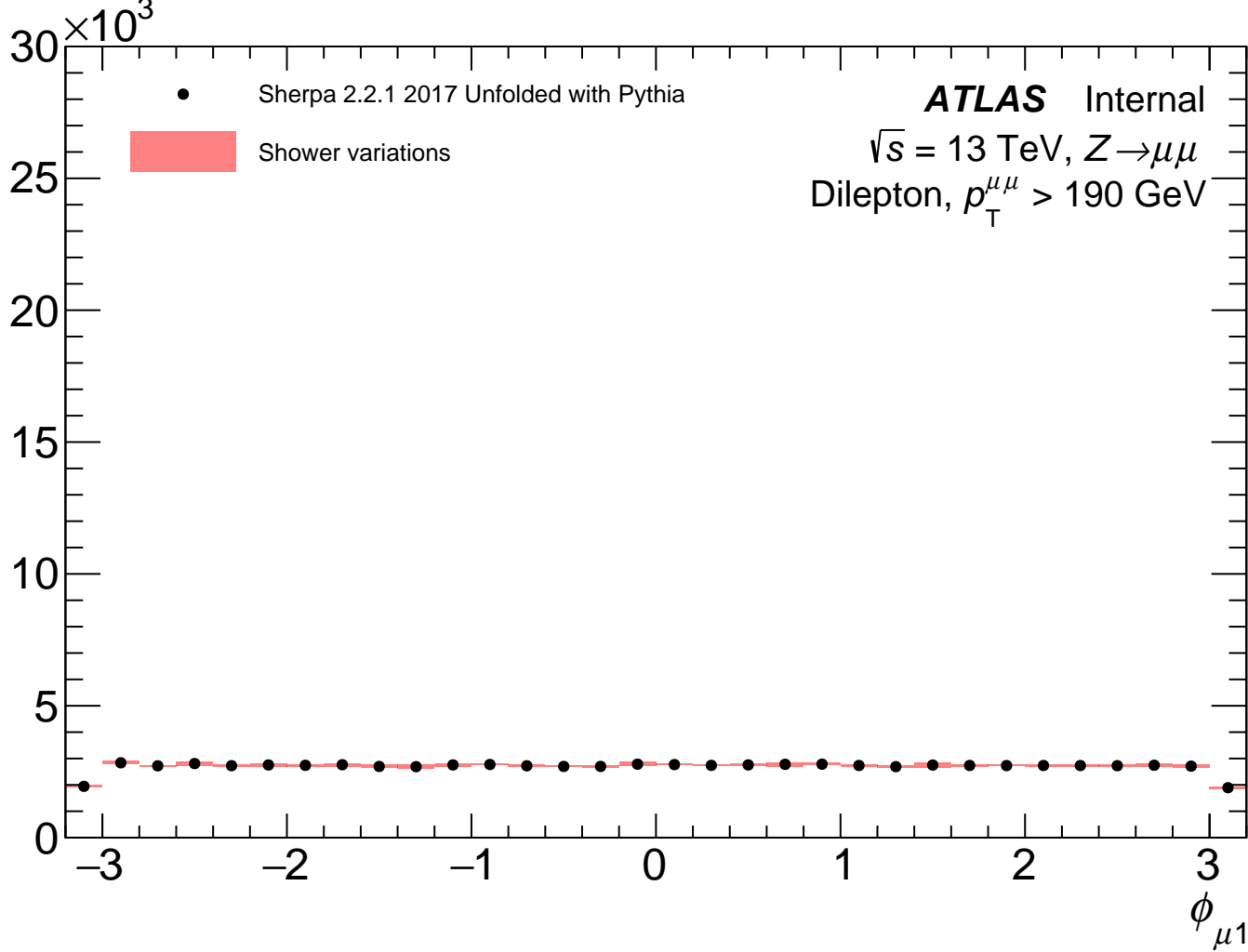
Events



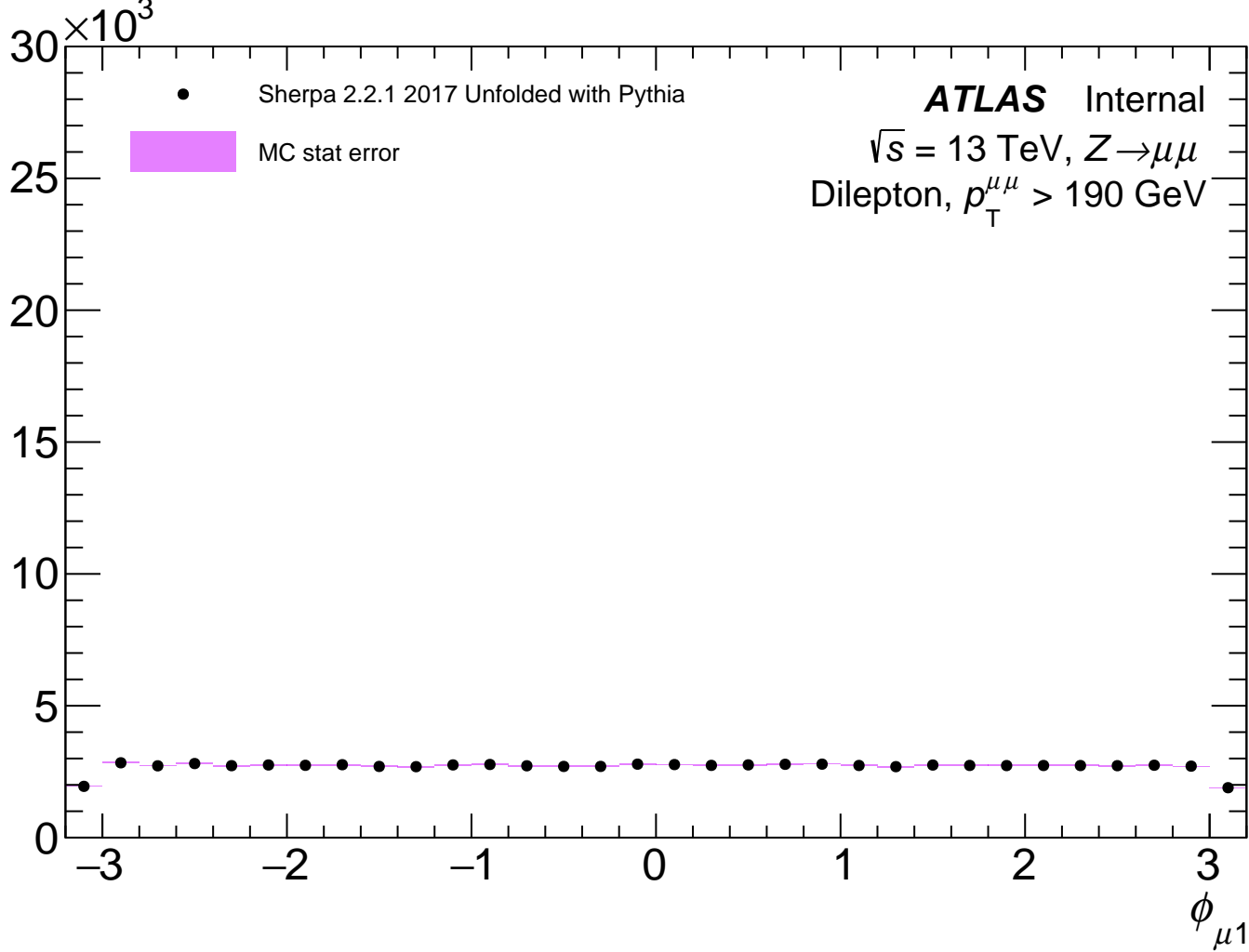
Events



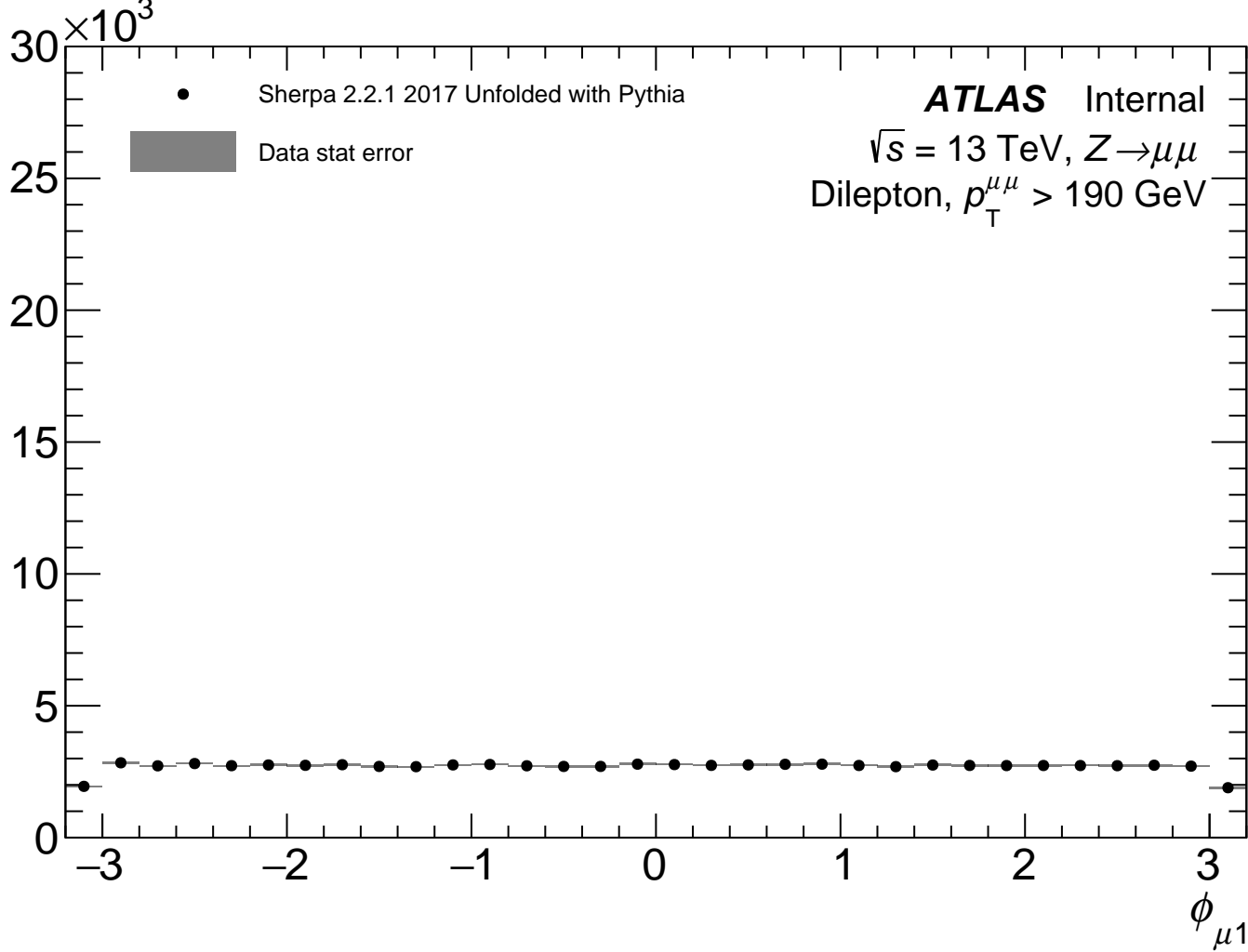
Events



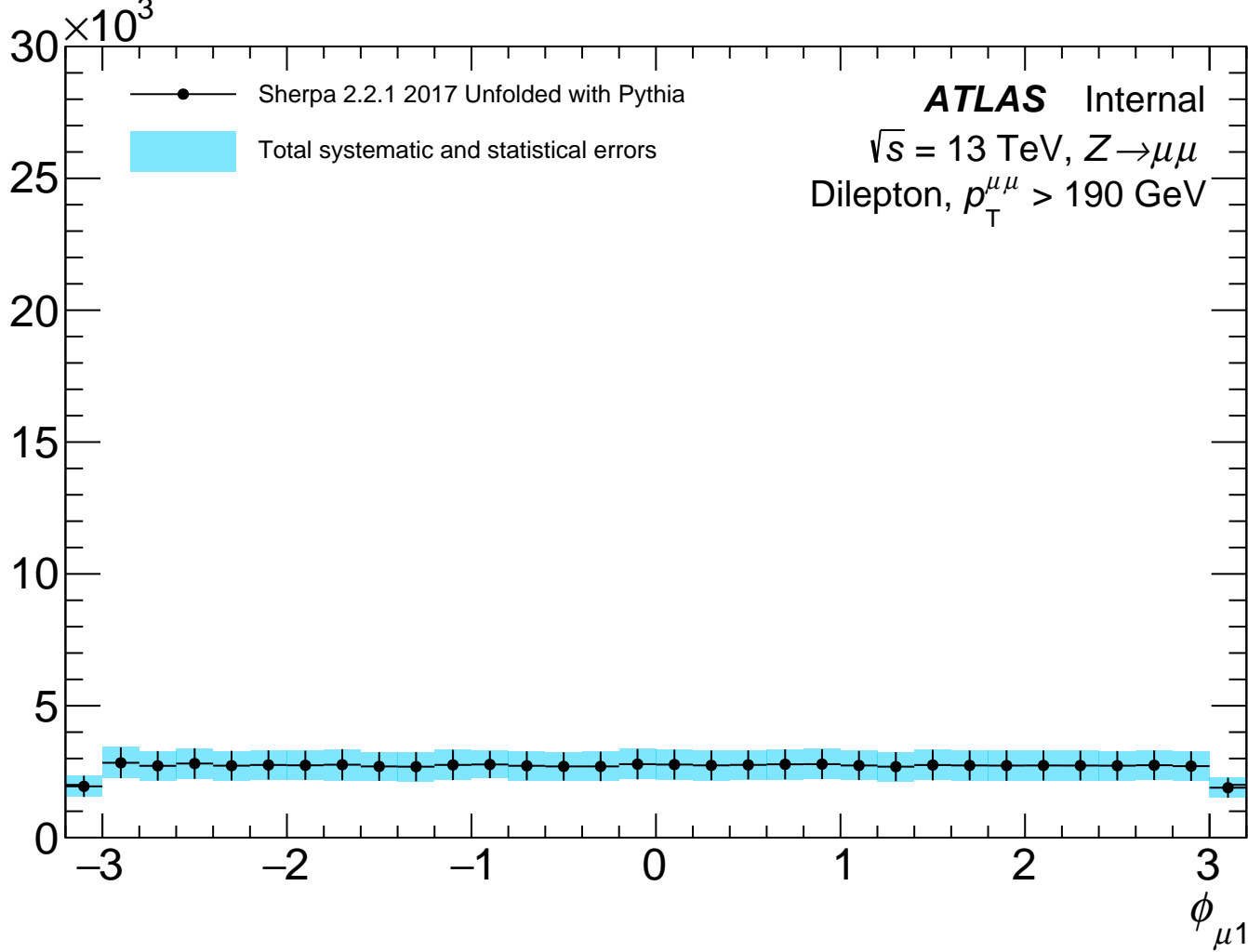
Events



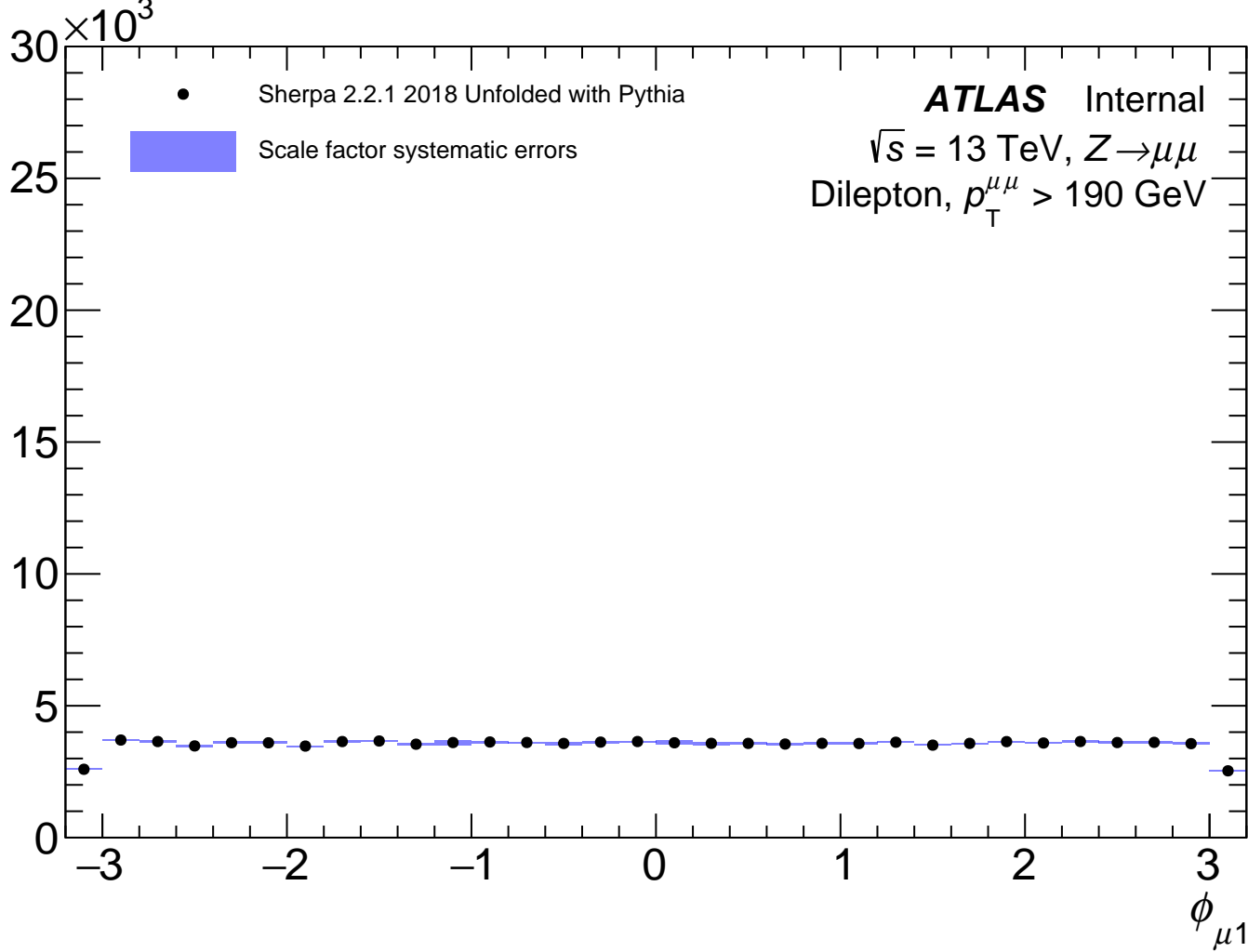
Events



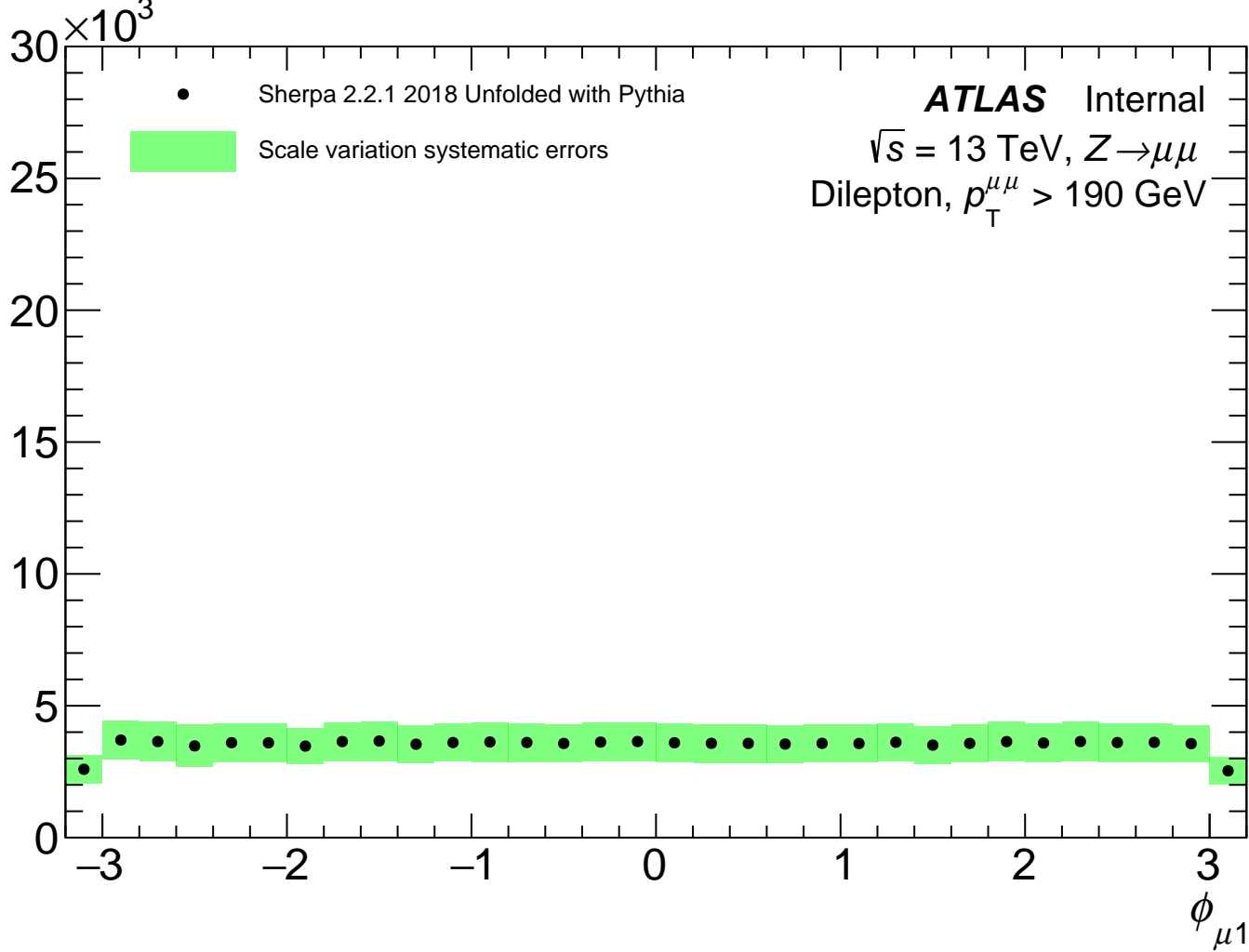
Events



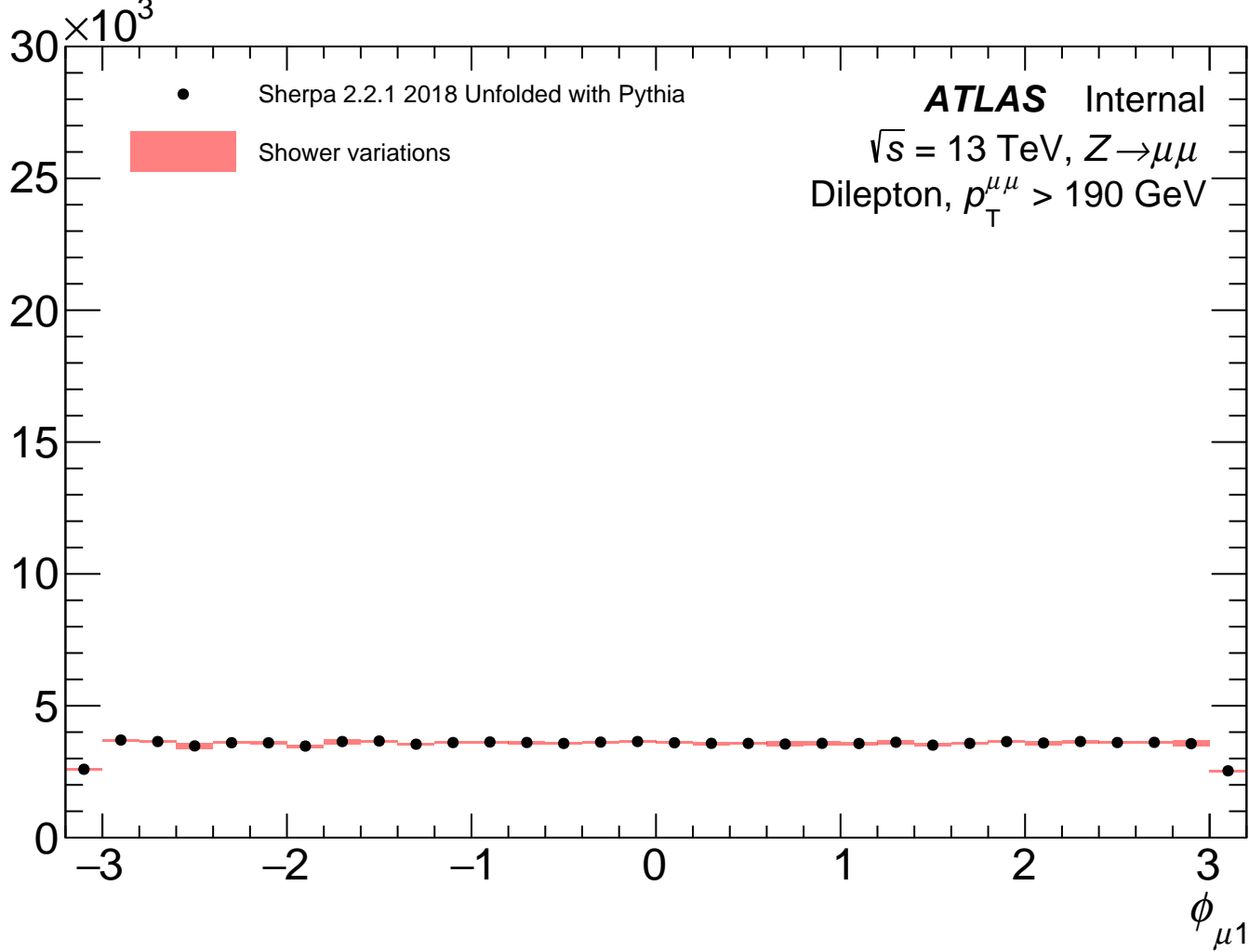
Events



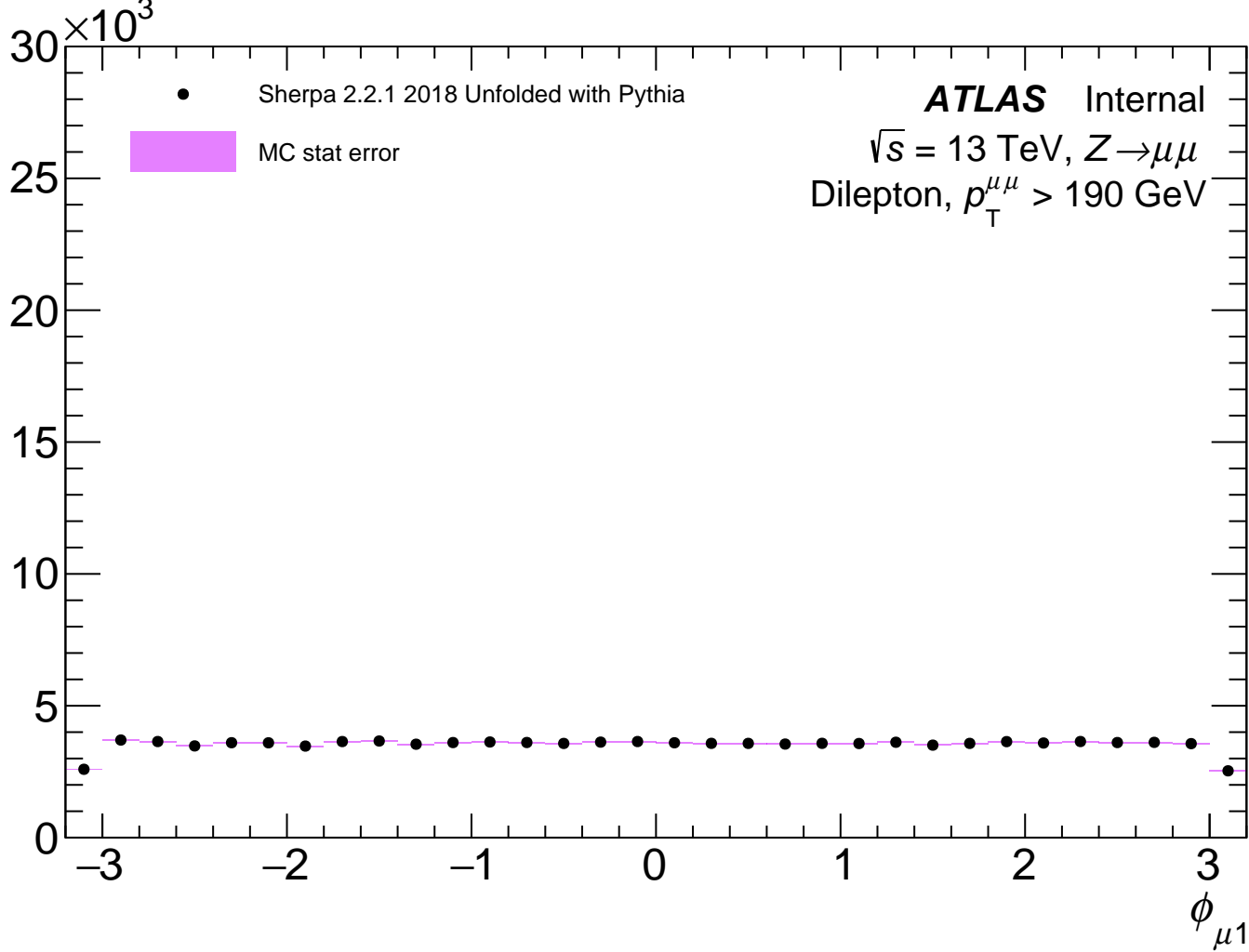
Events



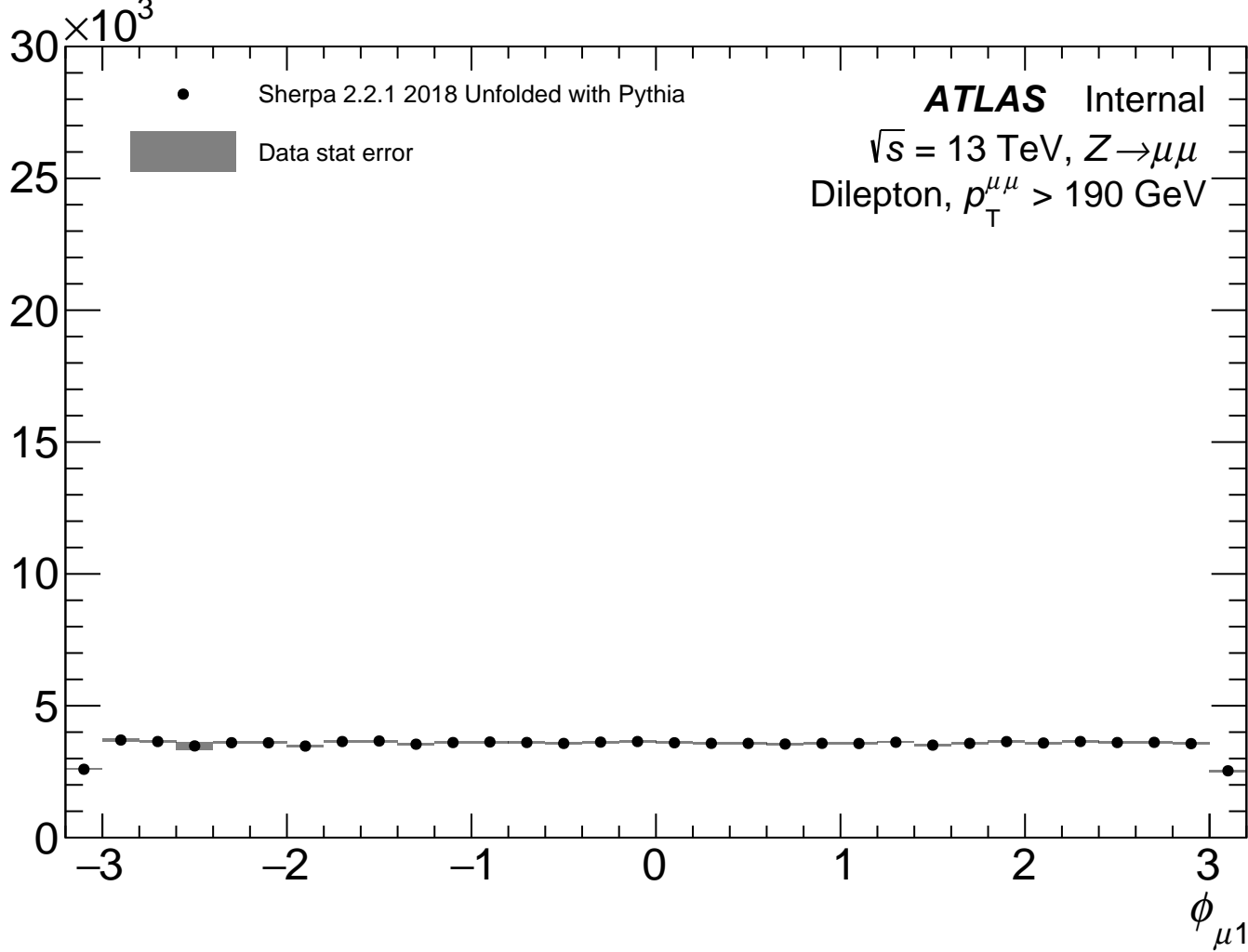
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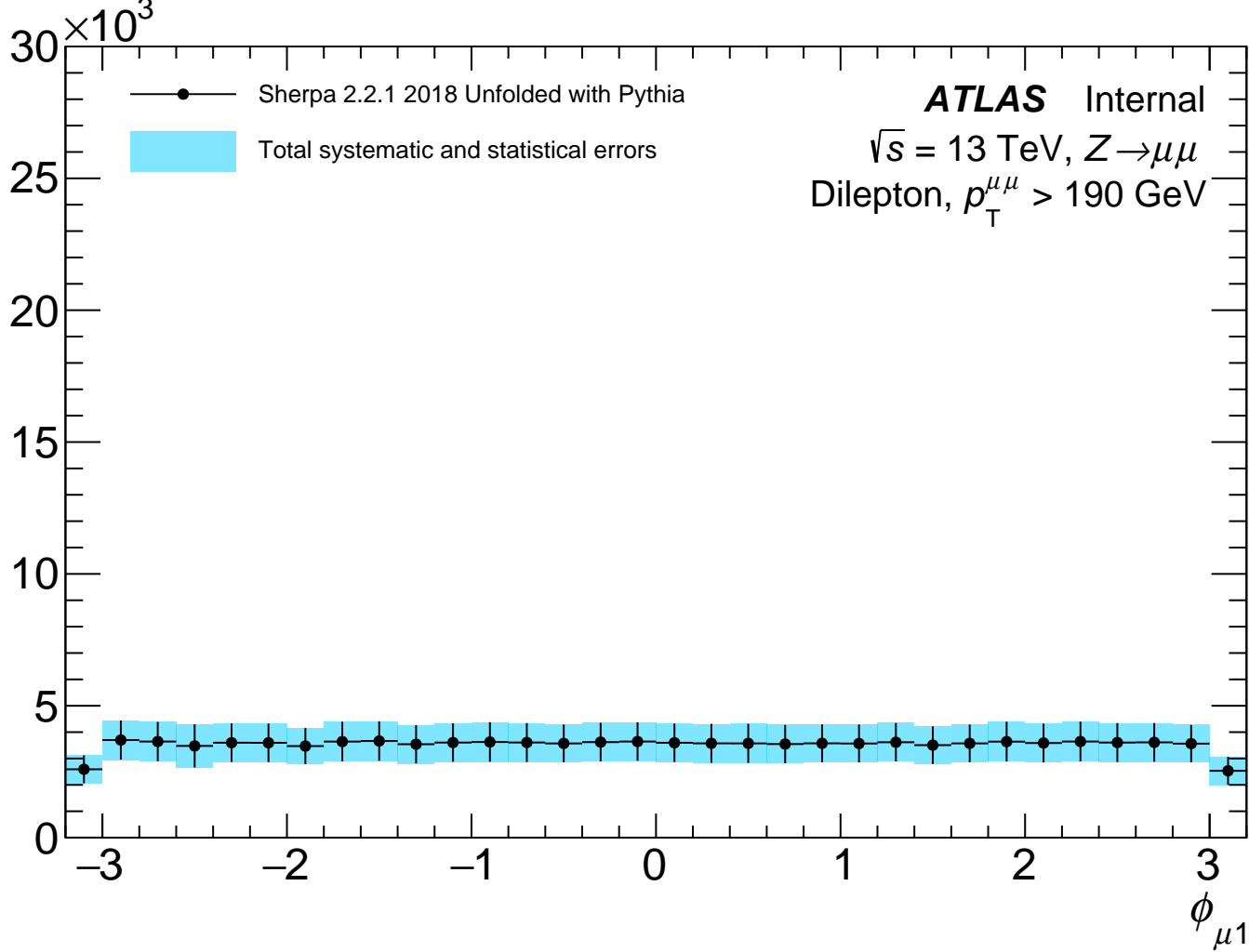
Events



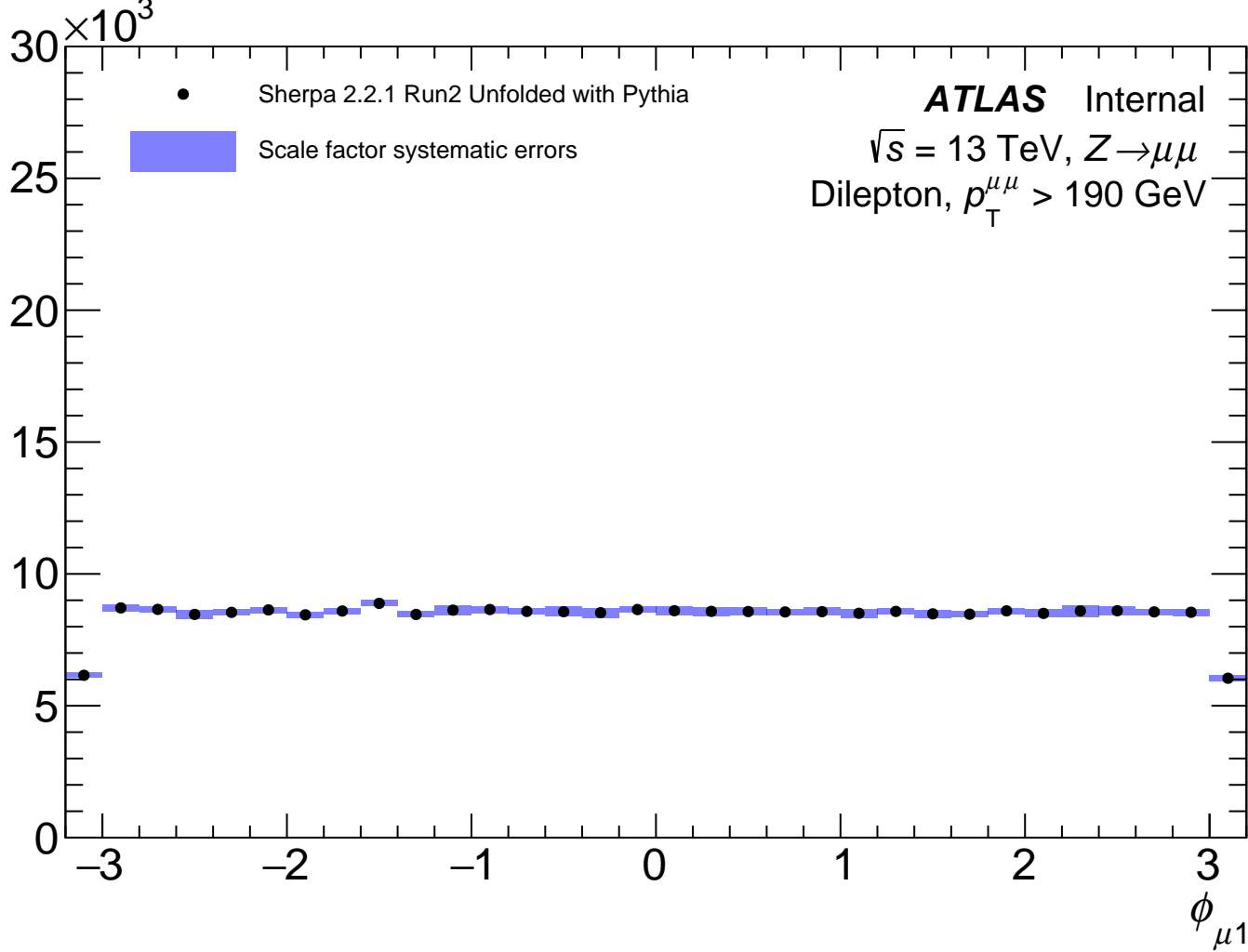
Events



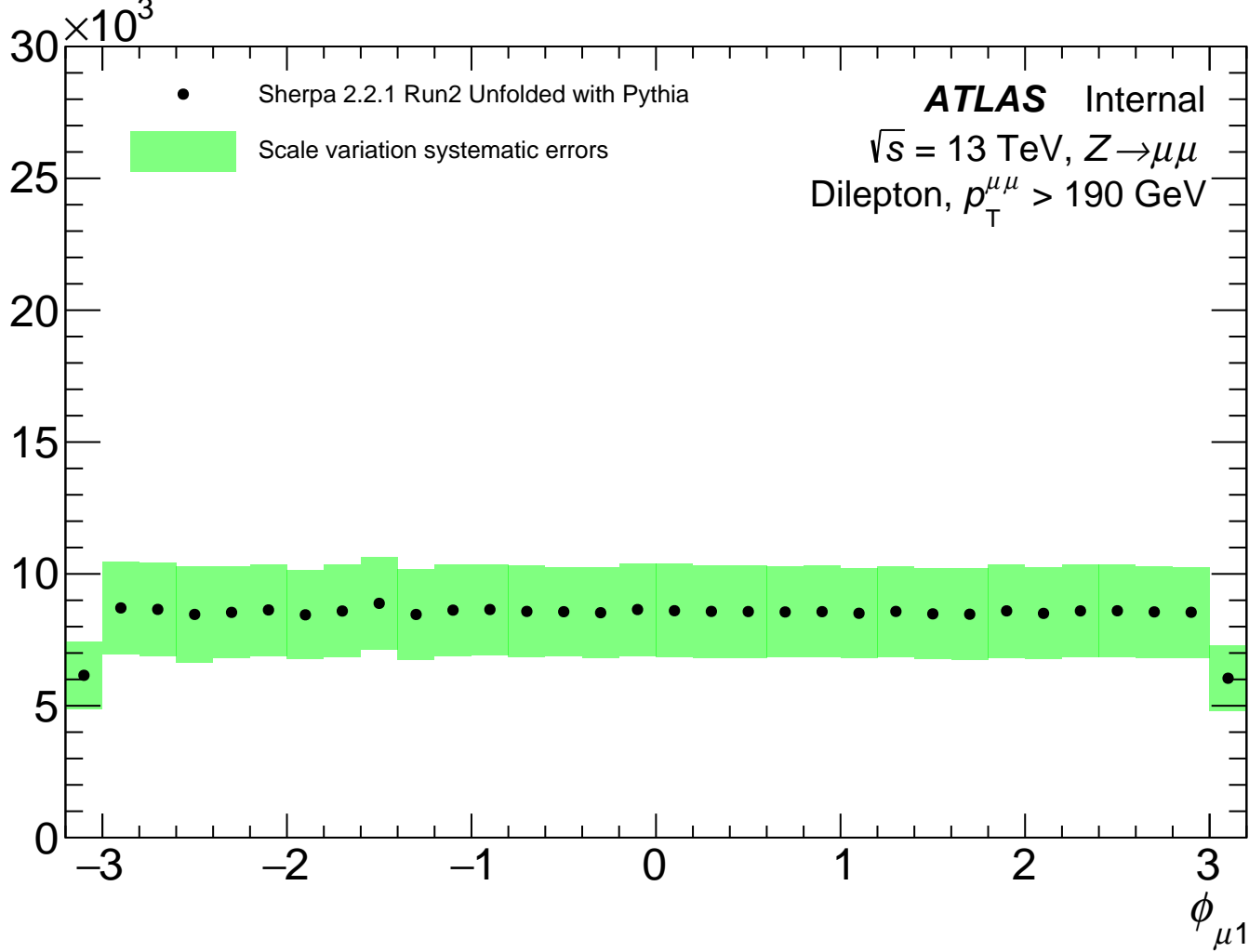
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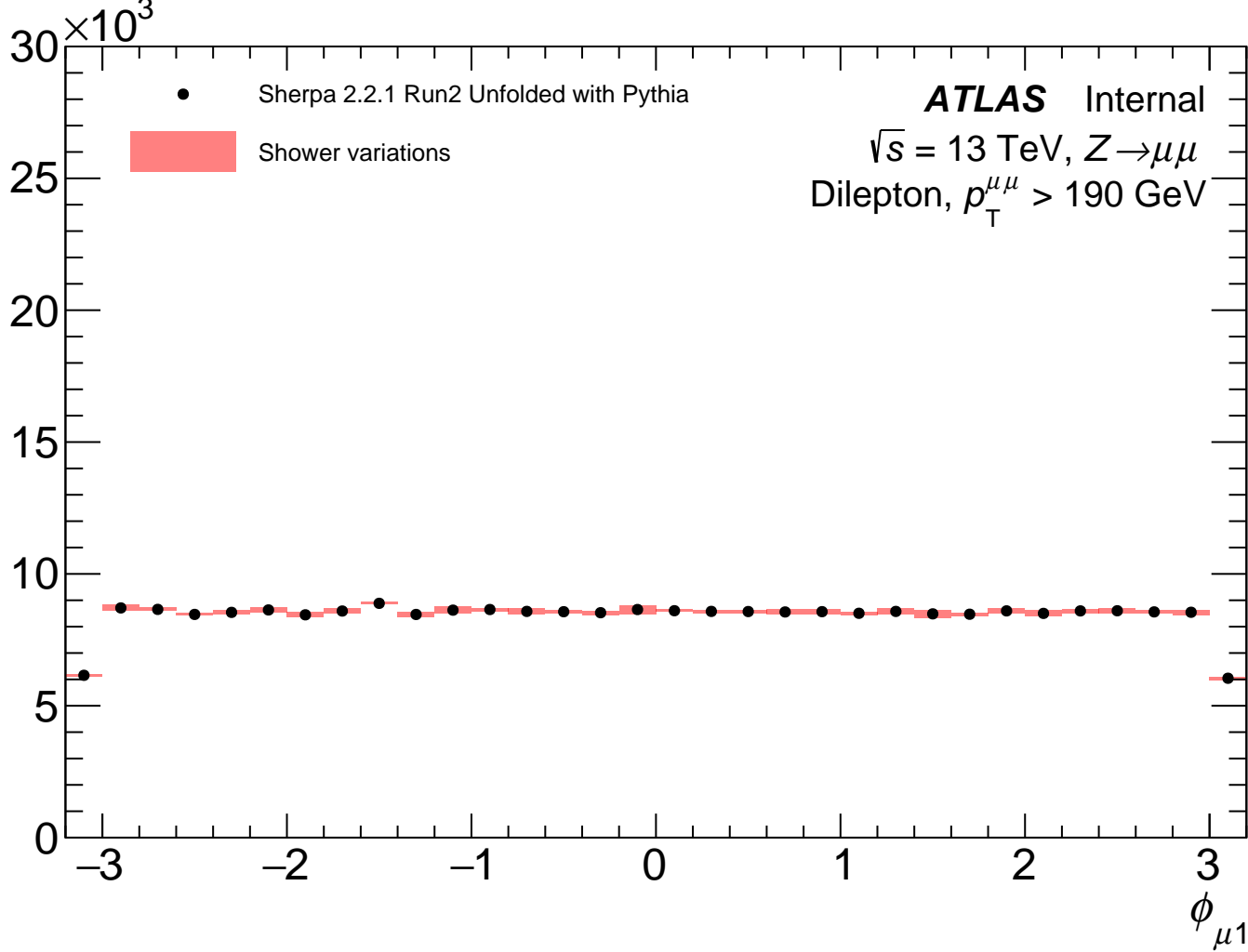
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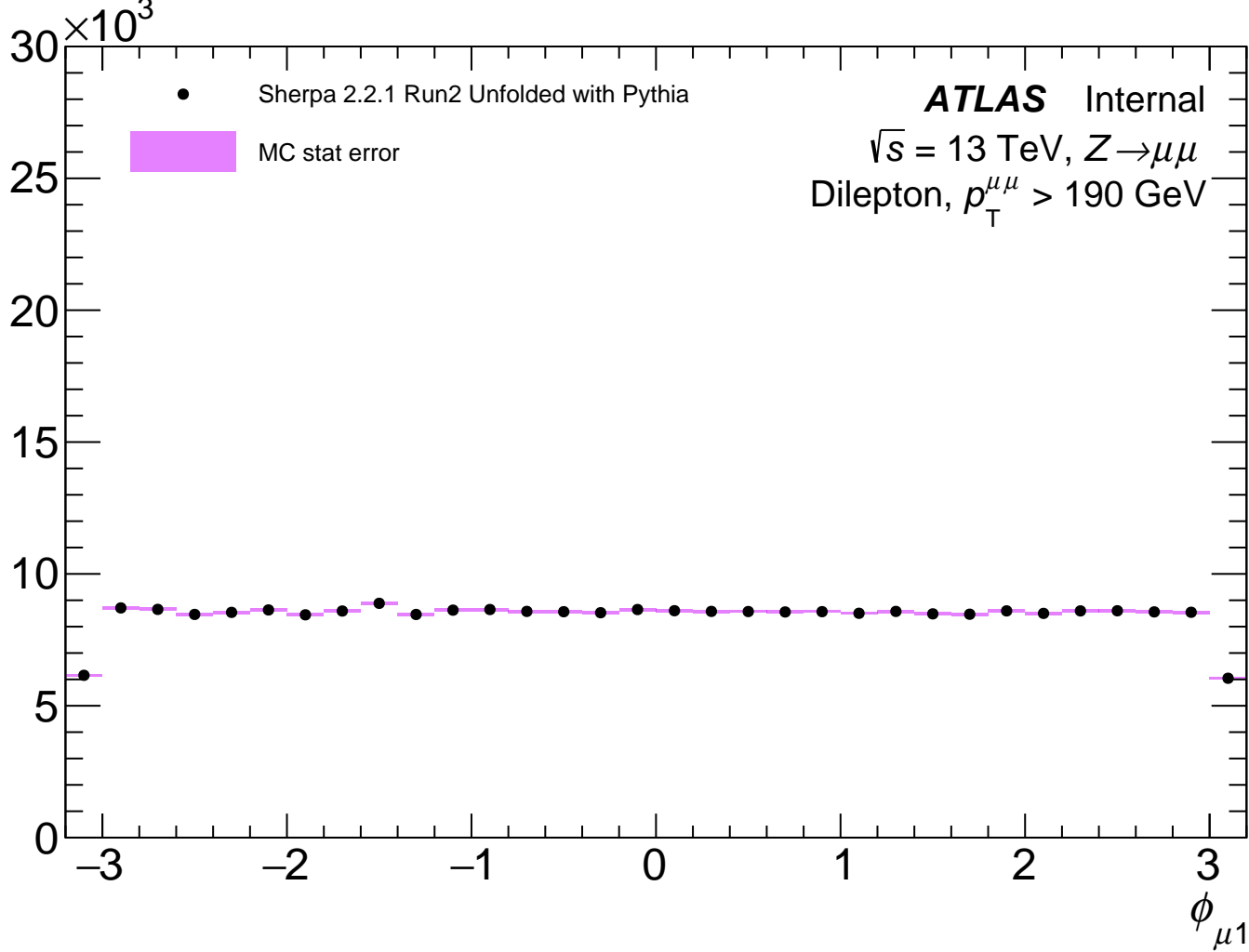
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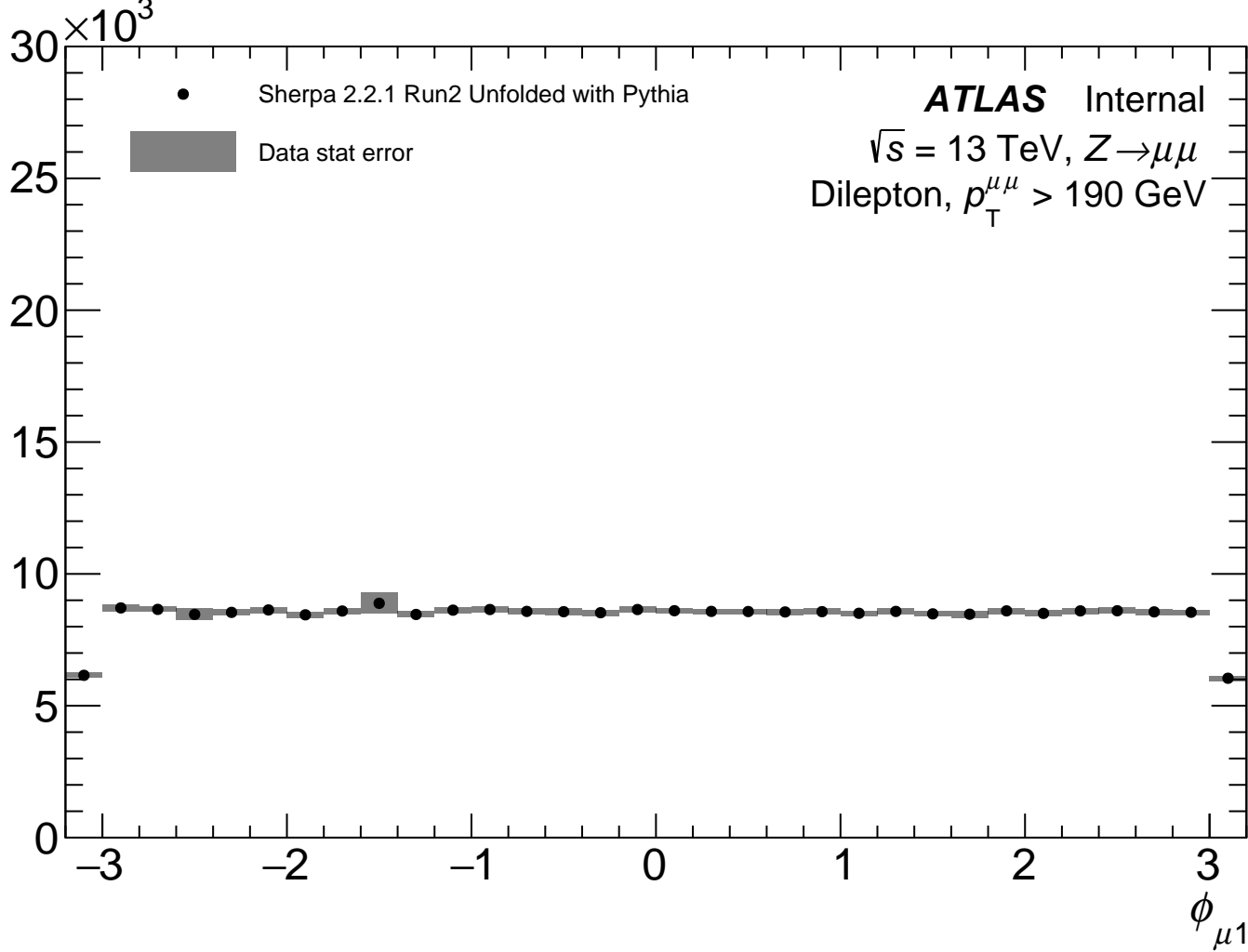
Events



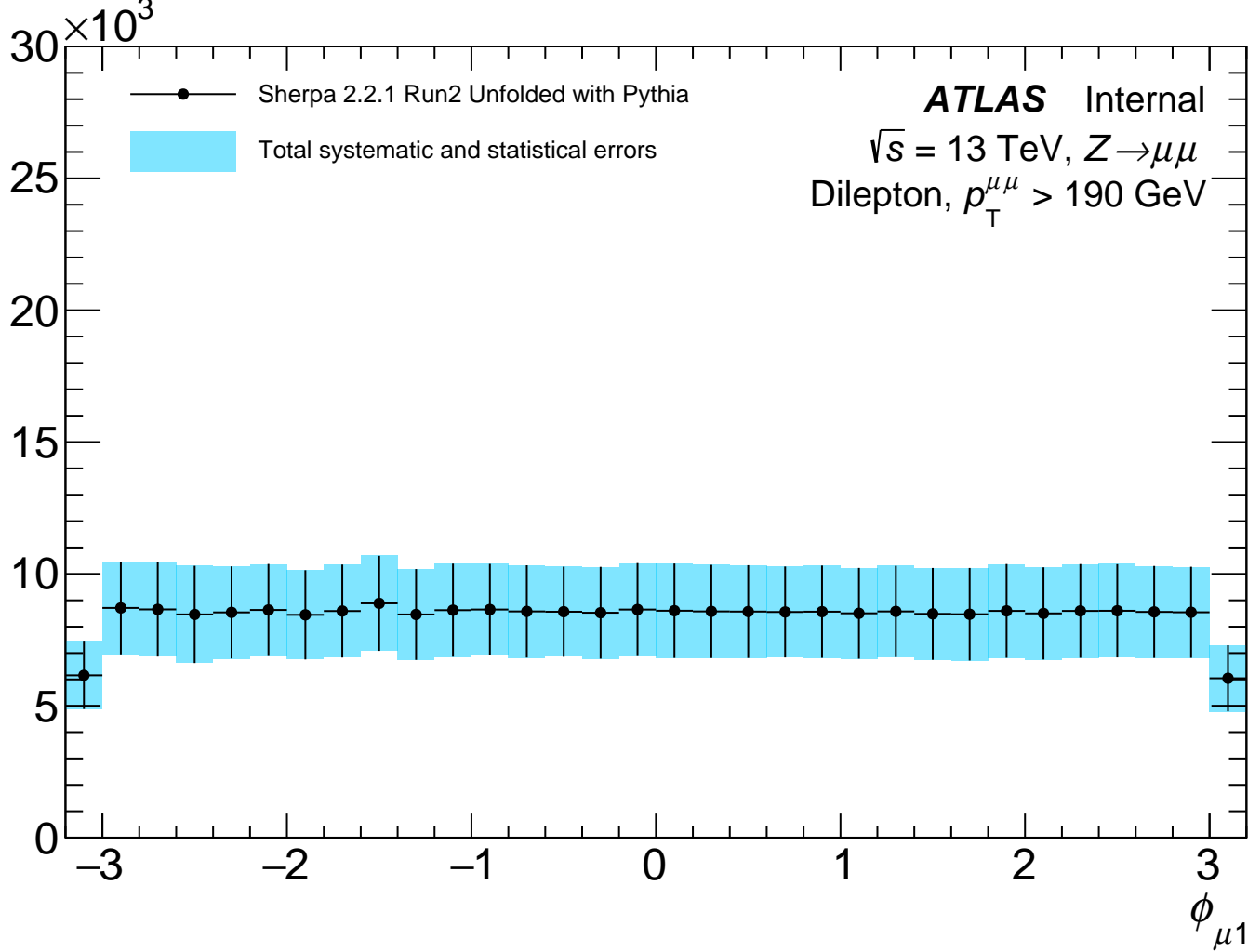
Events



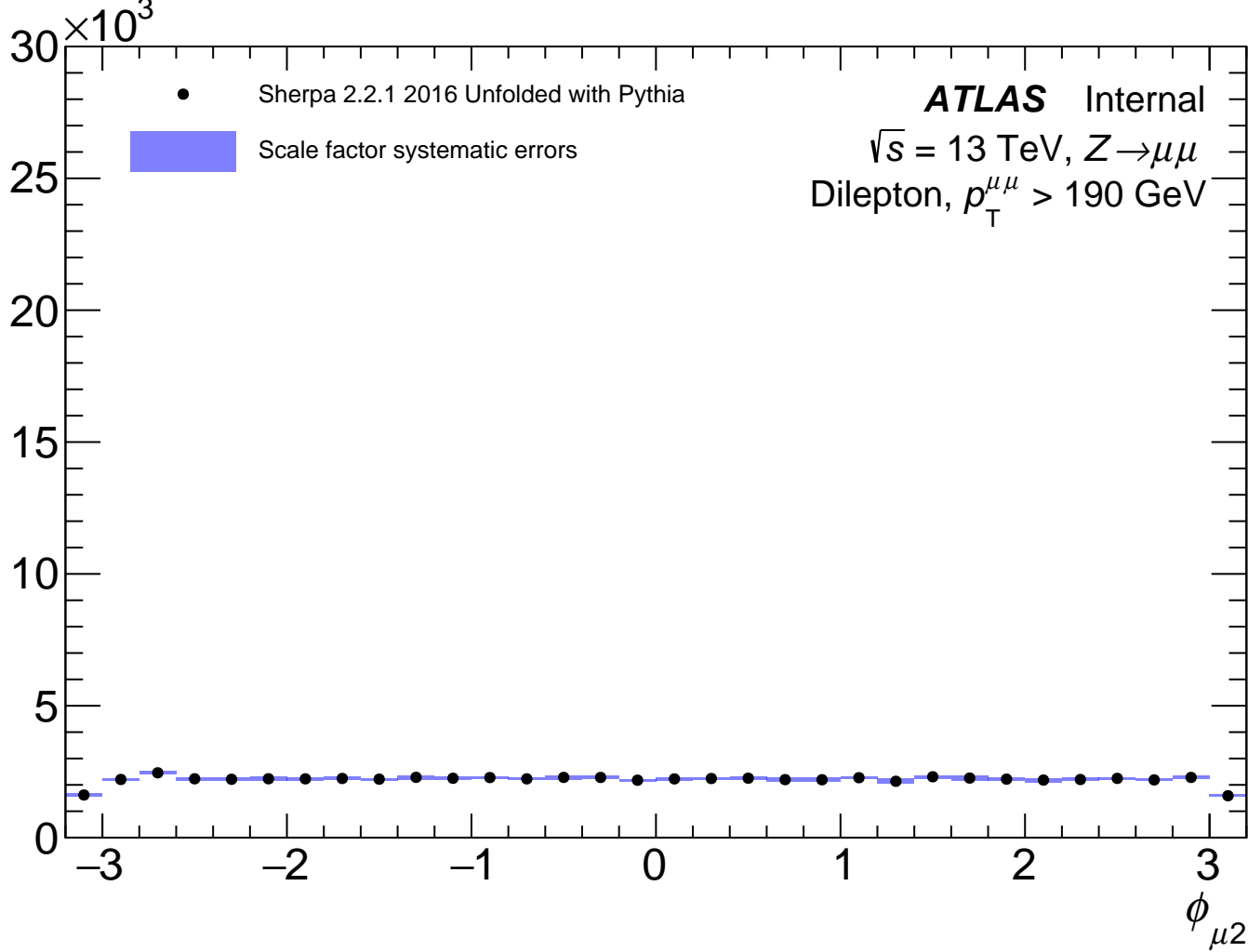
Events



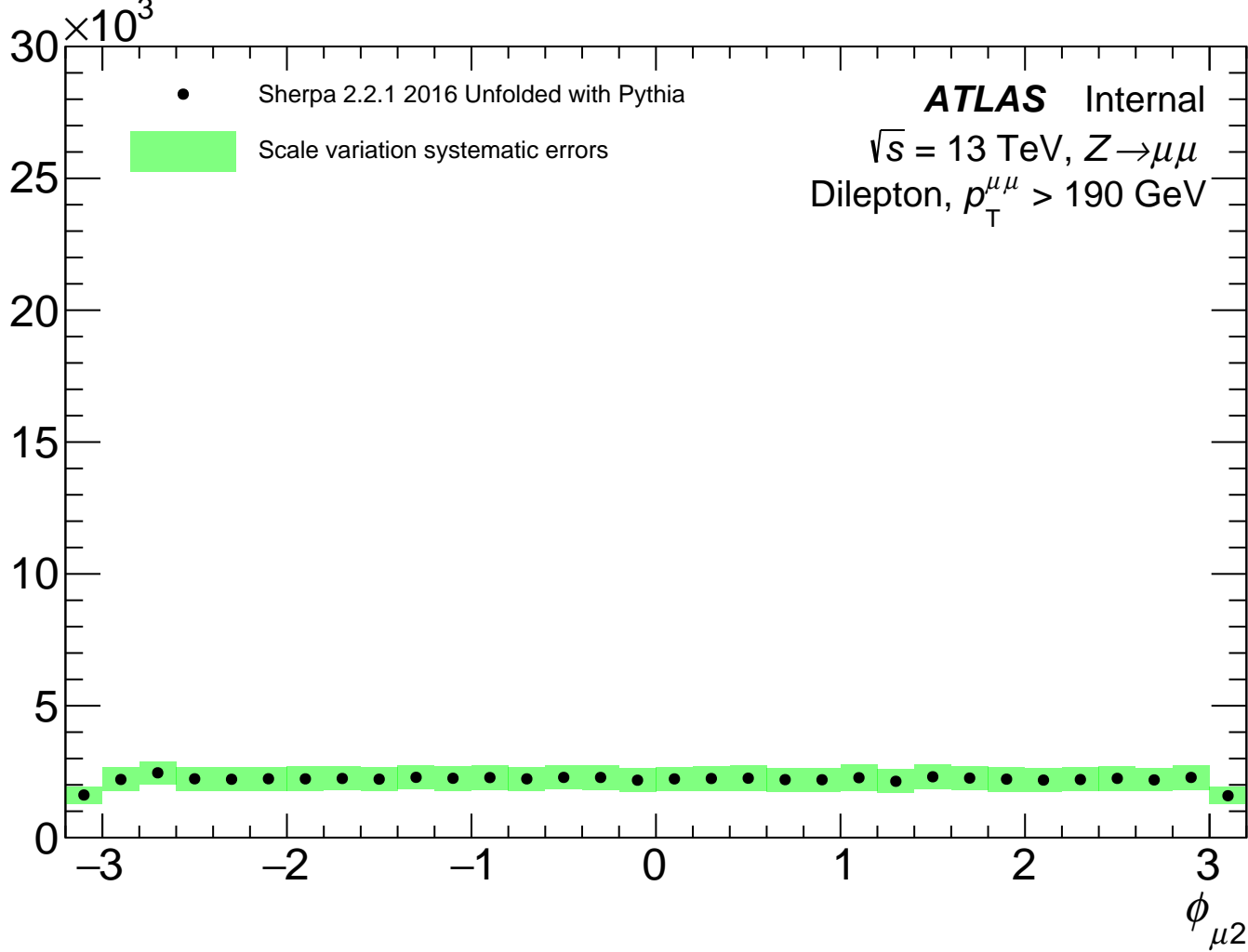
Events



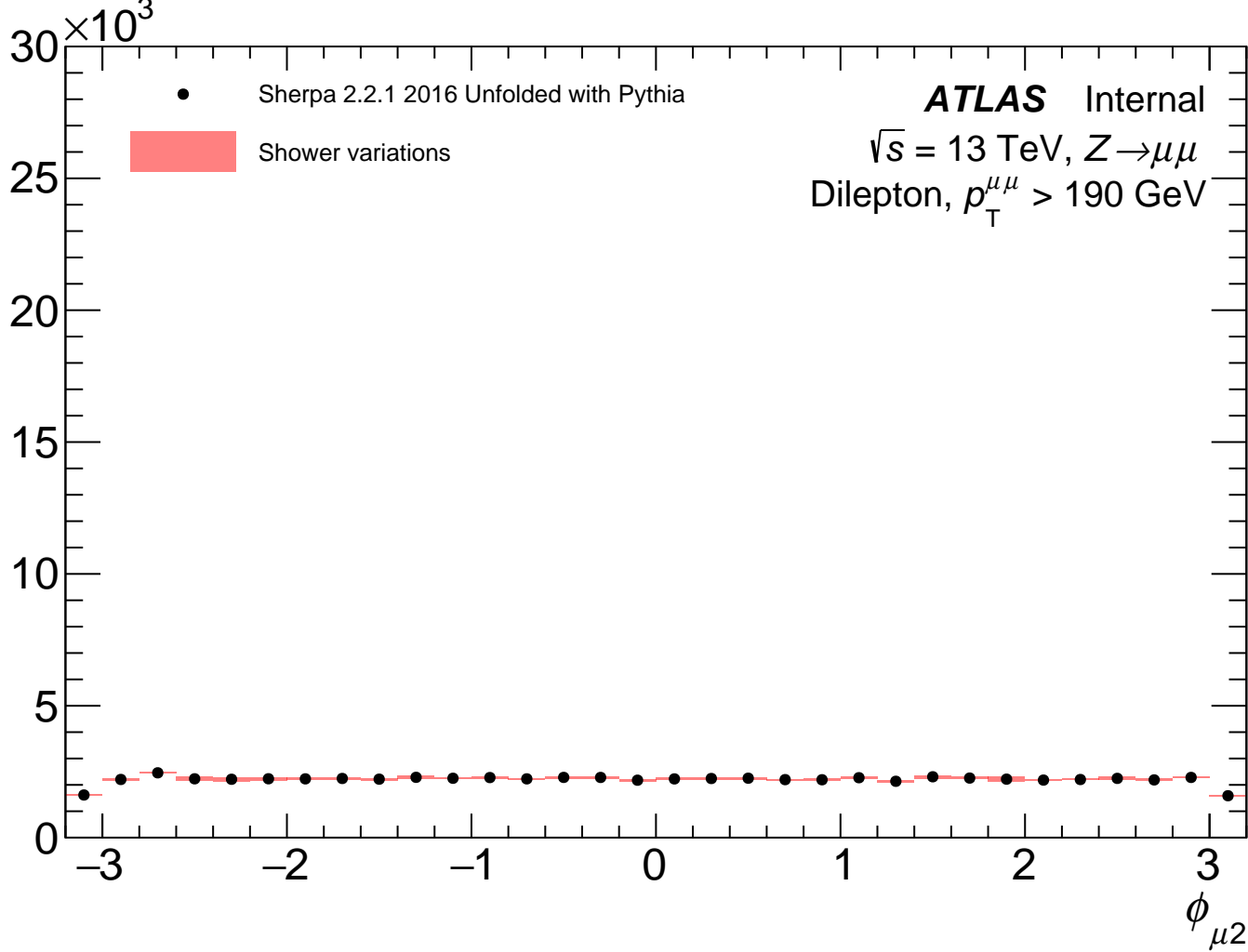
Events



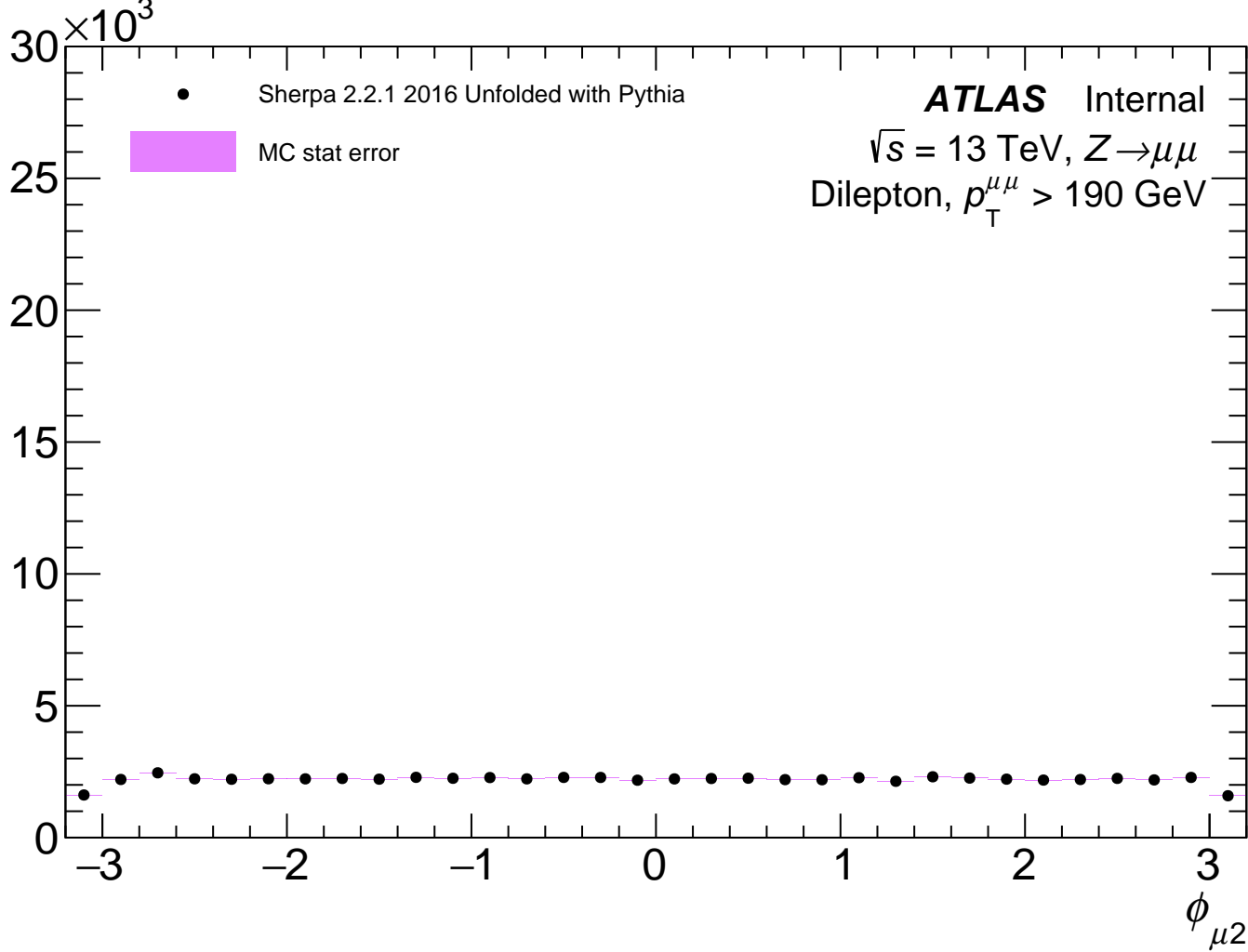
Events



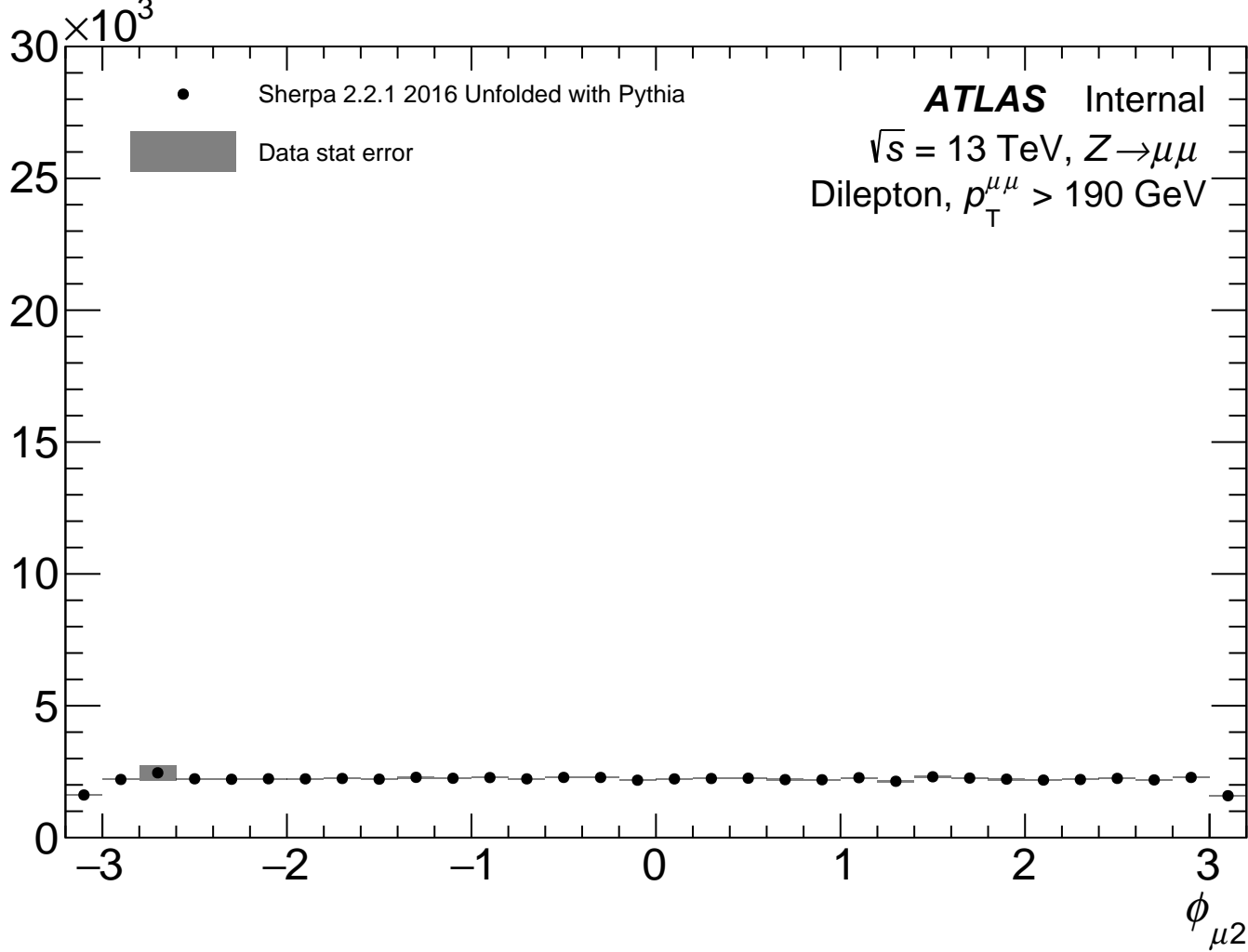
Events



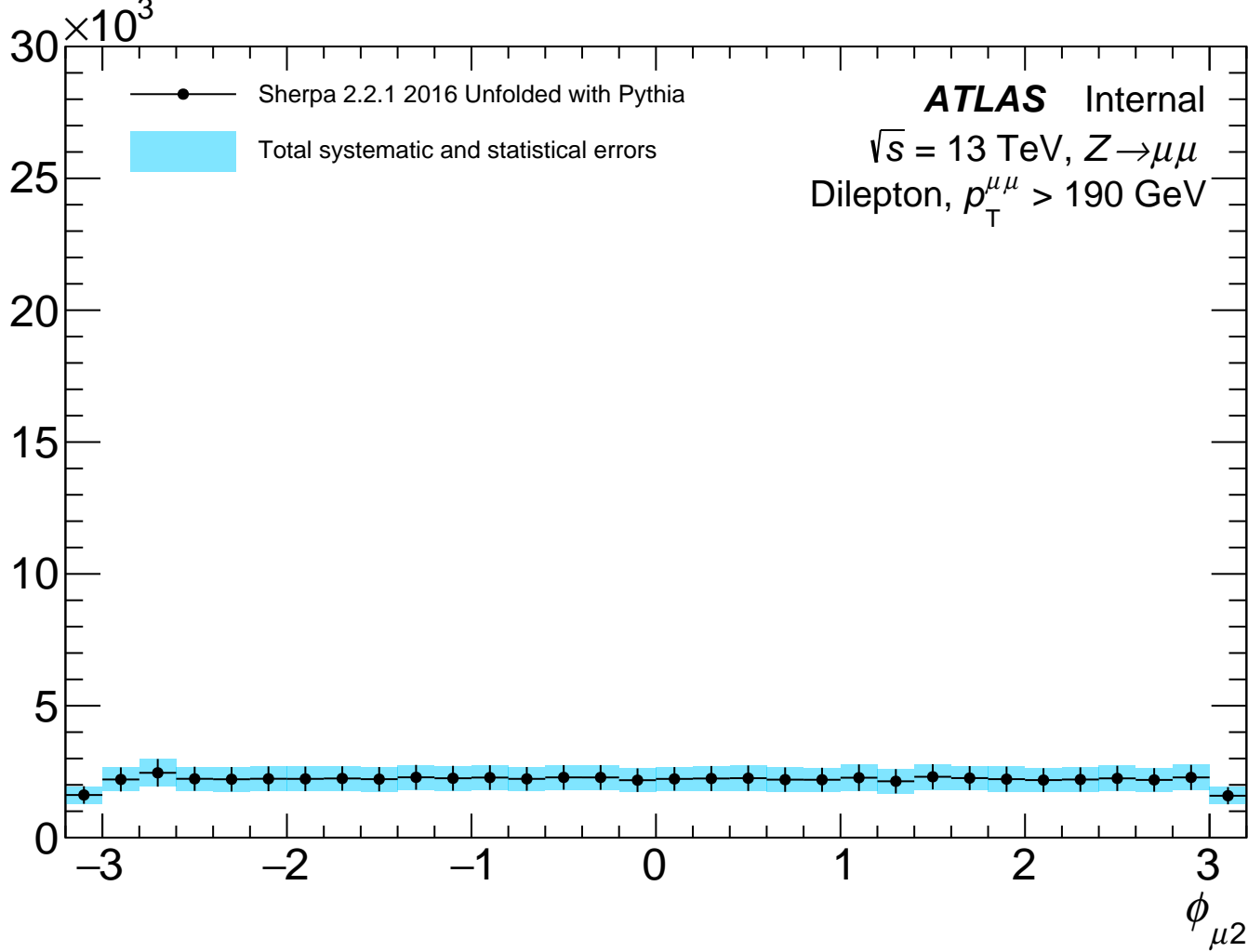
Events



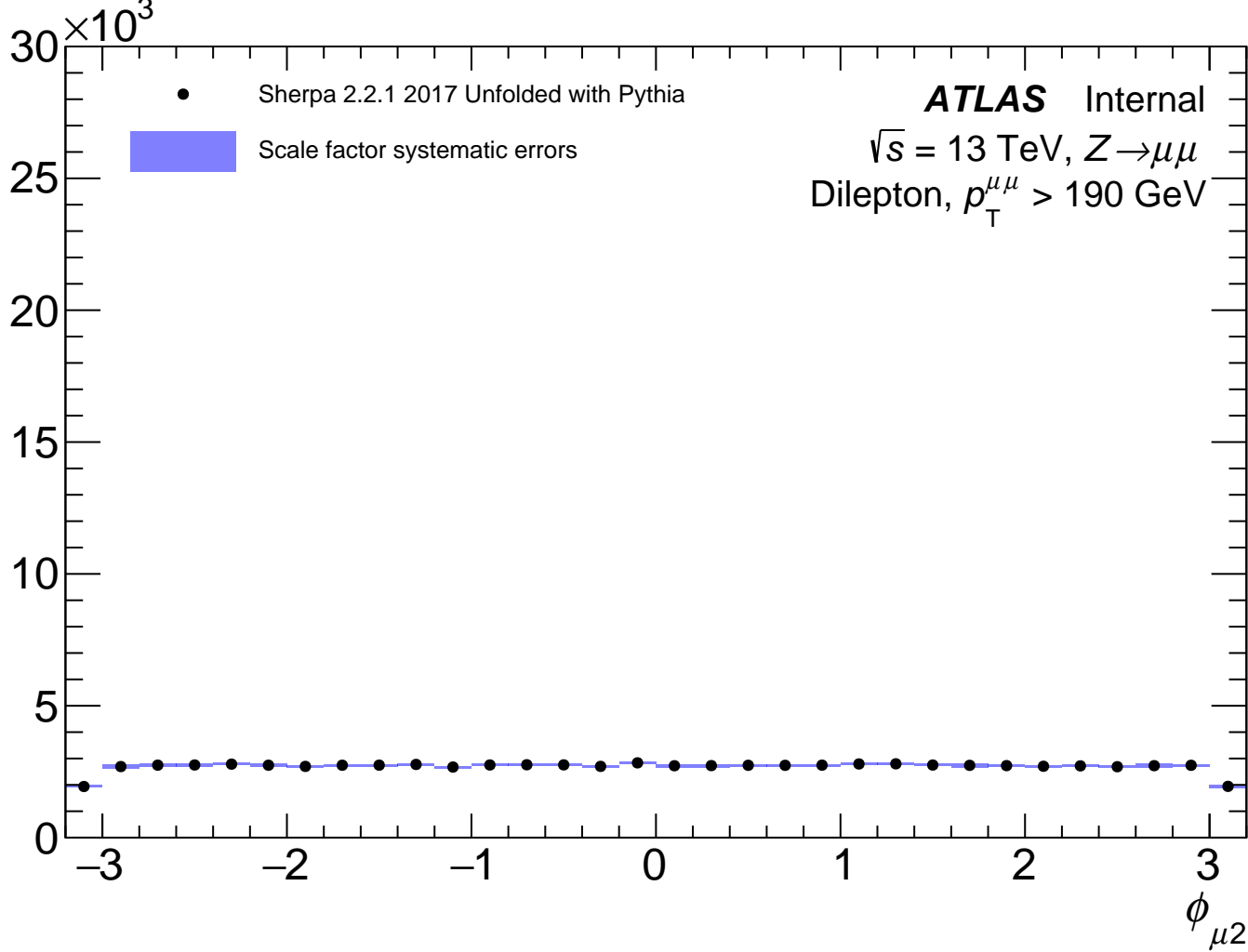
Events



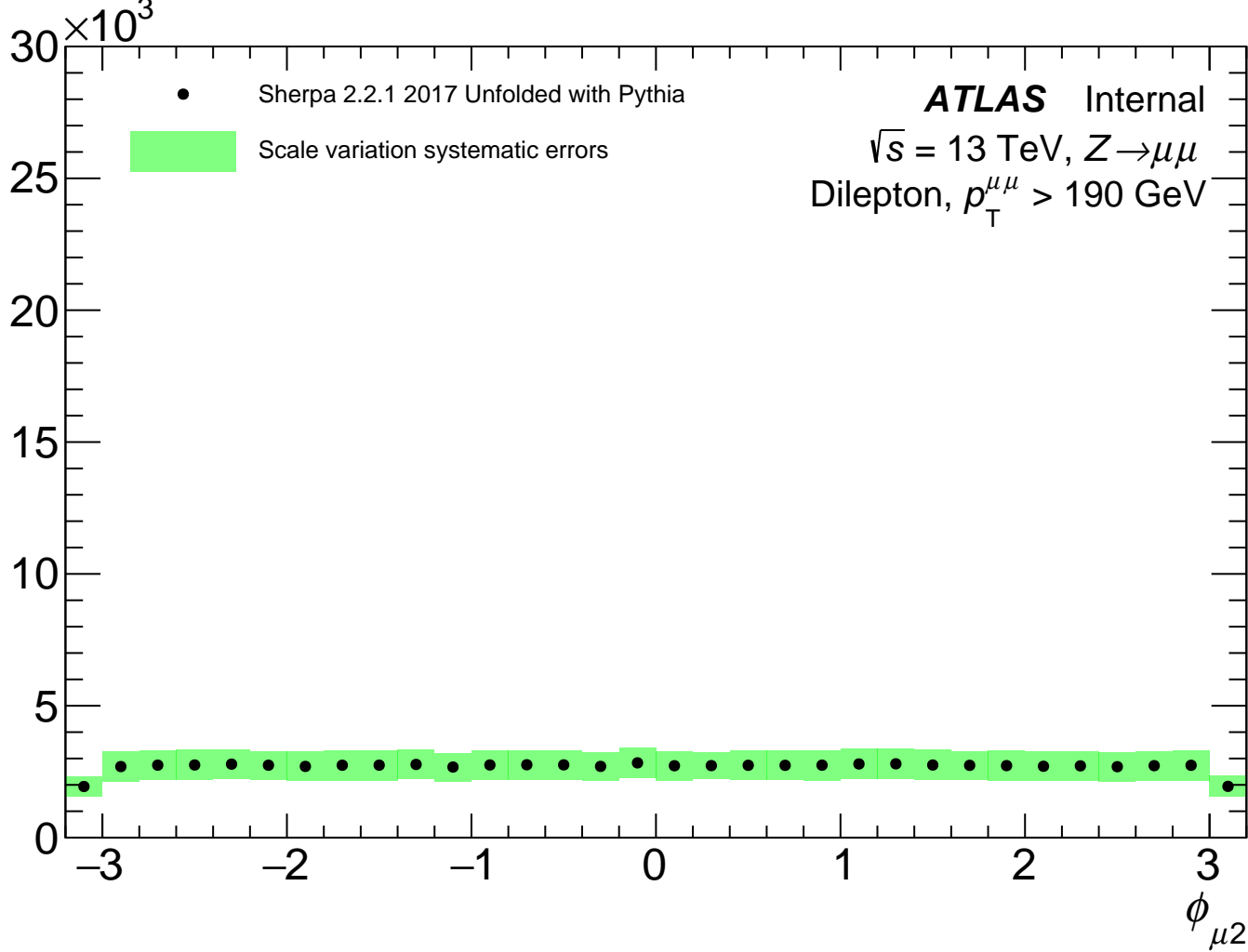
Events



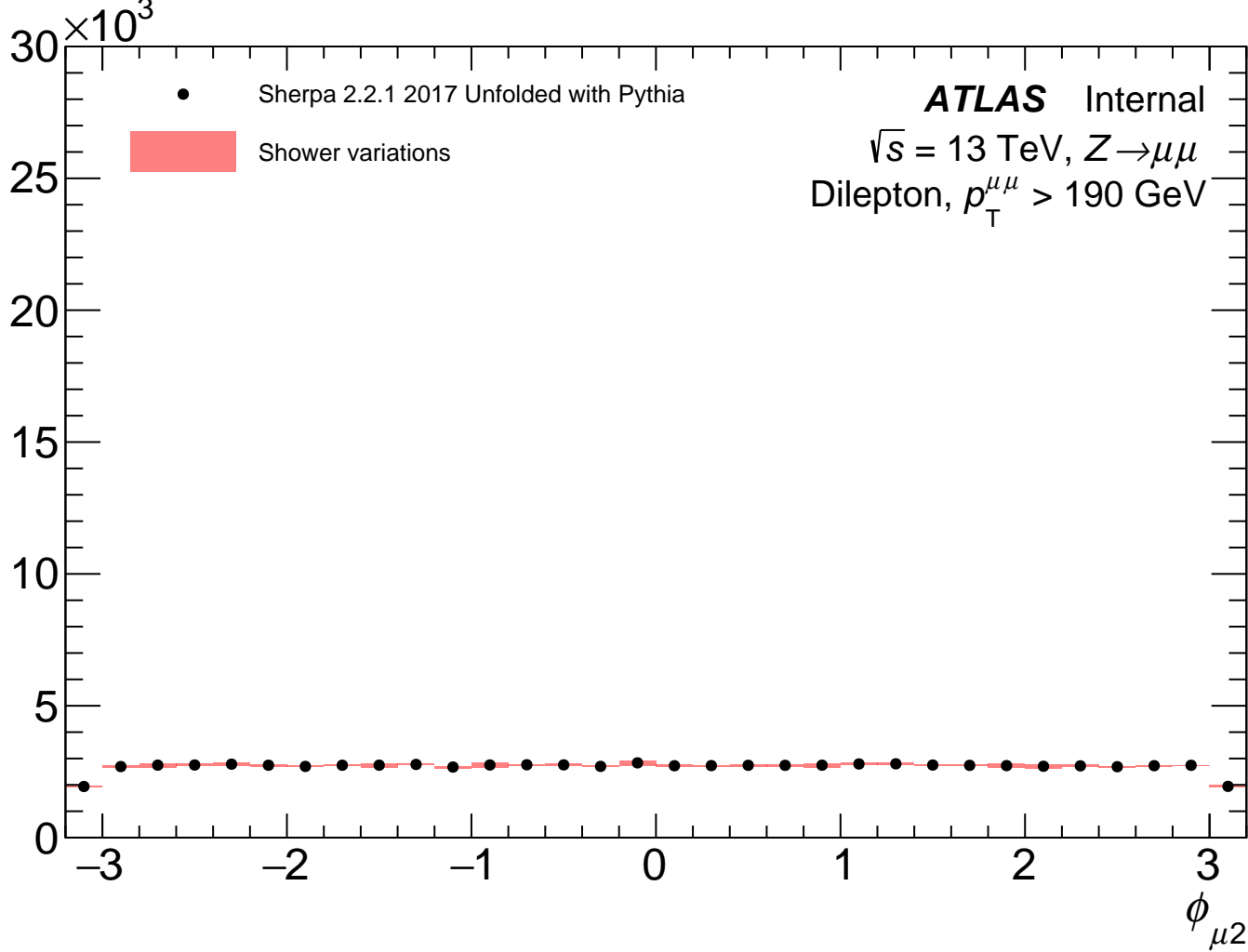
Events



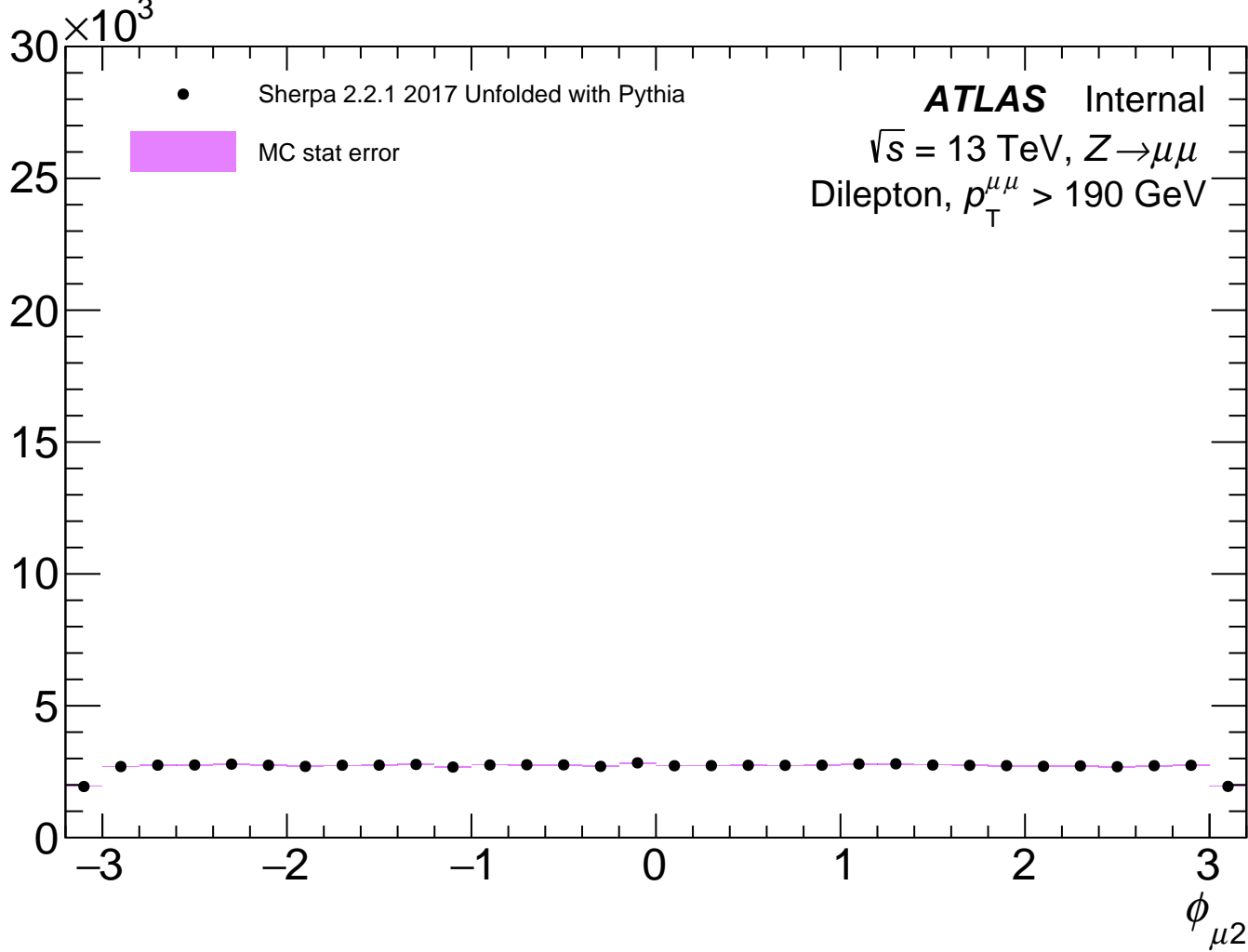
Events



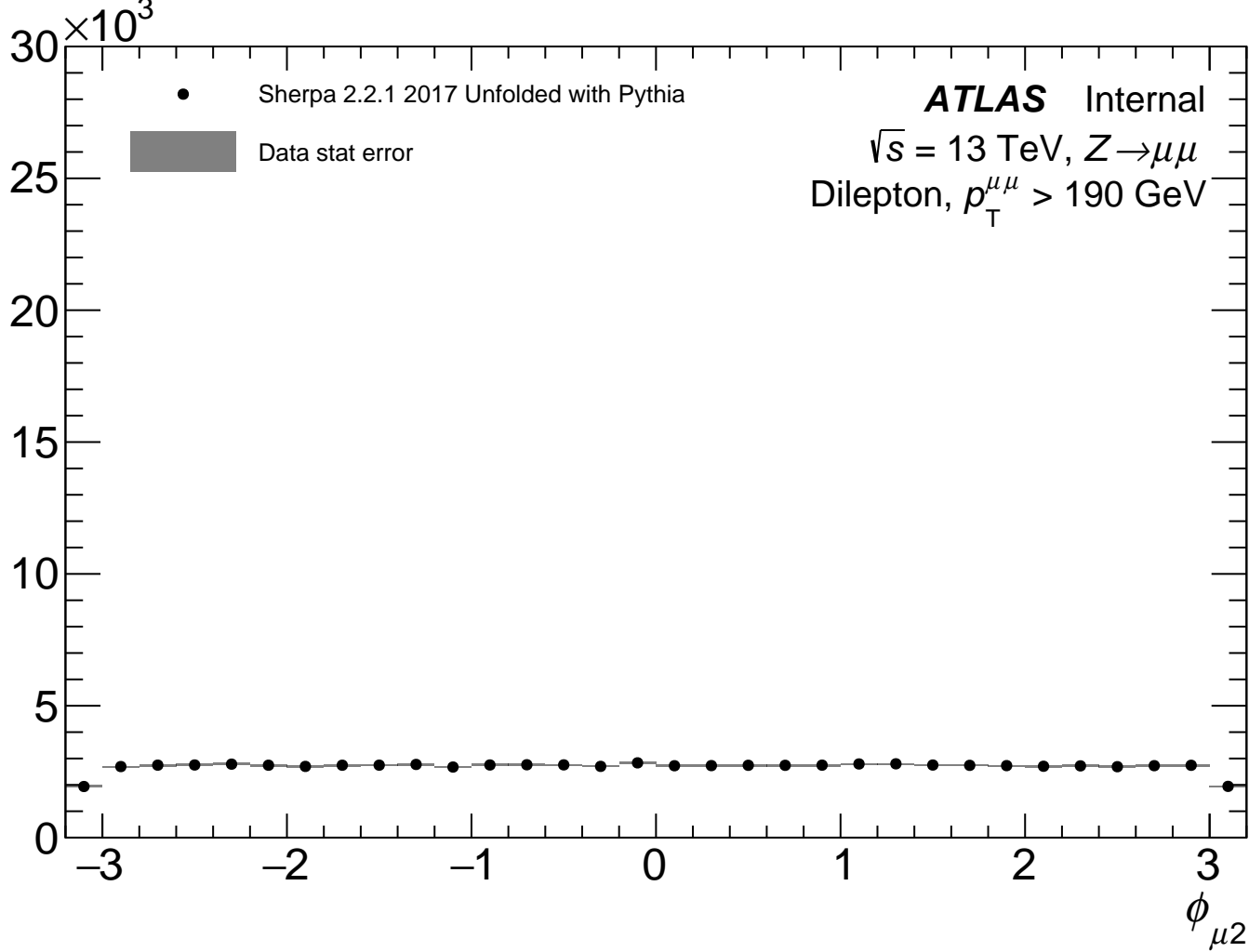
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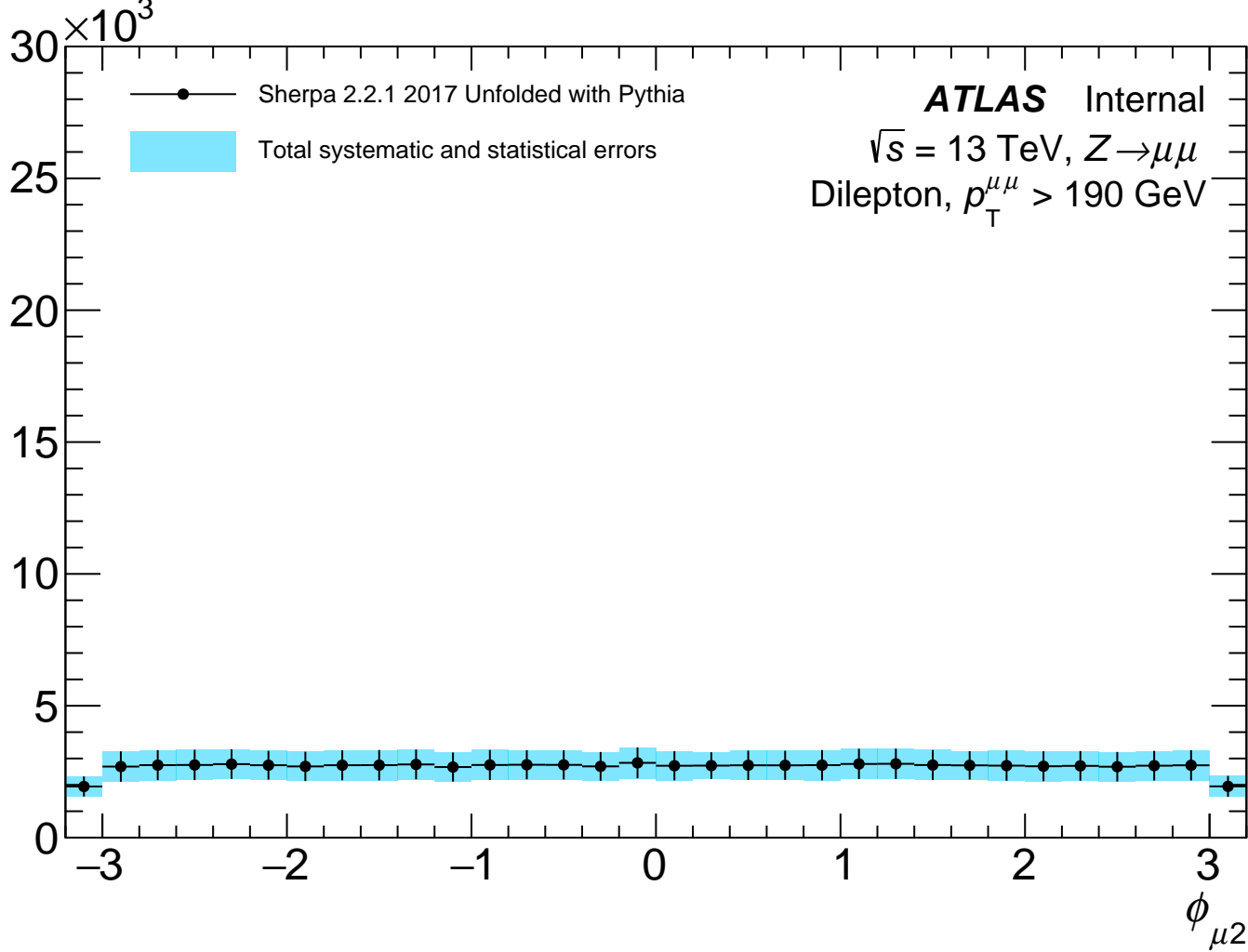
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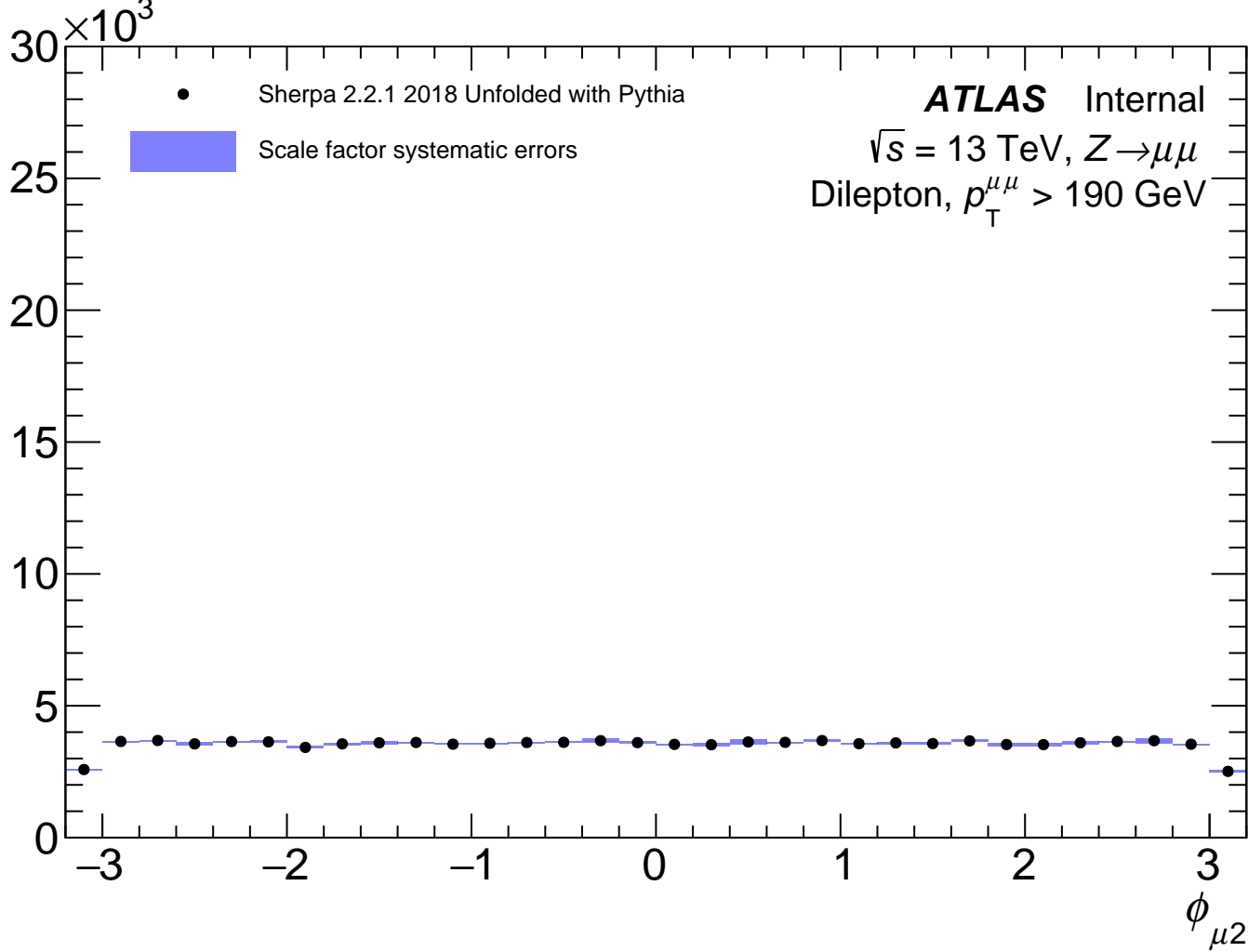
Events



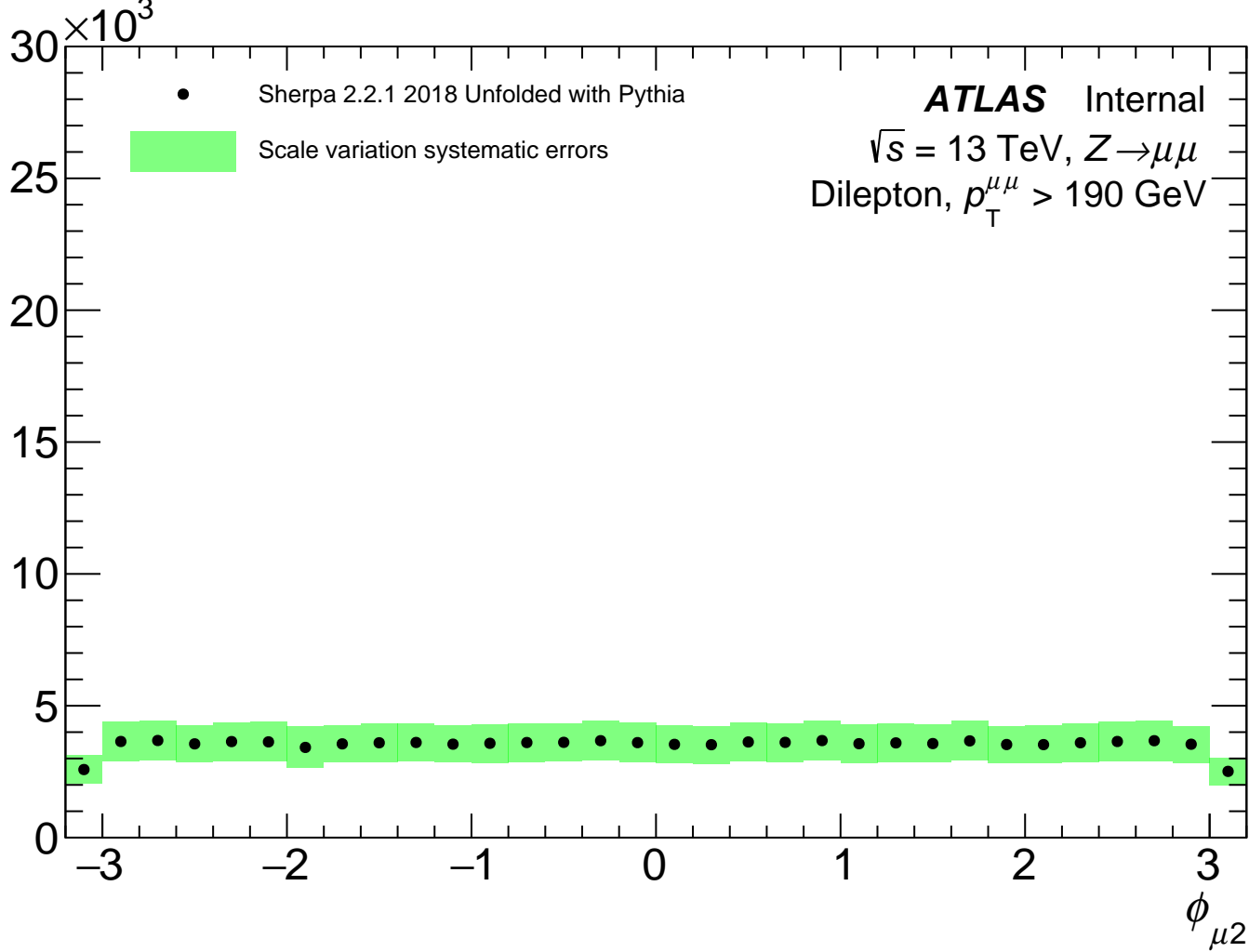
Events



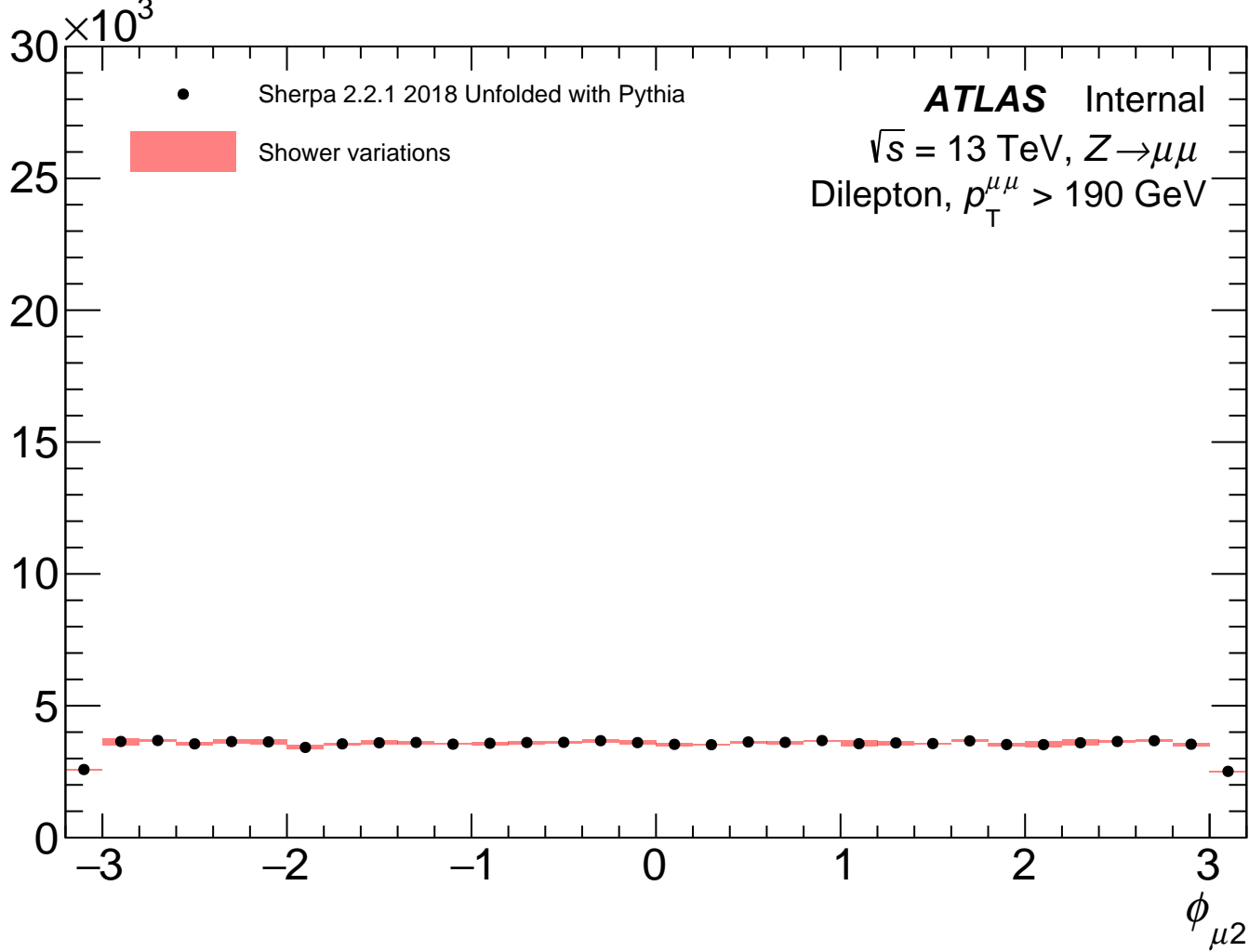
Events



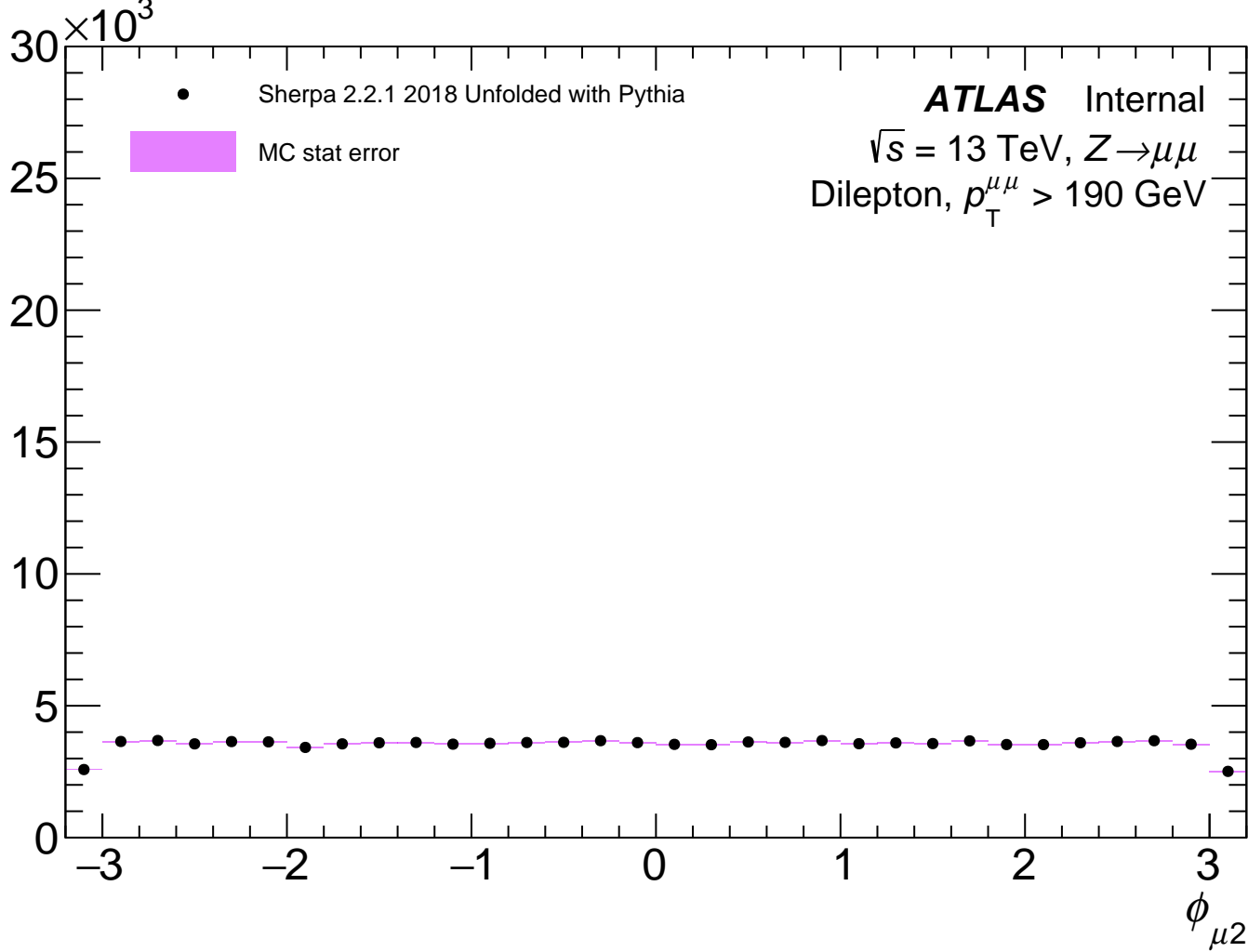
Events



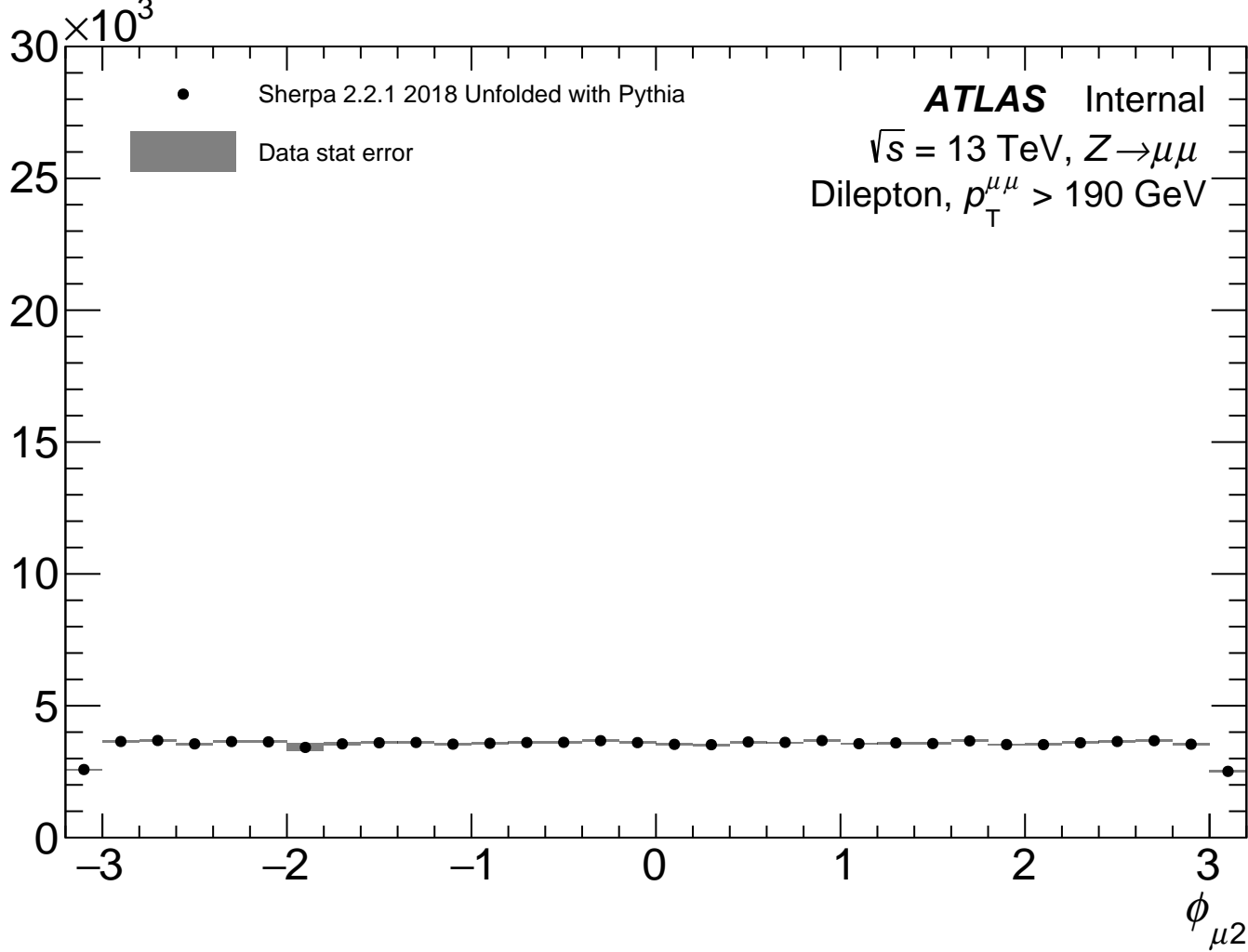
Events



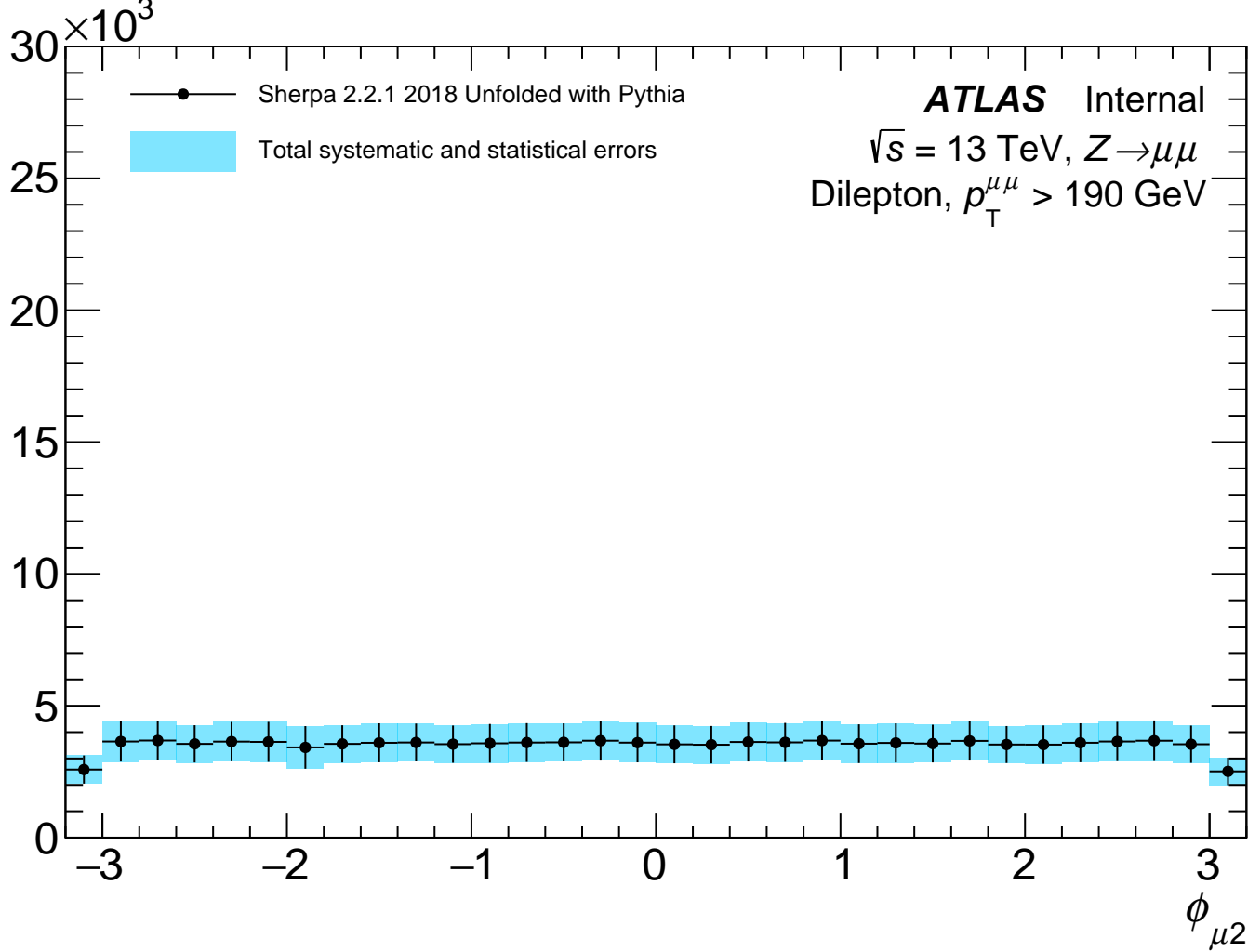
Events



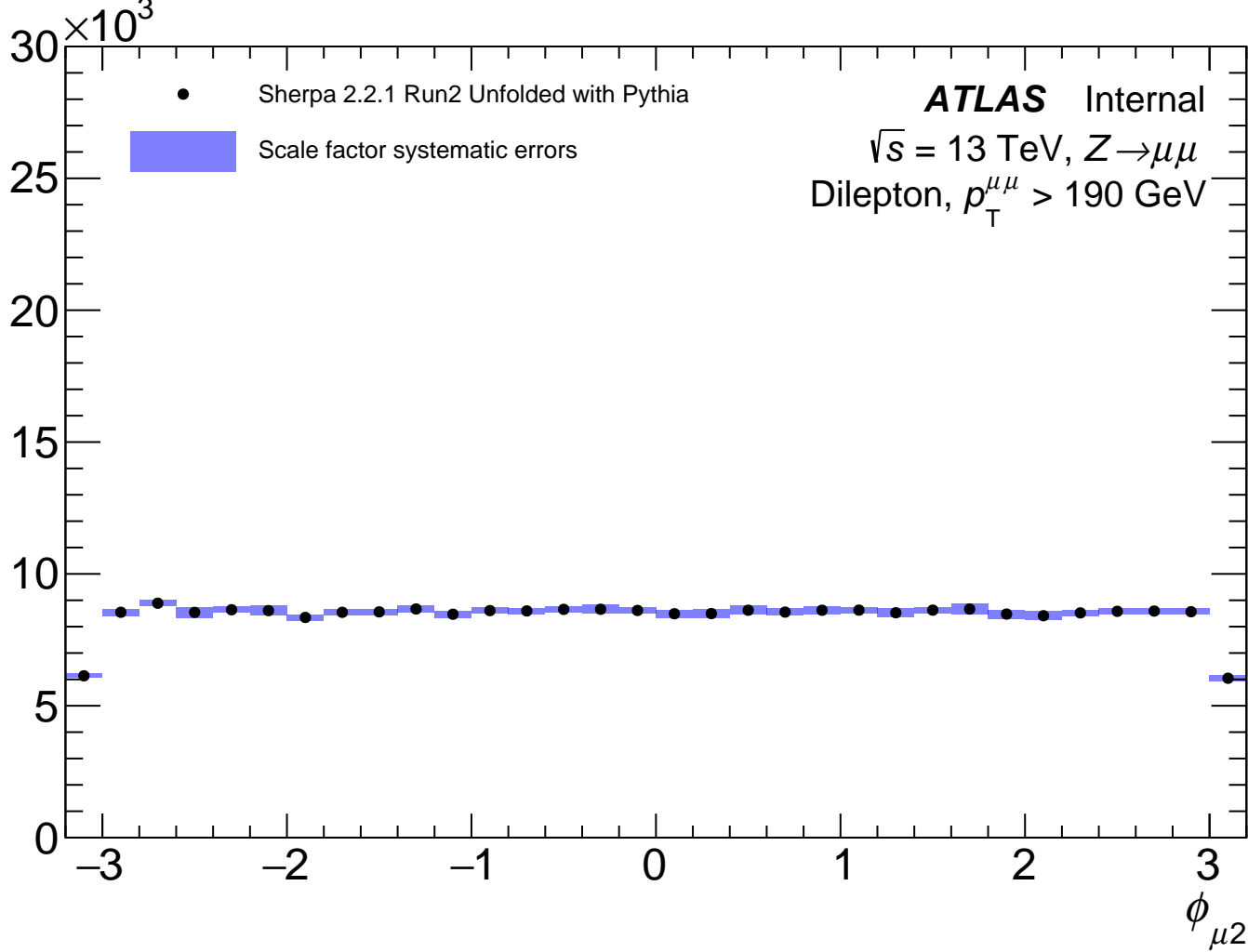
Events



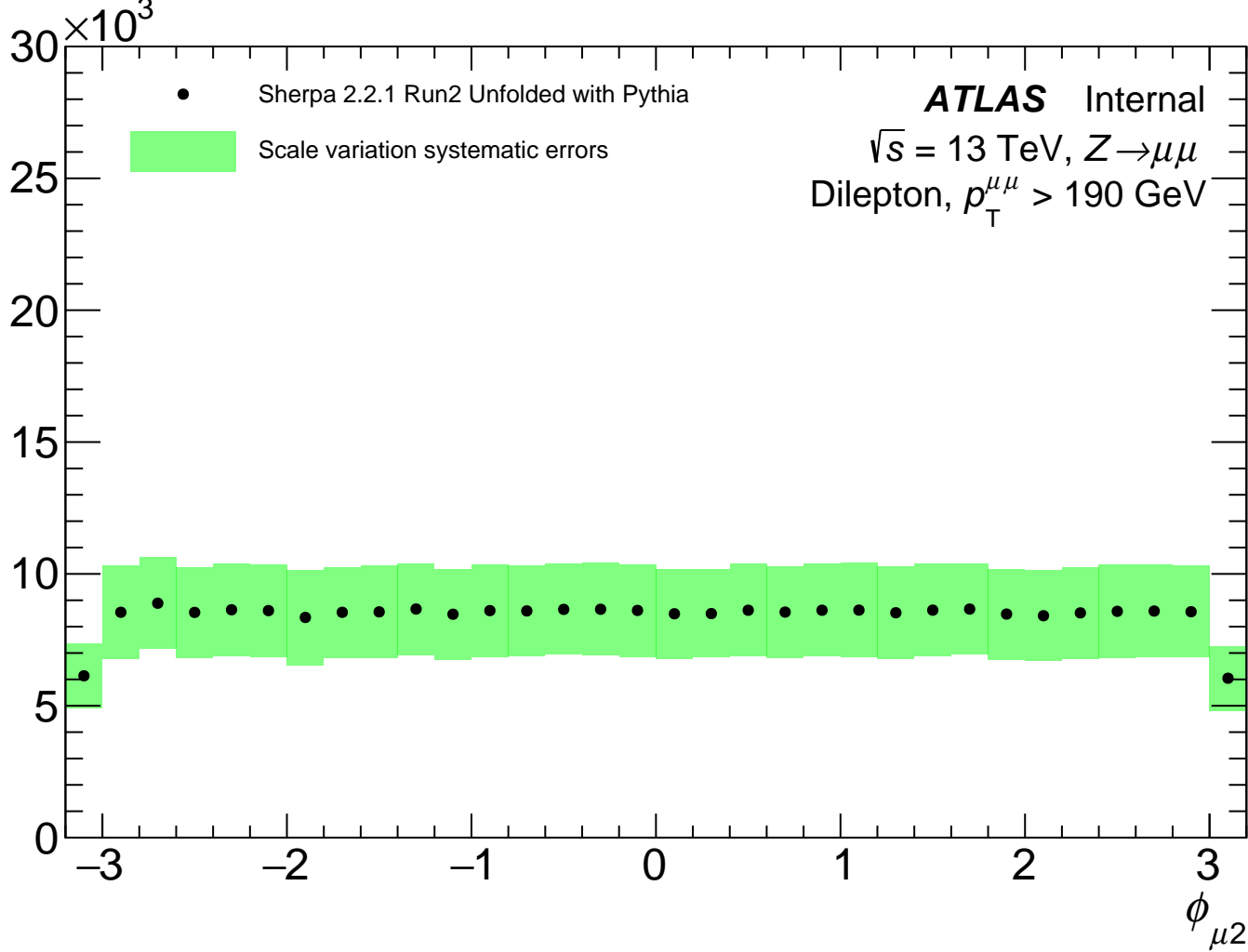
Events



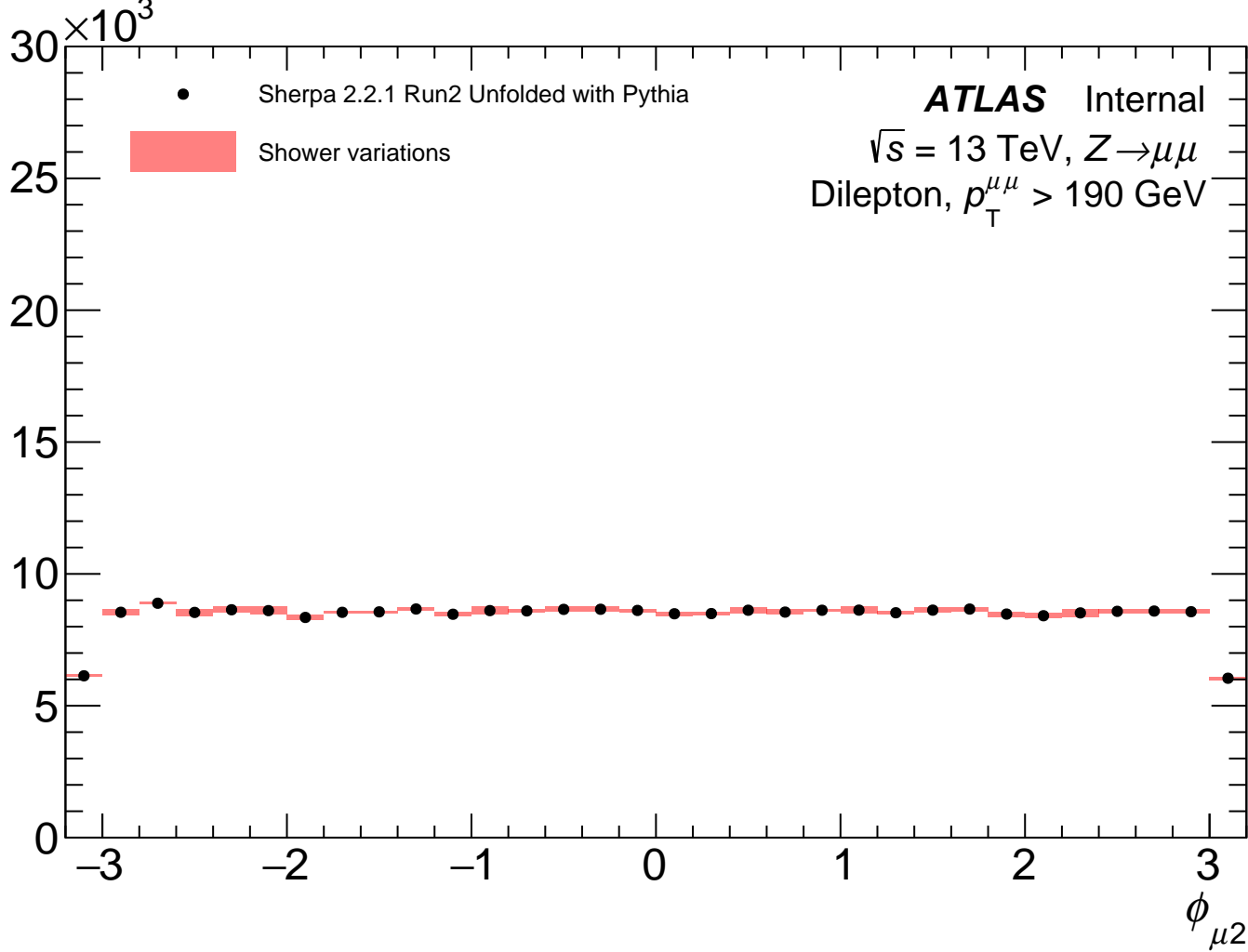
Events



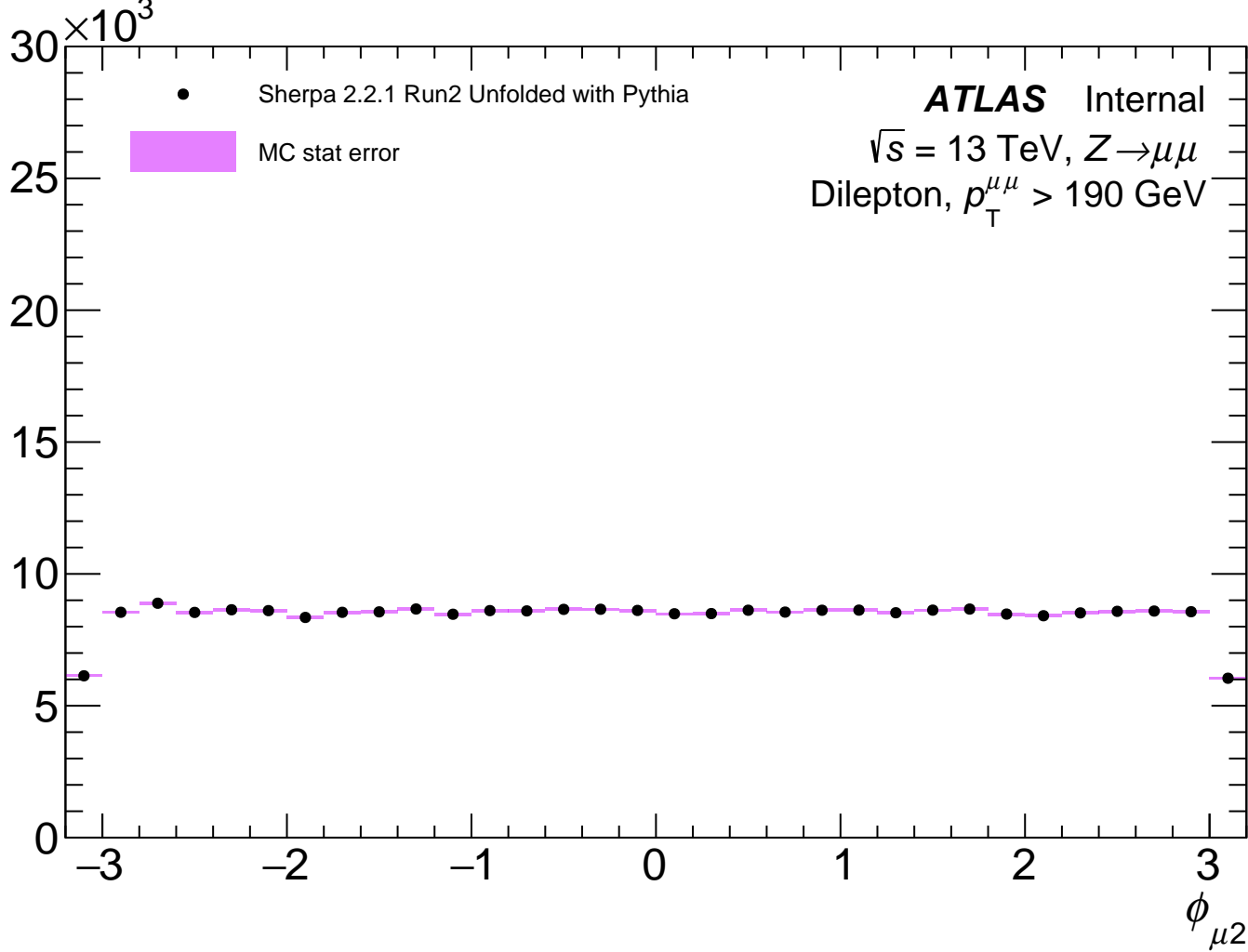
Events



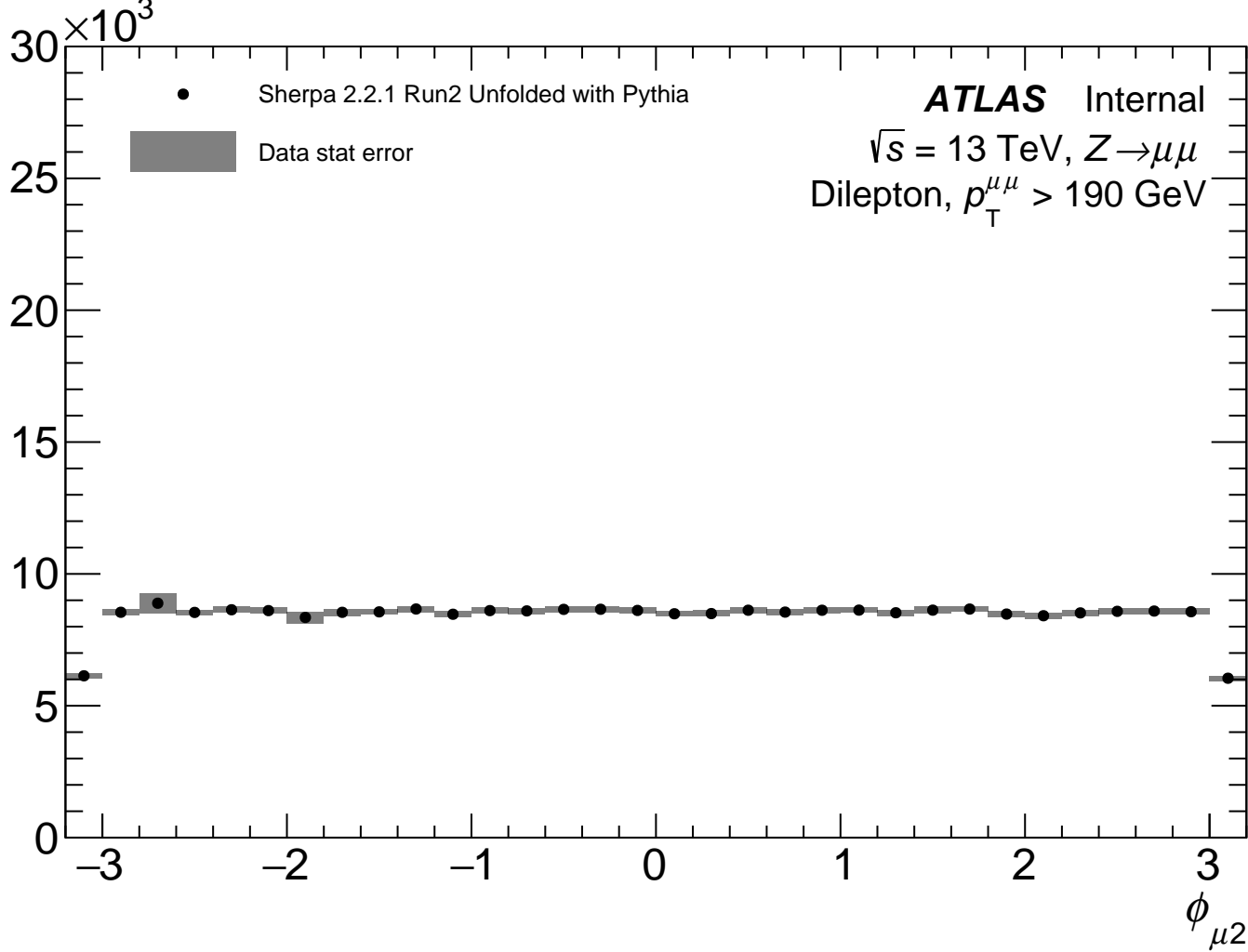
Events



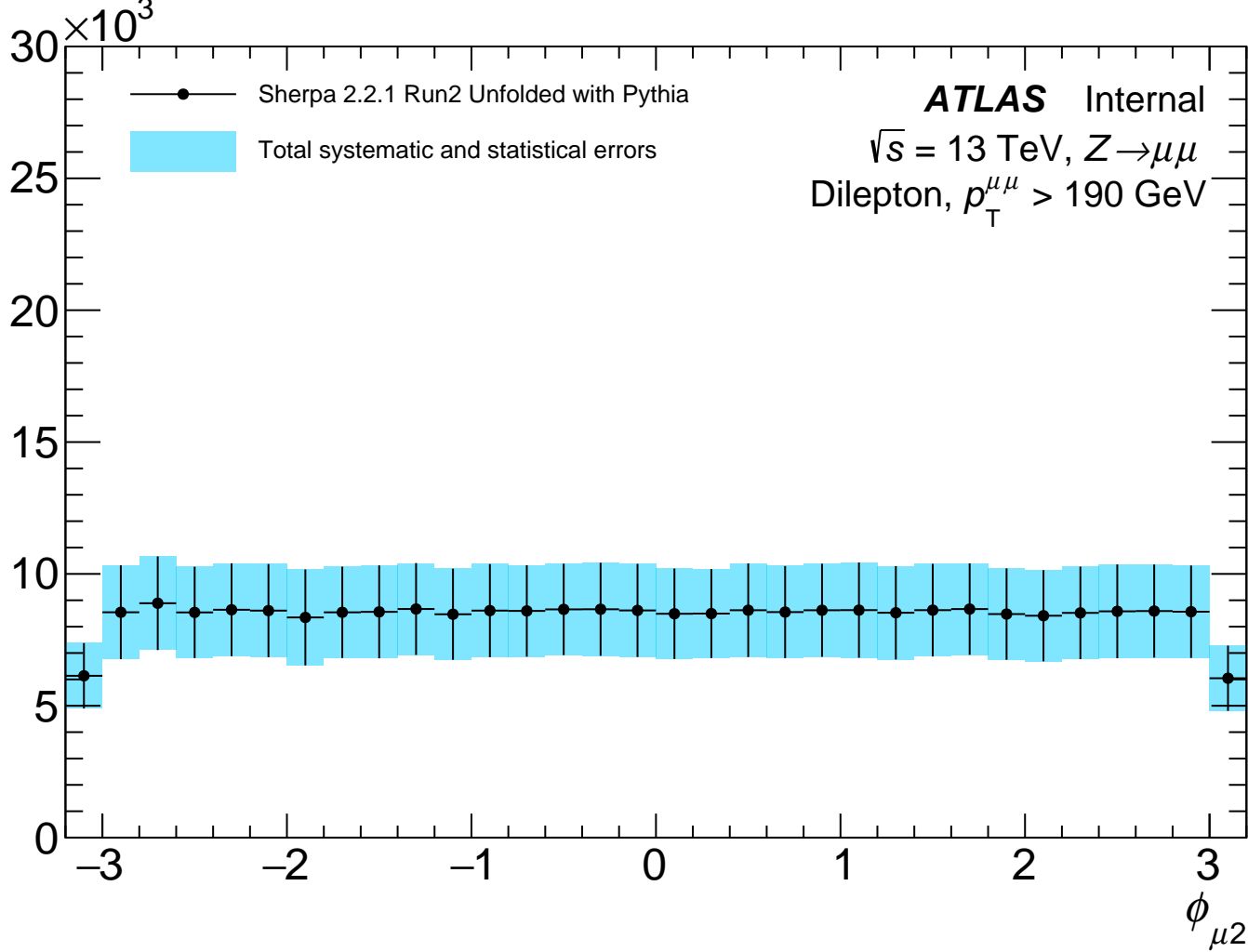
Events



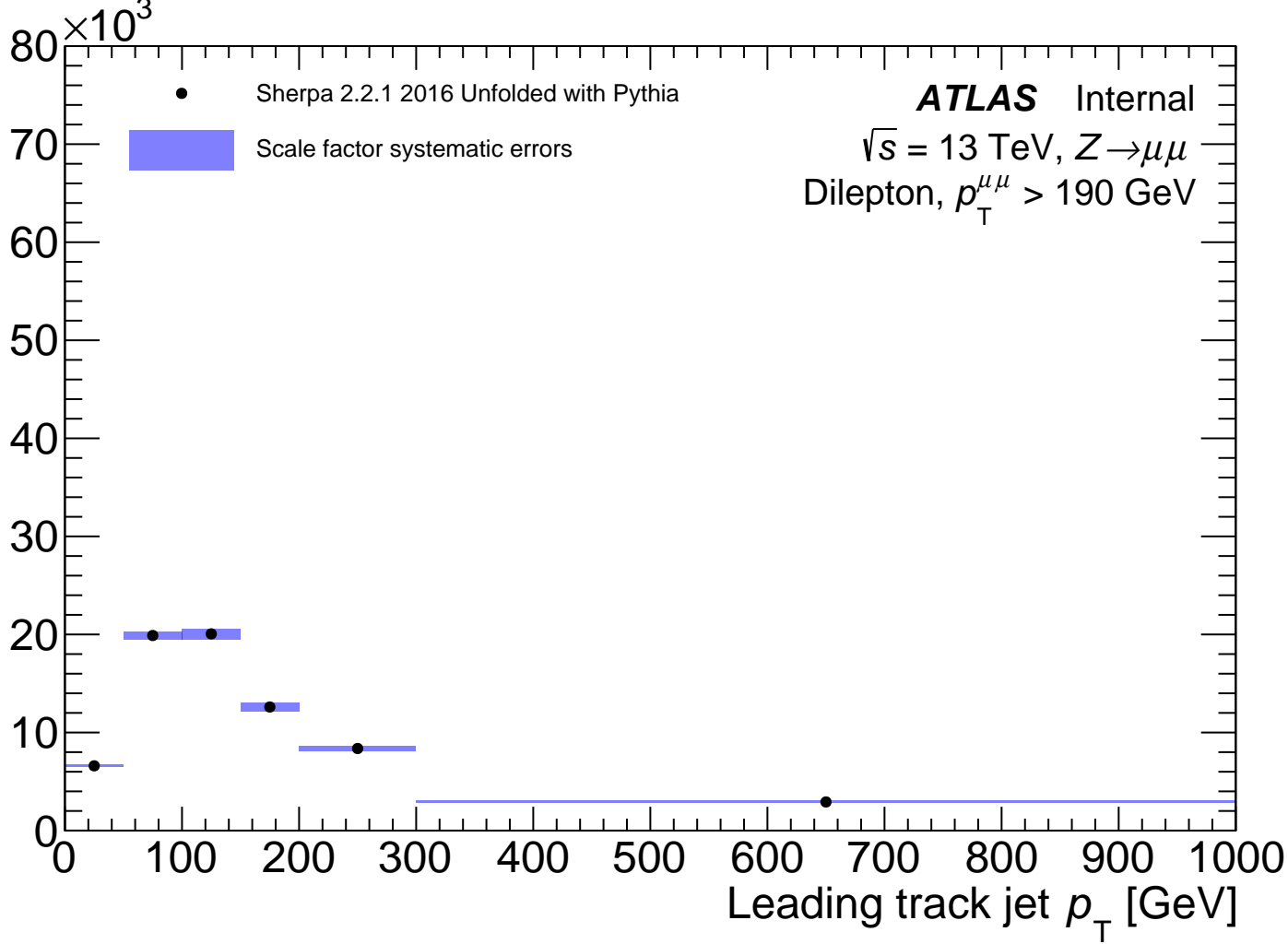
Events



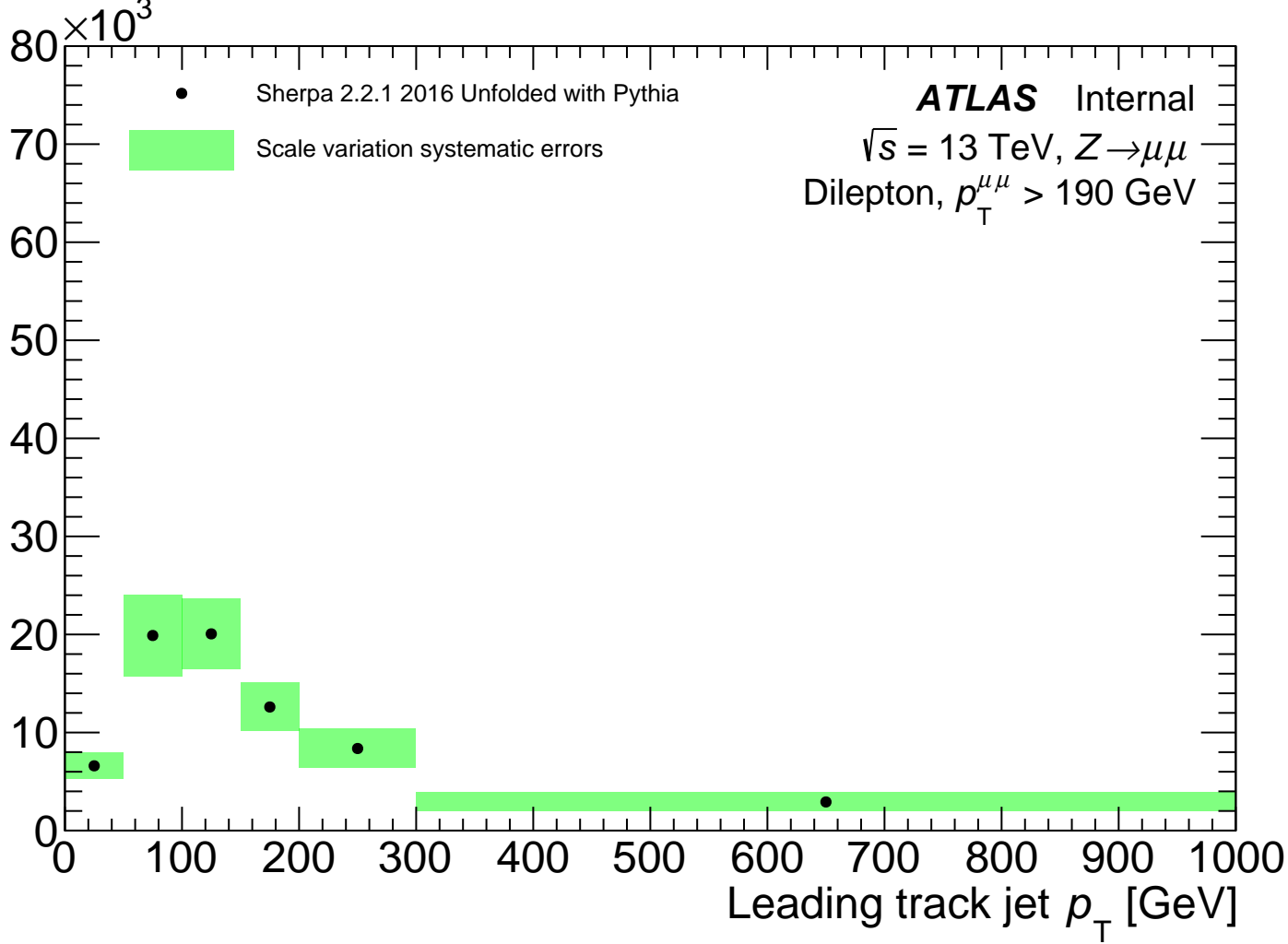
Events



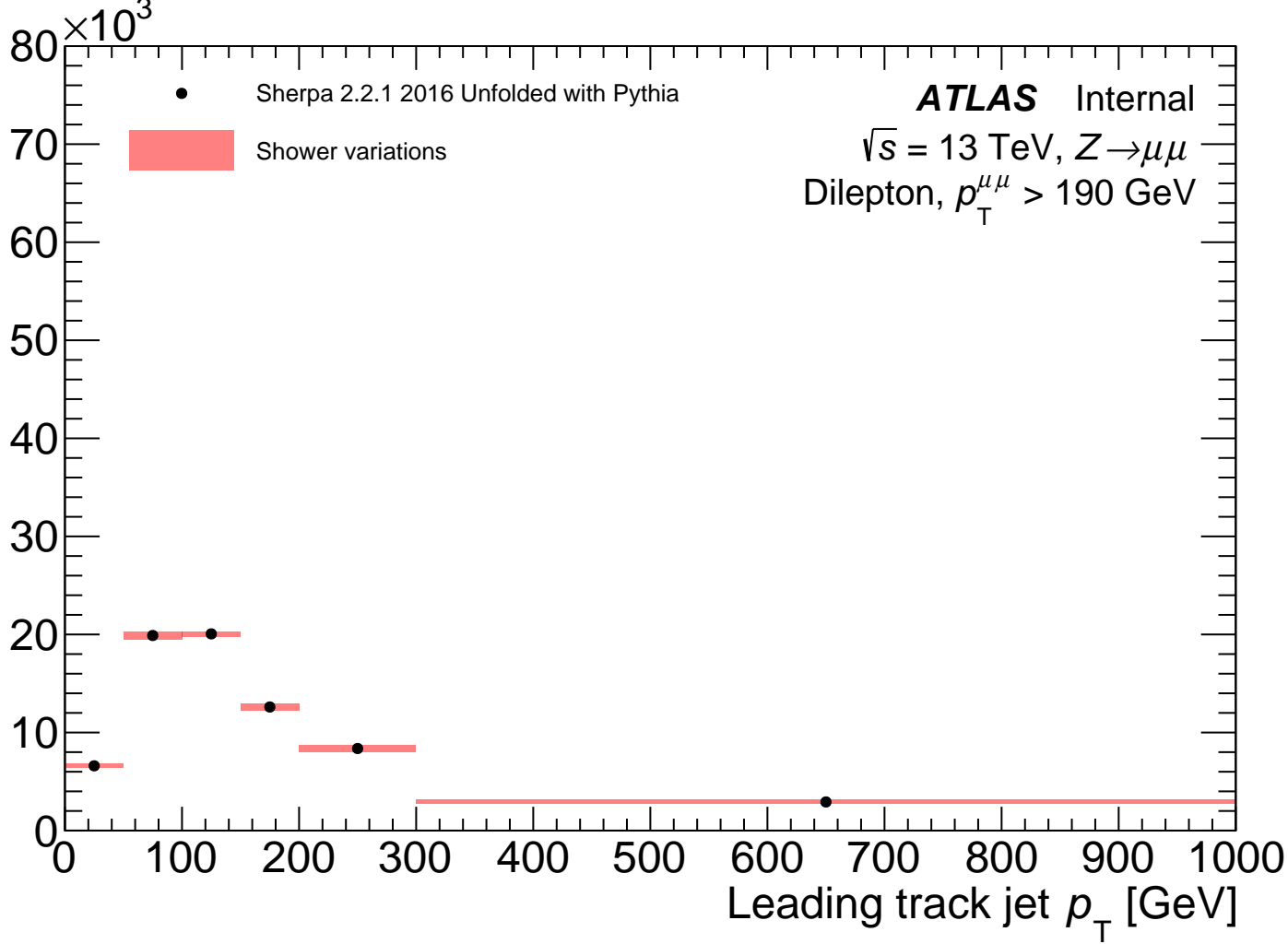
Events



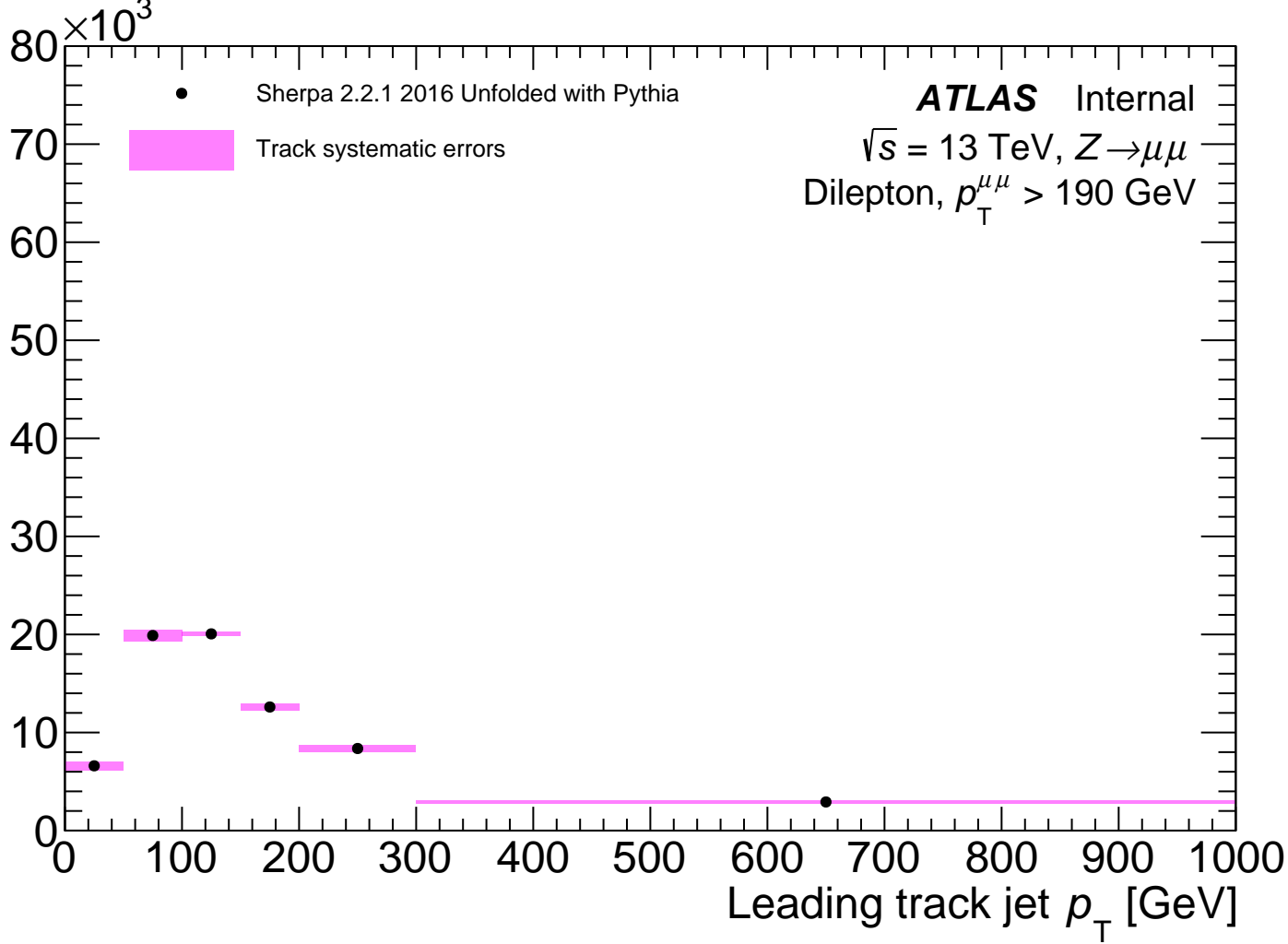
Events



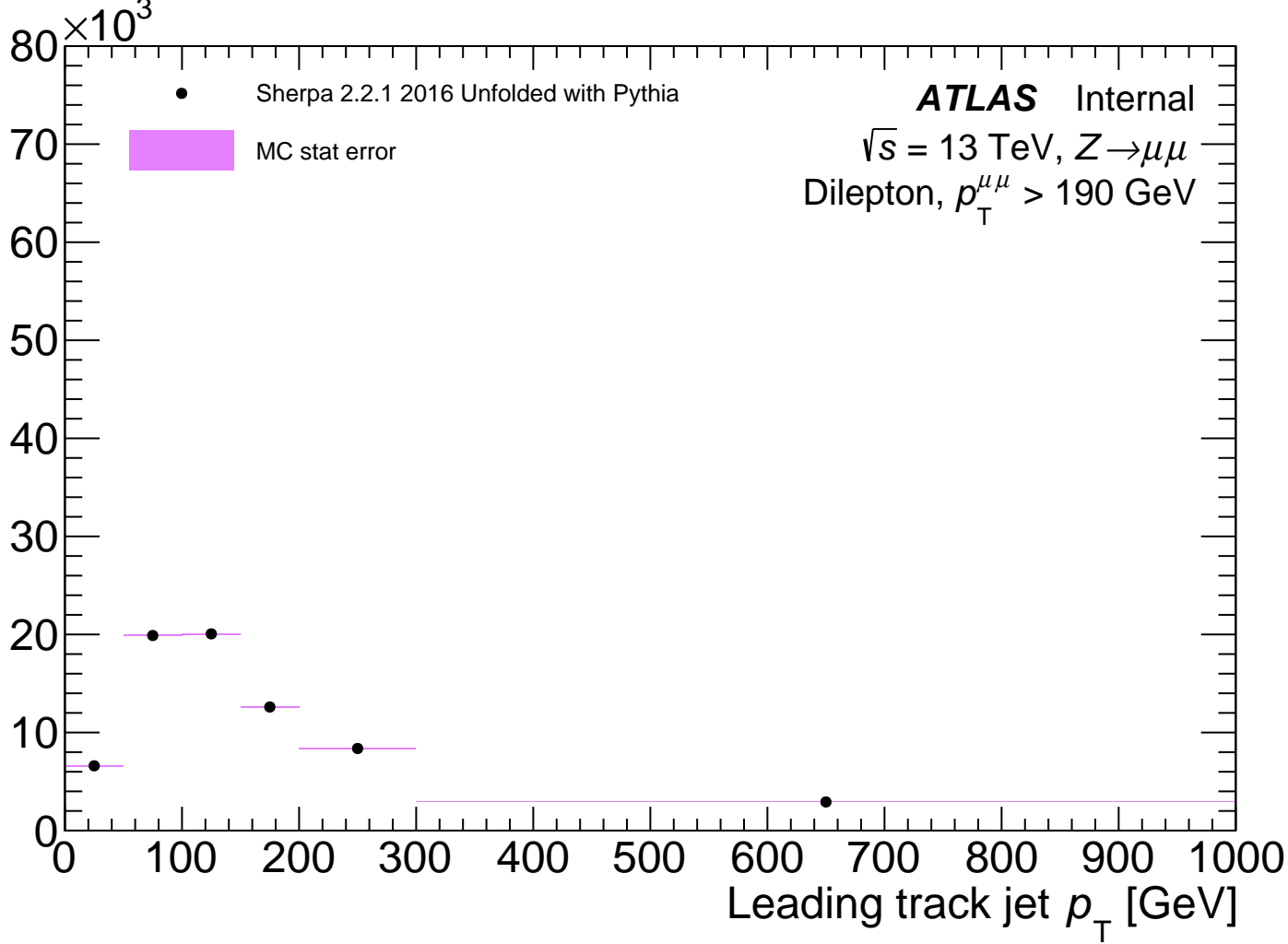
Events



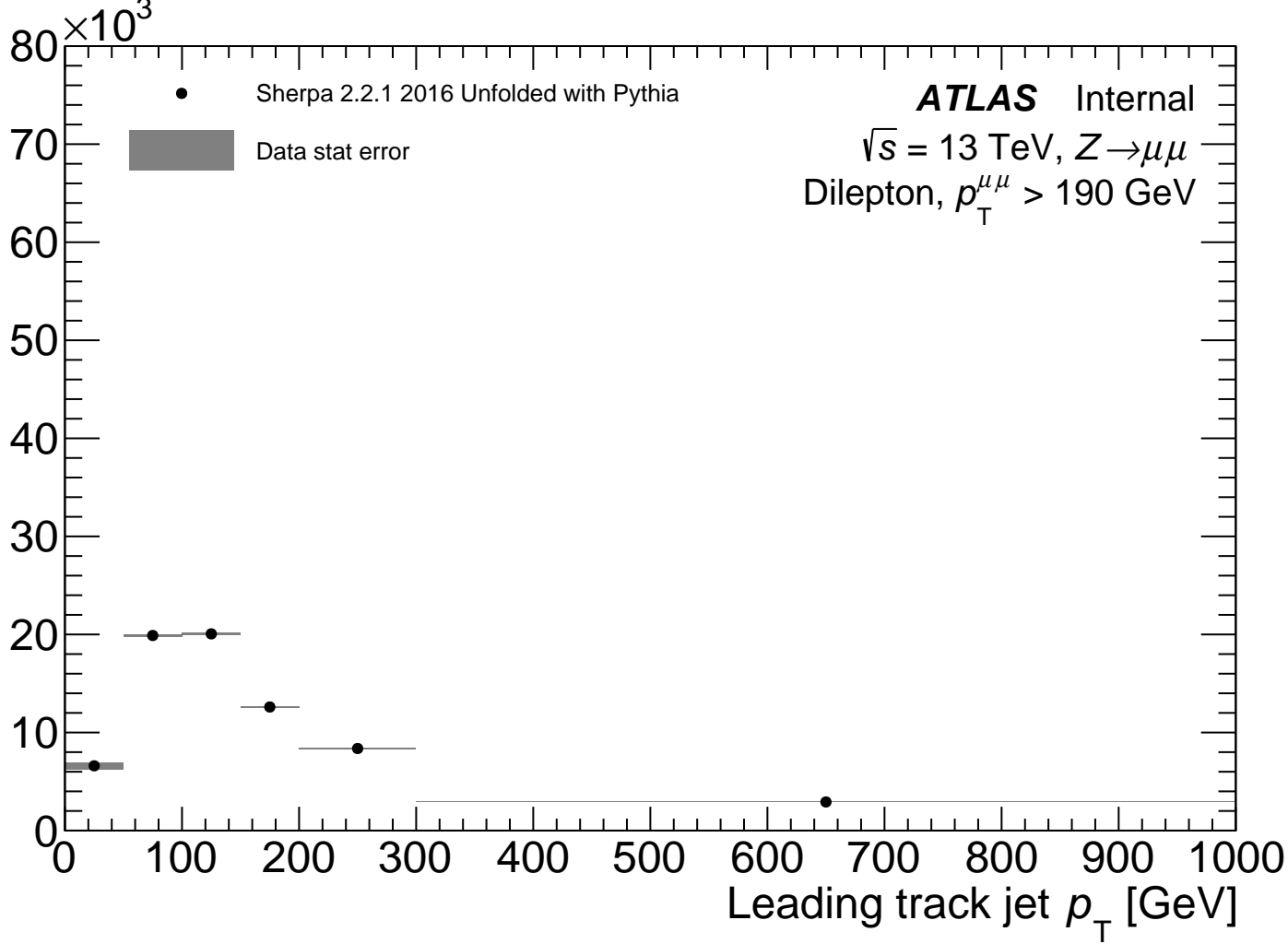
Events



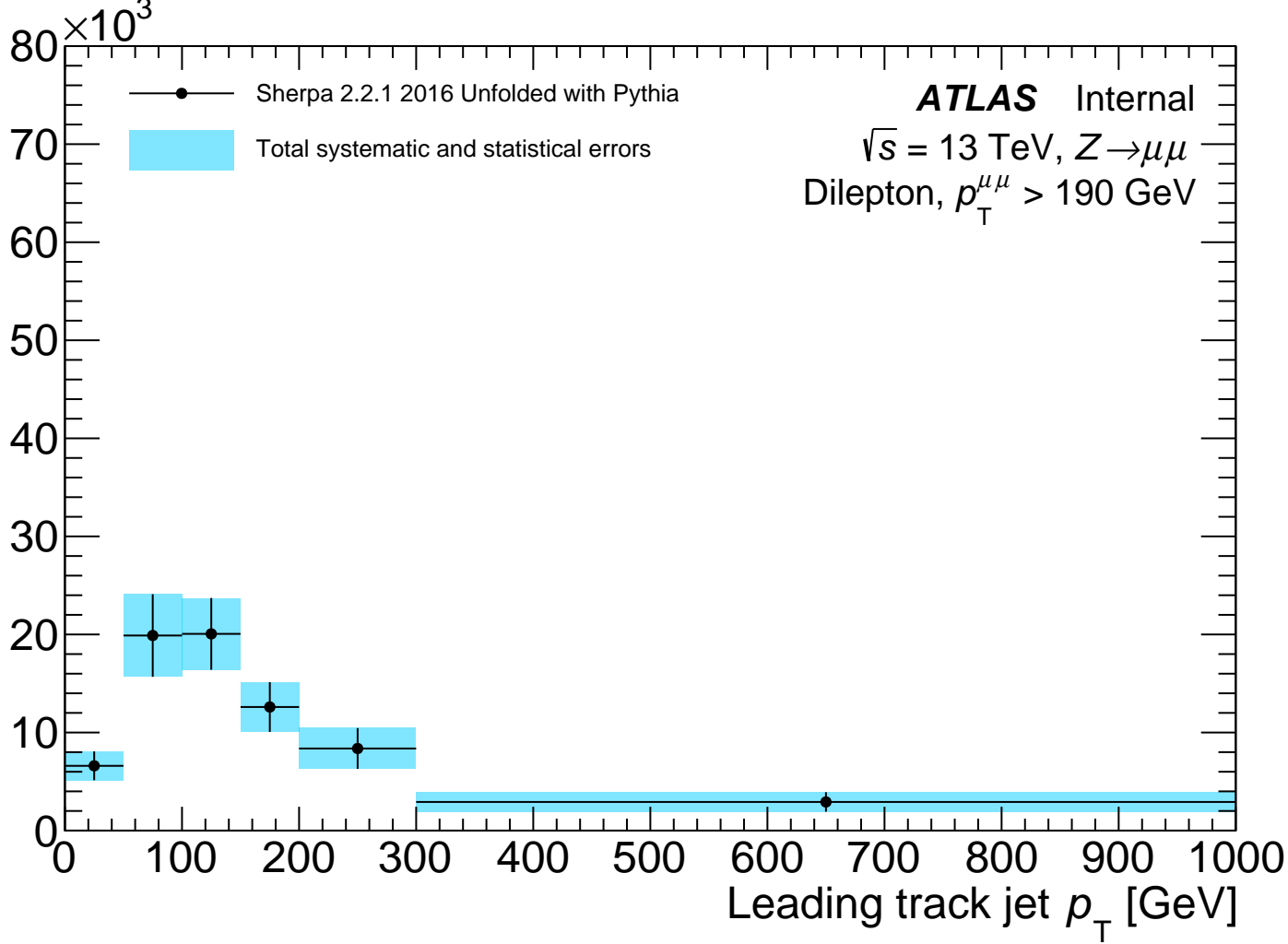
Events



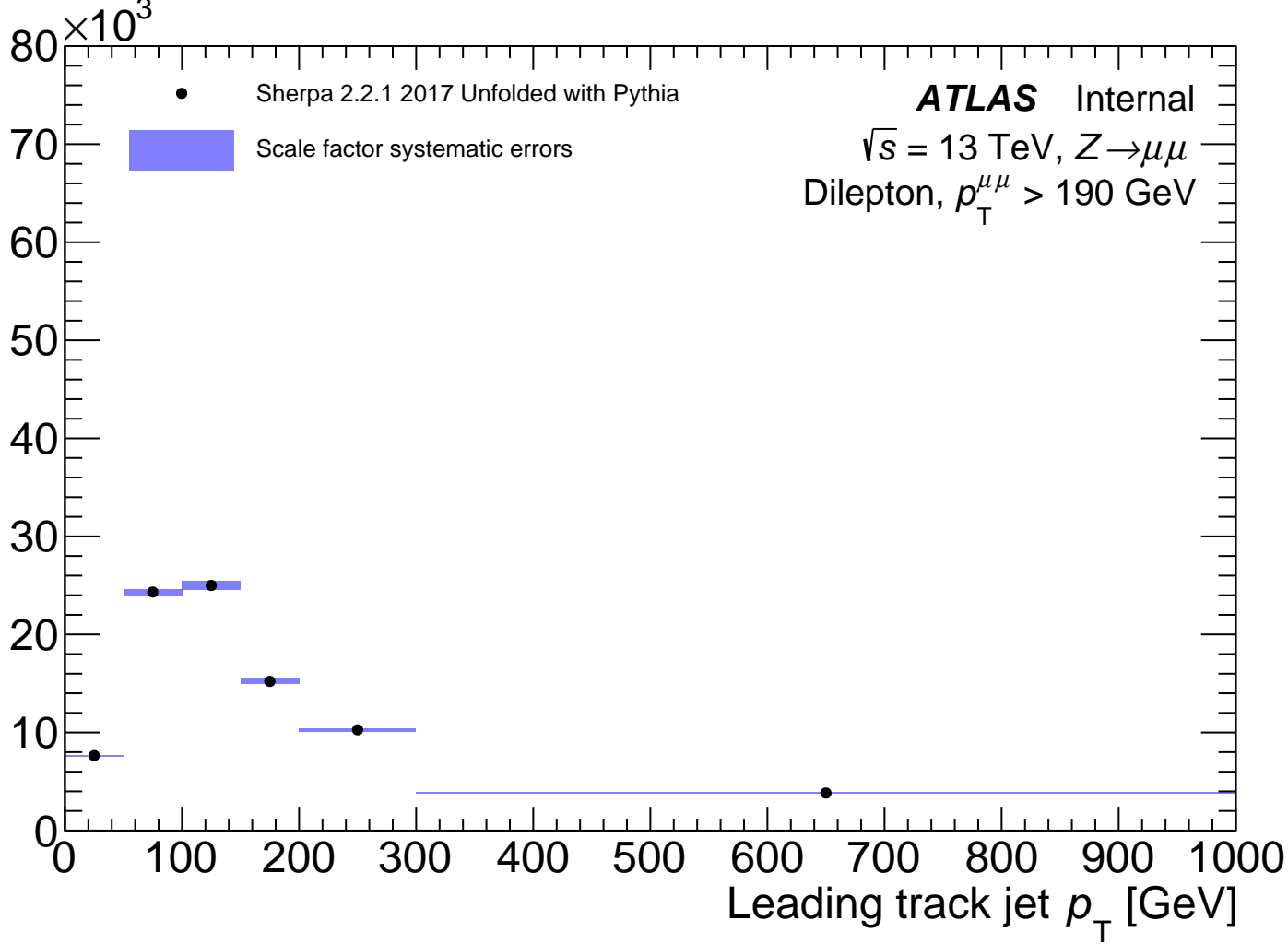
Events



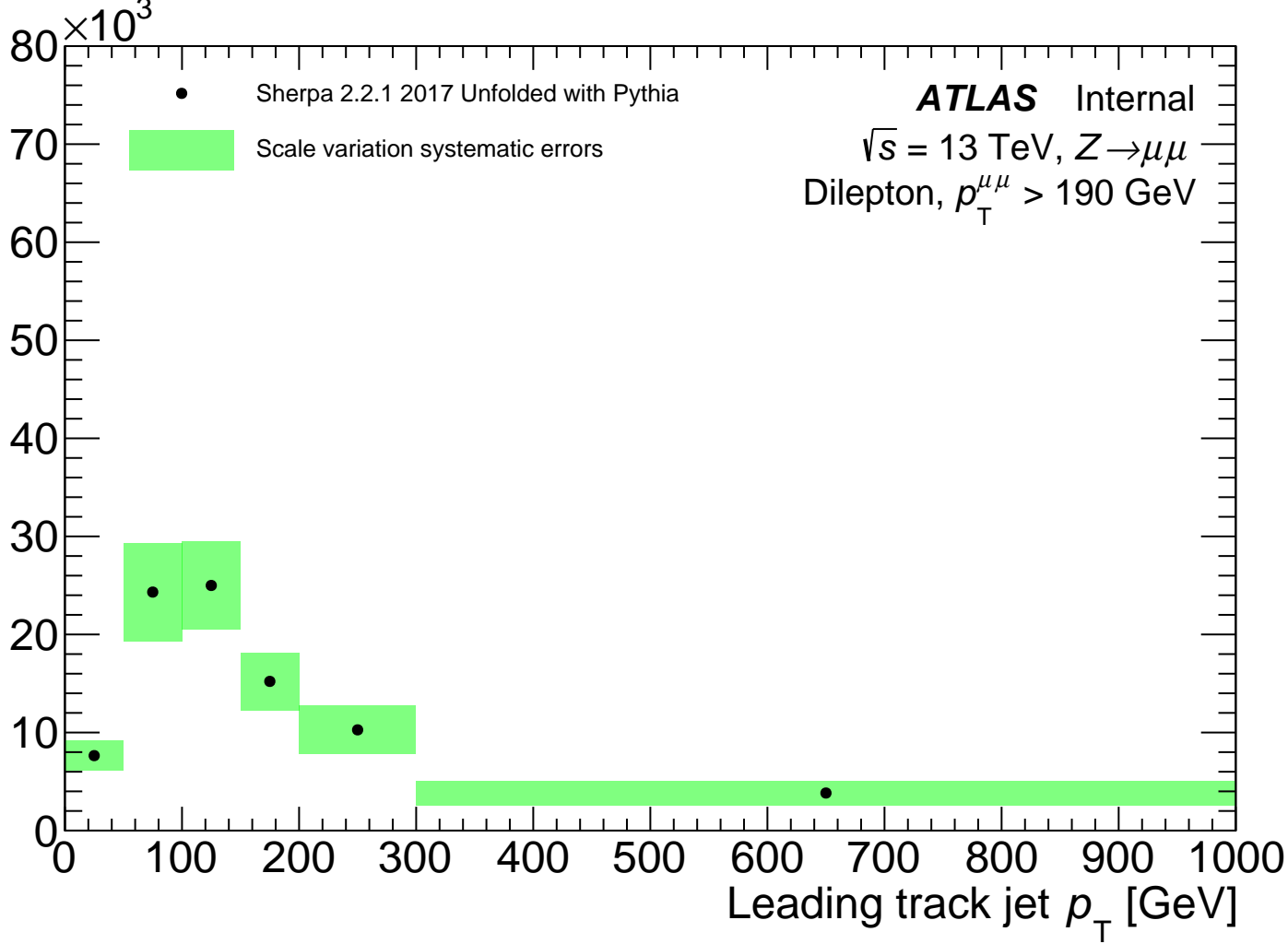
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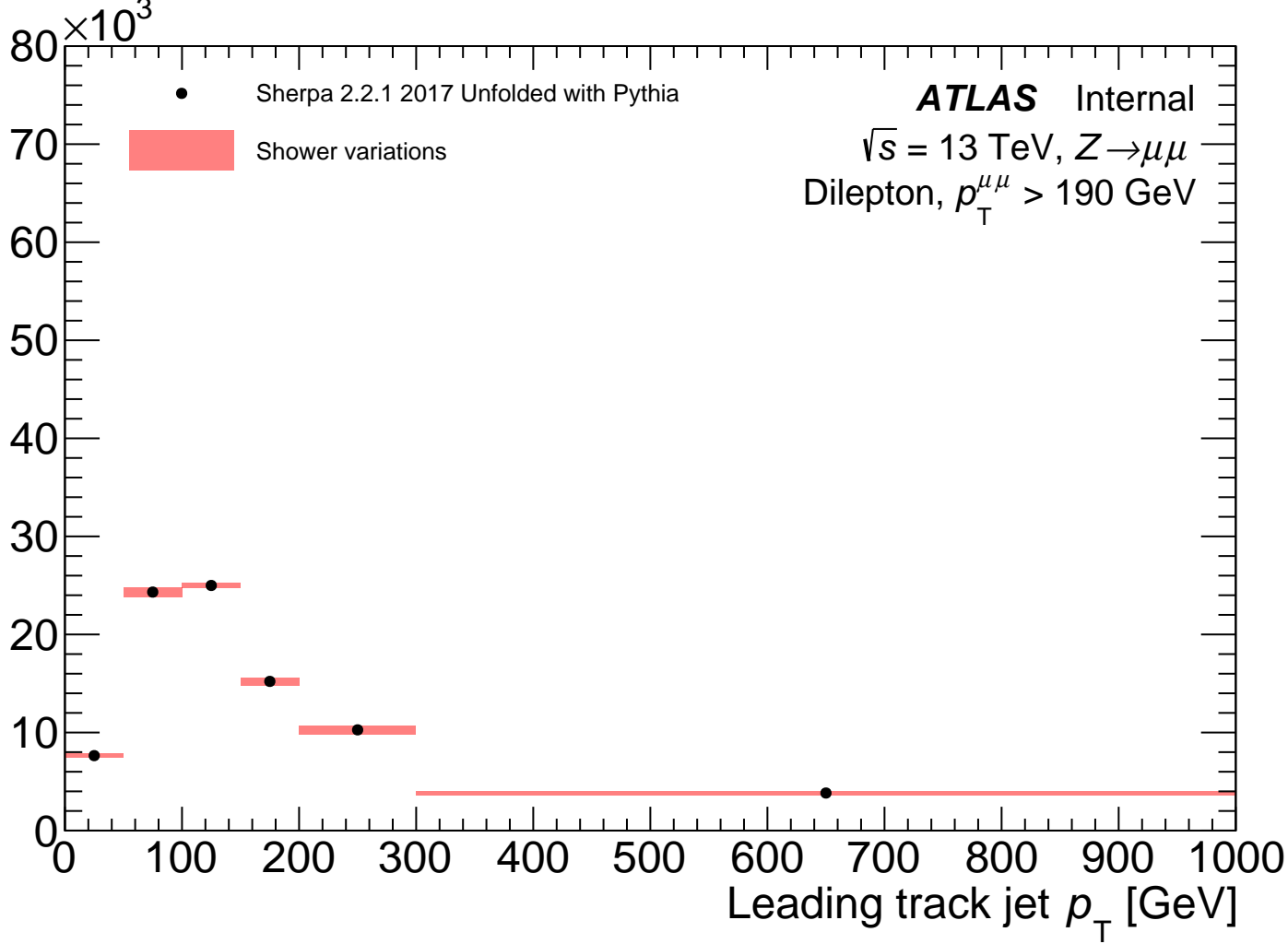
Events



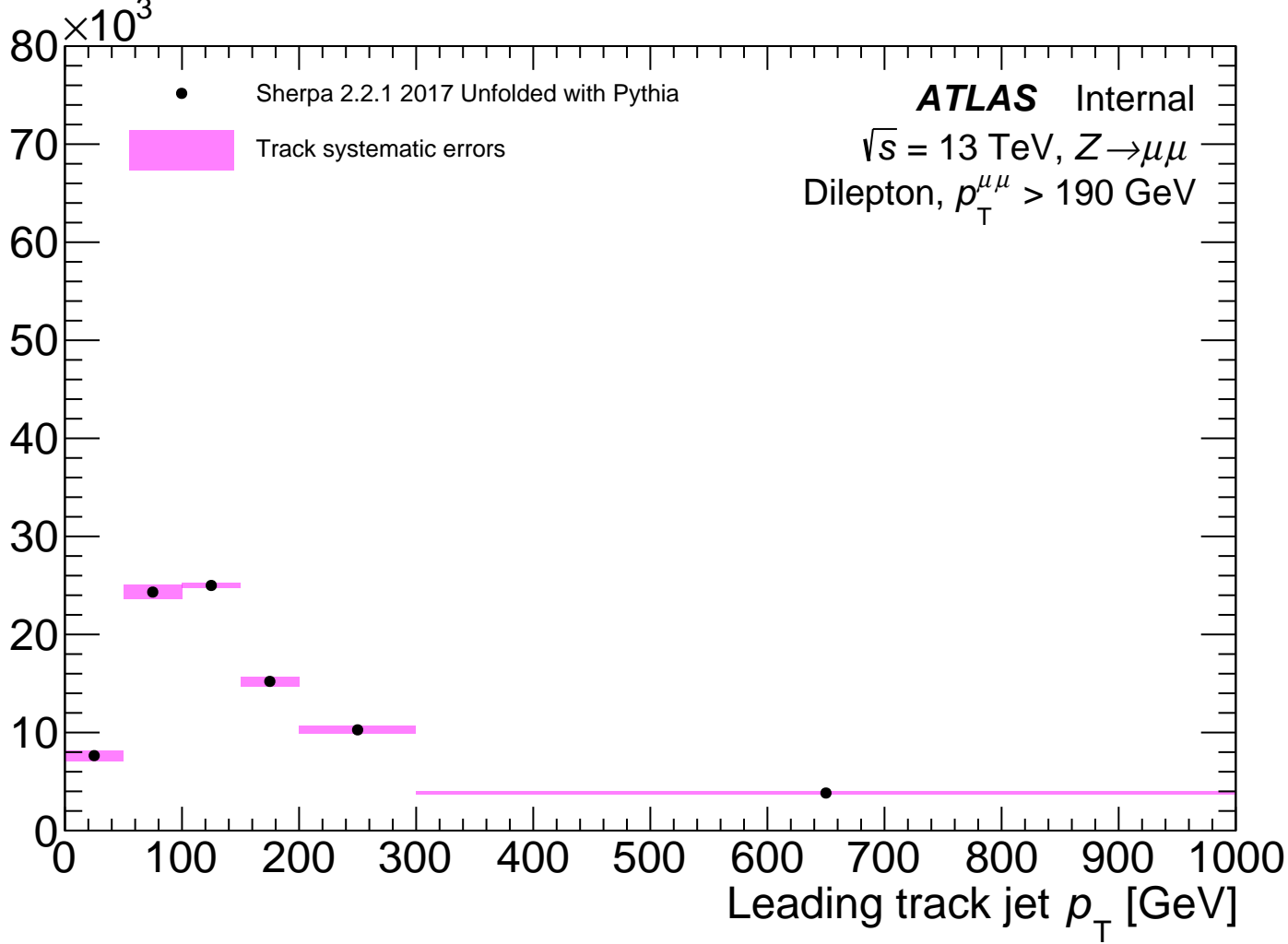
Events



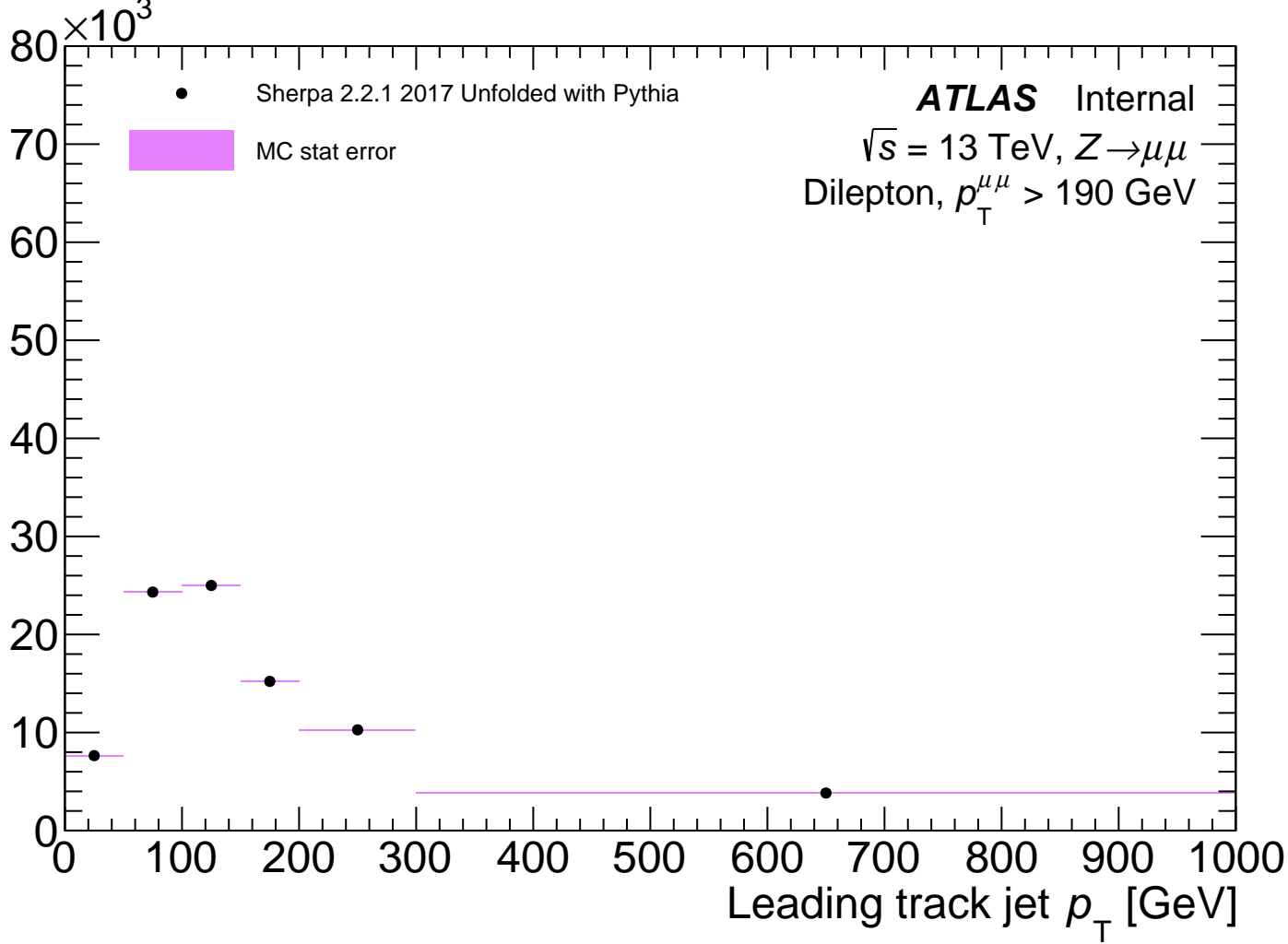
Events



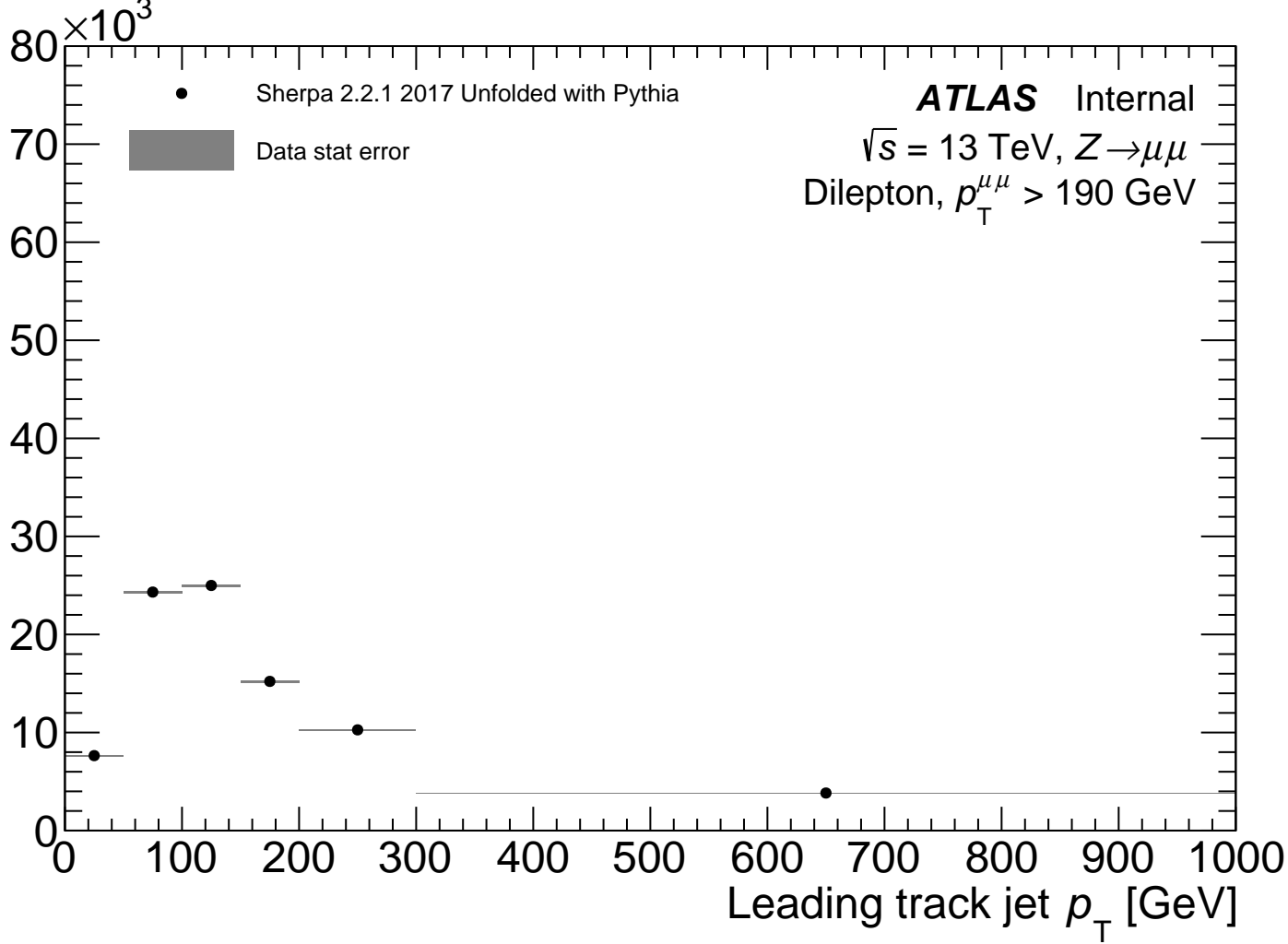
Events



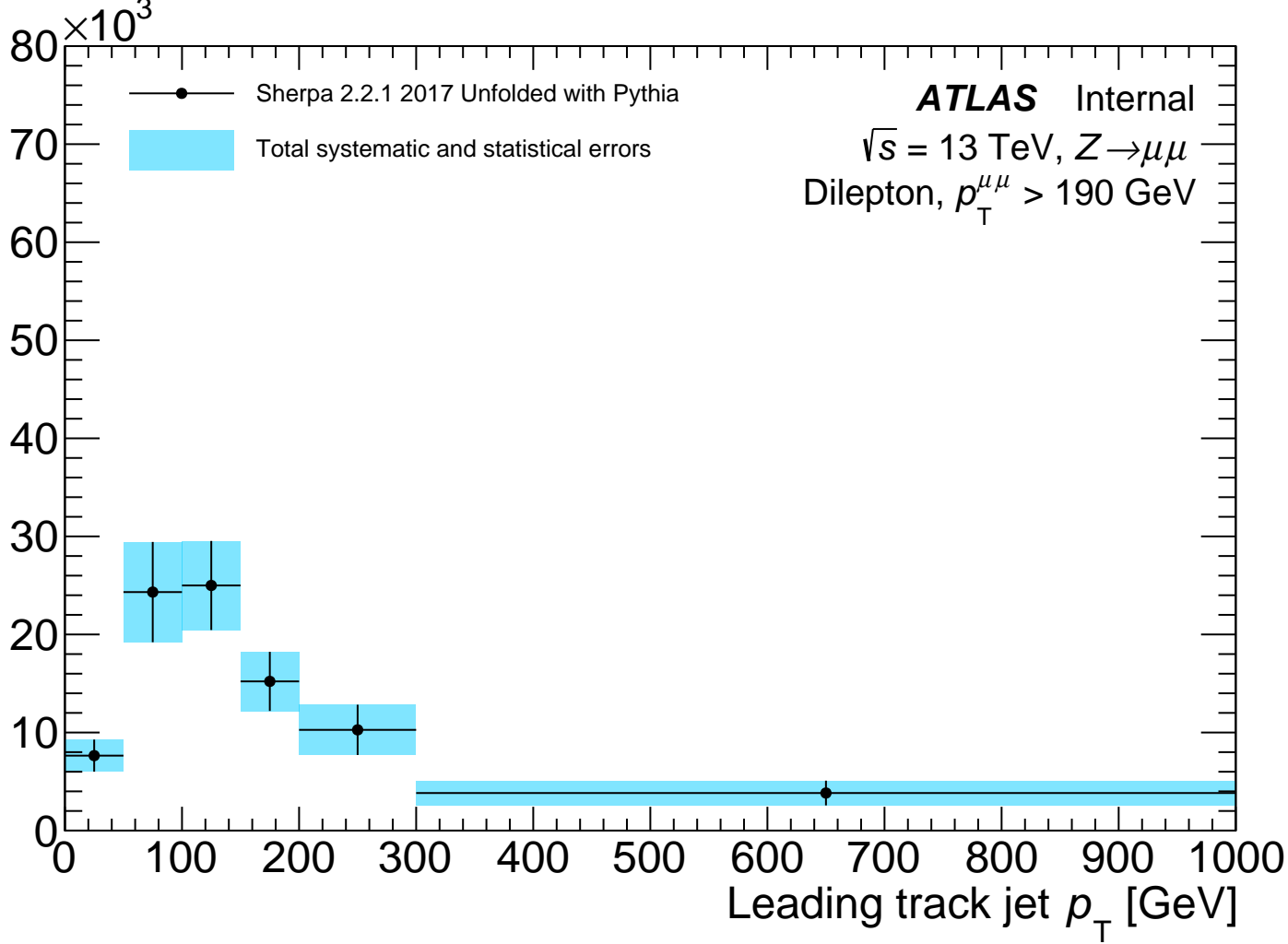
Events



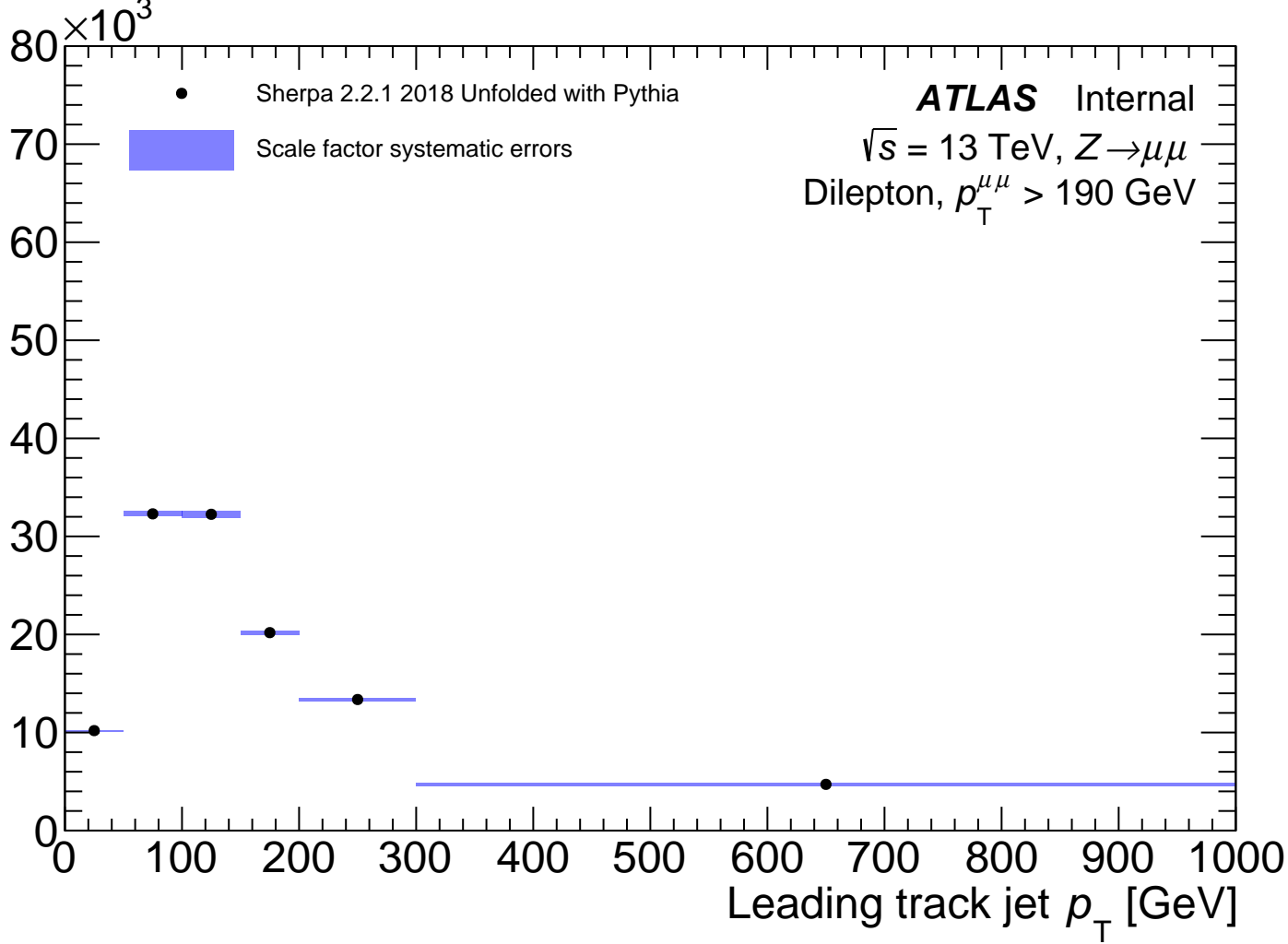
Events



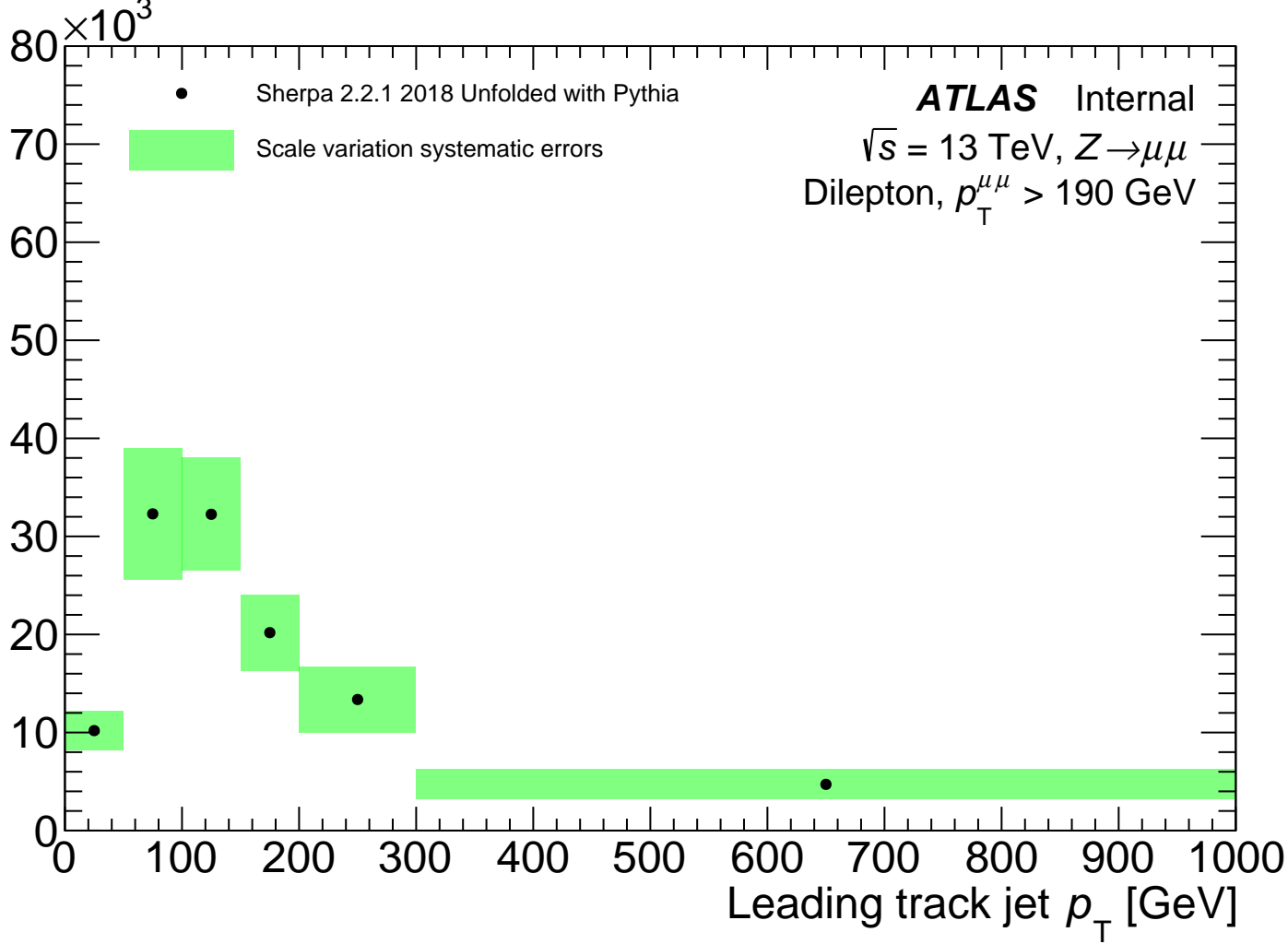
Events



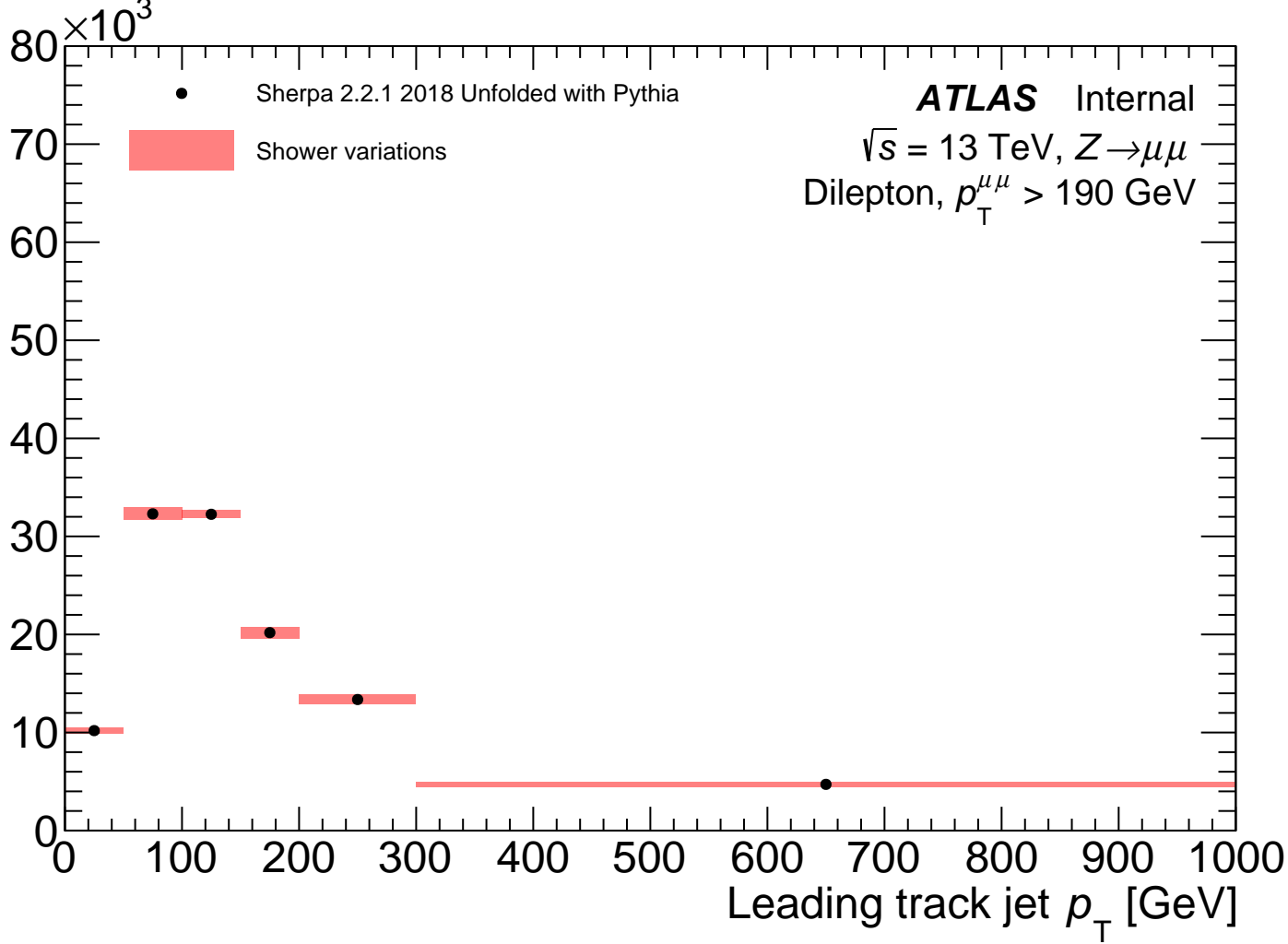
Events



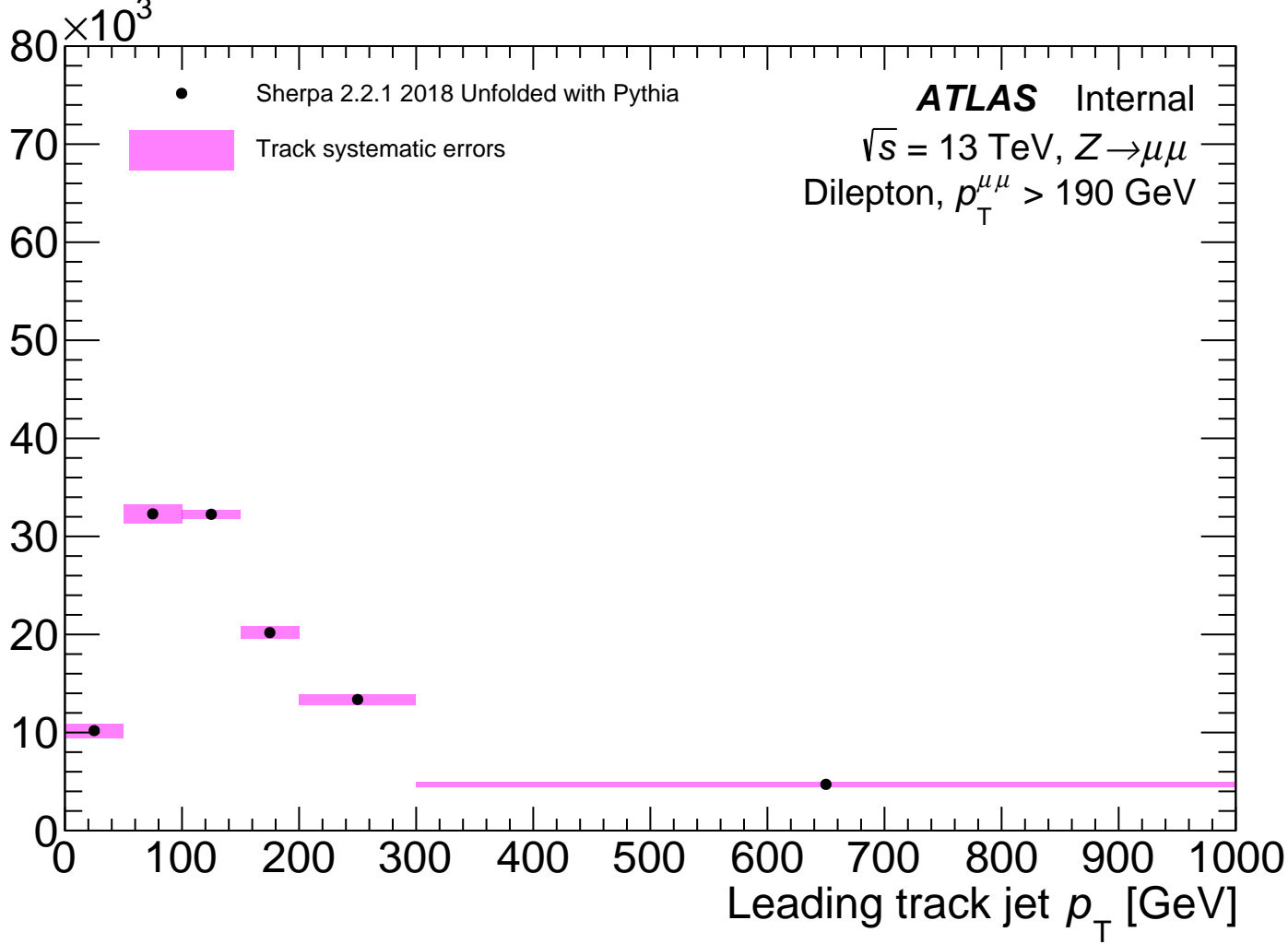
Events



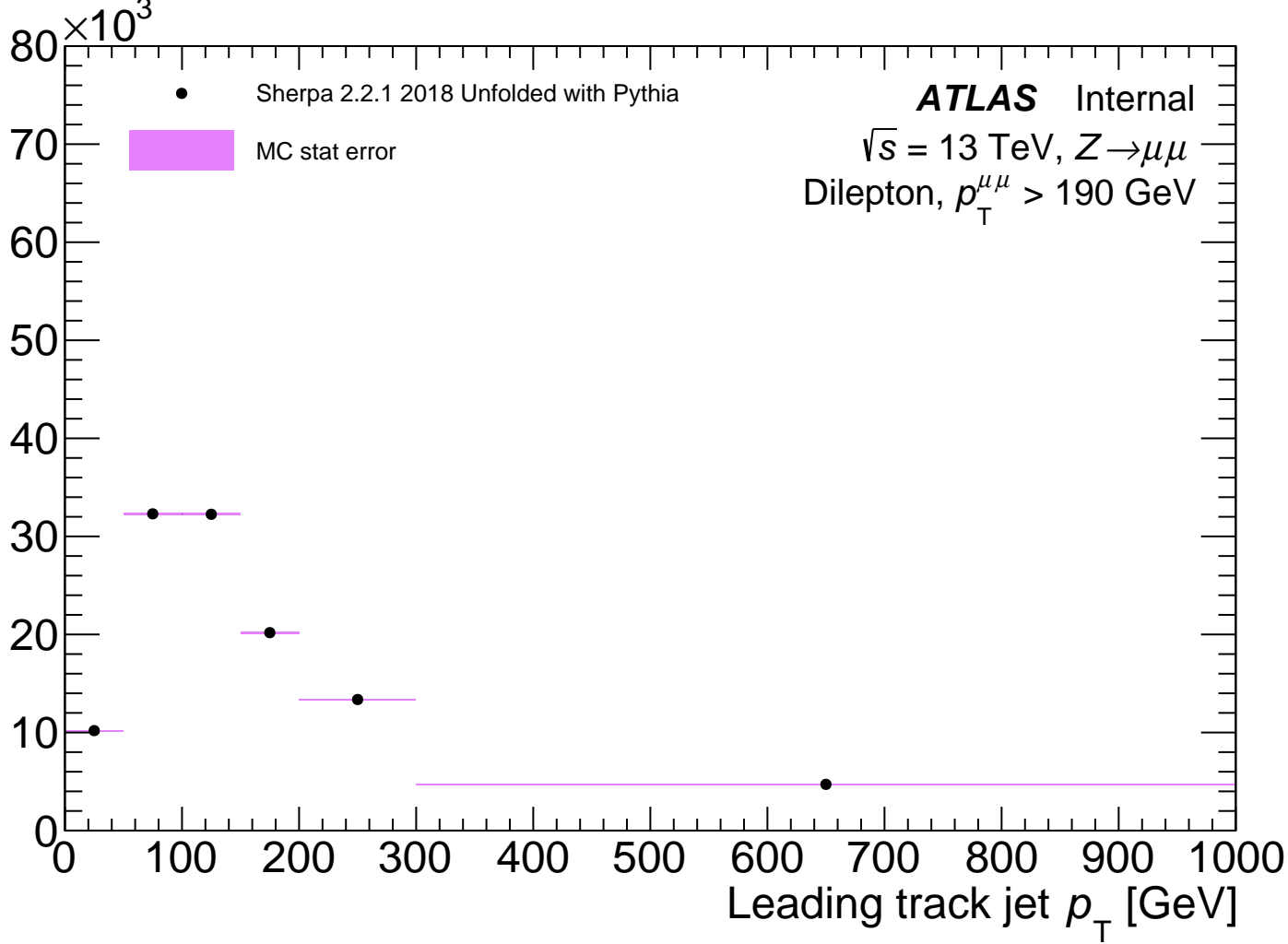
Events



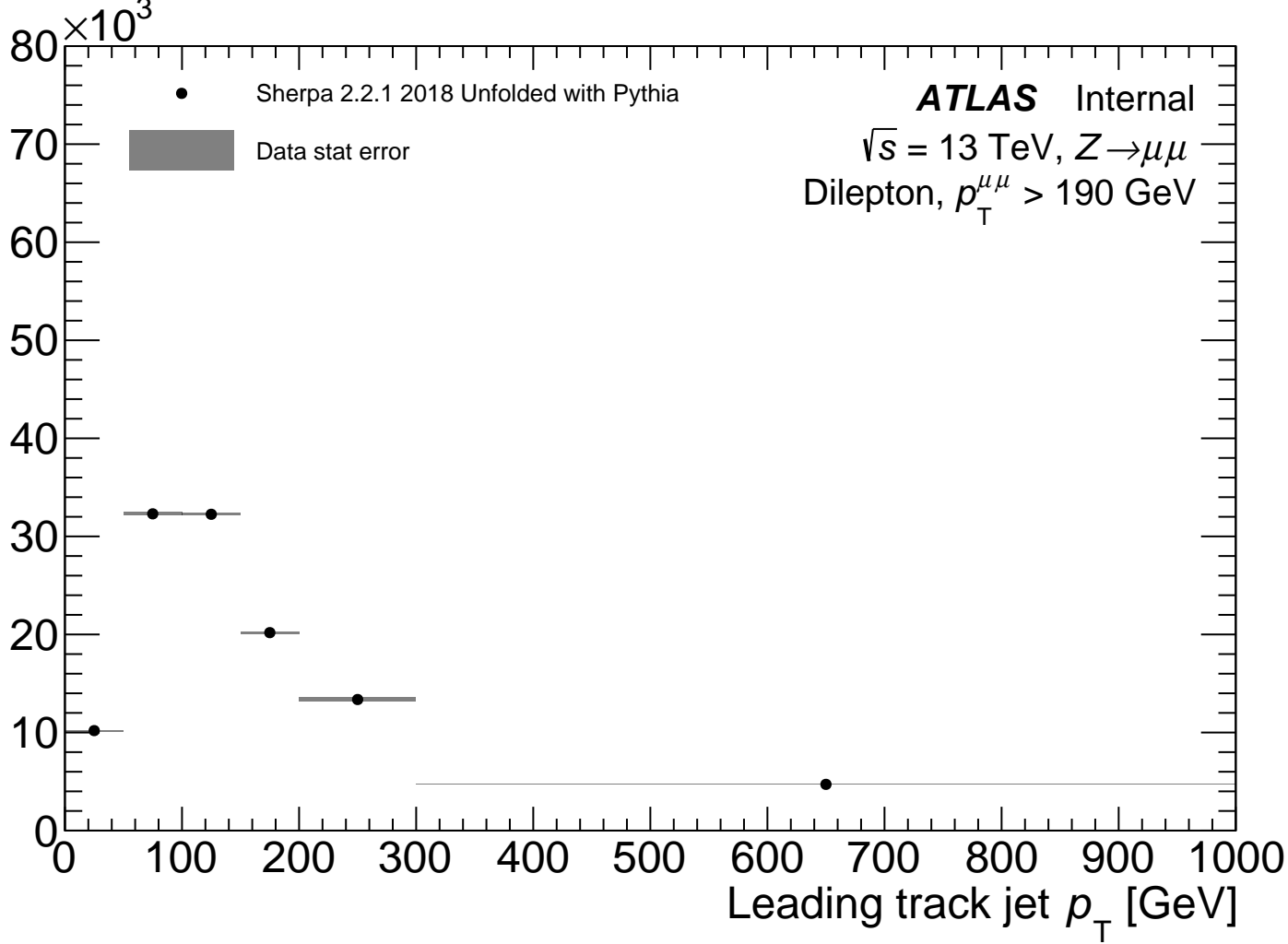
Events



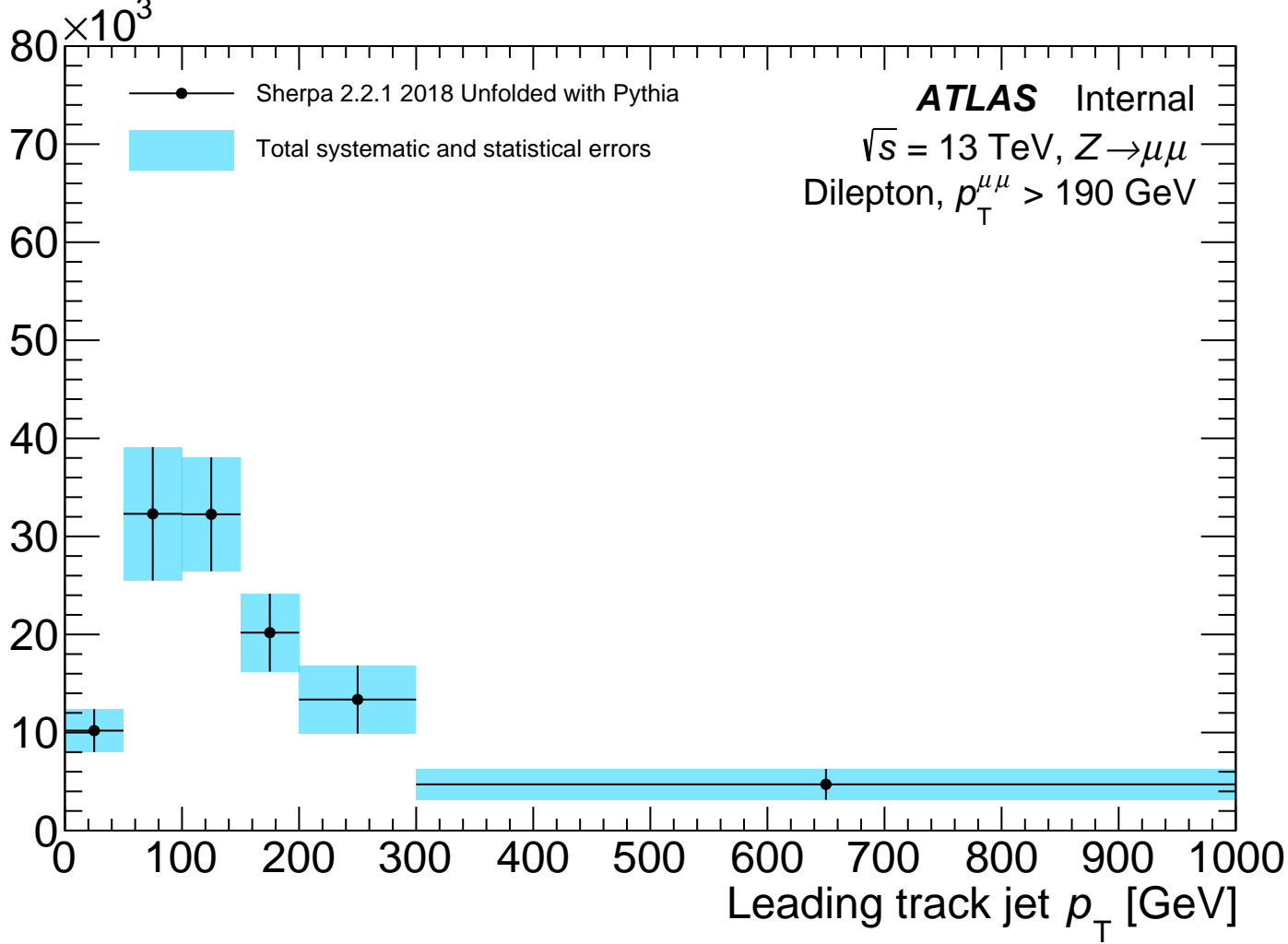
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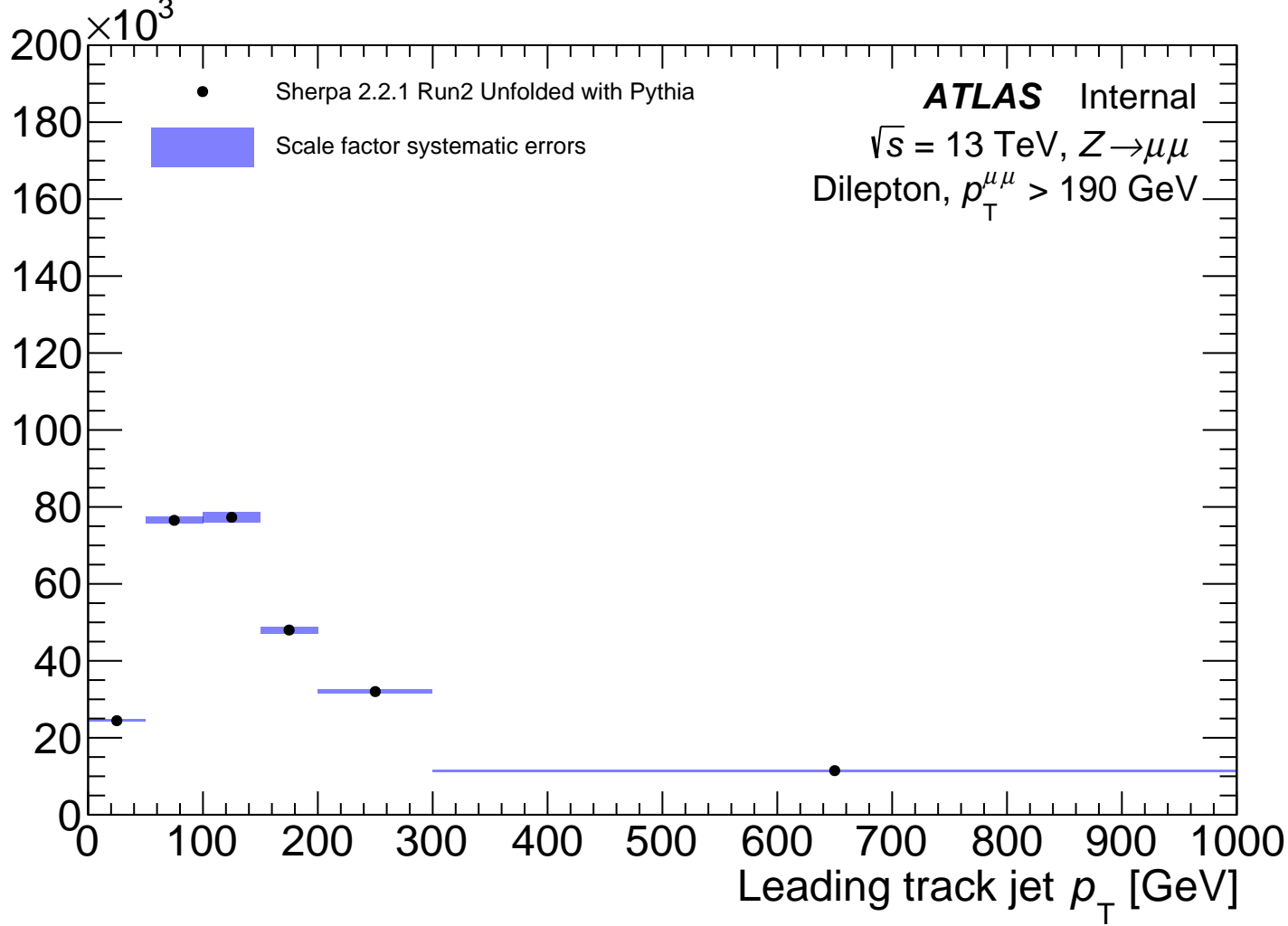
Events

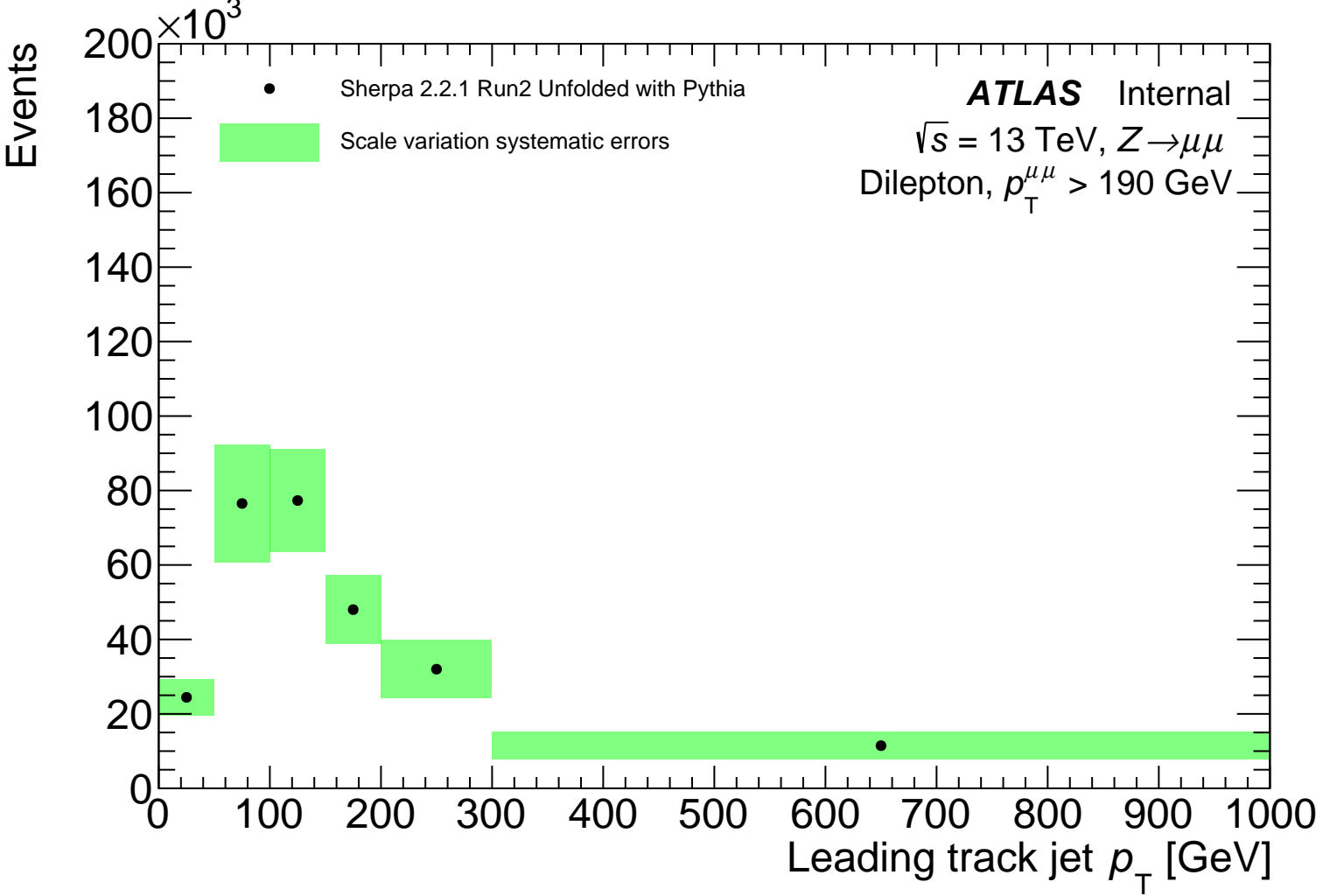


Events

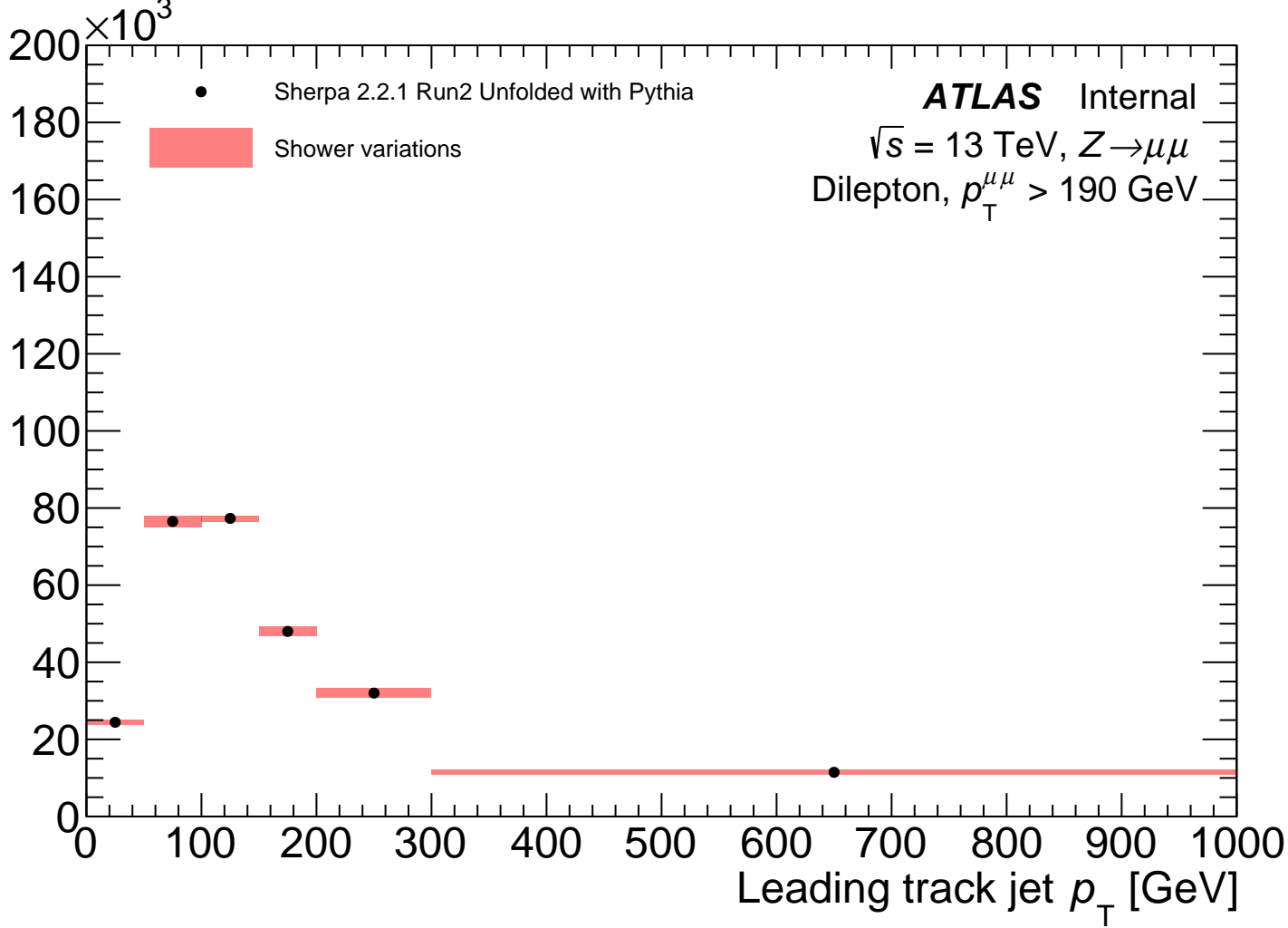


Events

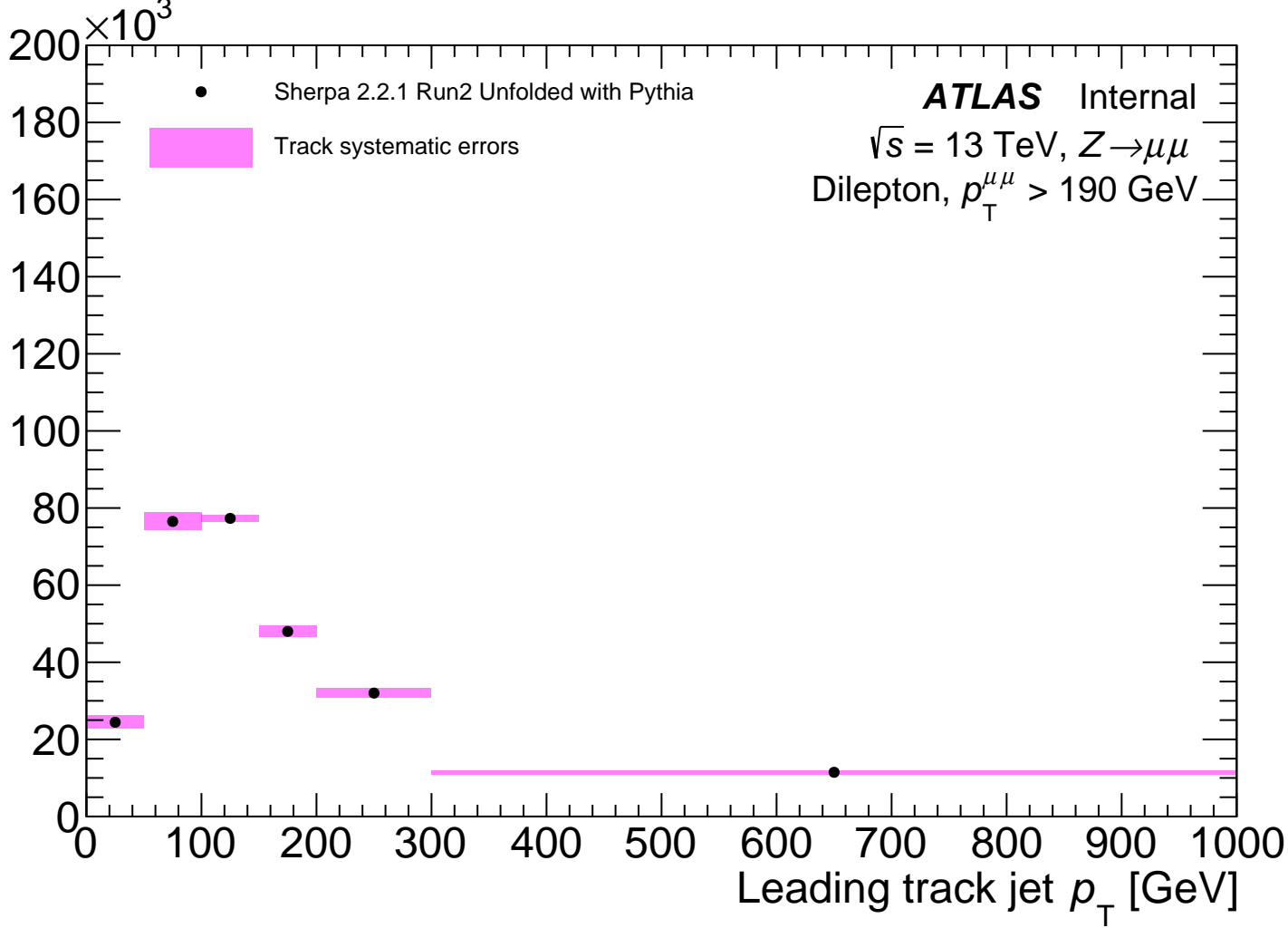




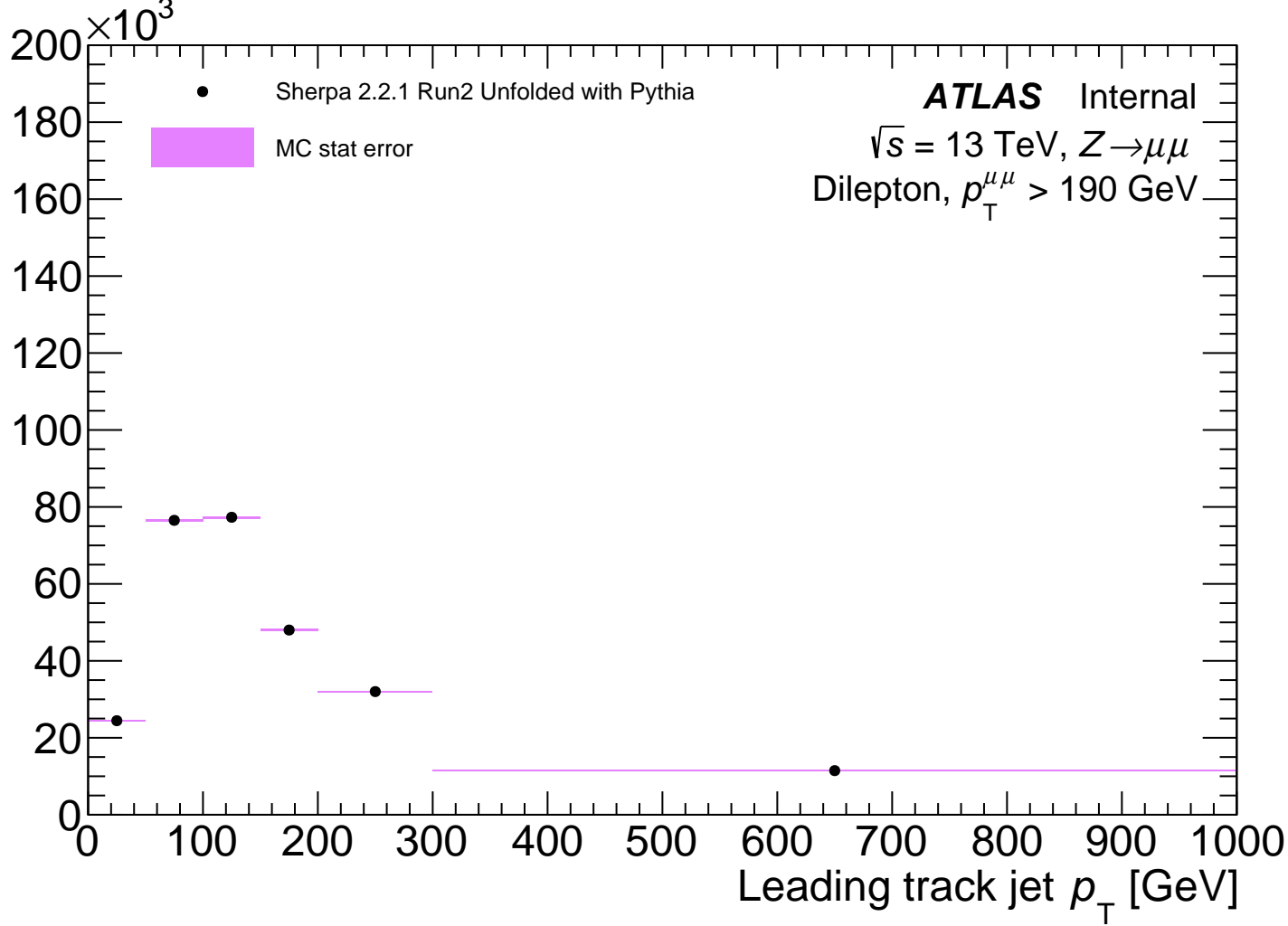
Events



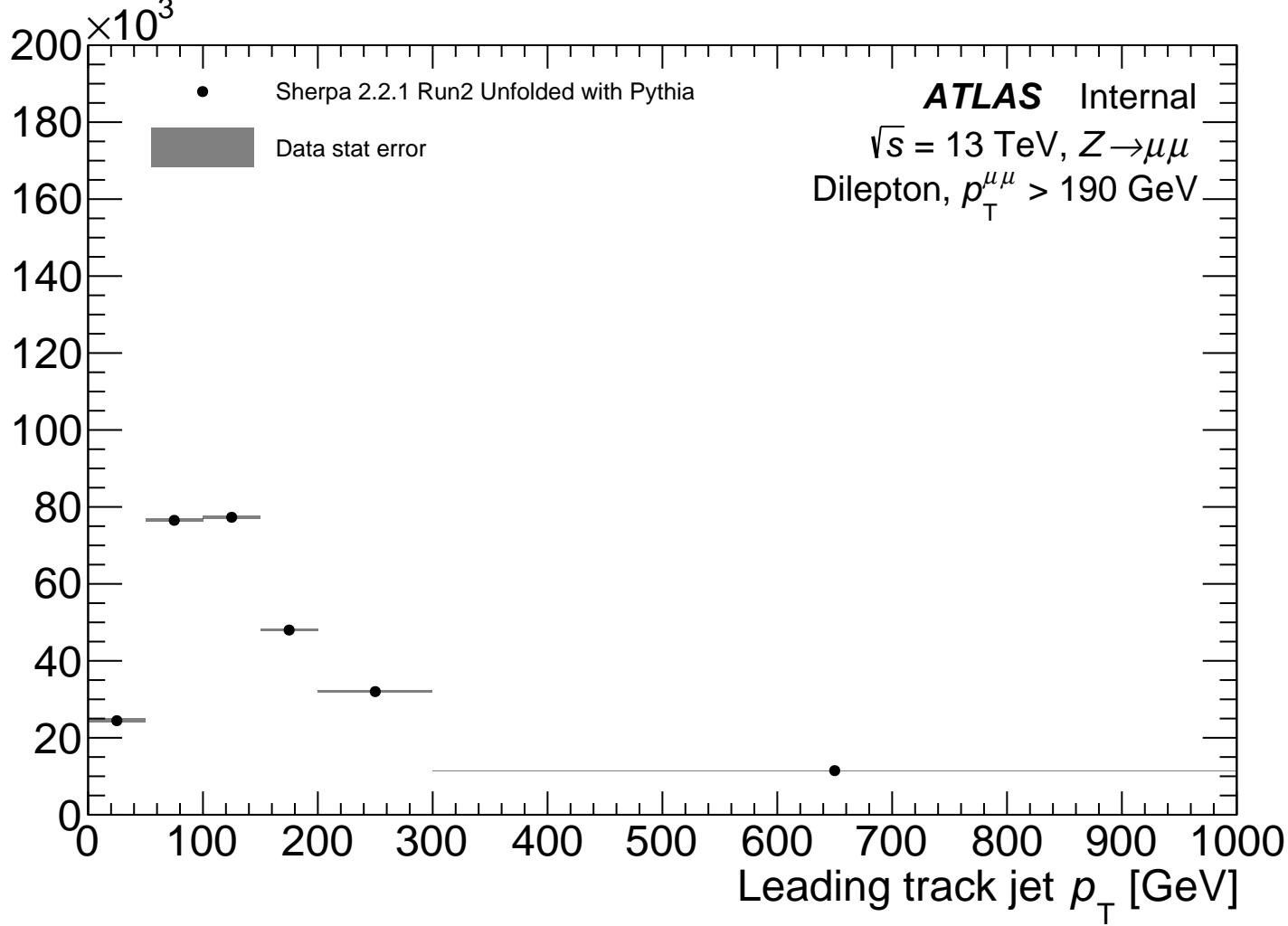
Events



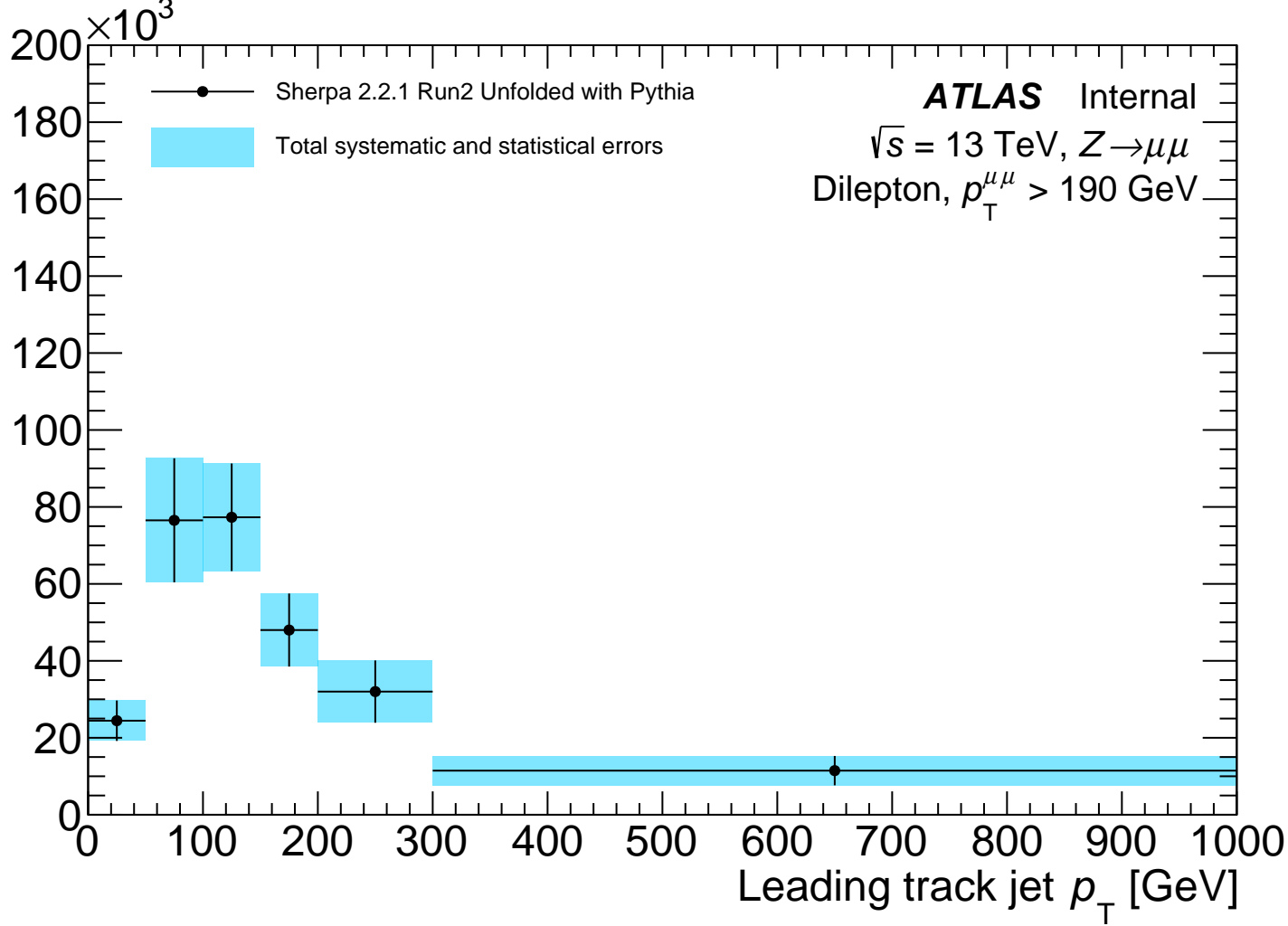
Events



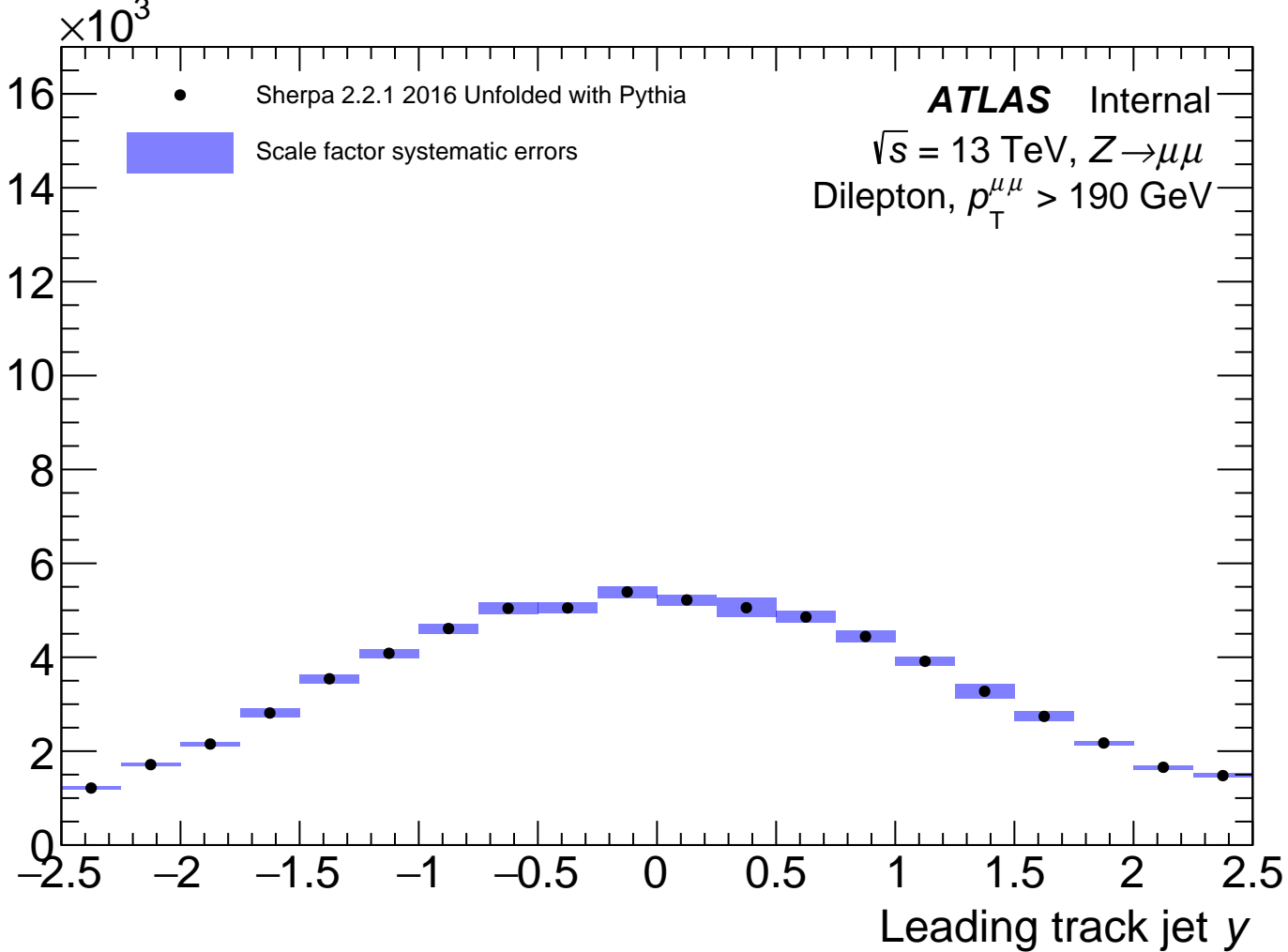
Events



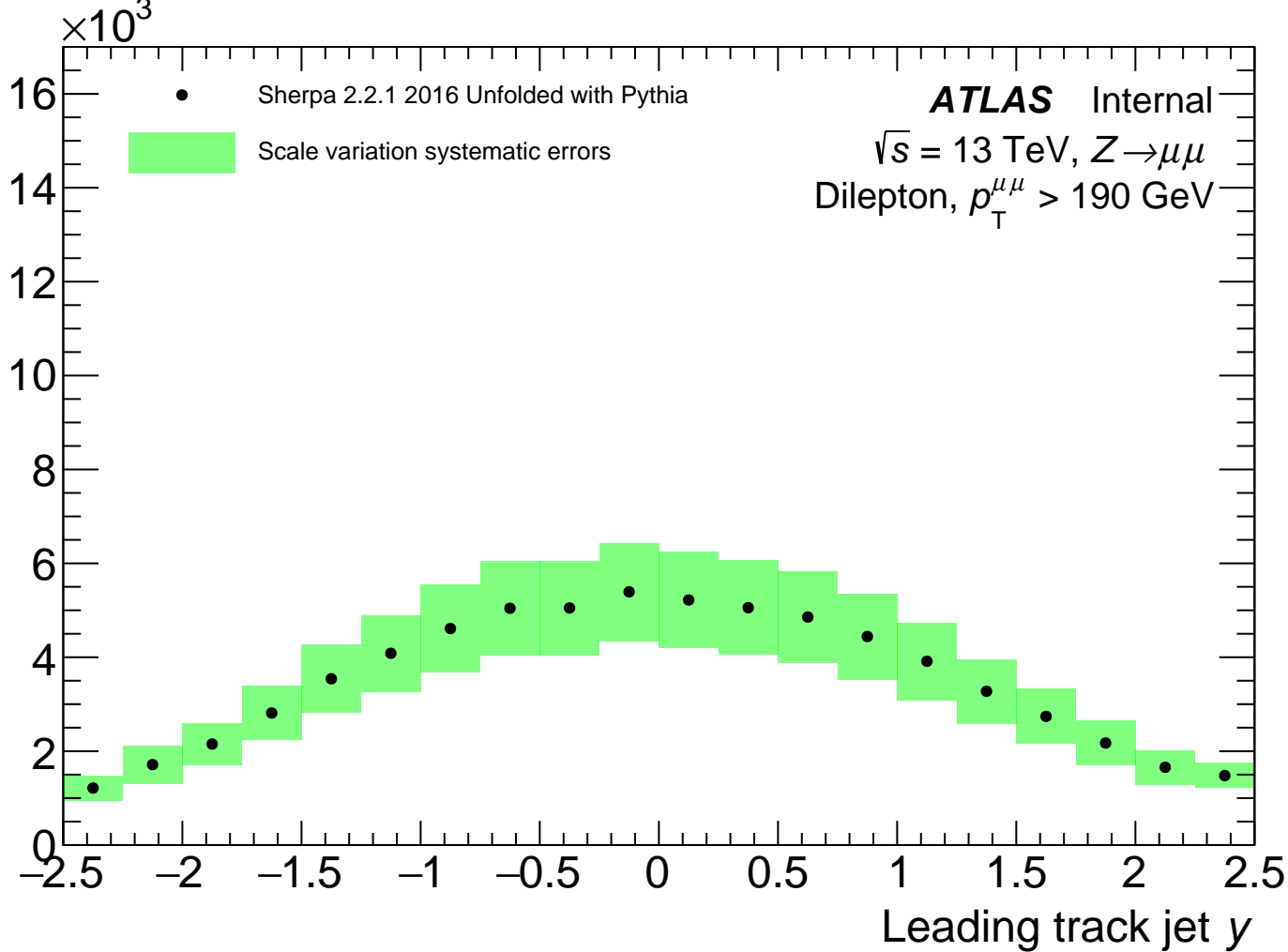
Events



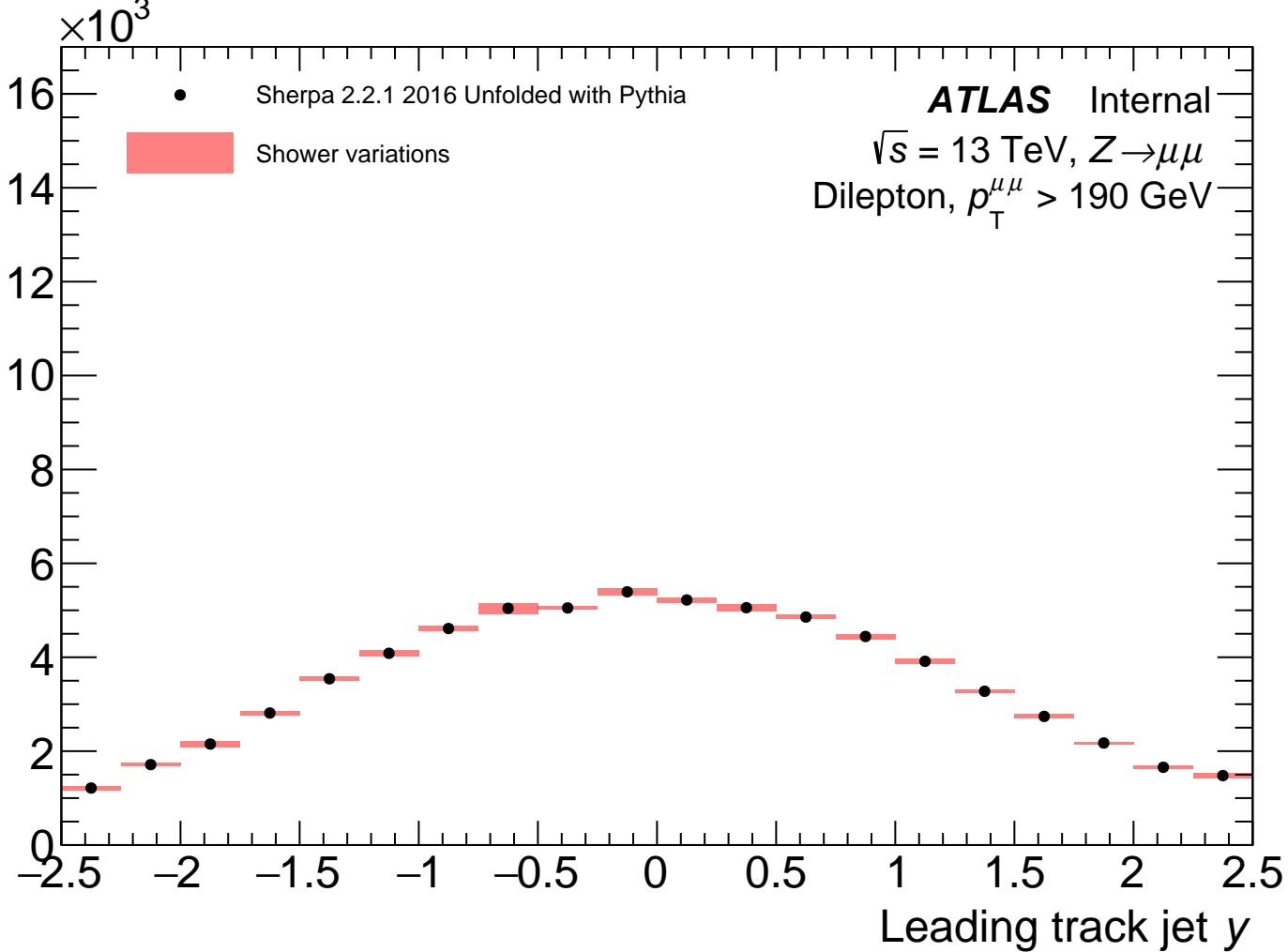
Events



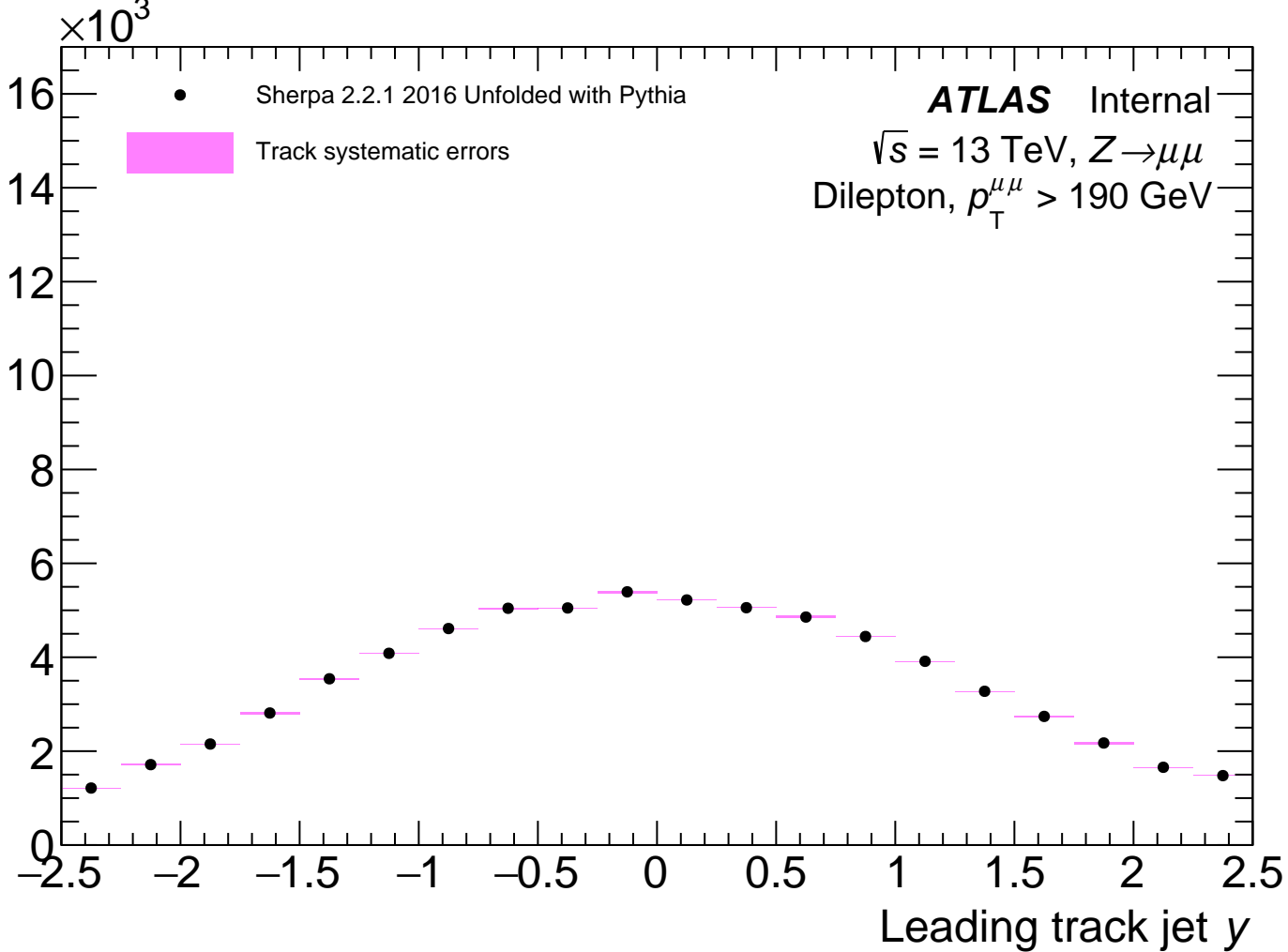
Events



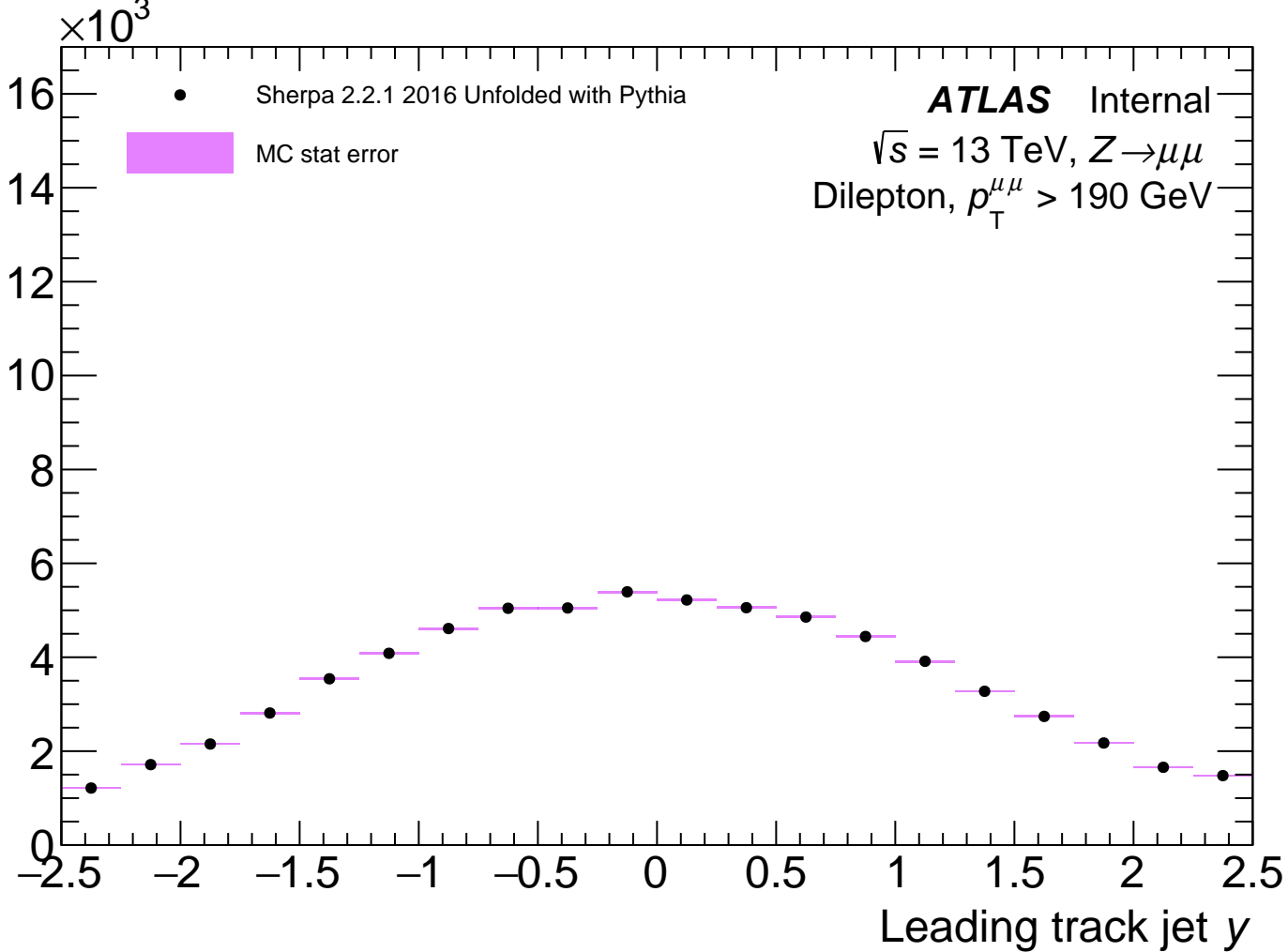
Events



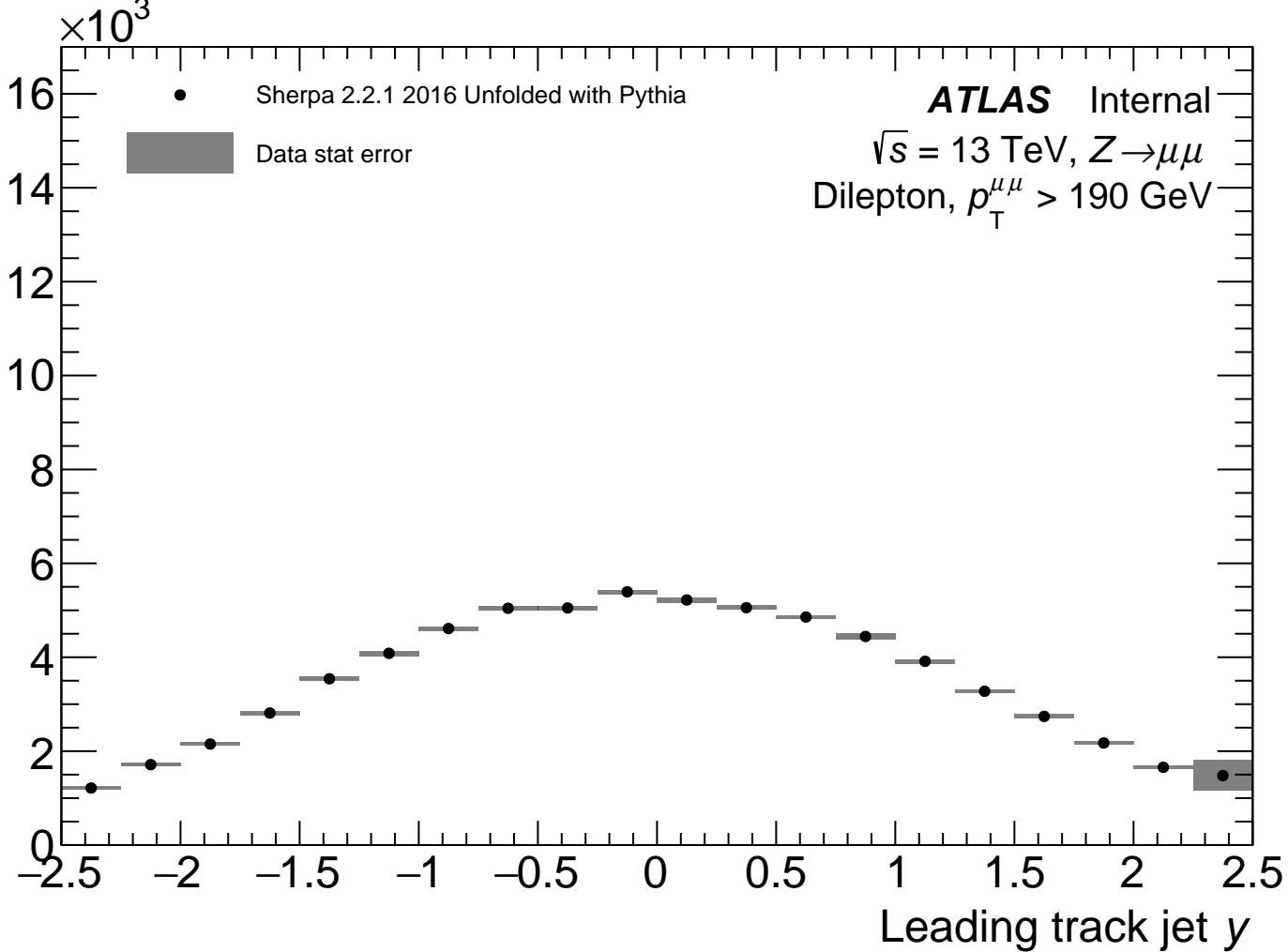
Events



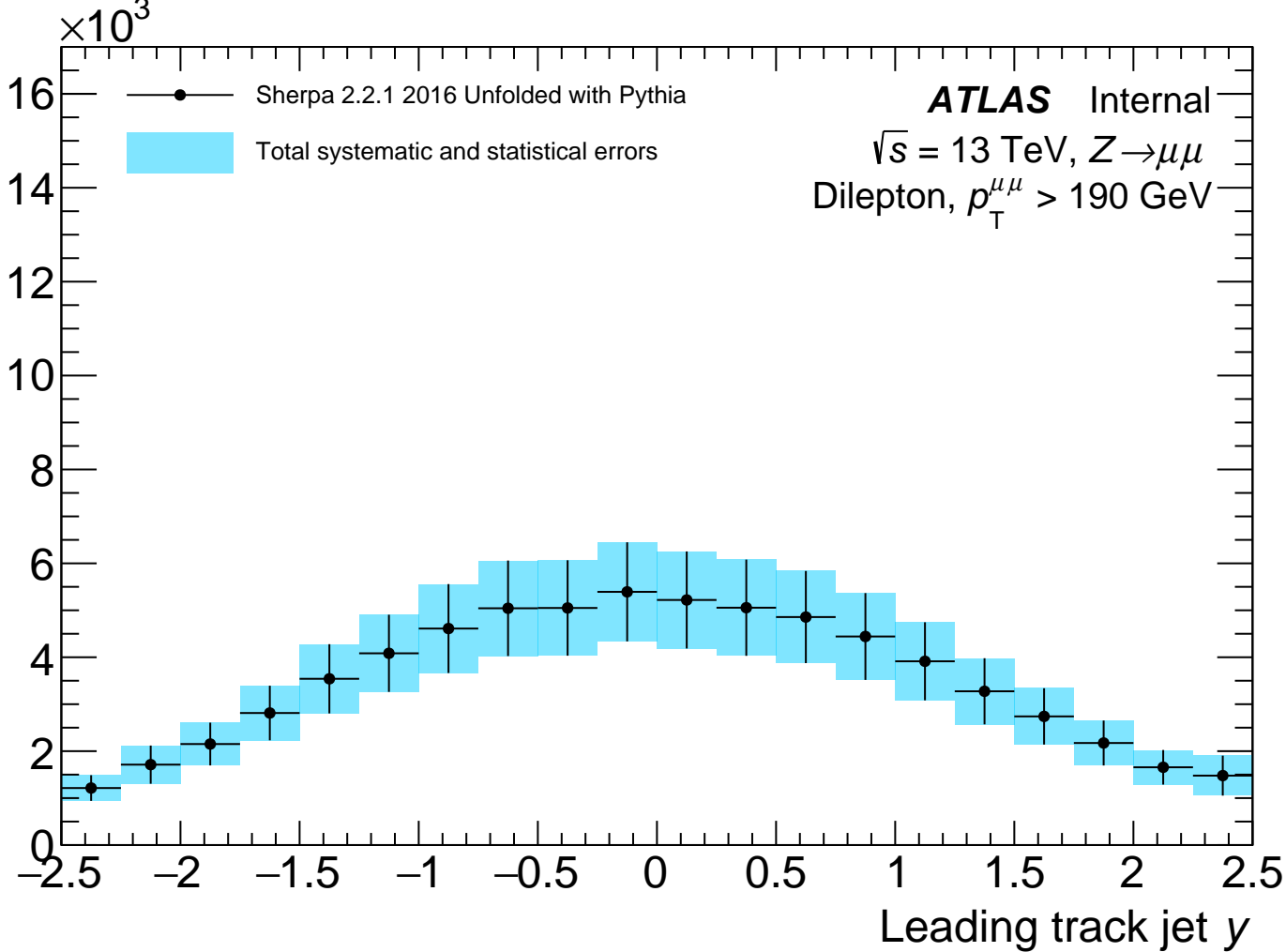
Events



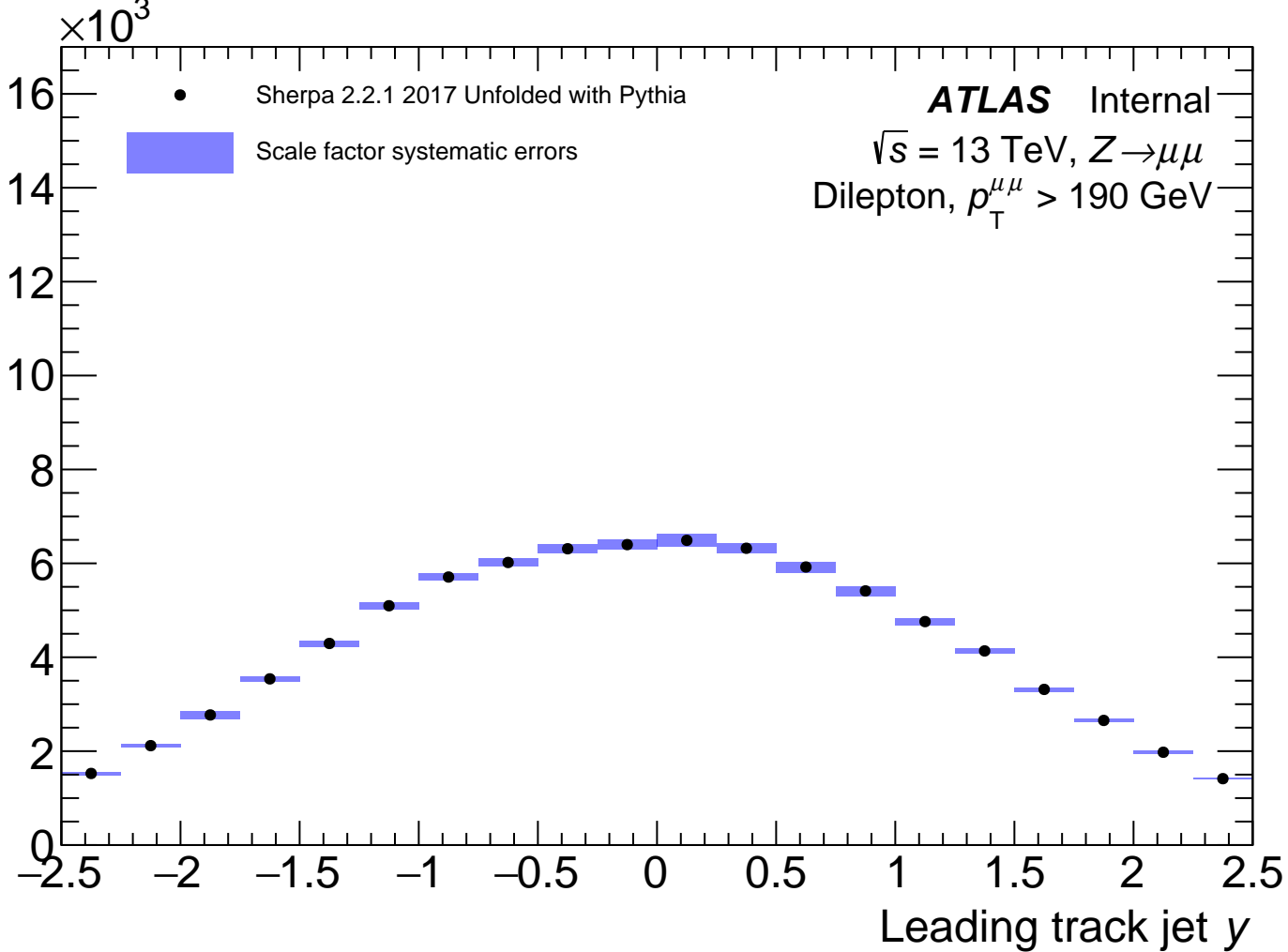
Events



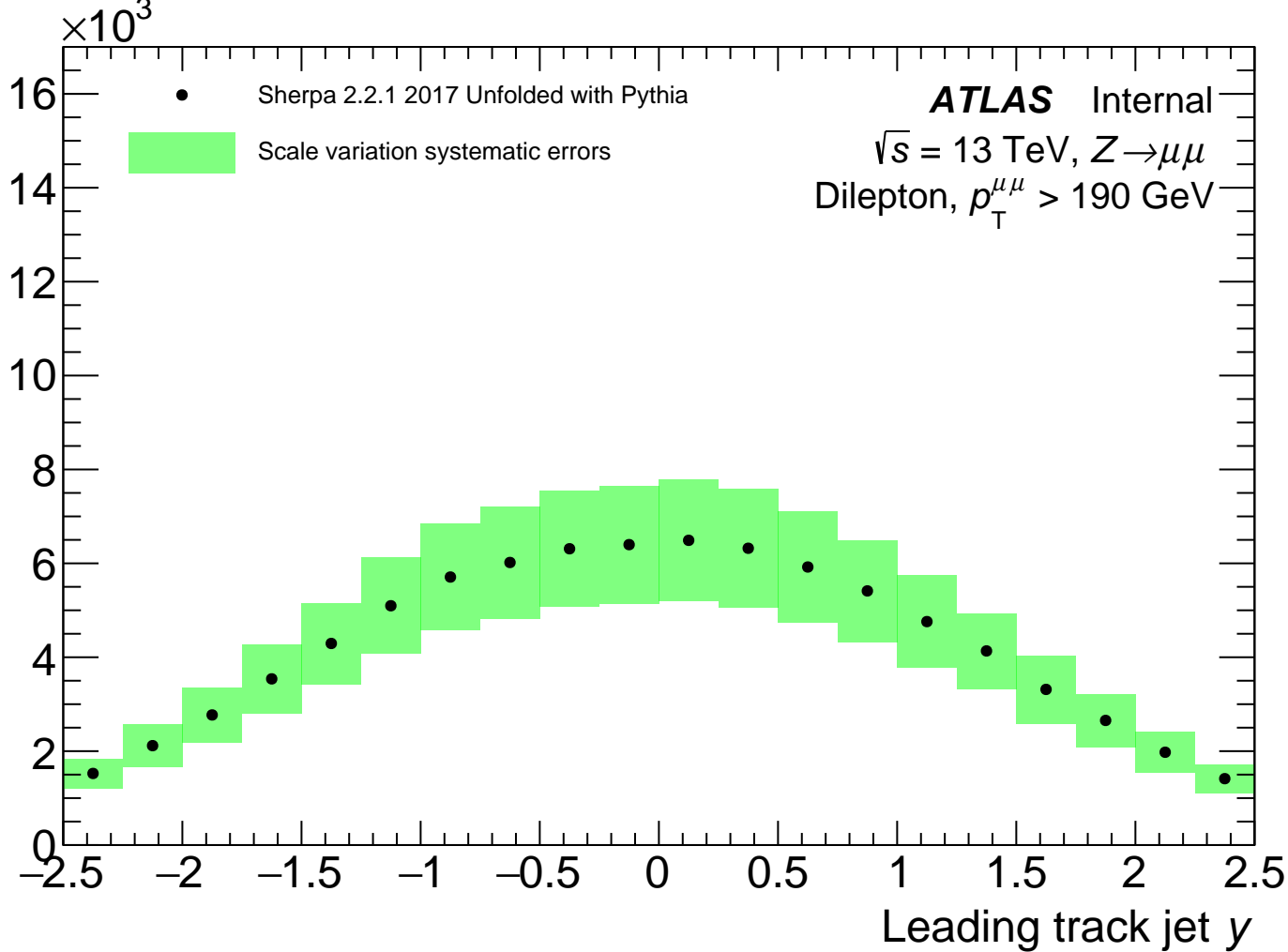
Events



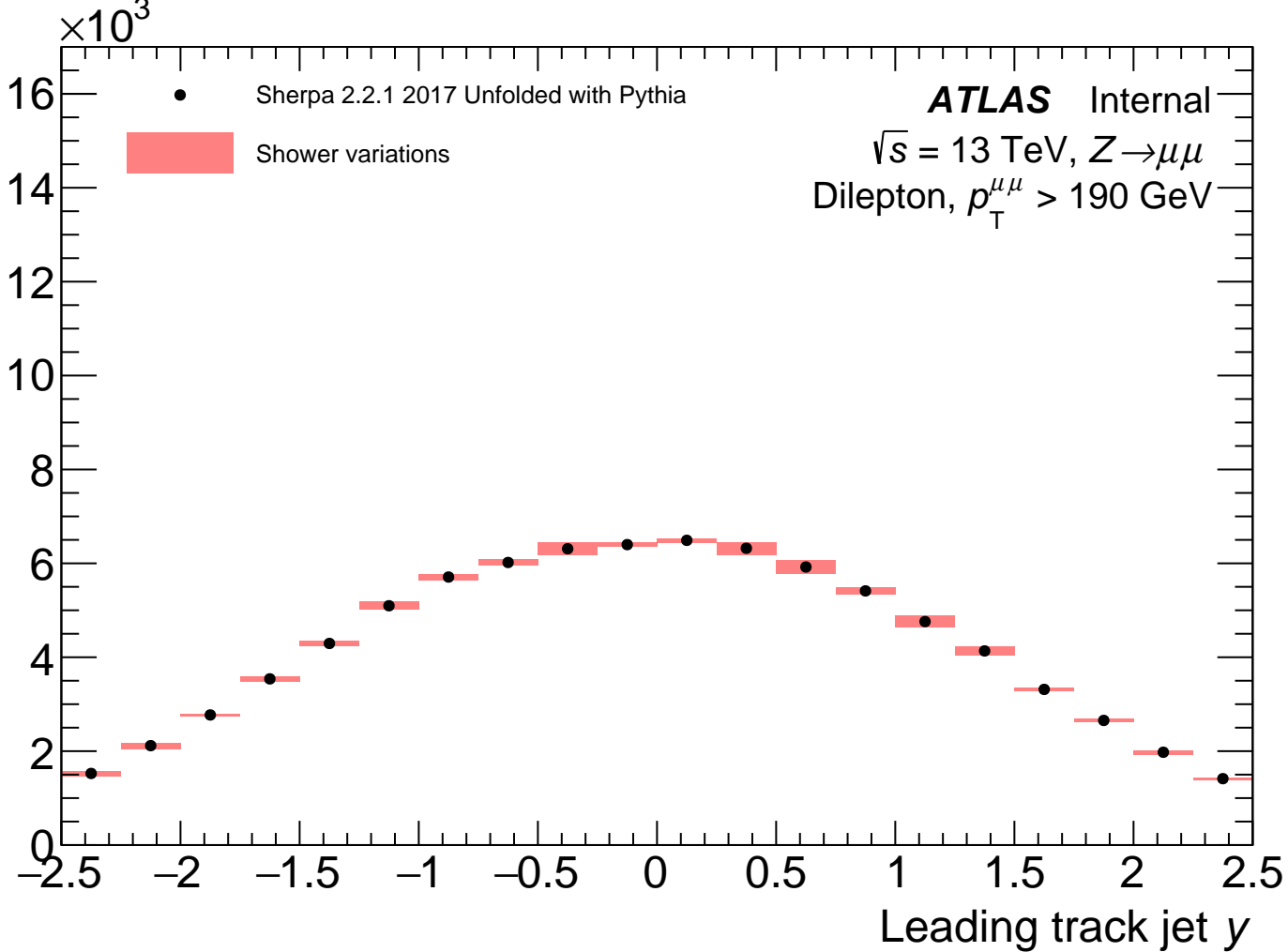
Events



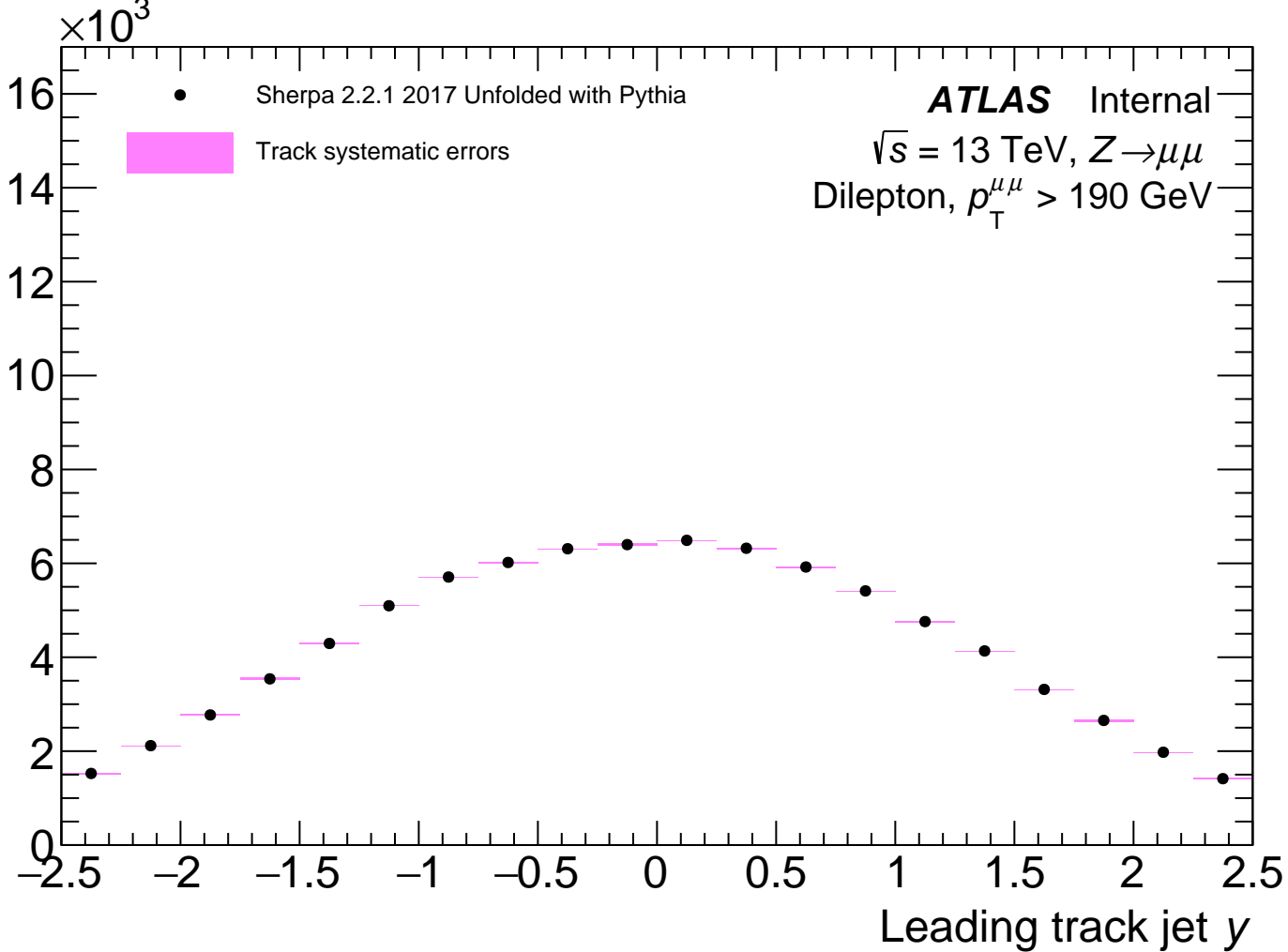
Events



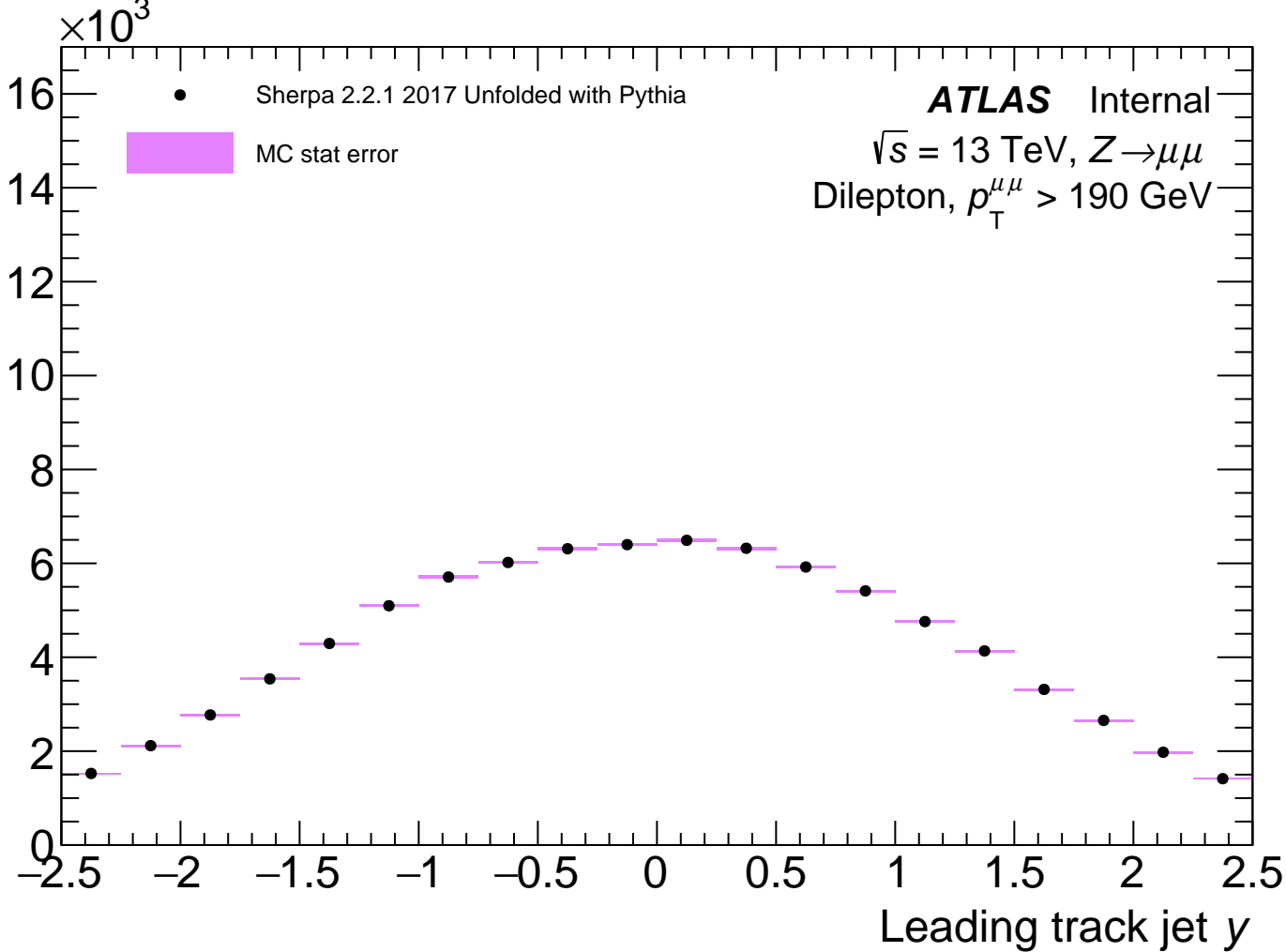
Events



Events



Events



Events

$\times 10^3$

16

14

12

10

8

6

4

2

0

•

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Data stat error

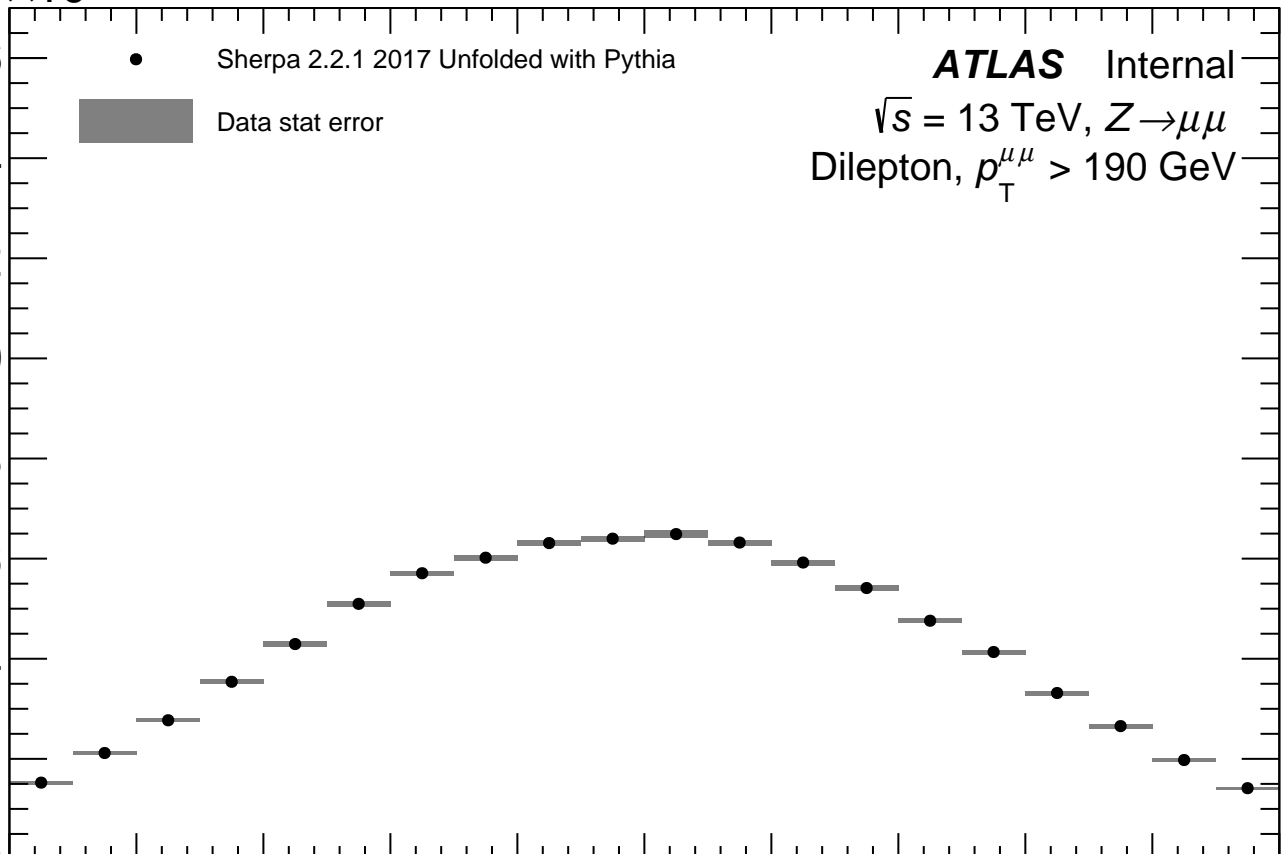
ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

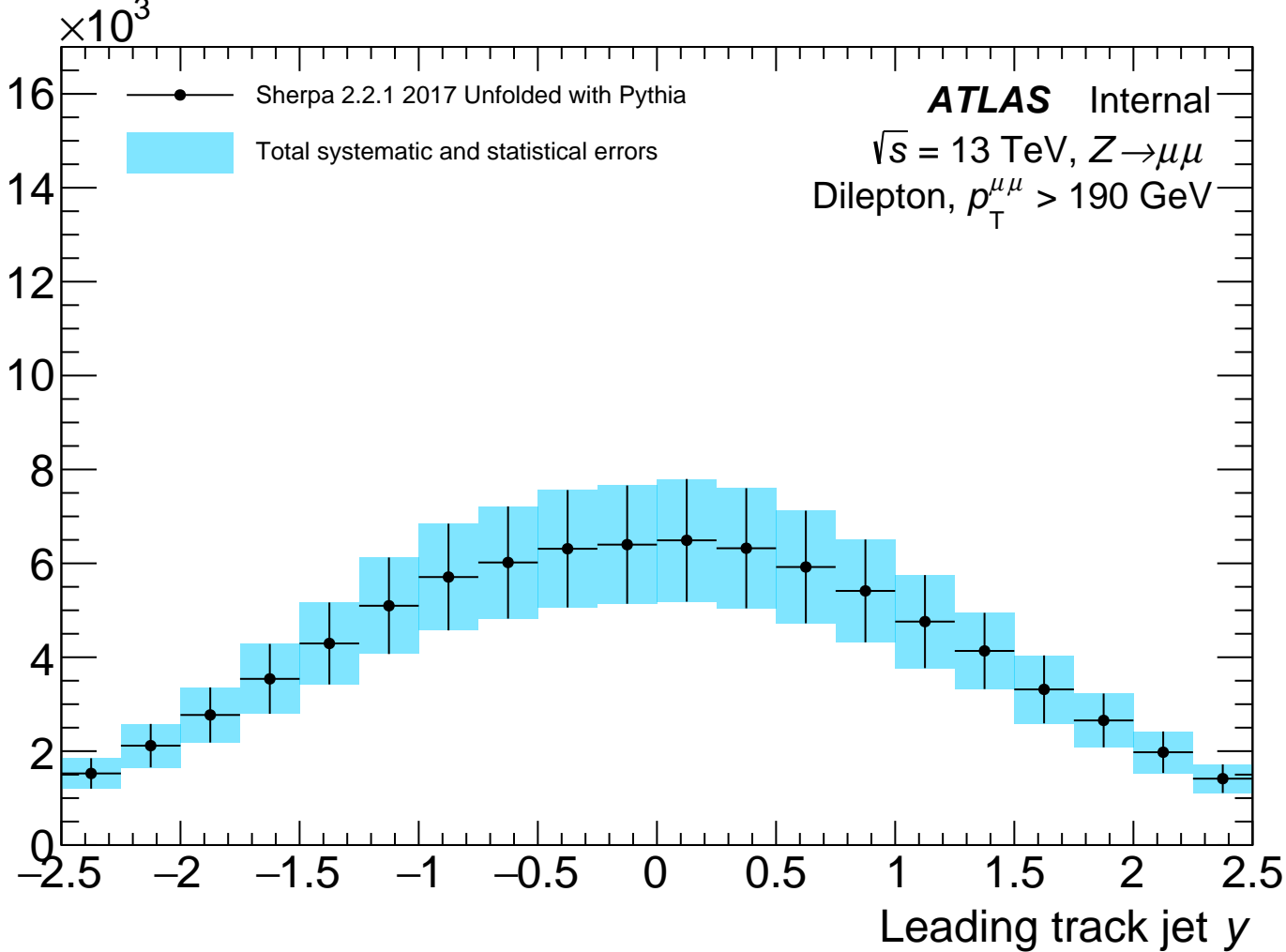
Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

-2.5 -2 -1.5 -1 -0.5 0 0.5 1 1.5 2 2.5

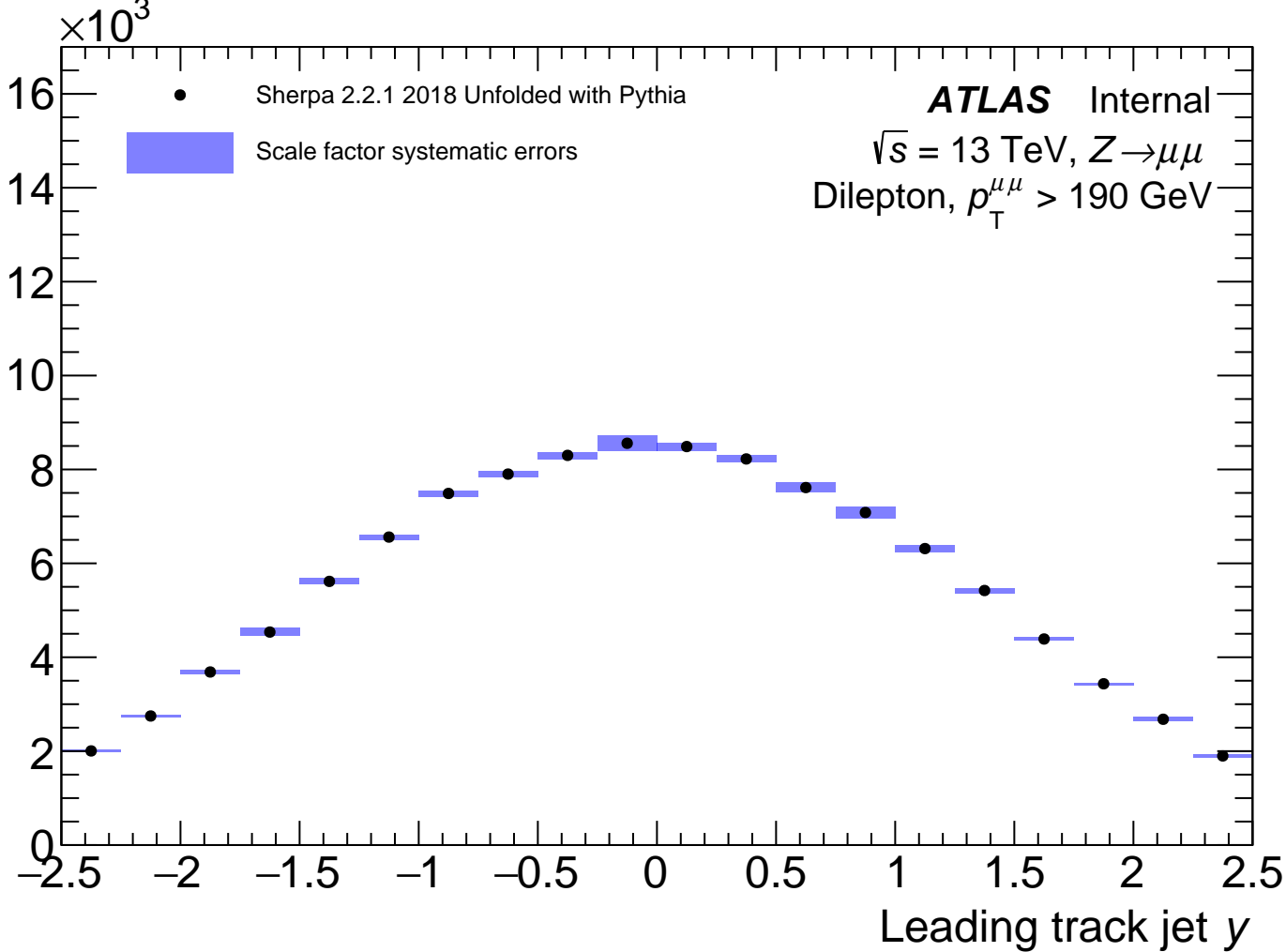
Leading track jet y



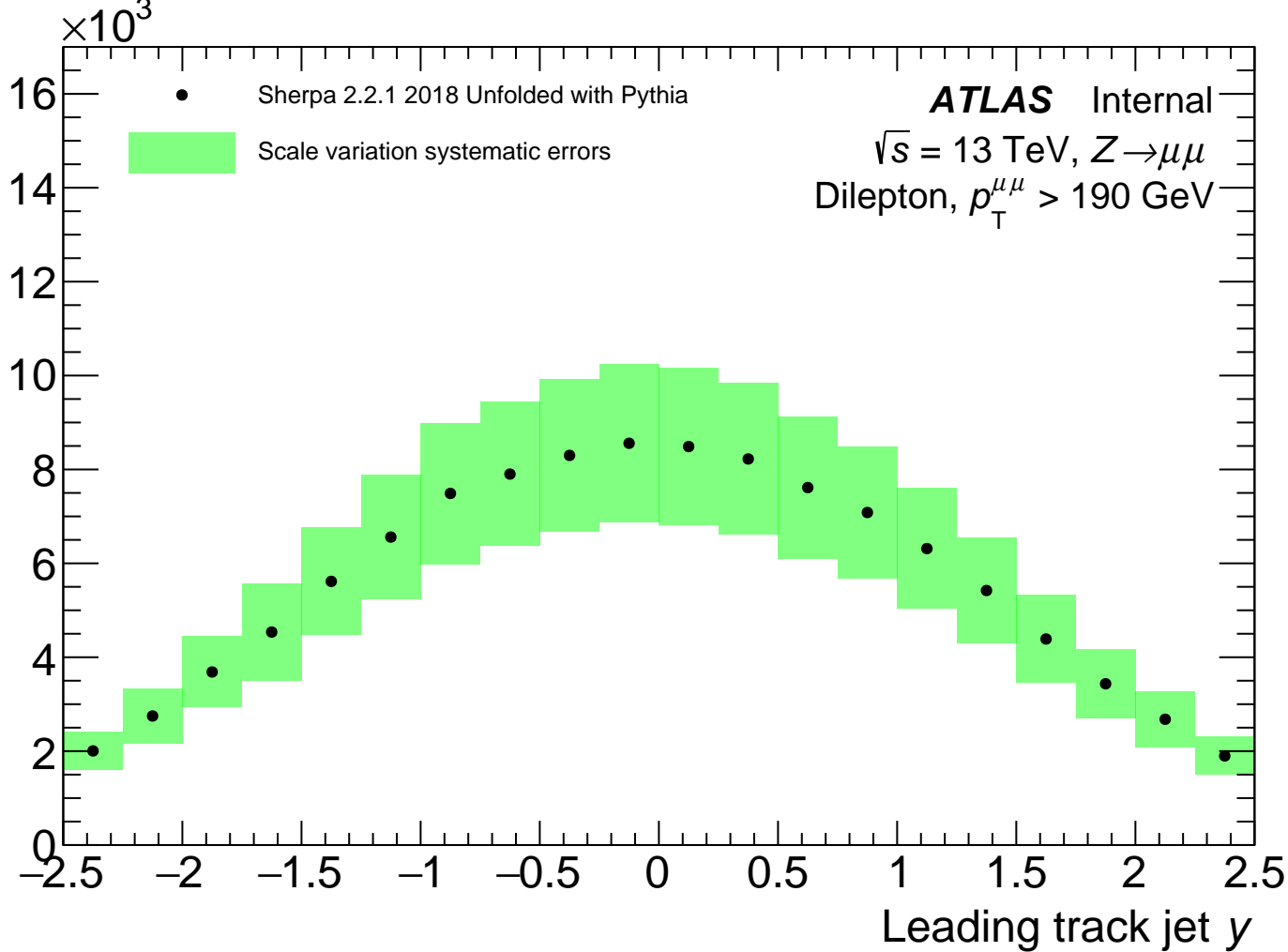
Events



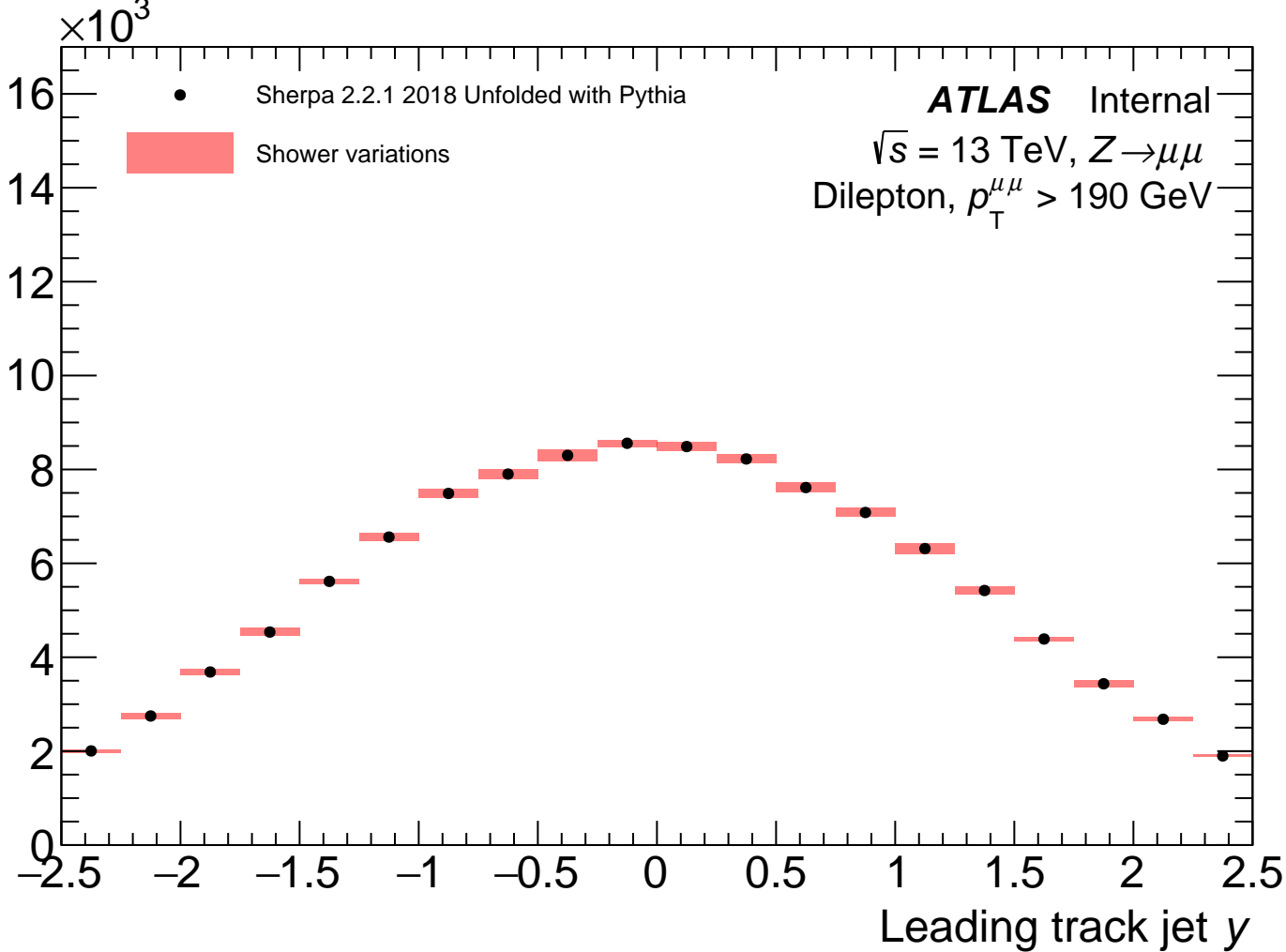
Events



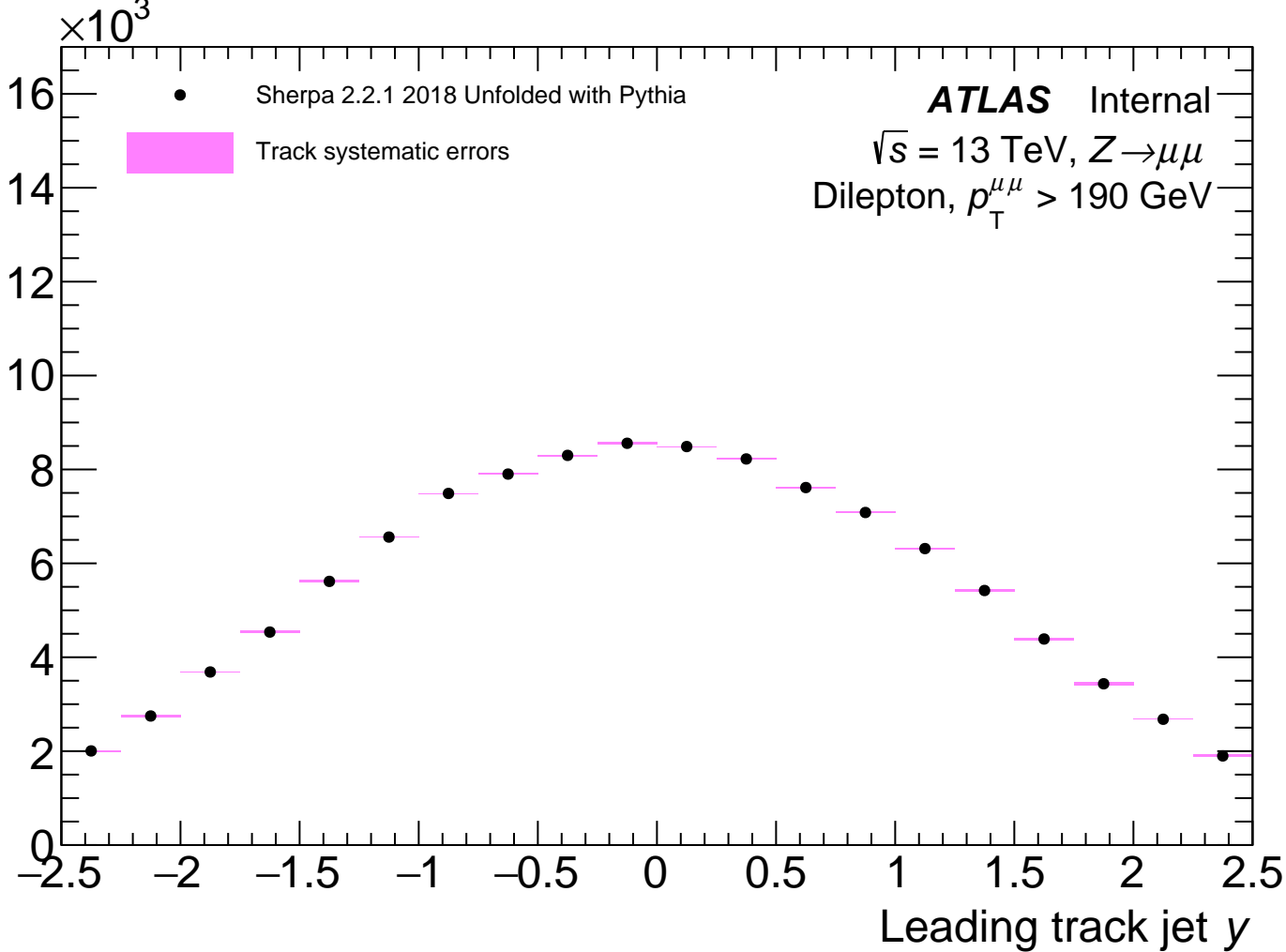
Events



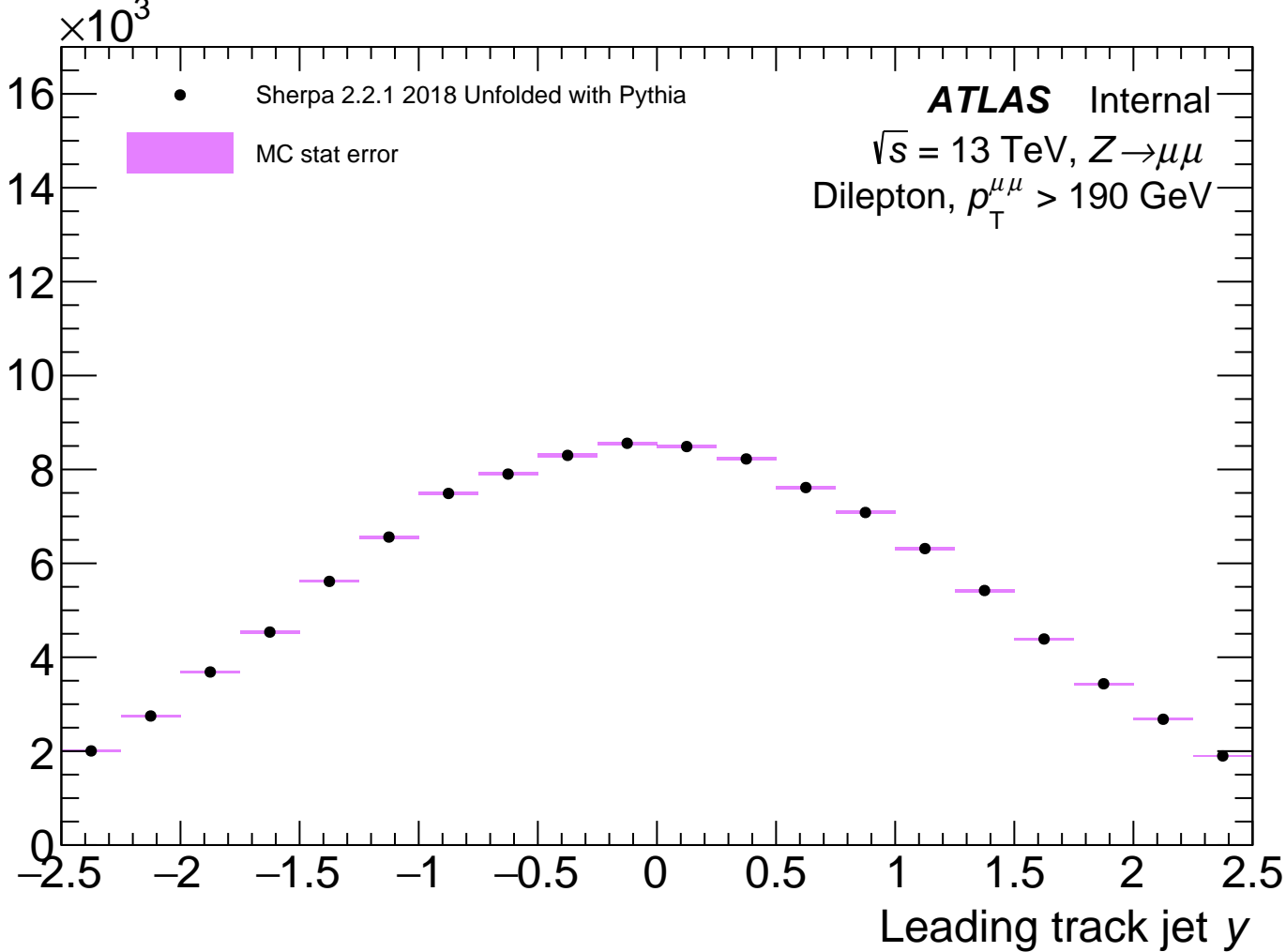
Events



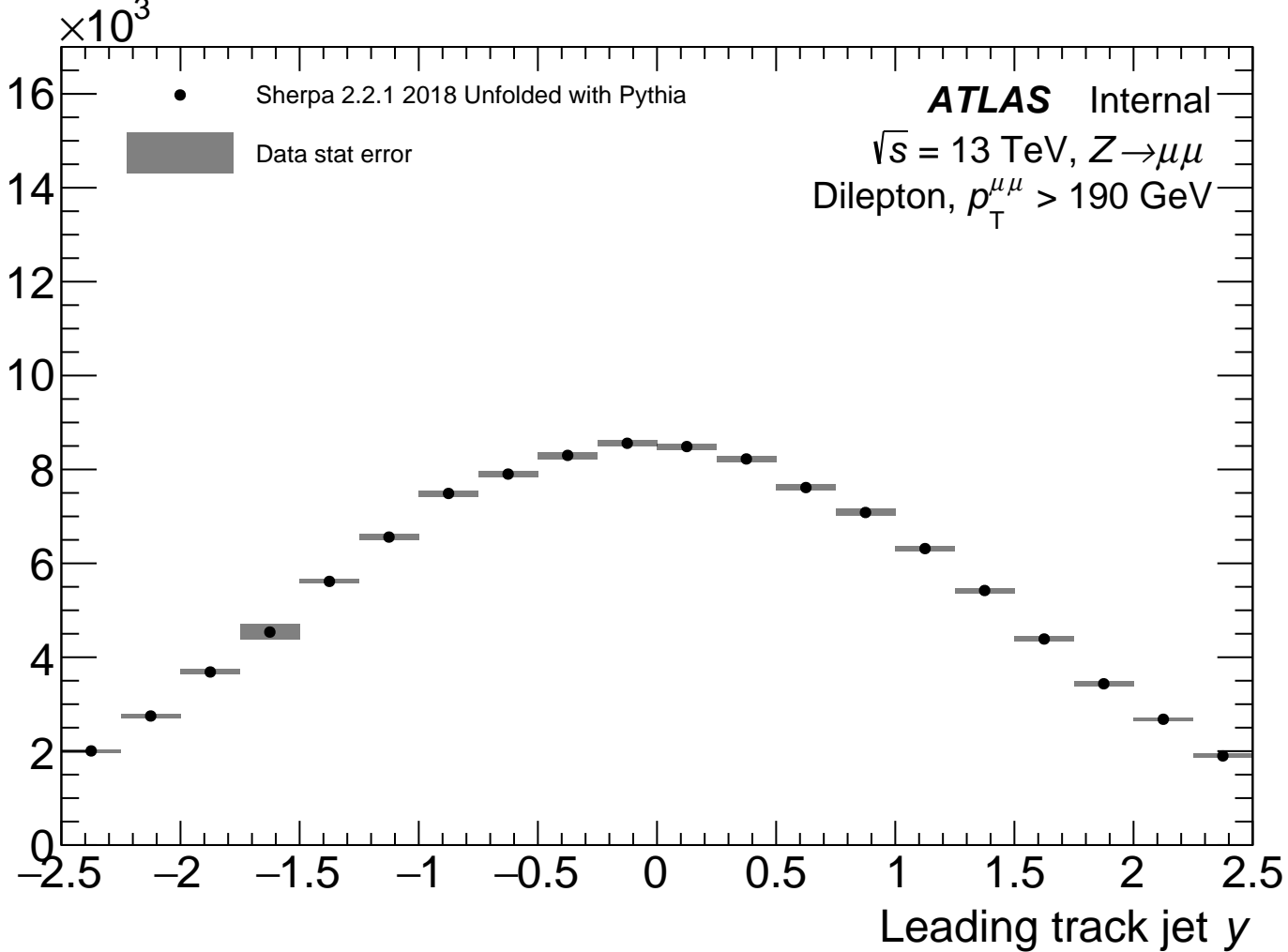
Events



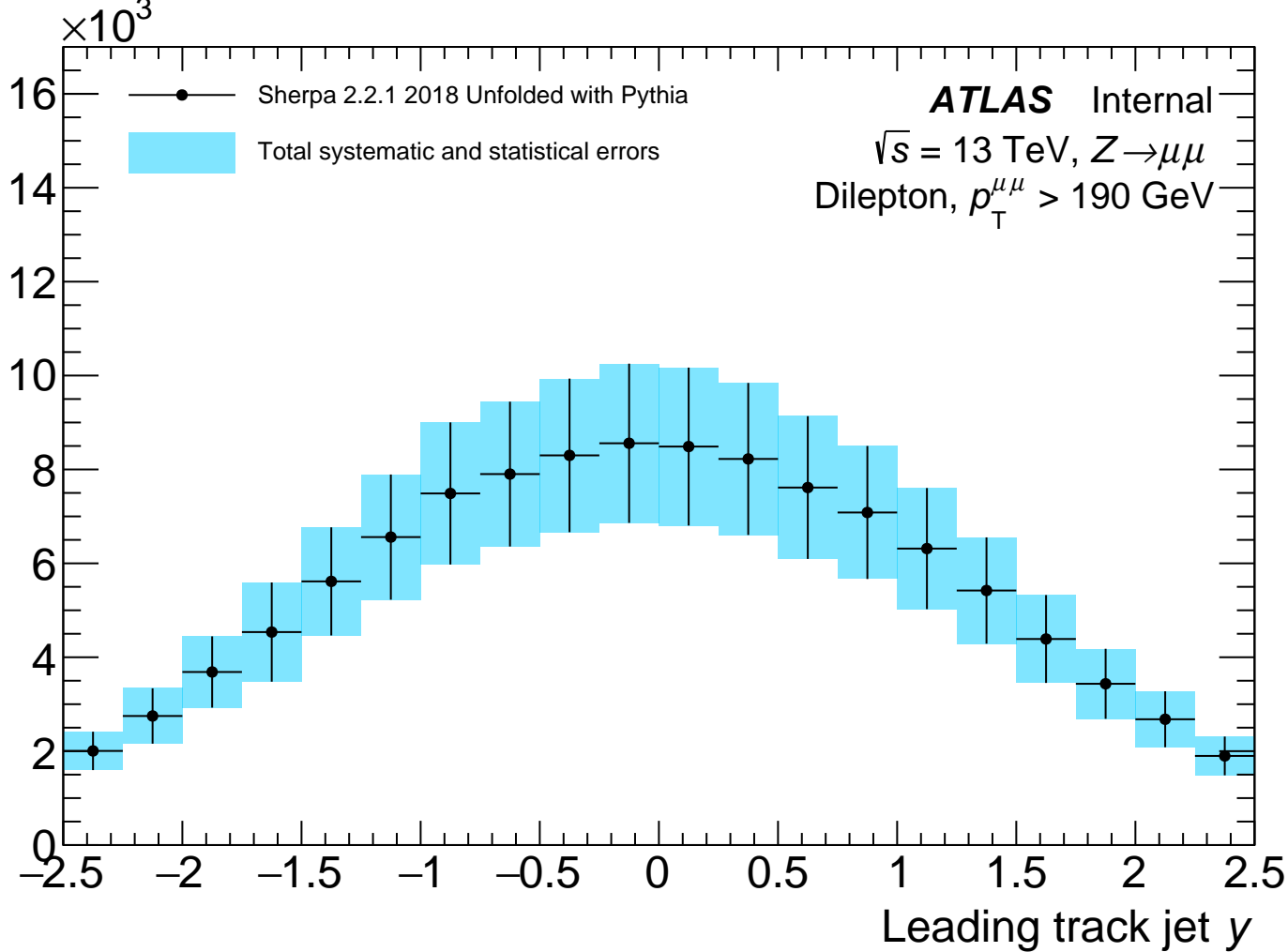
Events



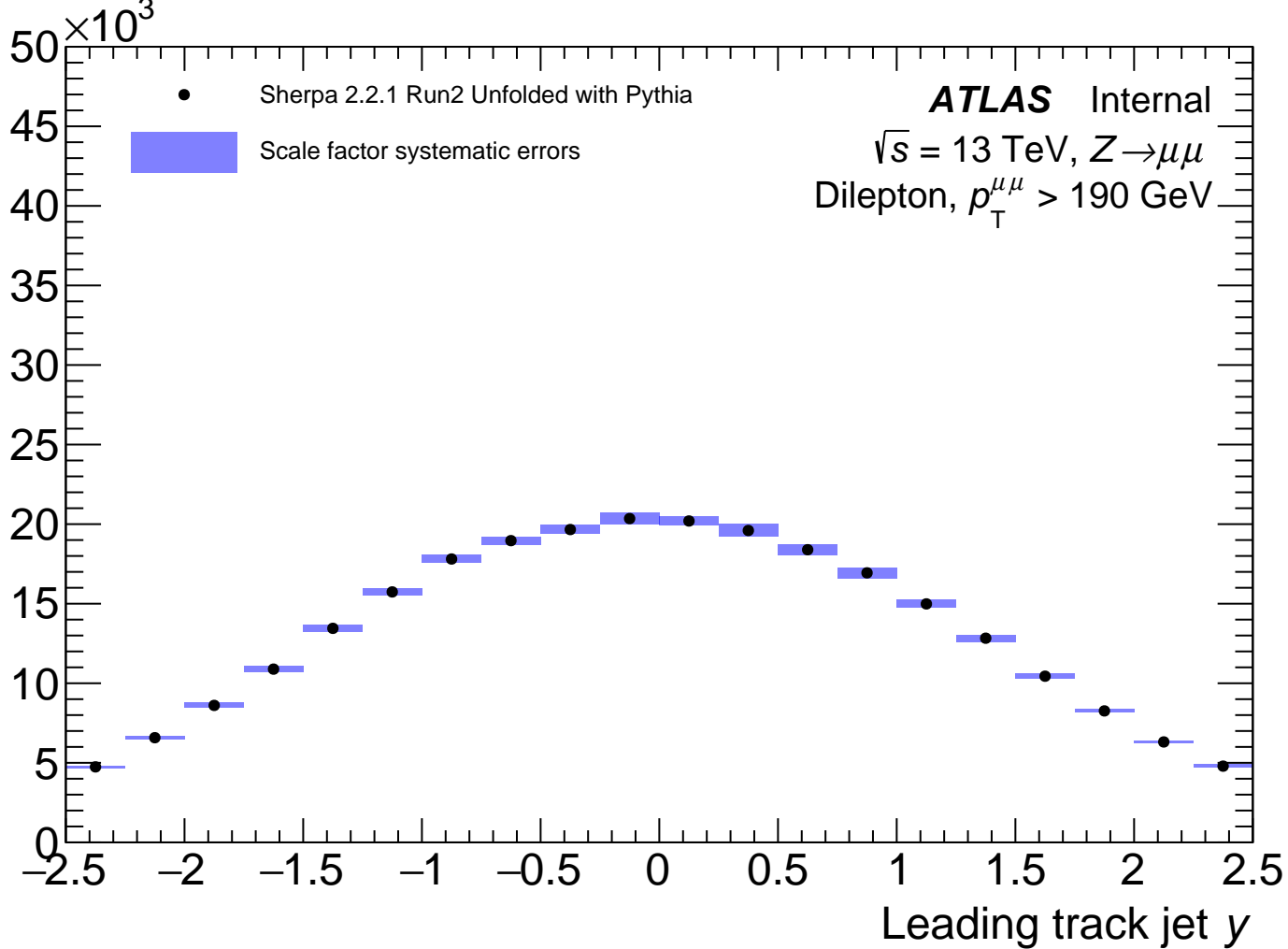
Events



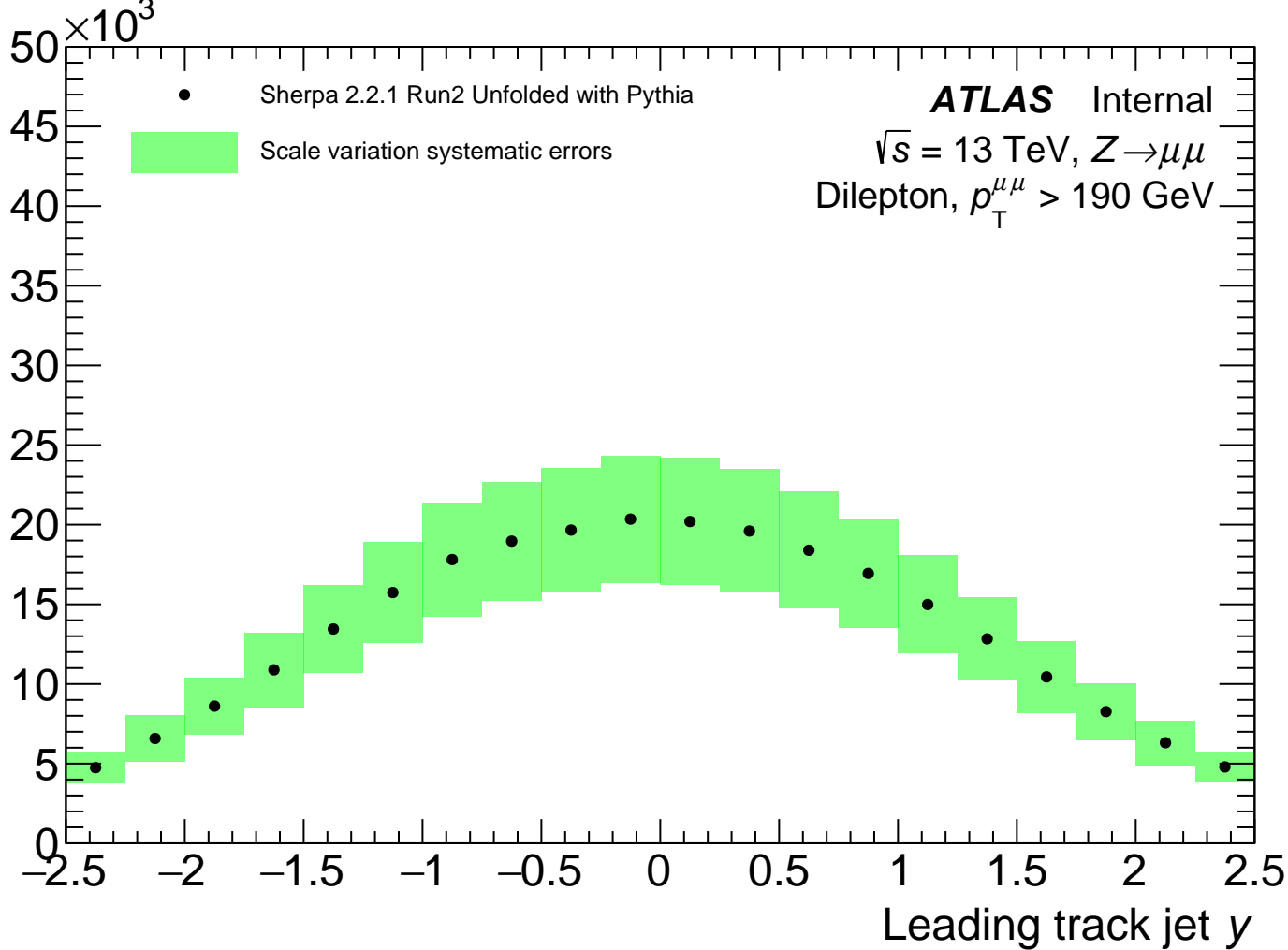
Events



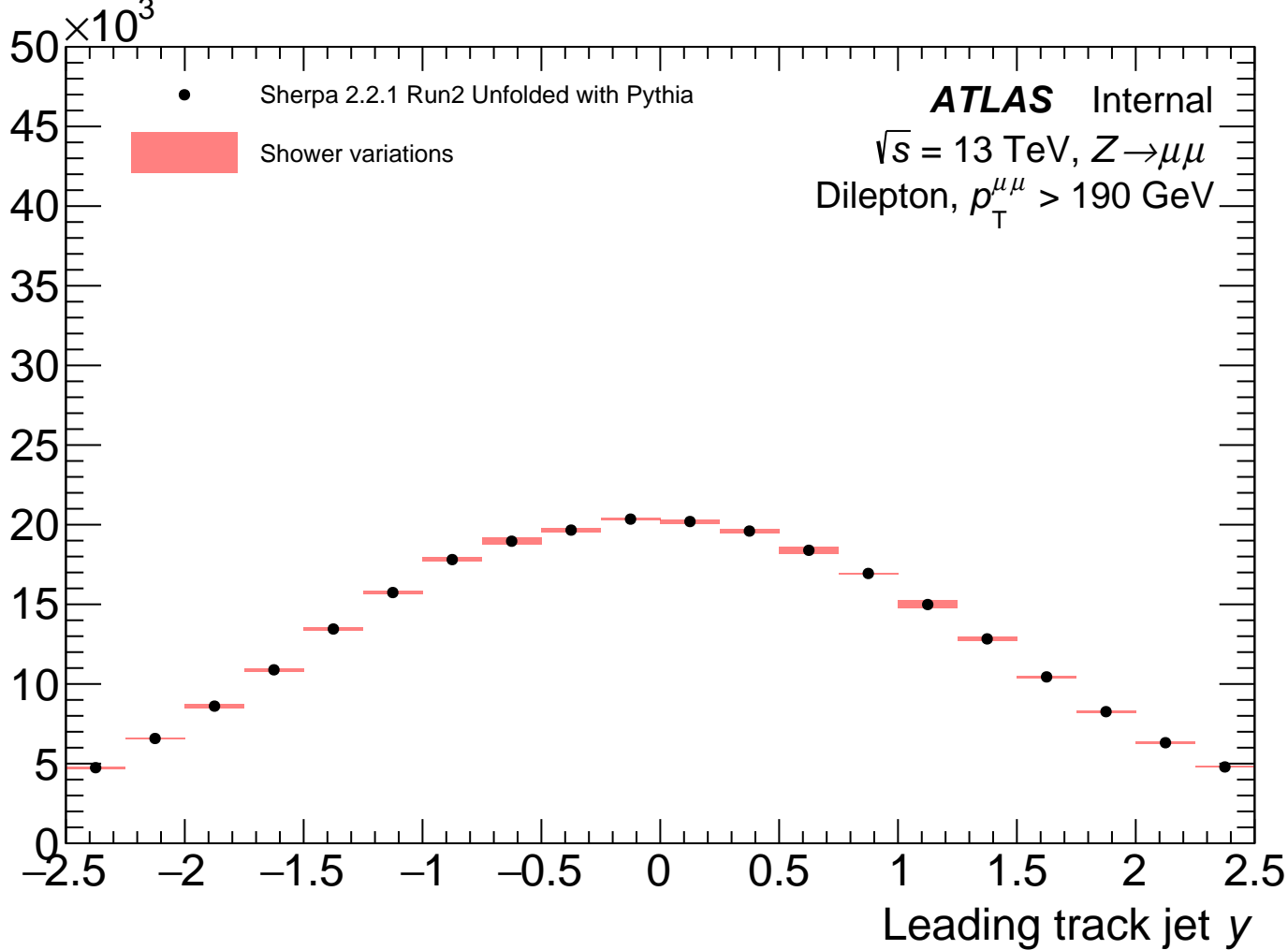
Events



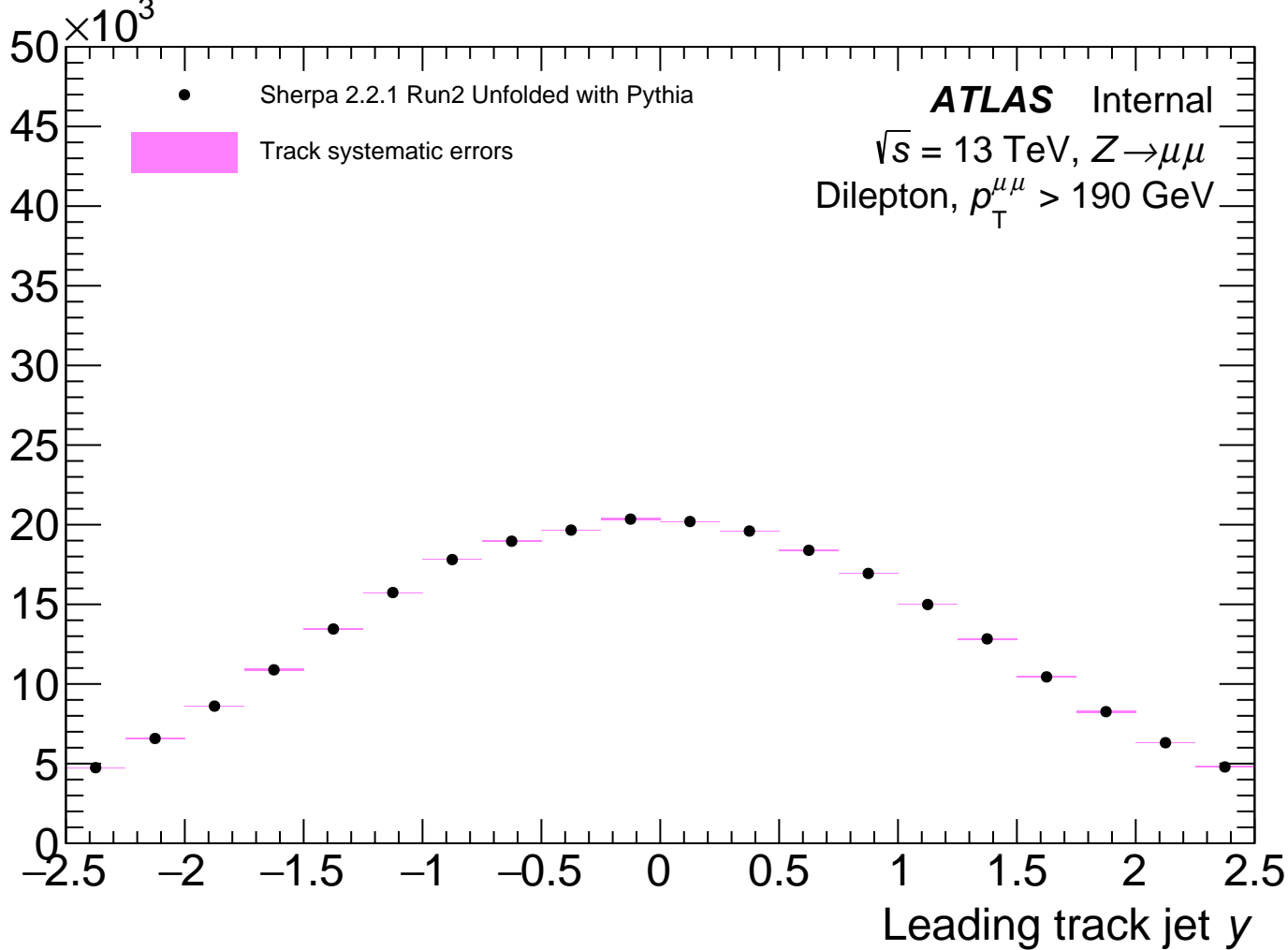
Events



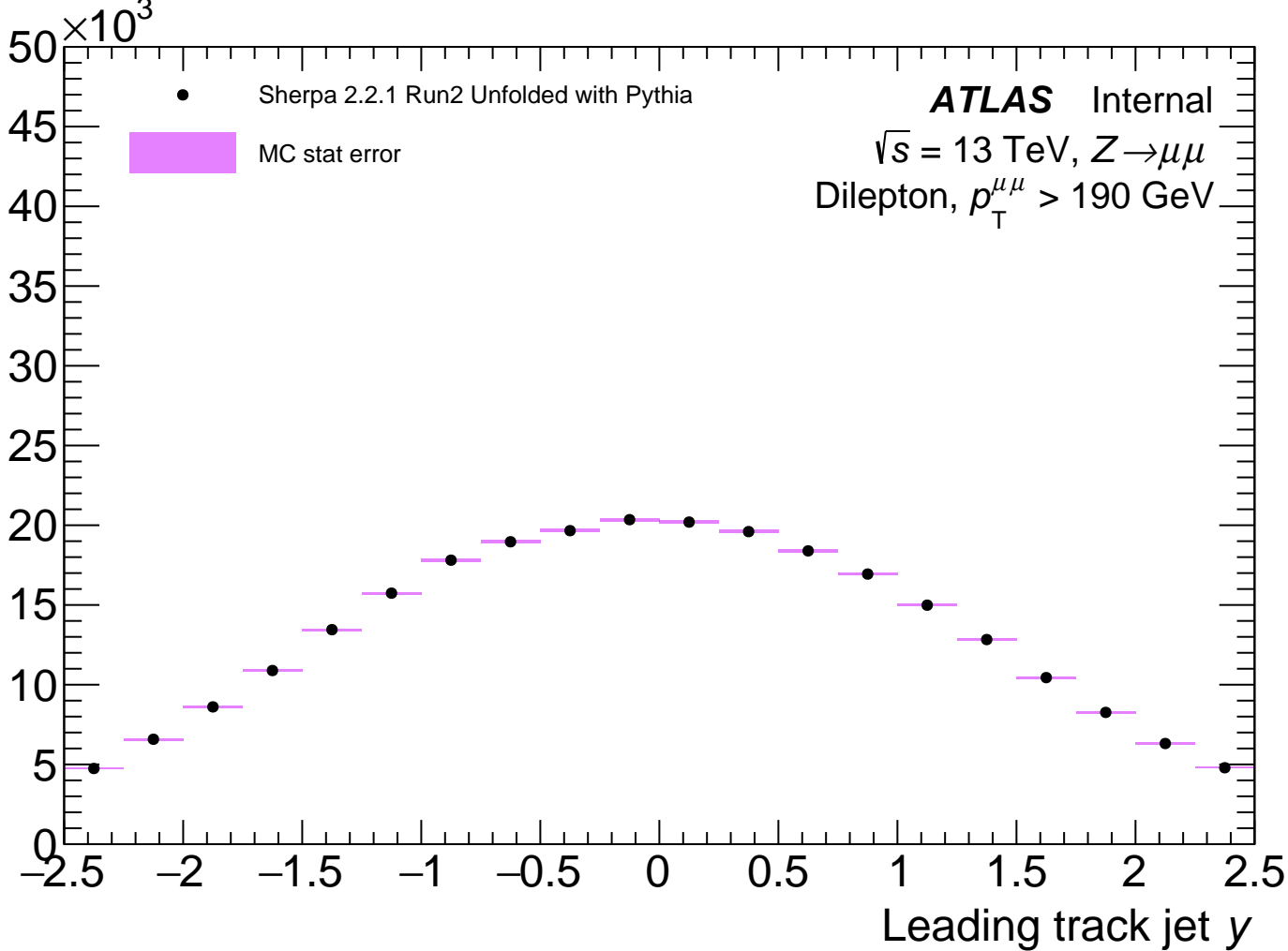
Events



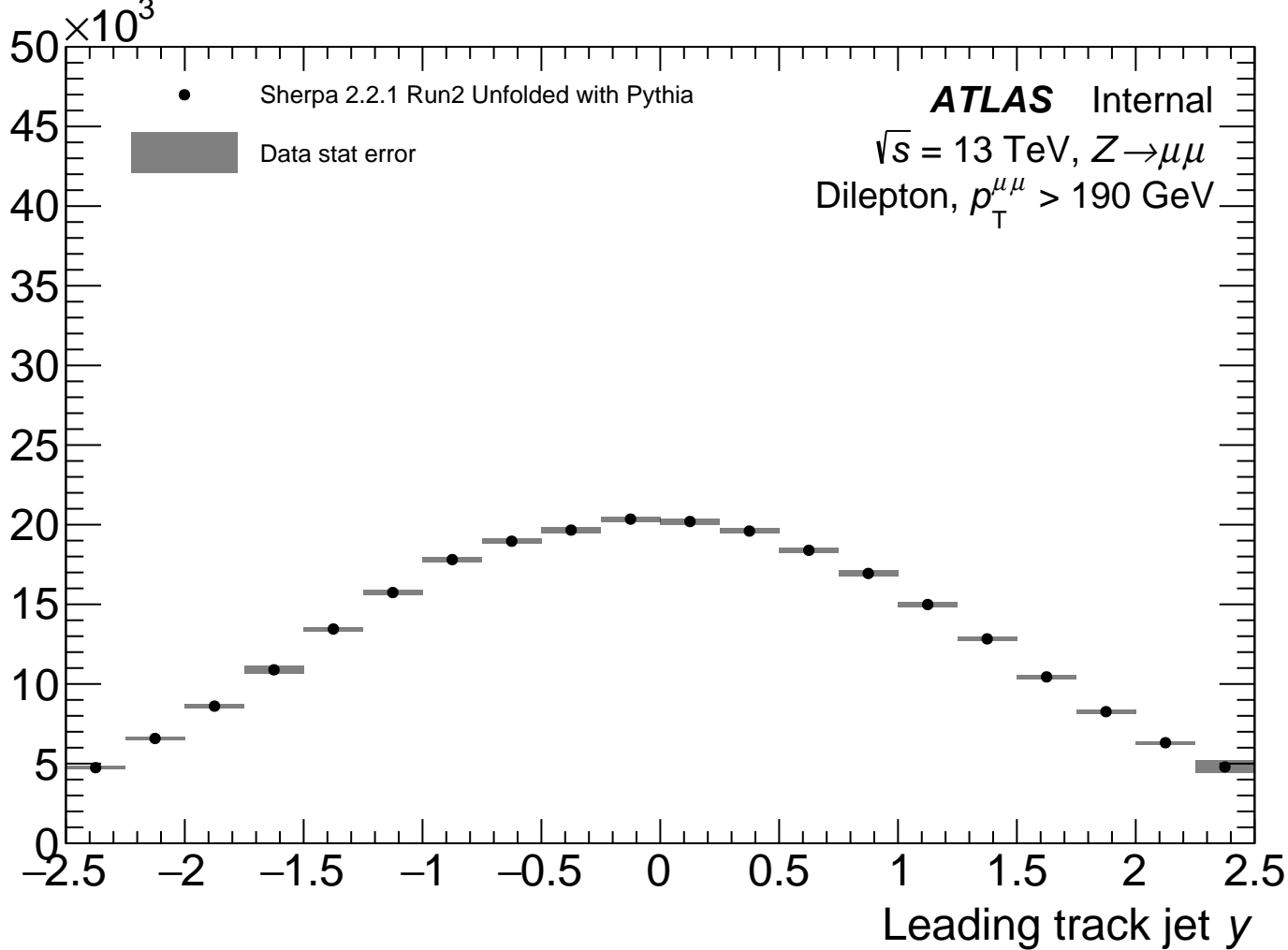
Events



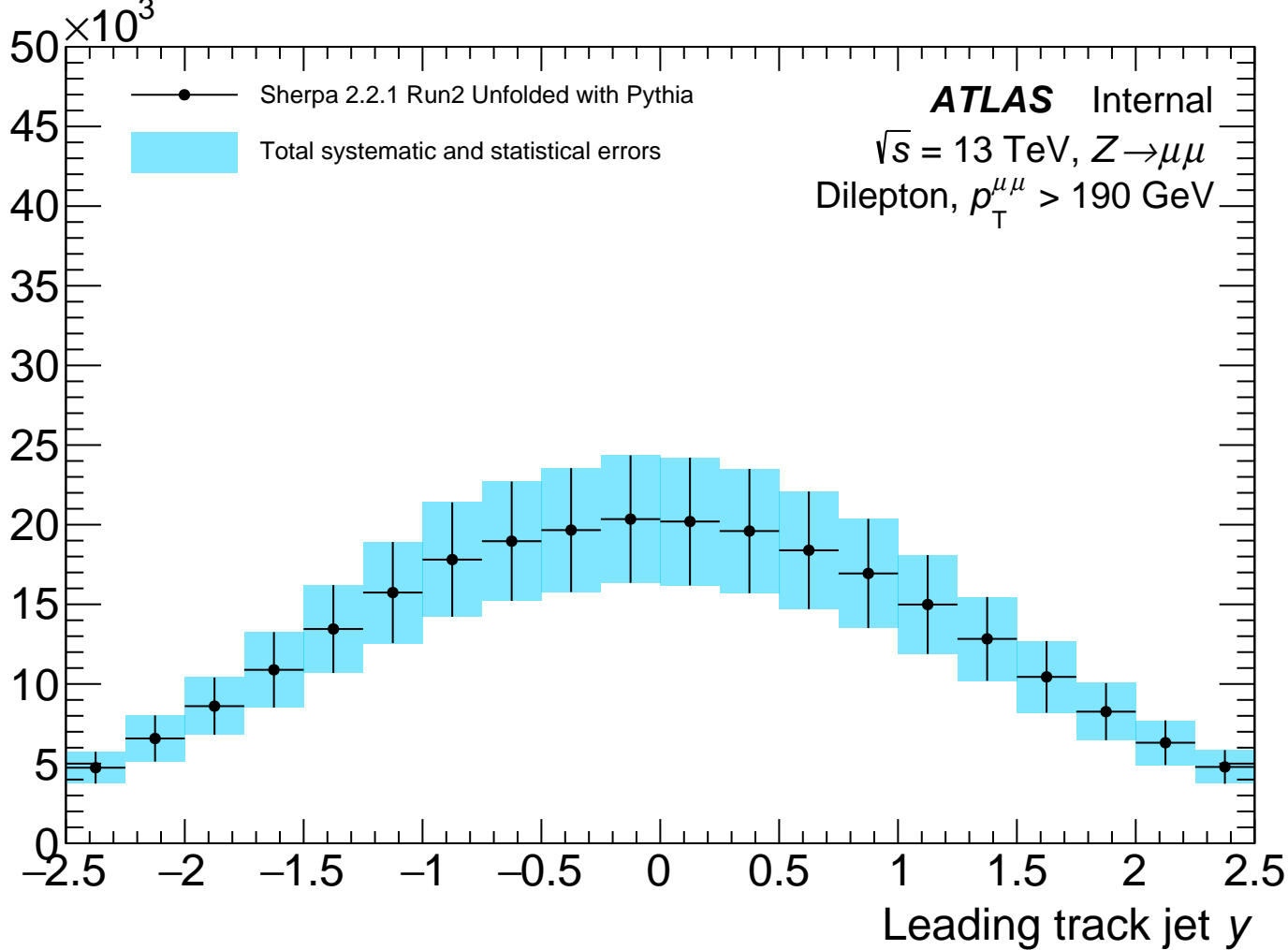
Events



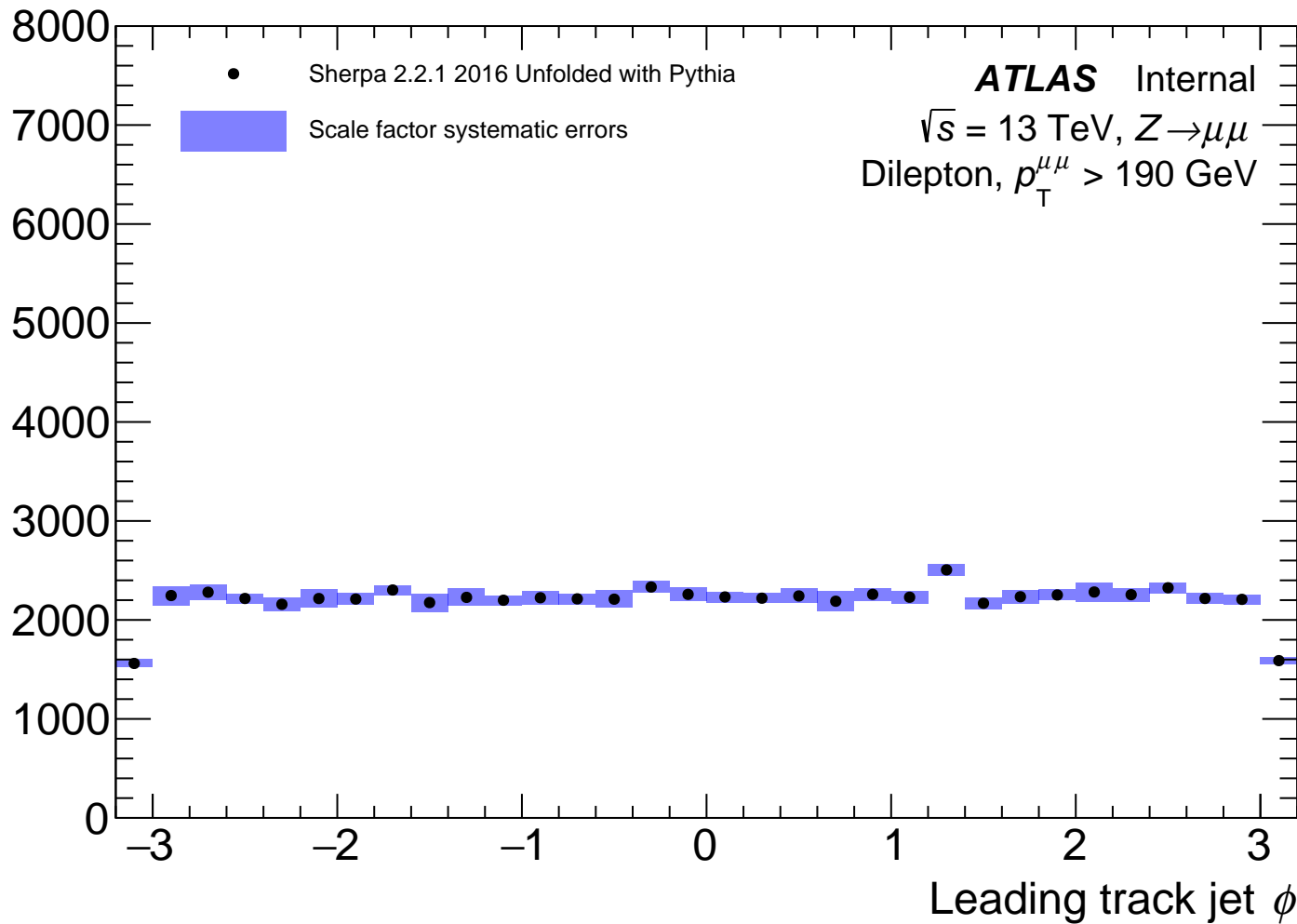
Events

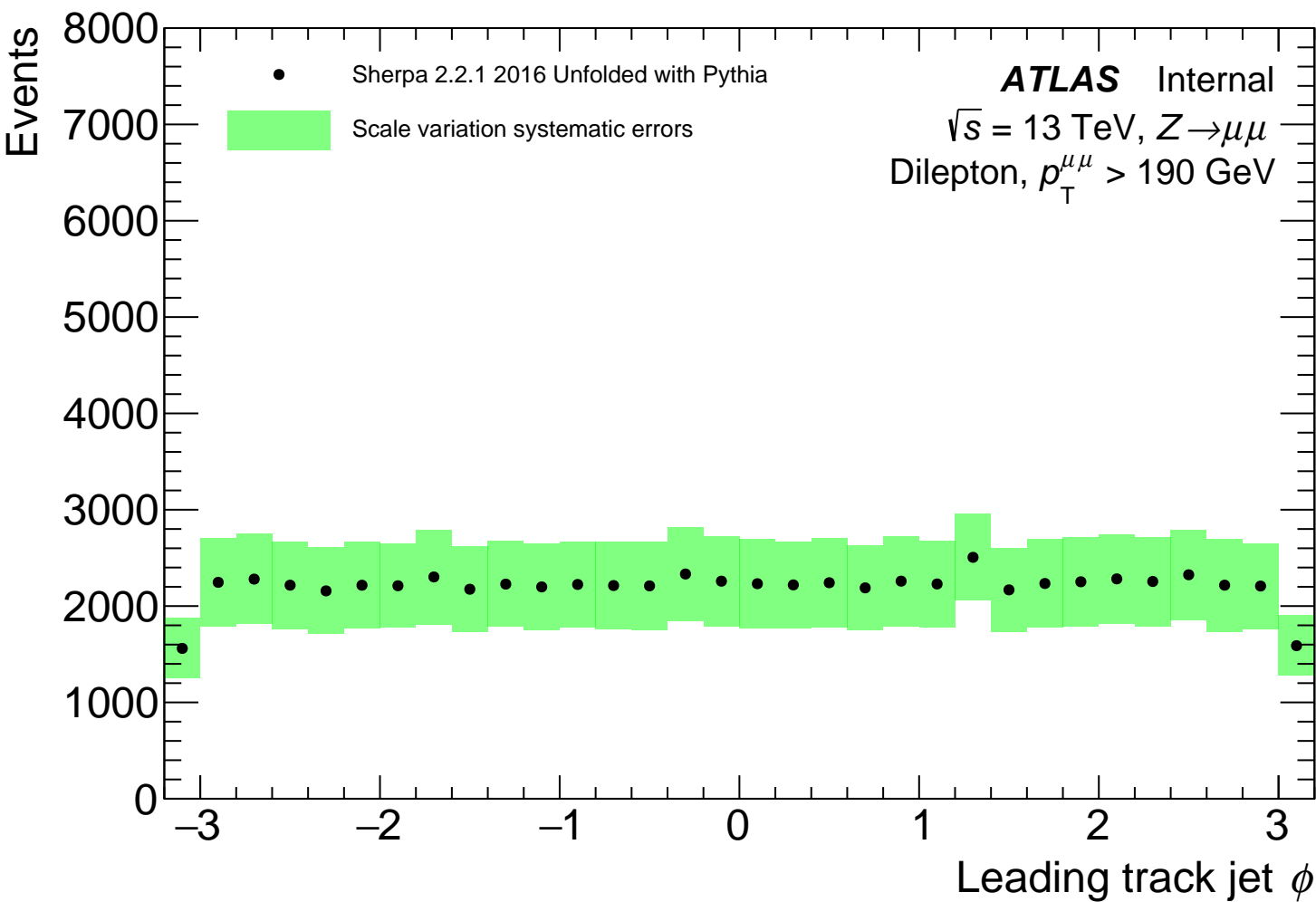


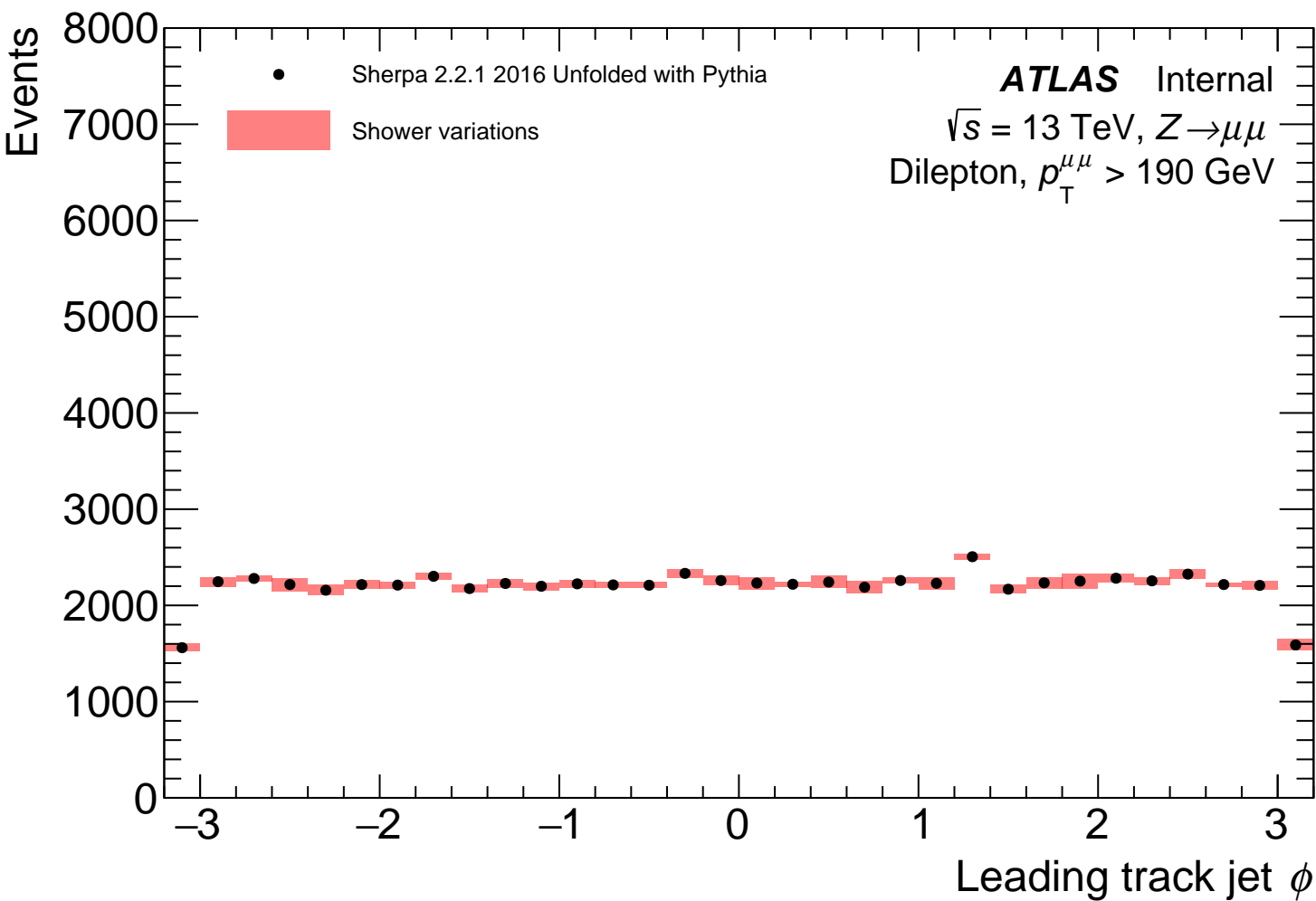
Events

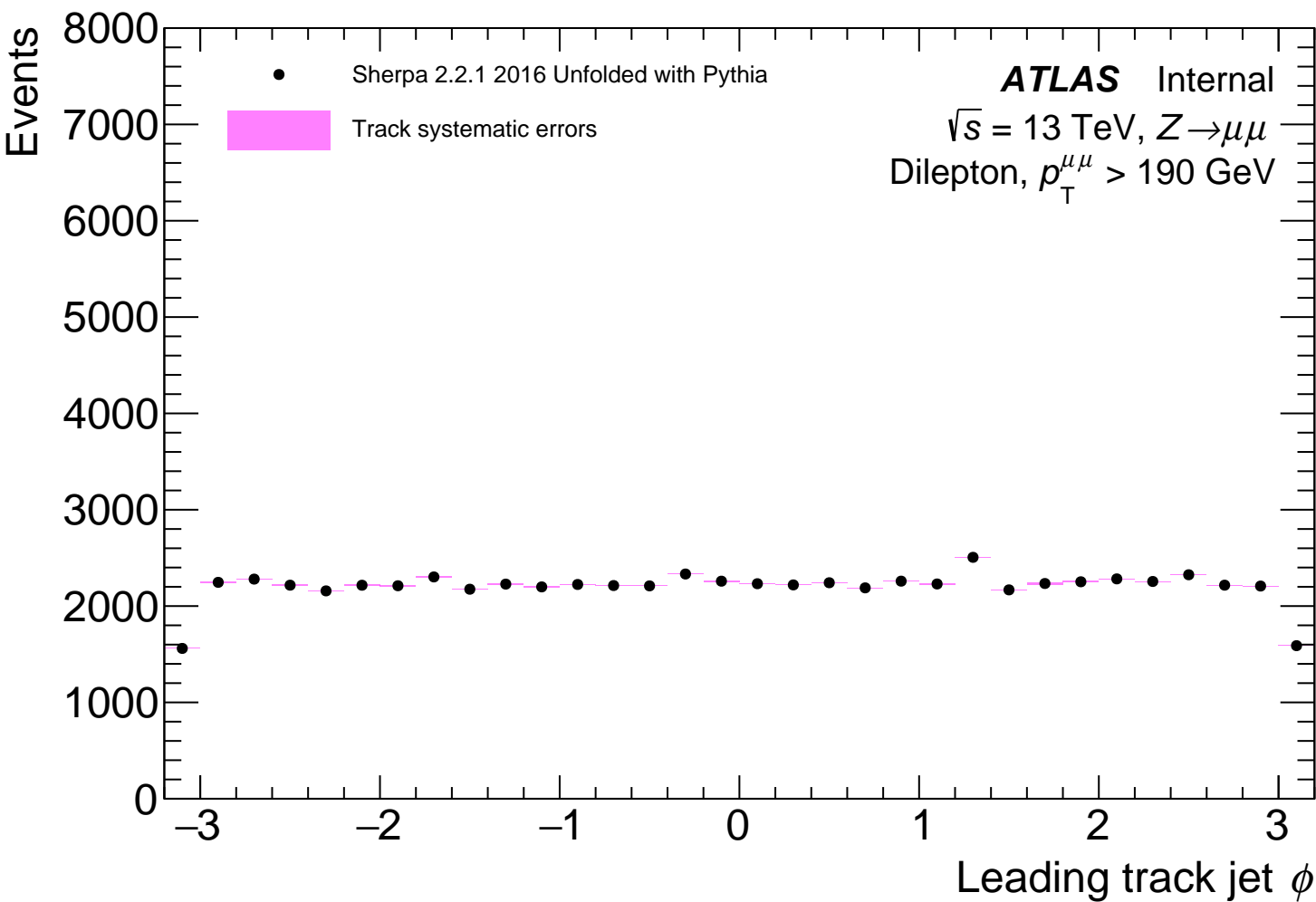


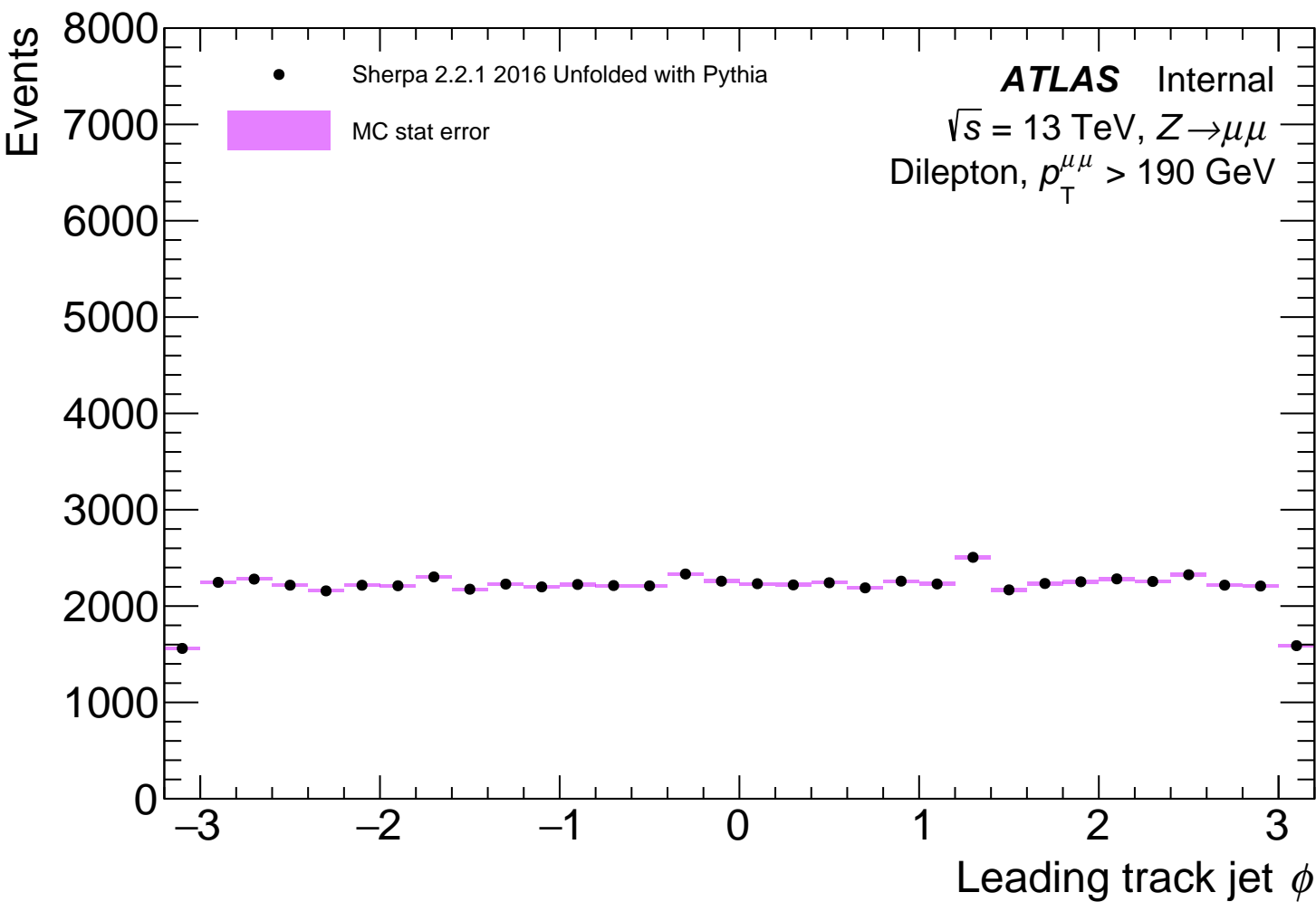
Events

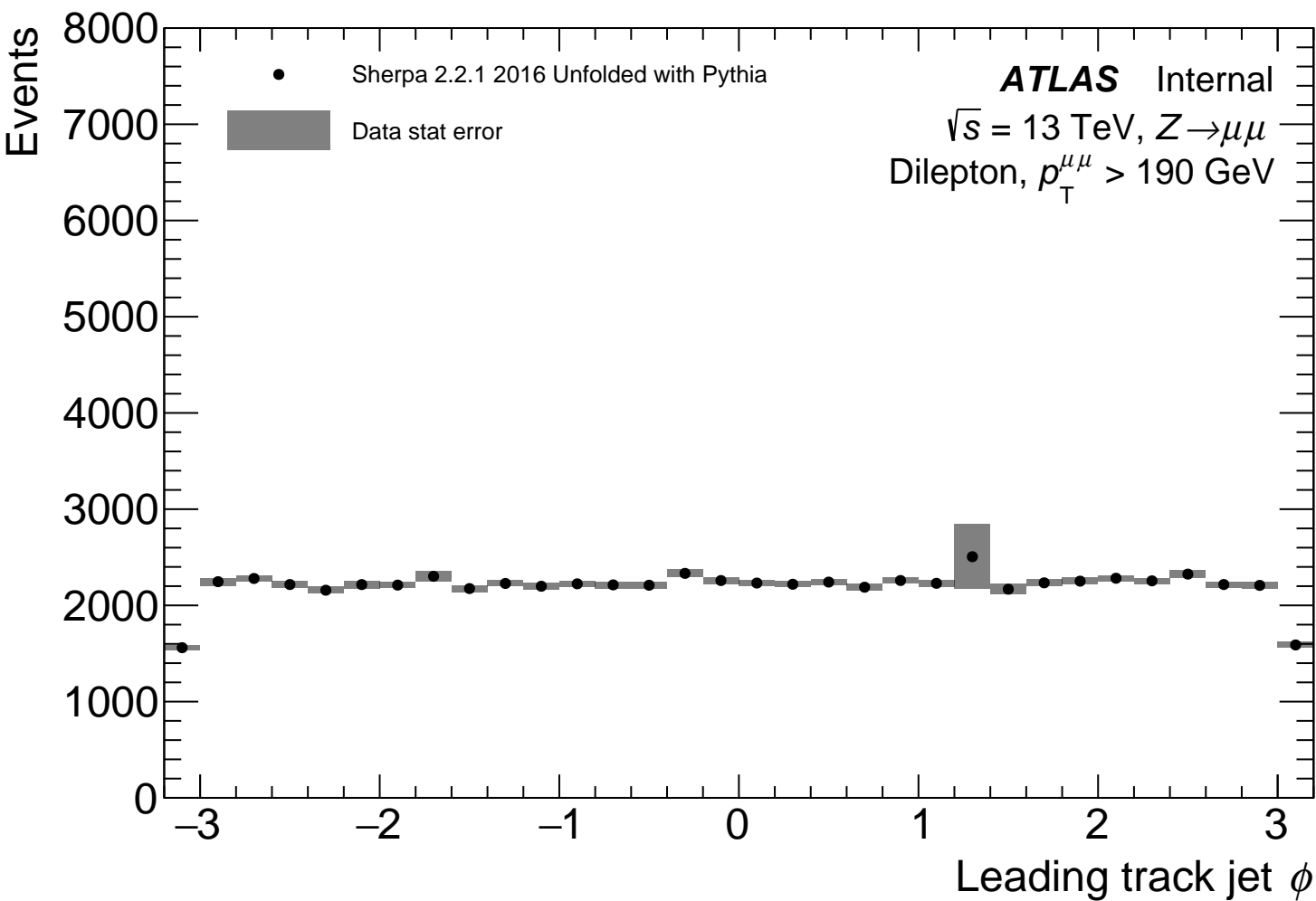


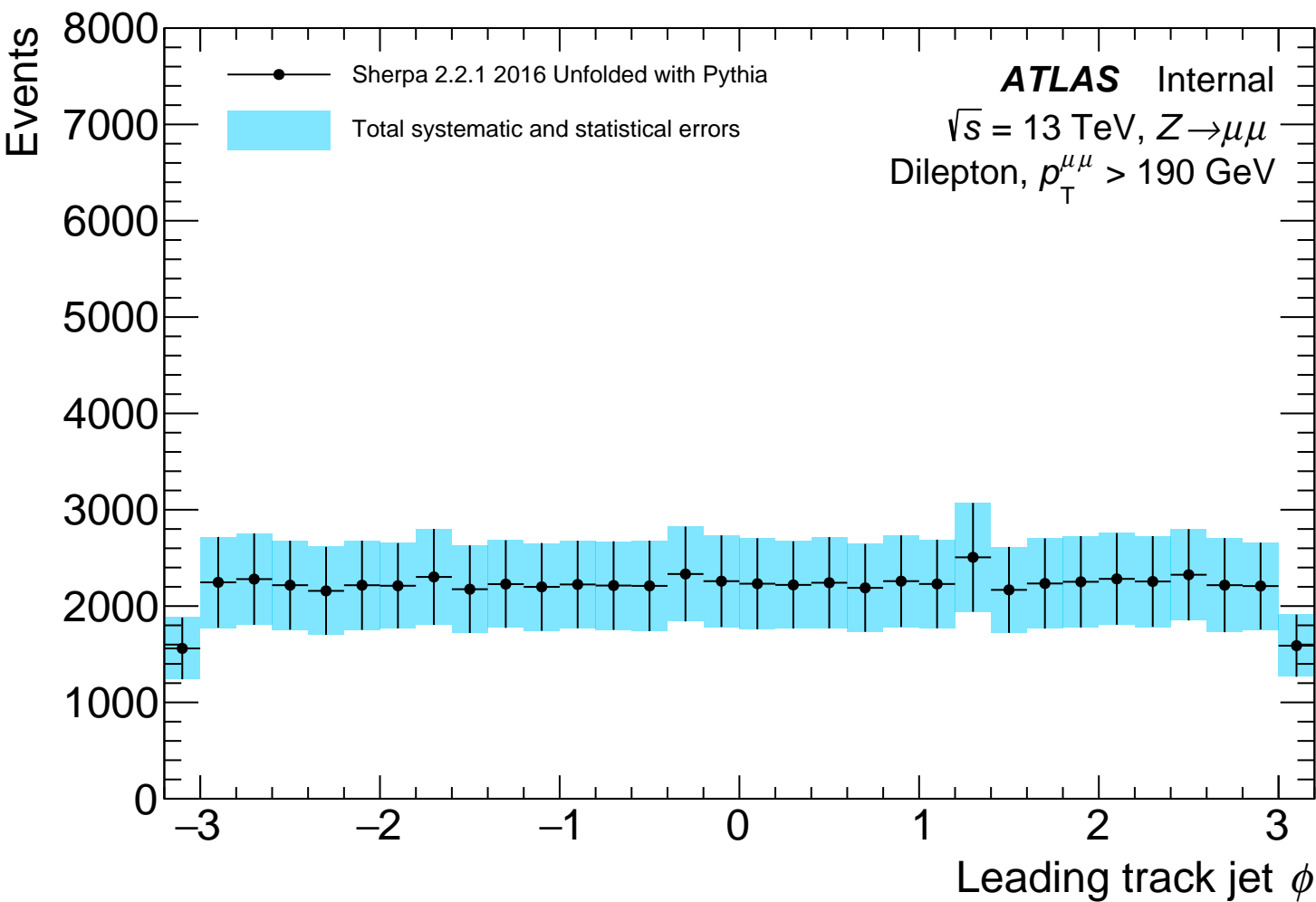


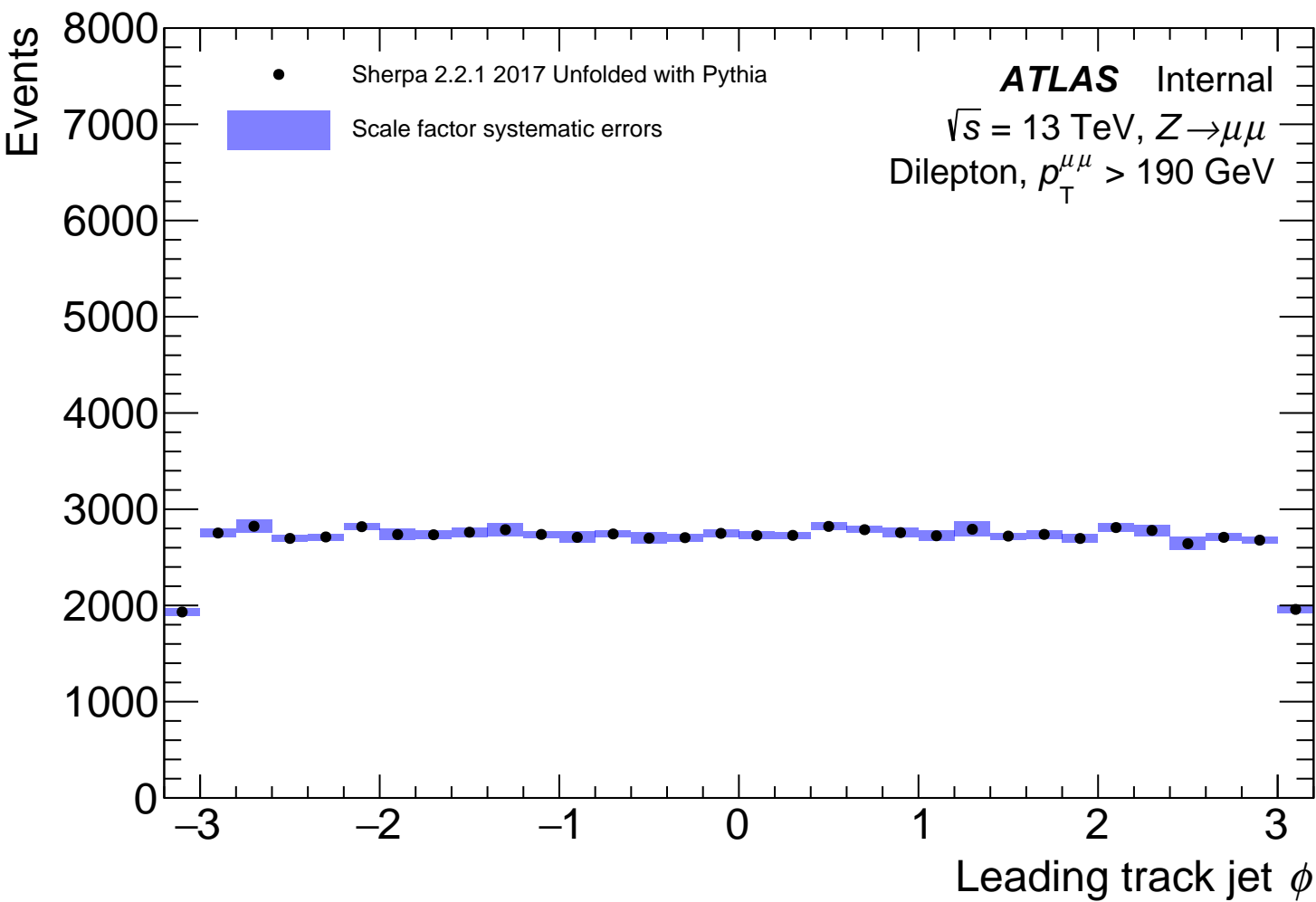


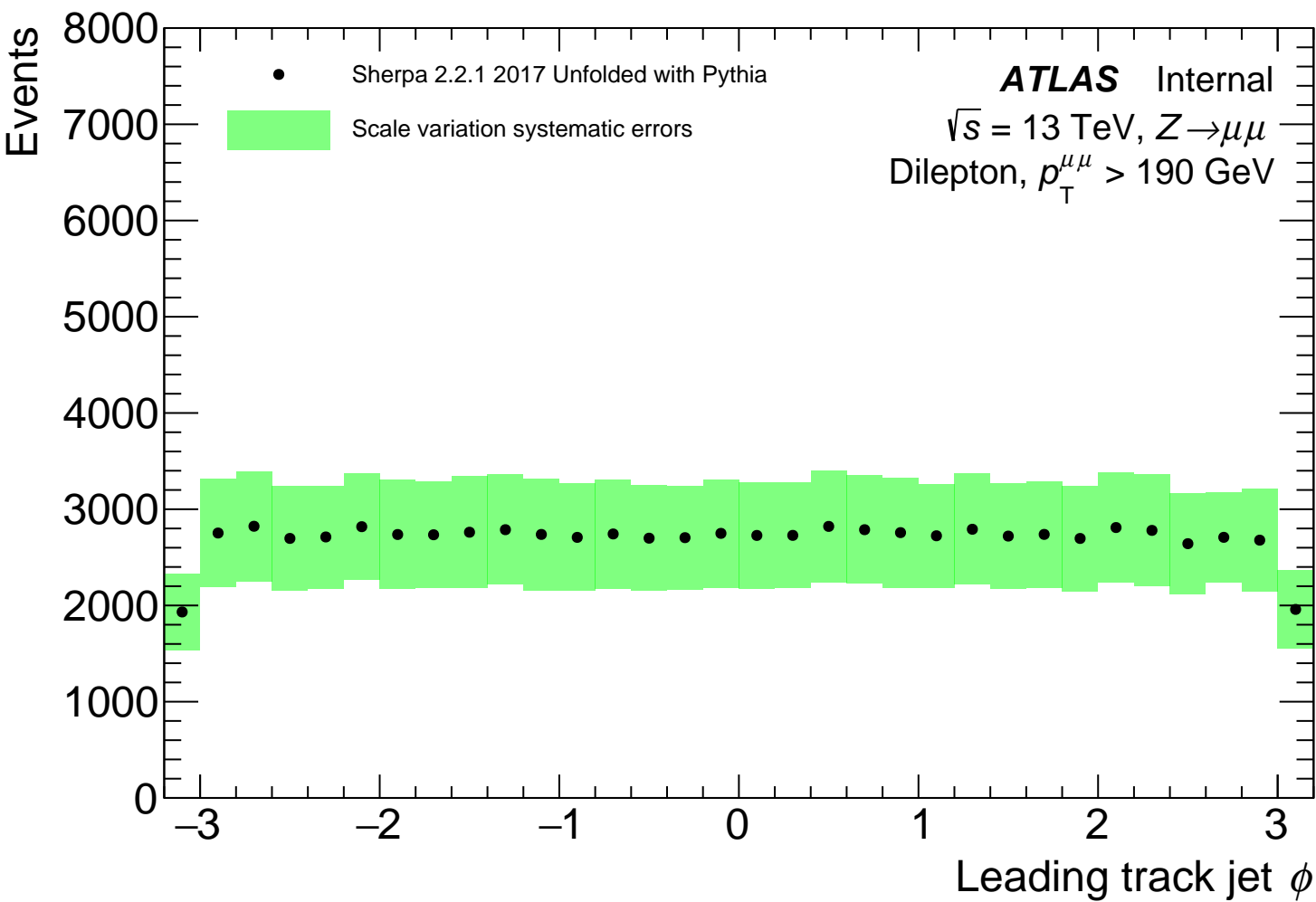


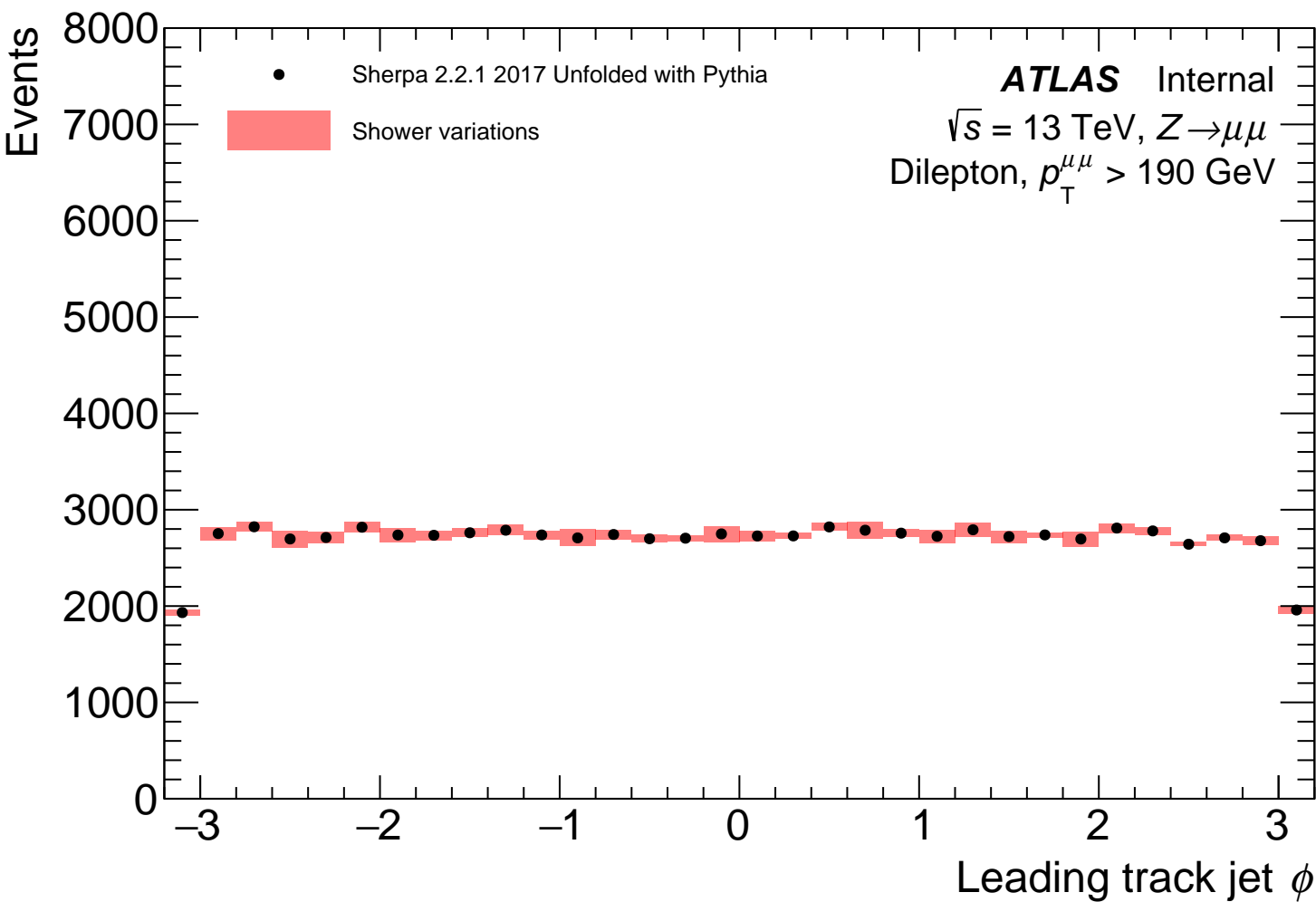


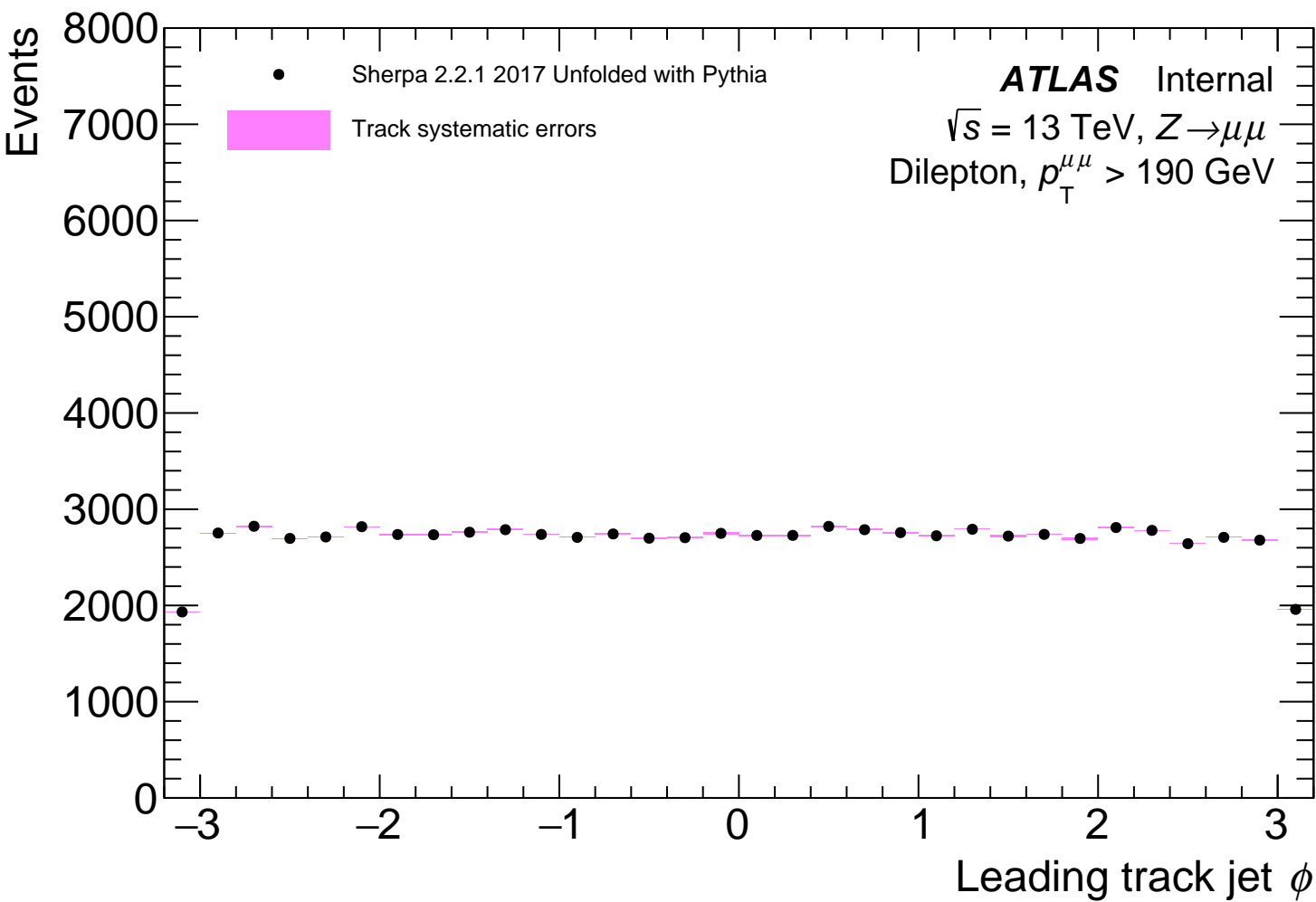












Events

8000

7000

6000

5000

4000

3000

2000

1000

0

-3

-2

-1

0

1

2

3

•

Sherpa 2.2.1 2017 Unfolded with Pythia



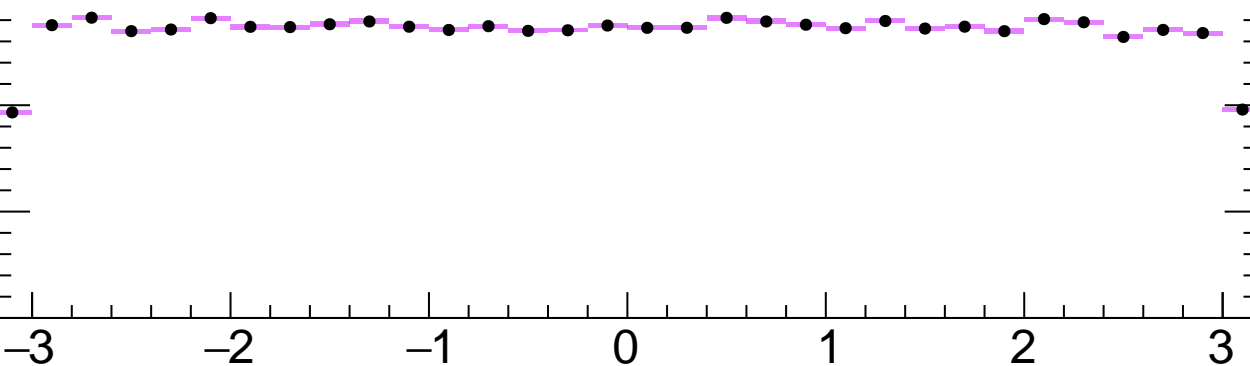
MC stat error

ATLAS Internal

$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

Leading track jet ϕ



Events

8000

7000

6000

5000

4000

3000

2000

1000

0

-3

-2

-1

0

1

2

3

•

Sherpa 2.2.1 2017 Unfolded with Pythia



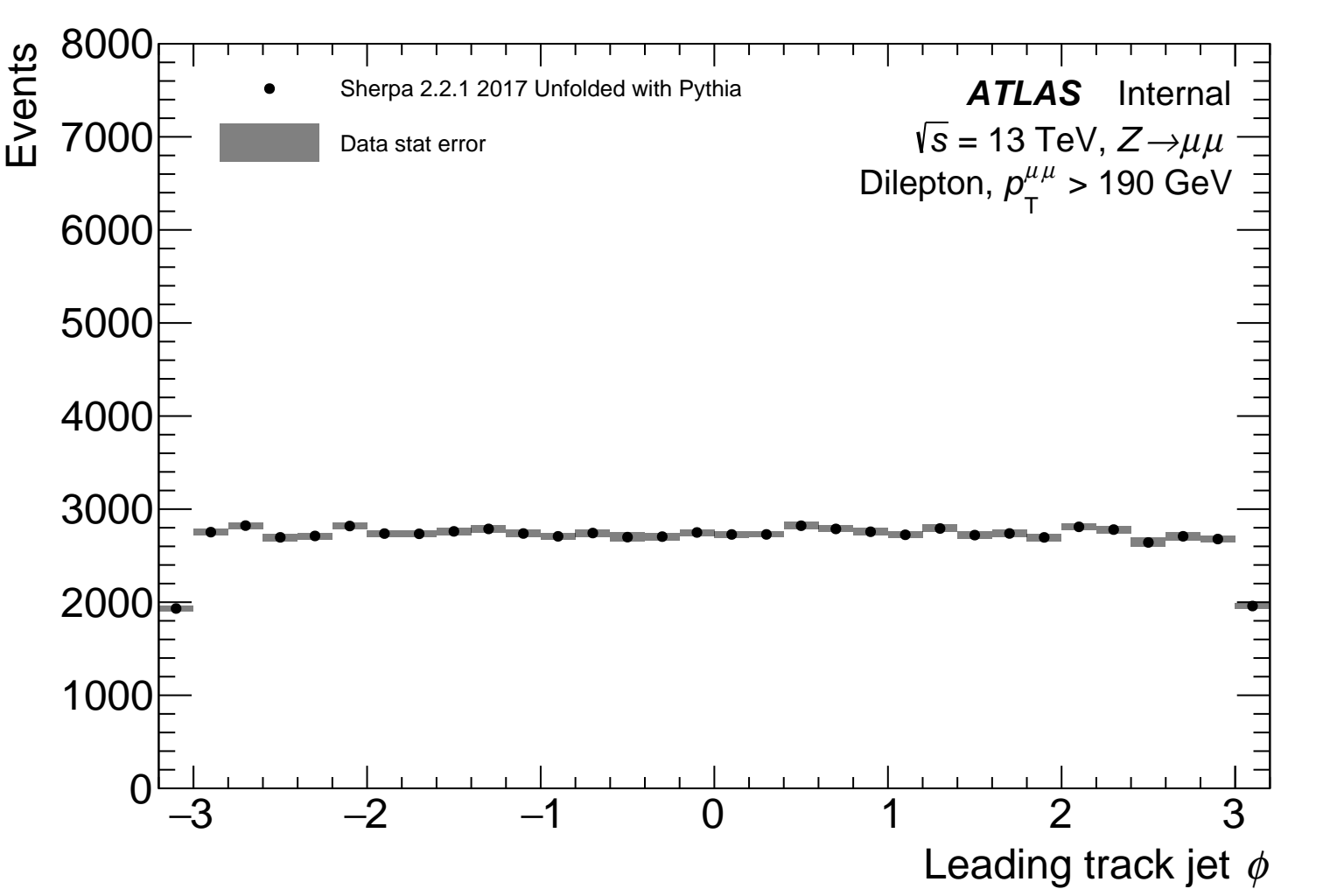
Data stat error

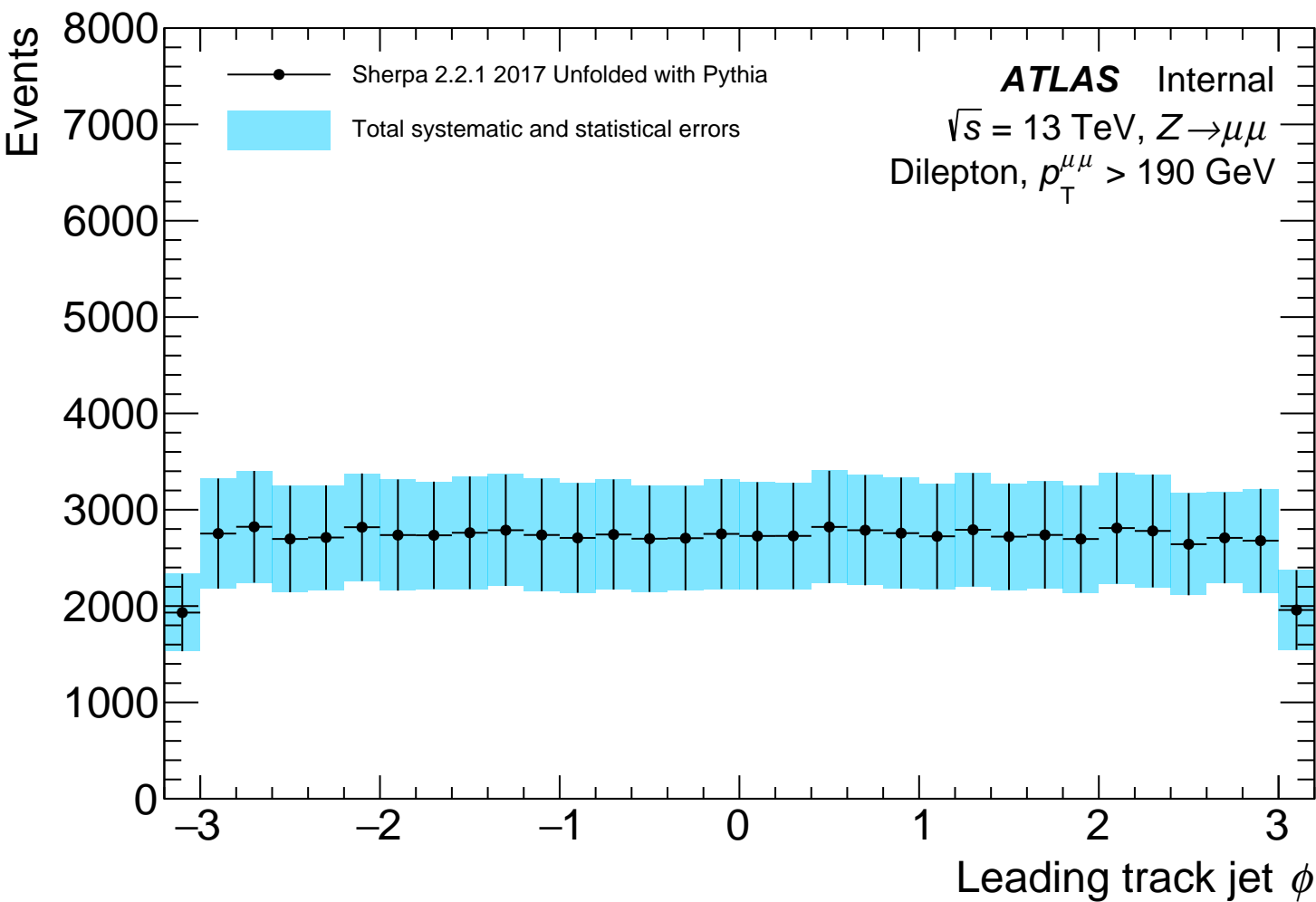
ATLAS Internal

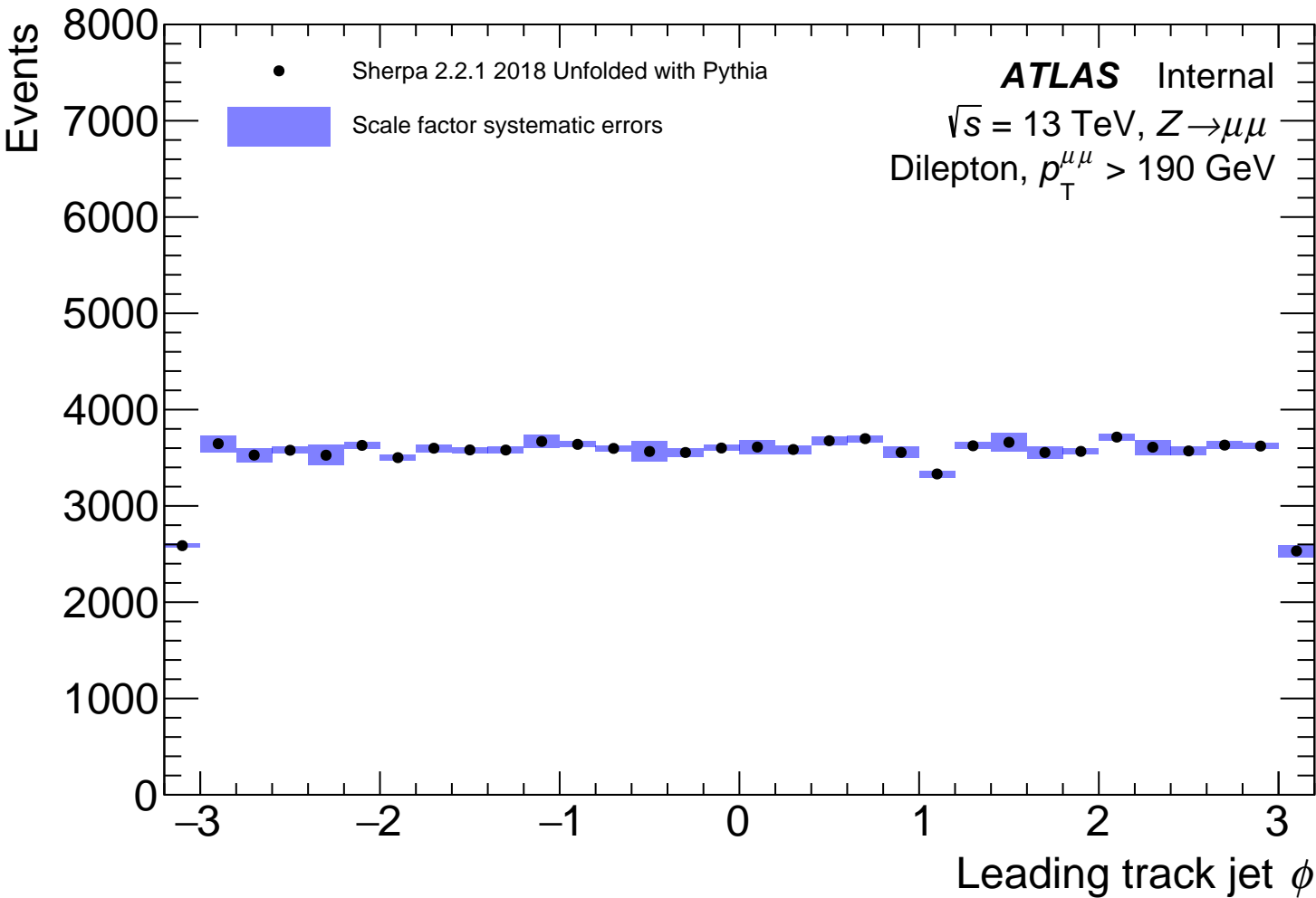
$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

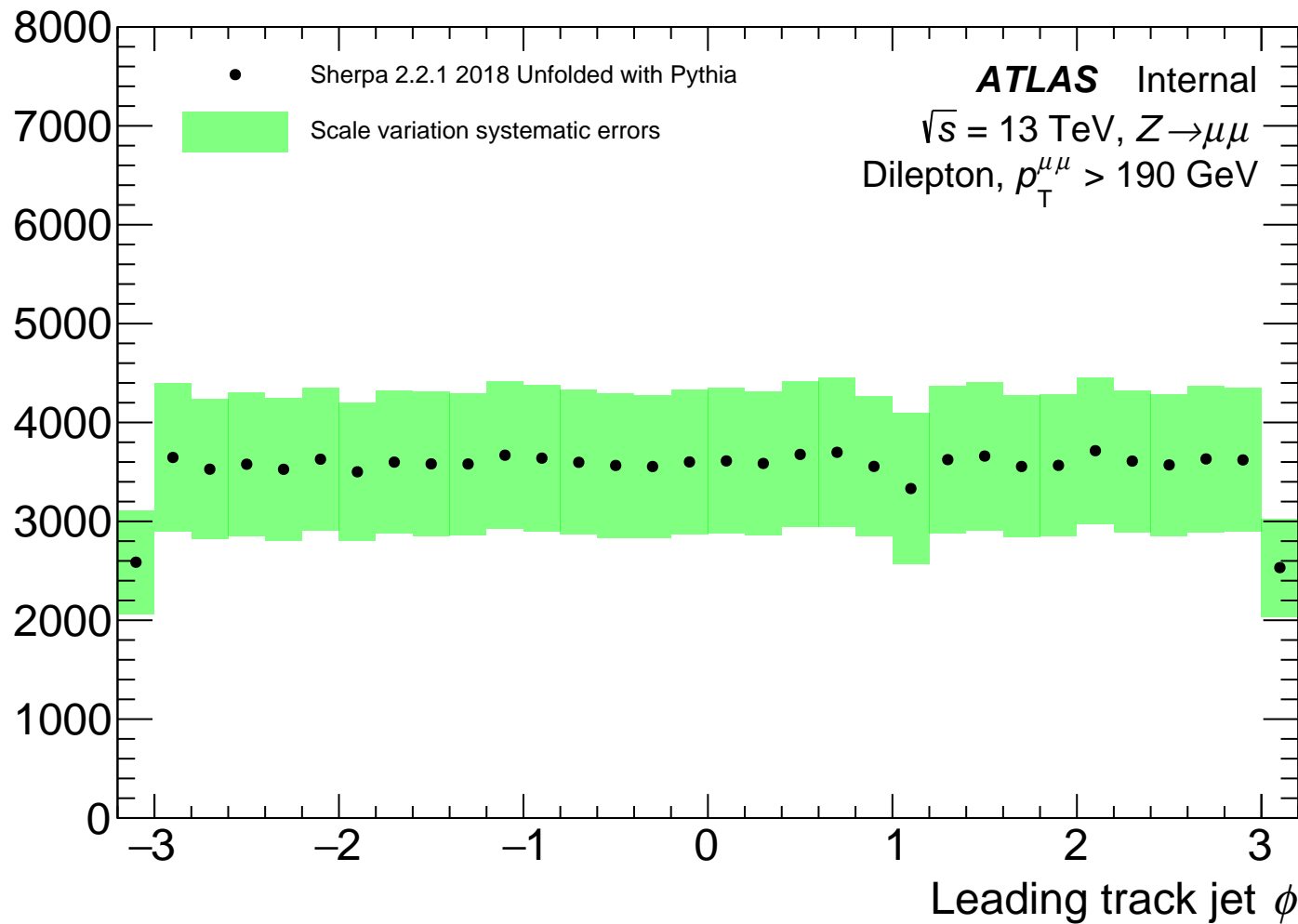
Leading track jet ϕ

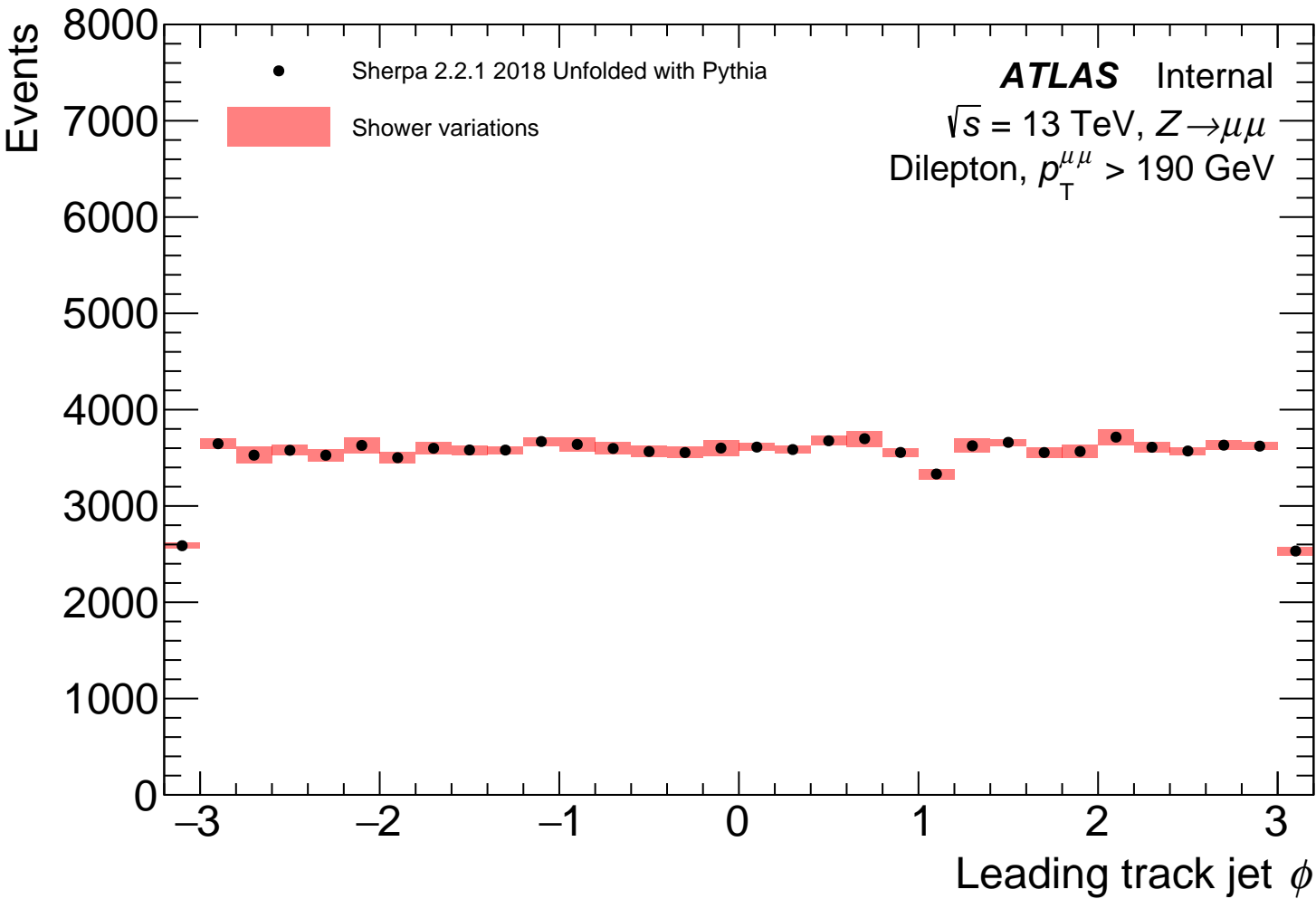


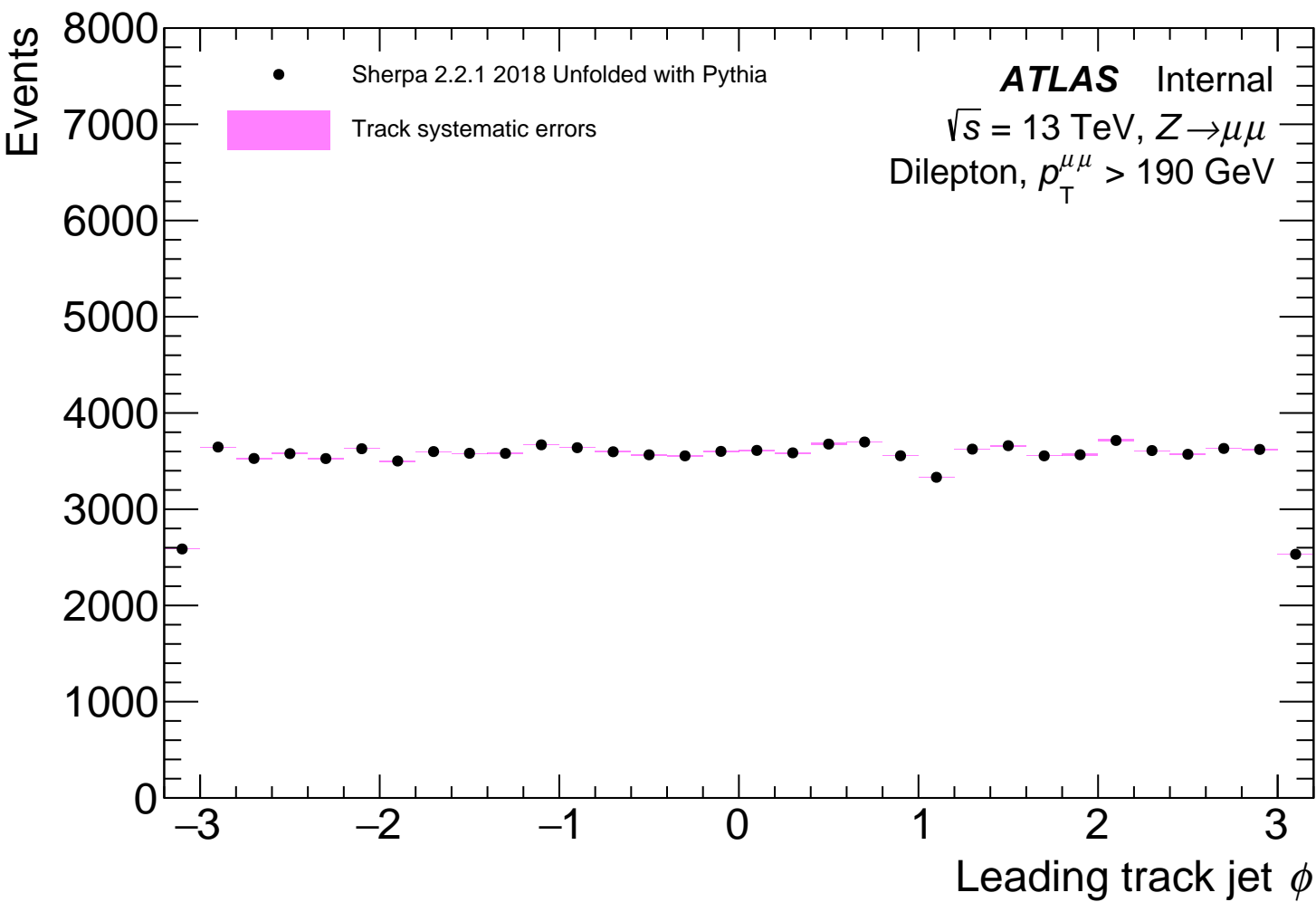


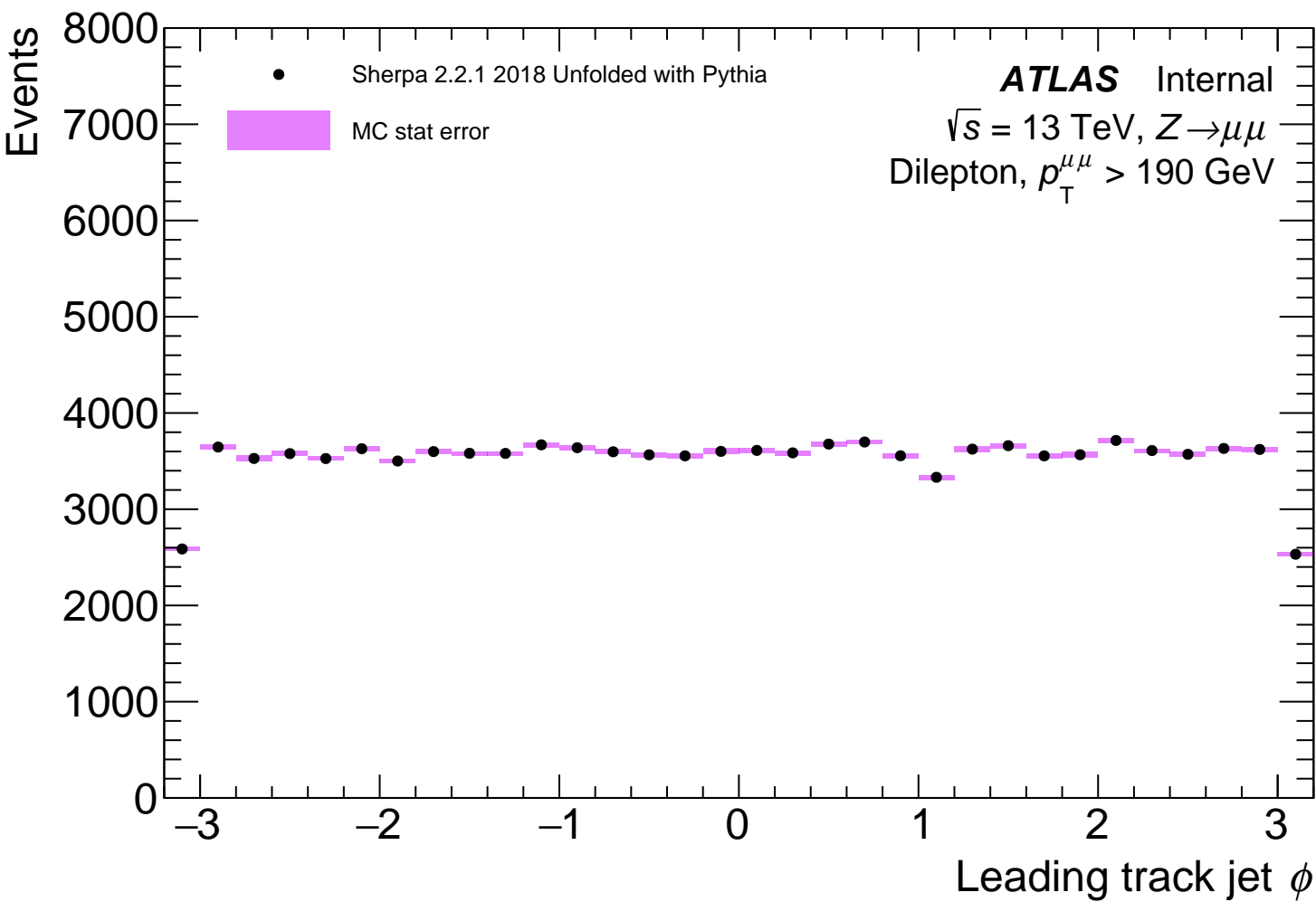


Events









Events

8000

7000

6000

5000

4000

3000

2000

1000

0

-3

-2

-1

0

1

2

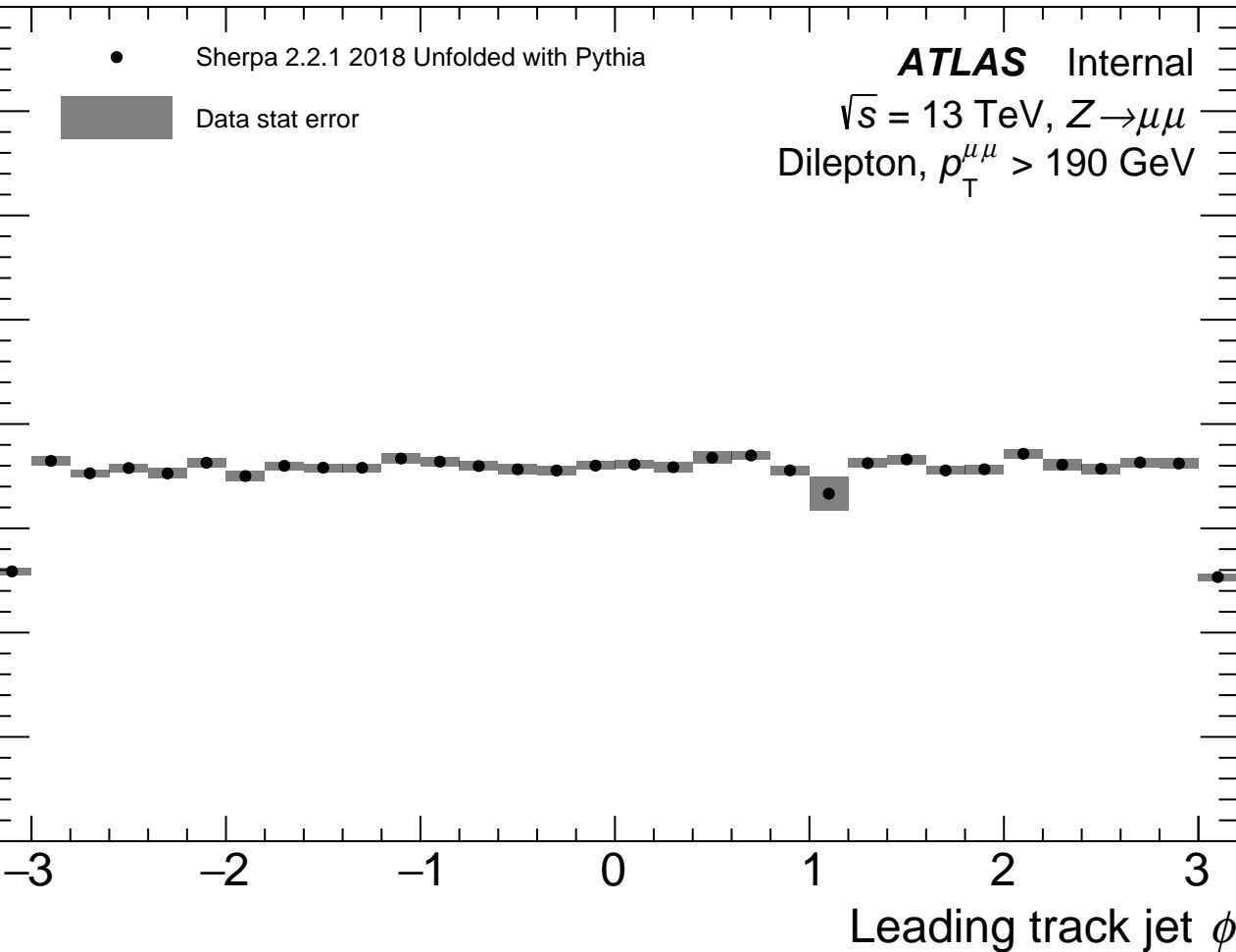
3

•

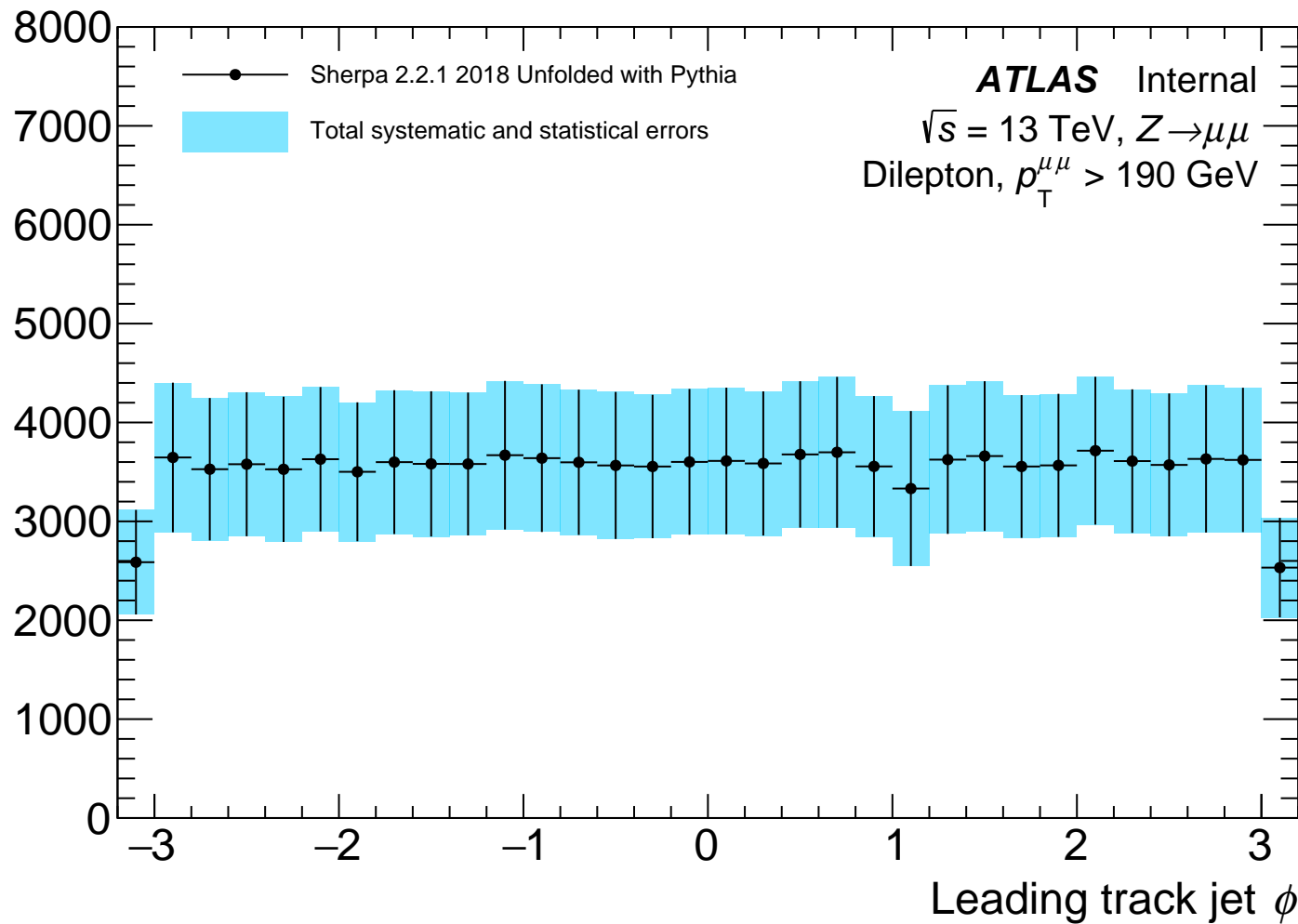
Sherpa 2.2.1 2018 Unfolded with Pythia



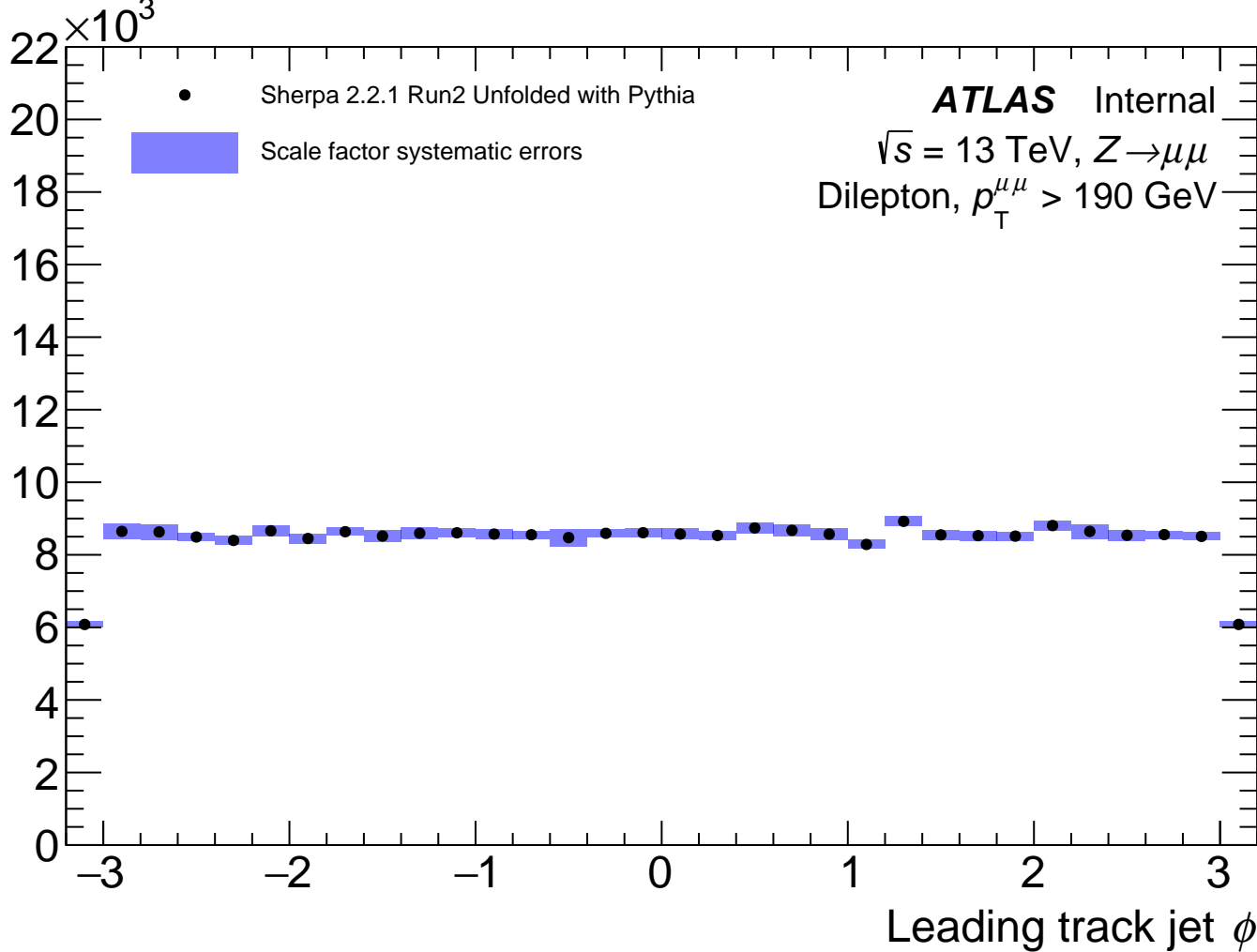
Data stat error

ATLAS Internal $\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$ Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$ Leading track jet ϕ

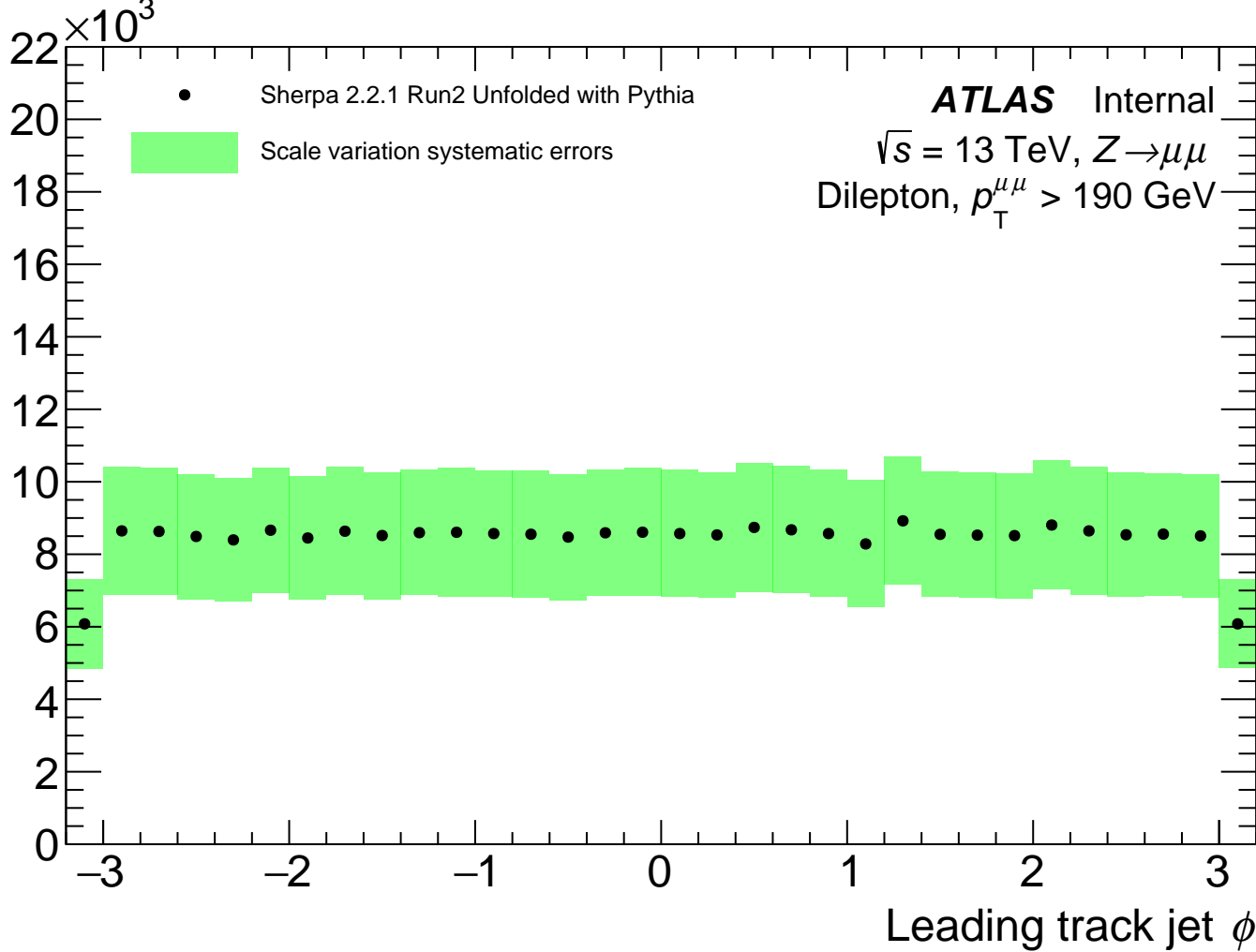
Events



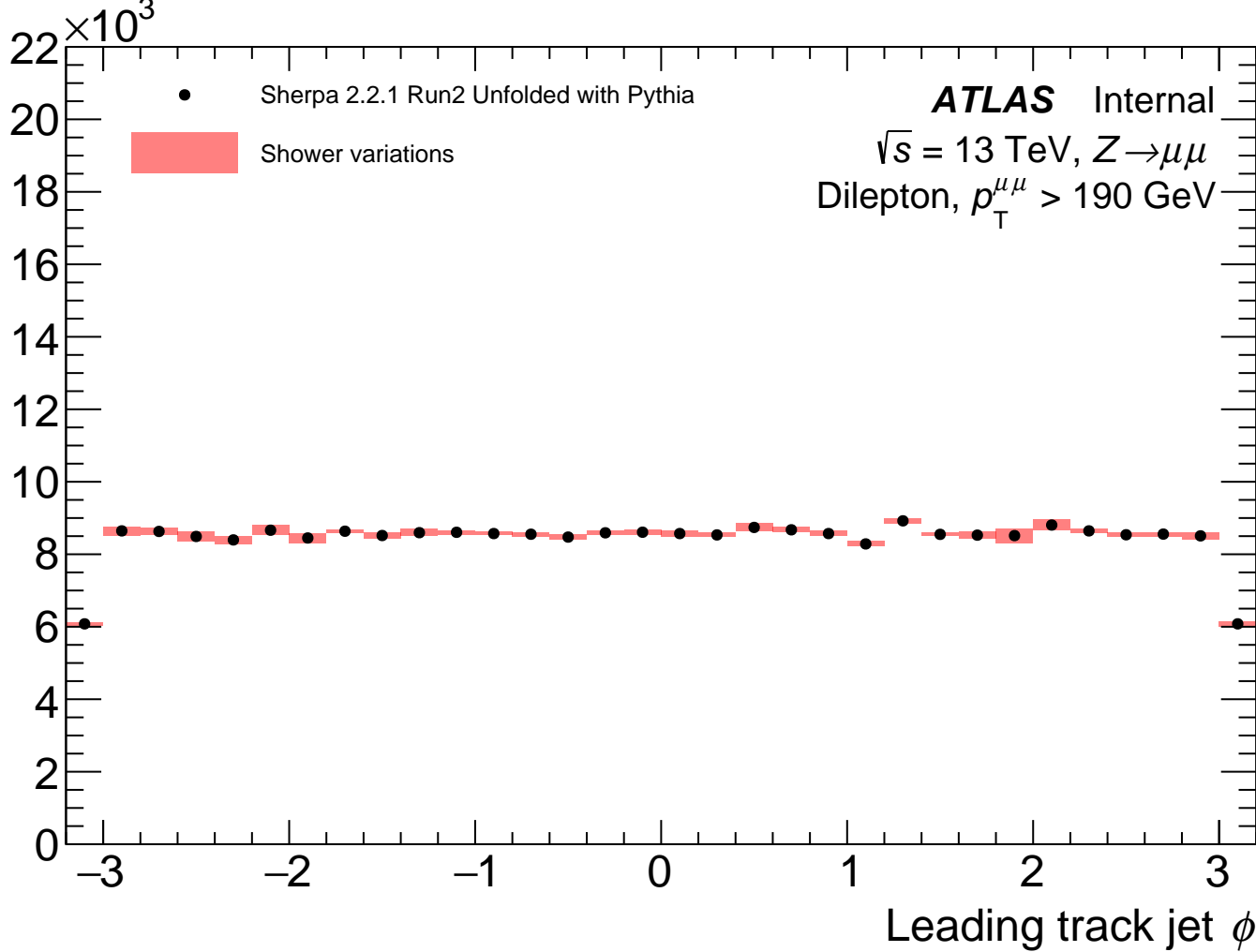
Events



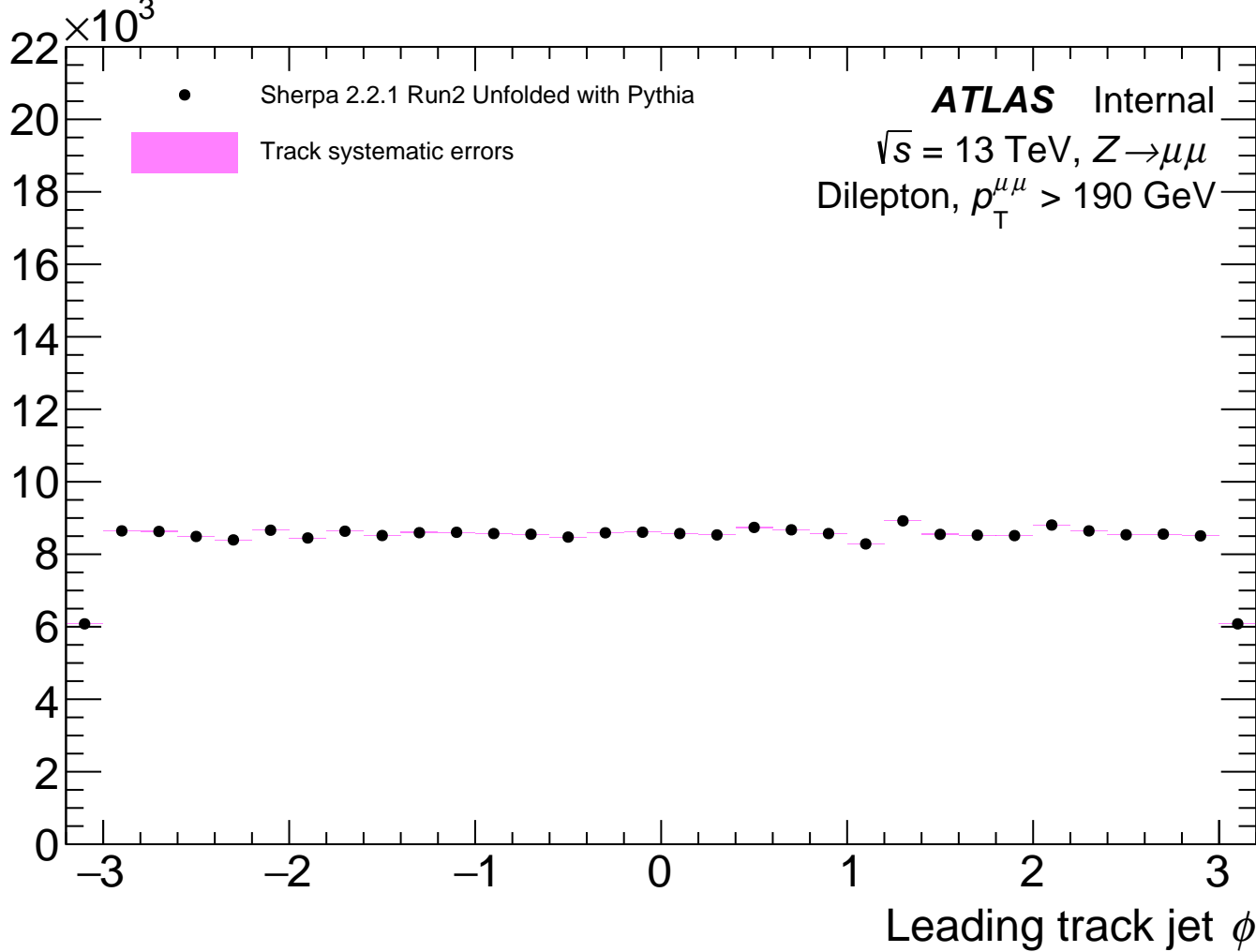
Events



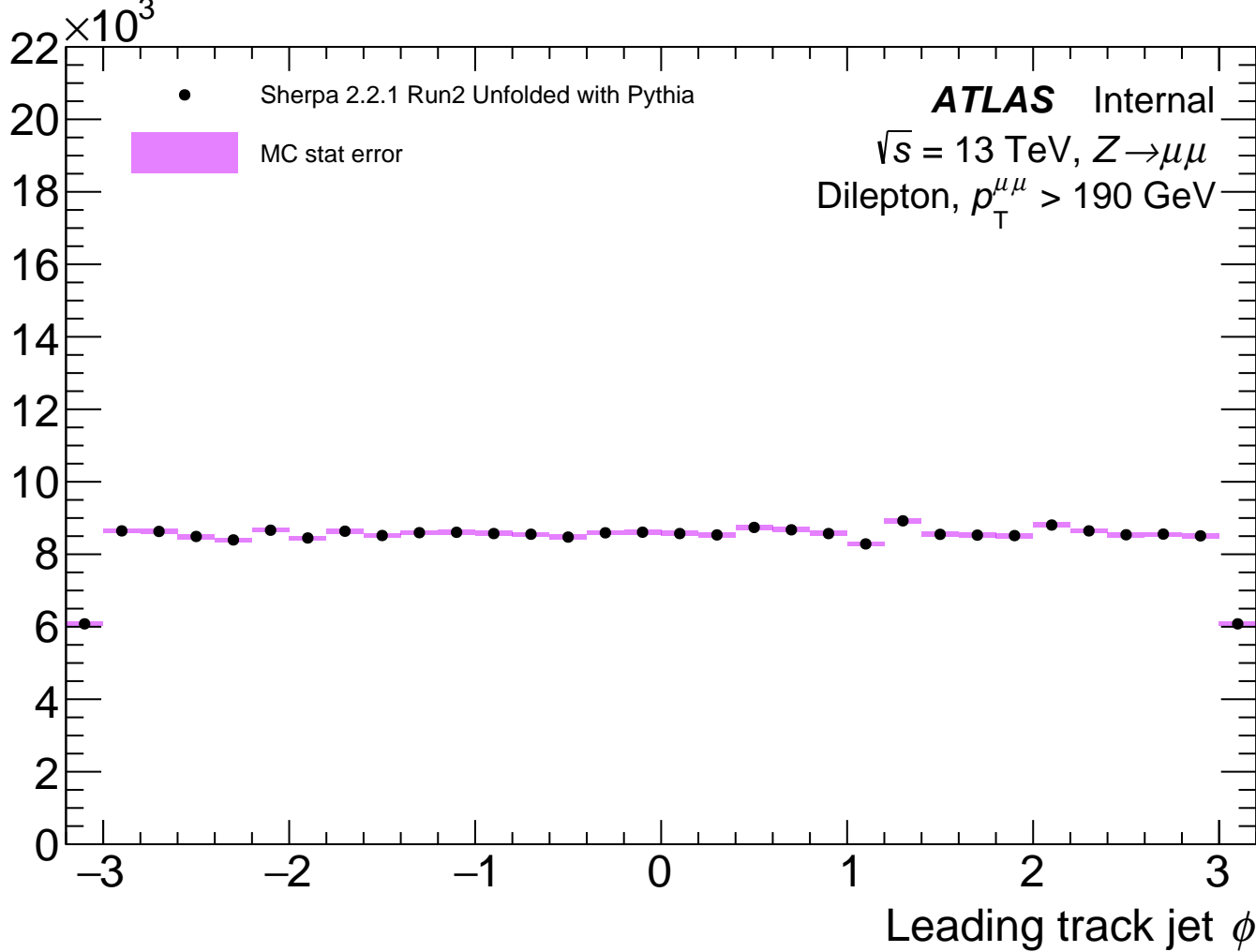
Events



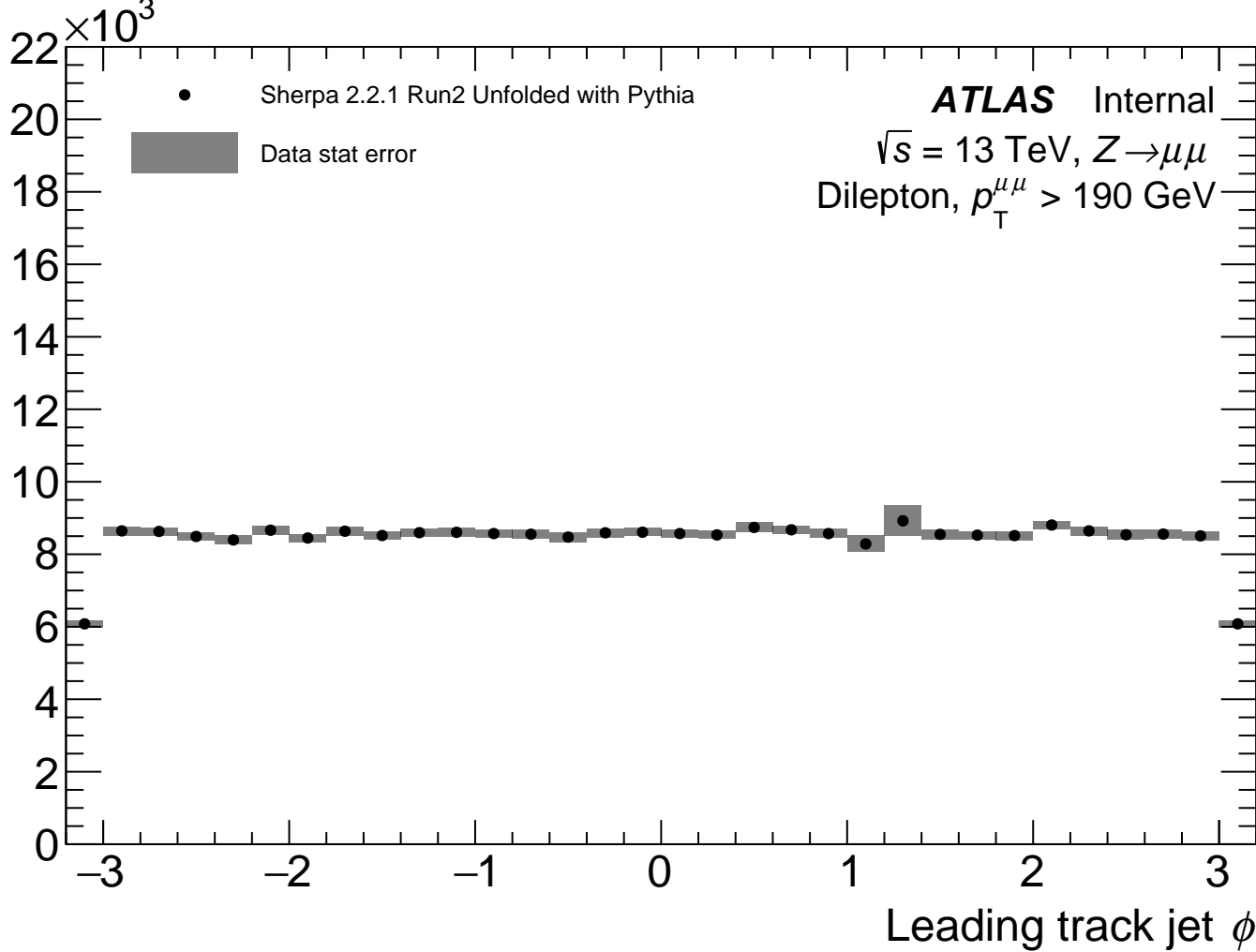
Events



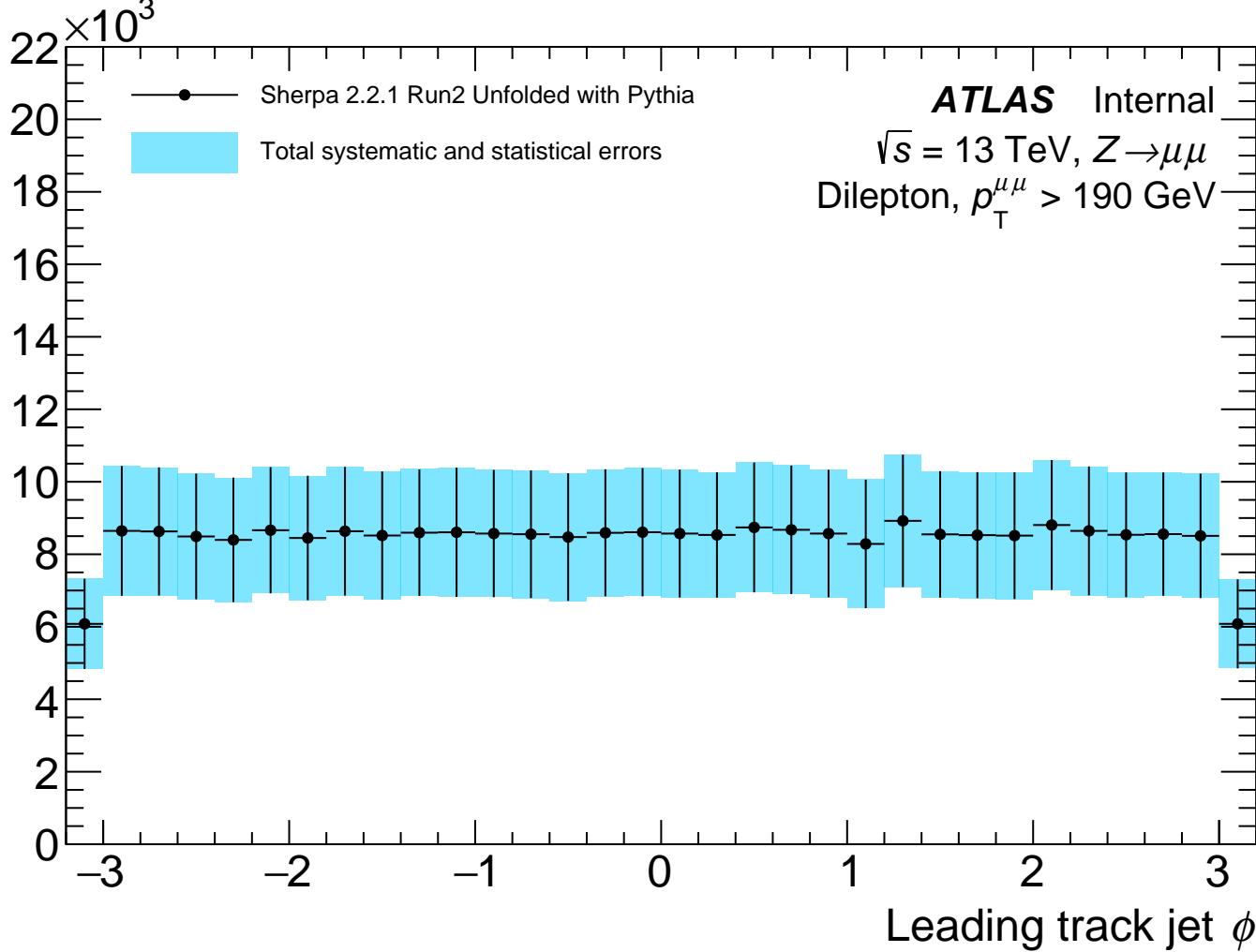
Events



Events

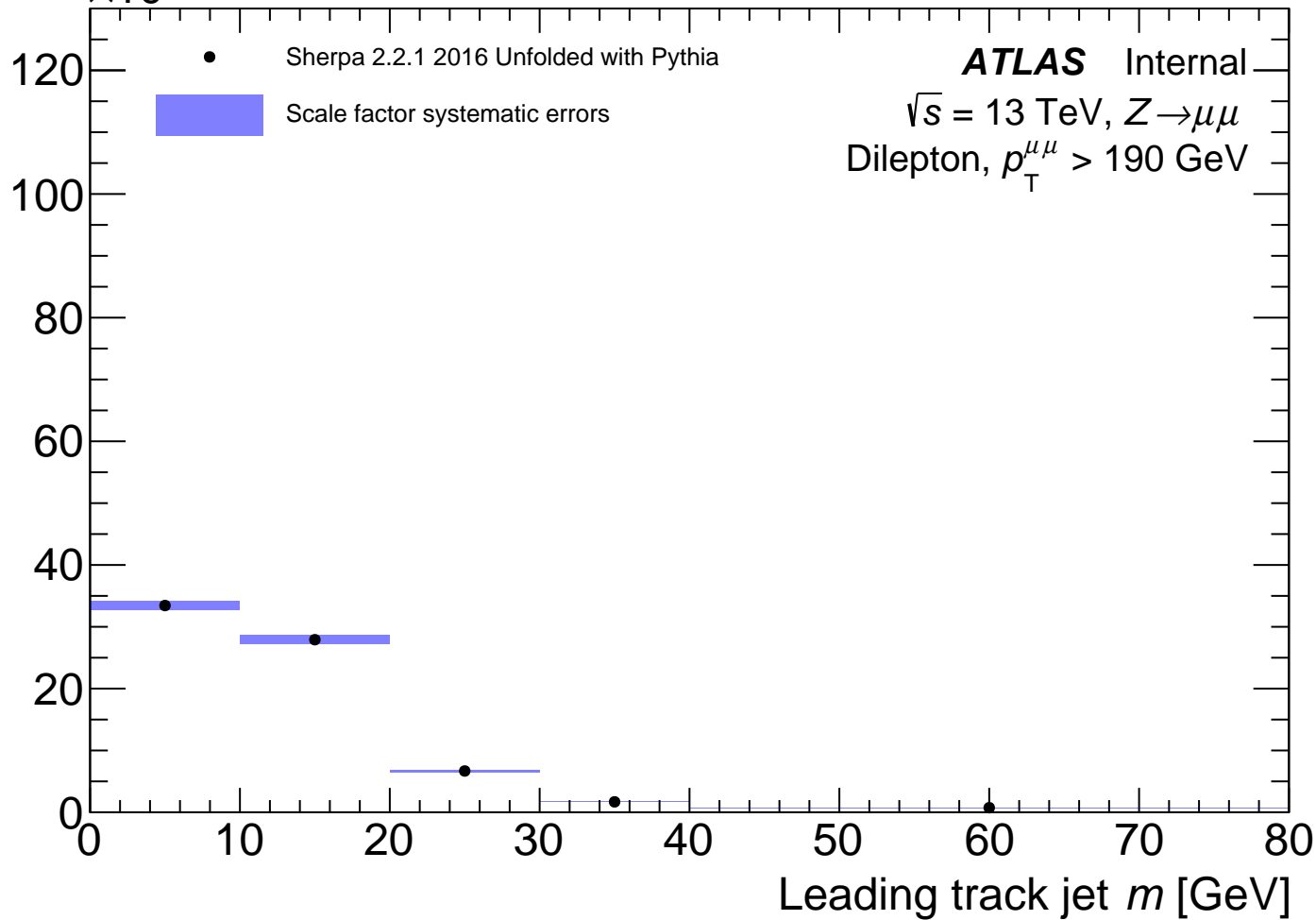


Events



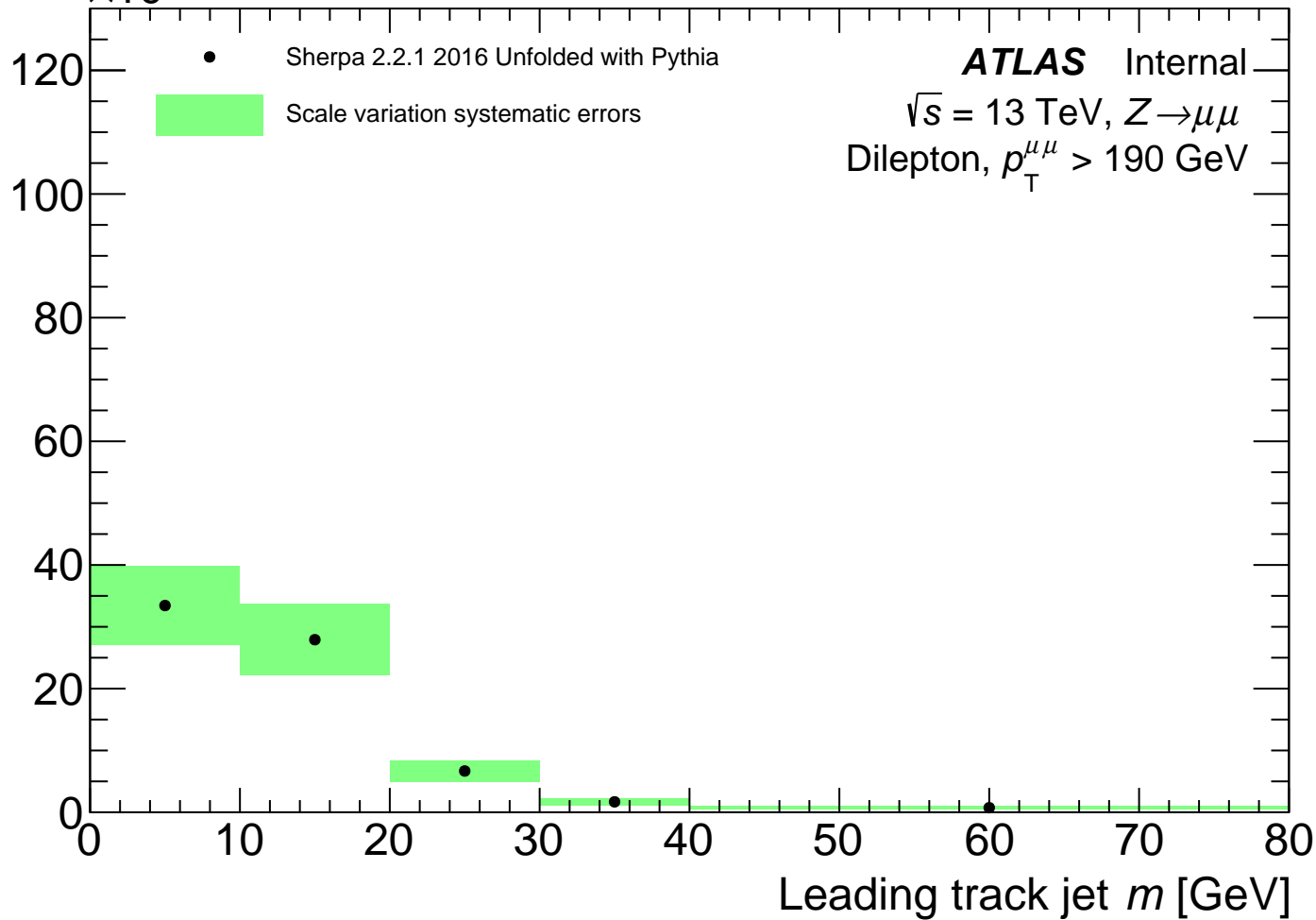
Events

$\times 10^3$



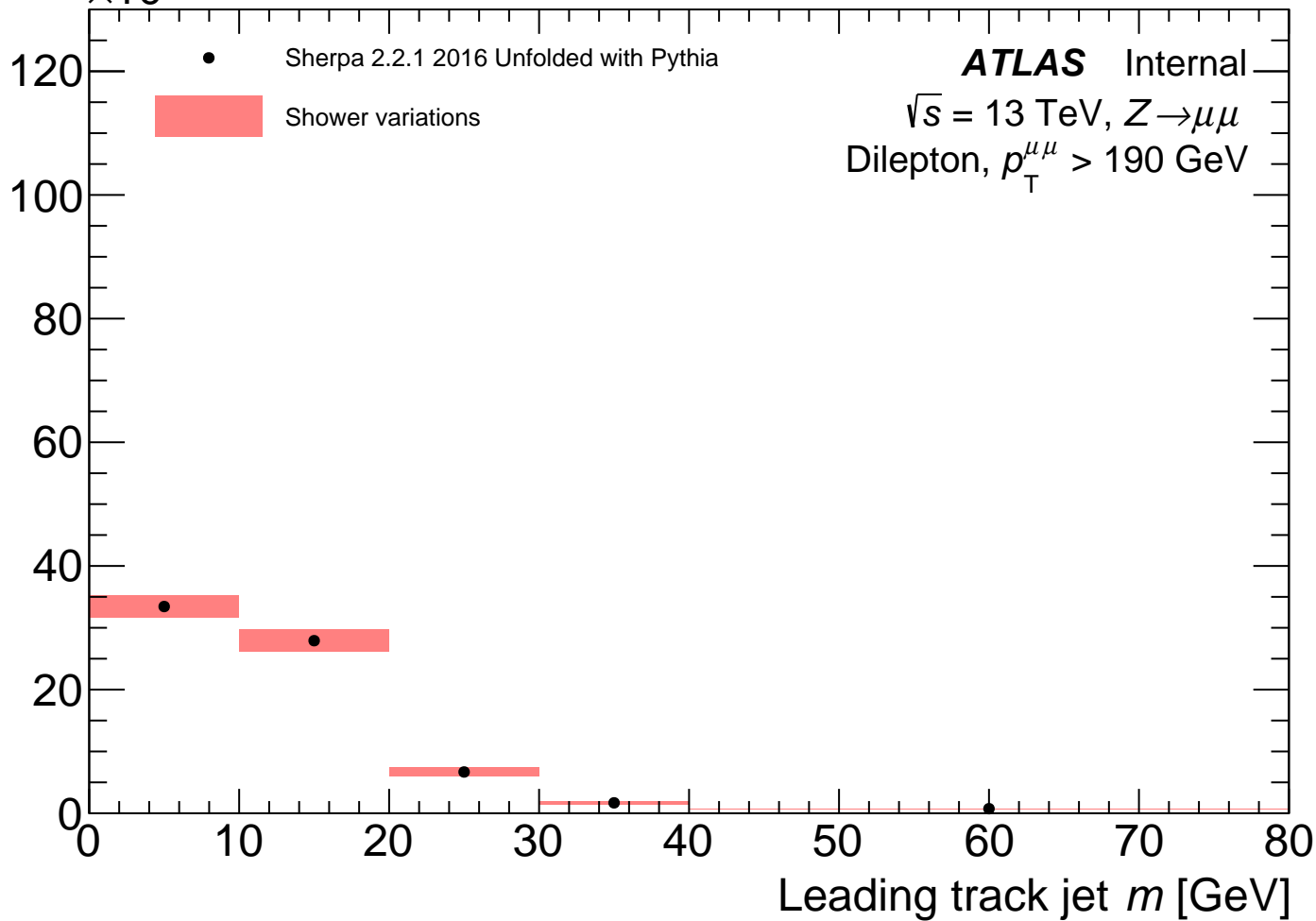
Events

$\times 10^3$



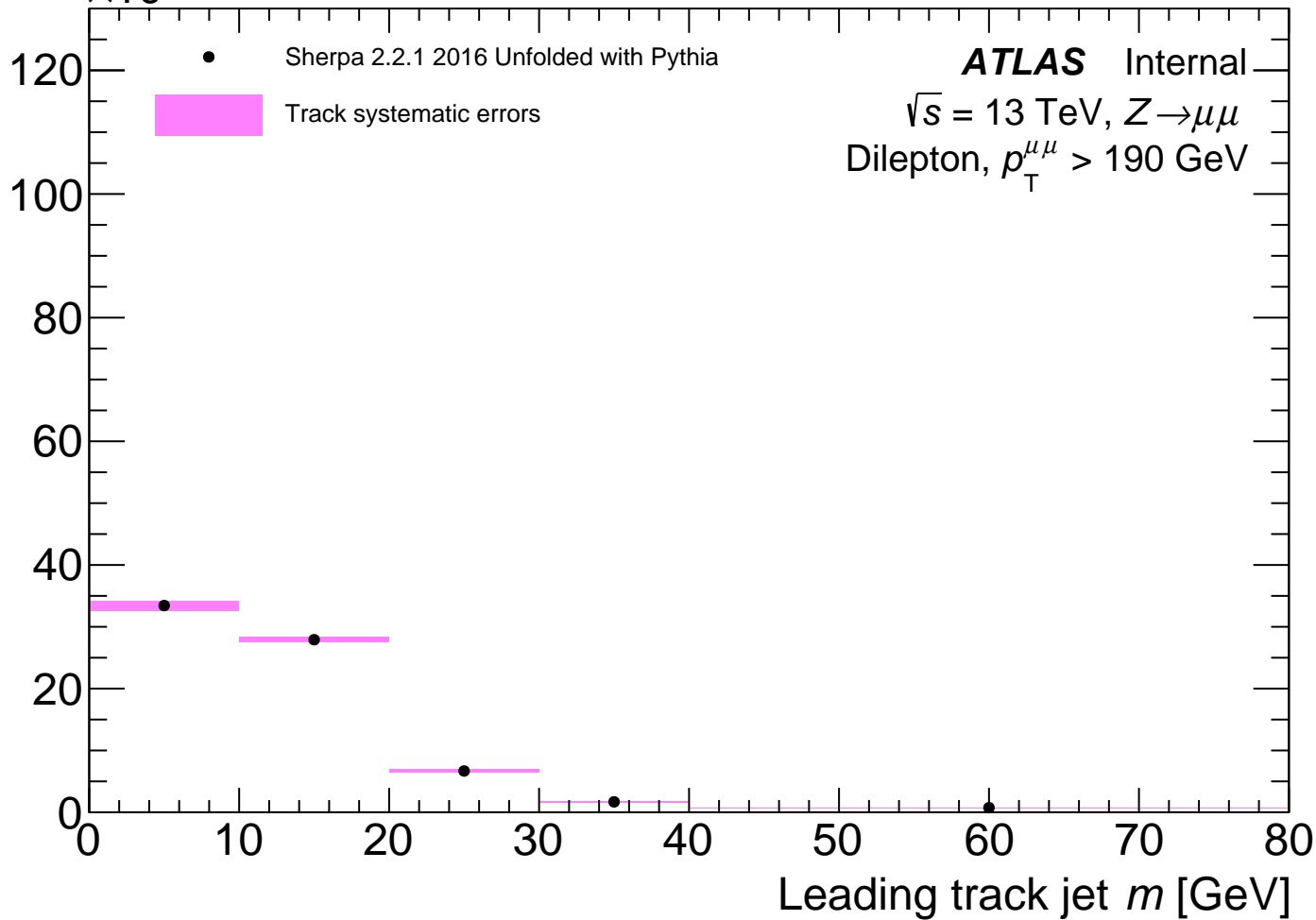
Events

$\times 10^3$



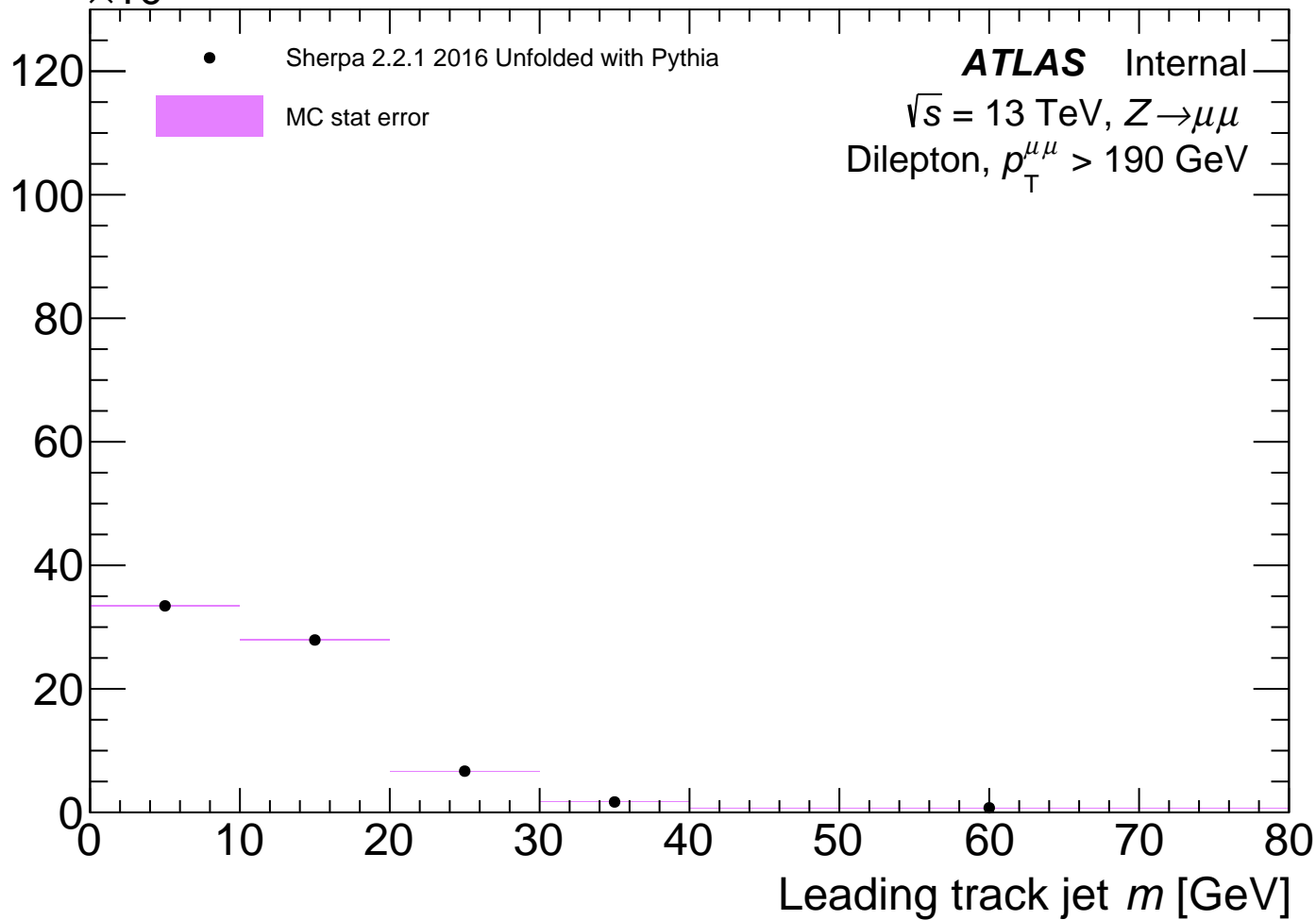
Events

$\times 10^3$



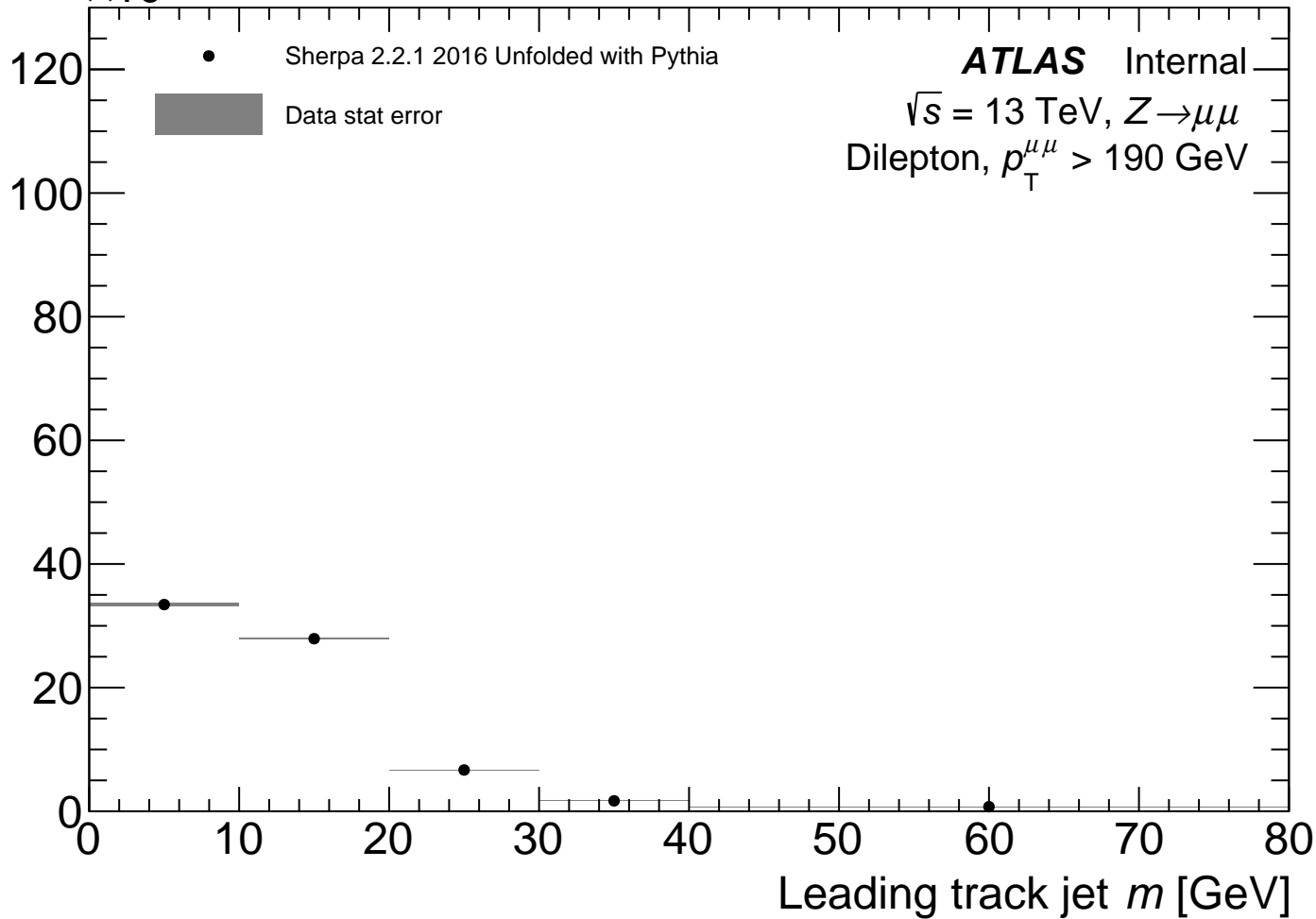
Events

$\times 10^3$



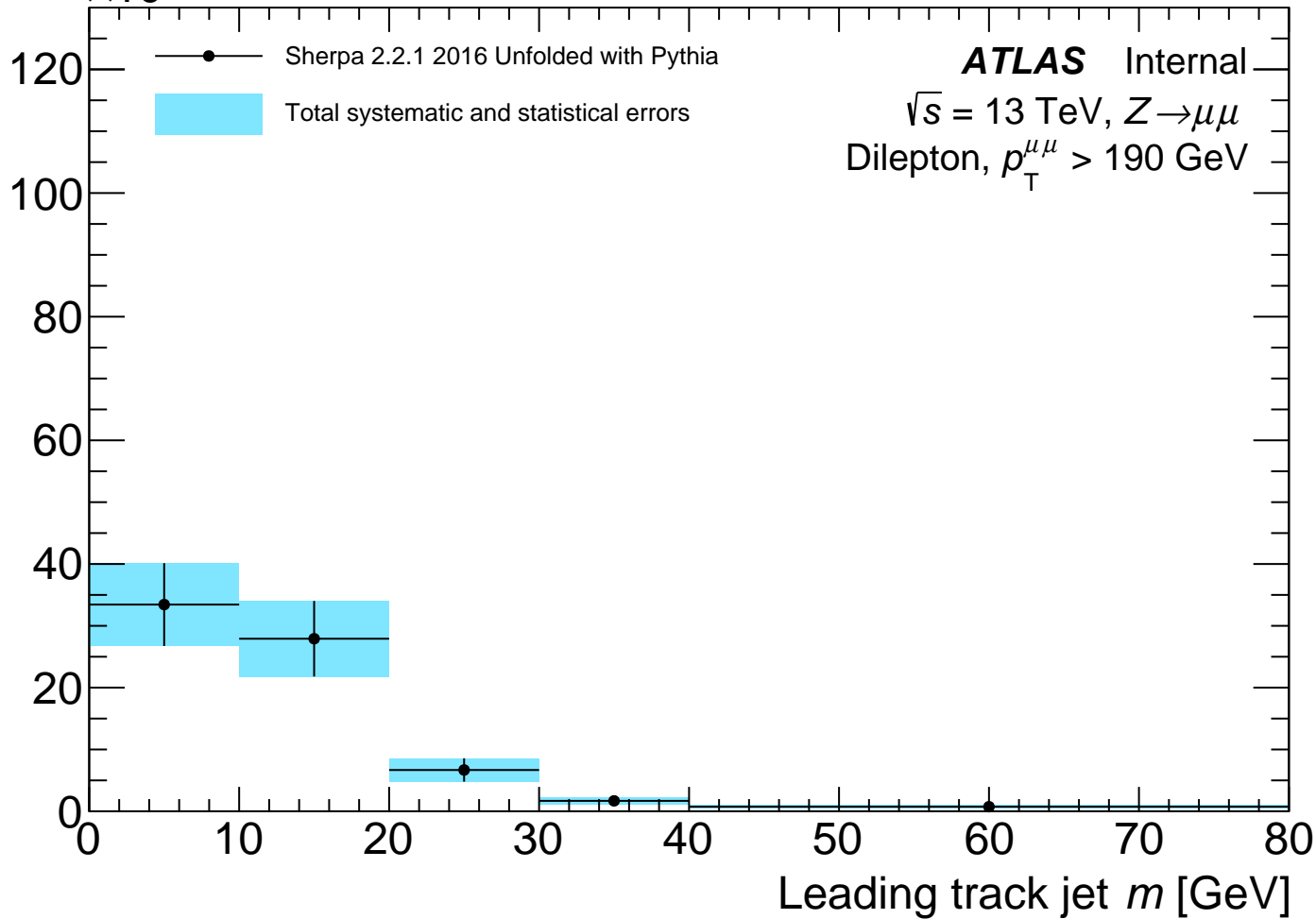
Events

$\times 10^3$



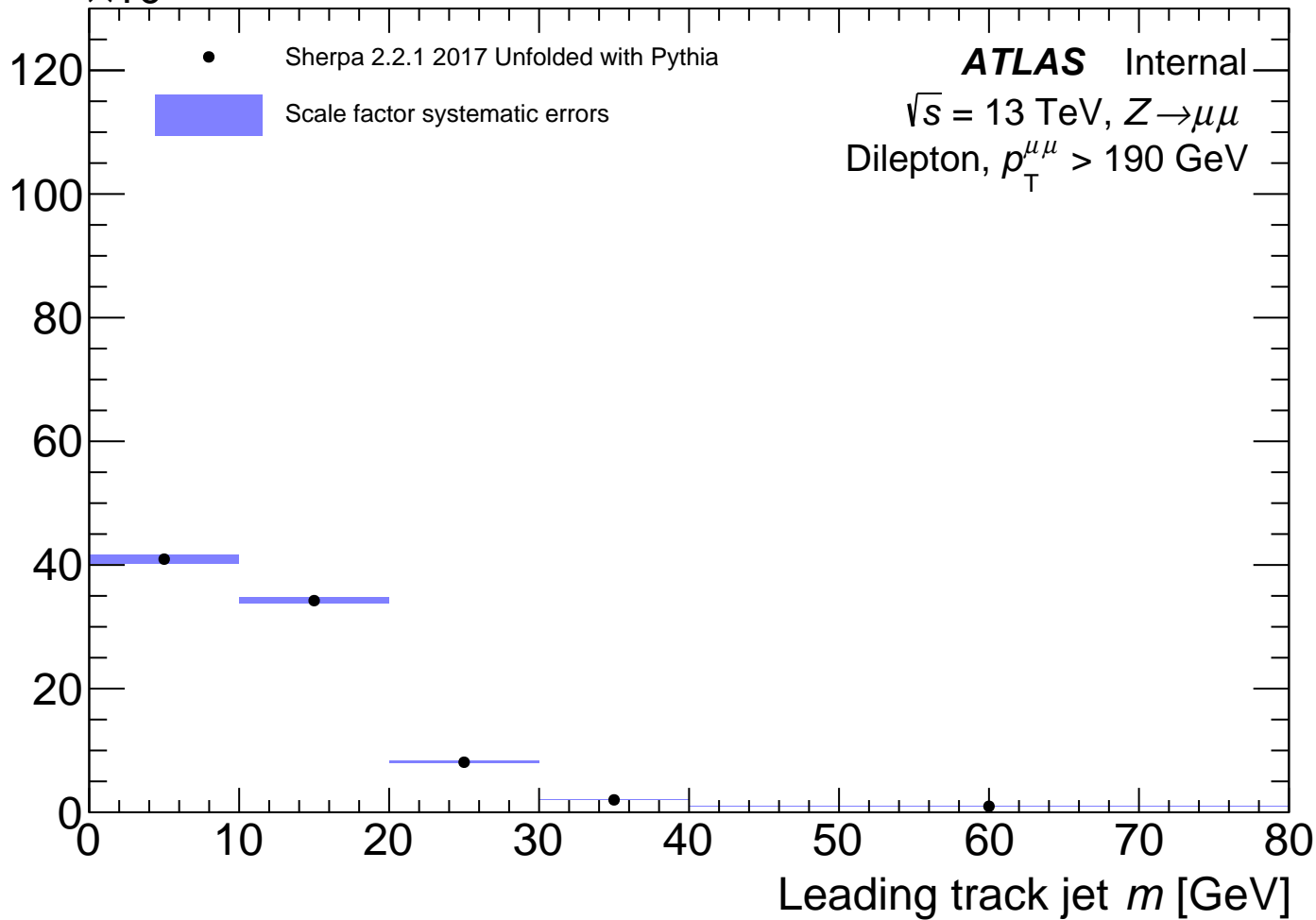
Events

$\times 10^3$



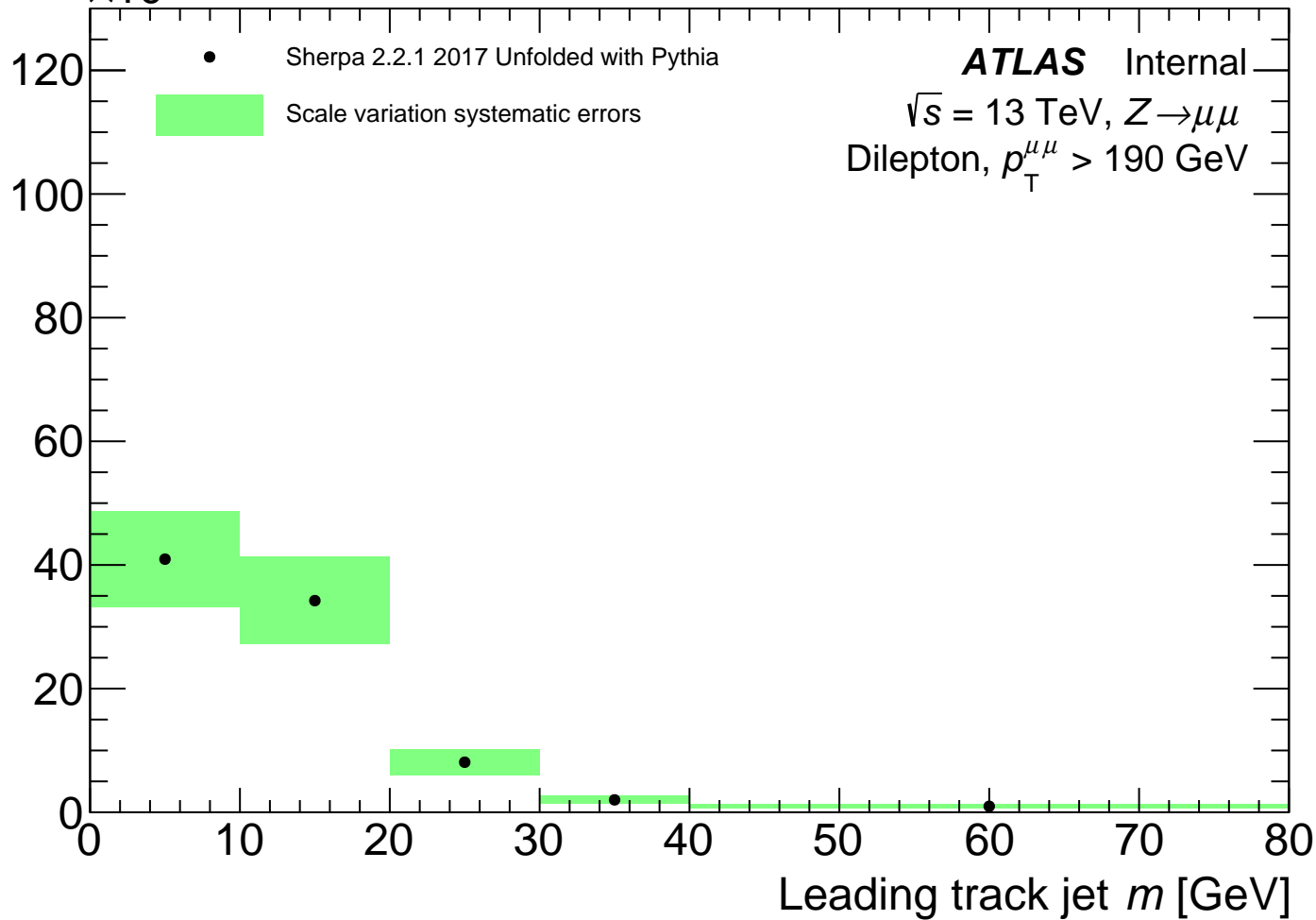
Events

$\times 10^3$



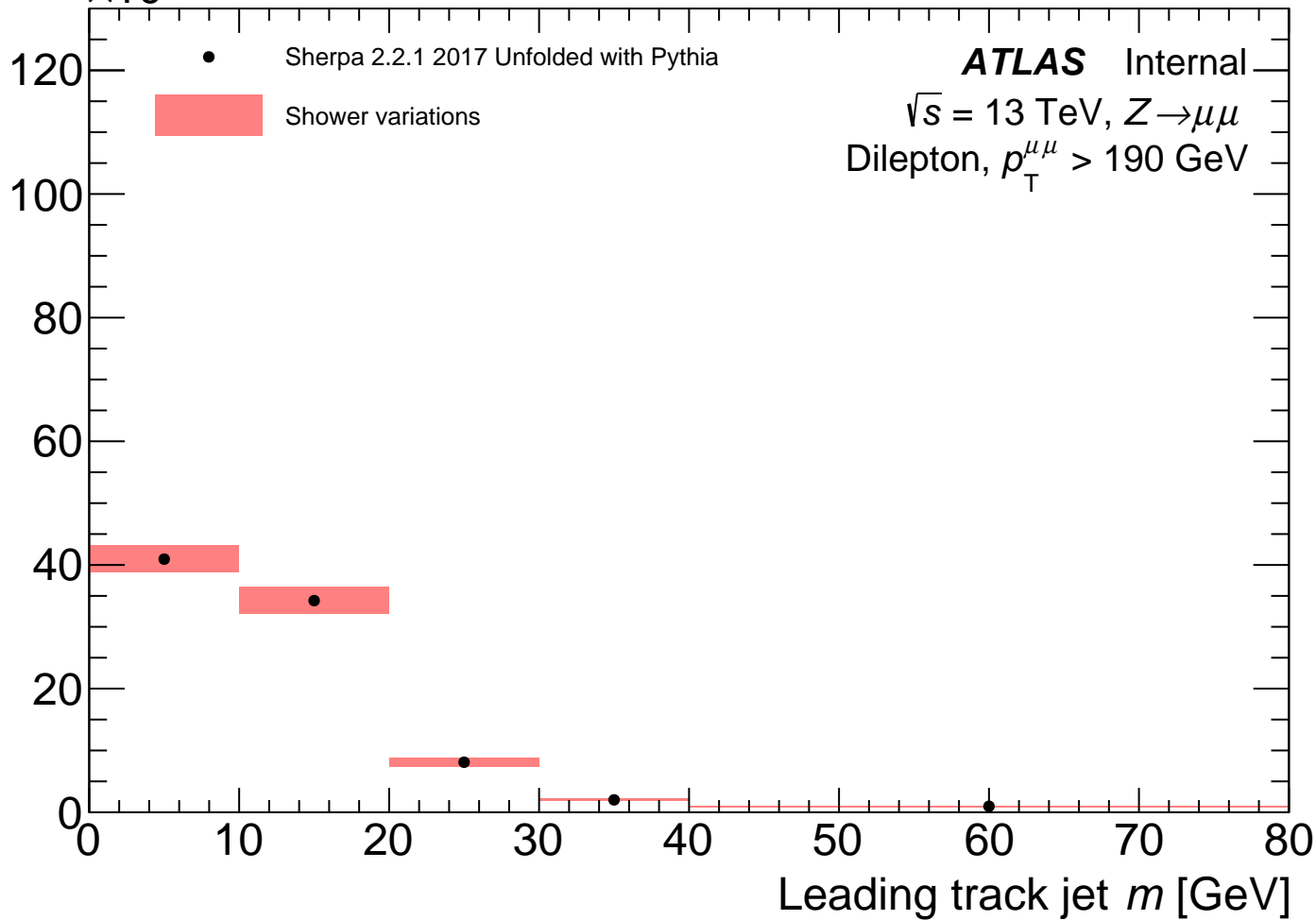
Events

$\times 10^3$



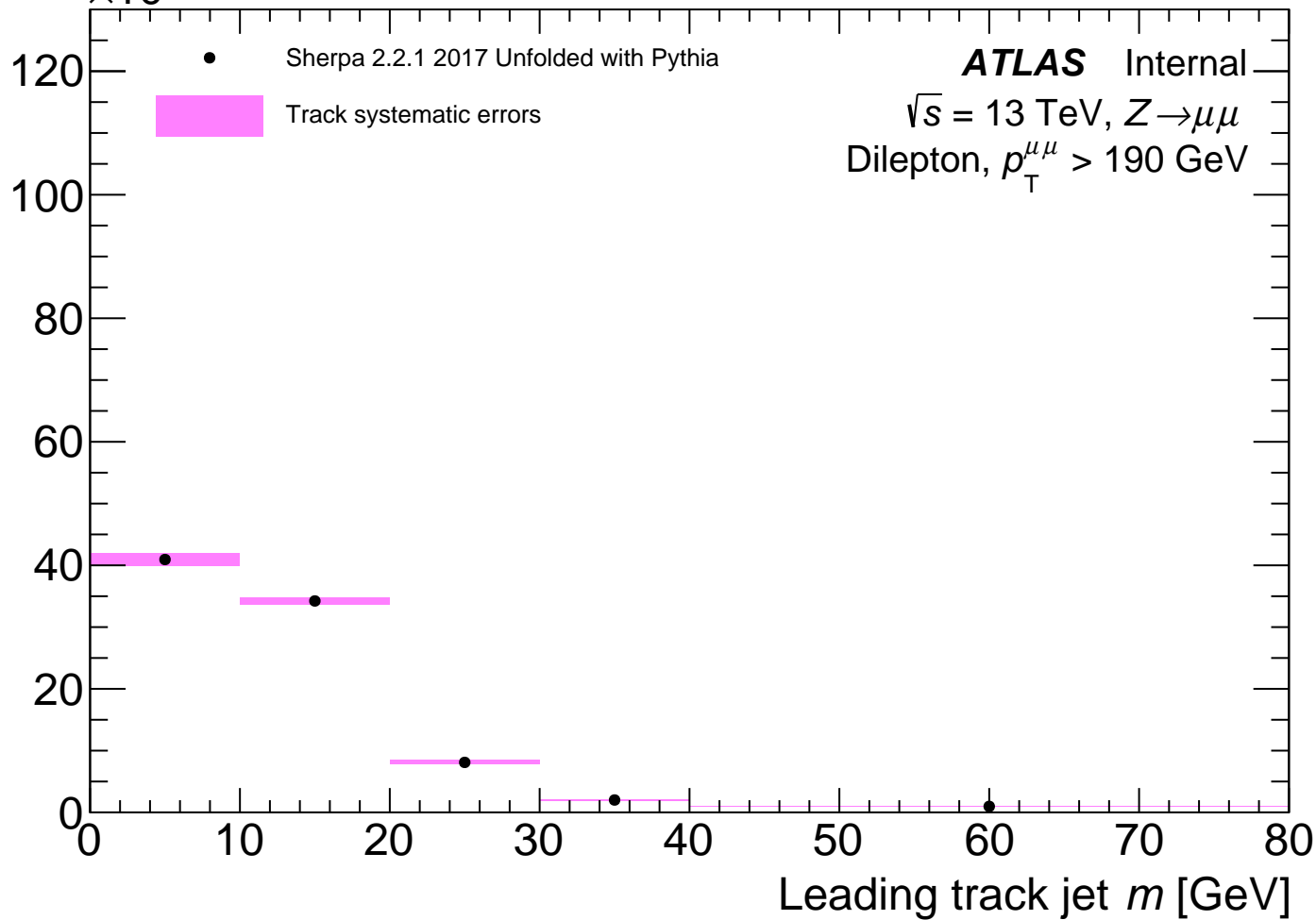
Events

$\times 10^3$



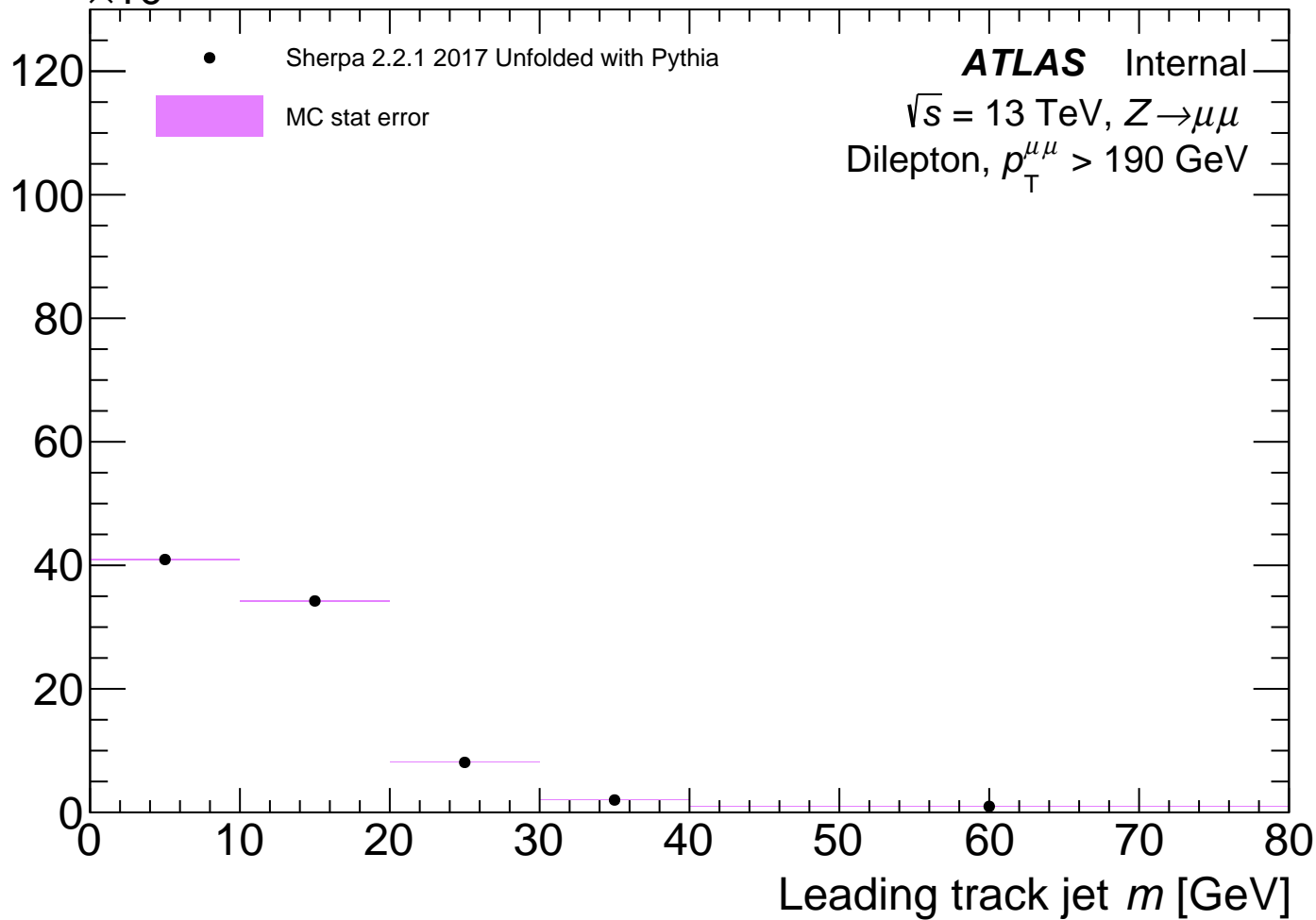
Events

$\times 10^3$



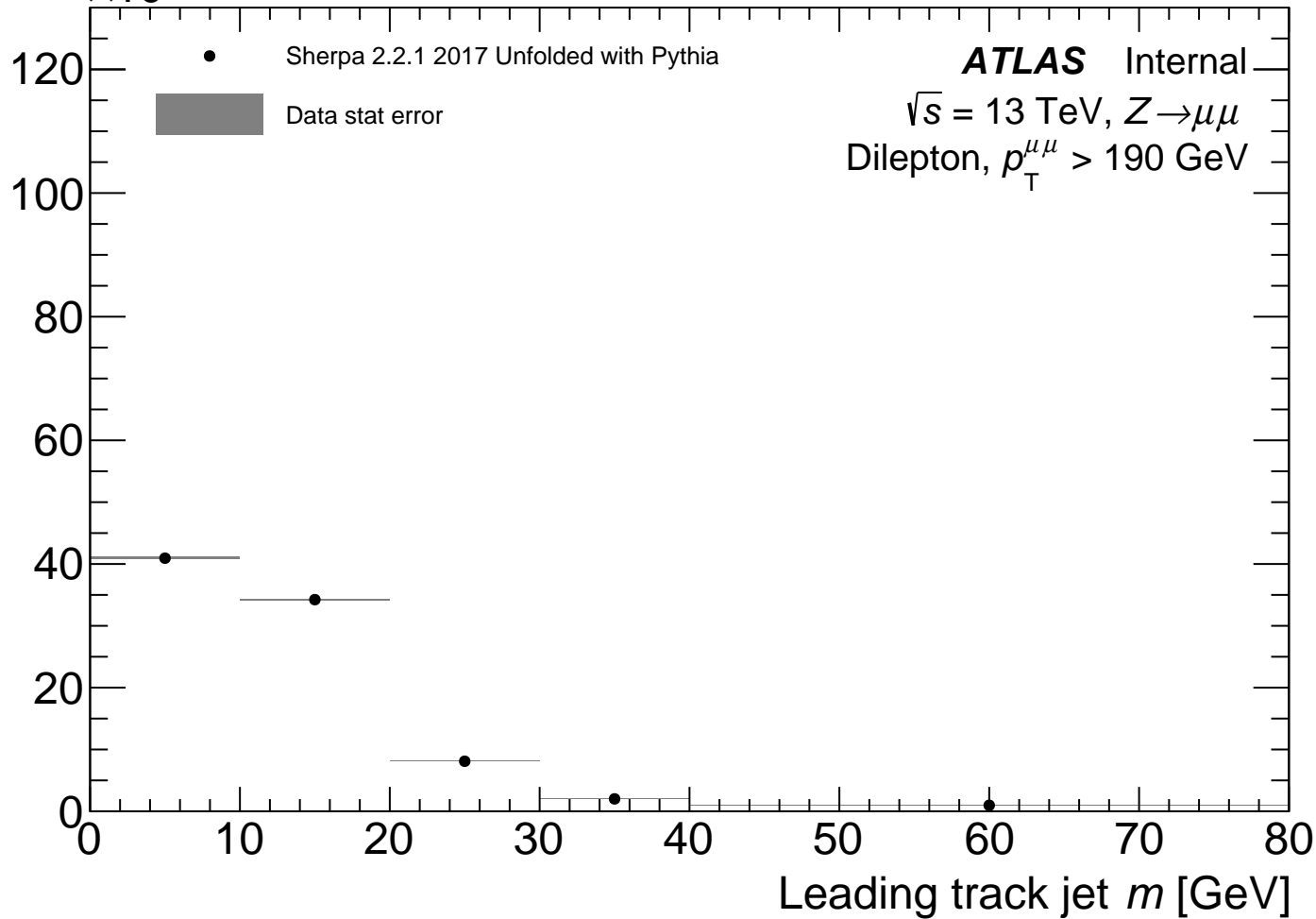
Events

$\times 10^3$



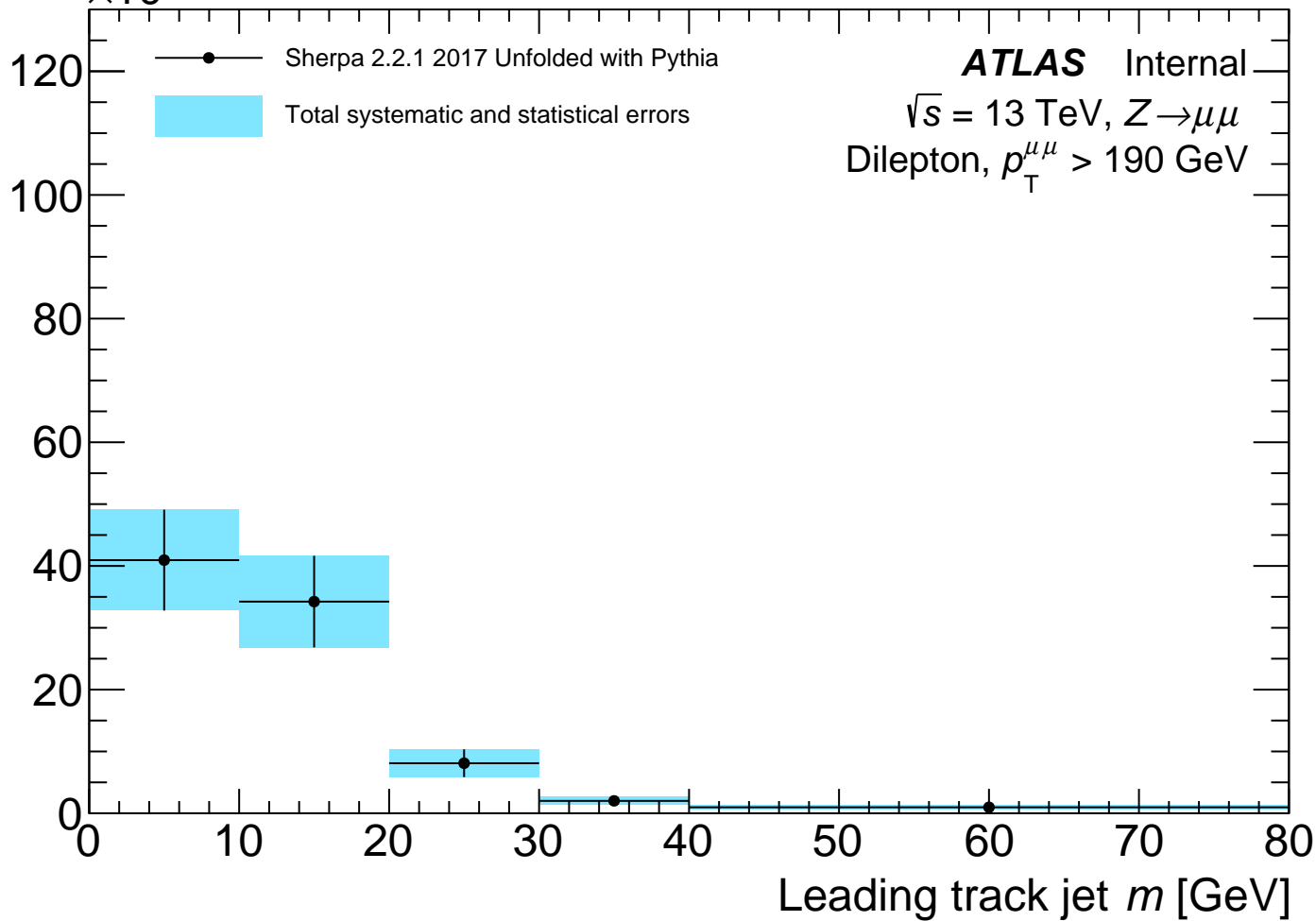
Events

$\times 10^3$



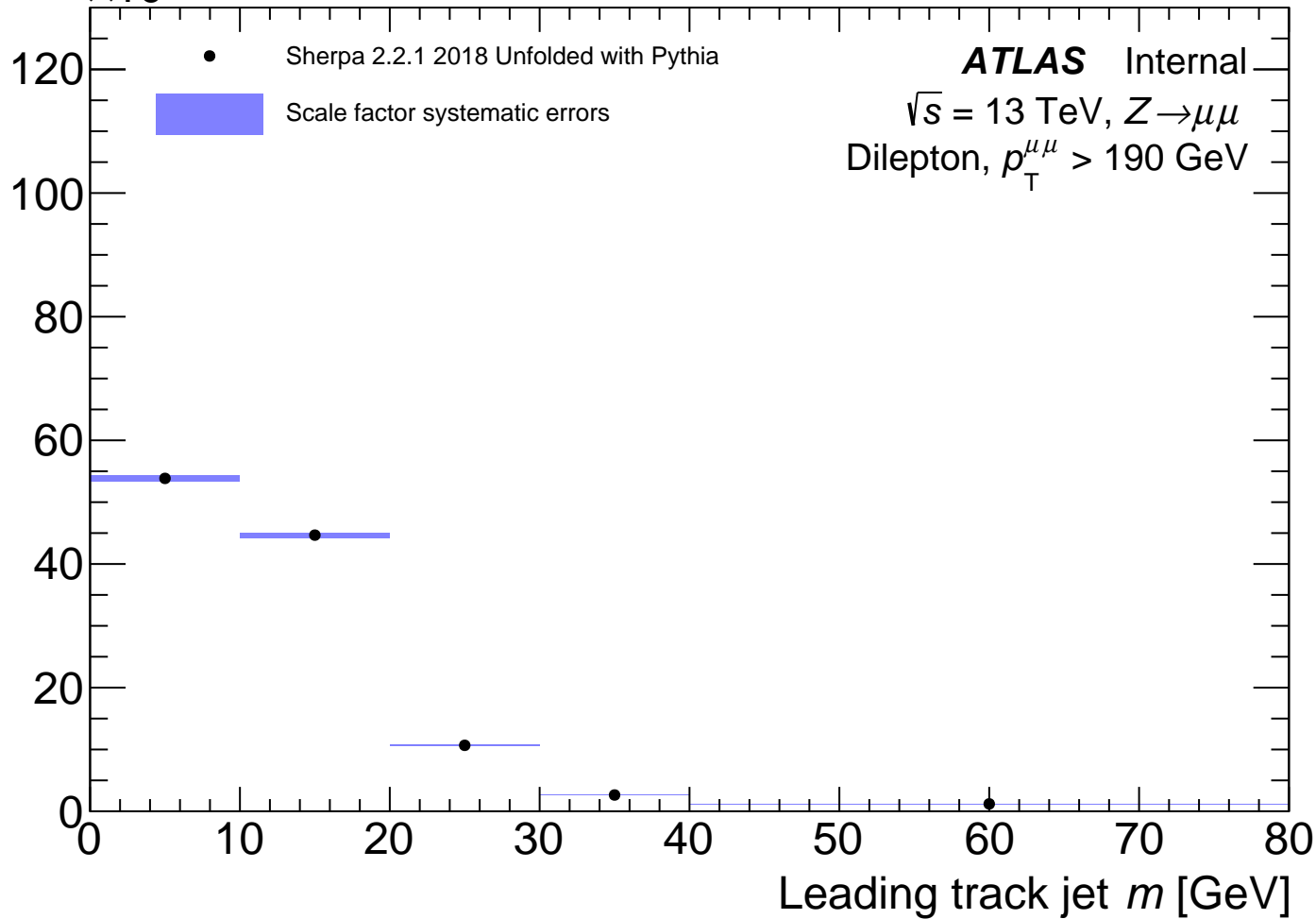
Events

$\times 10^3$



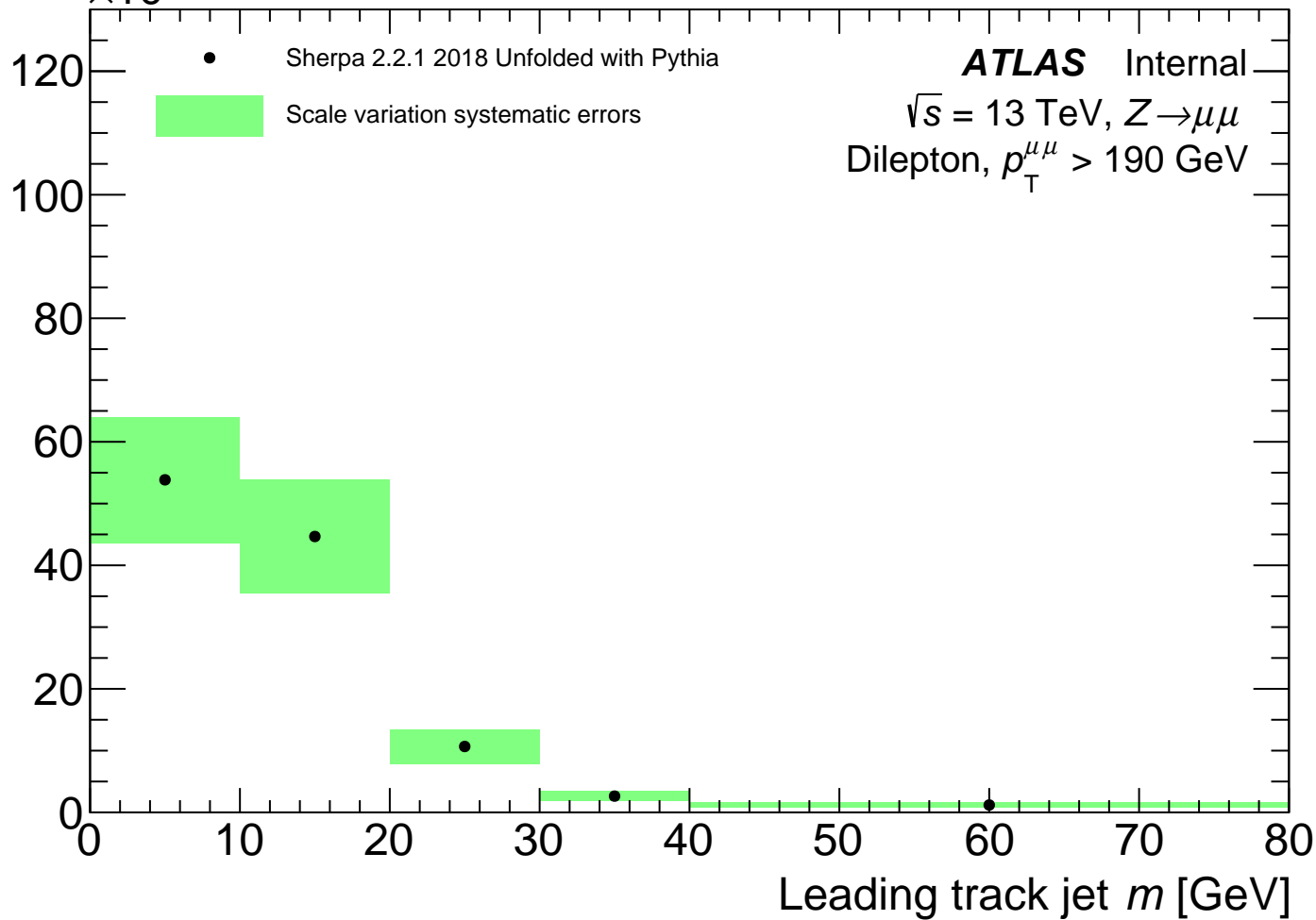
Events

$\times 10^3$



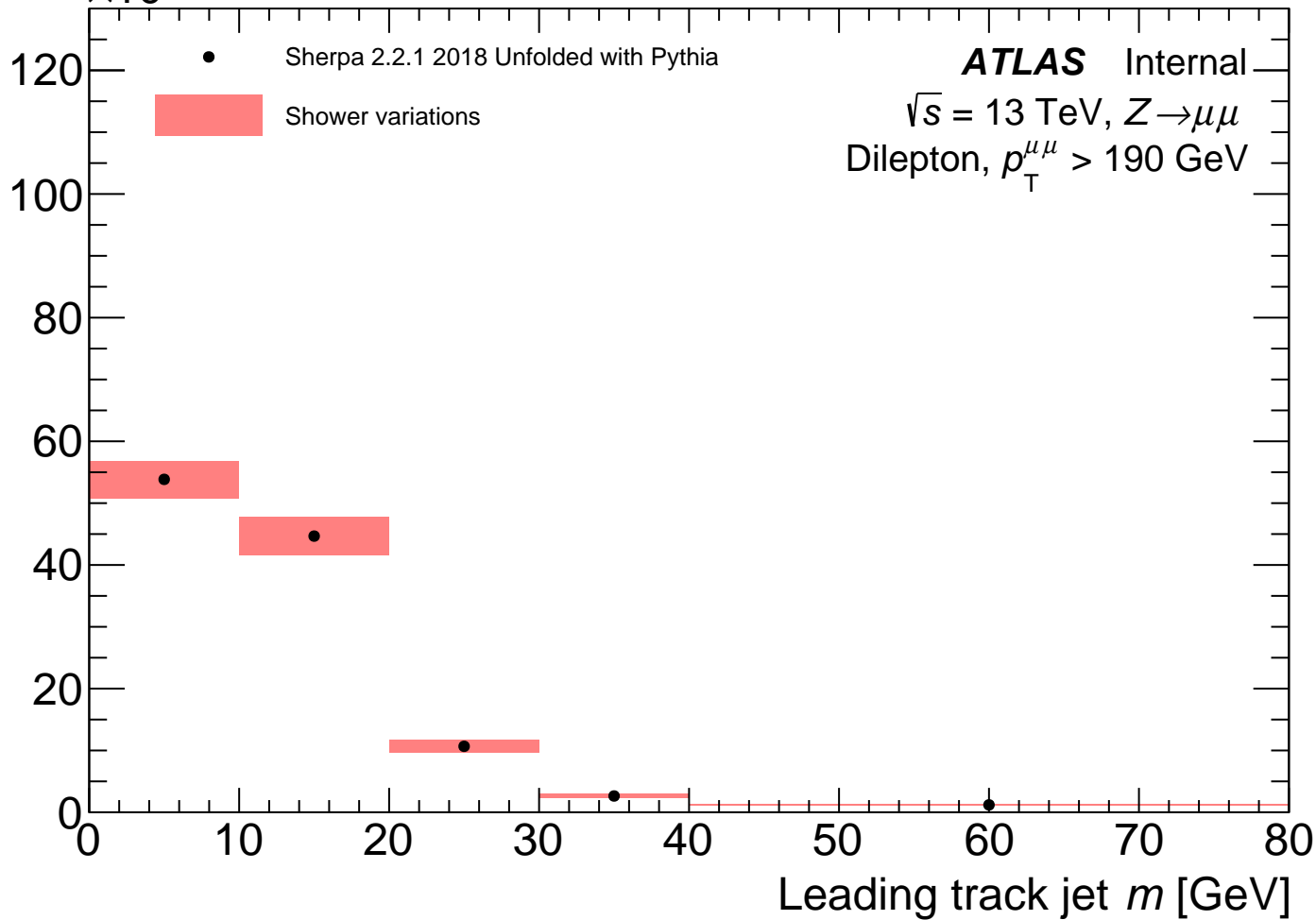
Events

$\times 10^3$



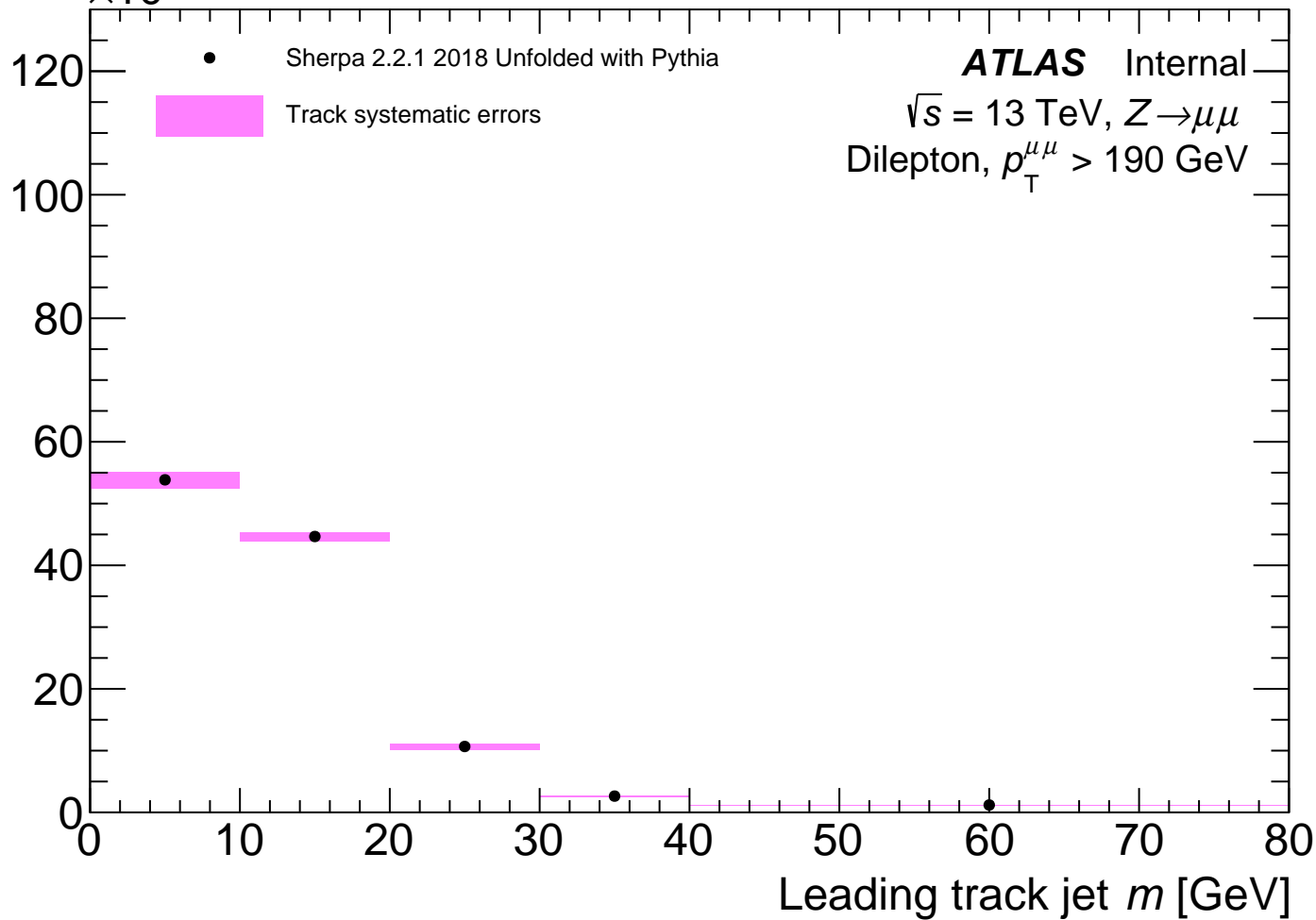
Events

$\times 10^3$



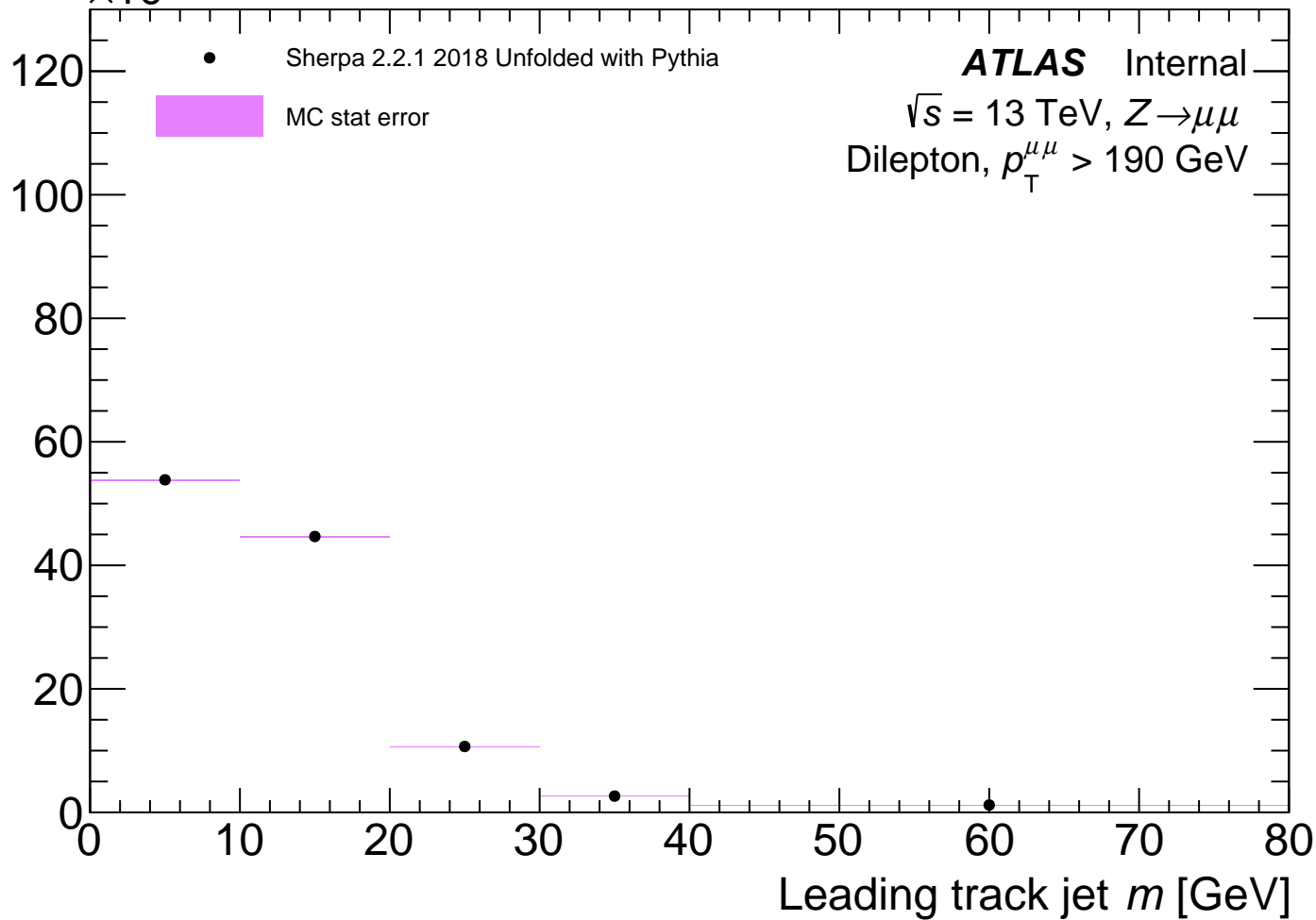
Events

$\times 10^3$



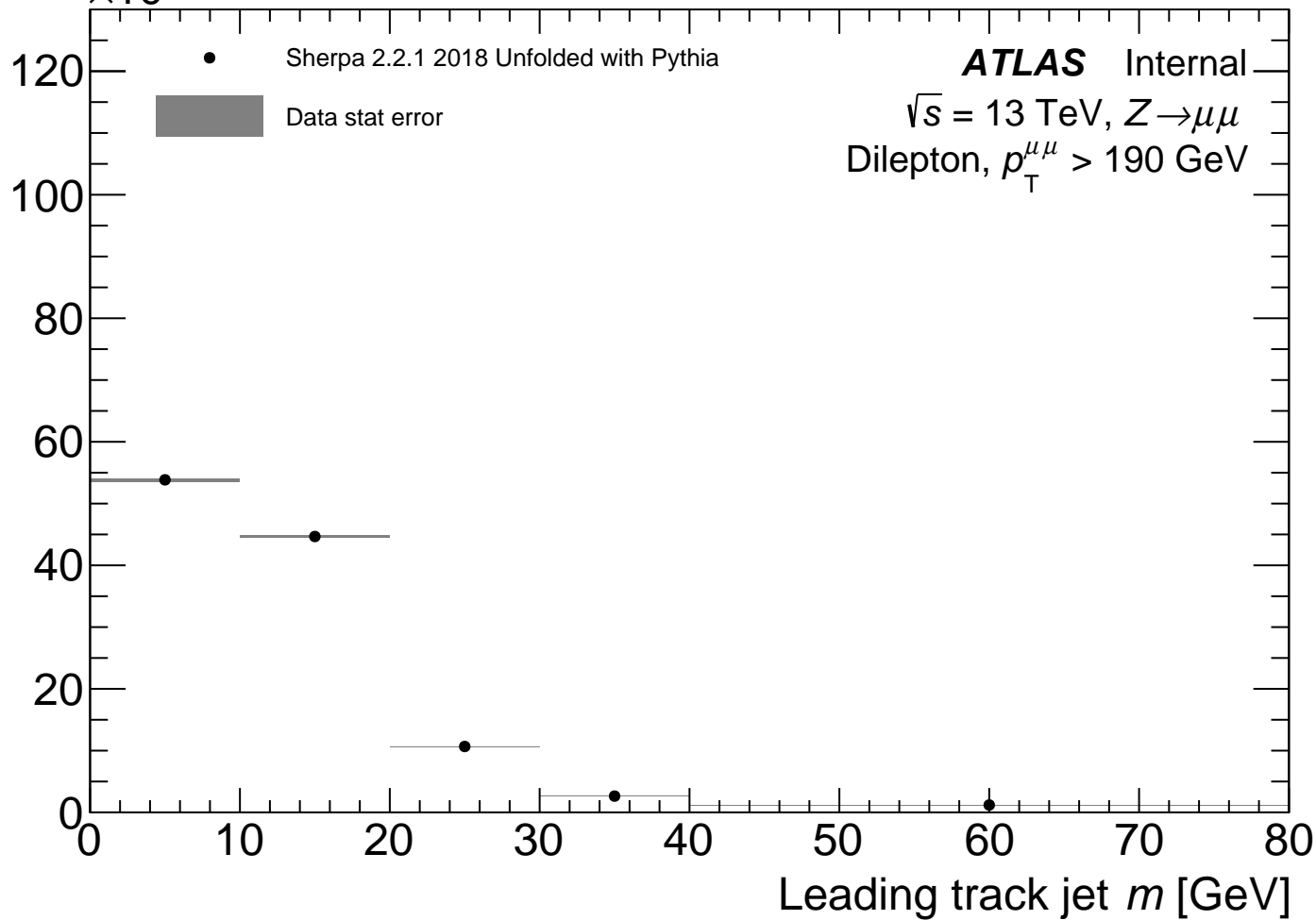
Events

$\times 10^3$



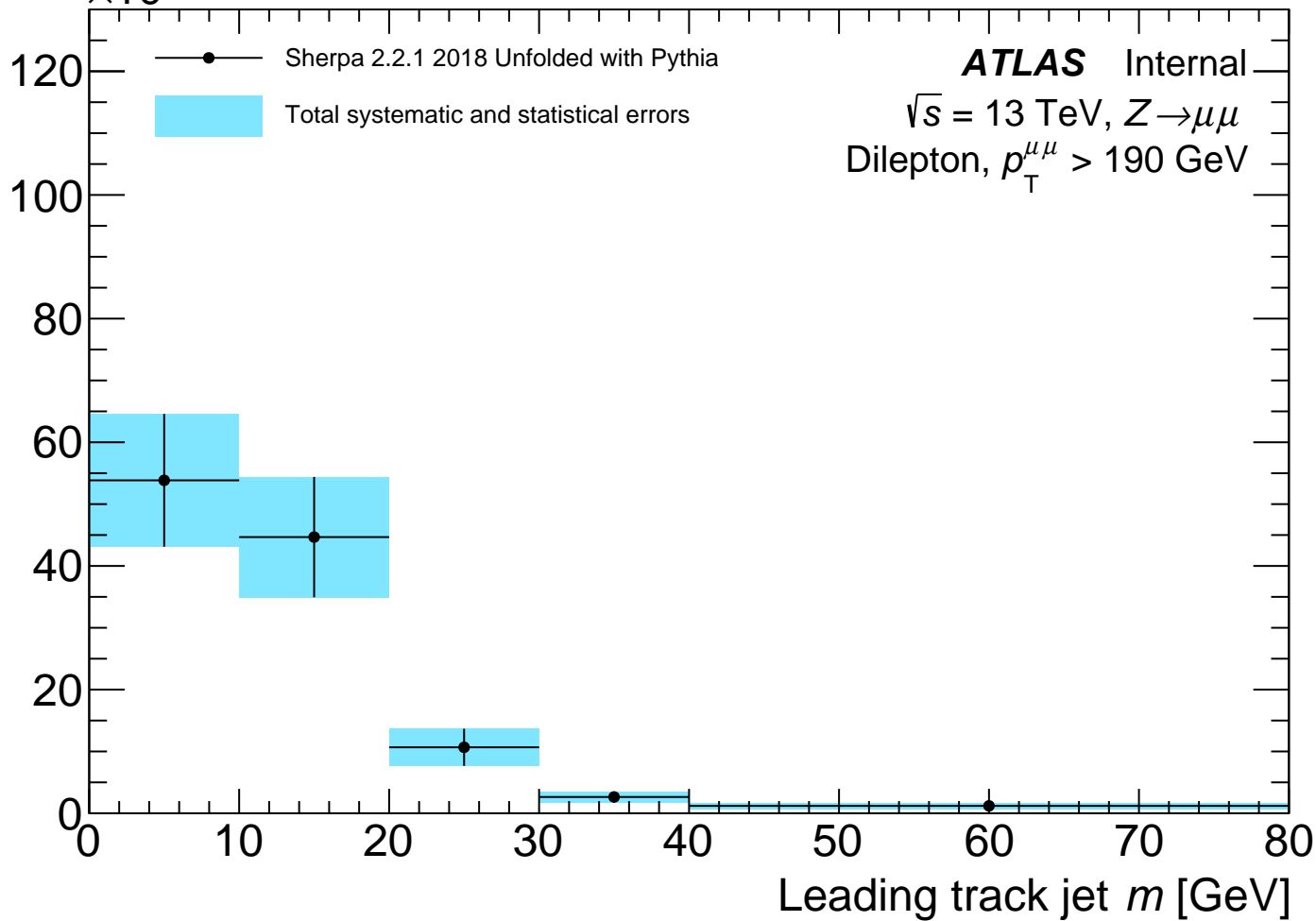
Events

$\times 10^3$



Events

$\times 10^3$



Events

$\times 10^3$

300

250

200

150

100

50

0

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Sherpa 2.2.1 Run2 Unfolded with Pythia



Scale factor systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Leading track jet m [GeV]

0

10

20

30

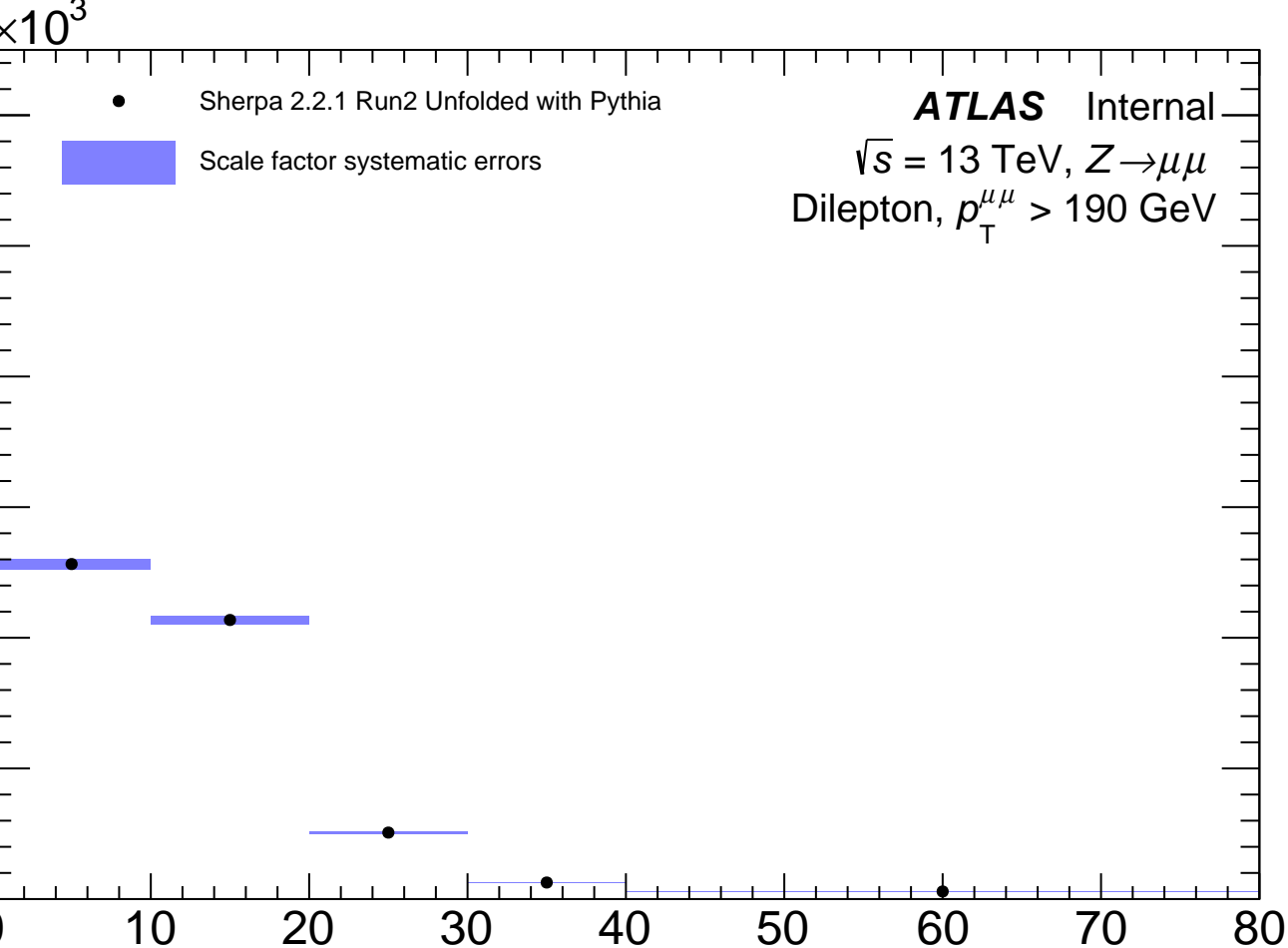
40

50

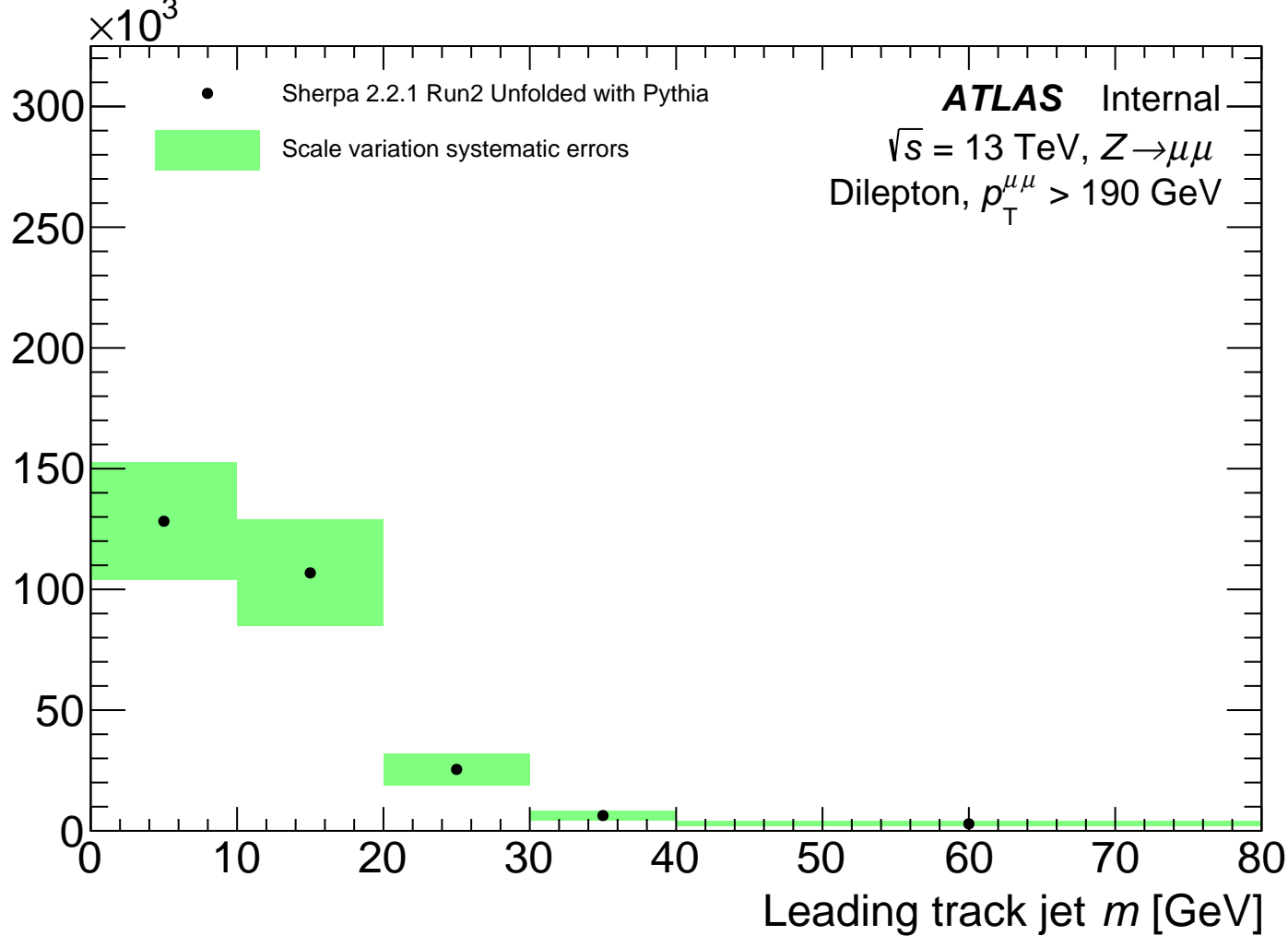
60

70

80



Events



Events

$\times 10^3$

300

250

200

150

100

50

0

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Sherpa 2.2.1 Run2 Unfolded with Pythia



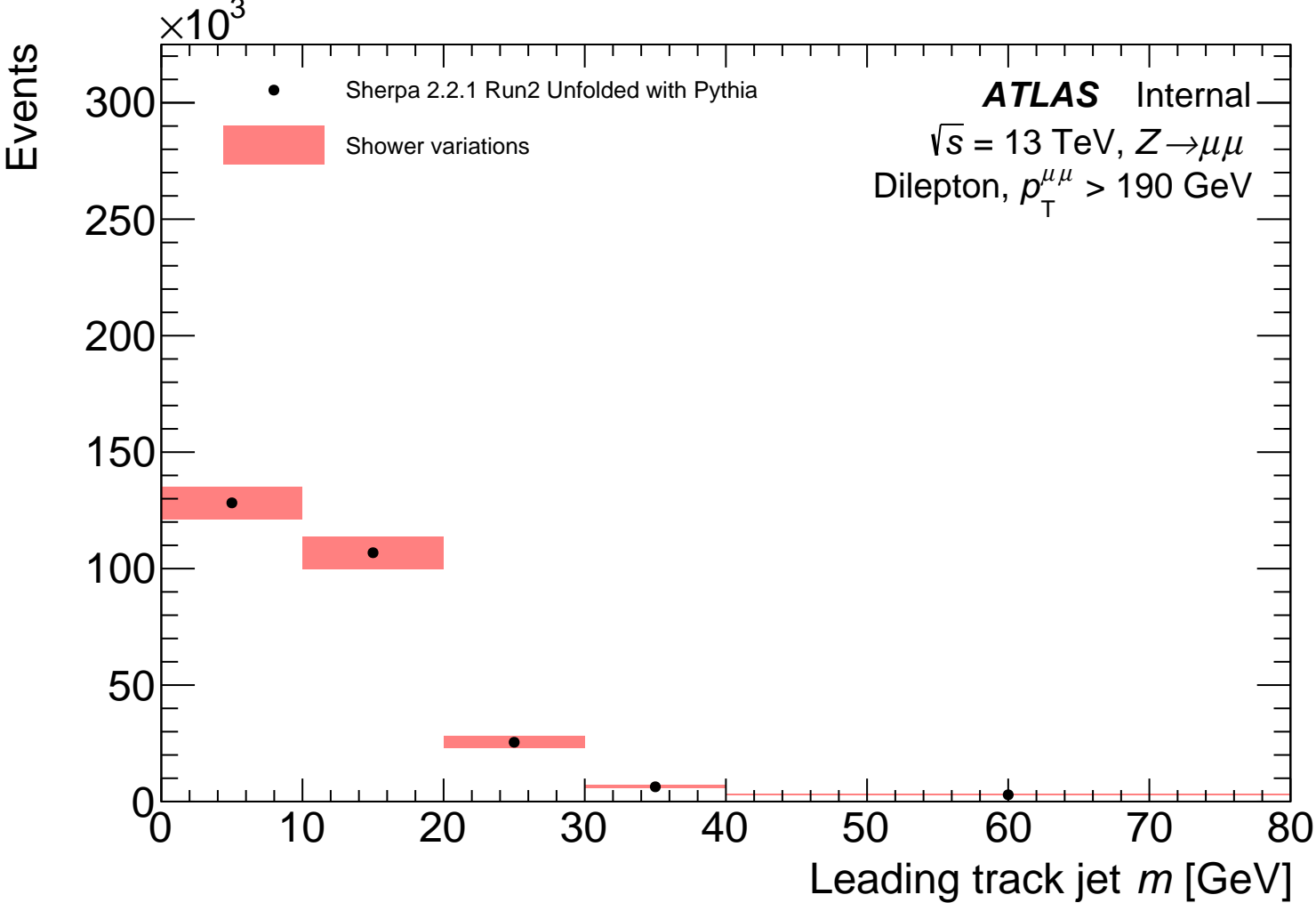
Shower variations

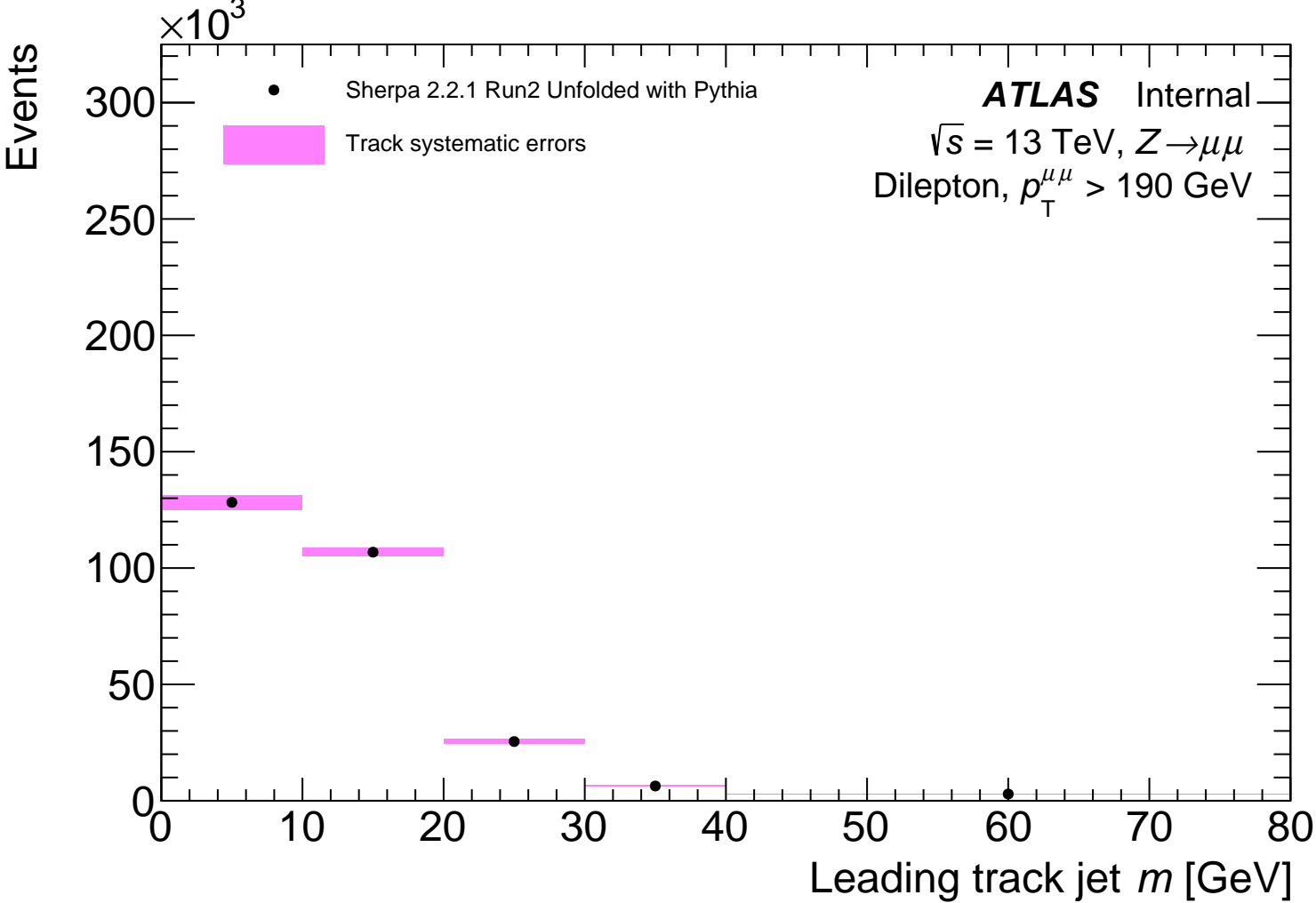
ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Leading track jet m [GeV]





Events

$\times 10^3$

300

250

200

150

100

50

0

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Sherpa 2.2.1 Run2 Unfolded with Pythia



MC stat error

ATLAS Internal

$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

Leading track jet m [GeV]

80

70

60

50

40

30

20

10

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300

250

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100

50

0

300

250

200

150

100

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Events

$\times 10^3$

300

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Sherpa 2.2.1 Run2 Unfolded with Pythia



Data stat error

ATLAS Internal

$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

Leading track jet m [GeV]

0

10

20

30

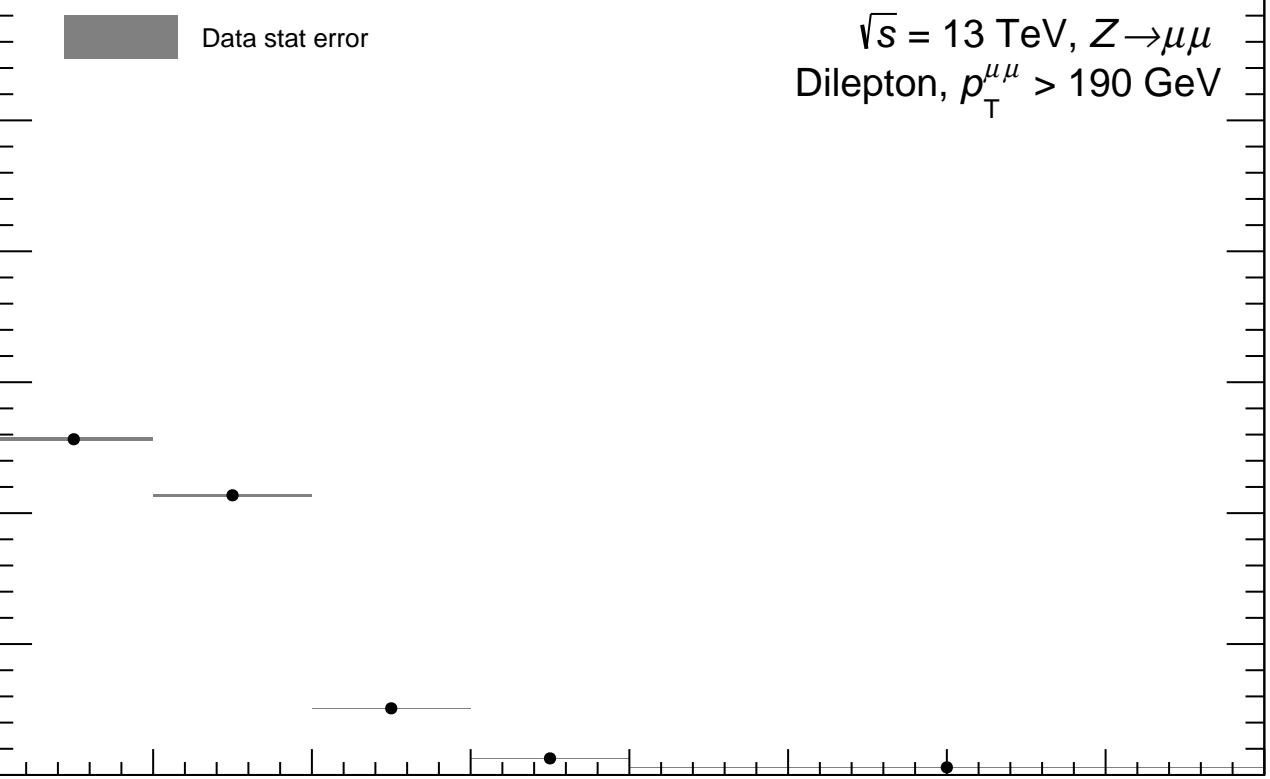
40

50

60

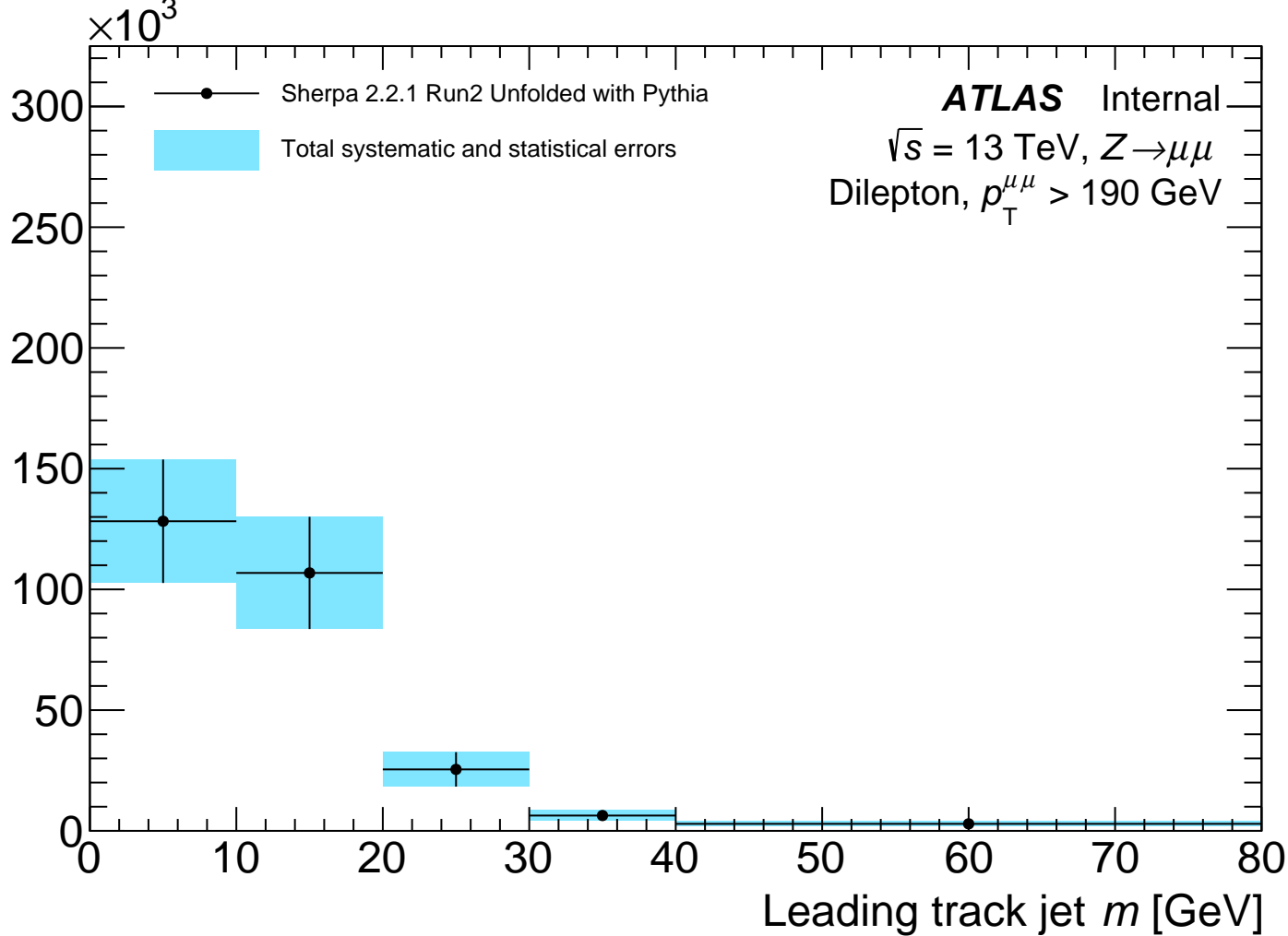
70

80

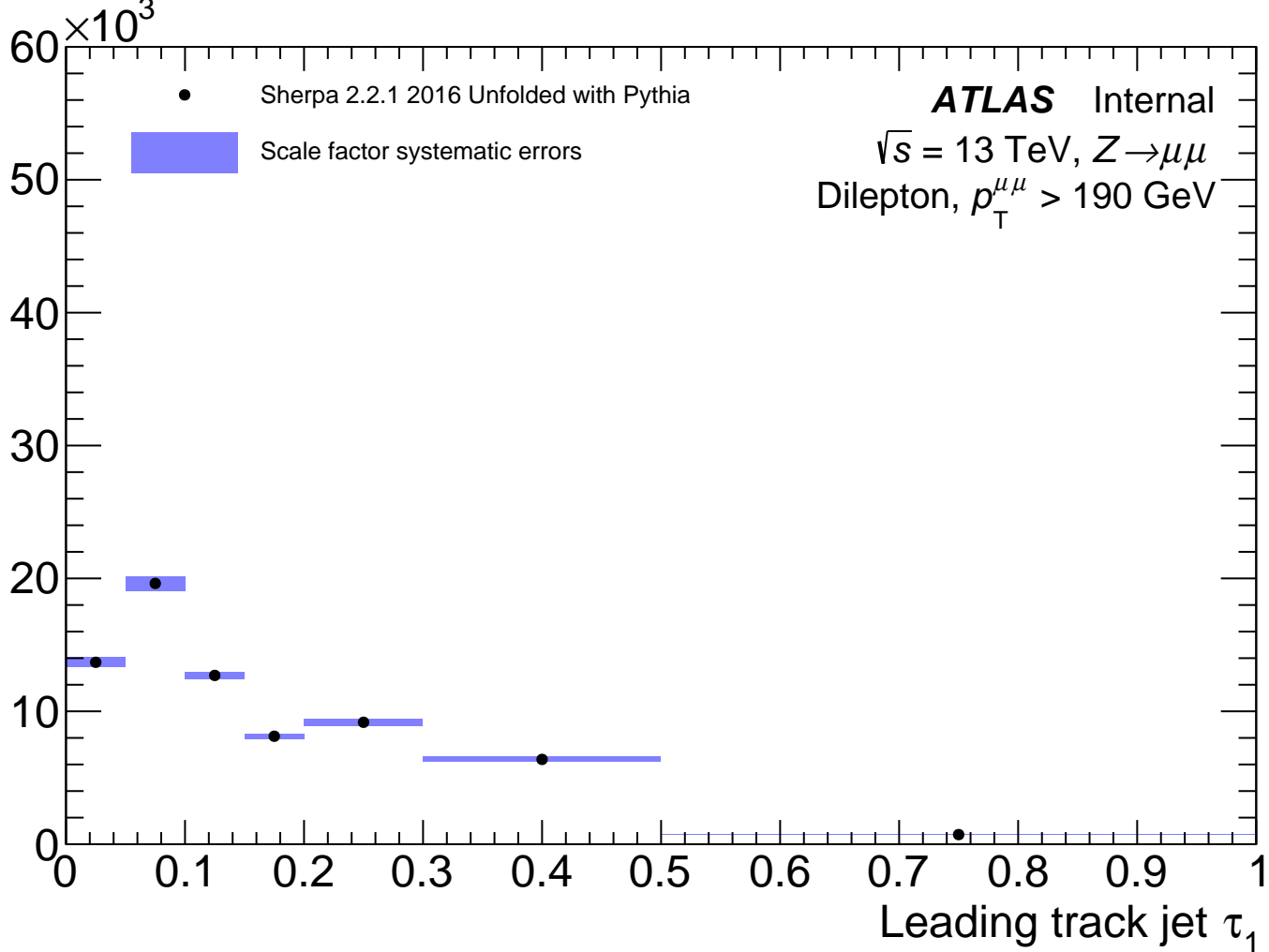


Leading track jet m [GeV]	Events ($\times 10^3$)
5	128
15	106
25	26
35	6
60	4

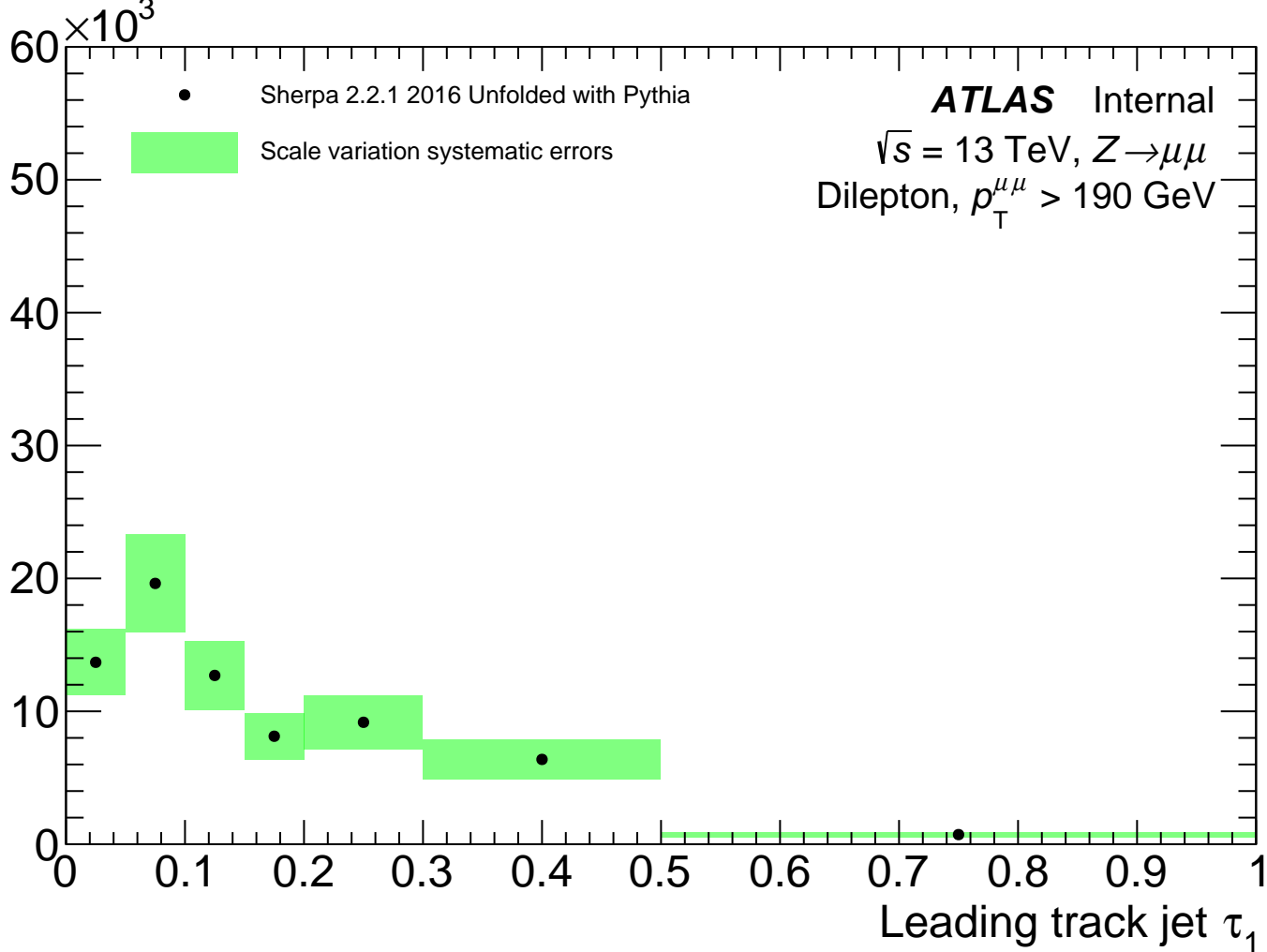
Events



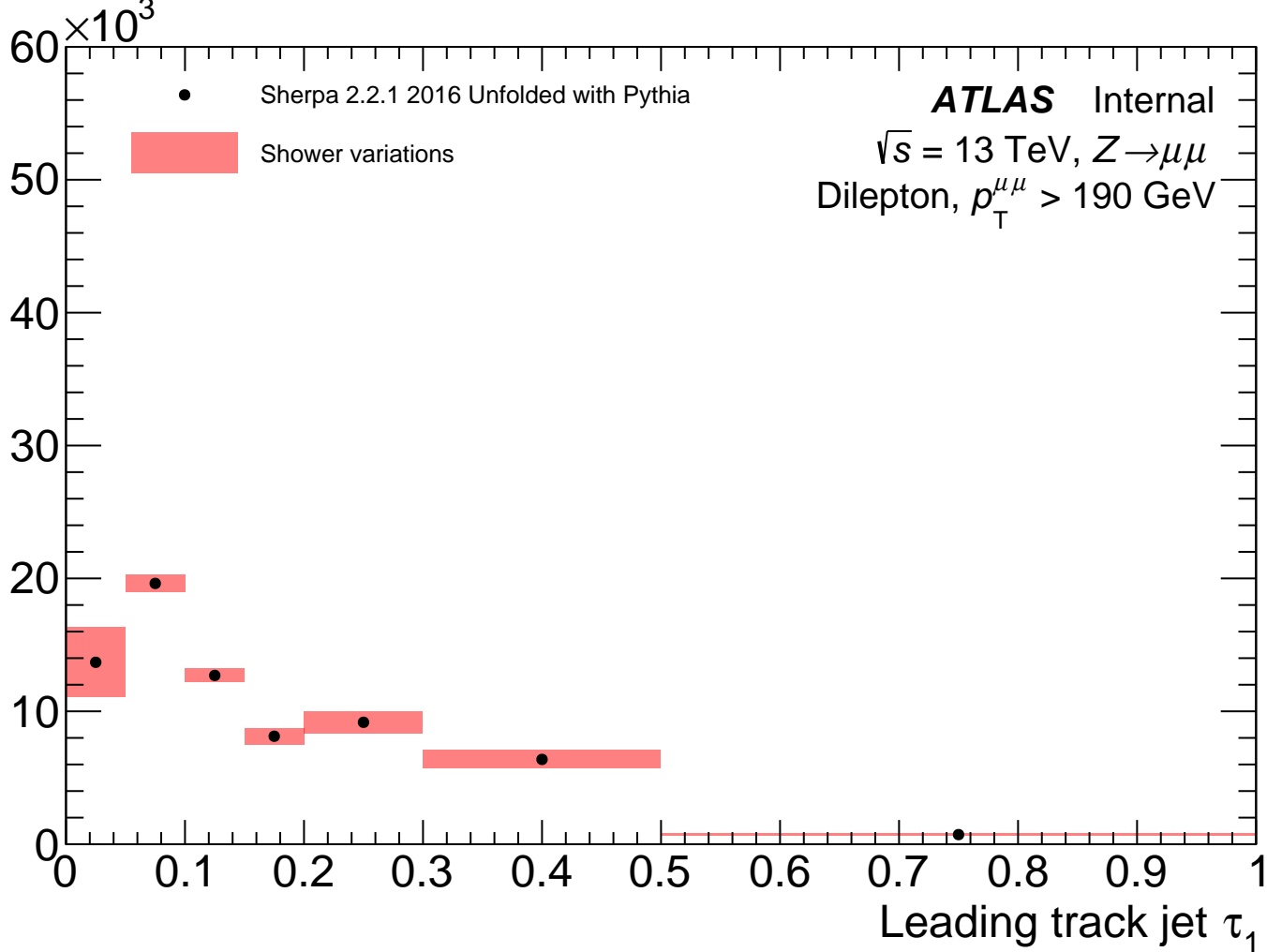
Events



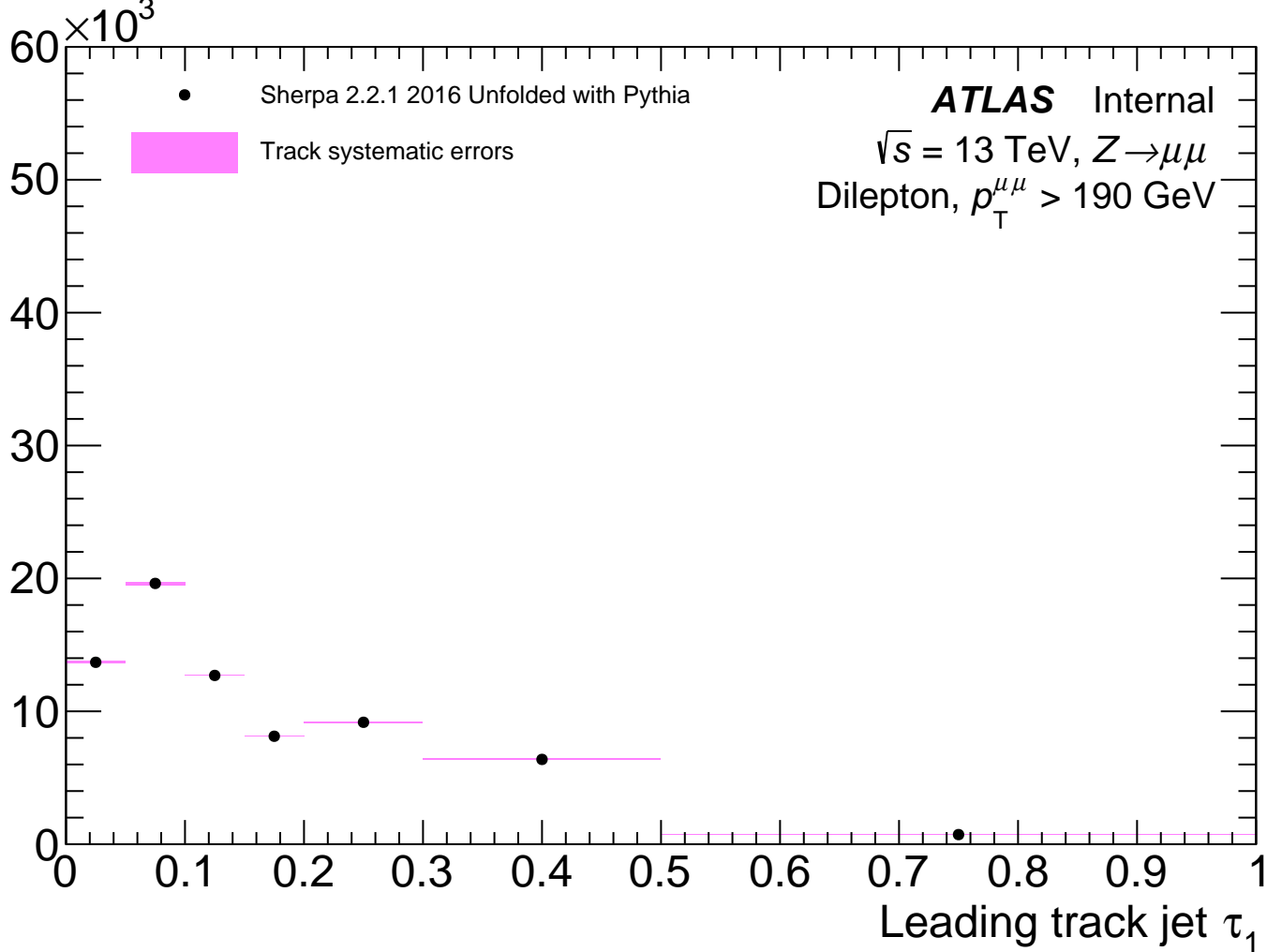
Events



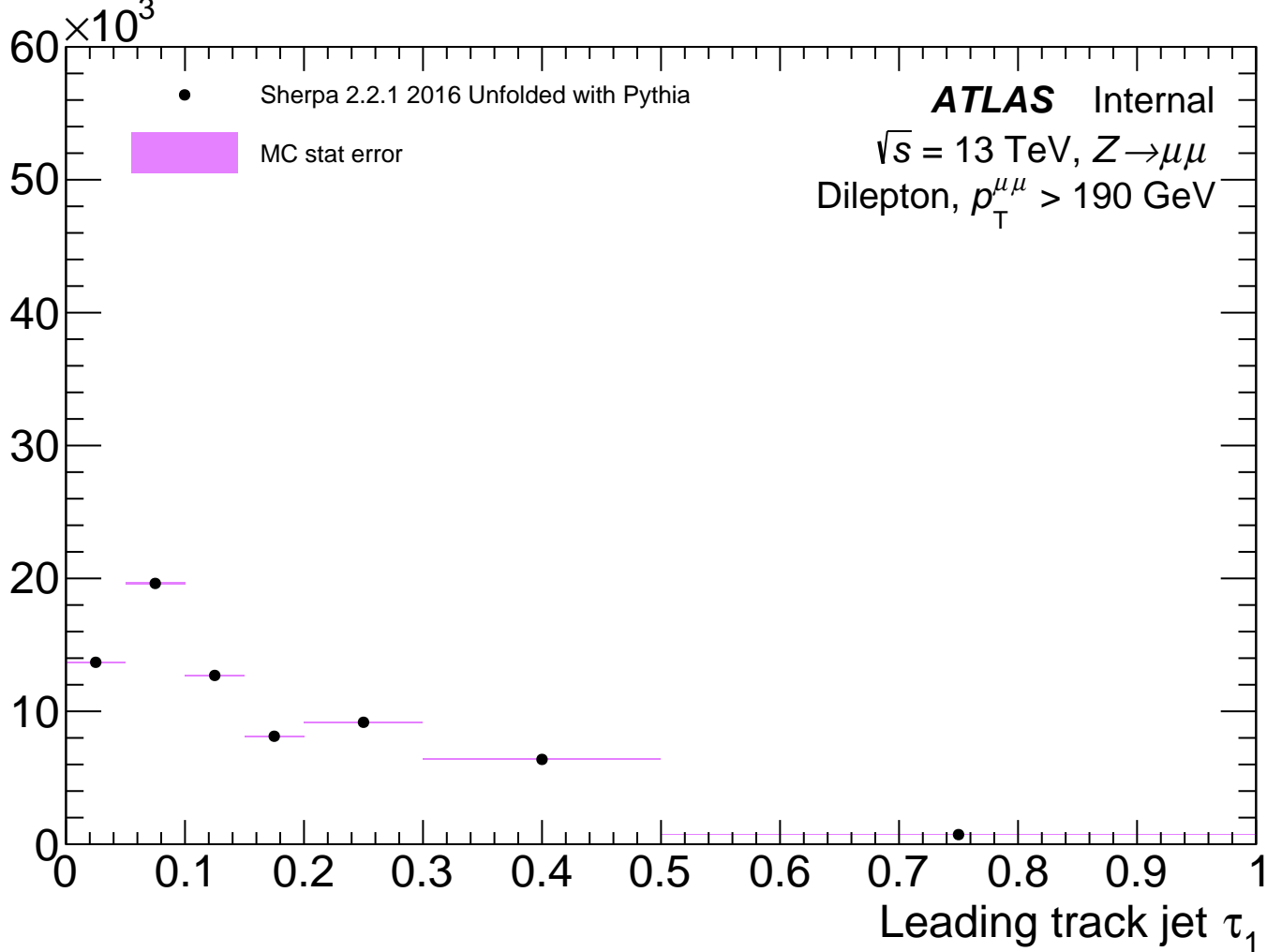
Events



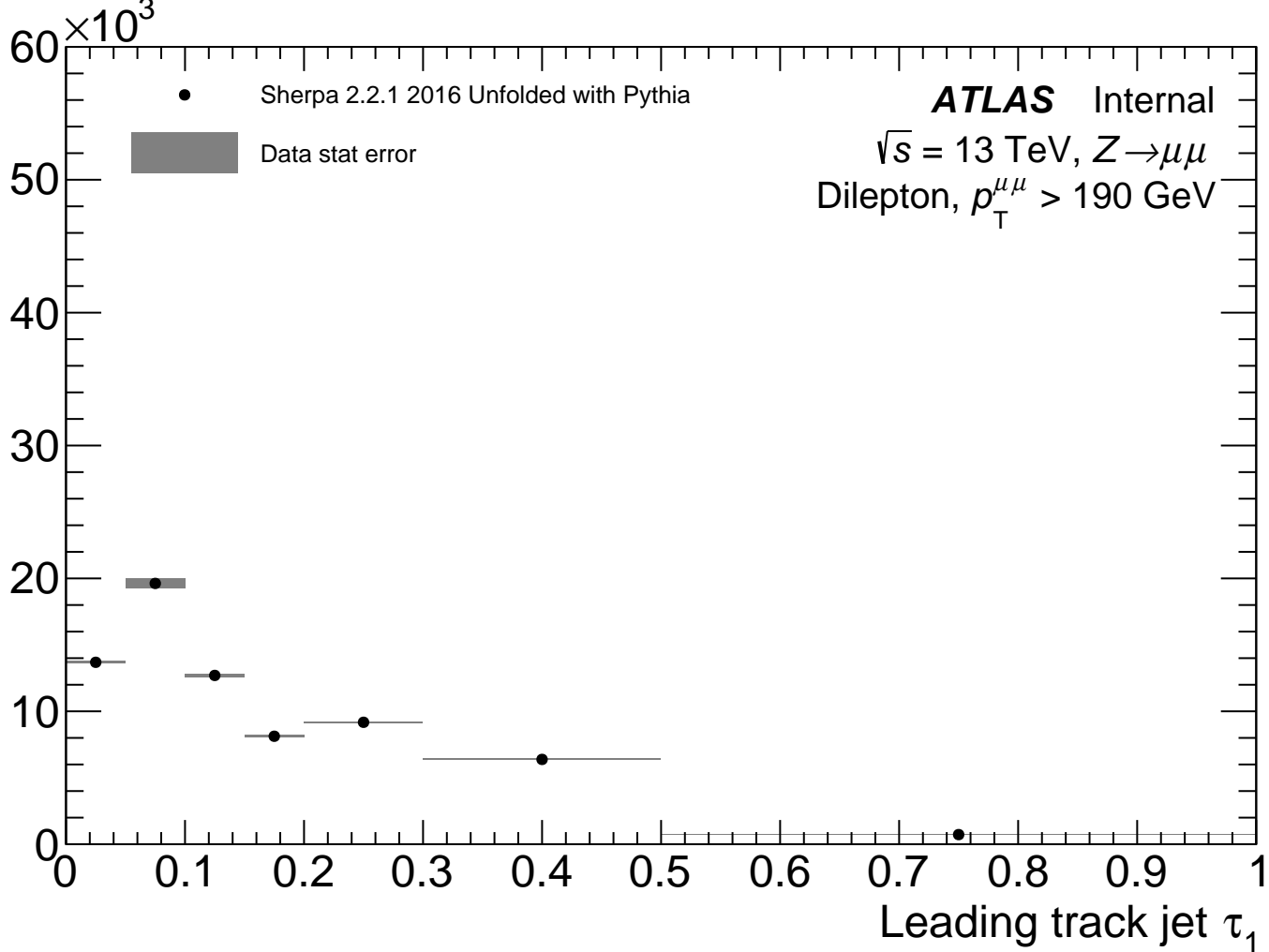
Events



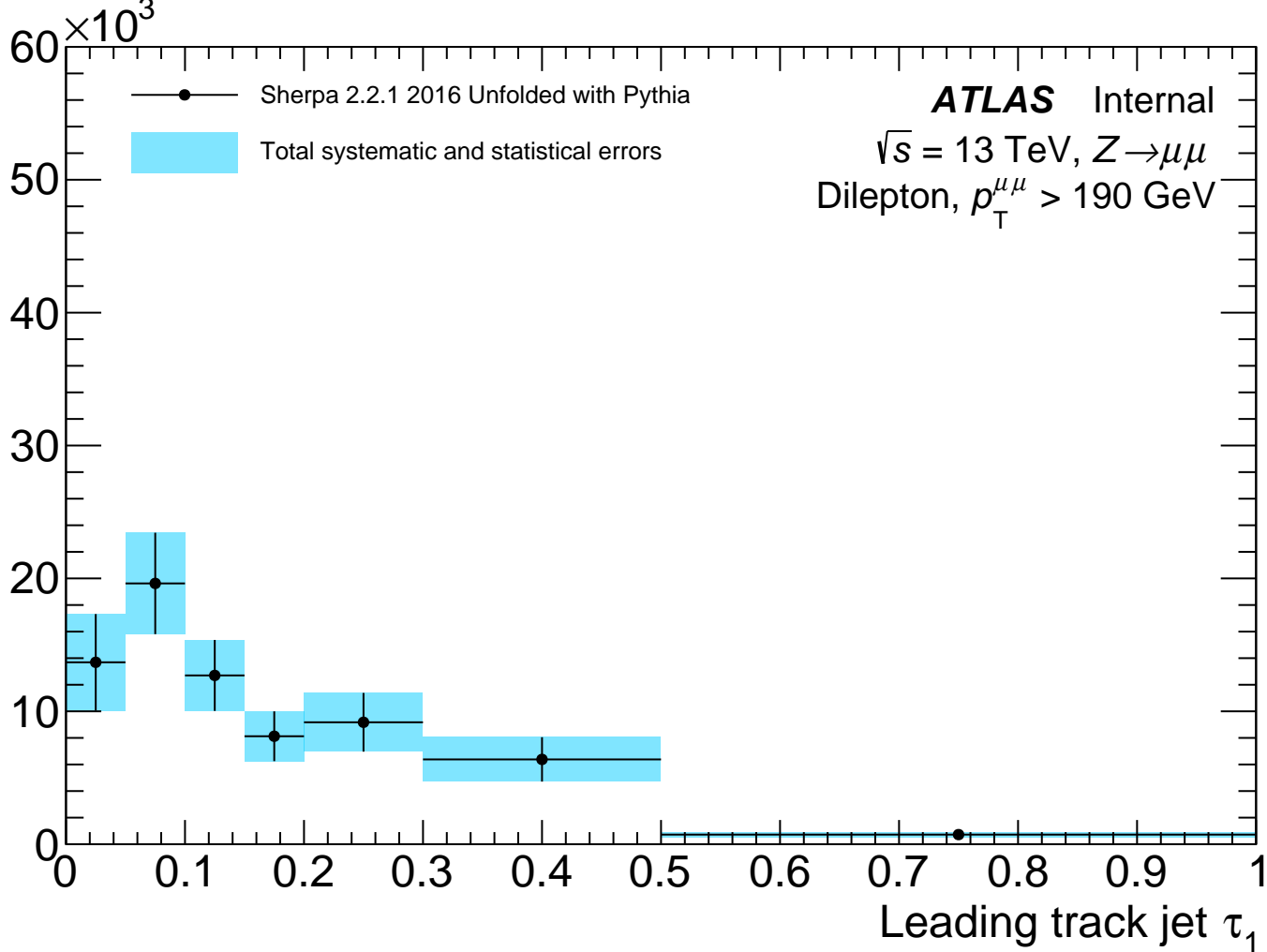
Events



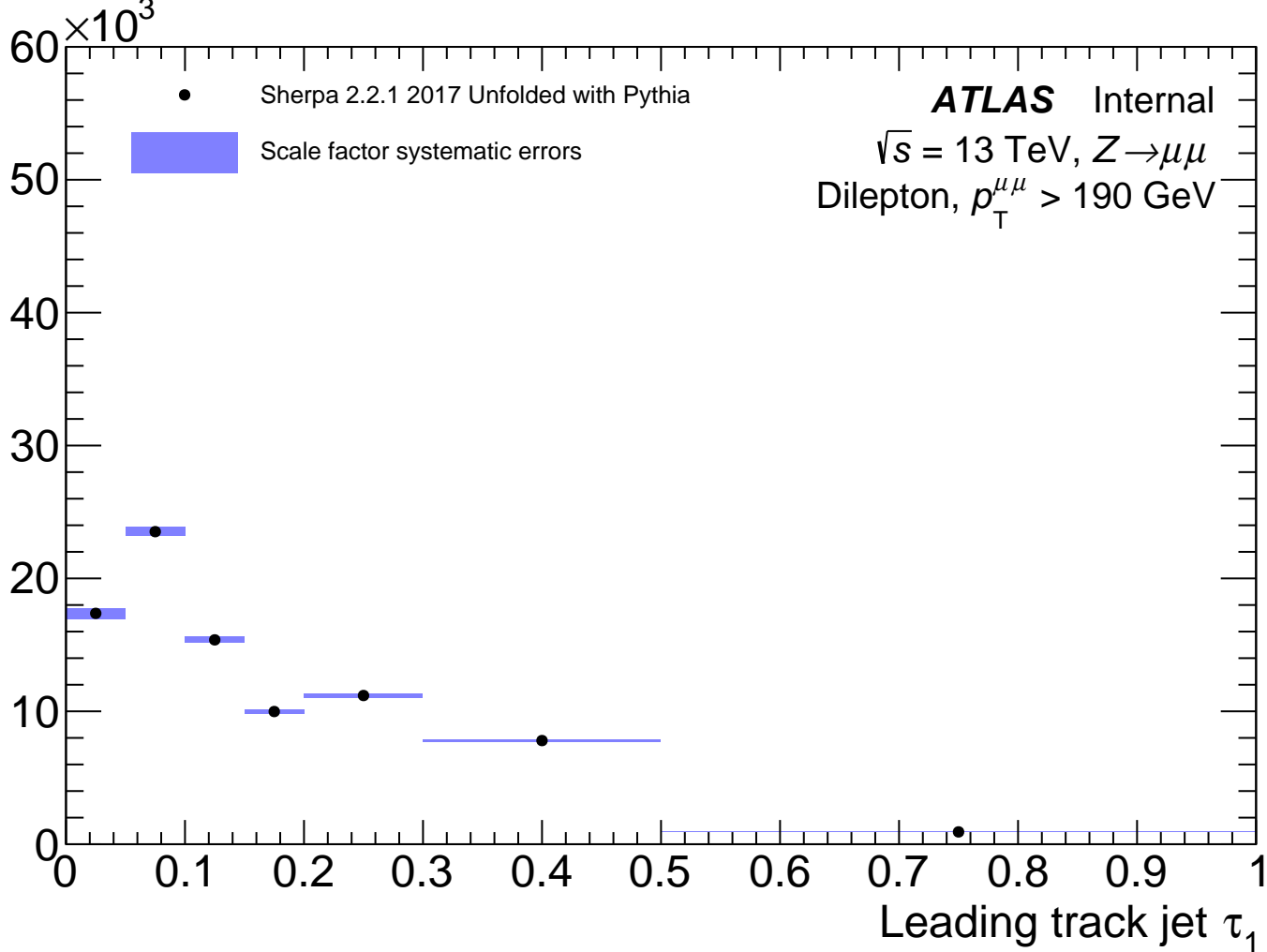
Events



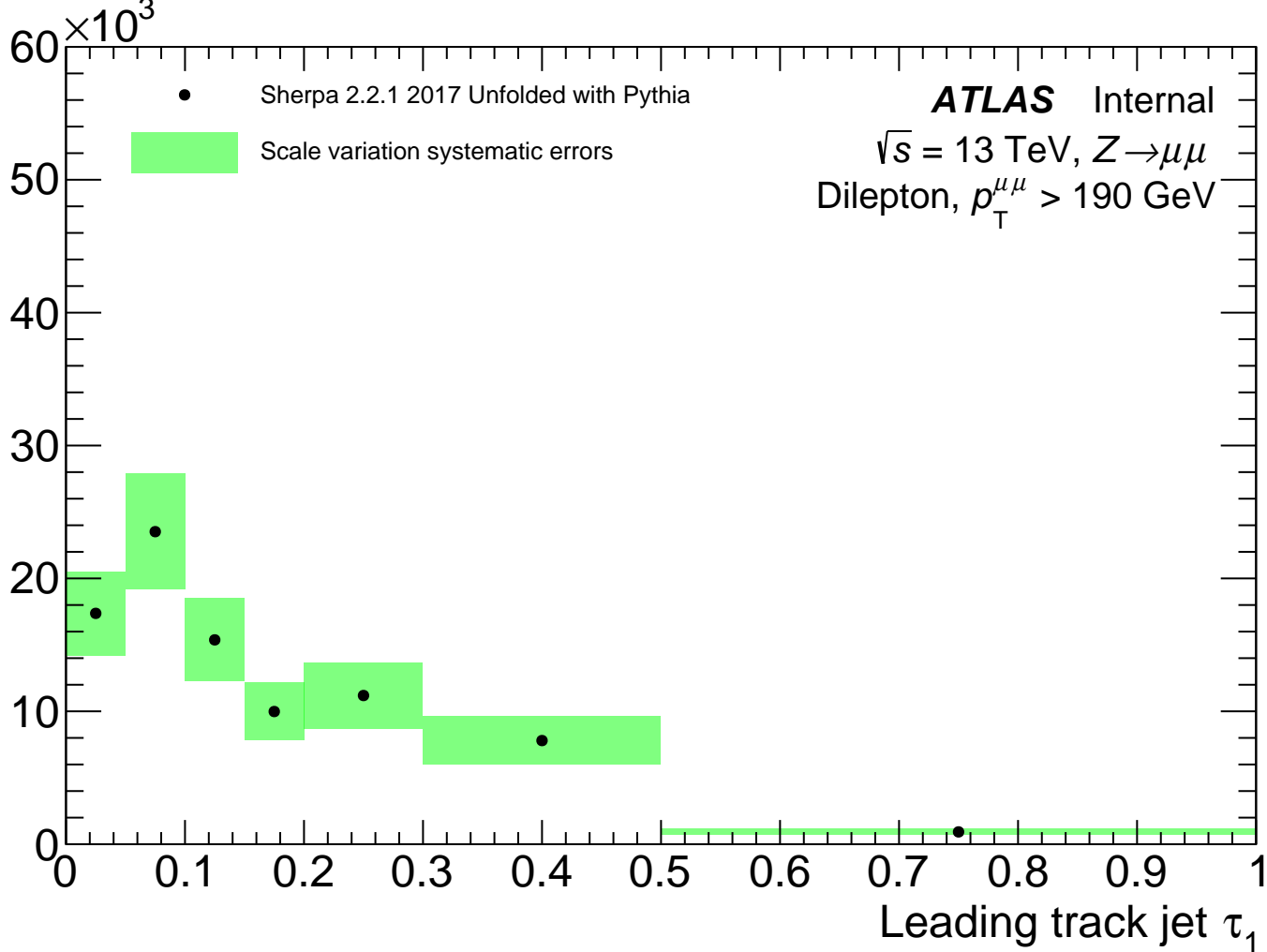
Events



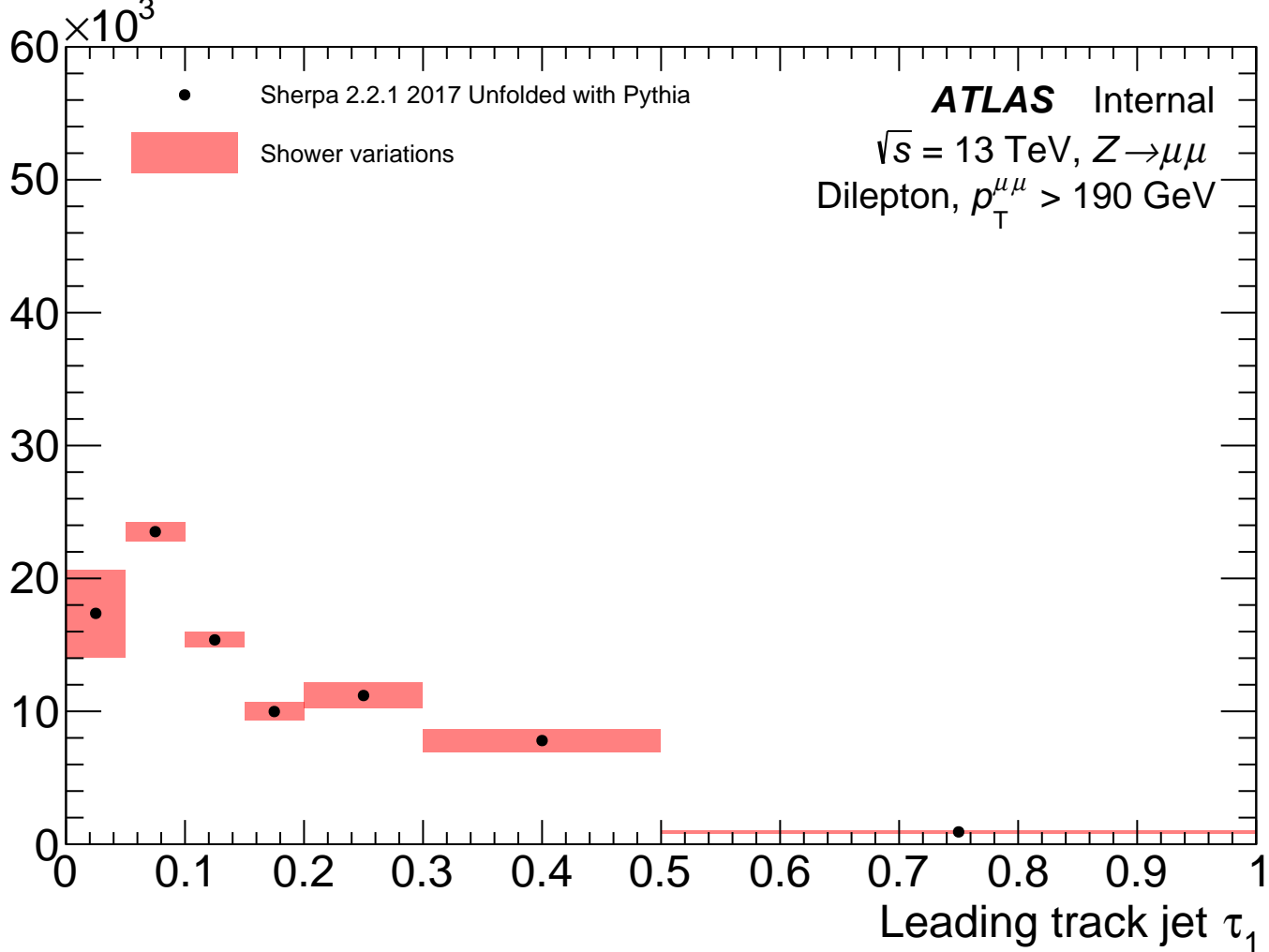
Events



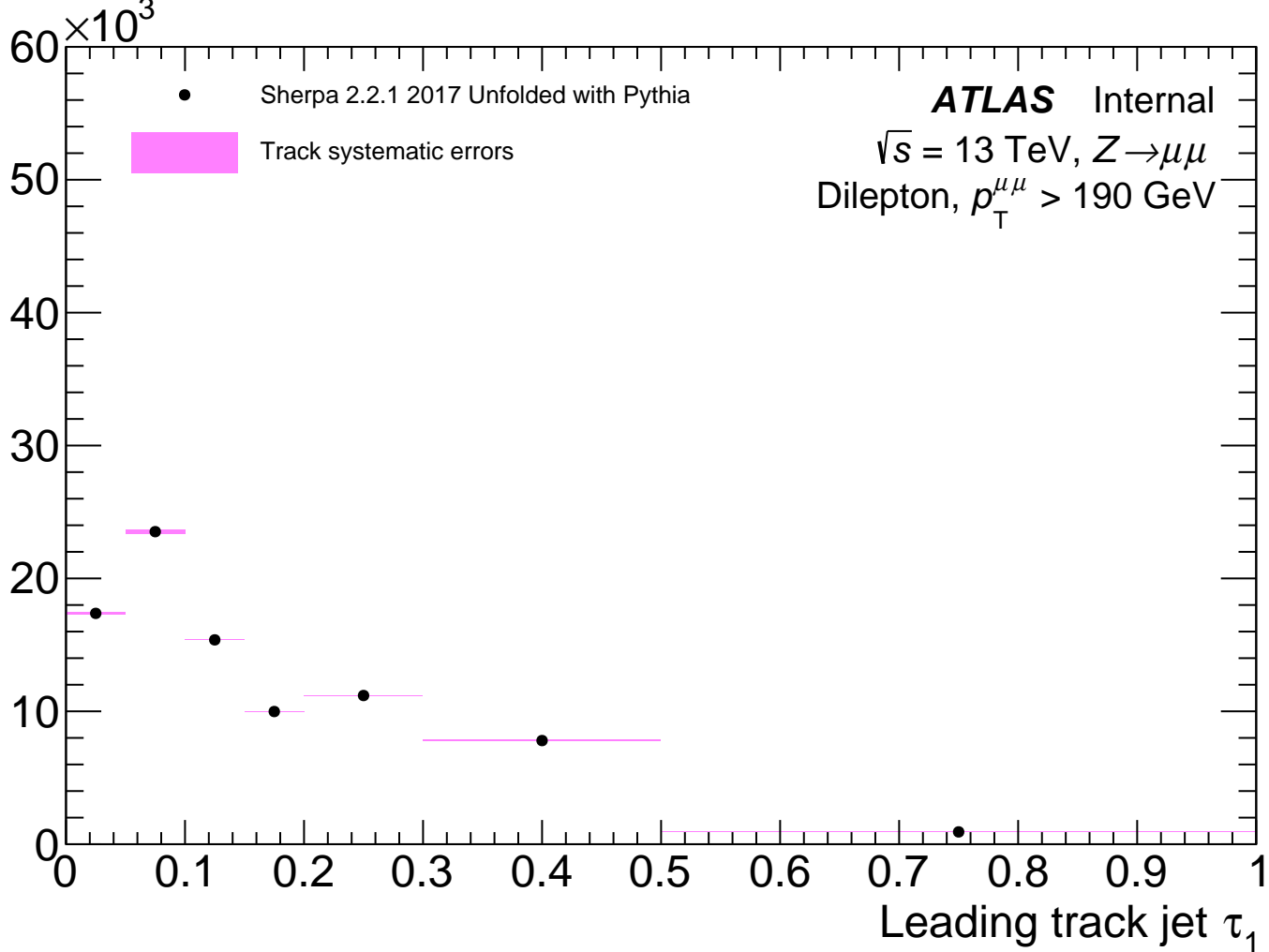
Events



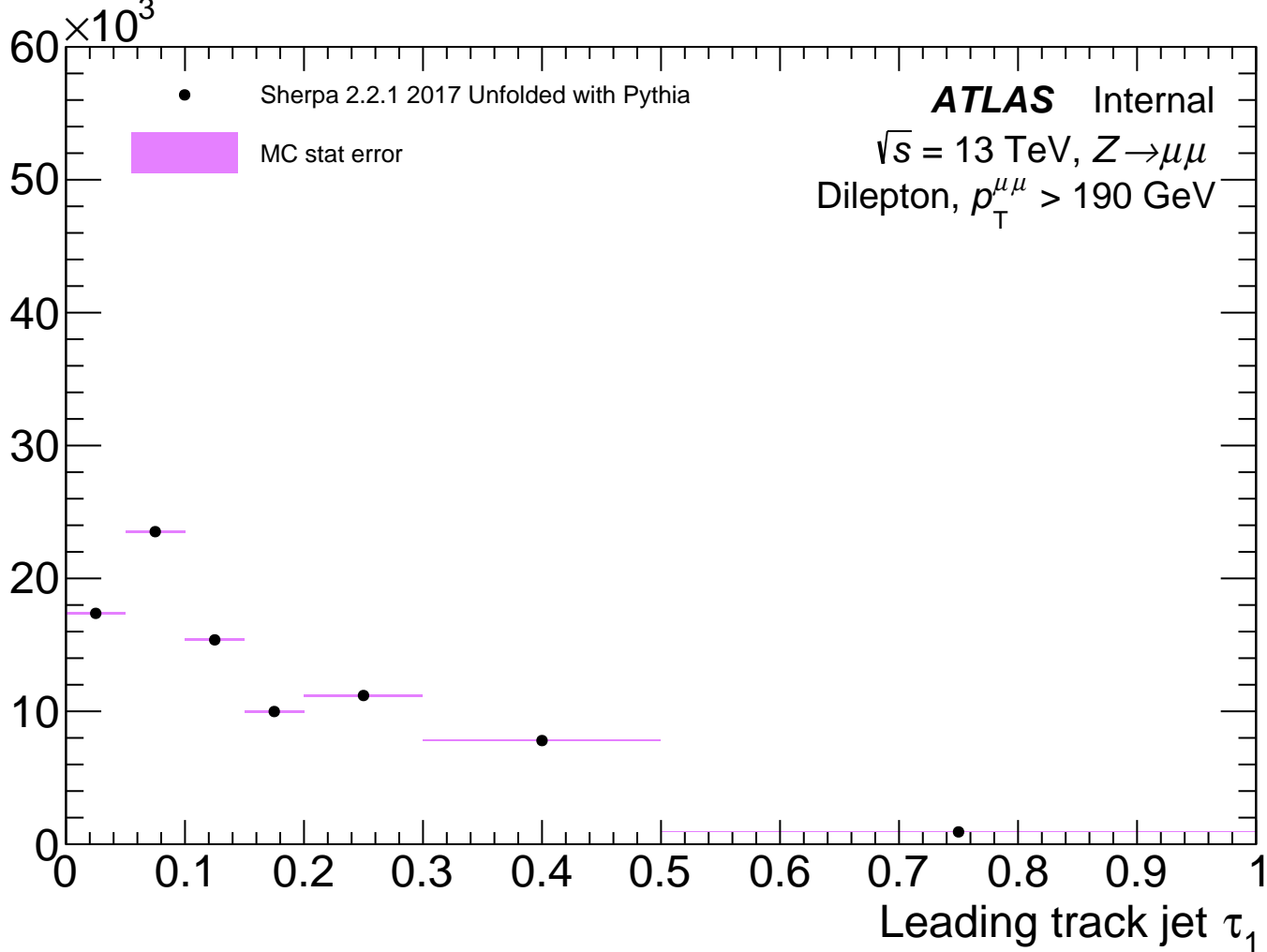
Events



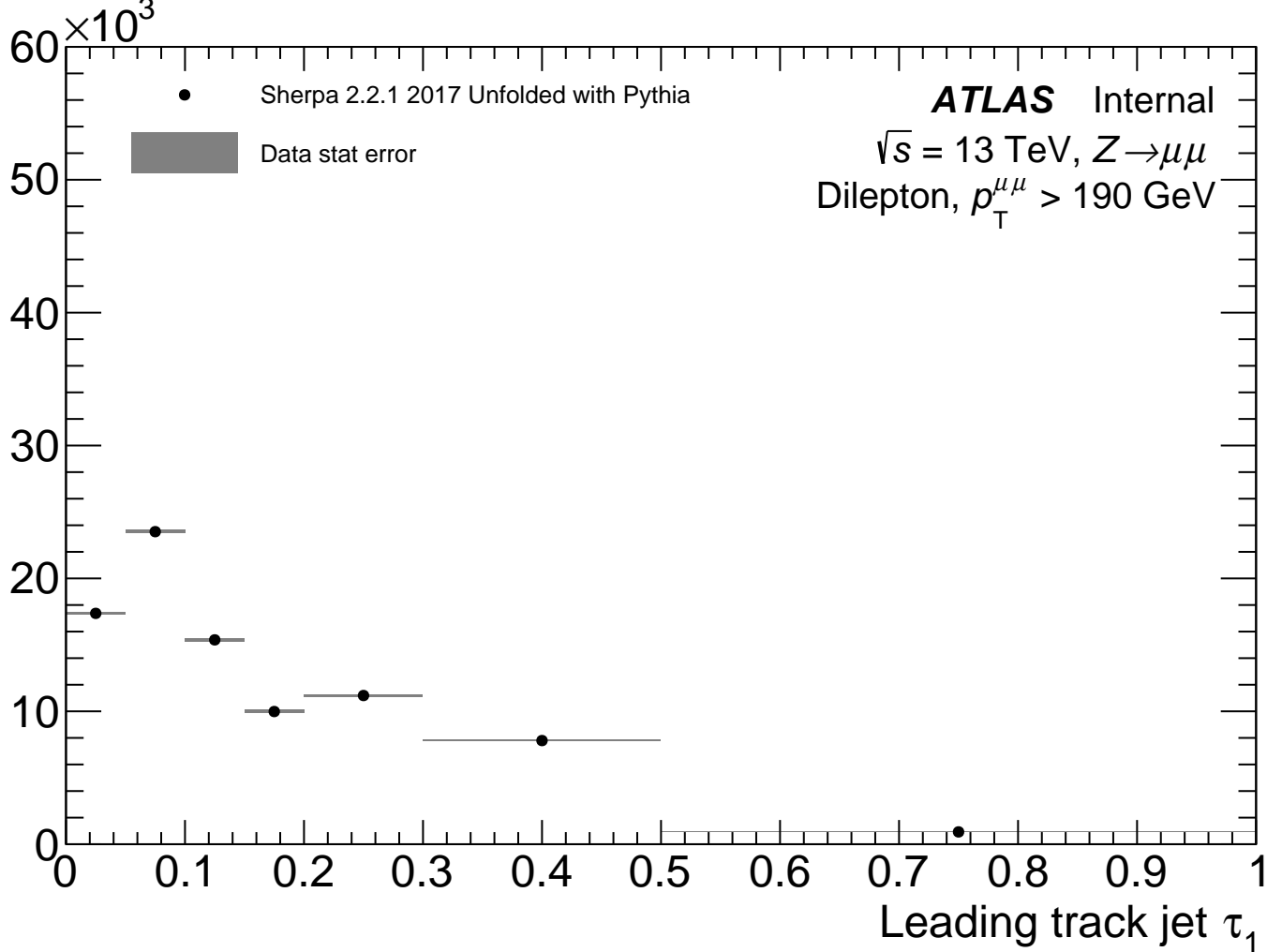
Events



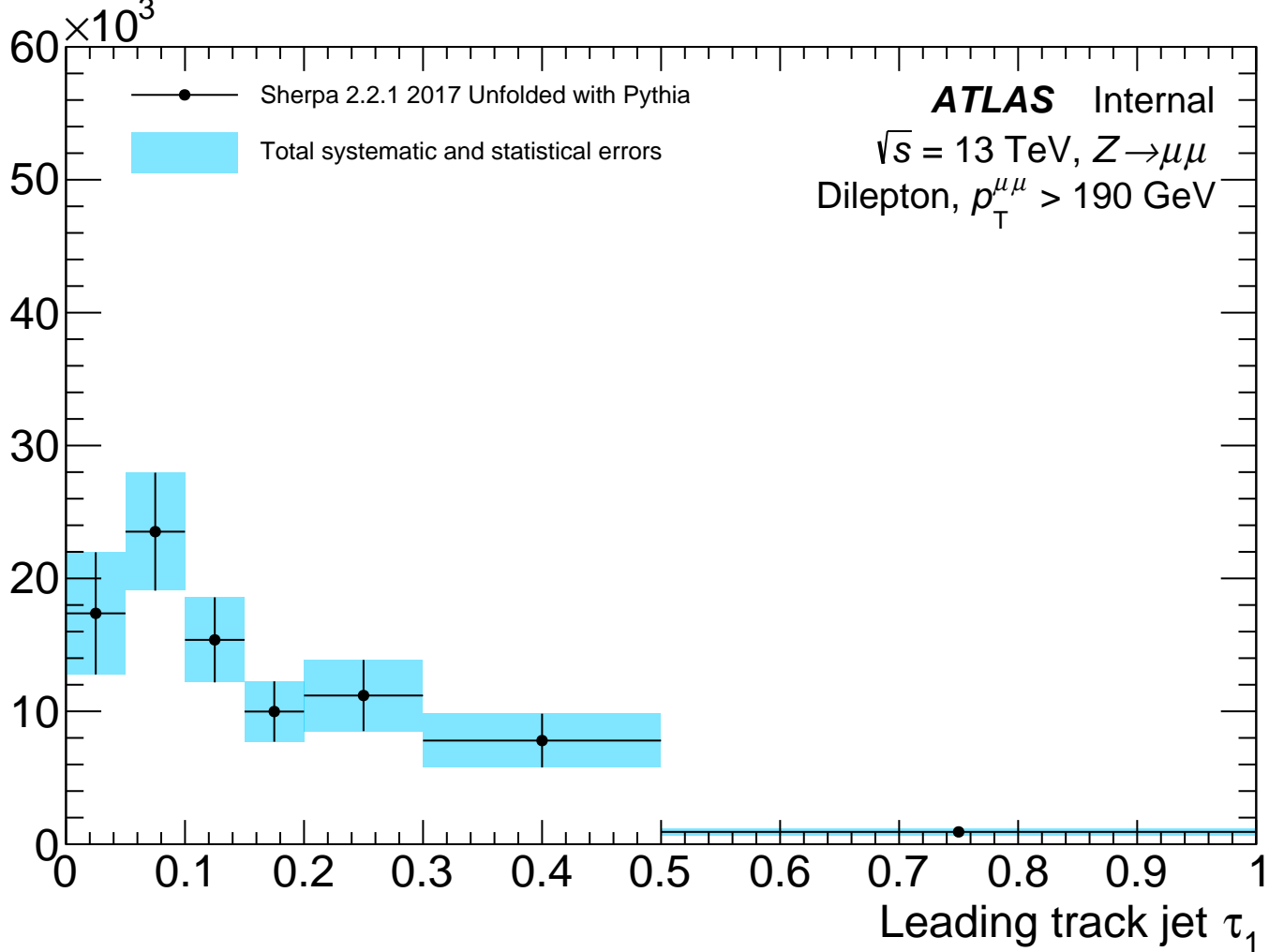
Events



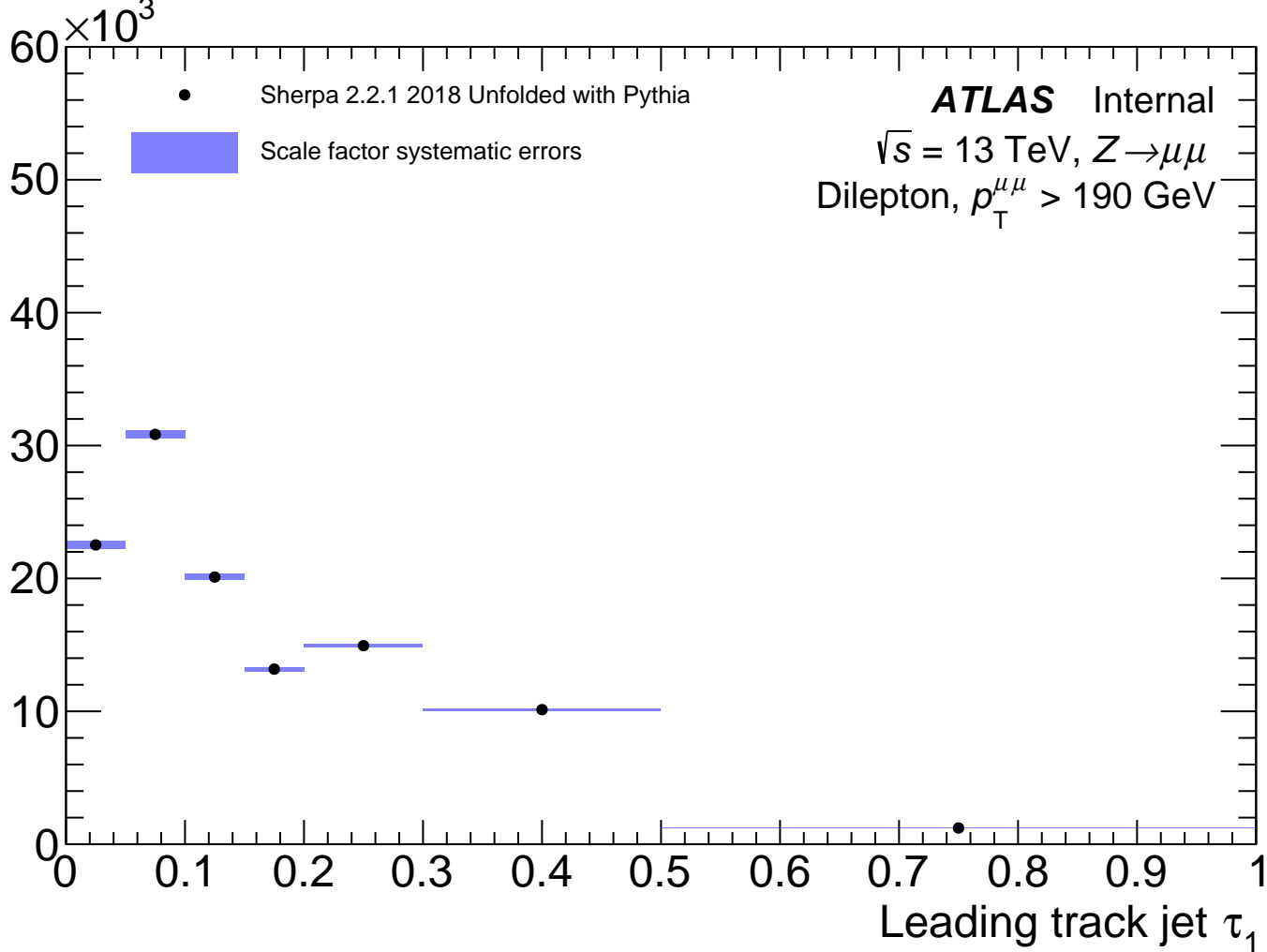
Events



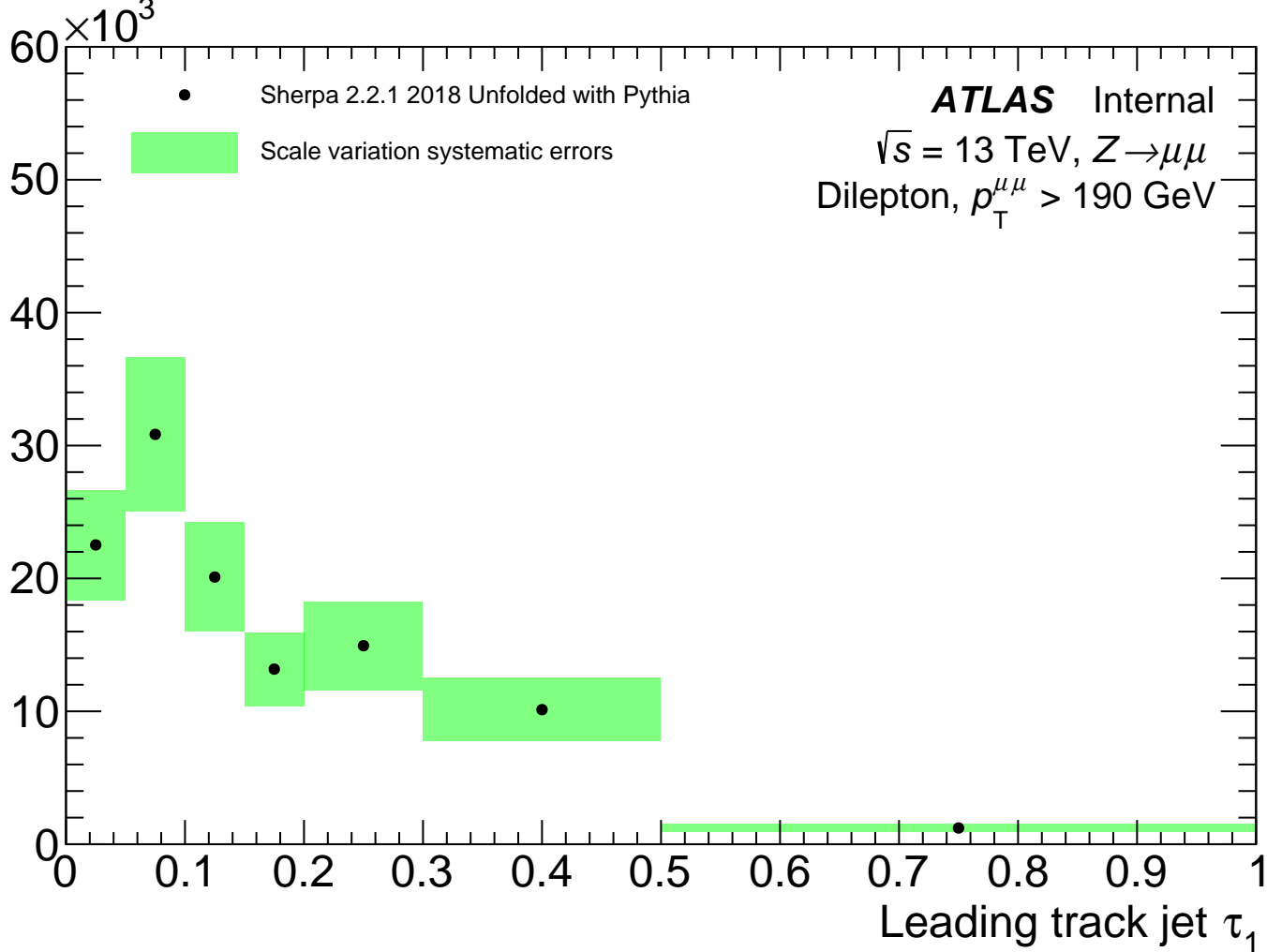
Events



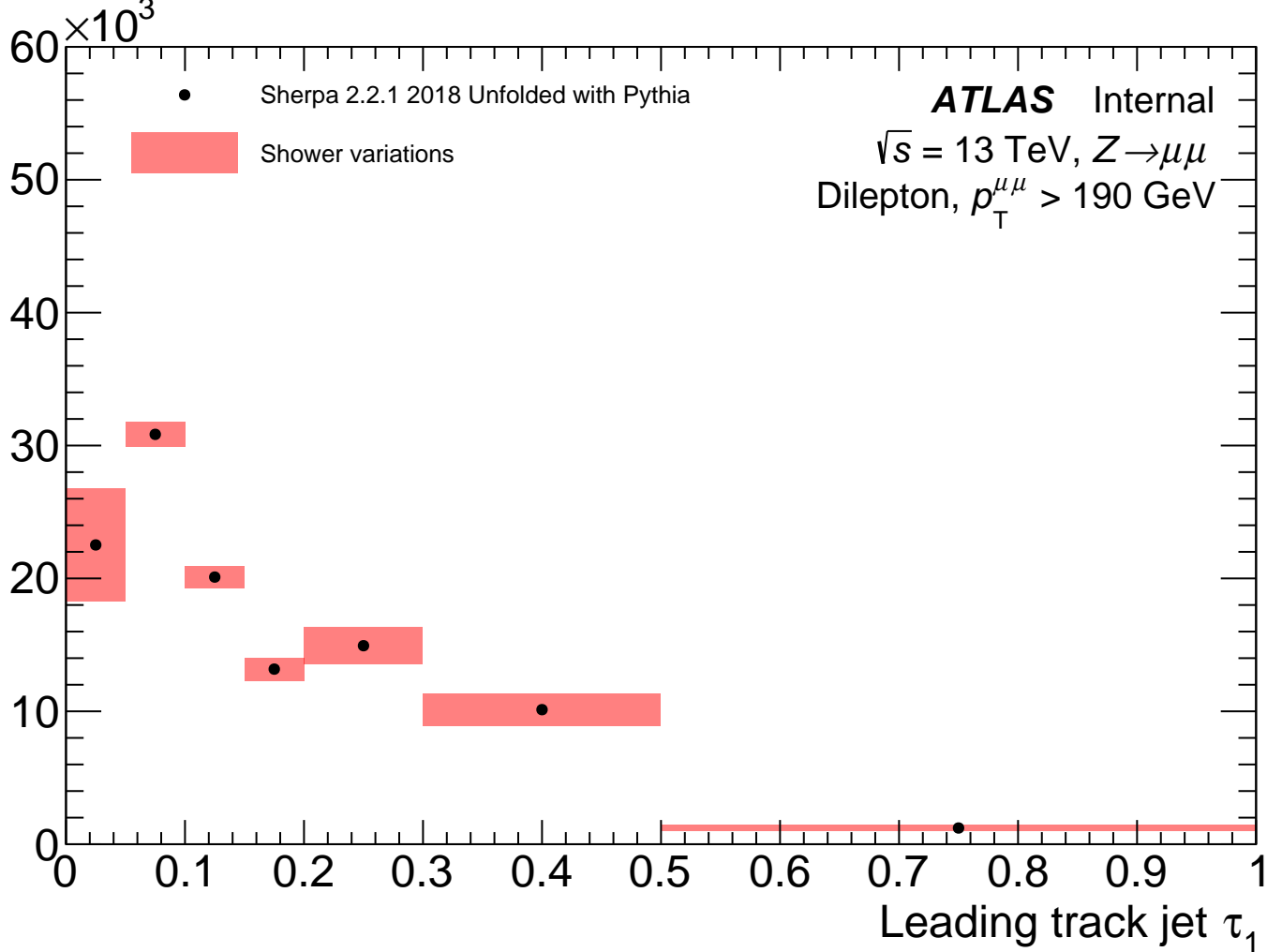
Events



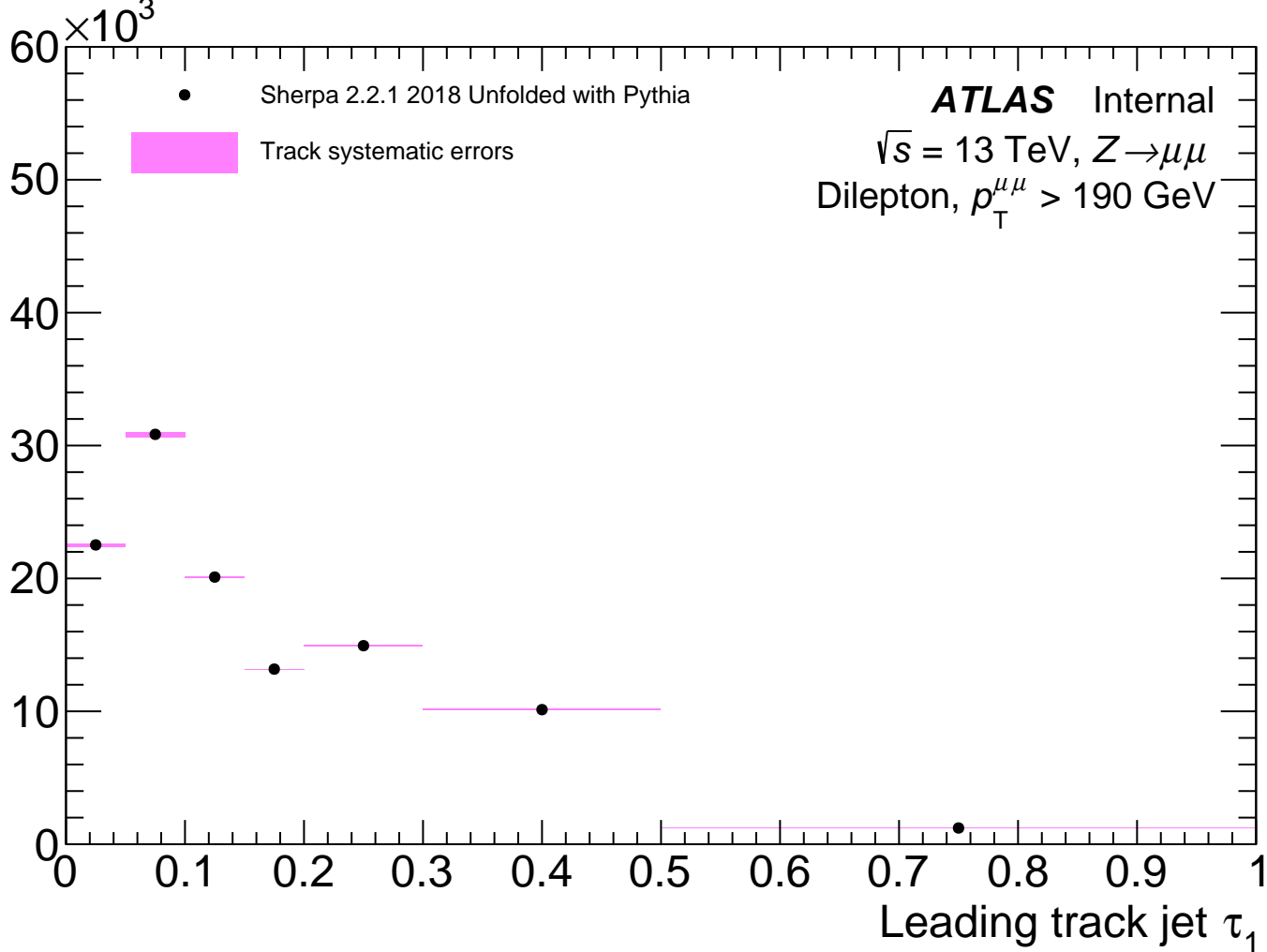
Events



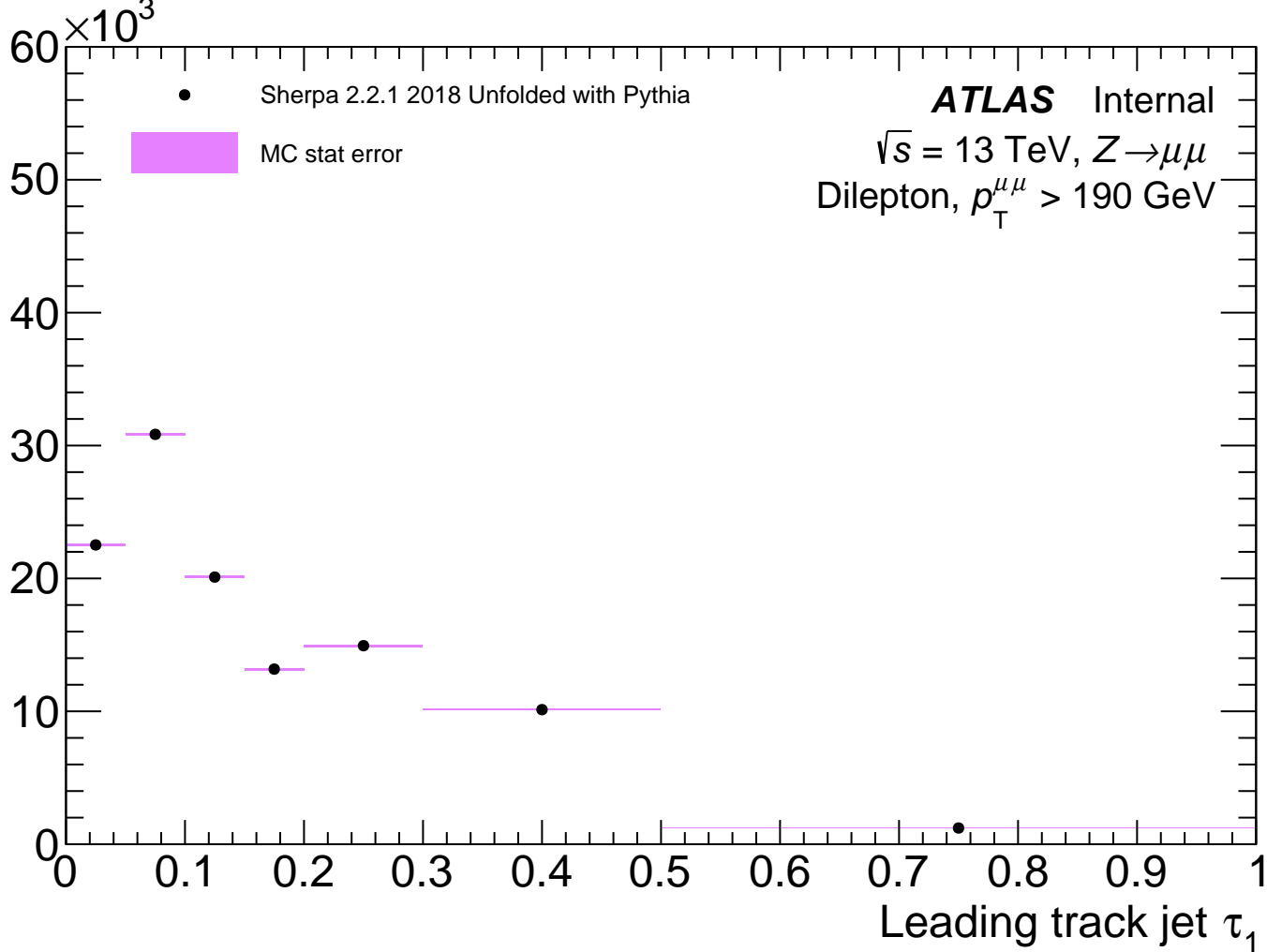
Events



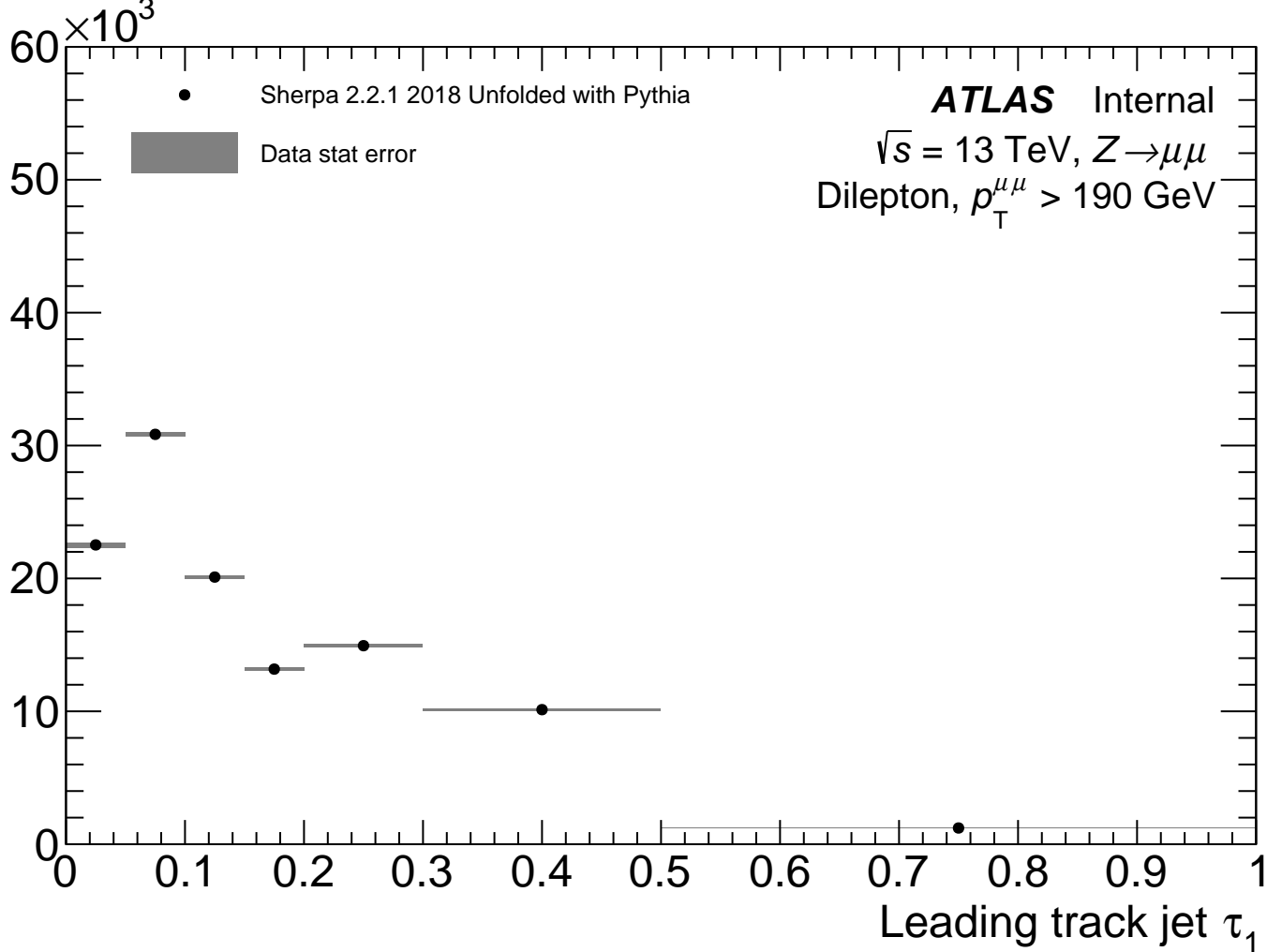
Events



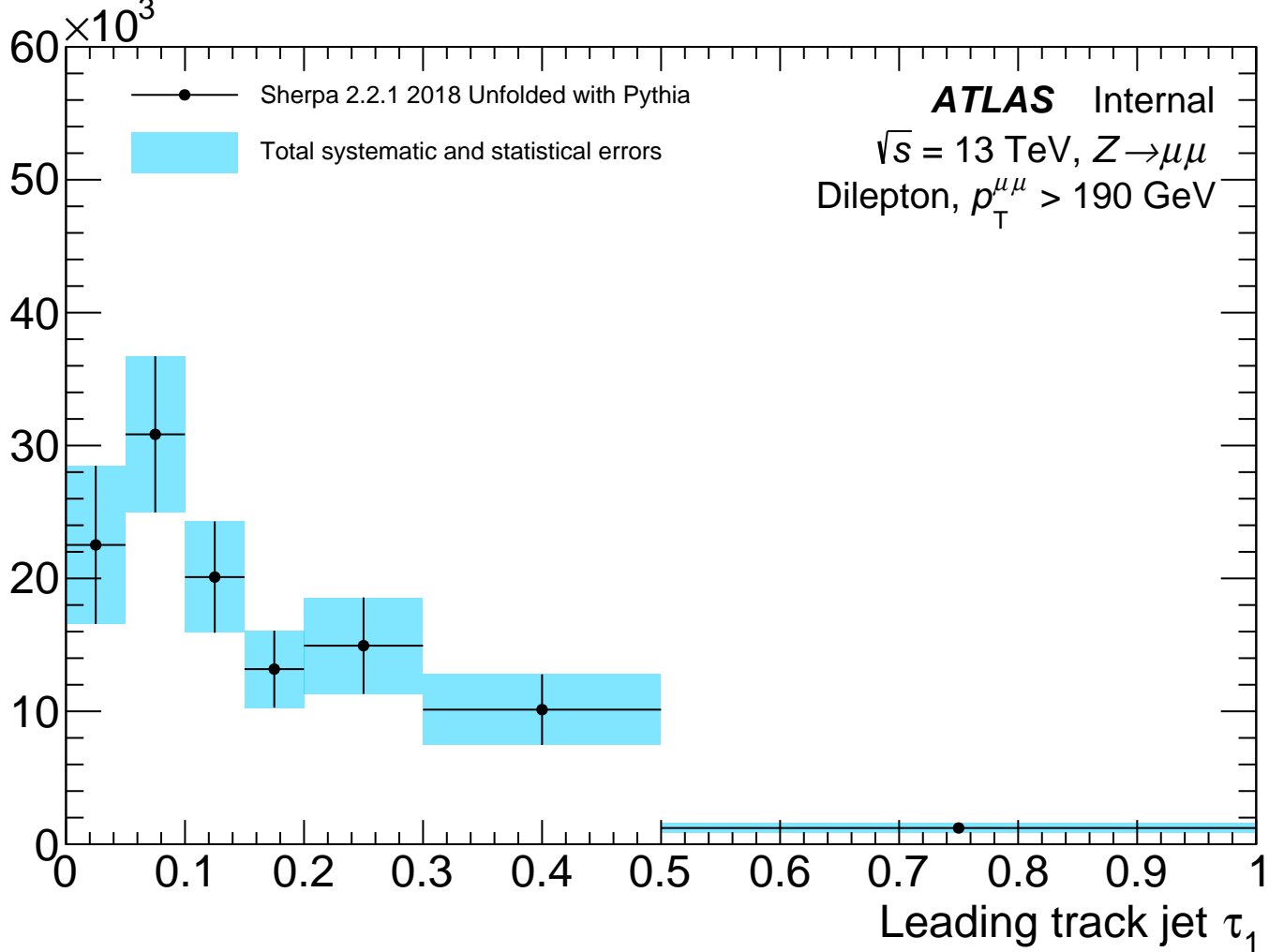
Events



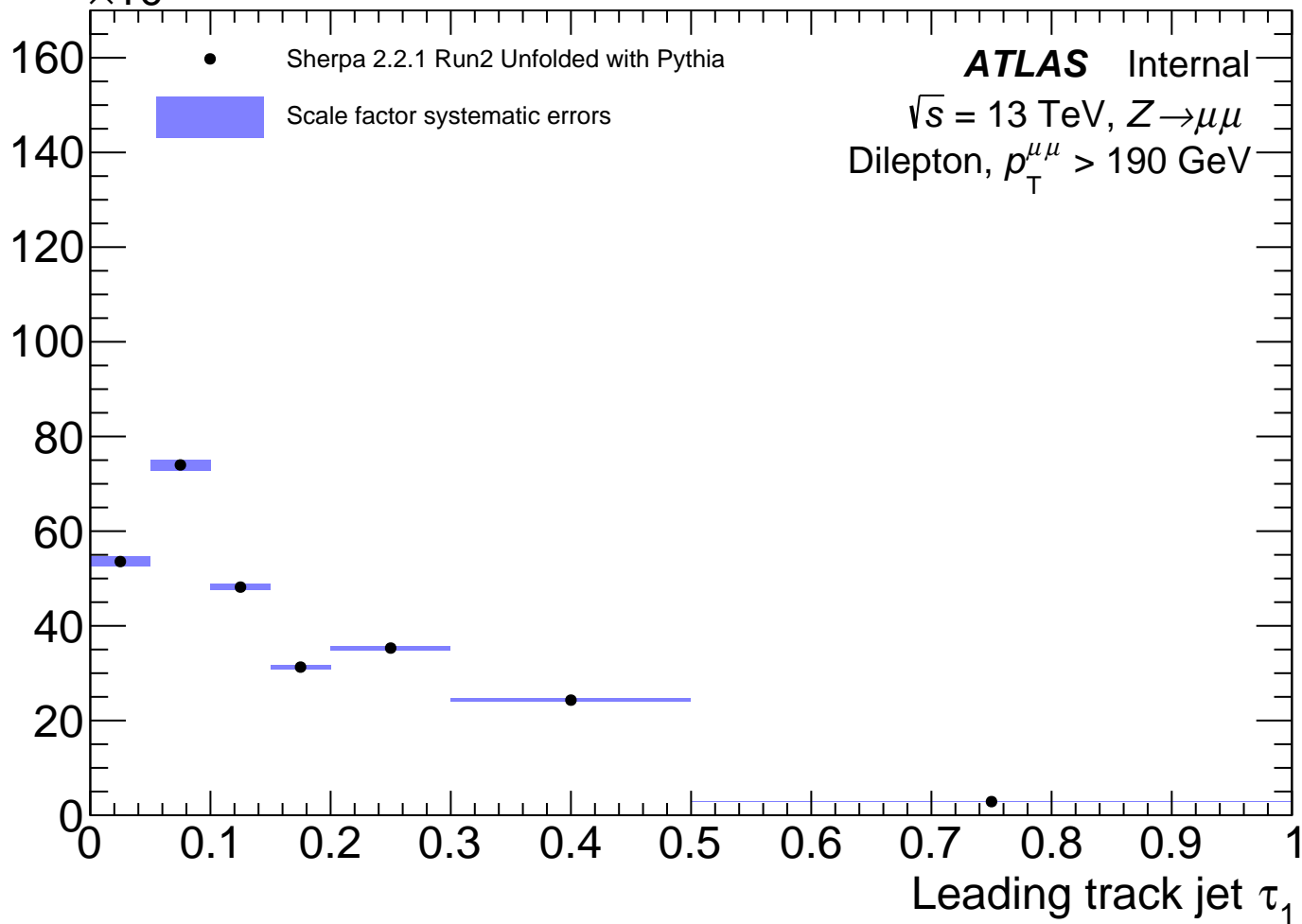
Events



Events

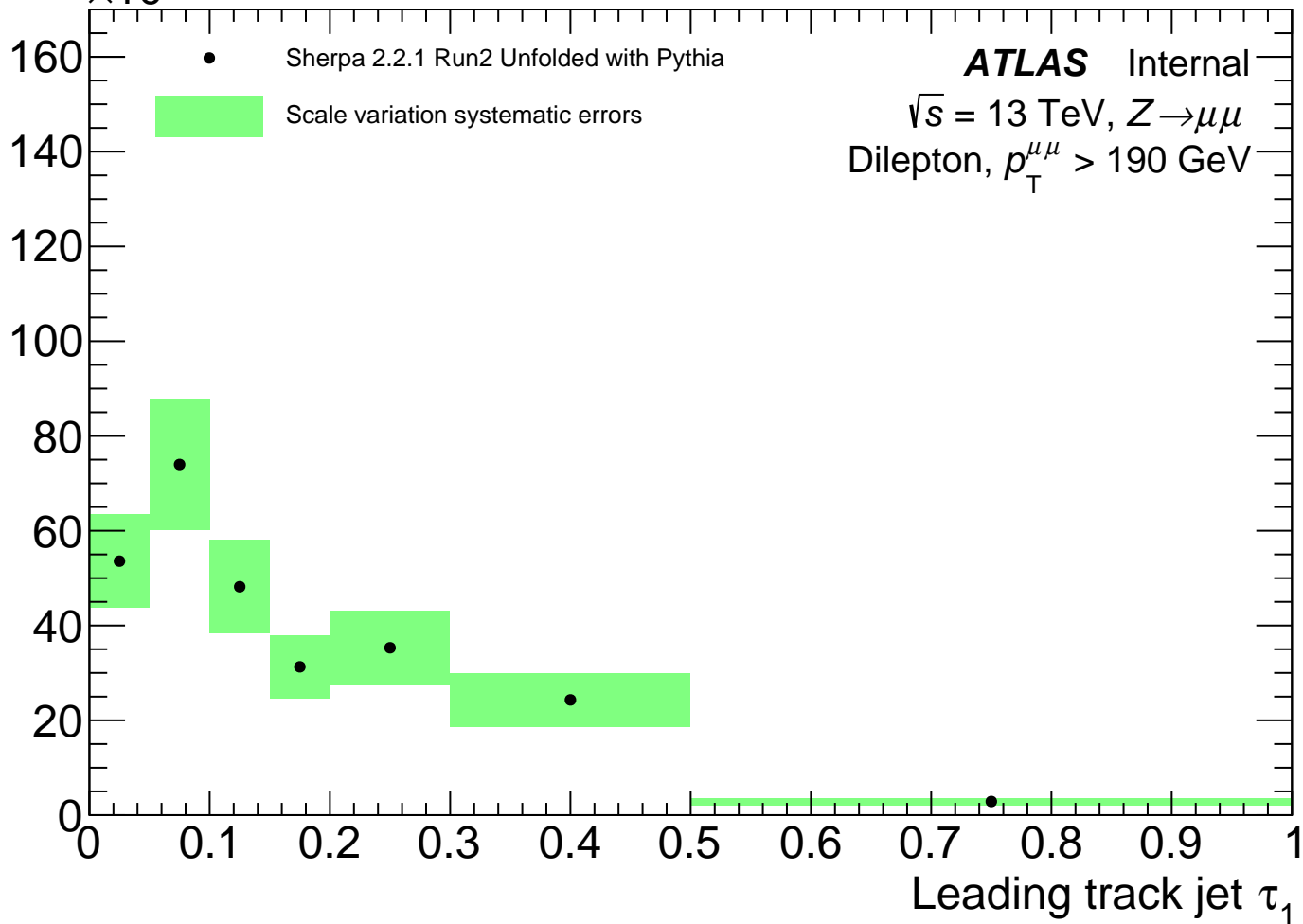


Events

 $\times 10^3$ 

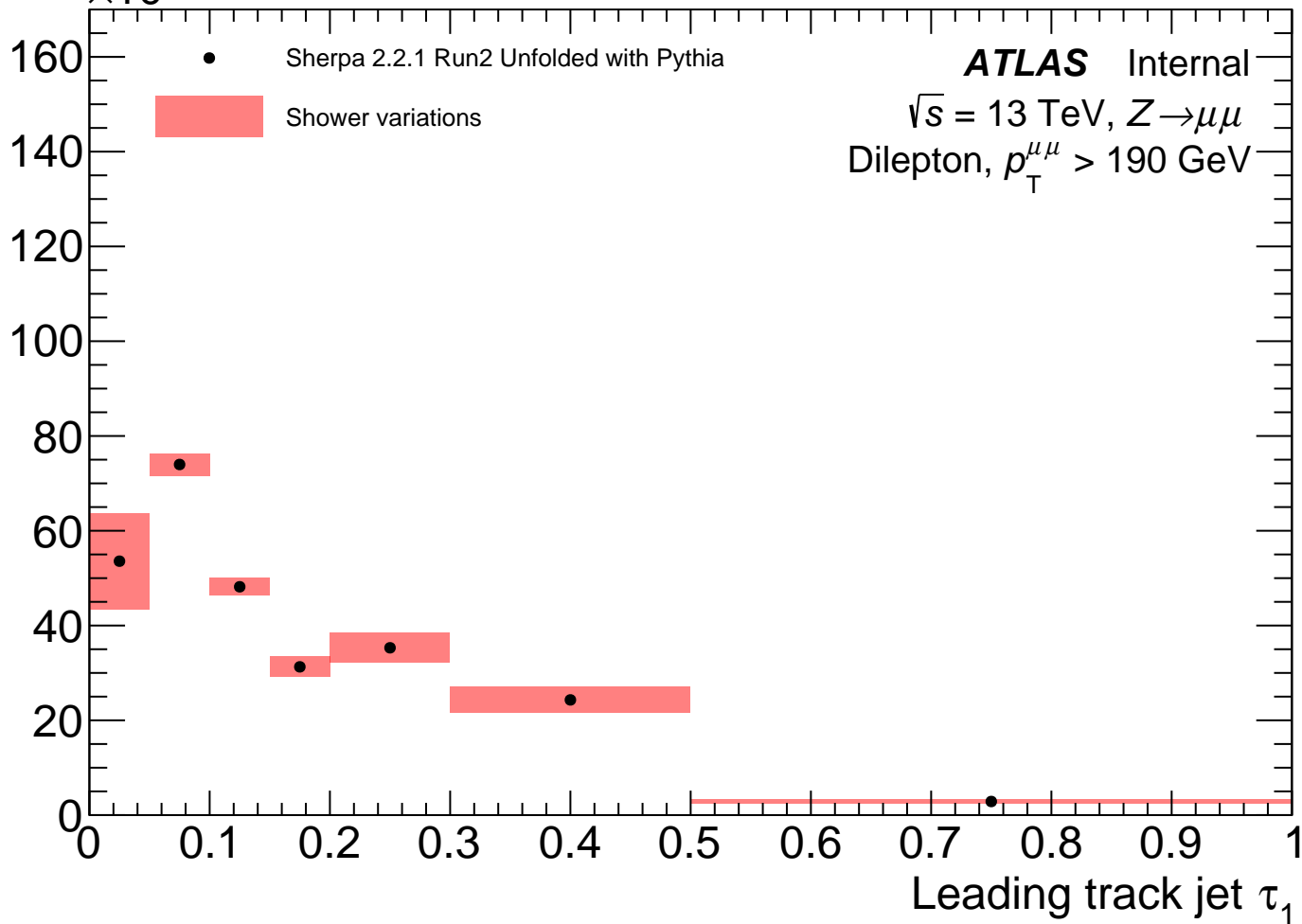
Events

$\times 10^3$



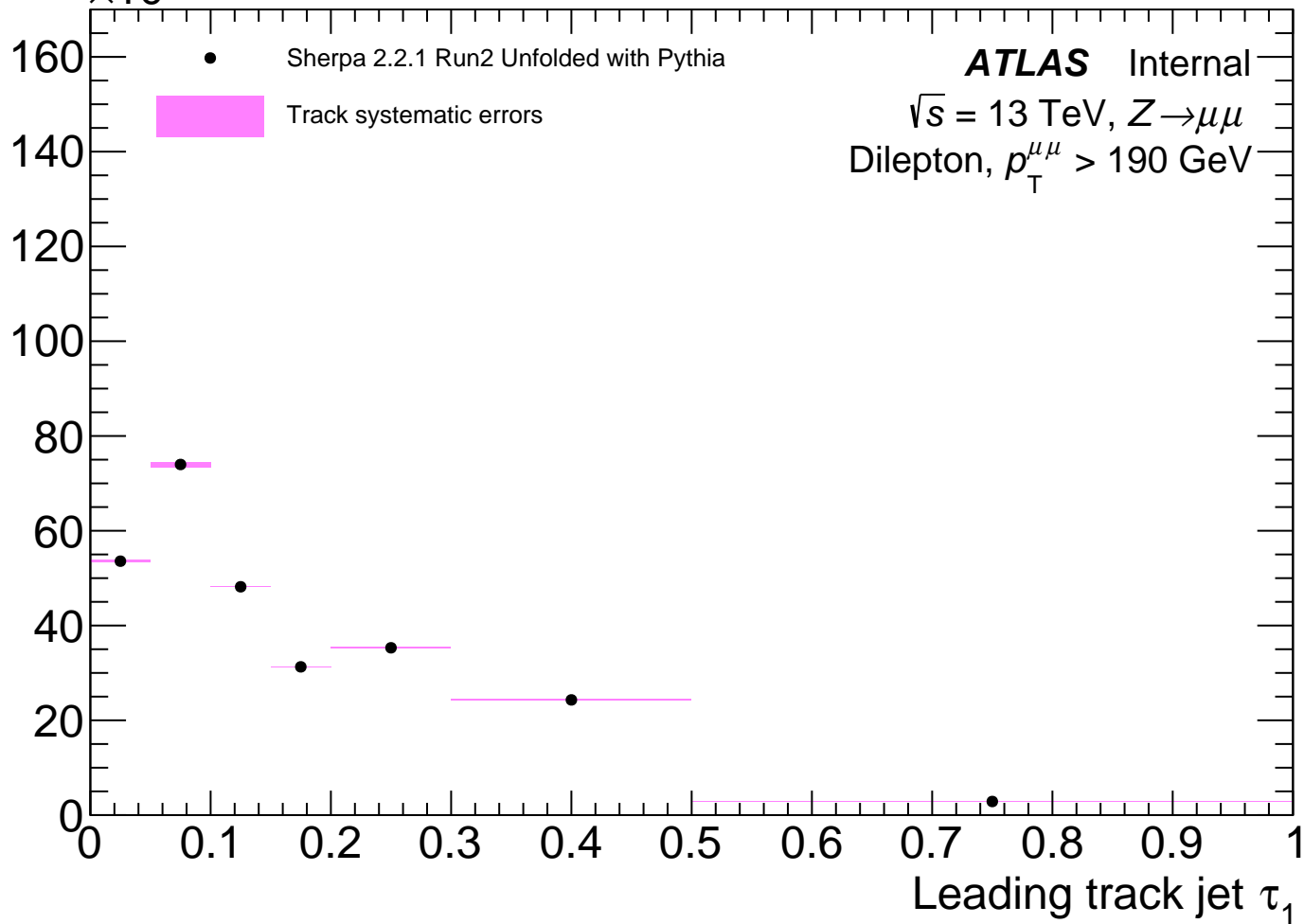
Events

$\times 10^3$



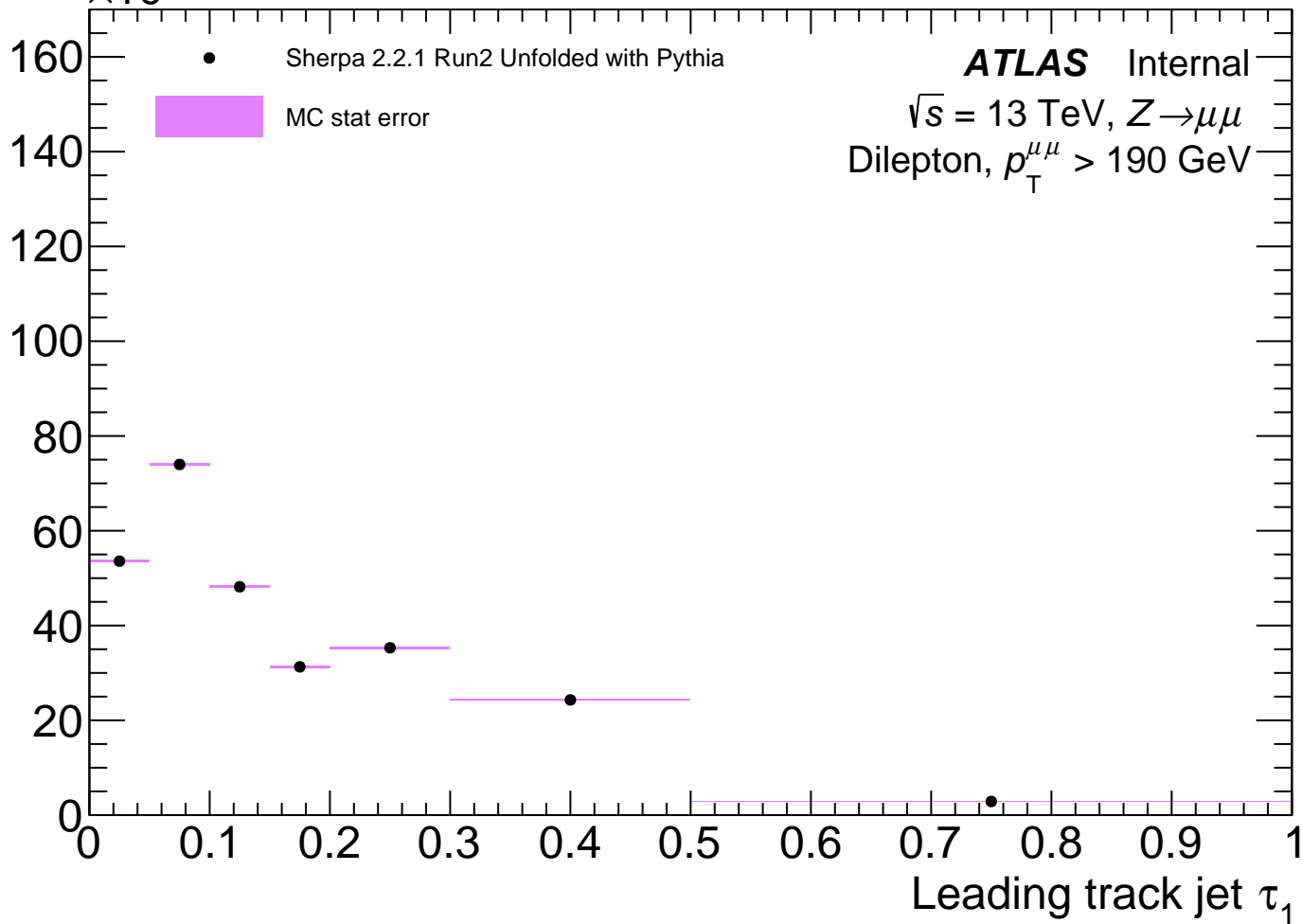
Events

$\times 10^3$



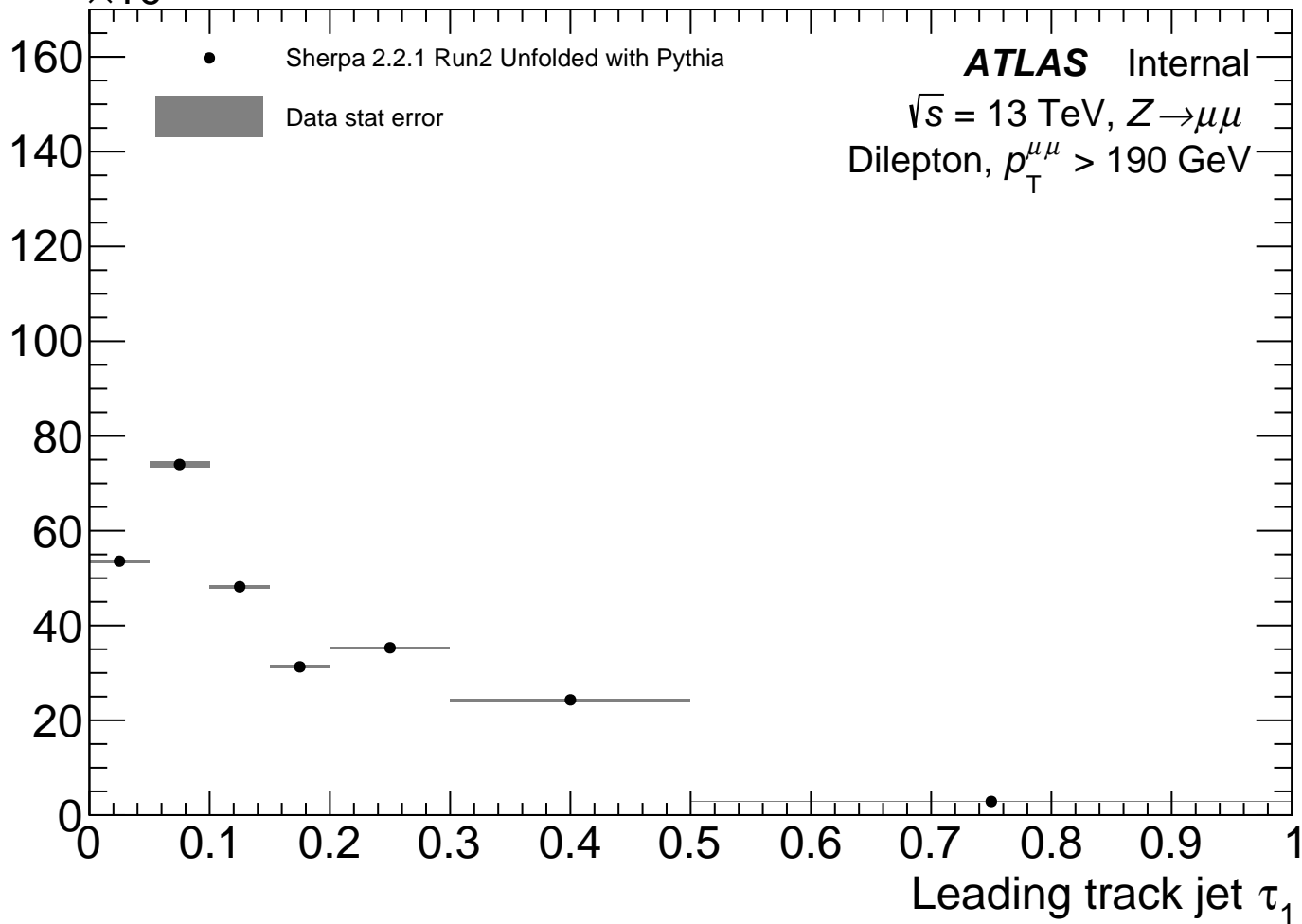
Events

$\times 10^3$



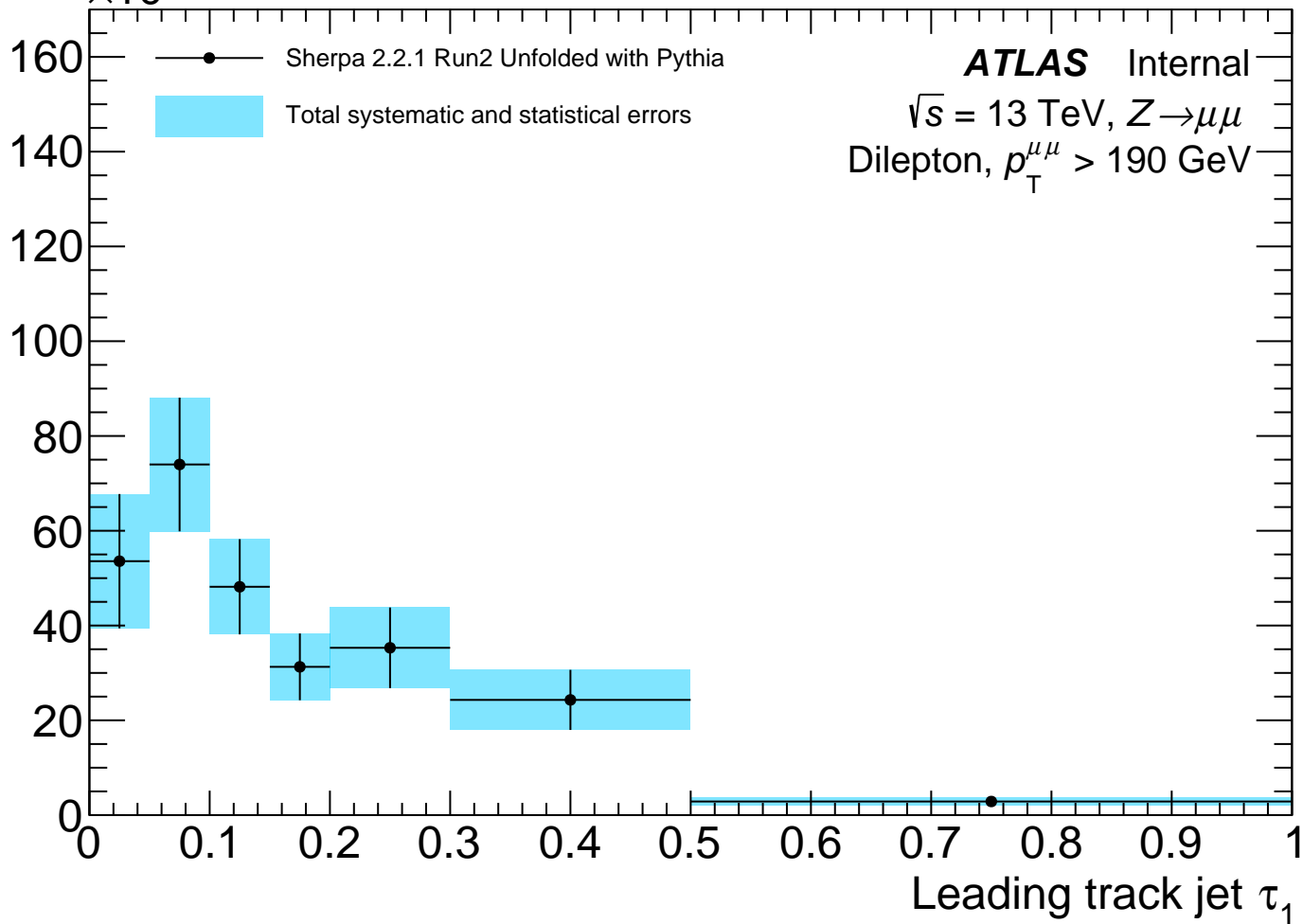
Events

$\times 10^3$

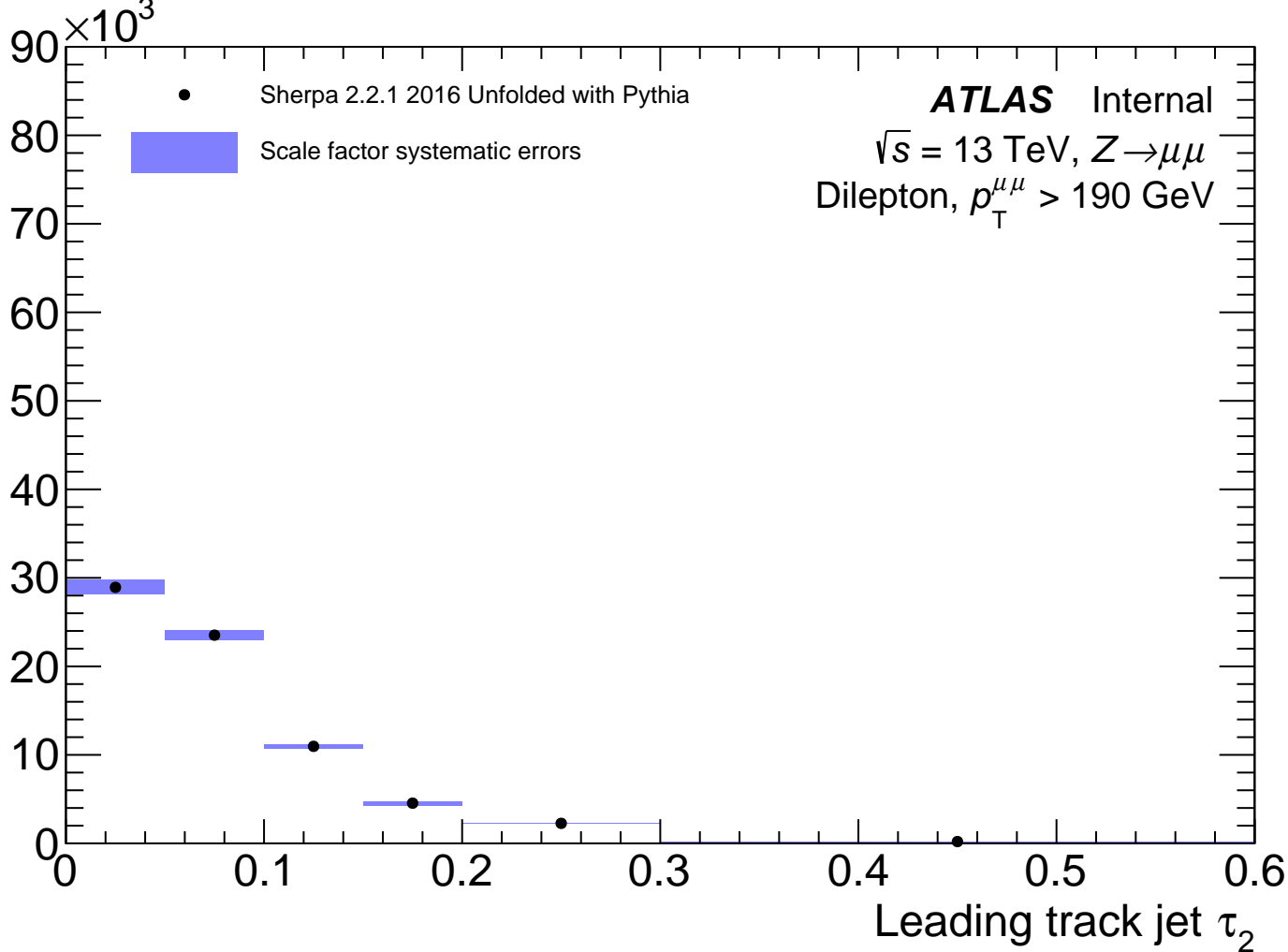


Events

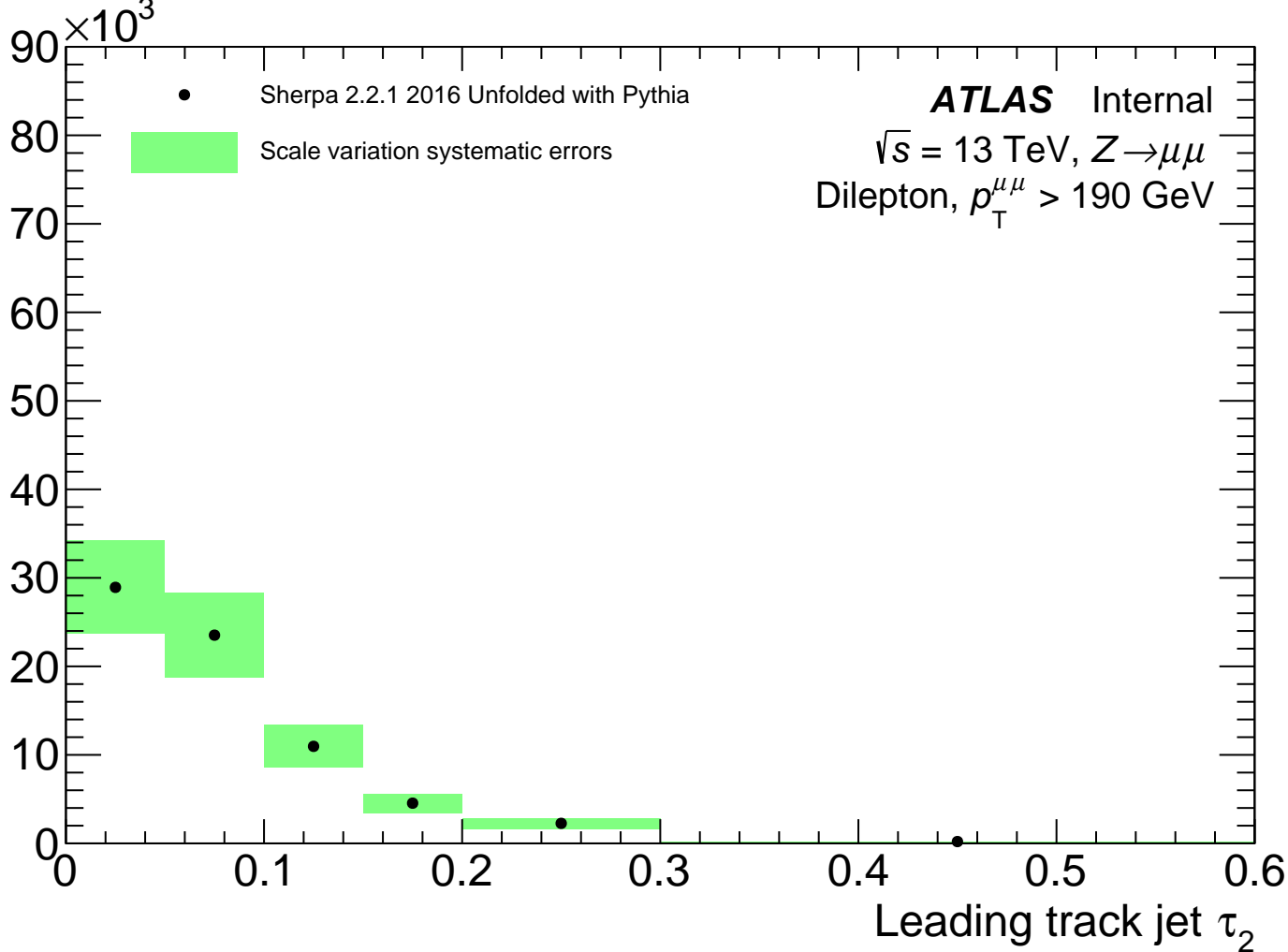
$\times 10^3$



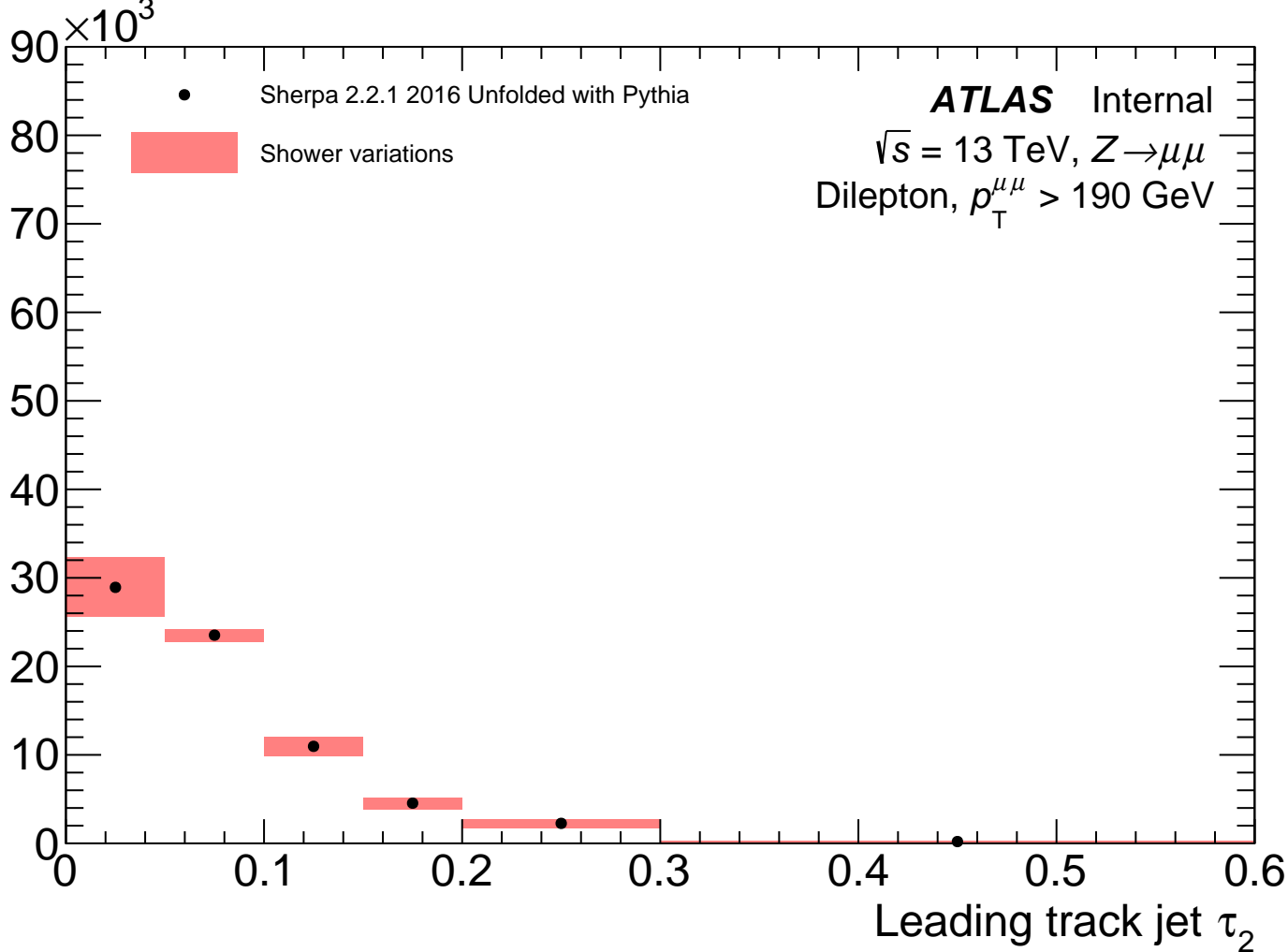
Events



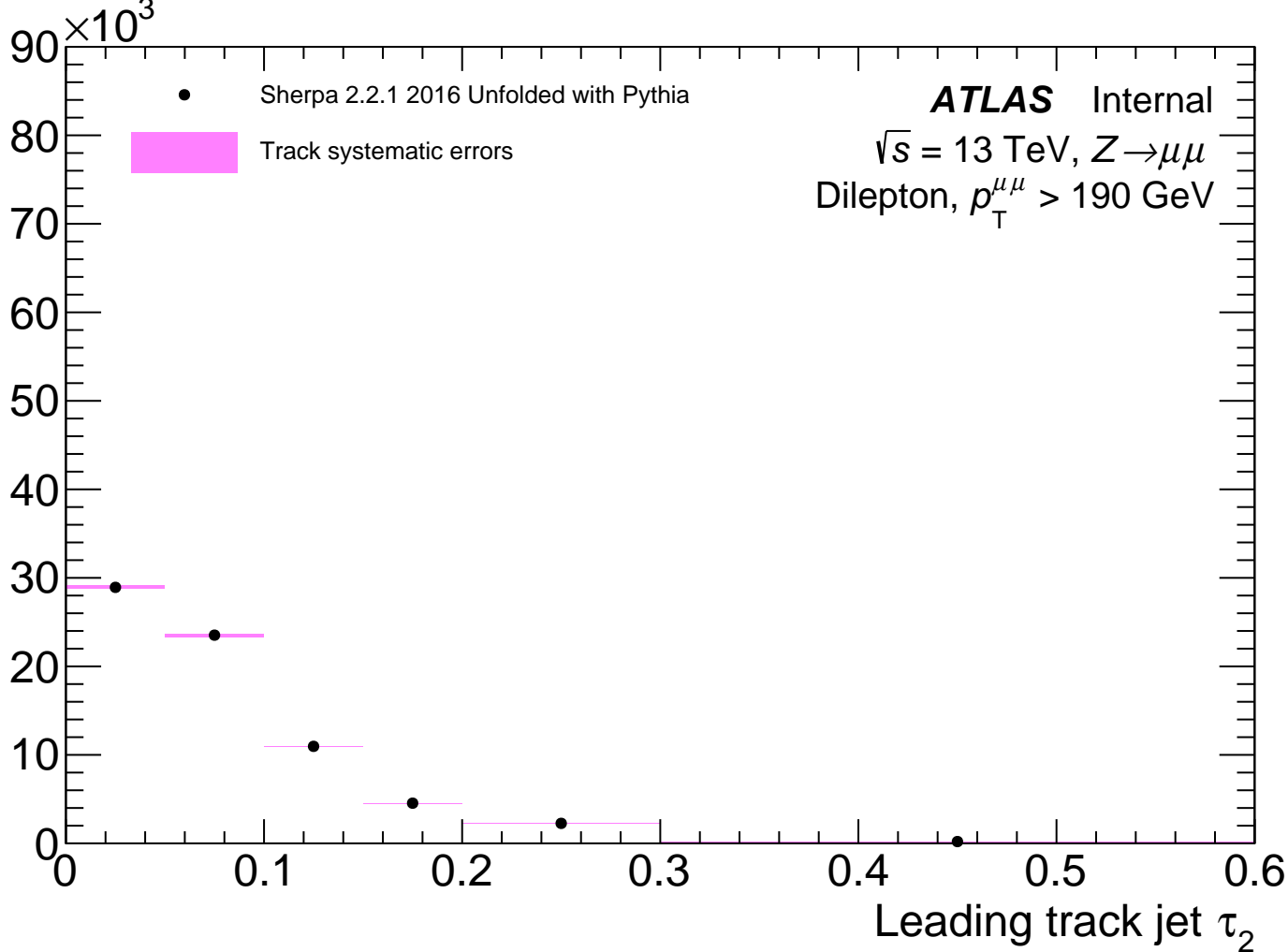
Events



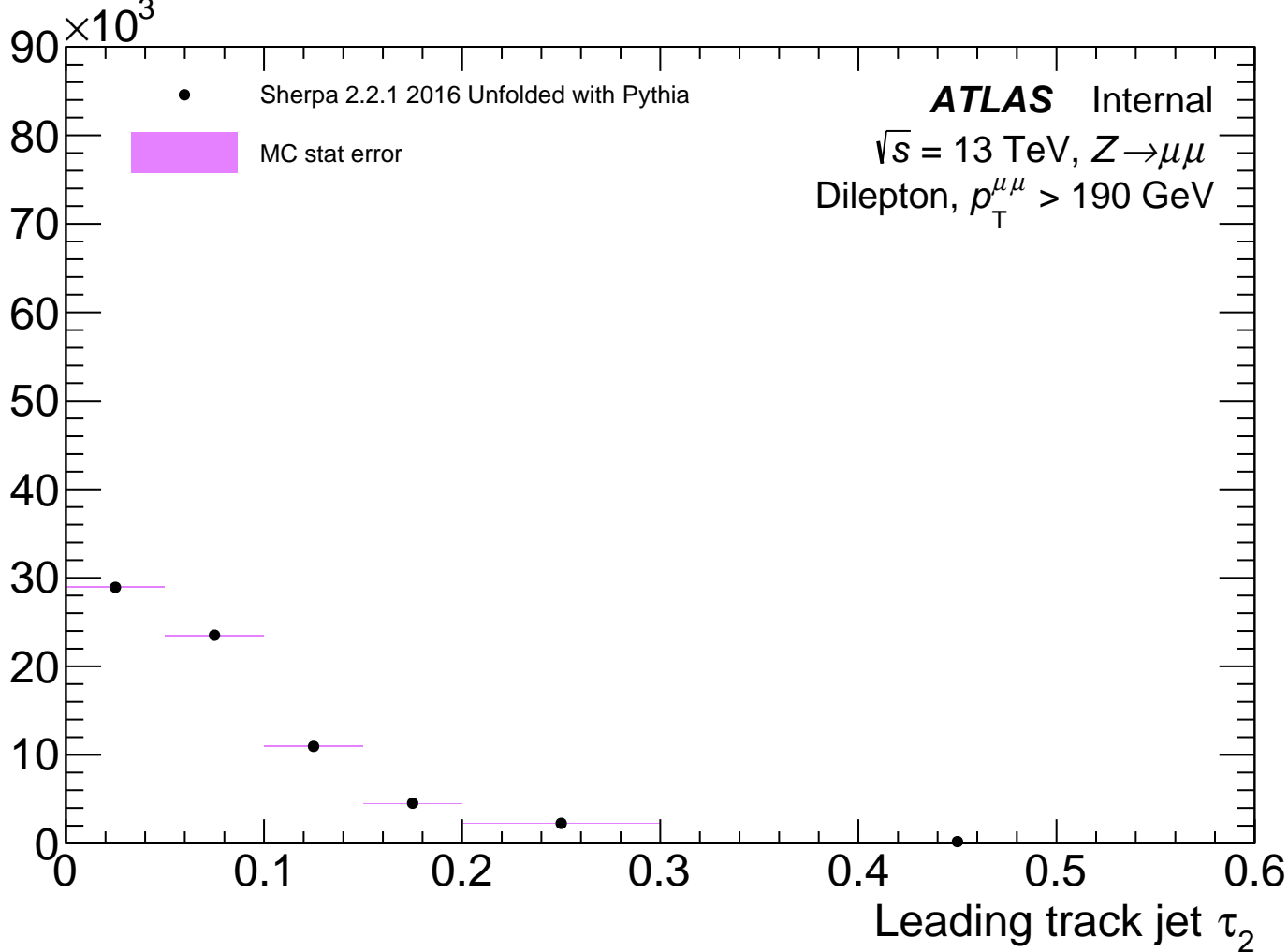
Events



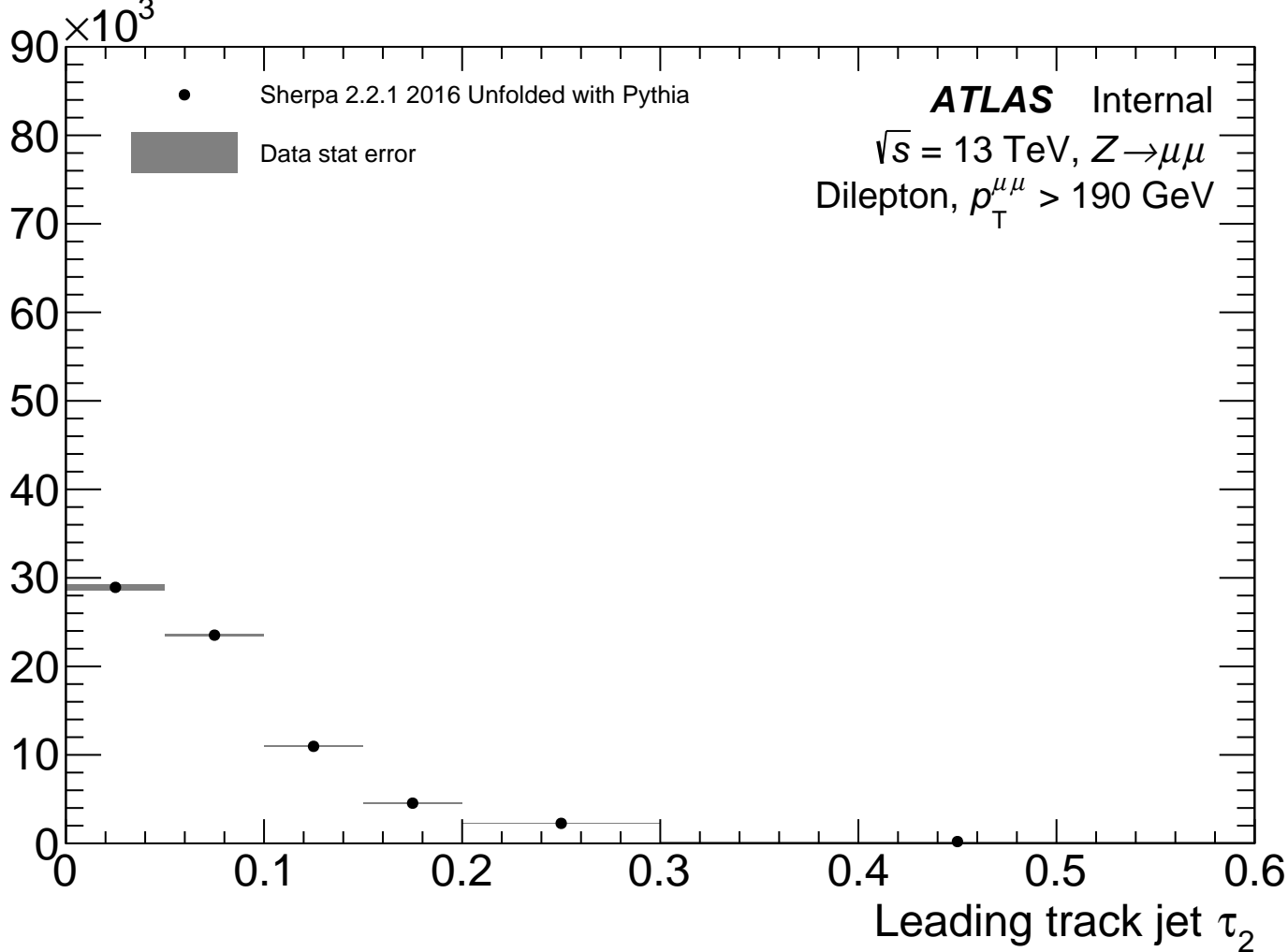
Events



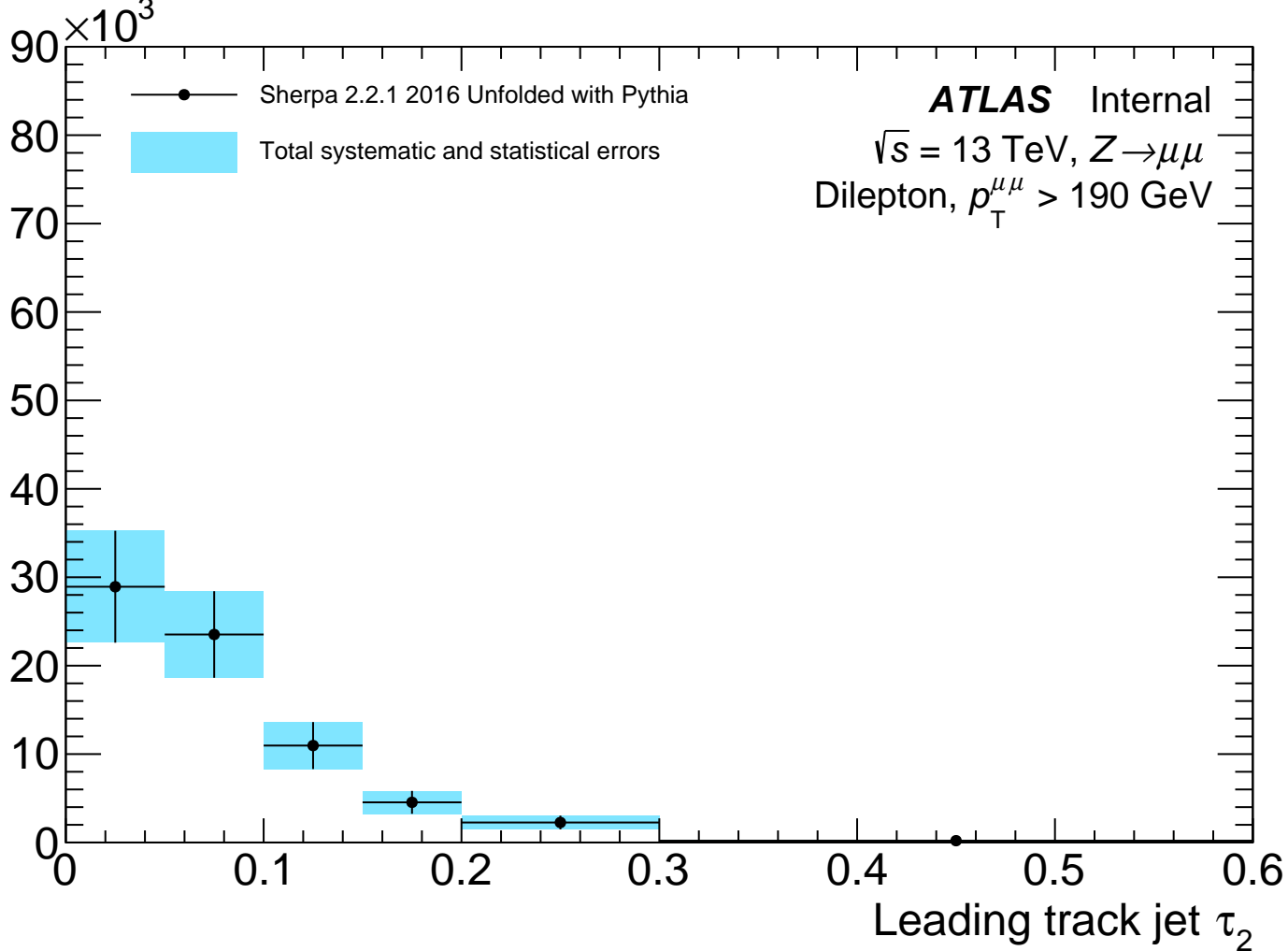
Events



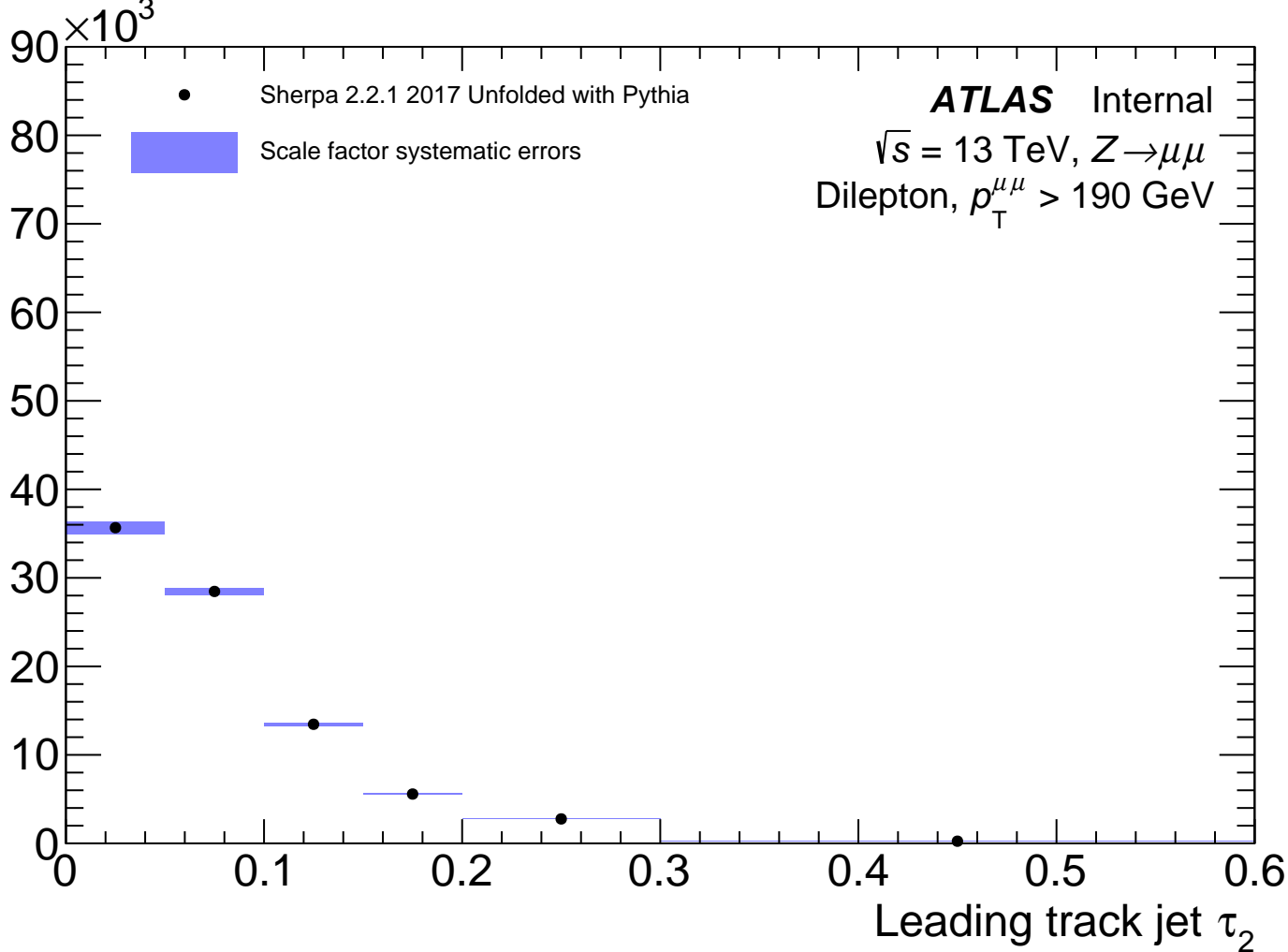
Events



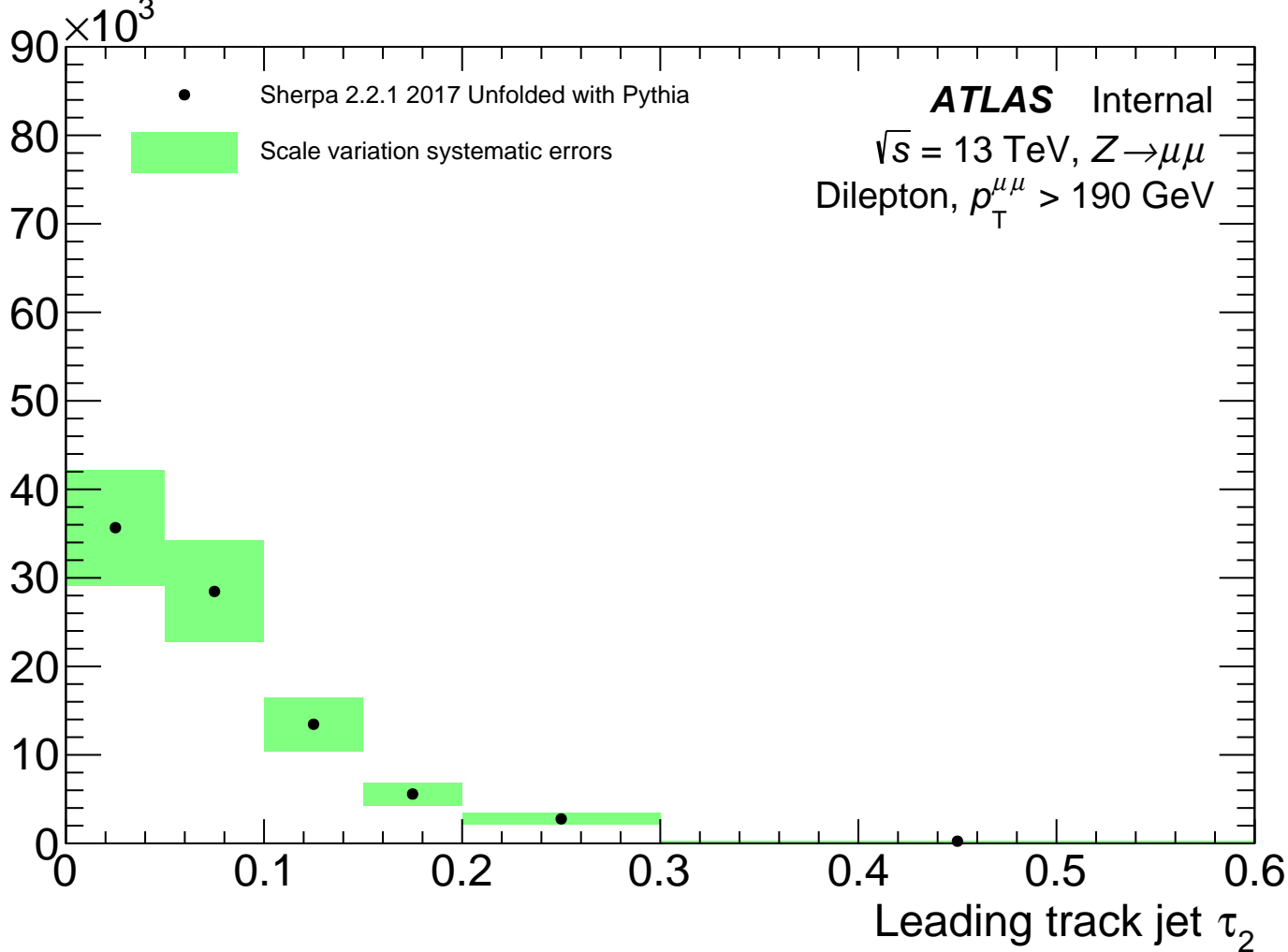
Events



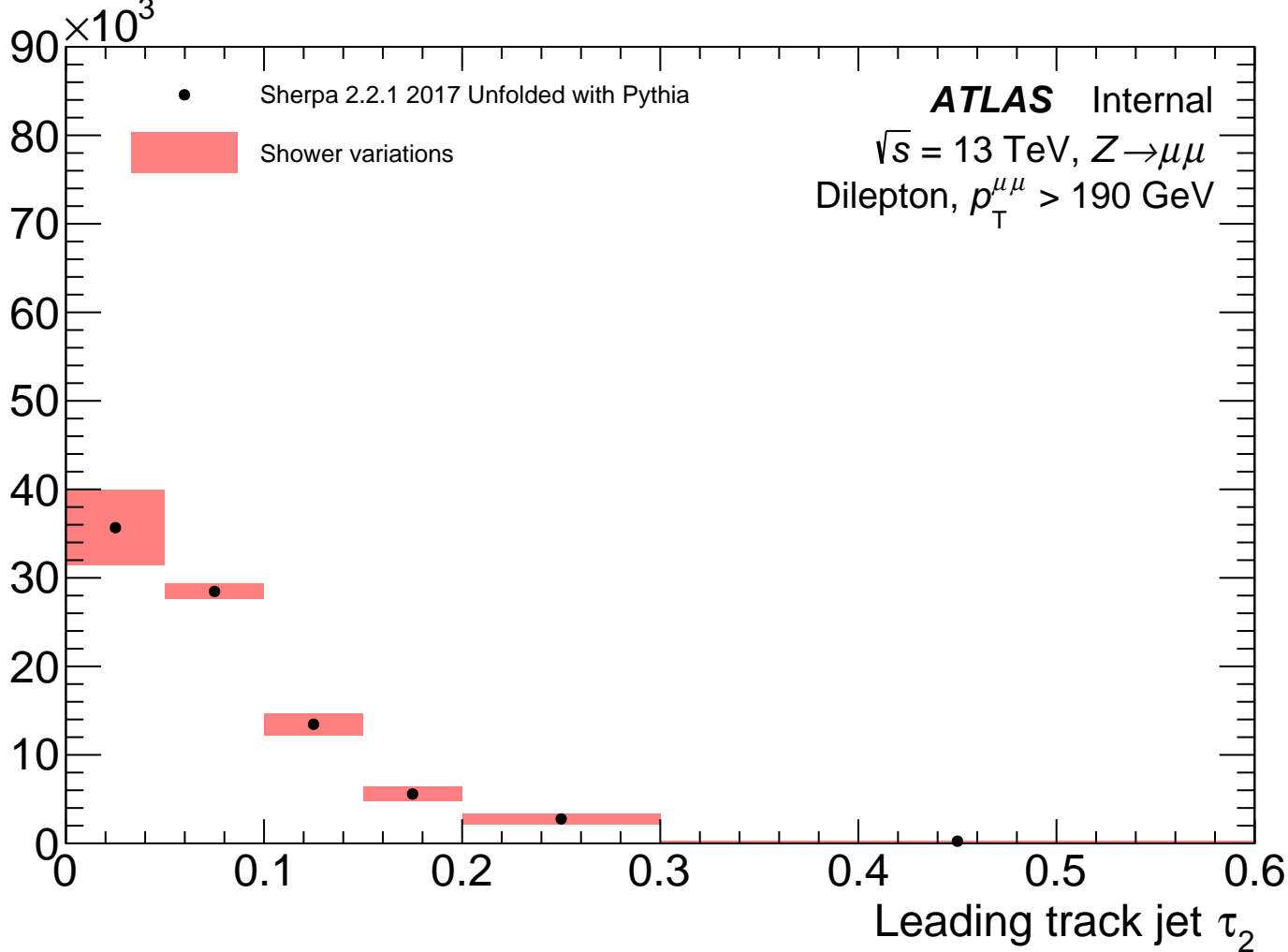
Events



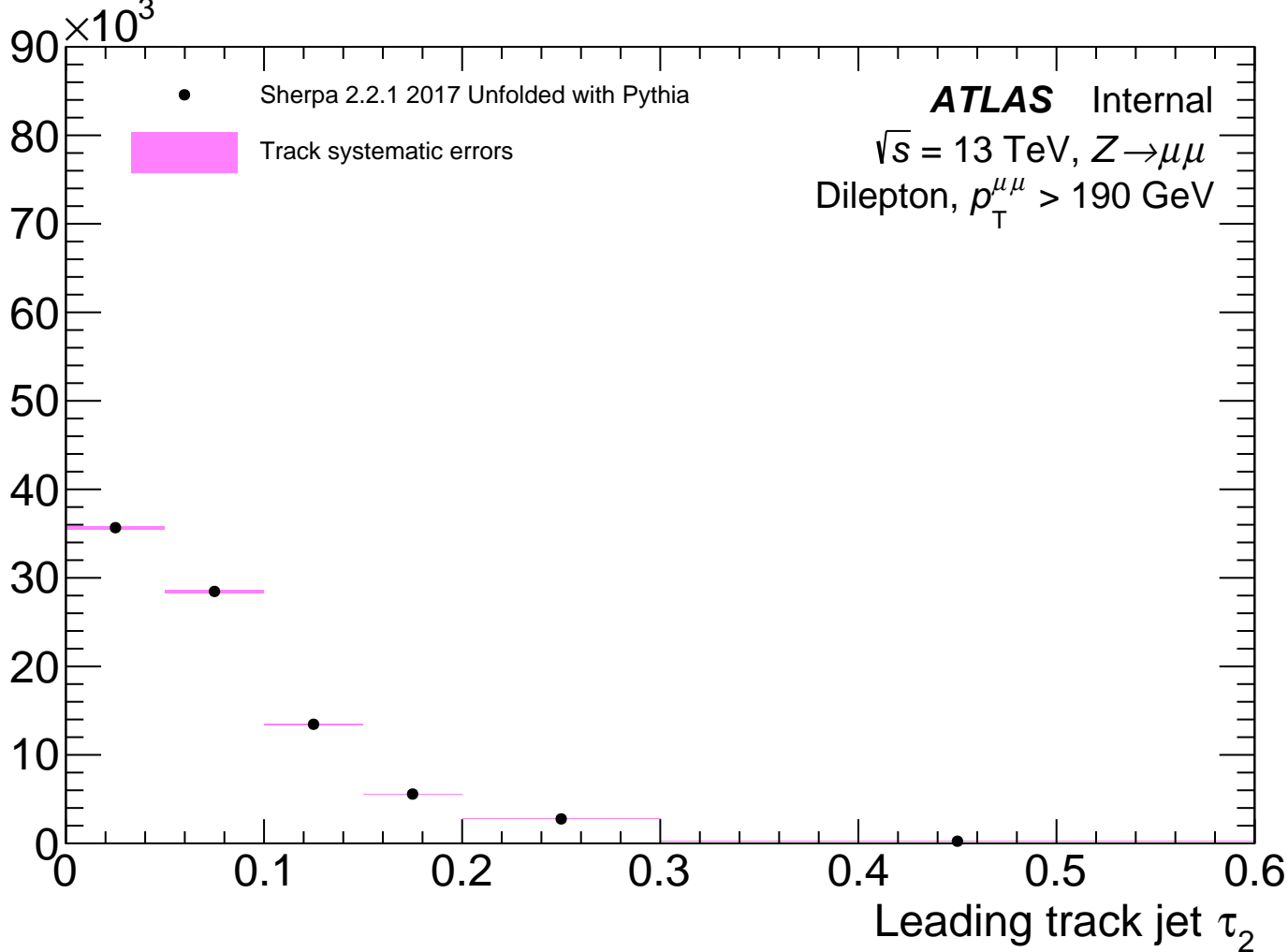
Events



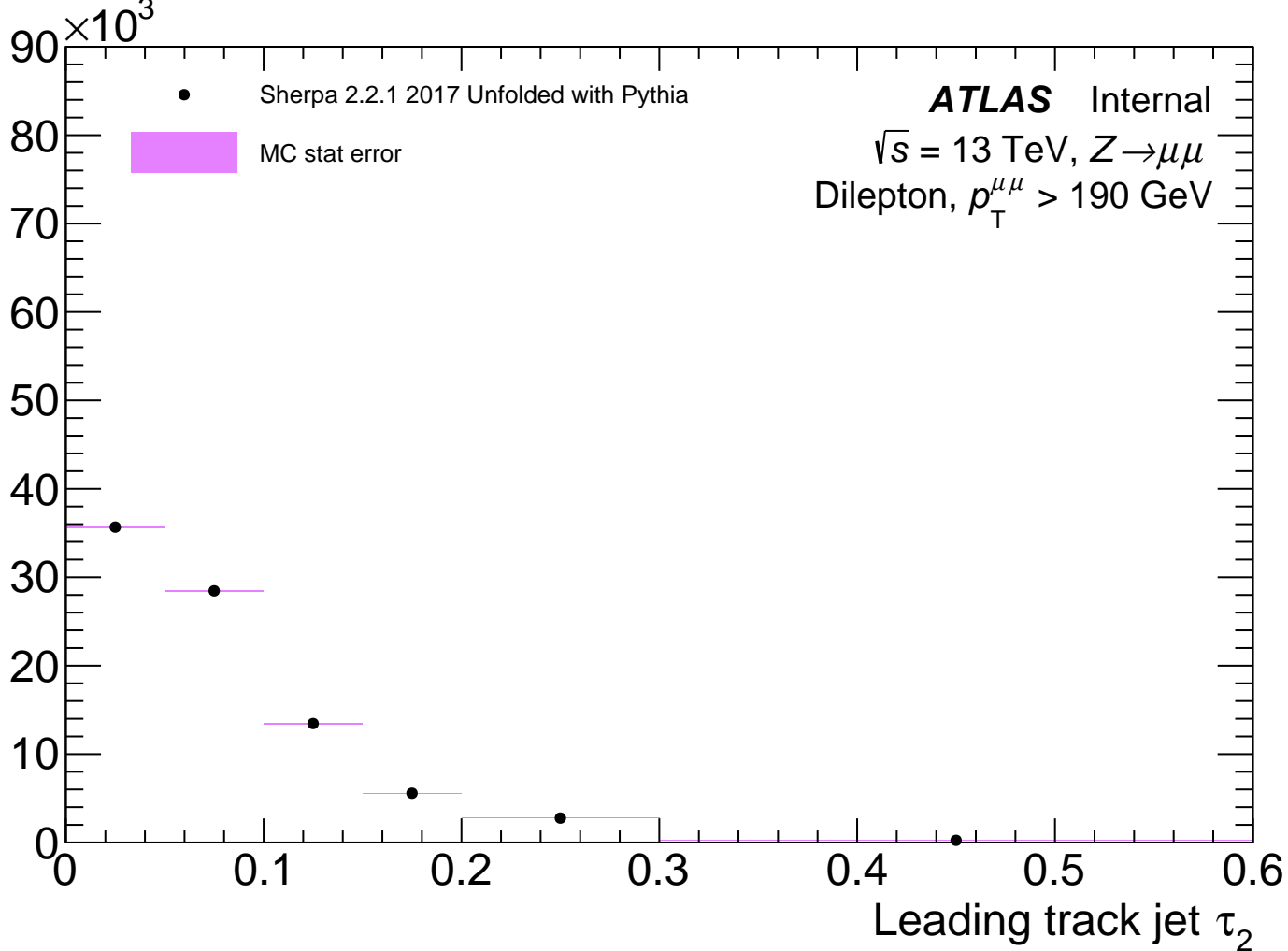
Events



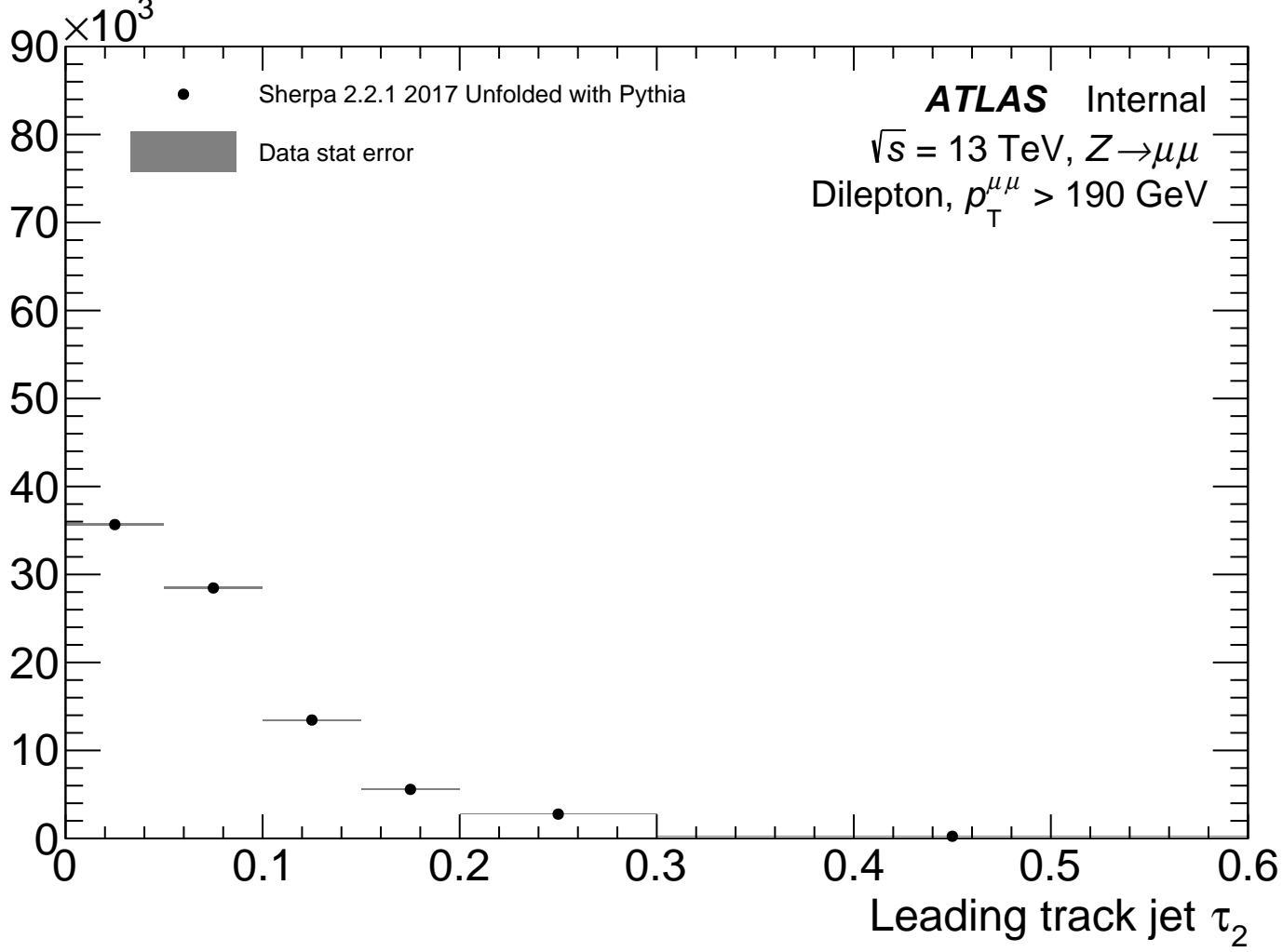
Events



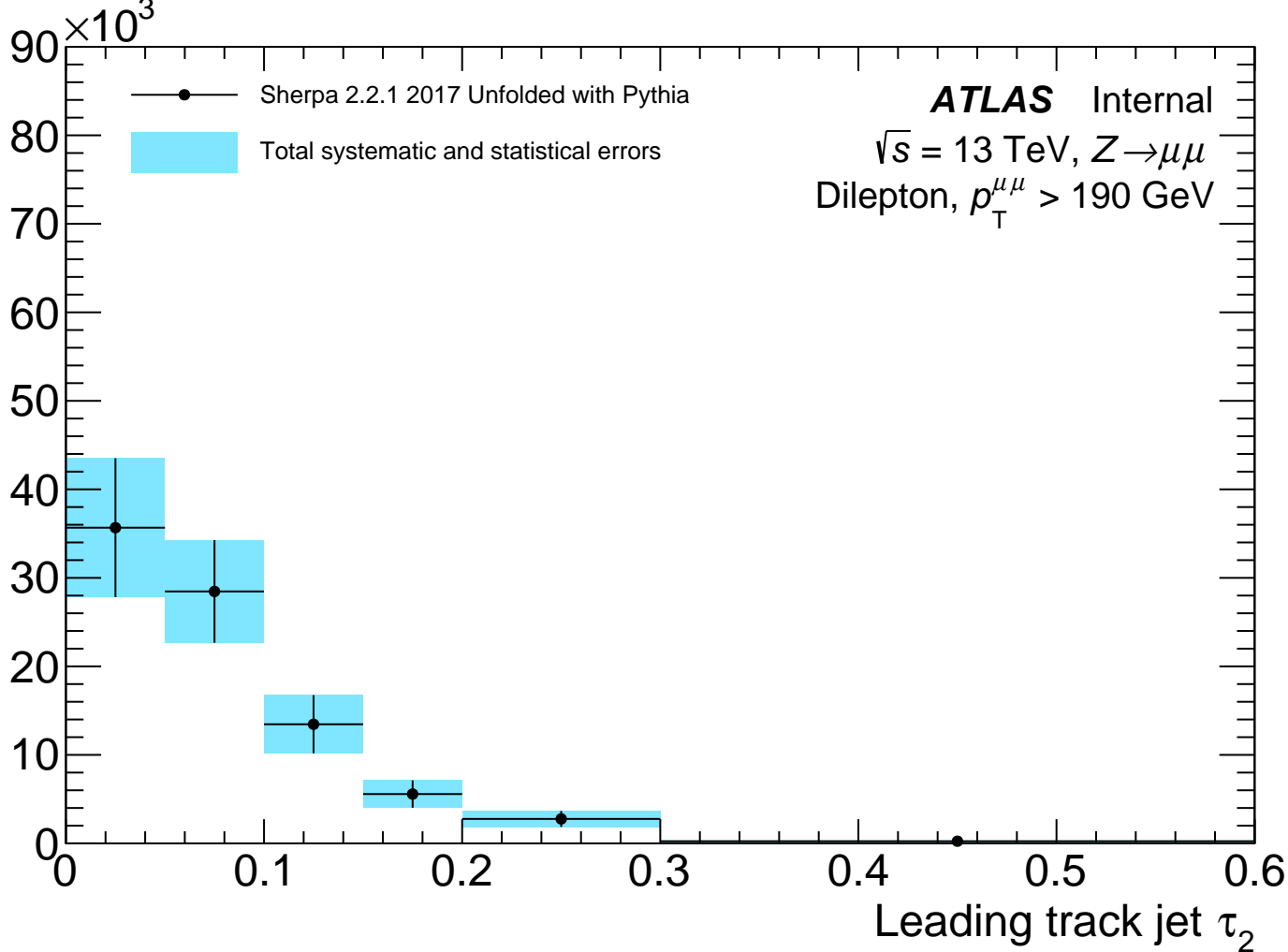
Events



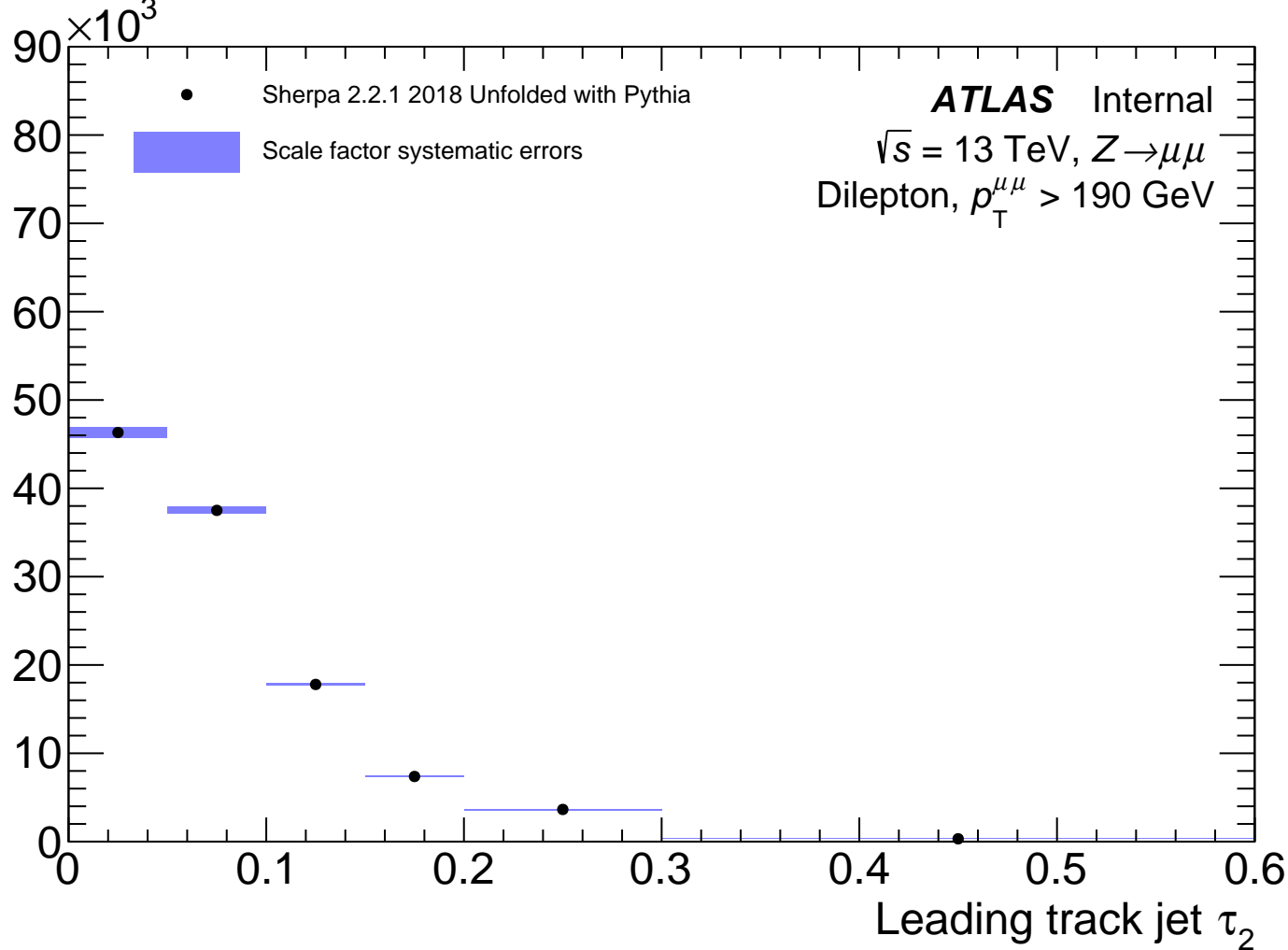
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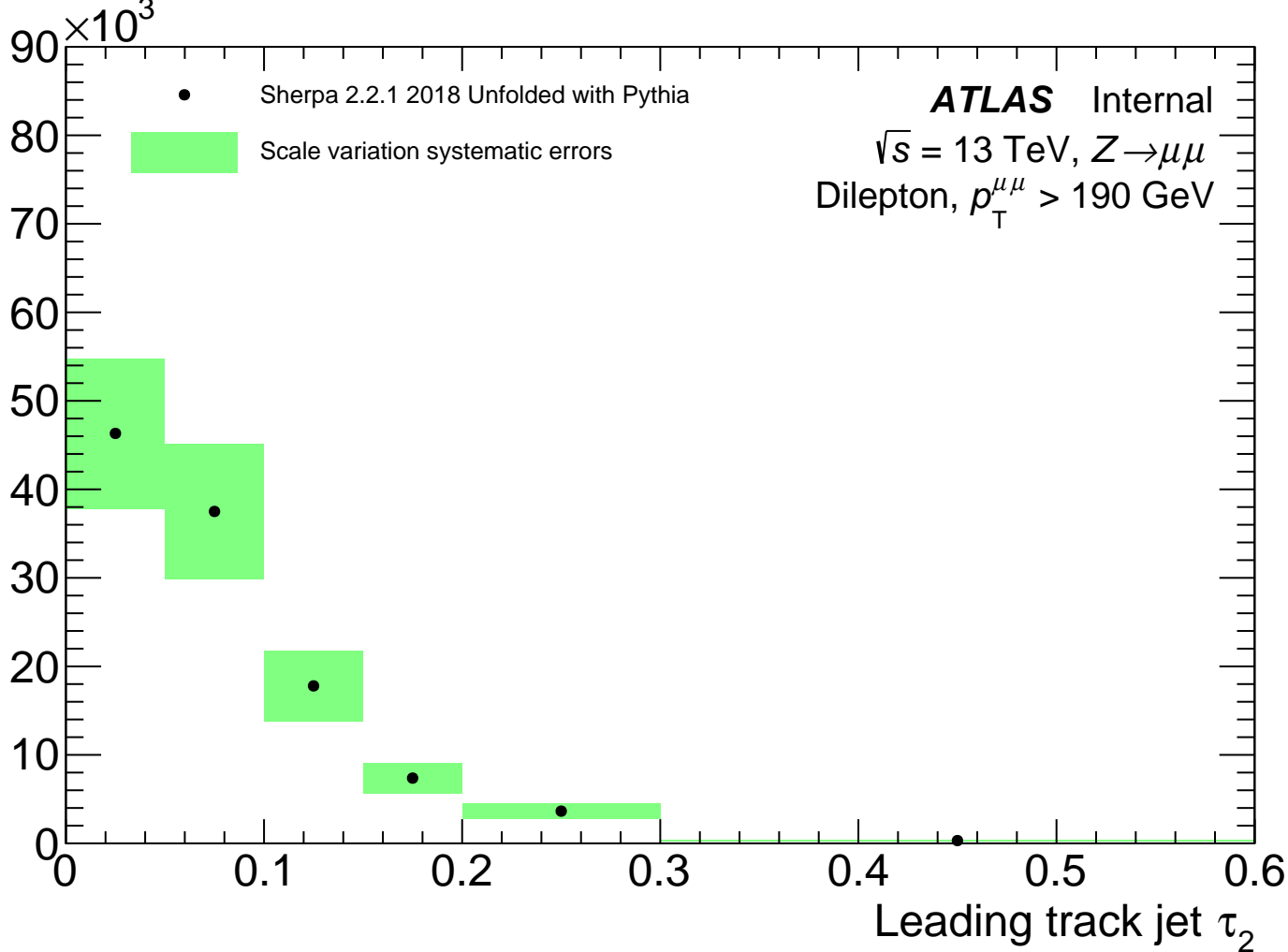
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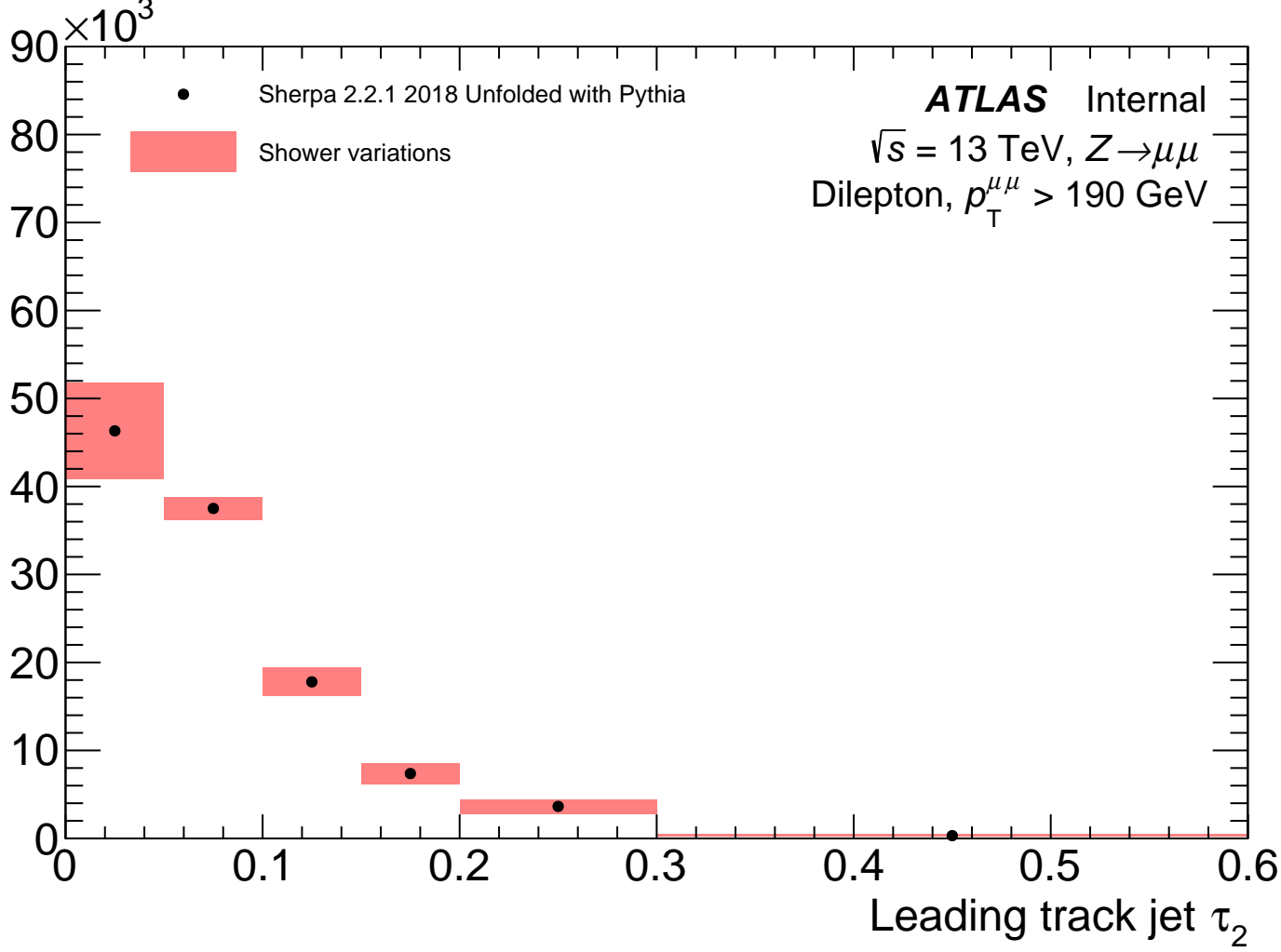
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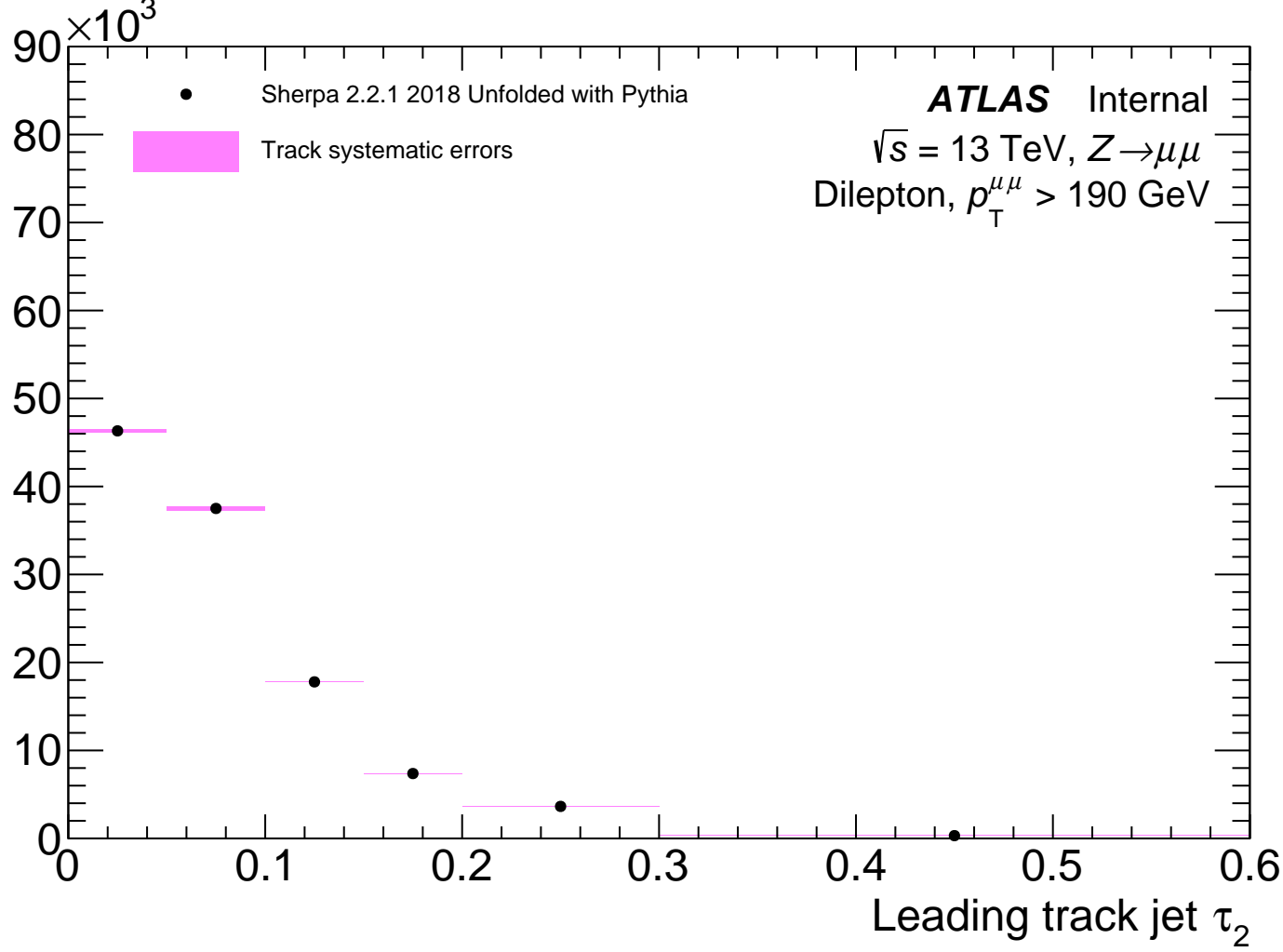
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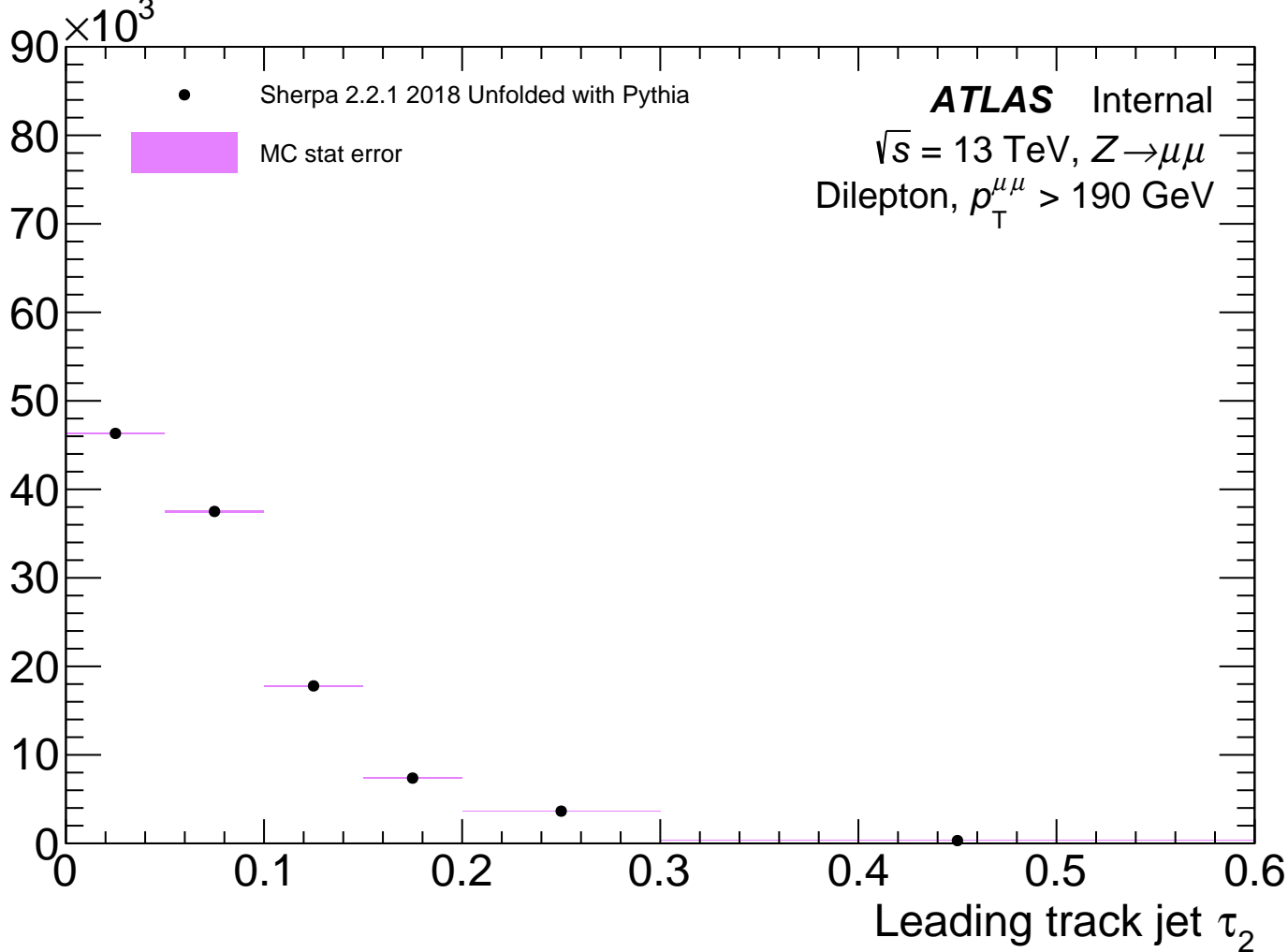
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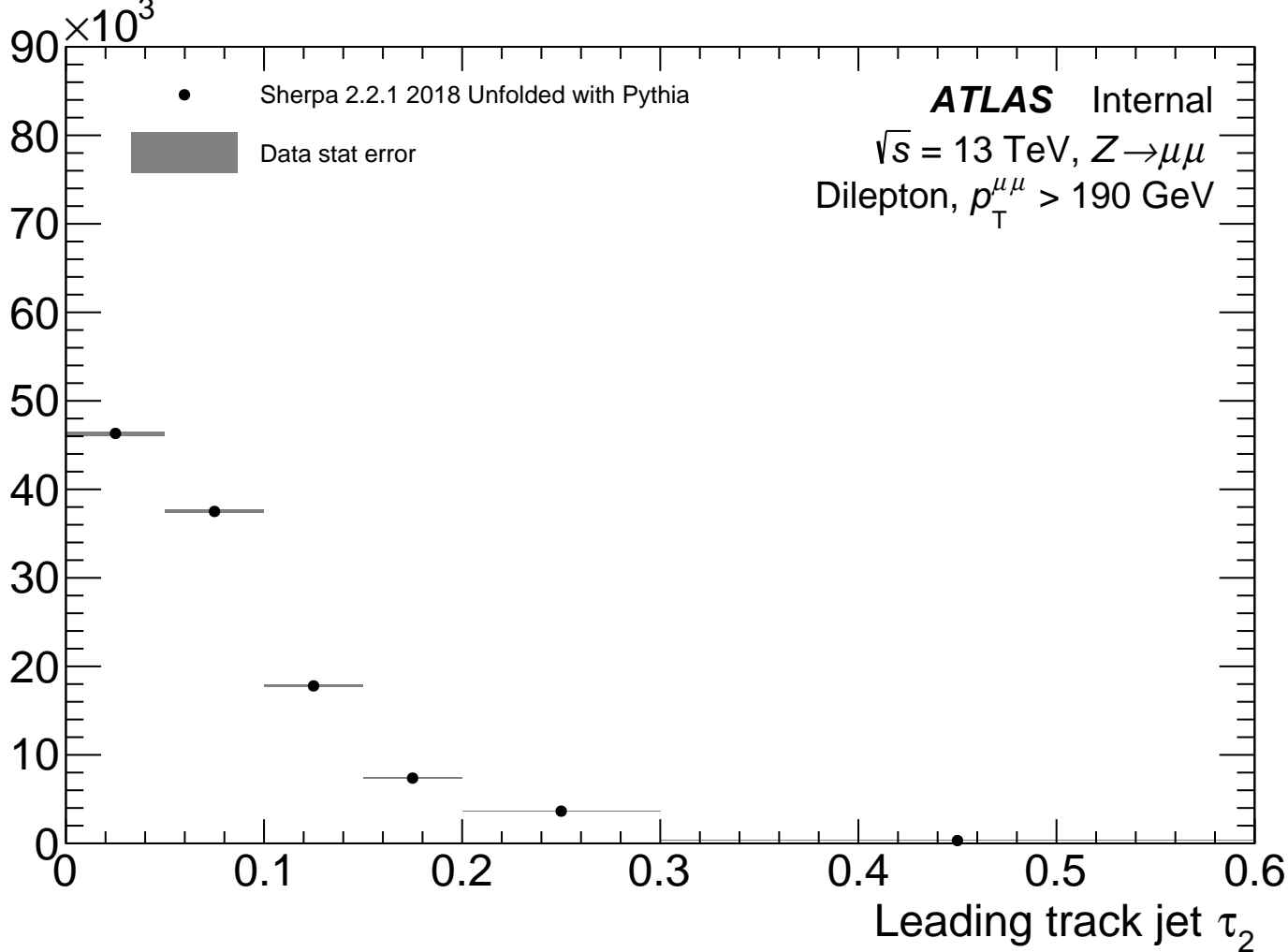
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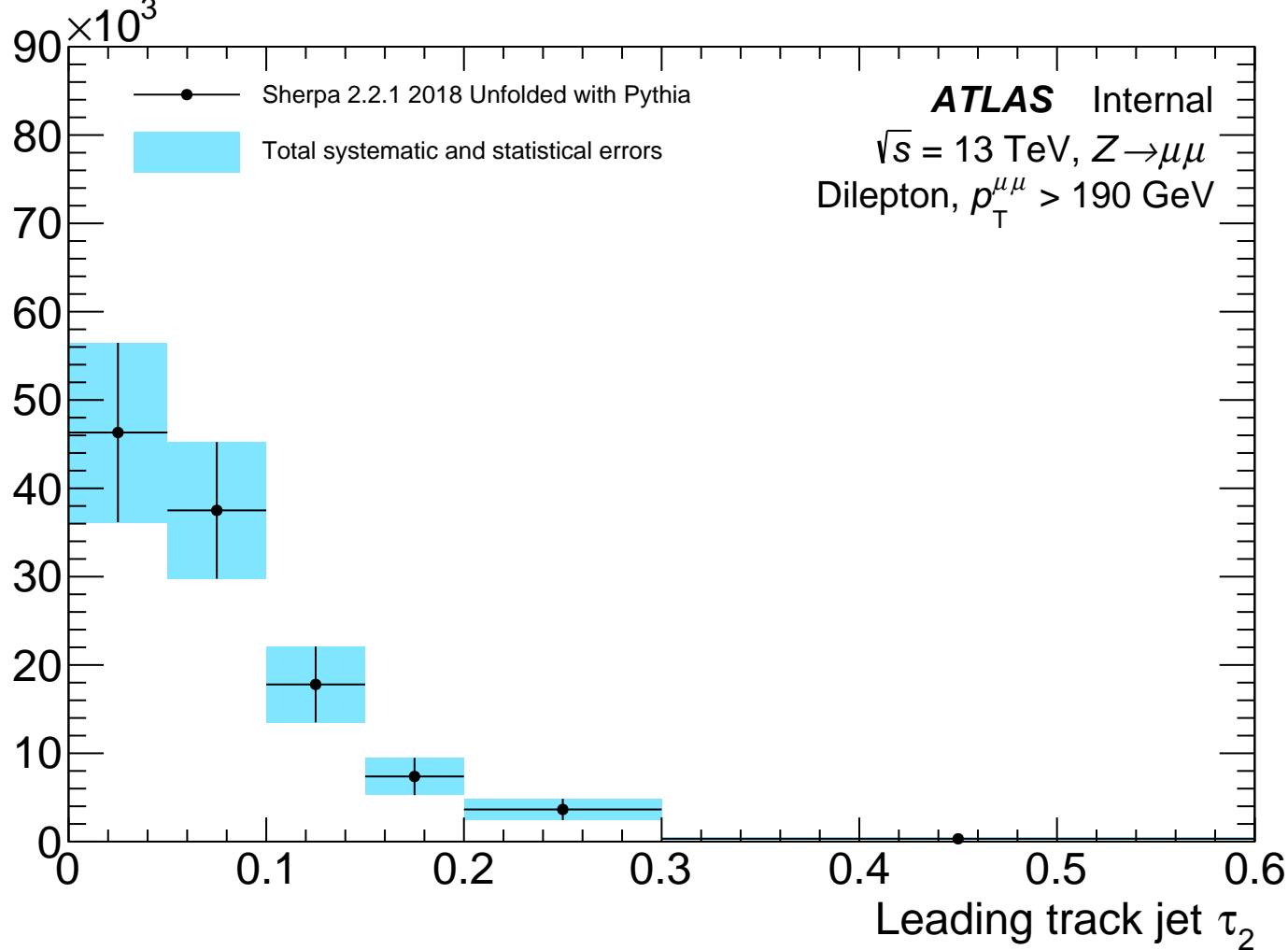
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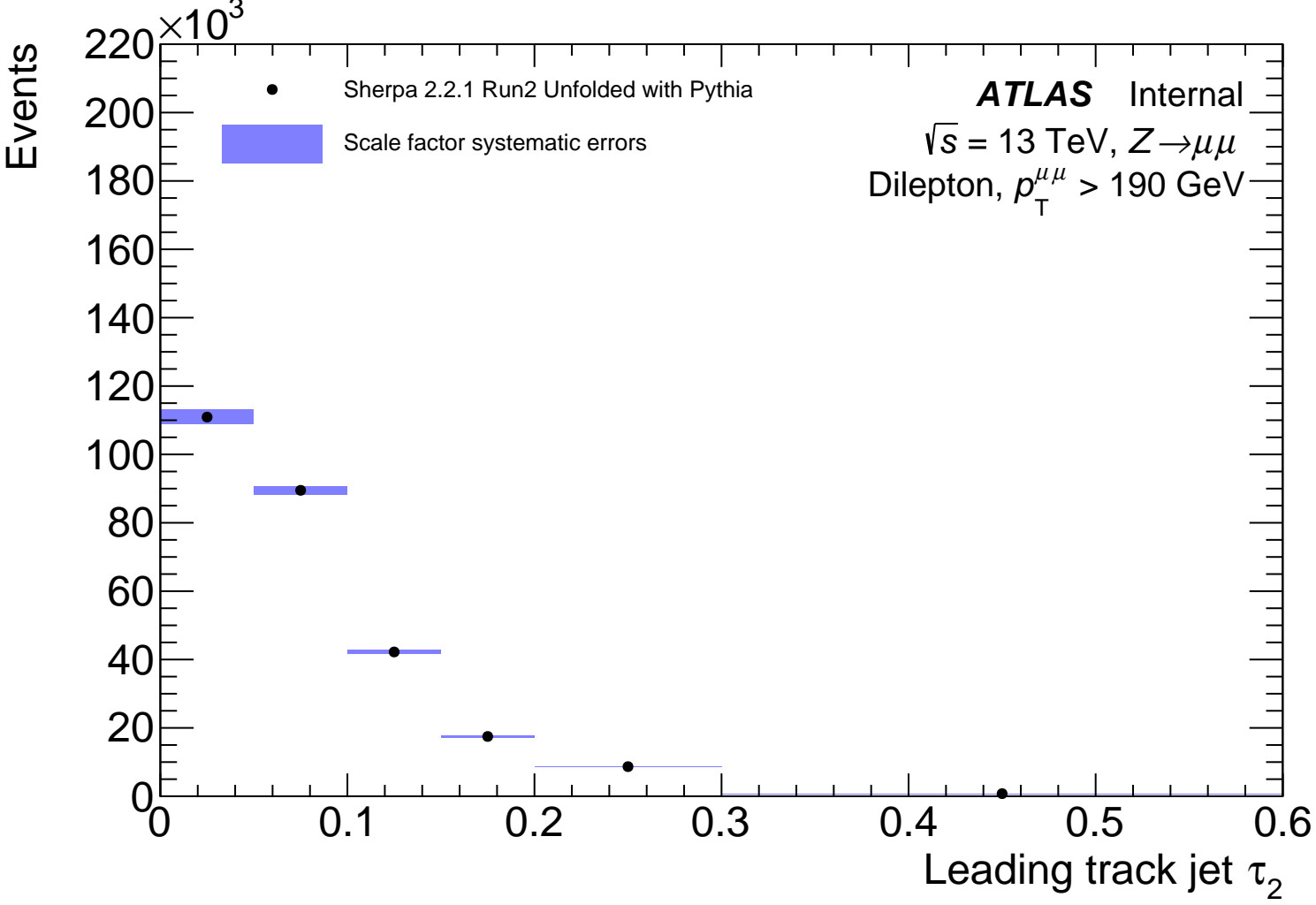


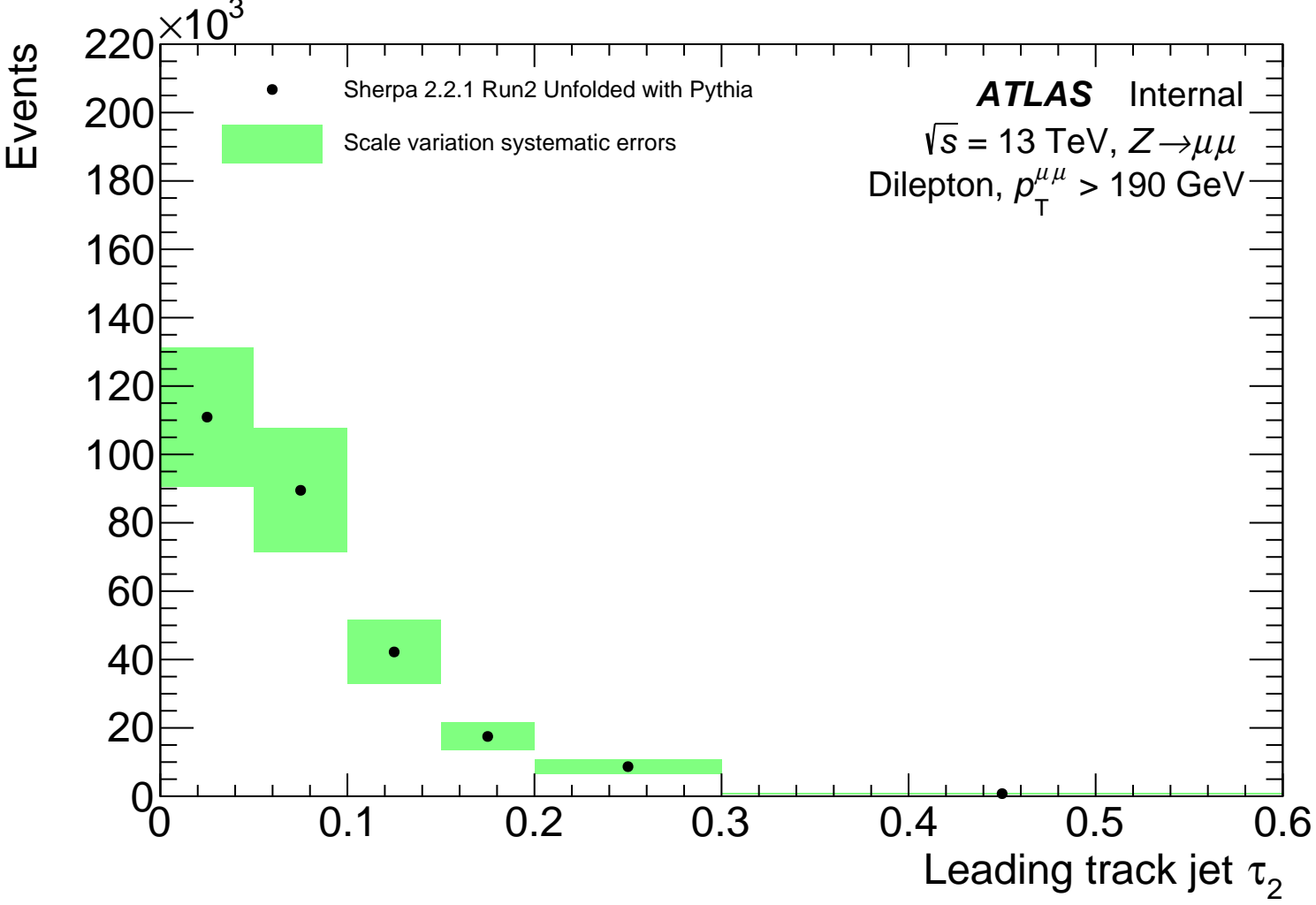
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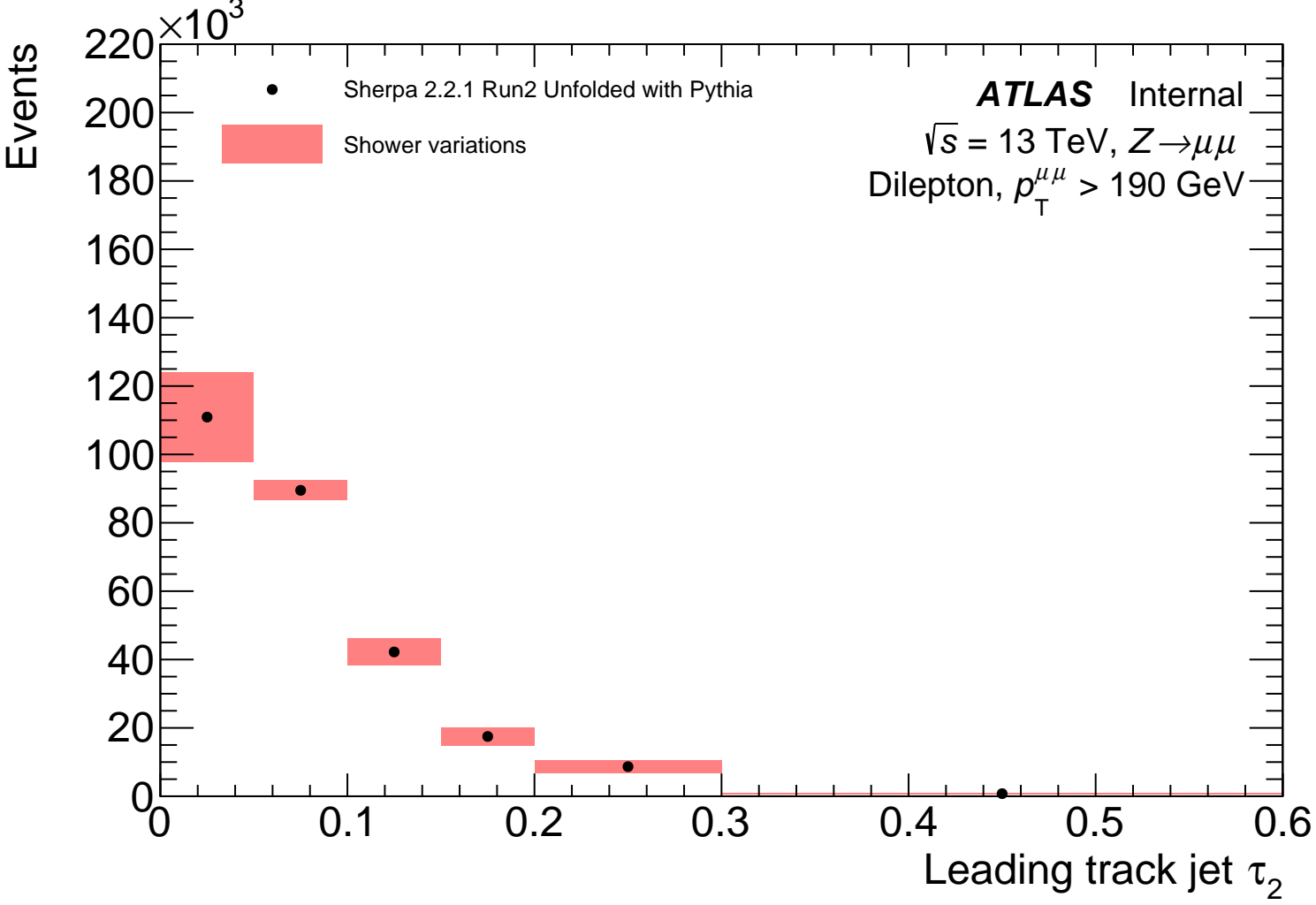


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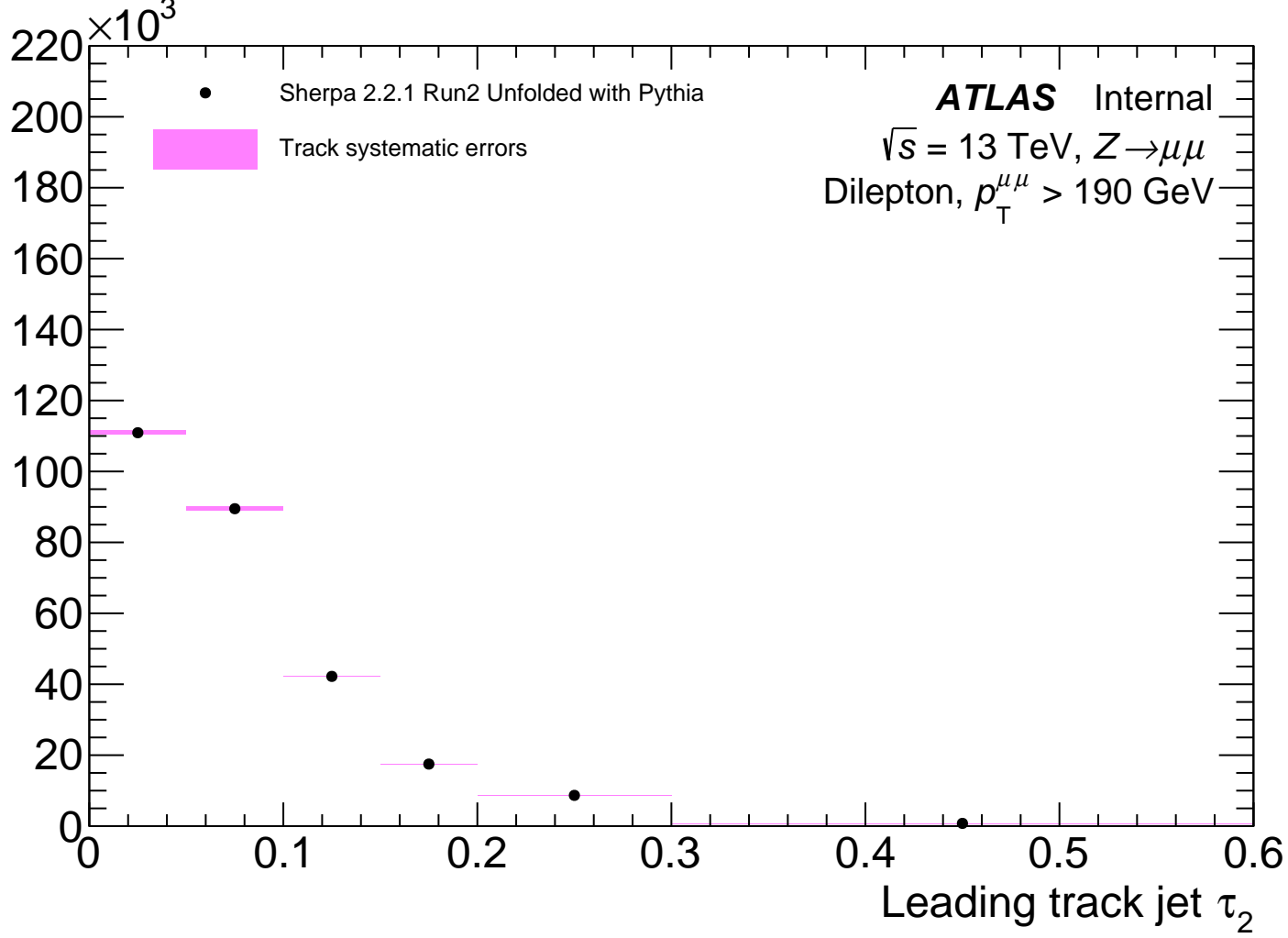




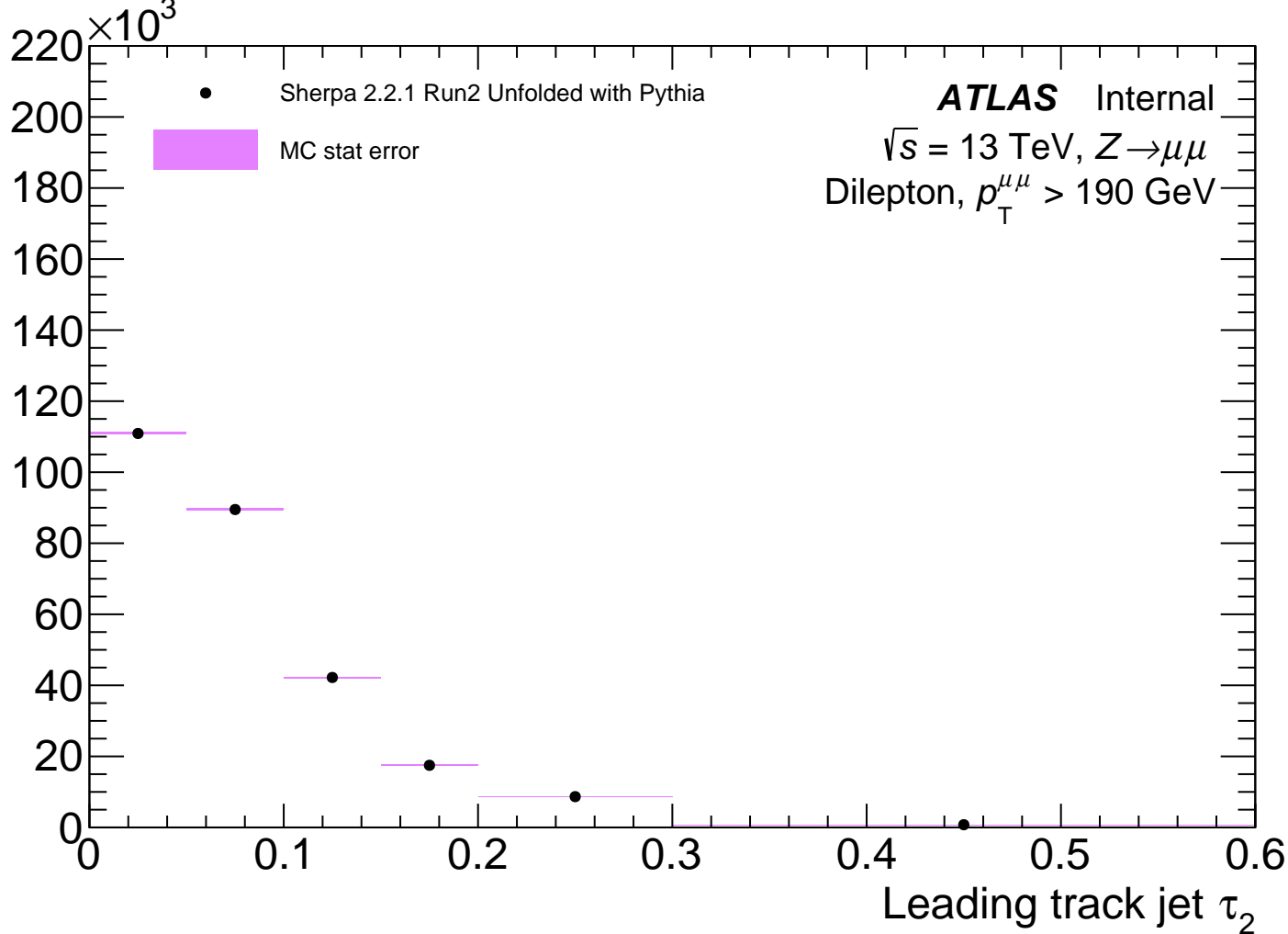


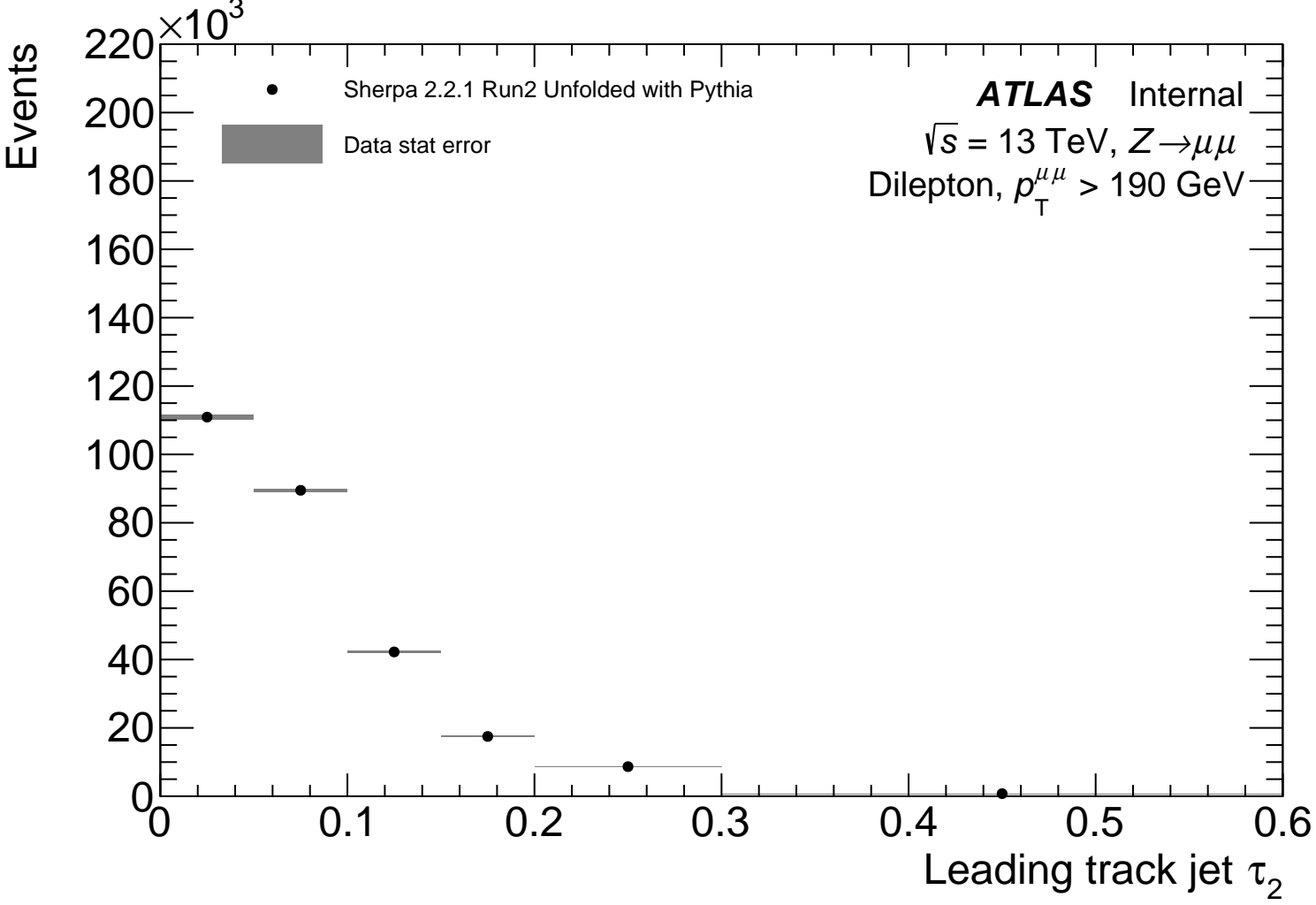


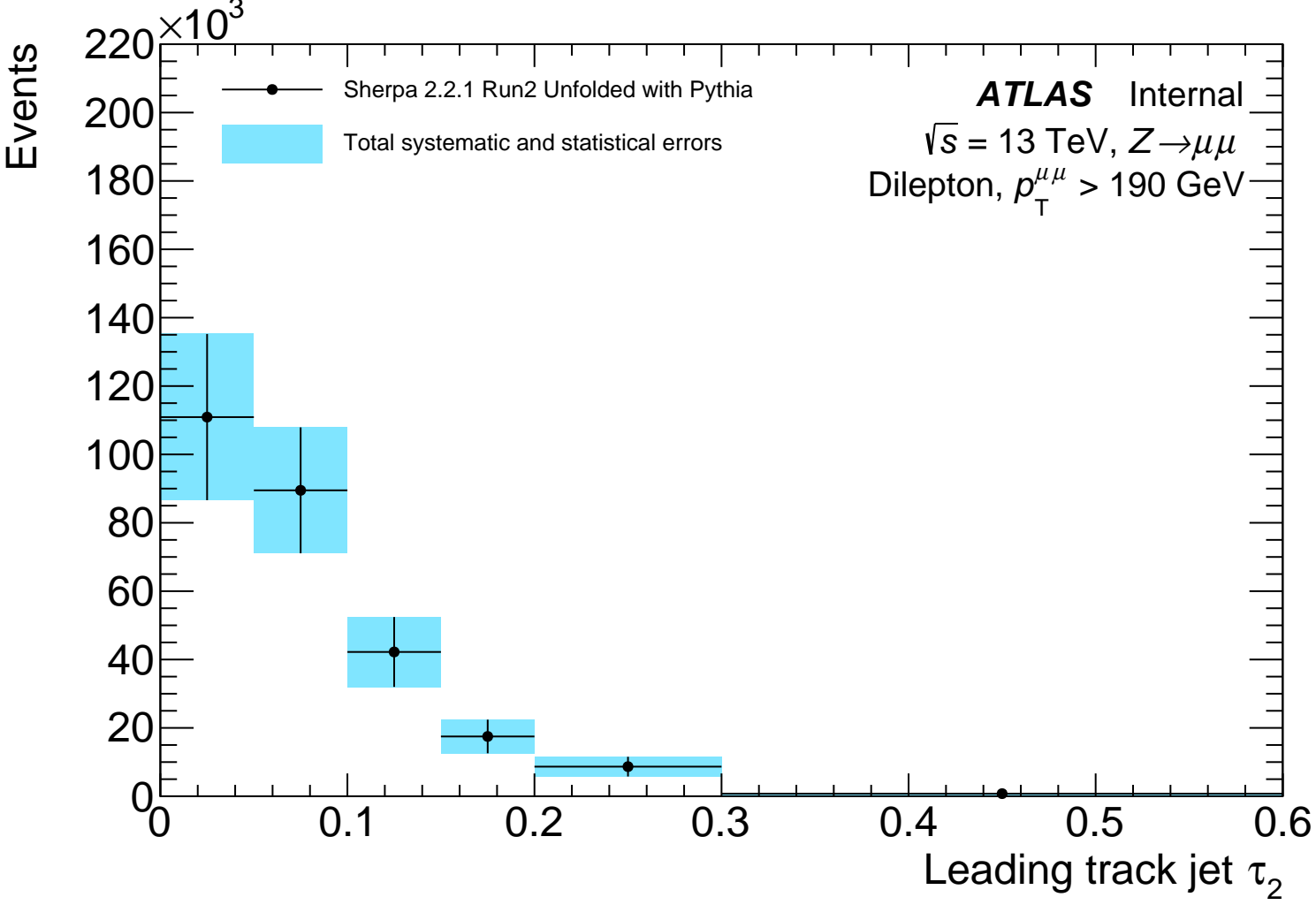
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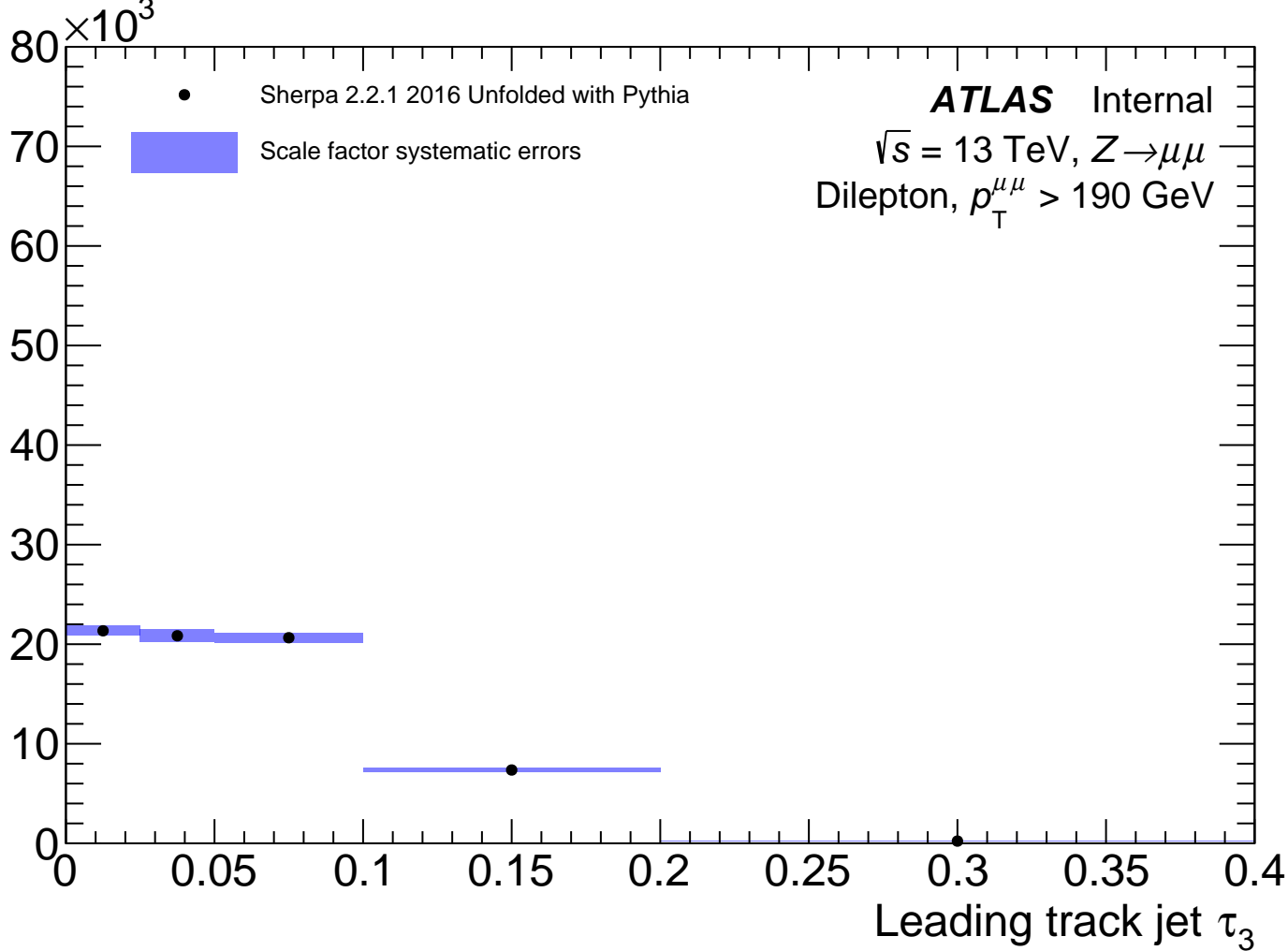
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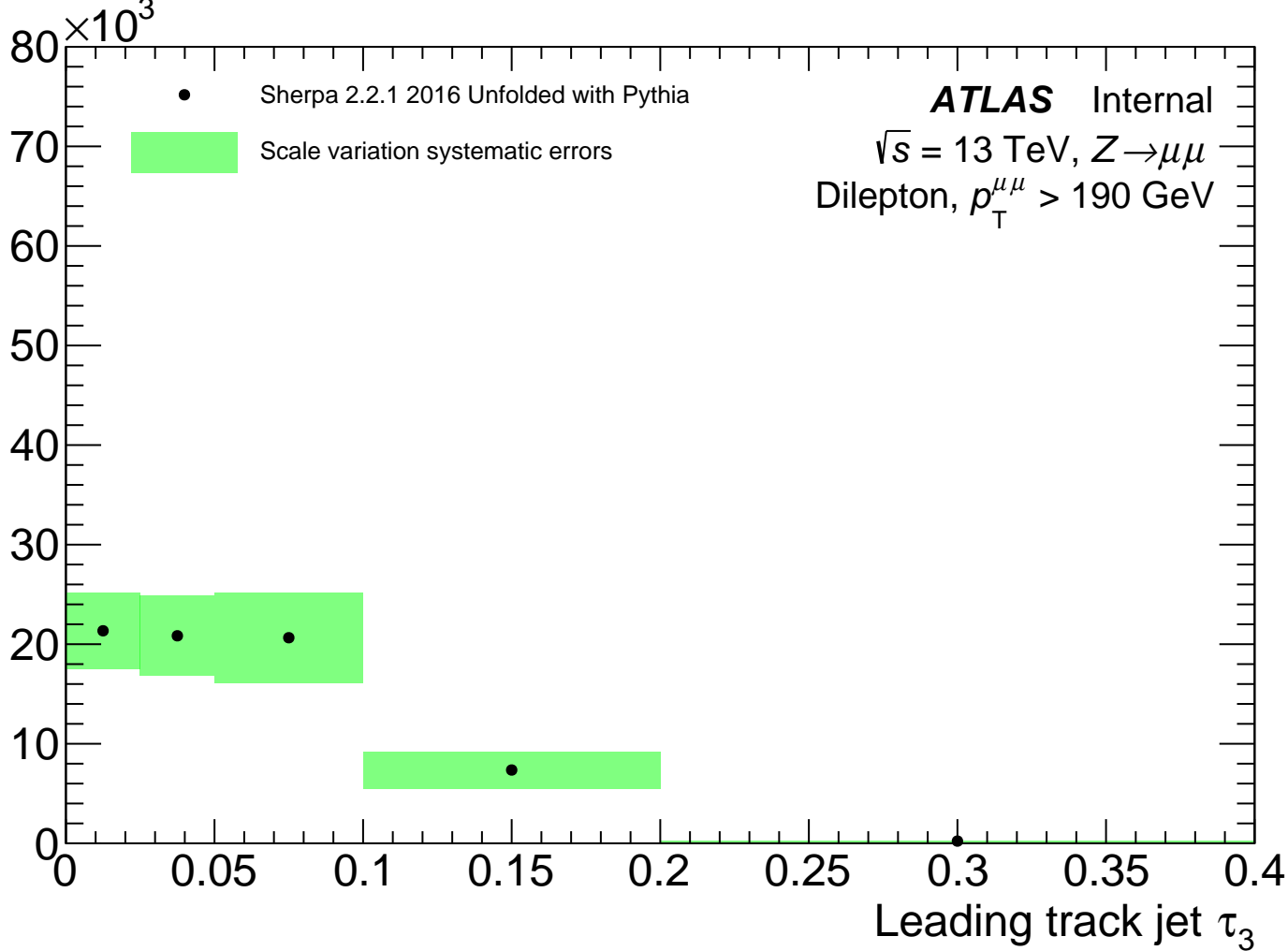




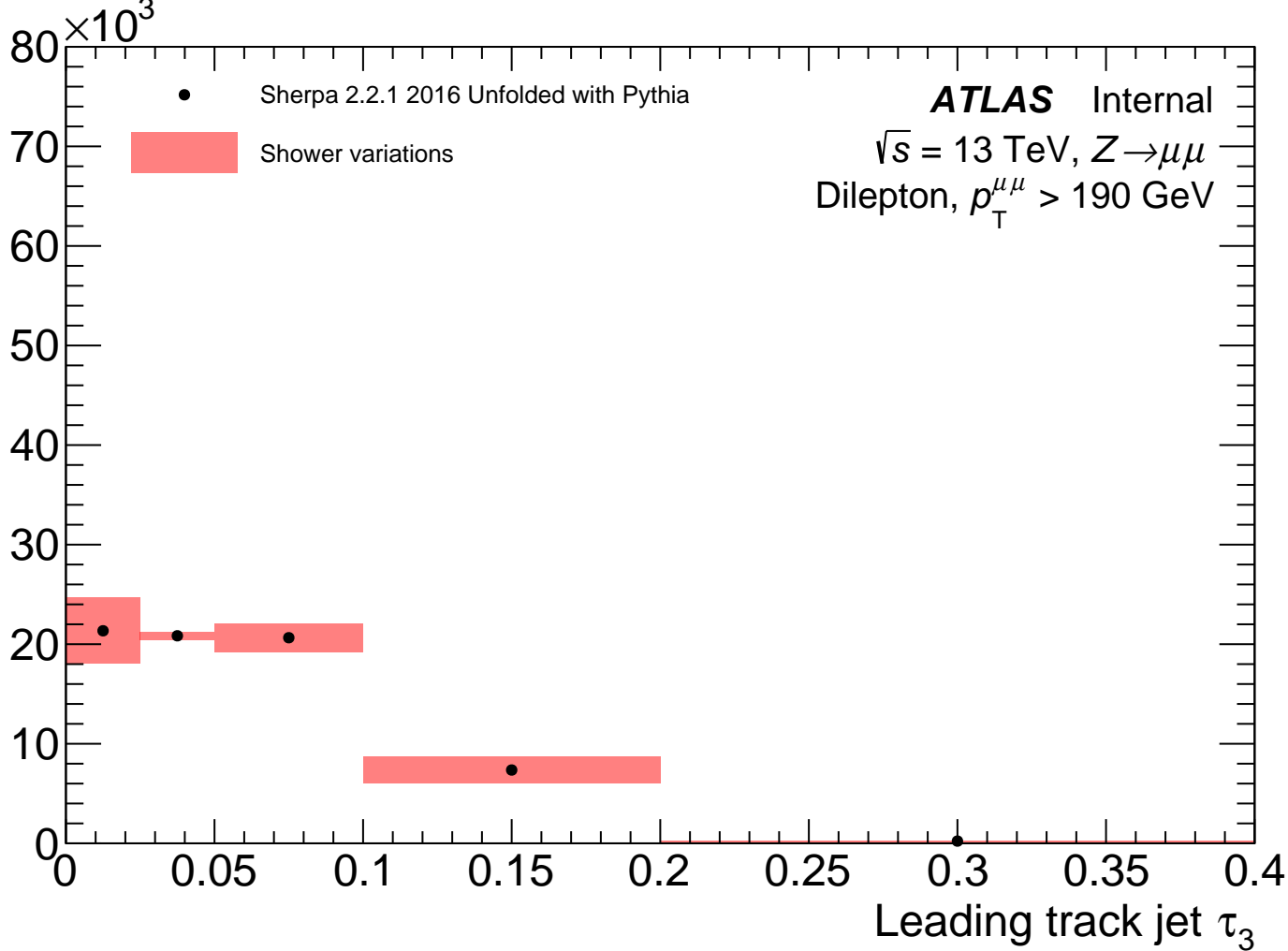
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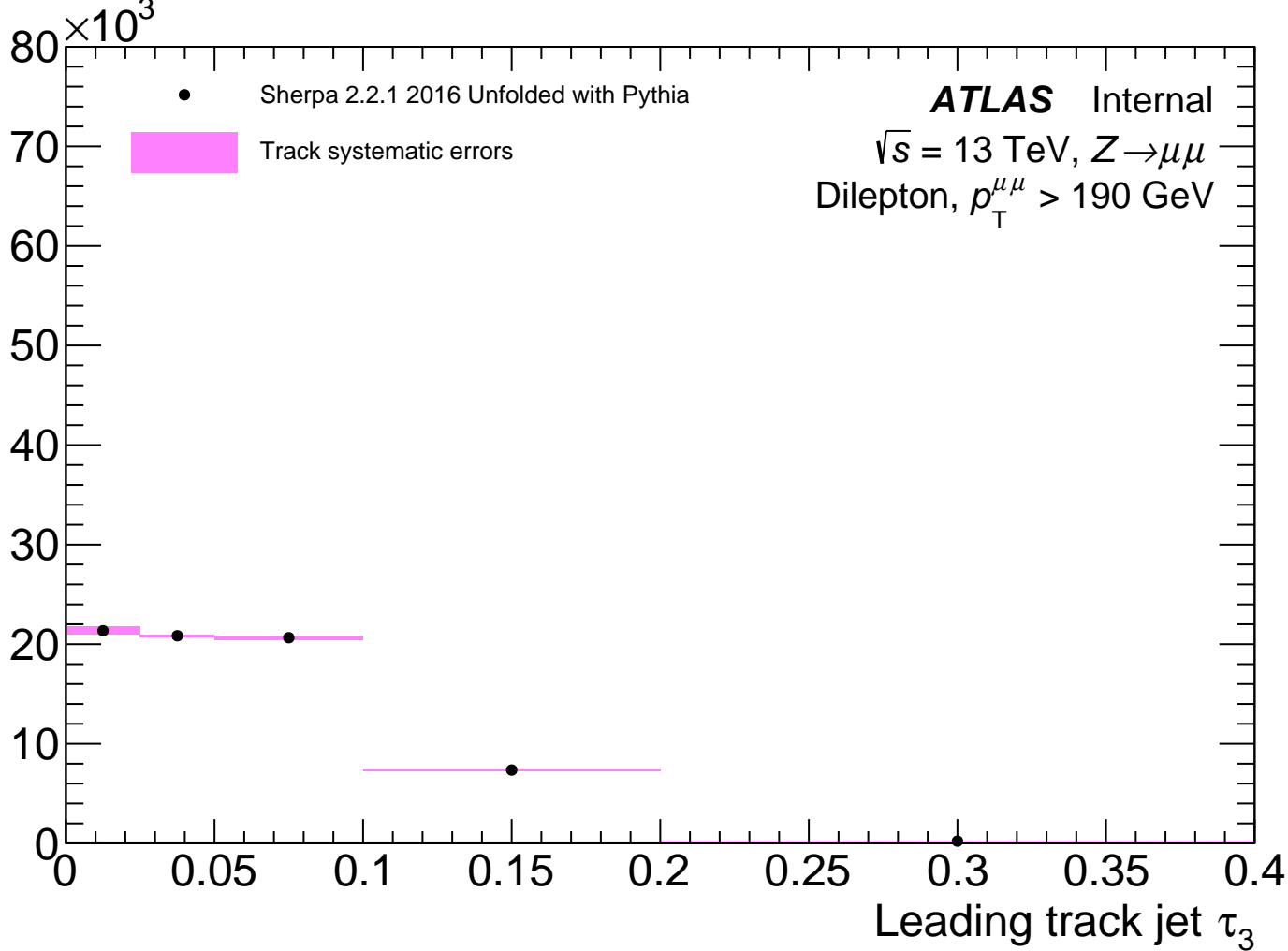
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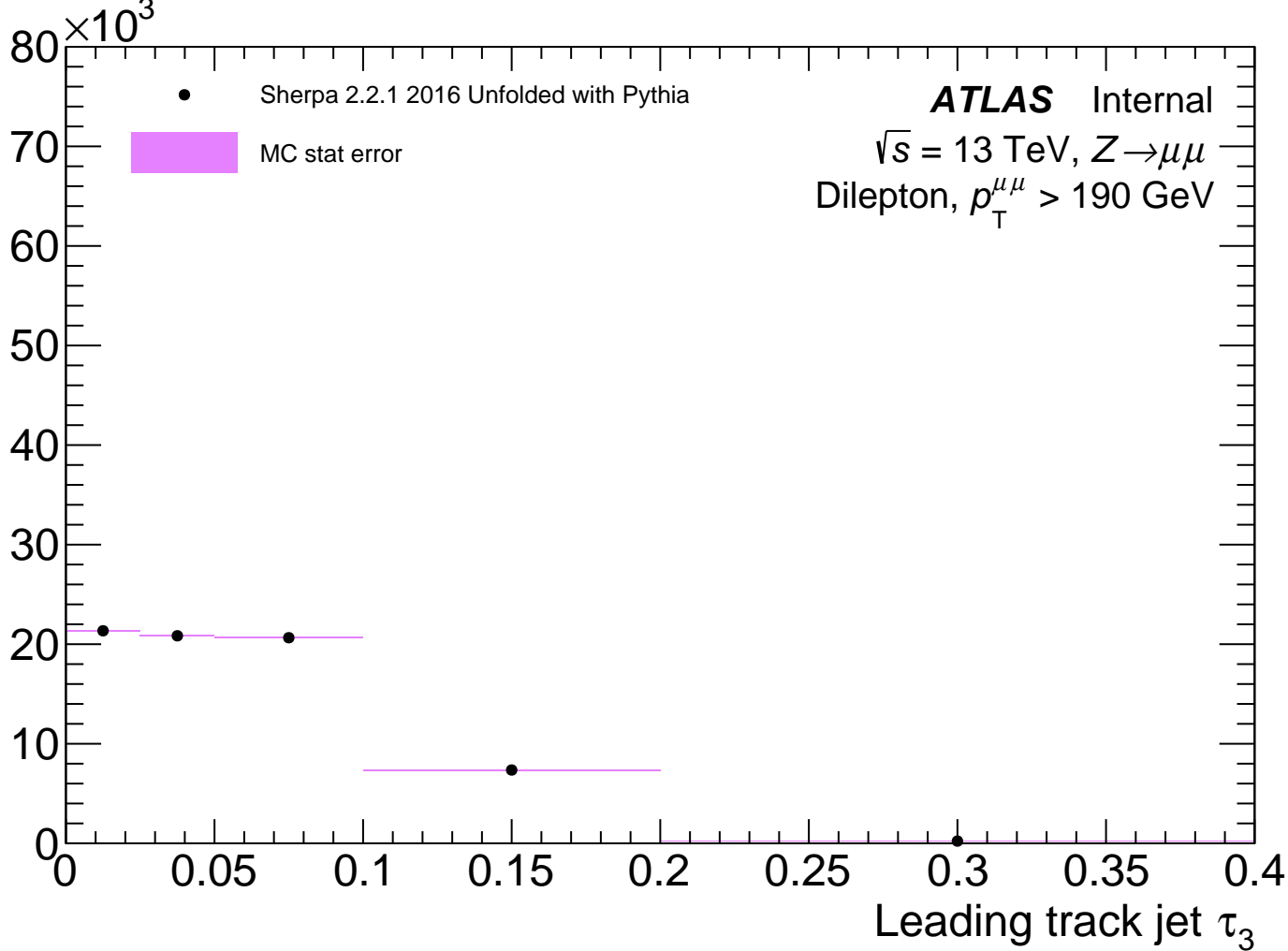
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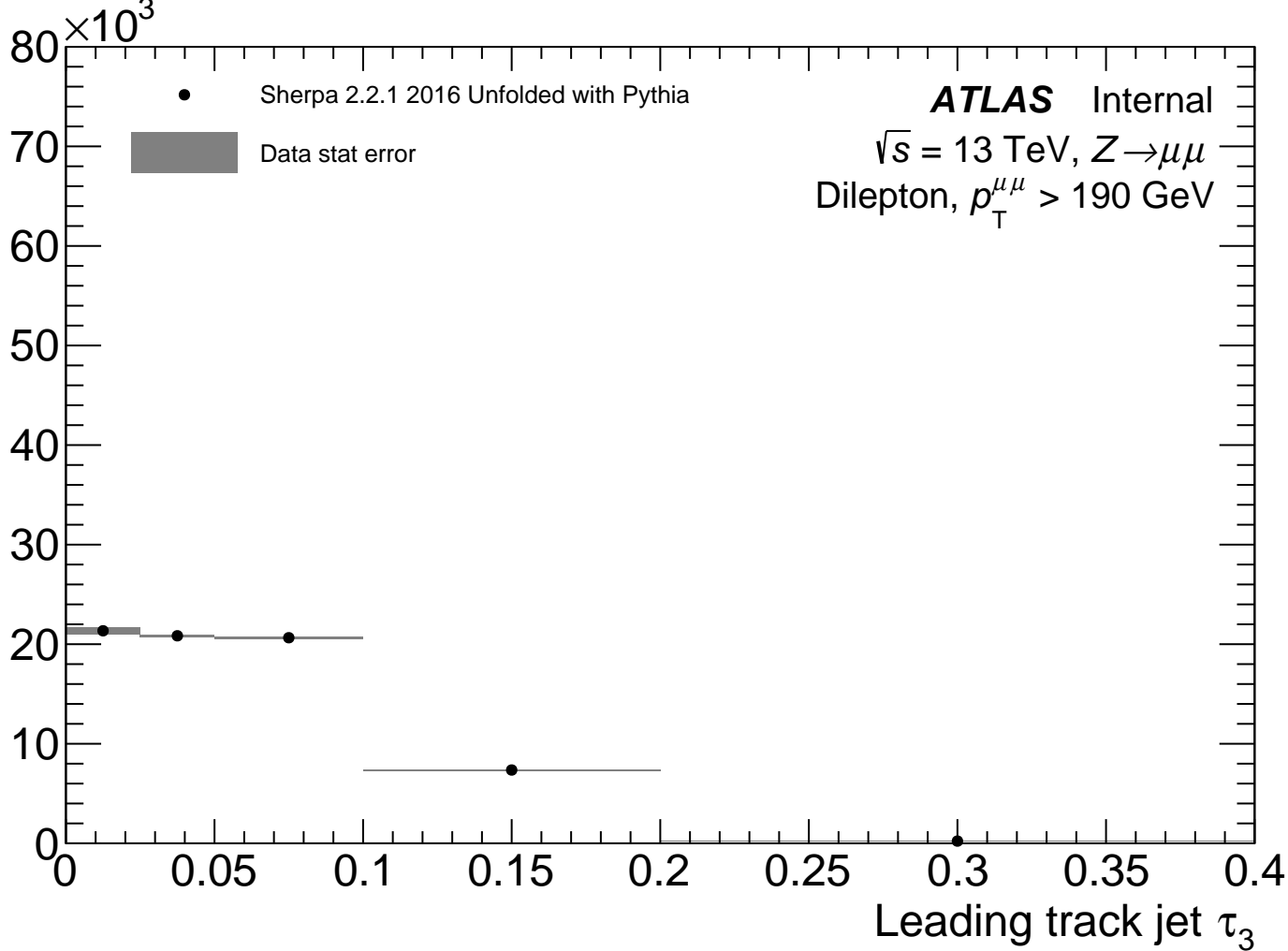
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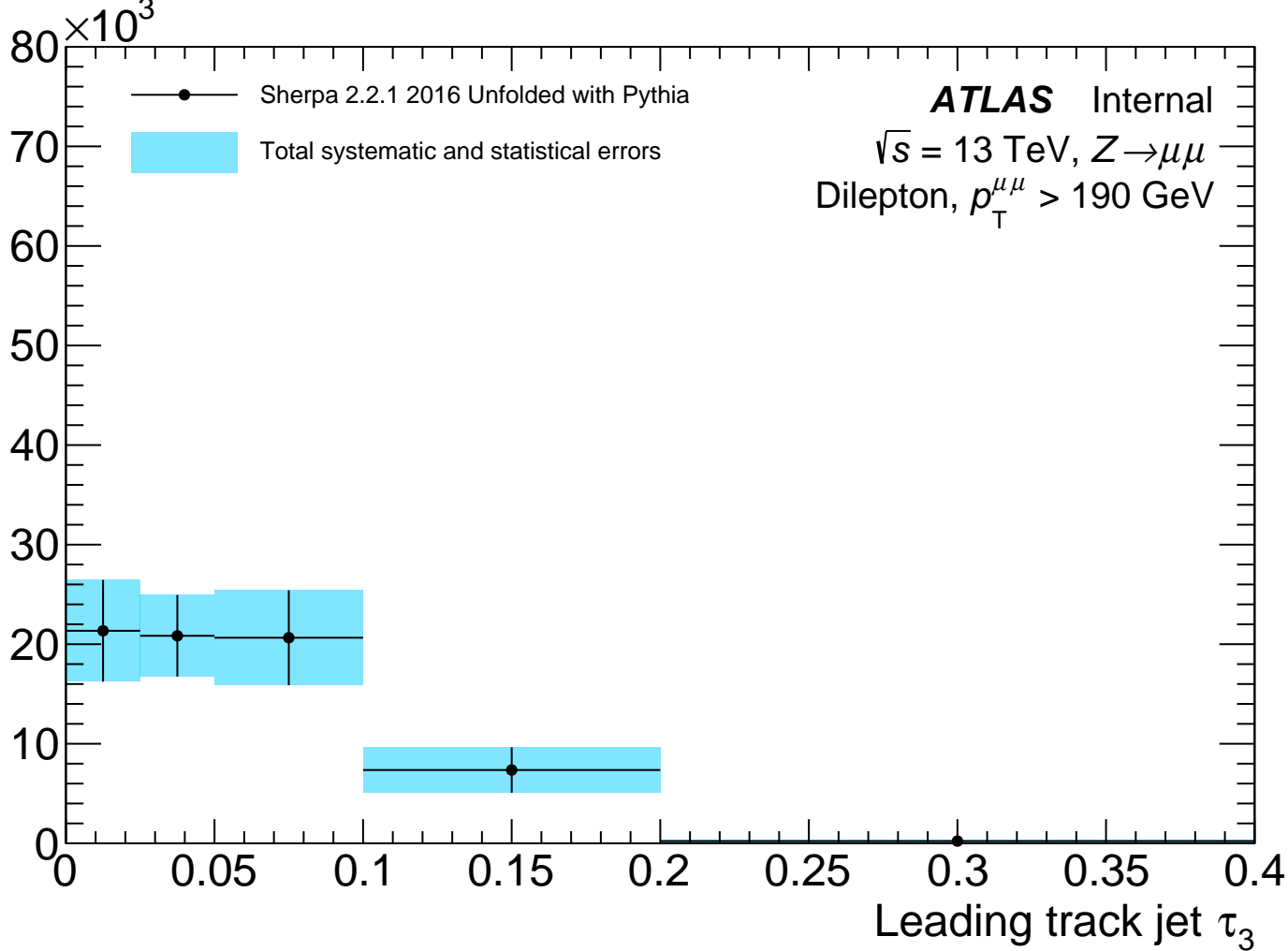
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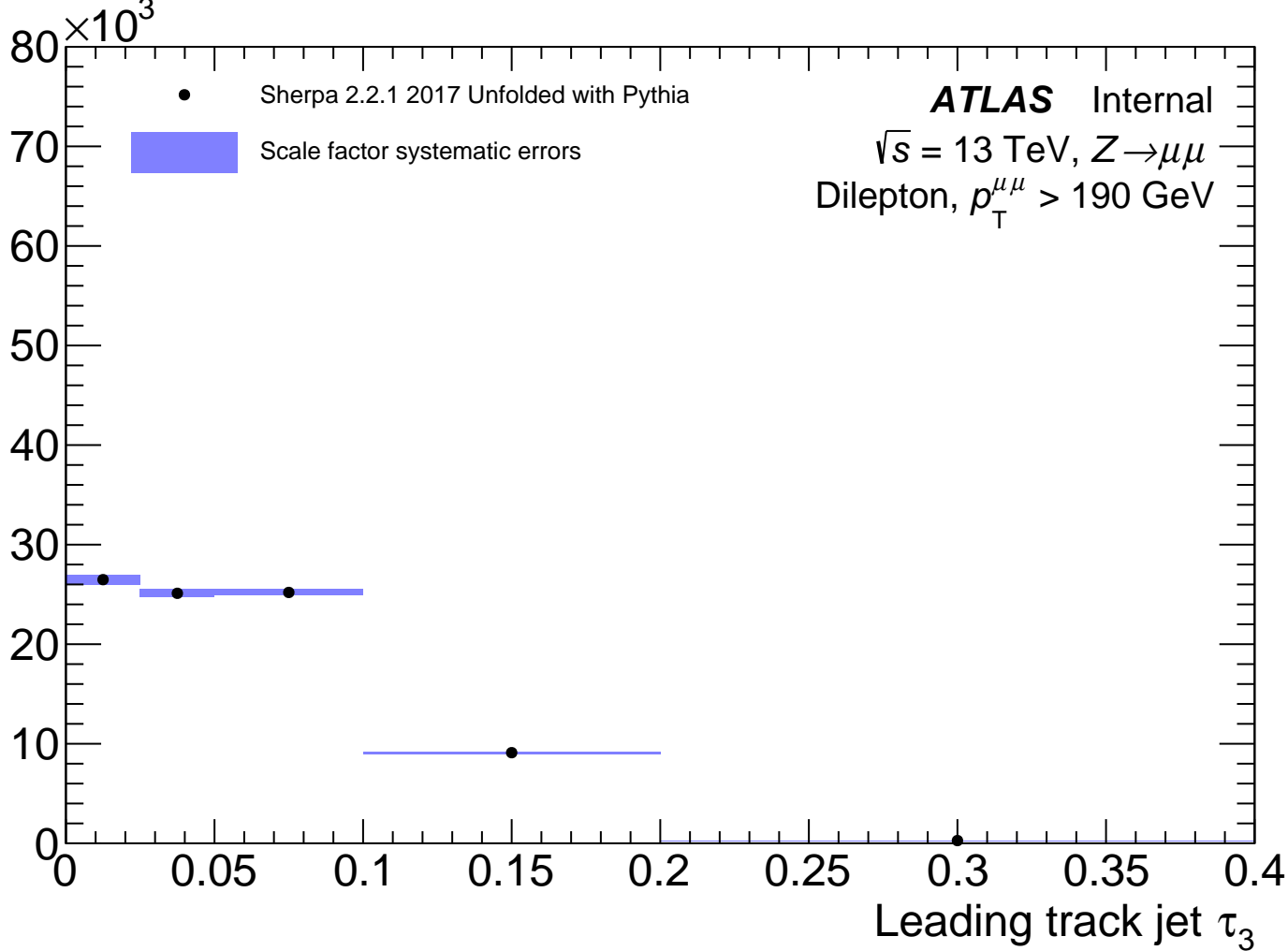
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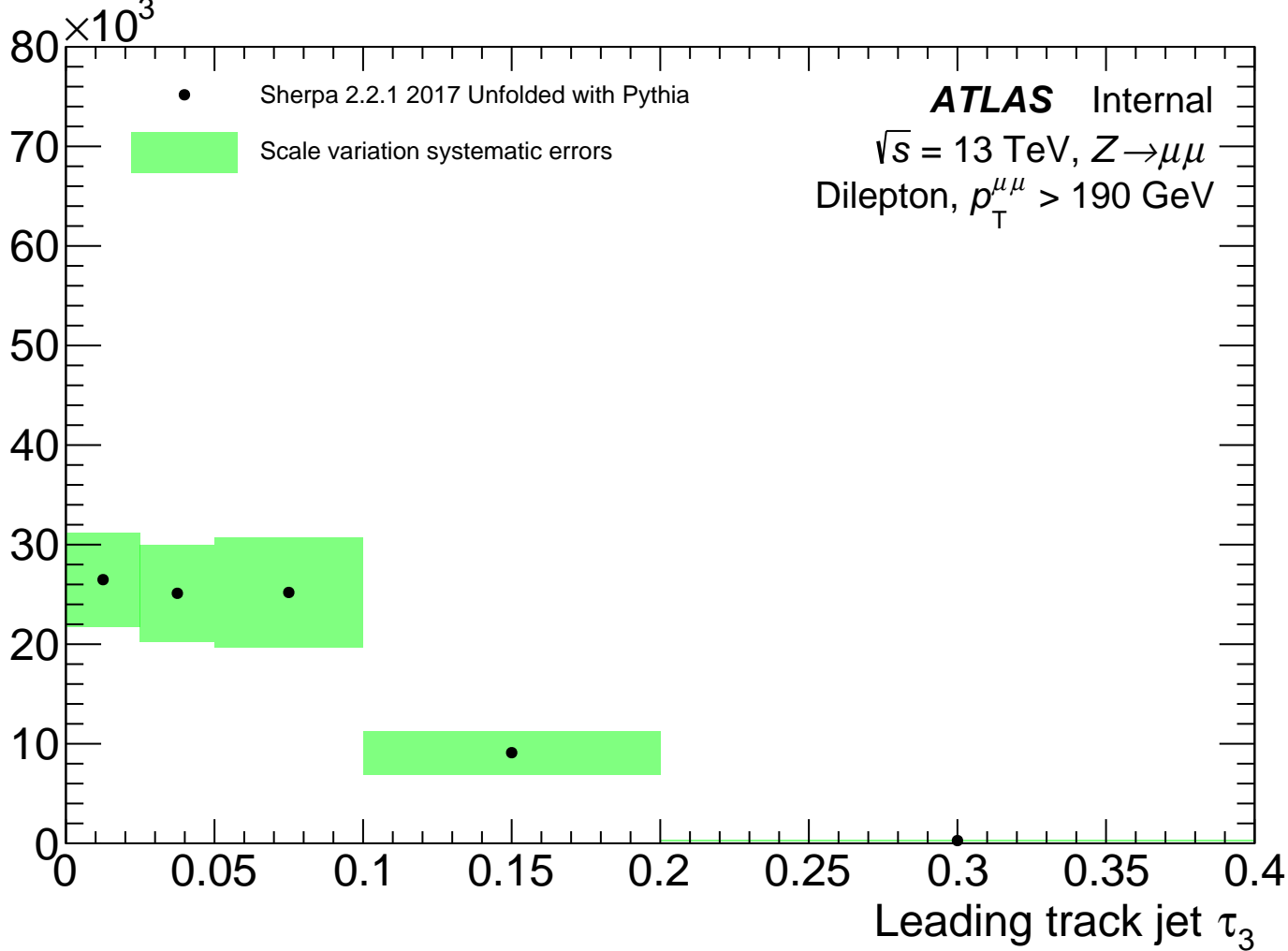
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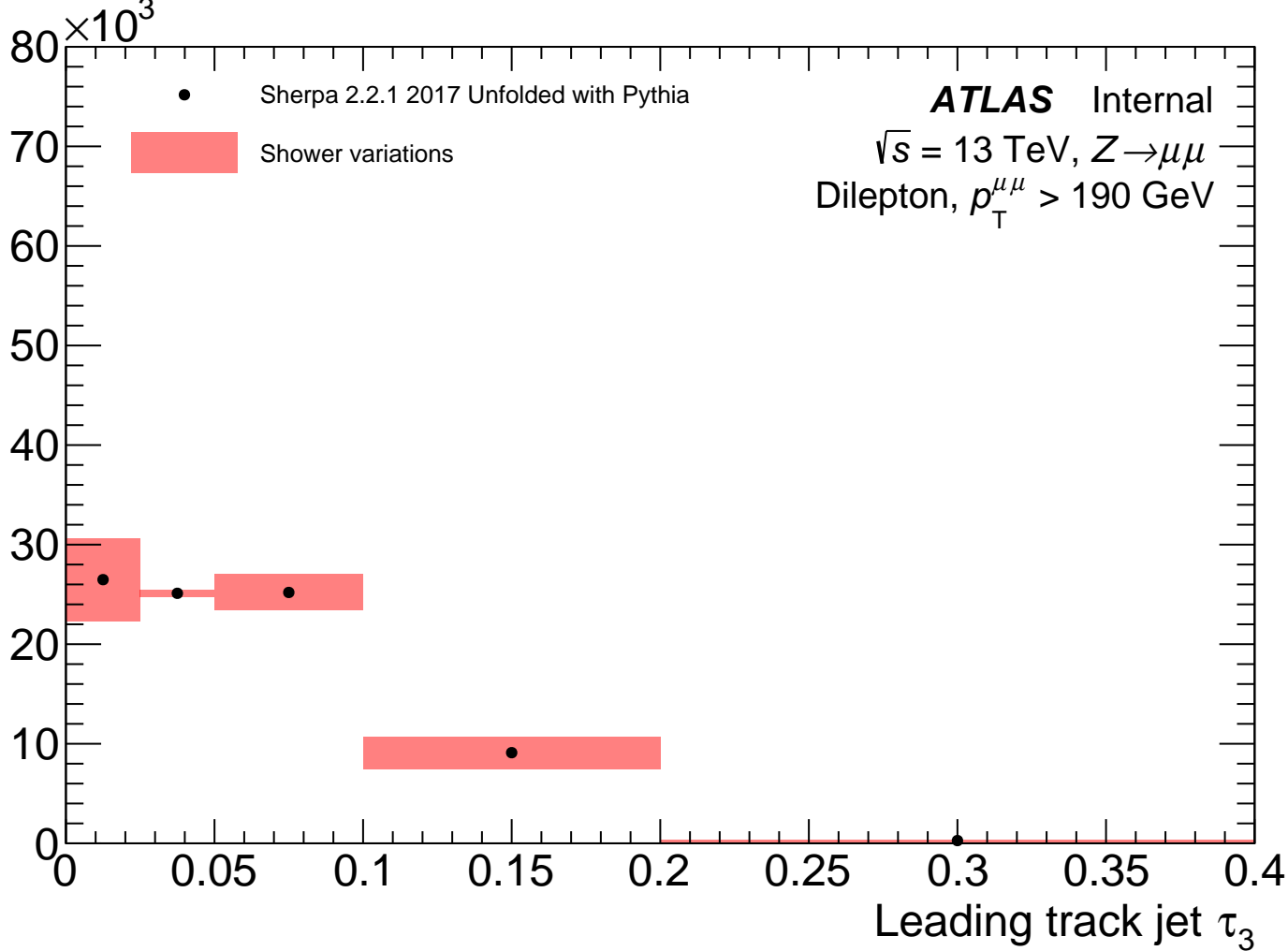
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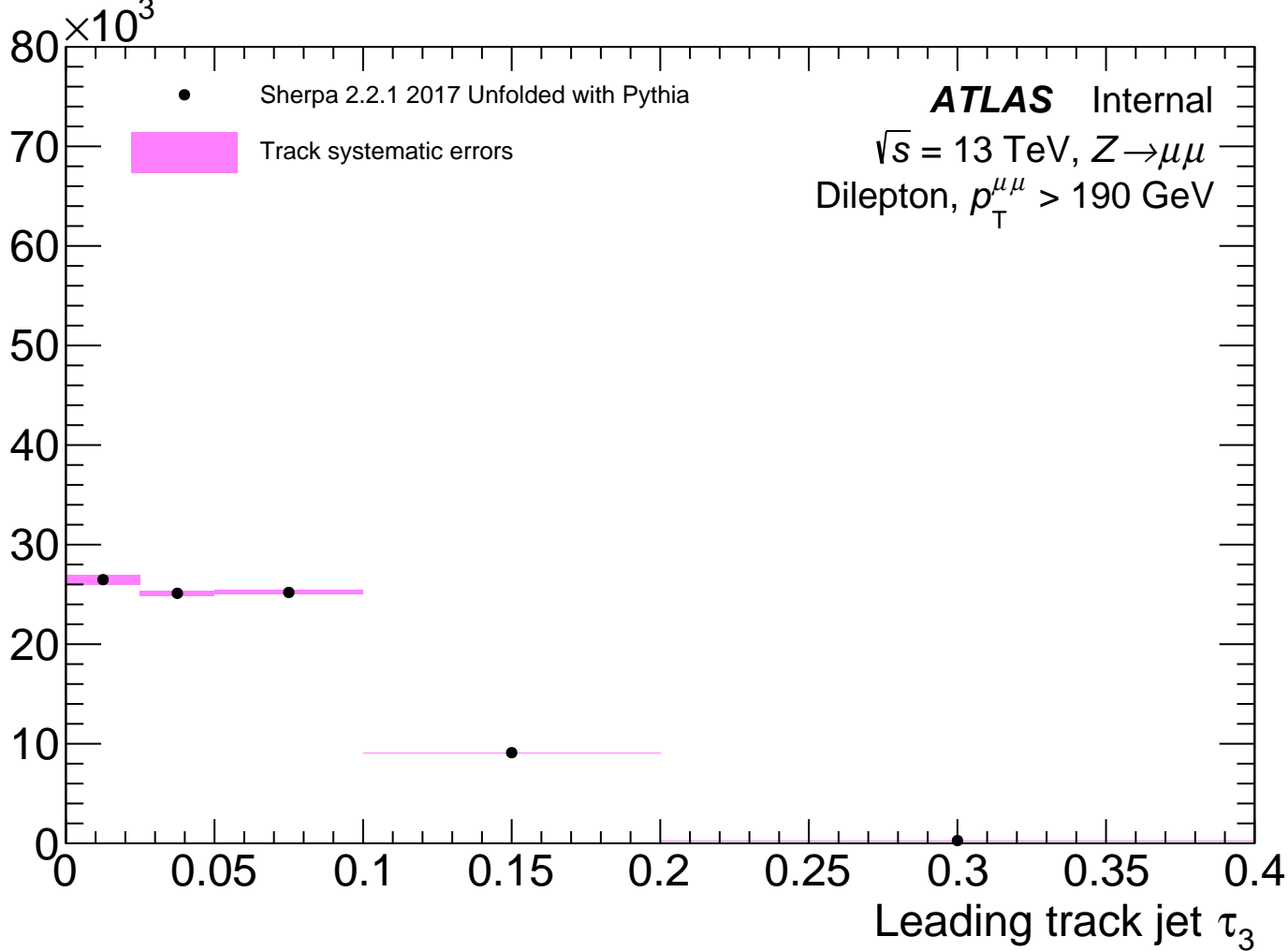
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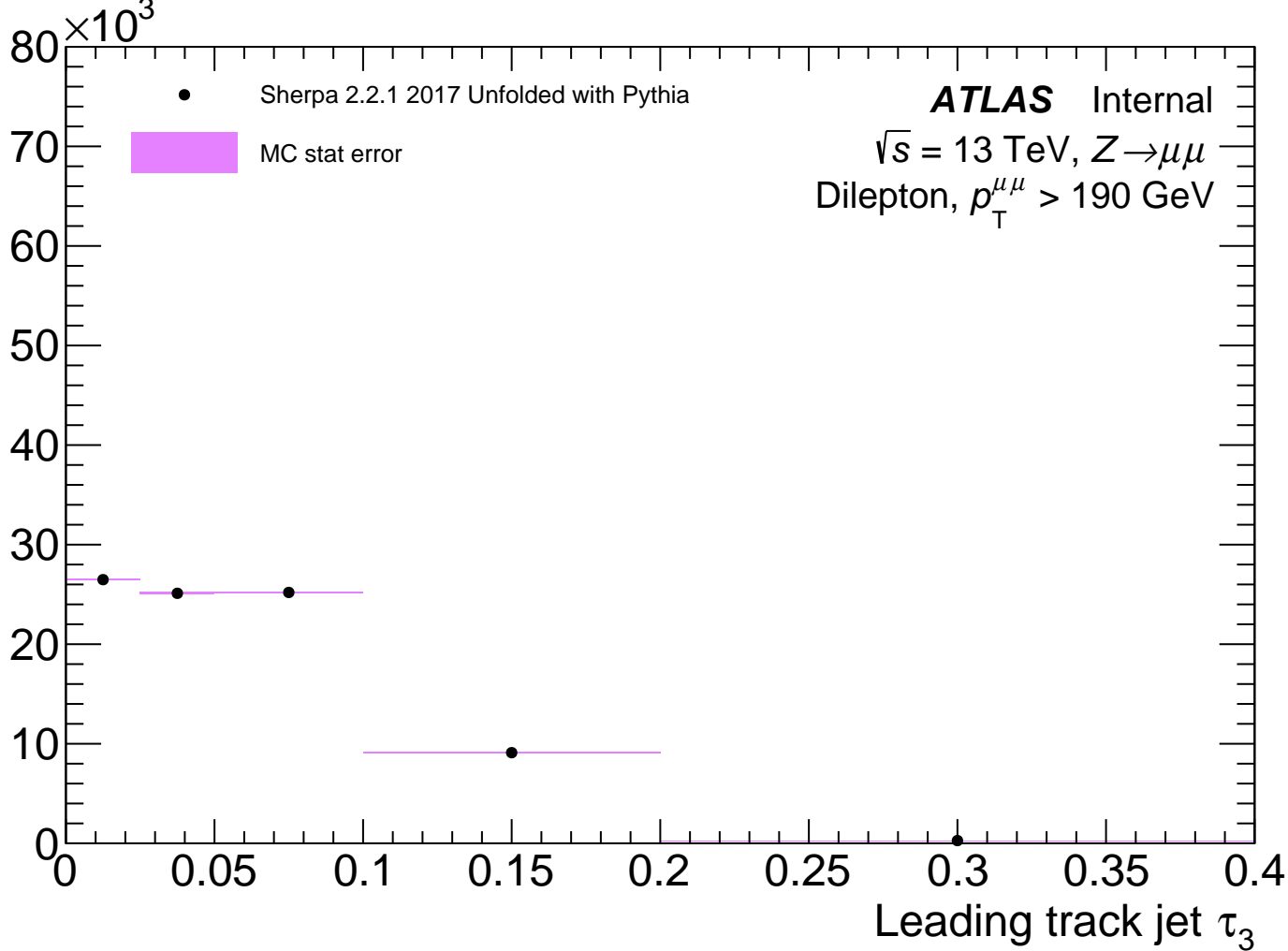
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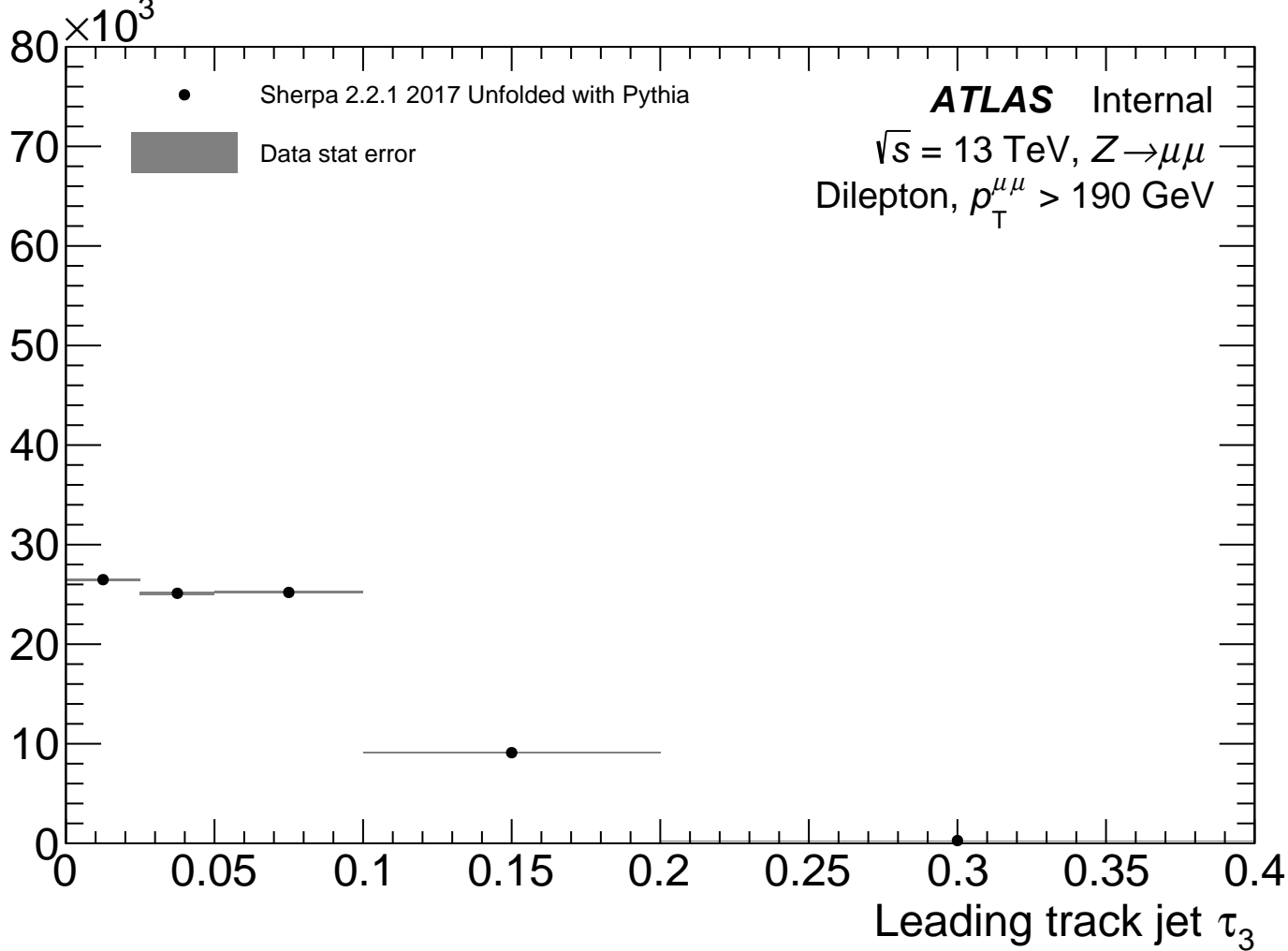
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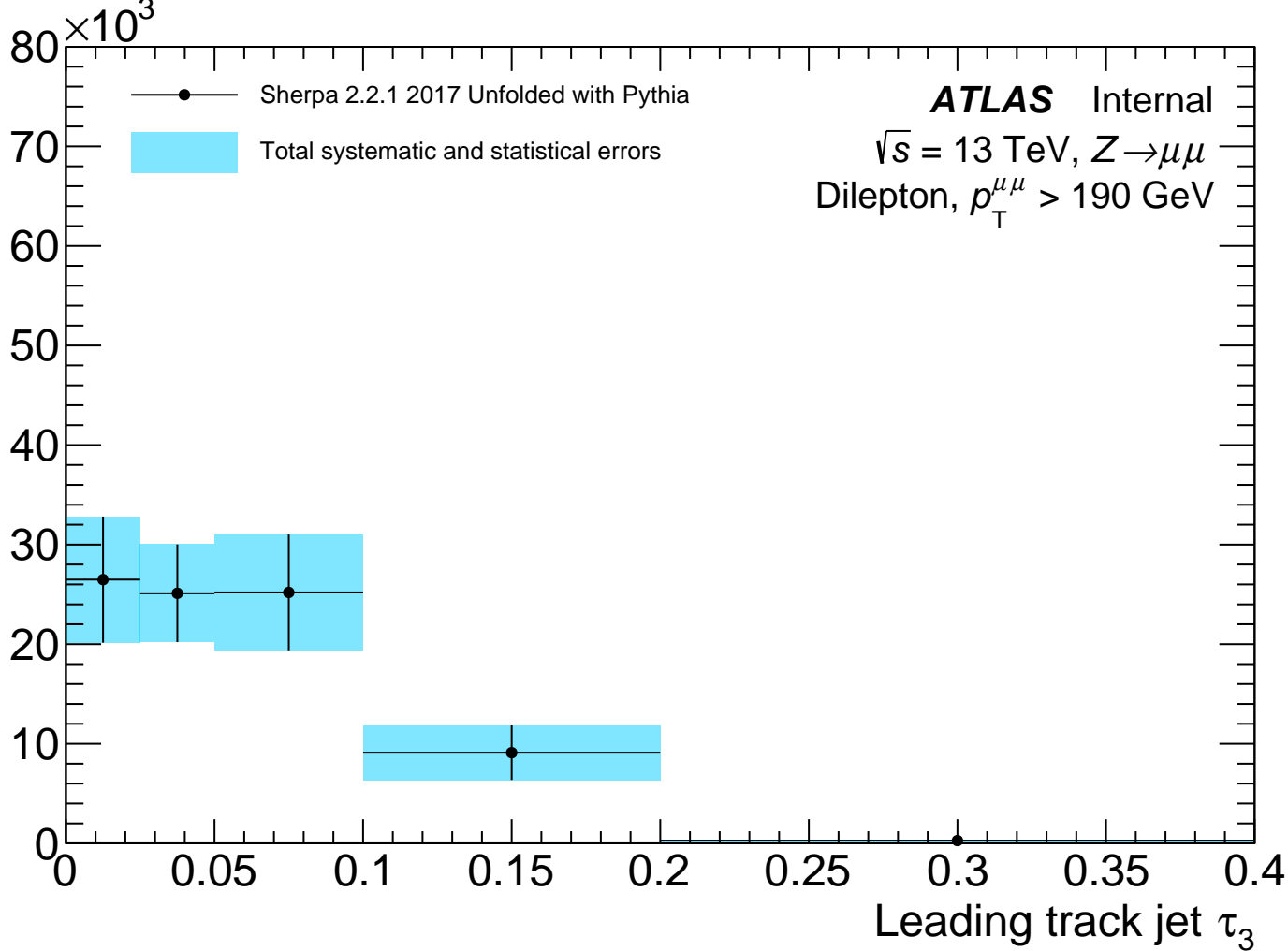
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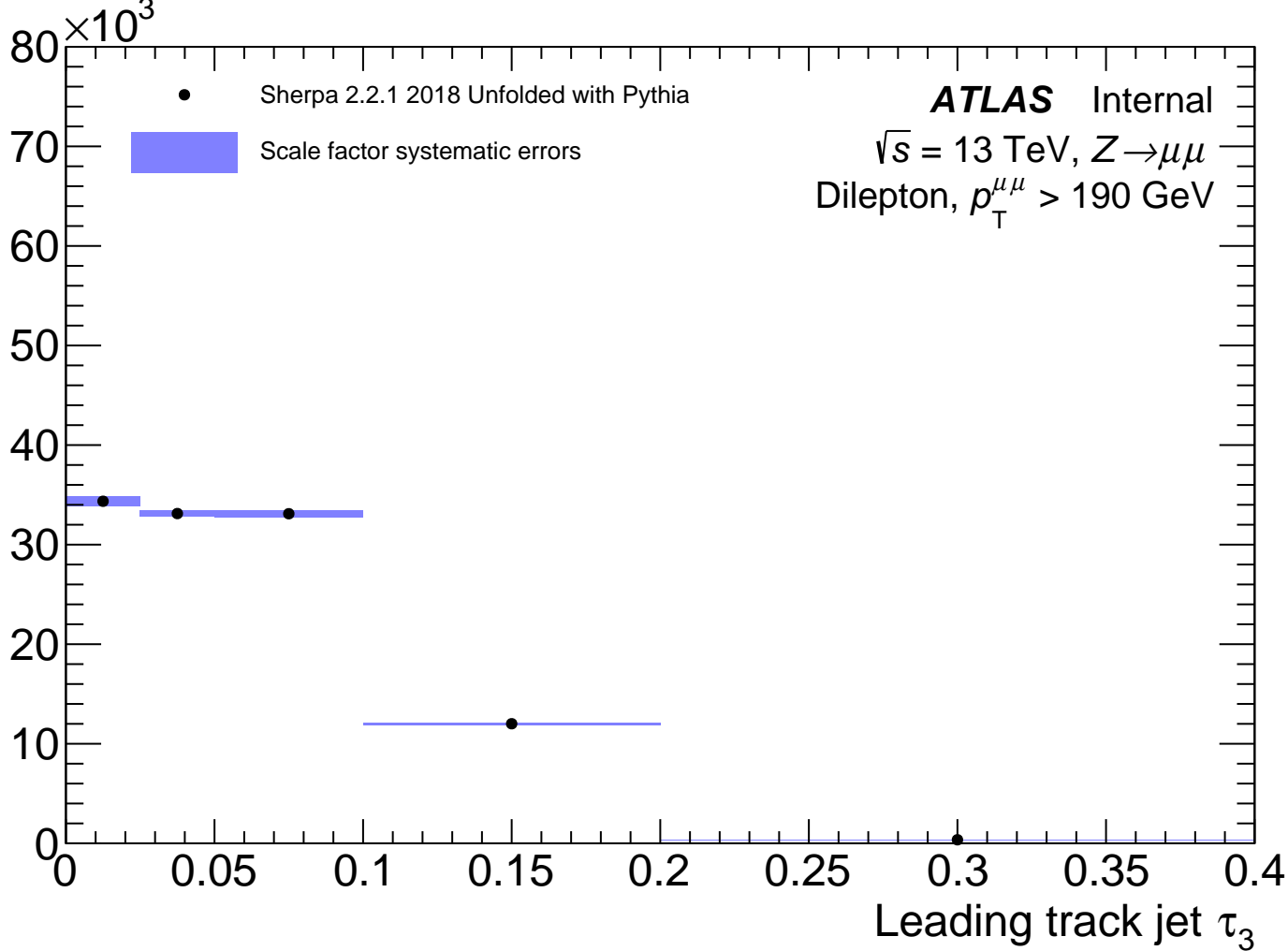
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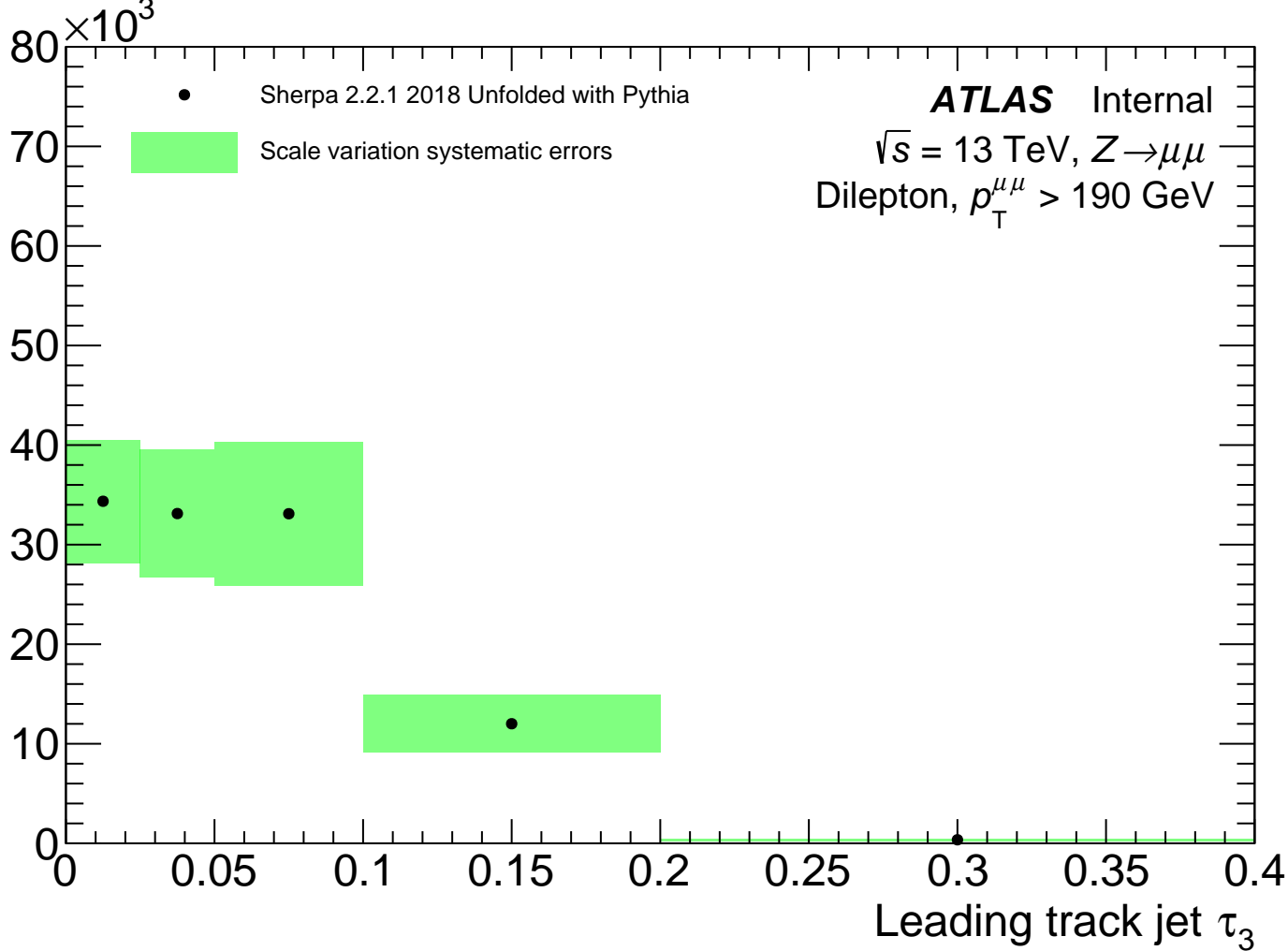
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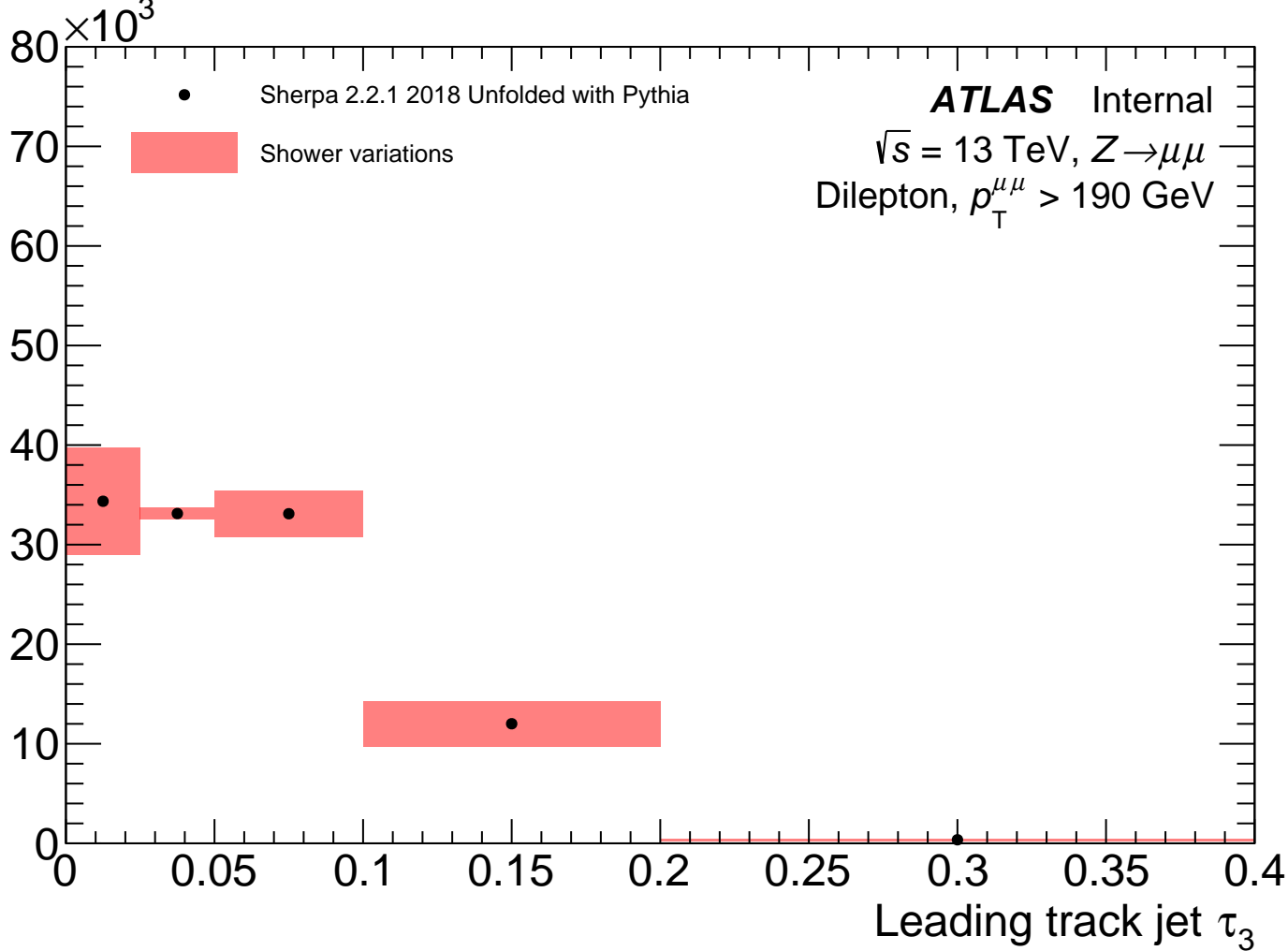
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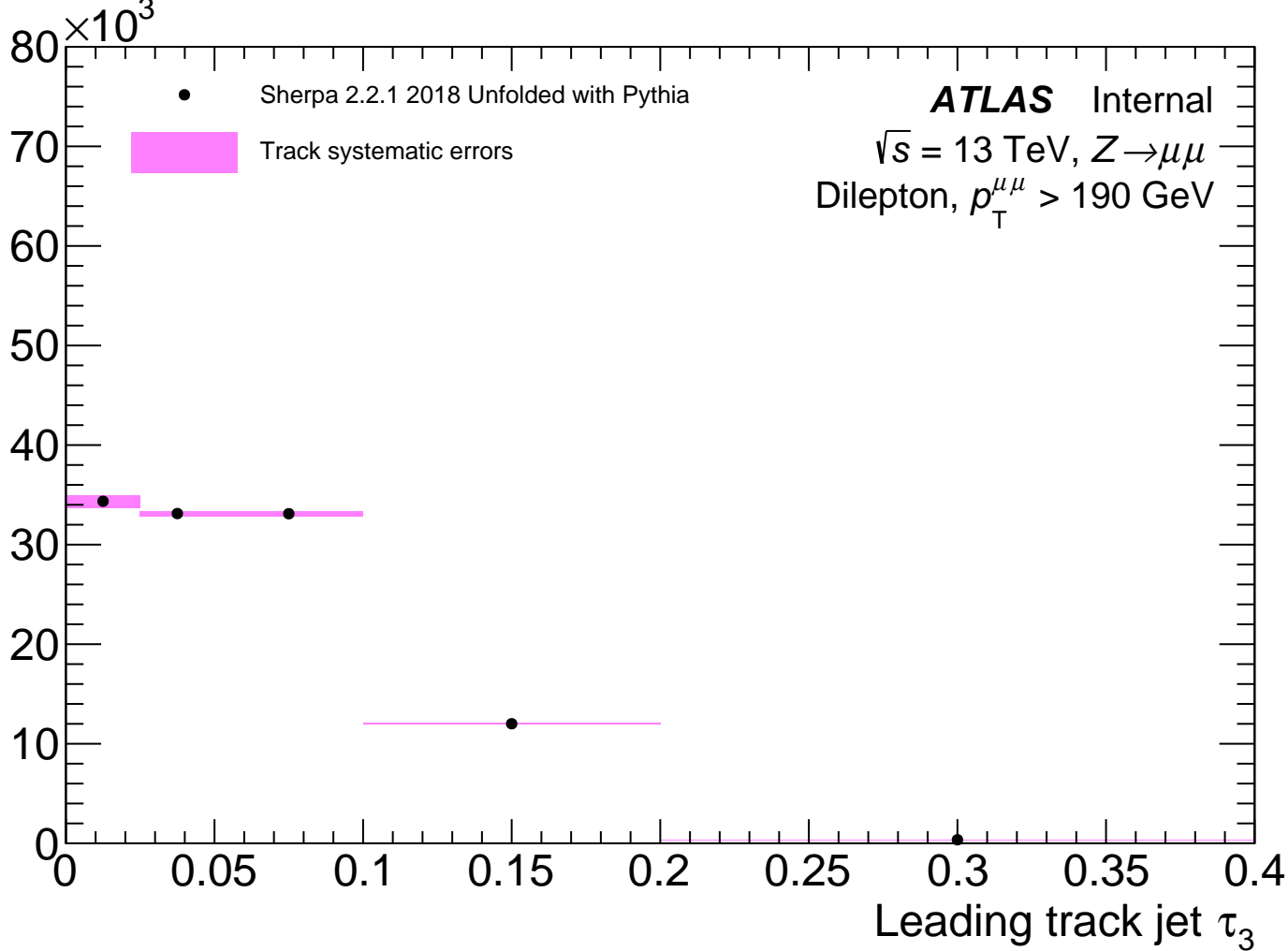
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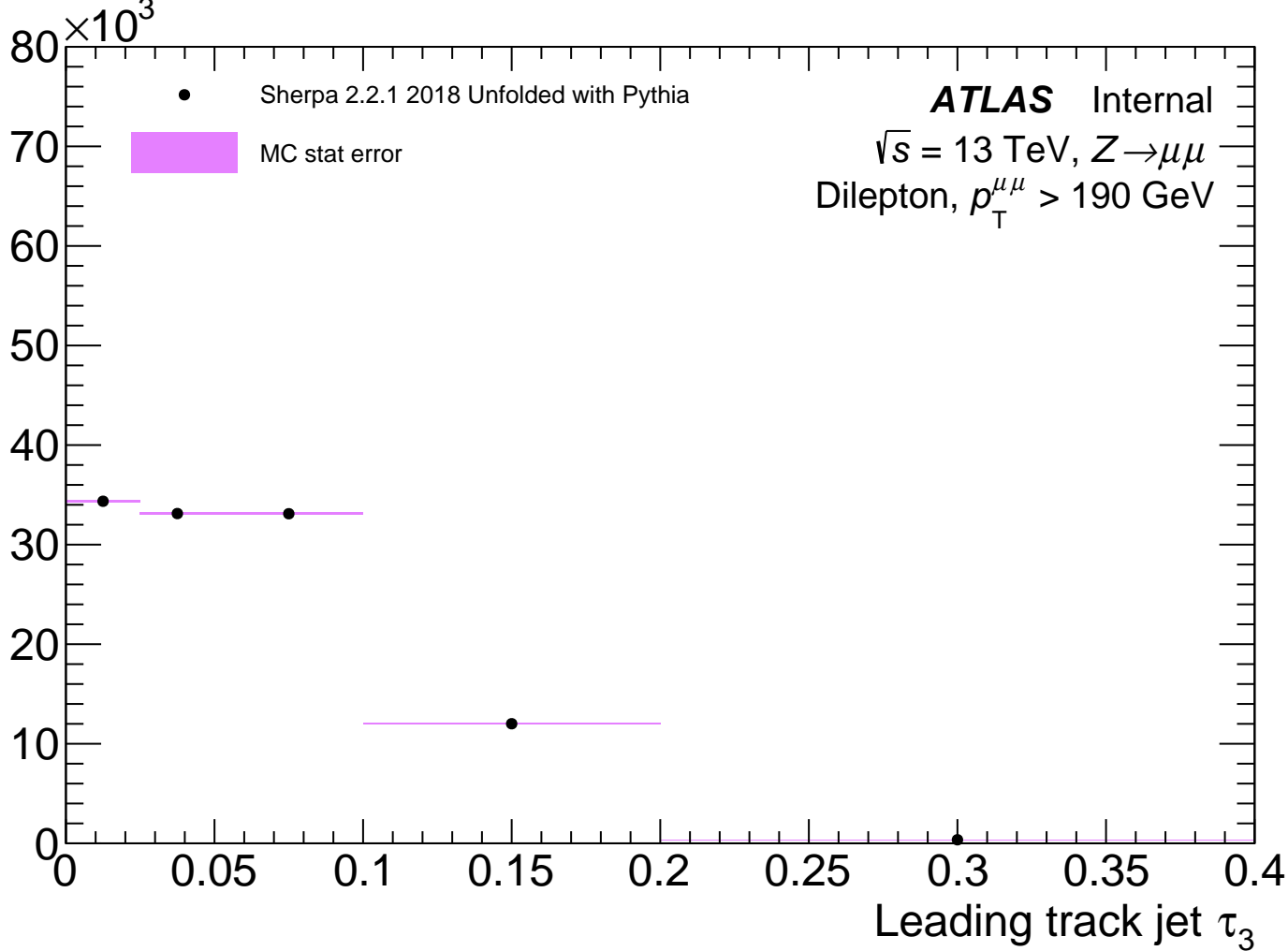
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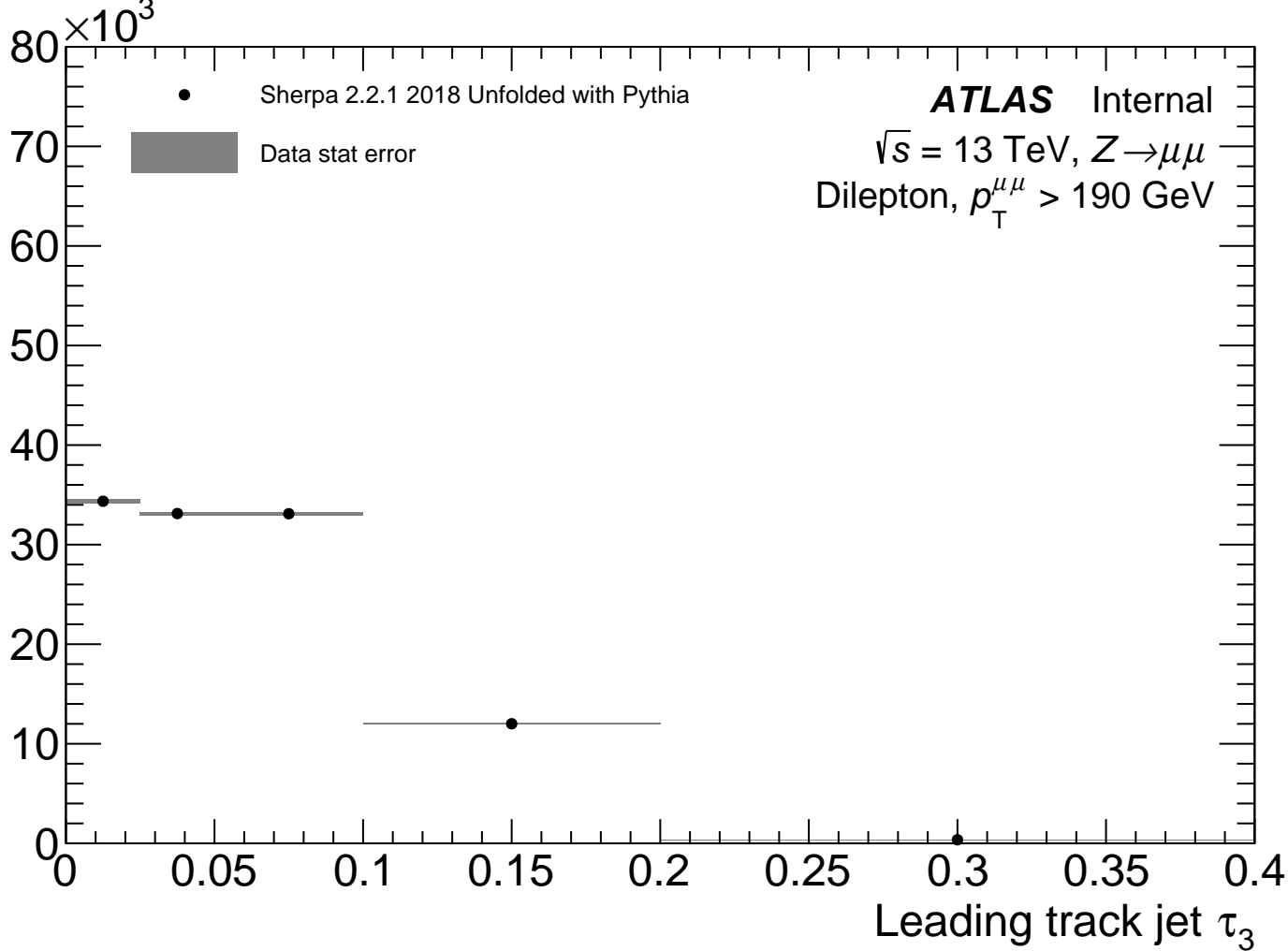
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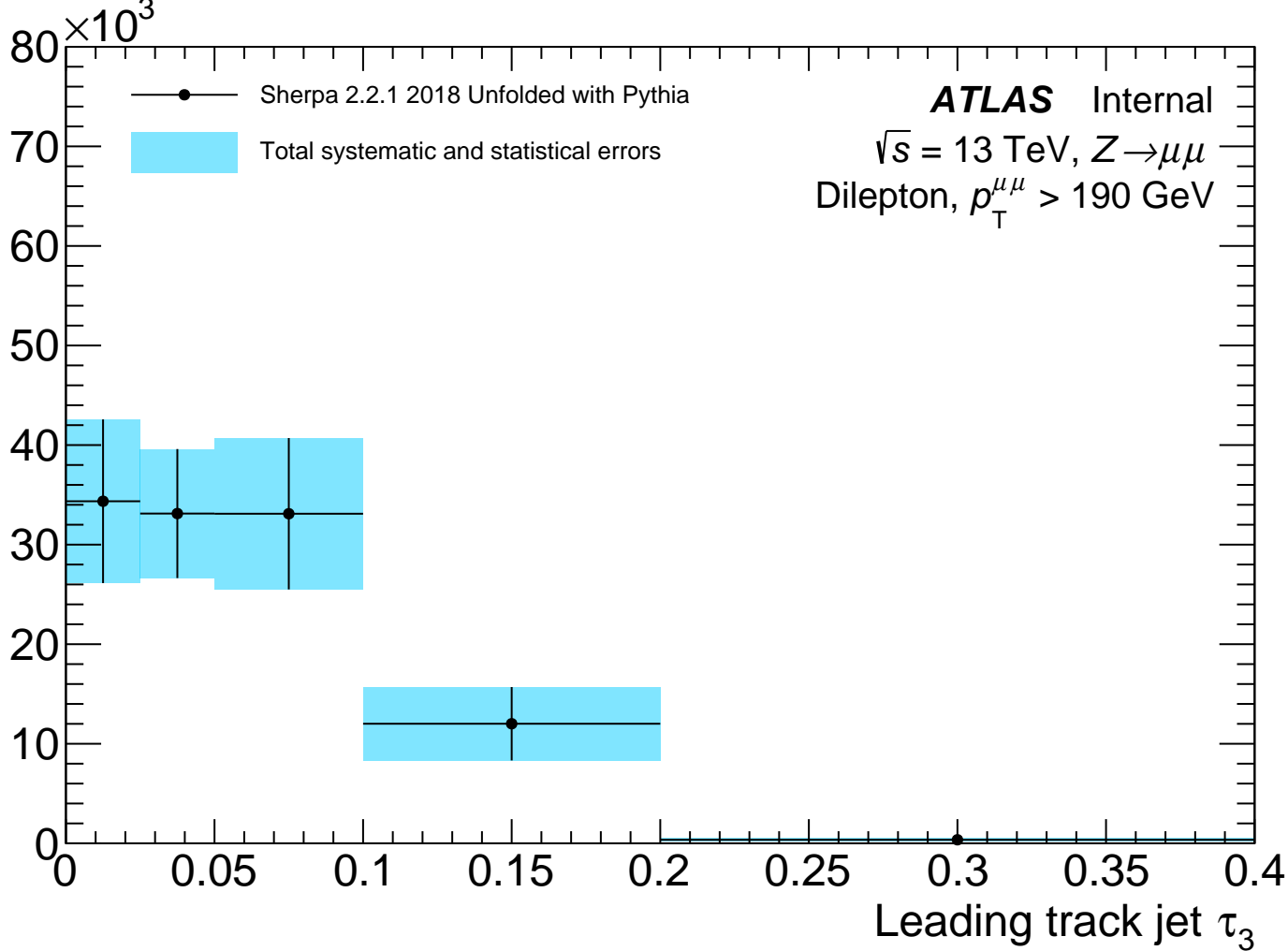
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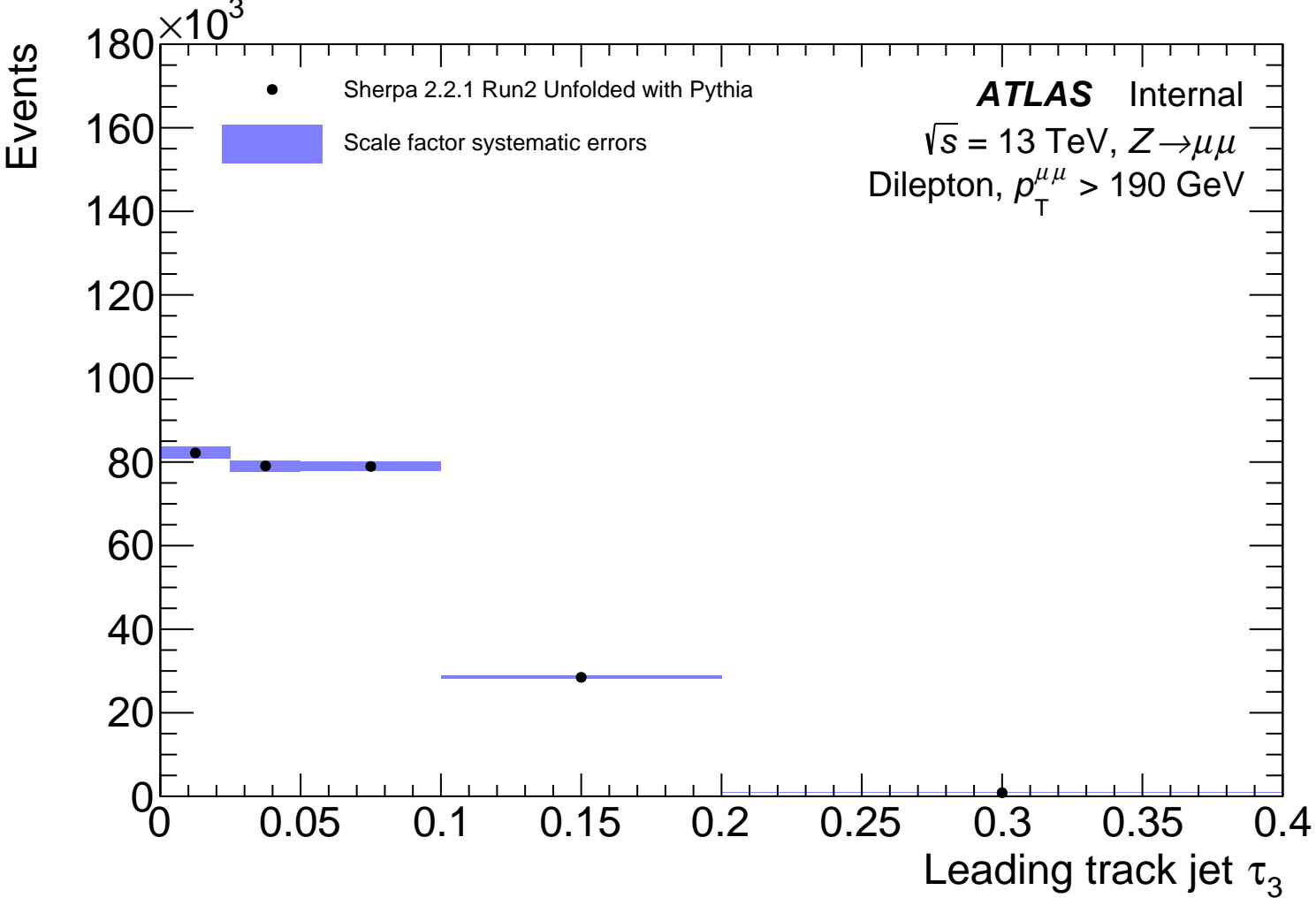


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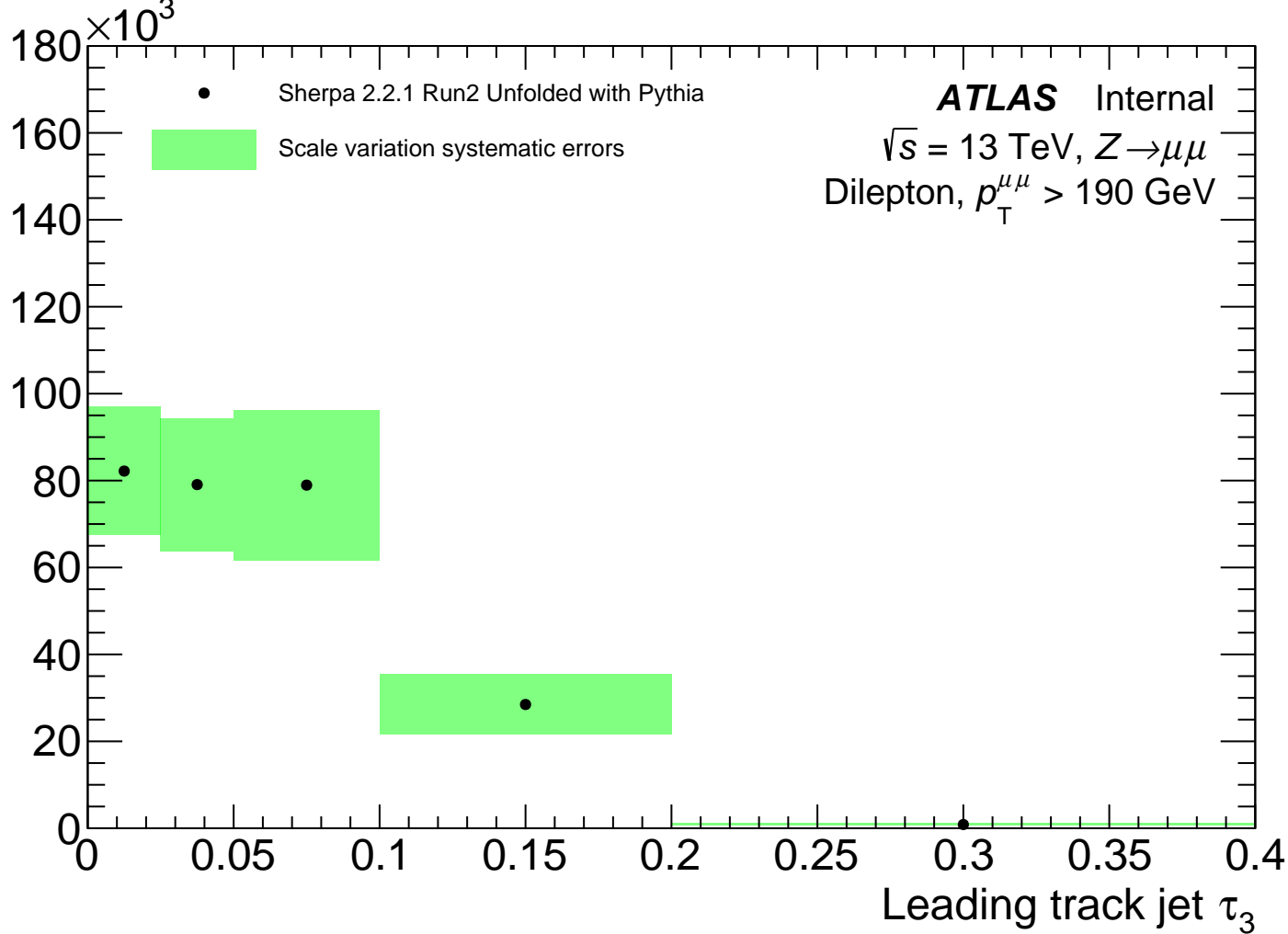


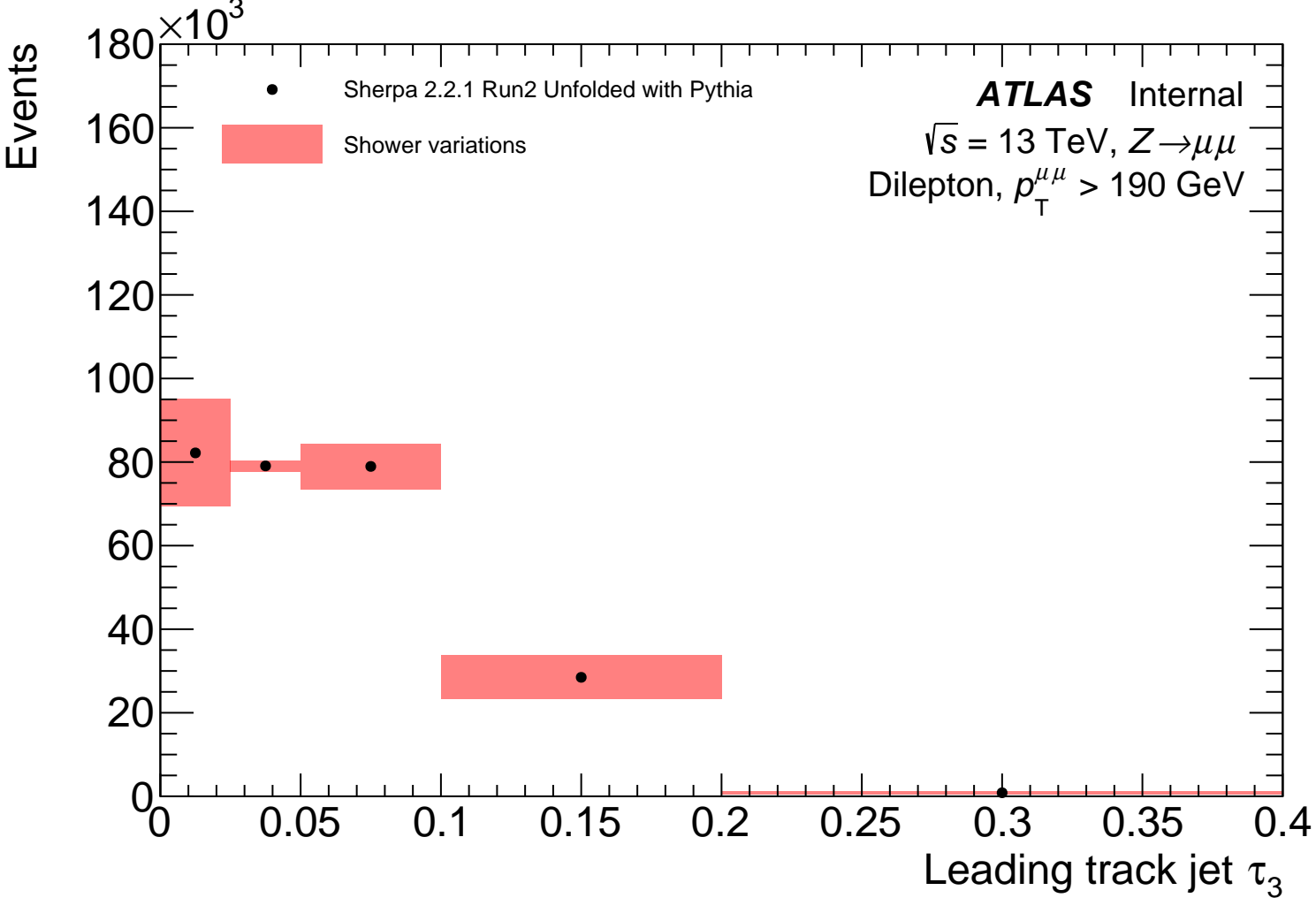
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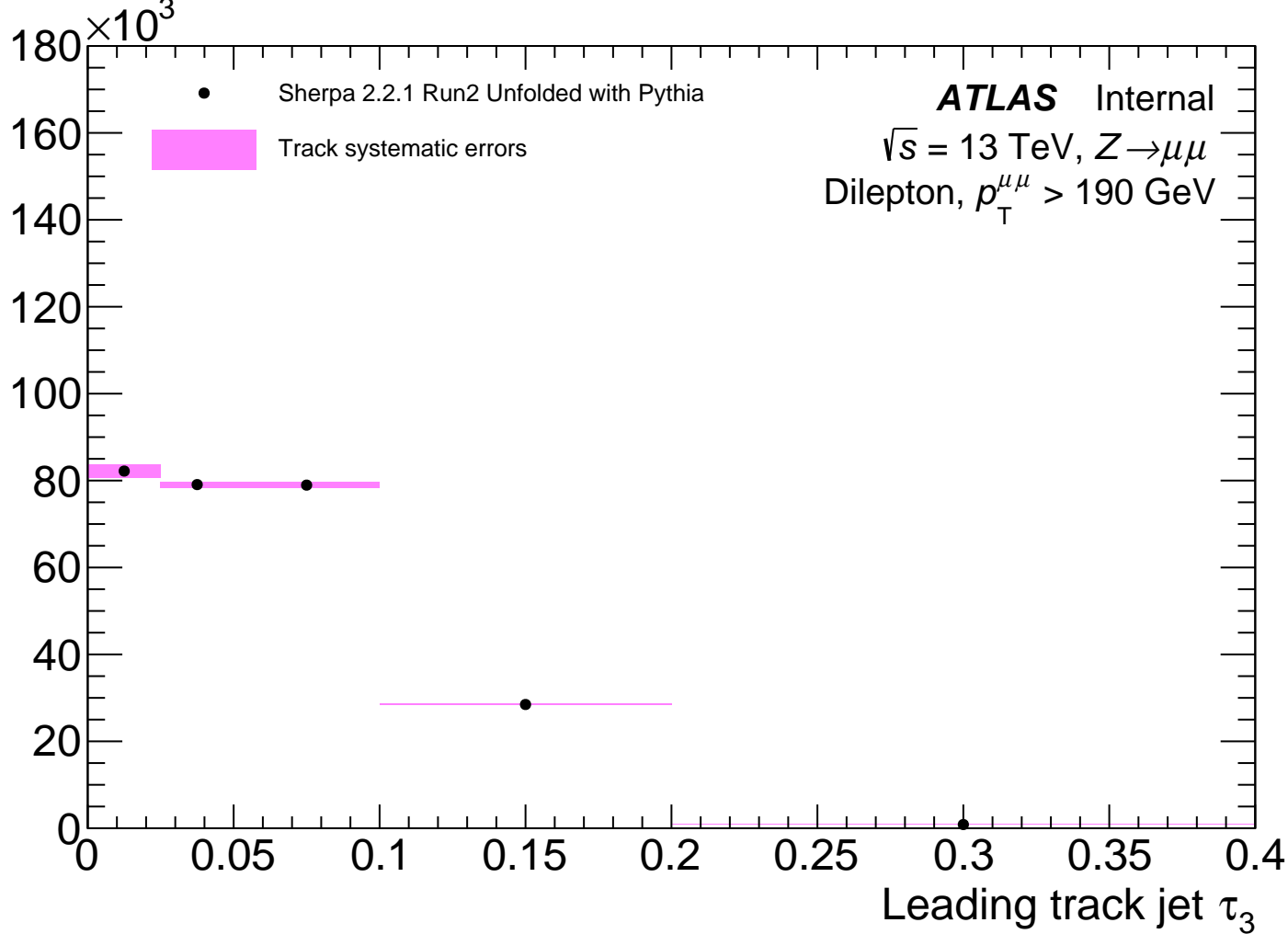


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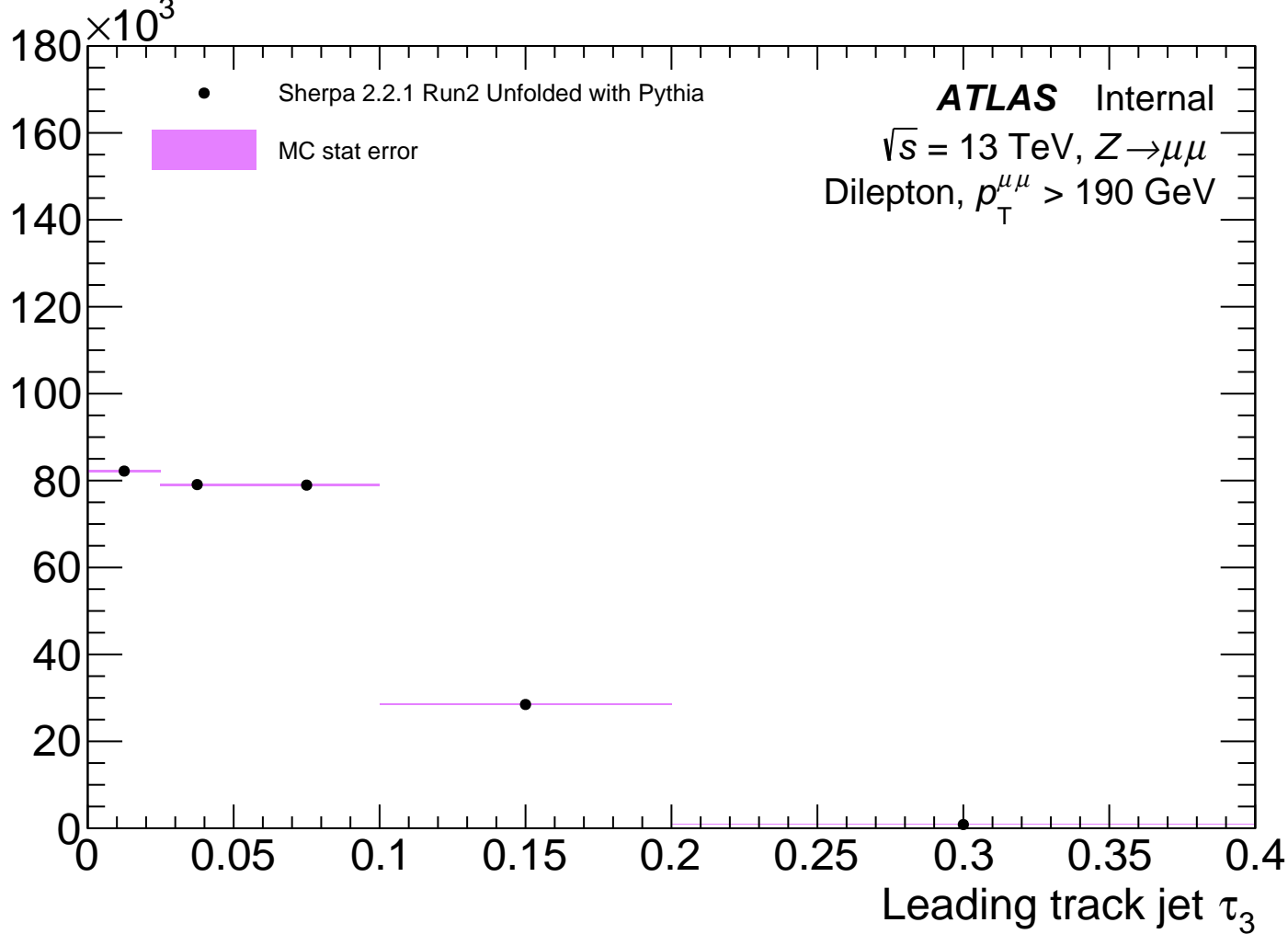


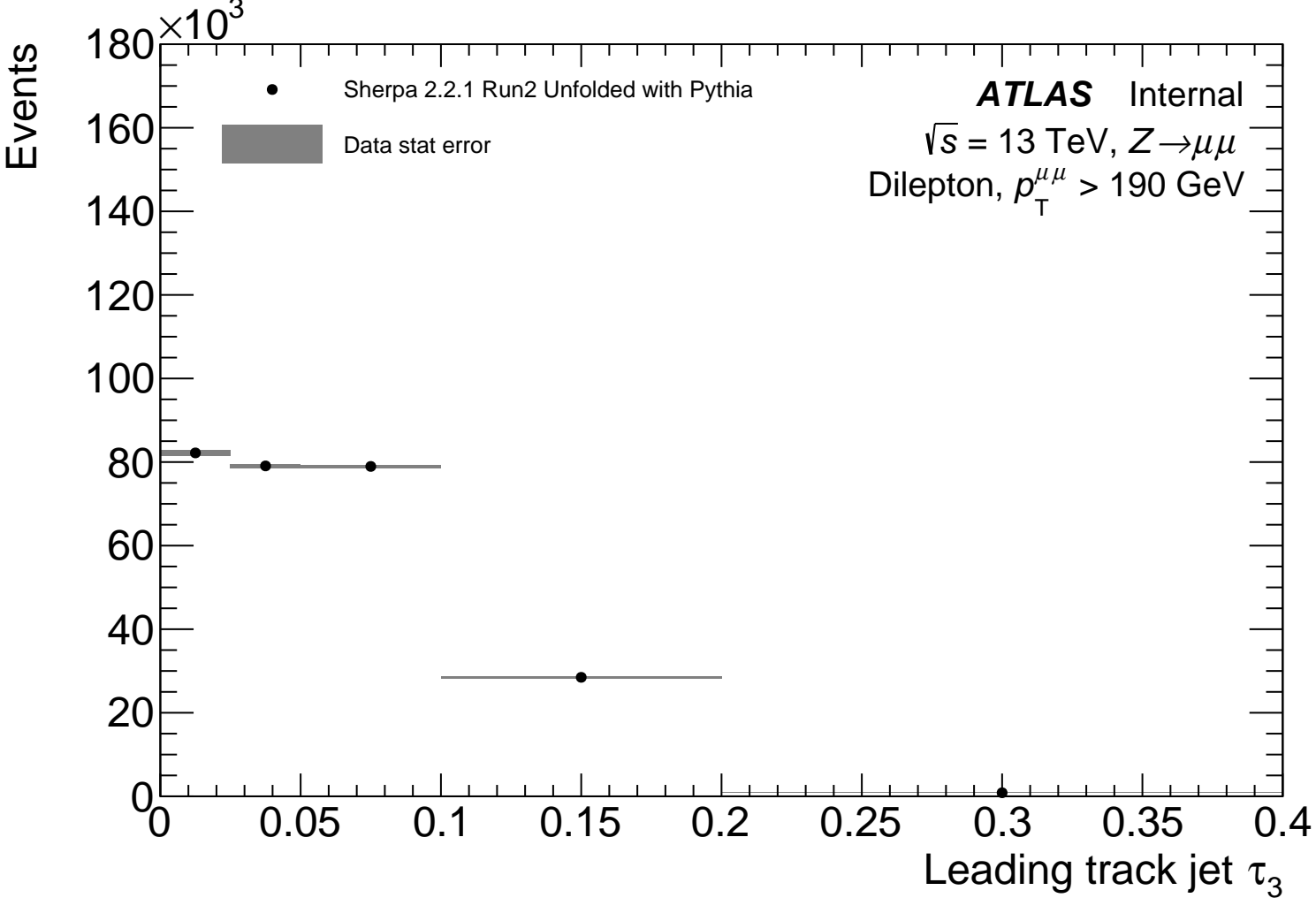


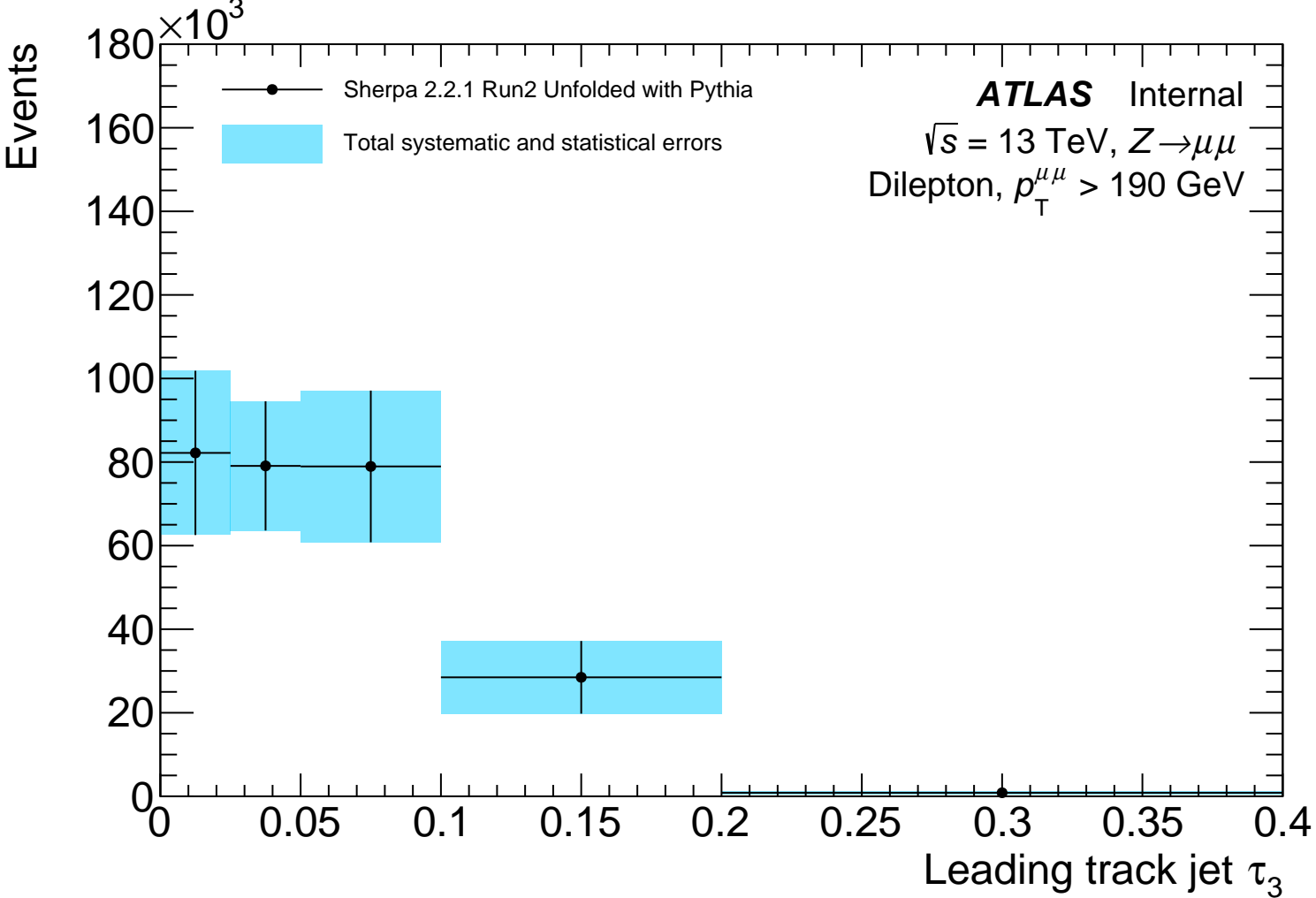
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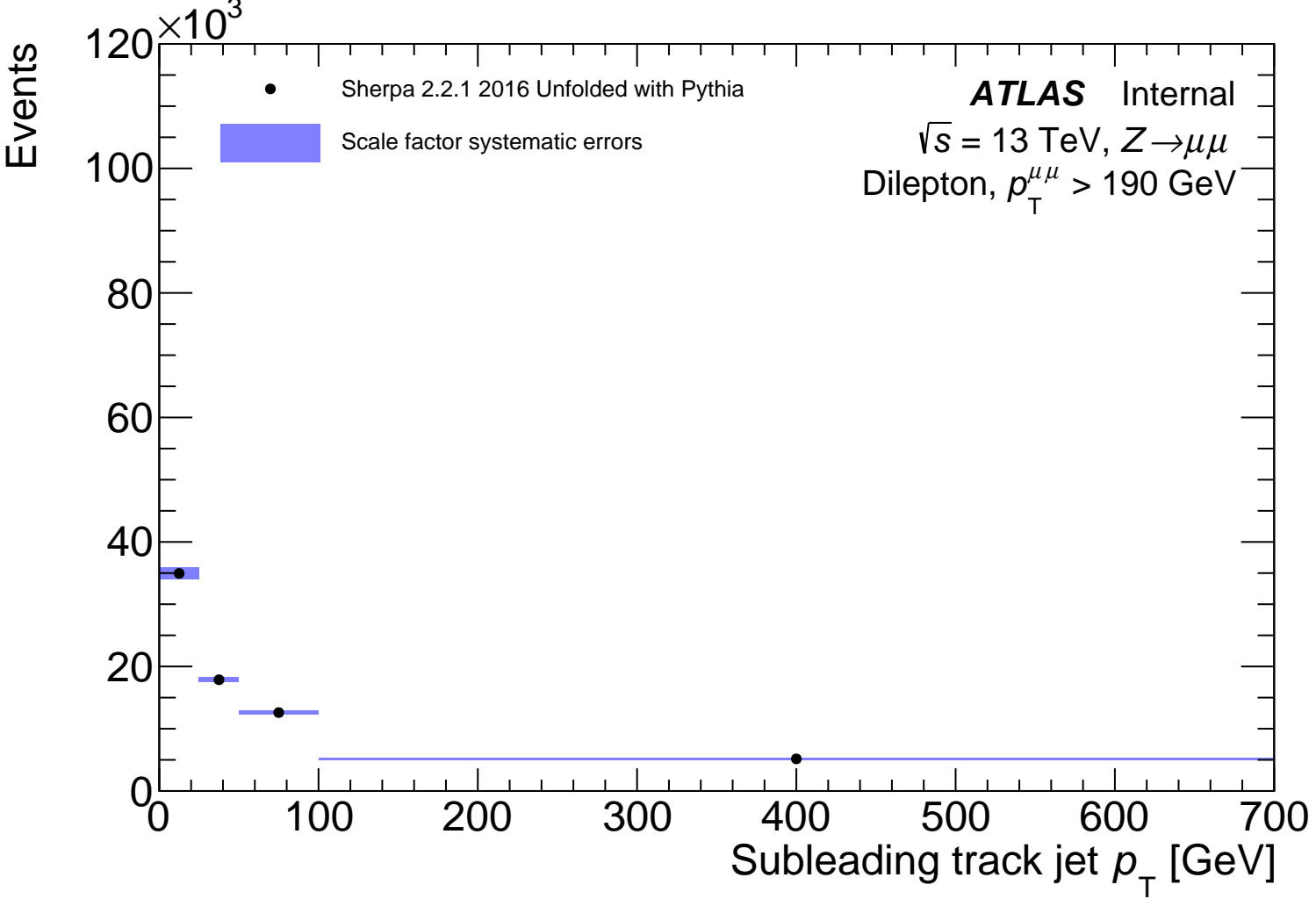


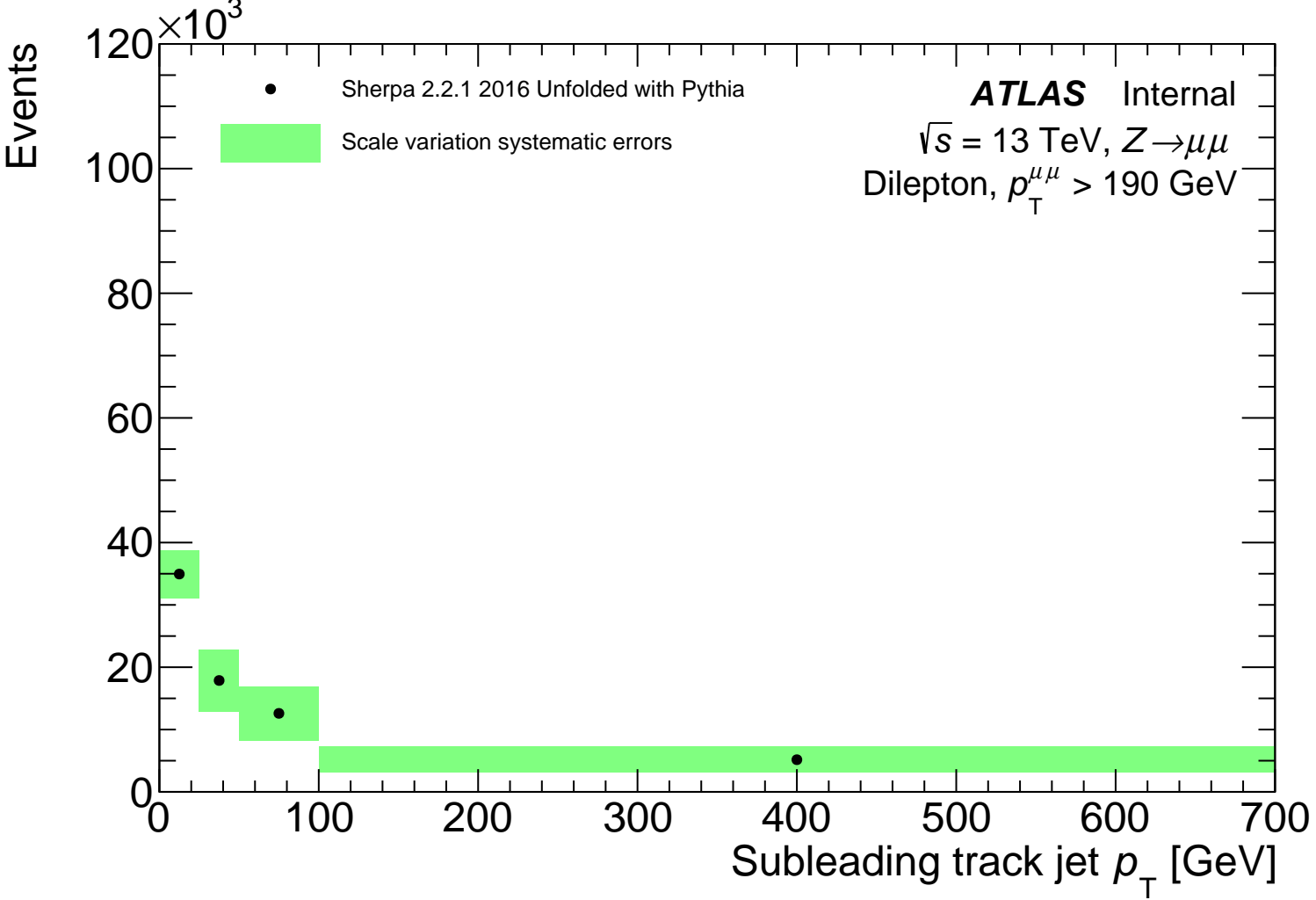
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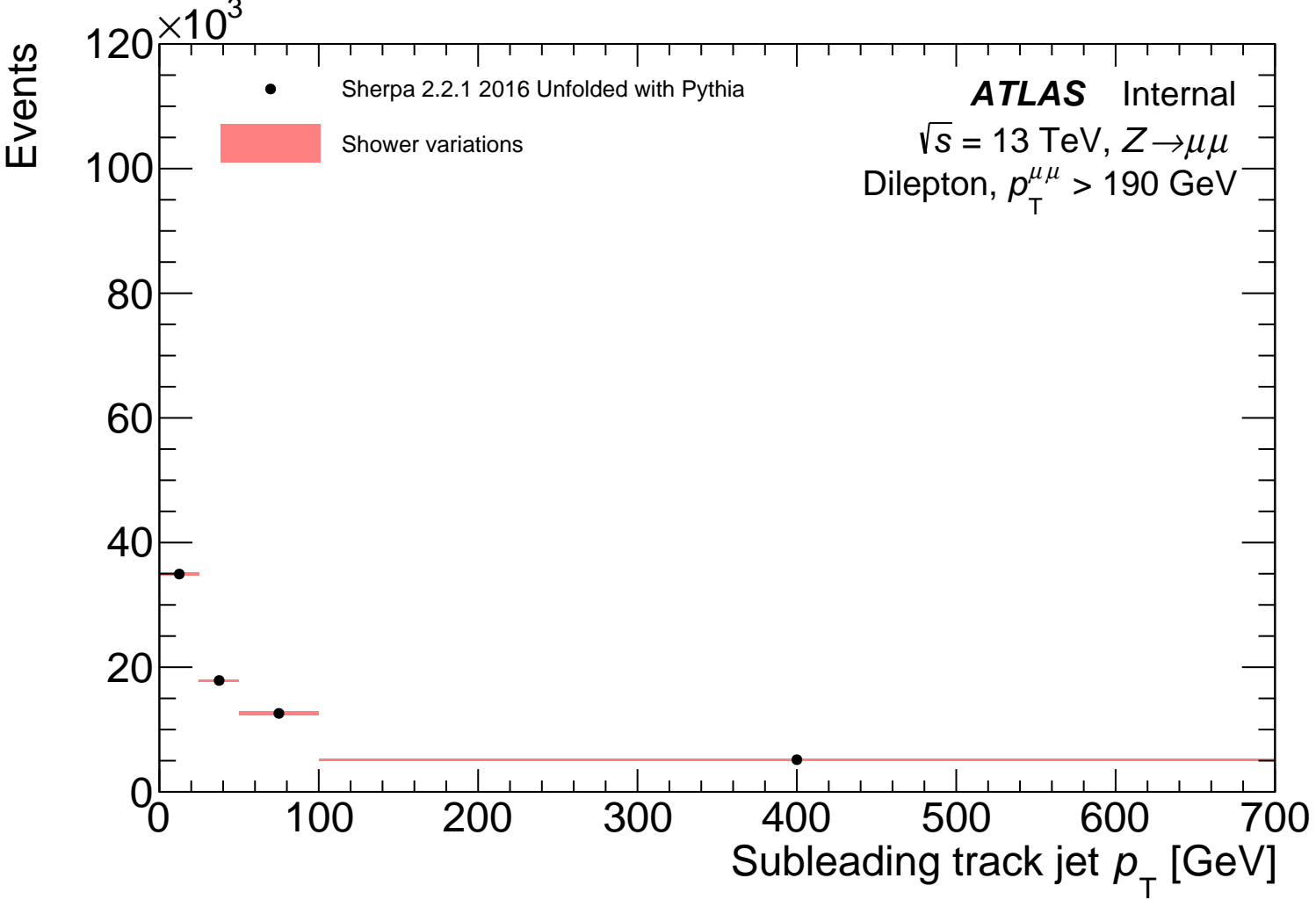


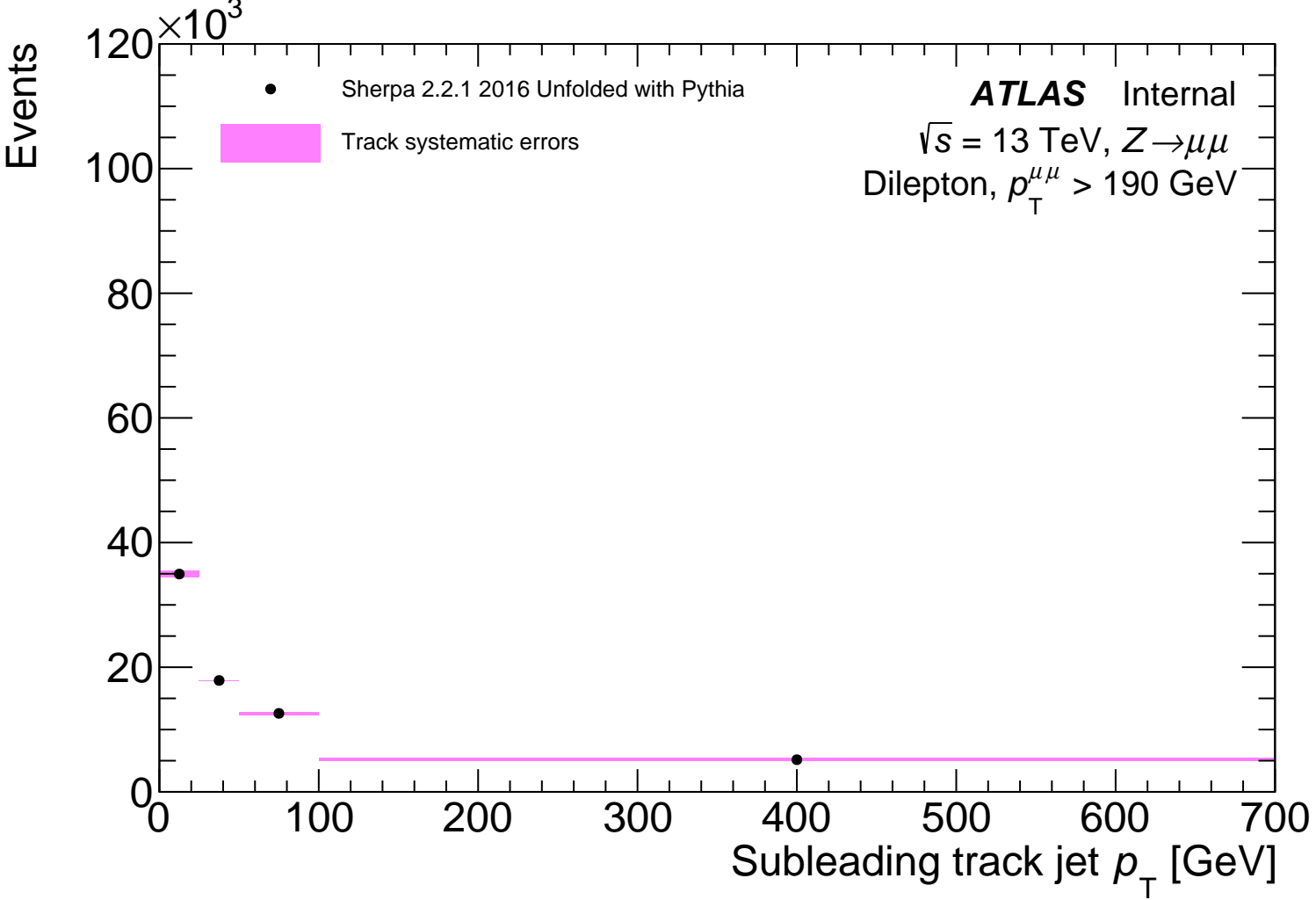


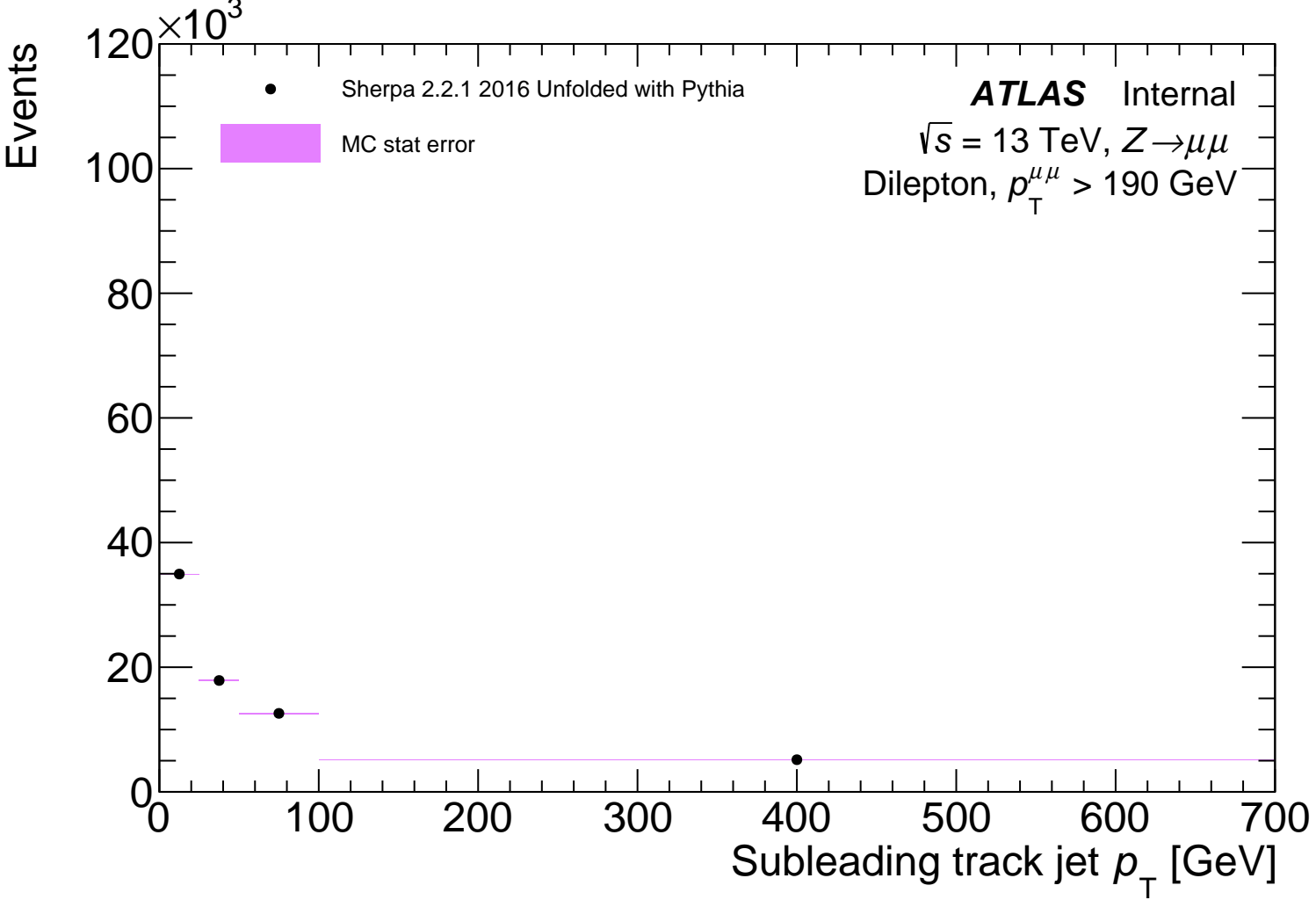


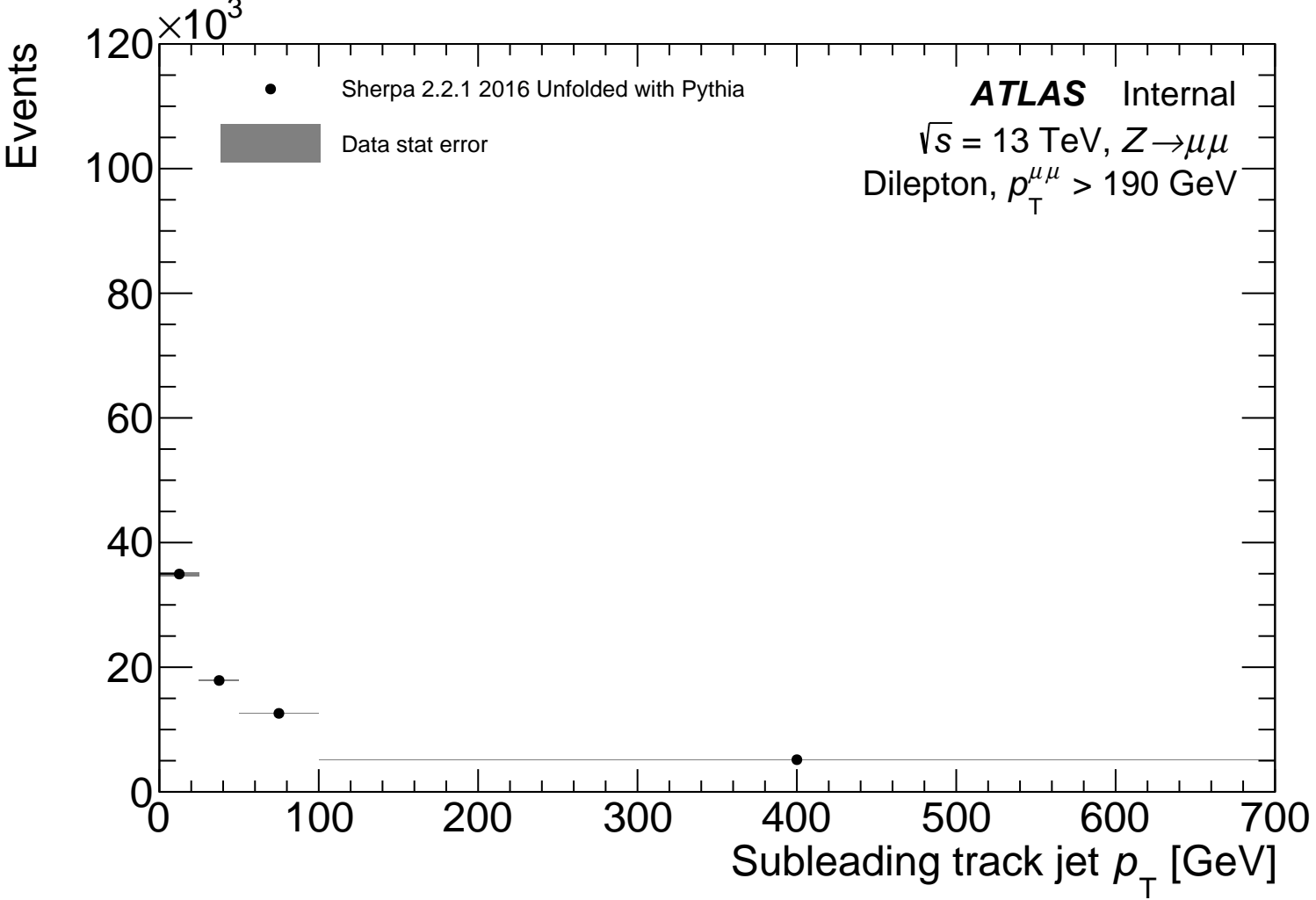




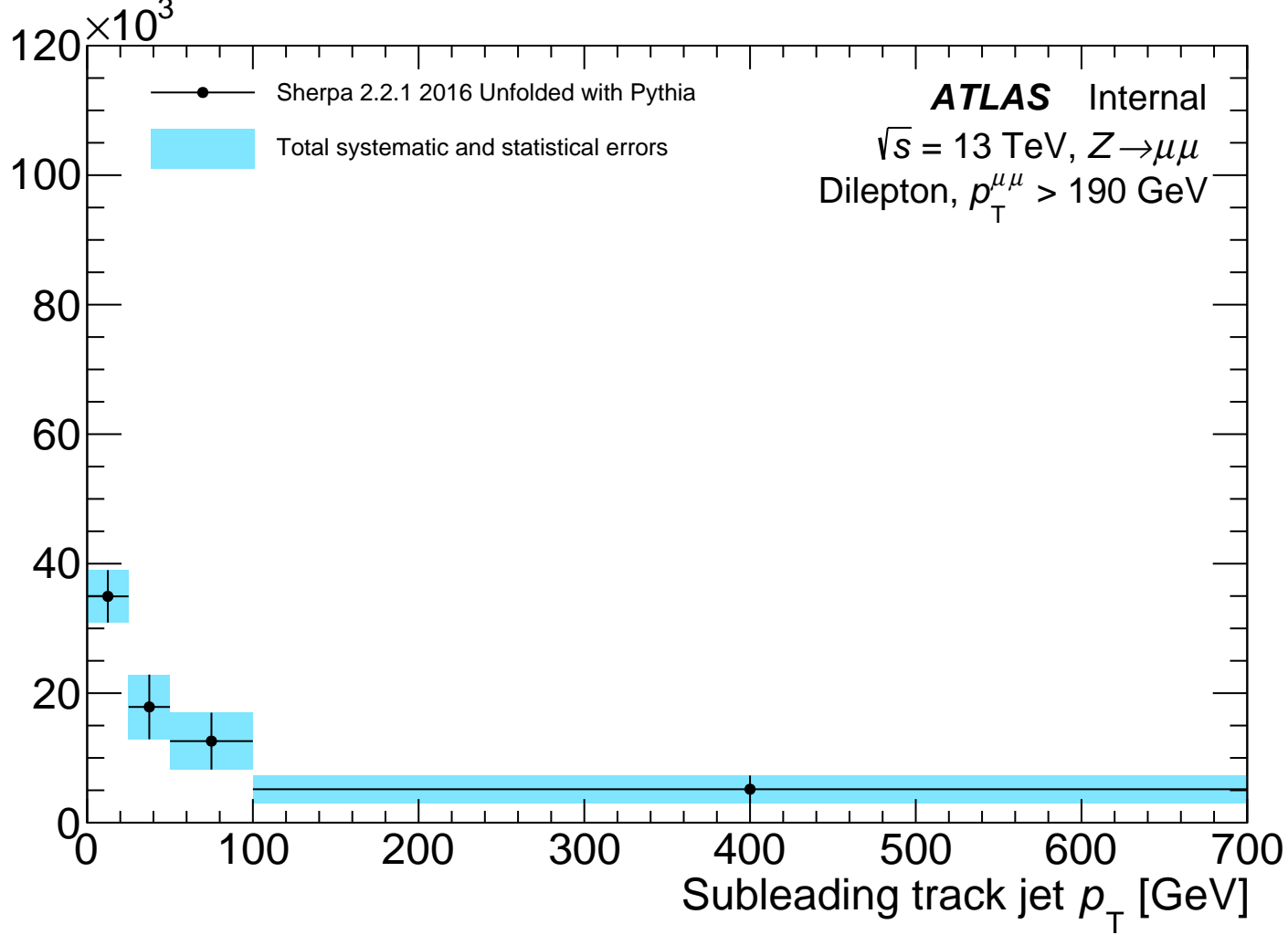


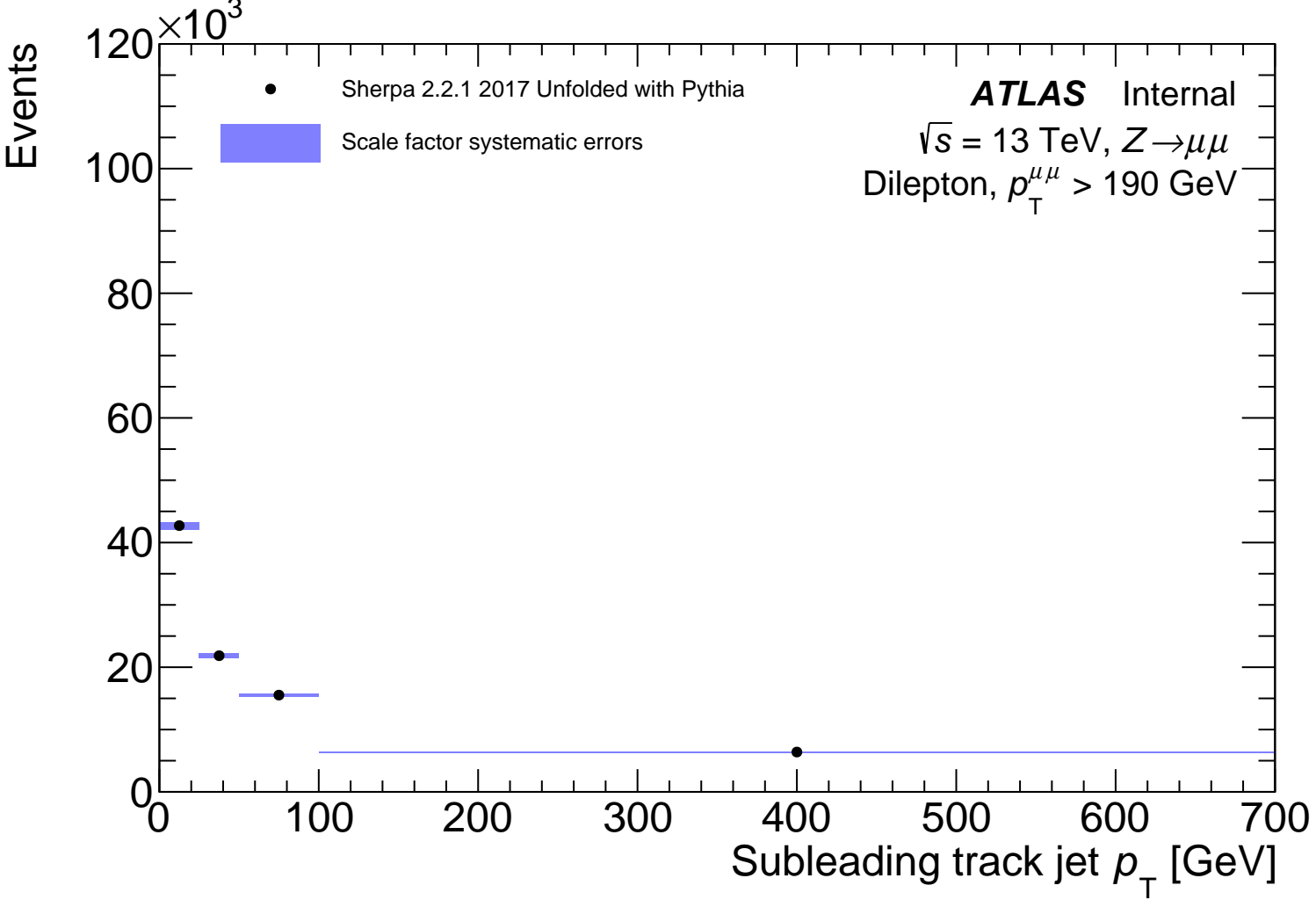


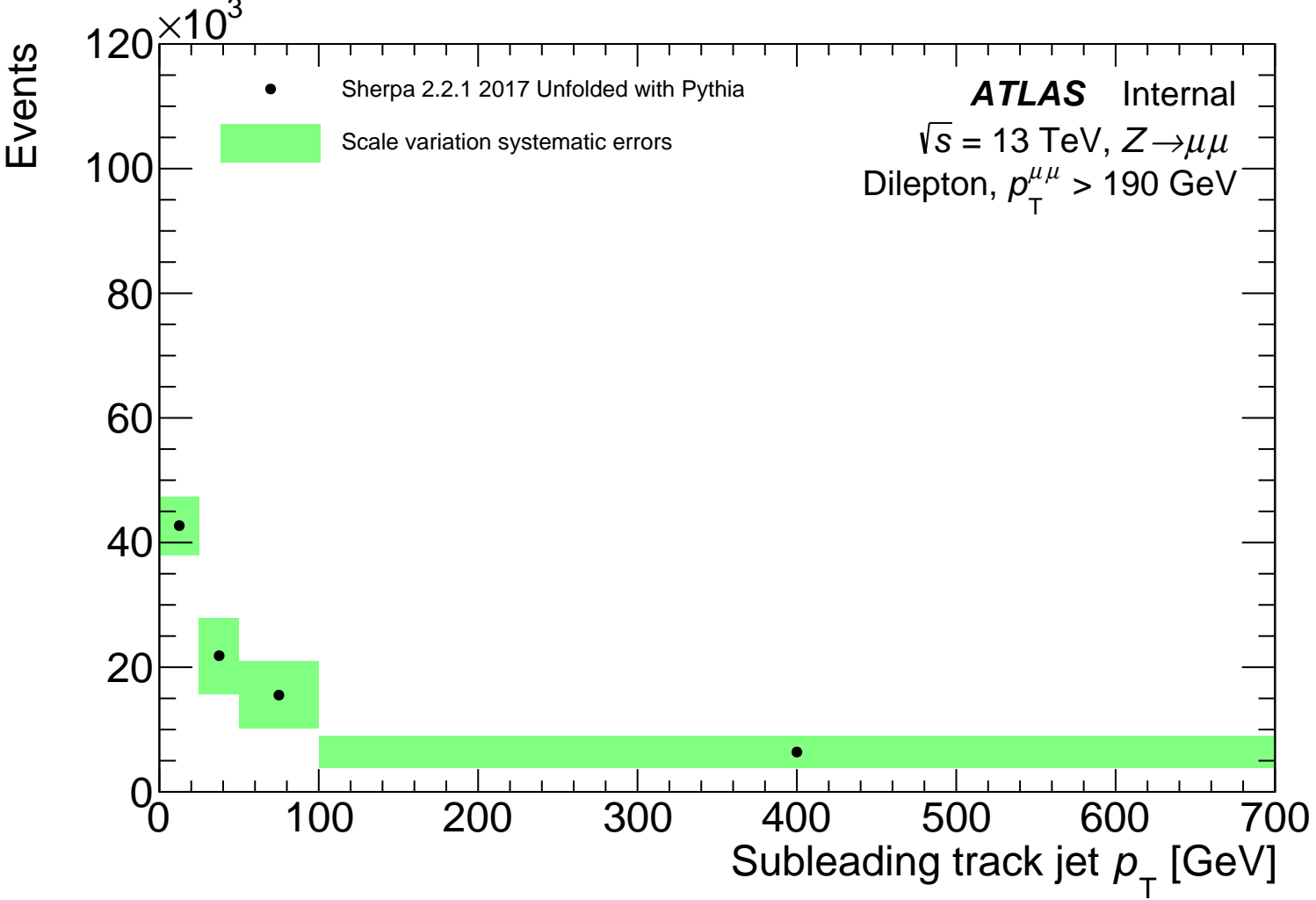


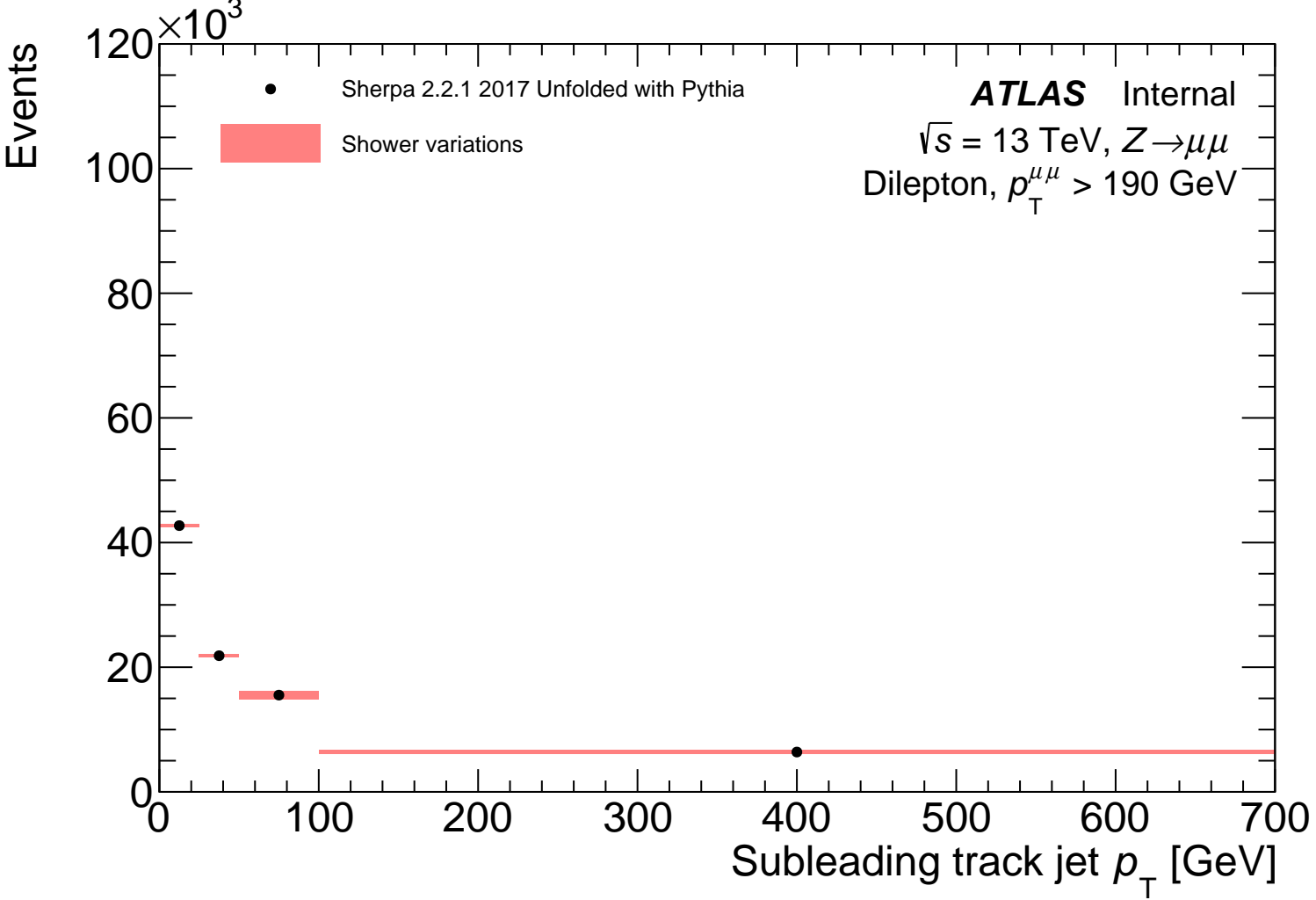


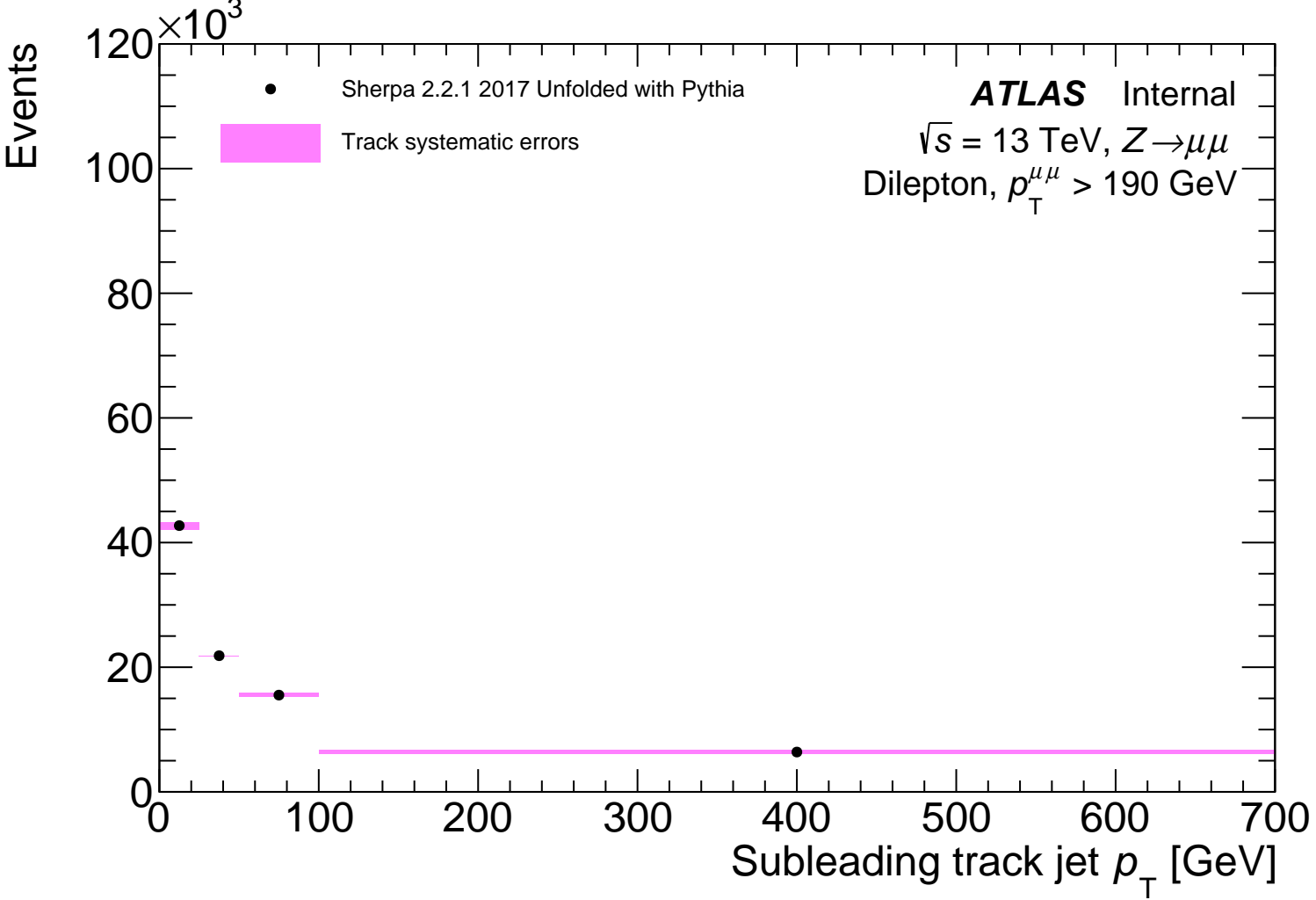
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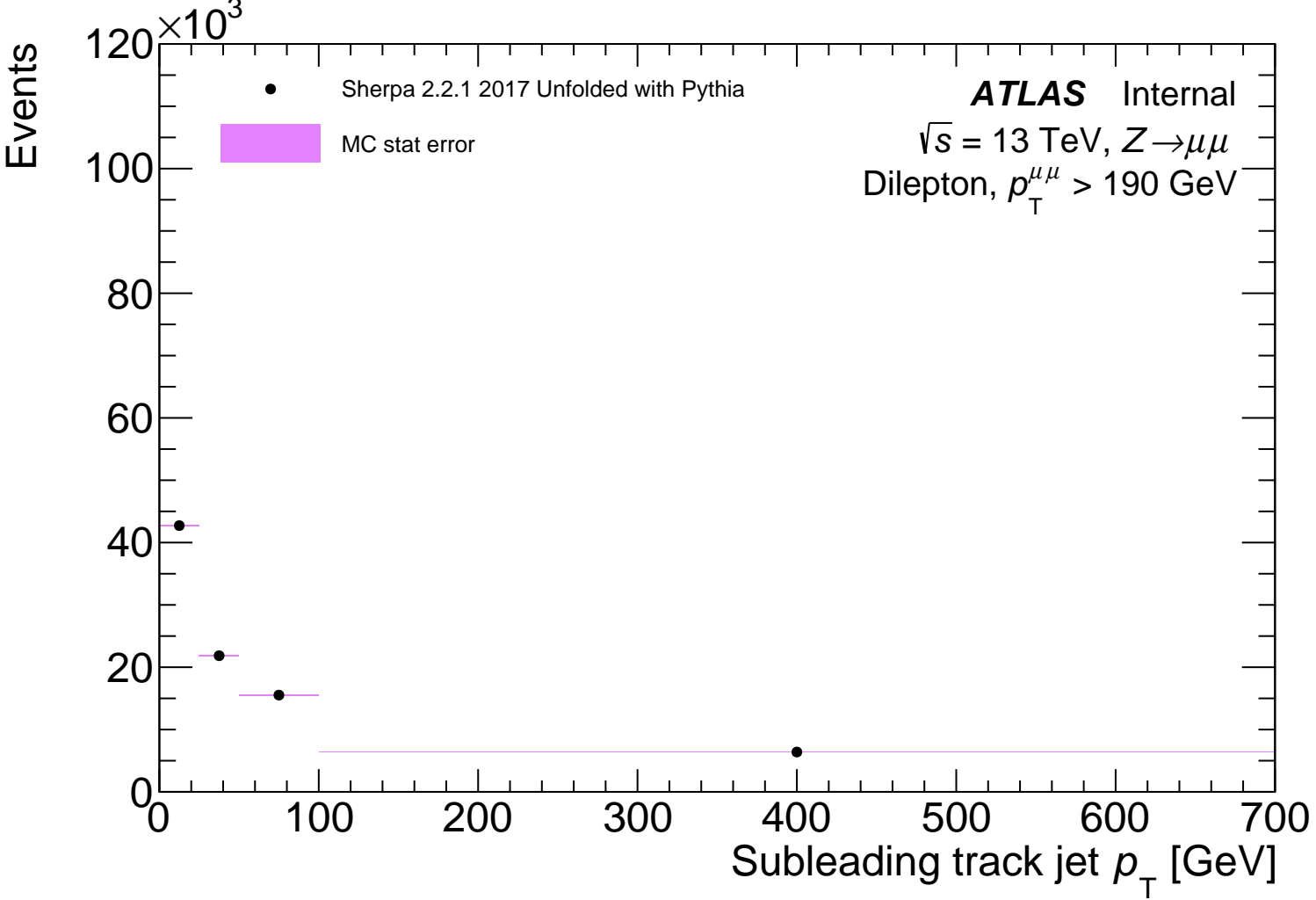


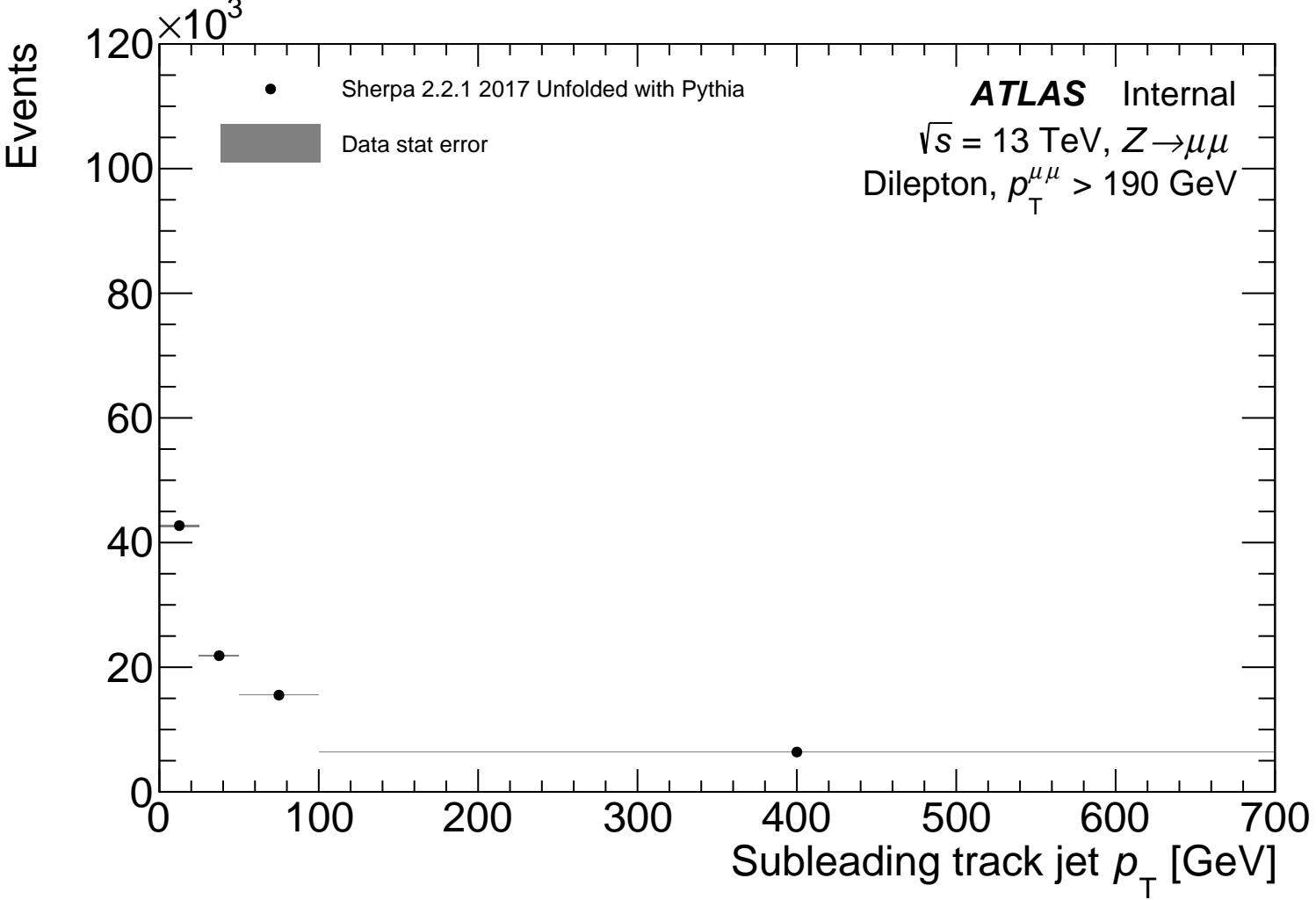


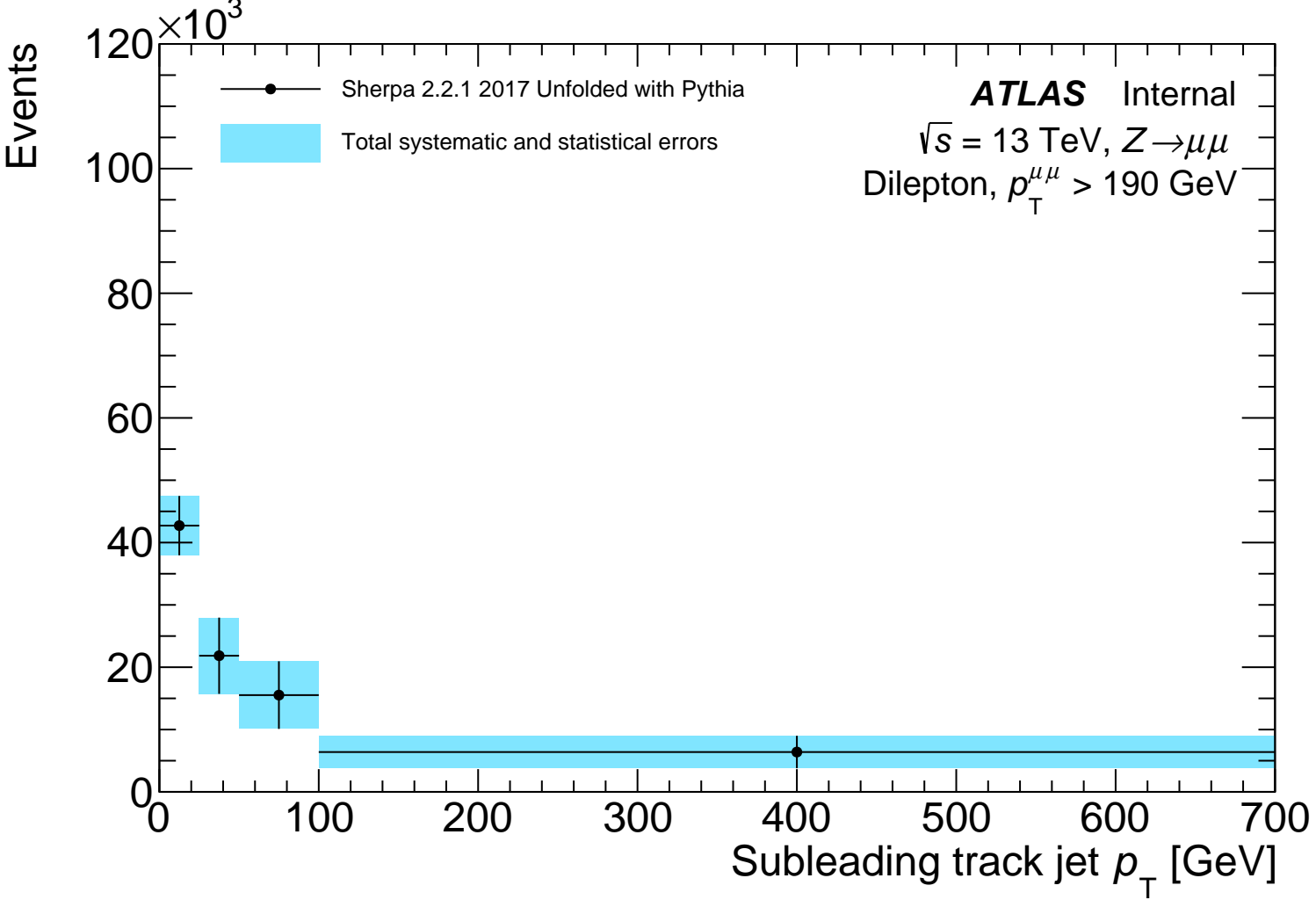


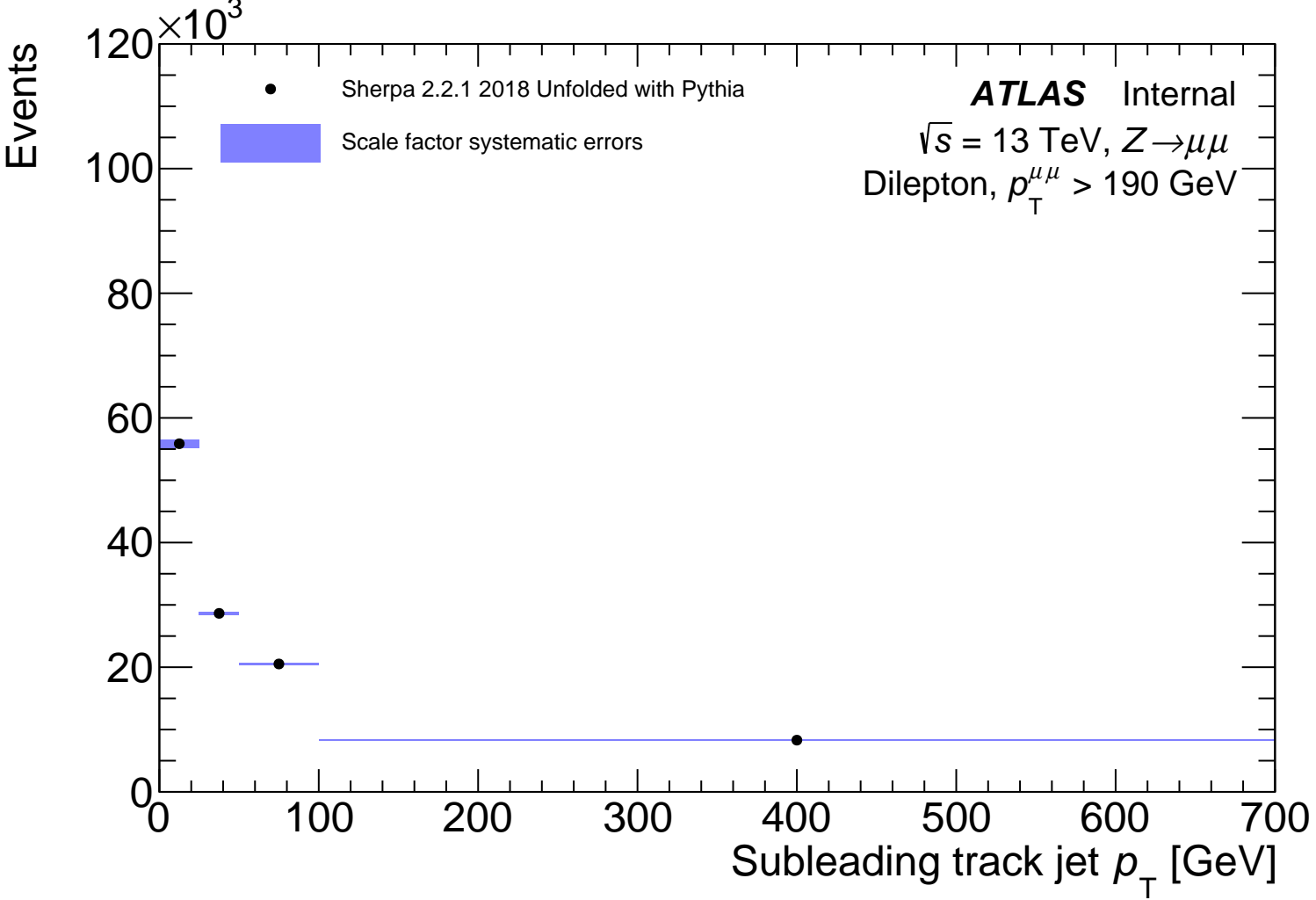


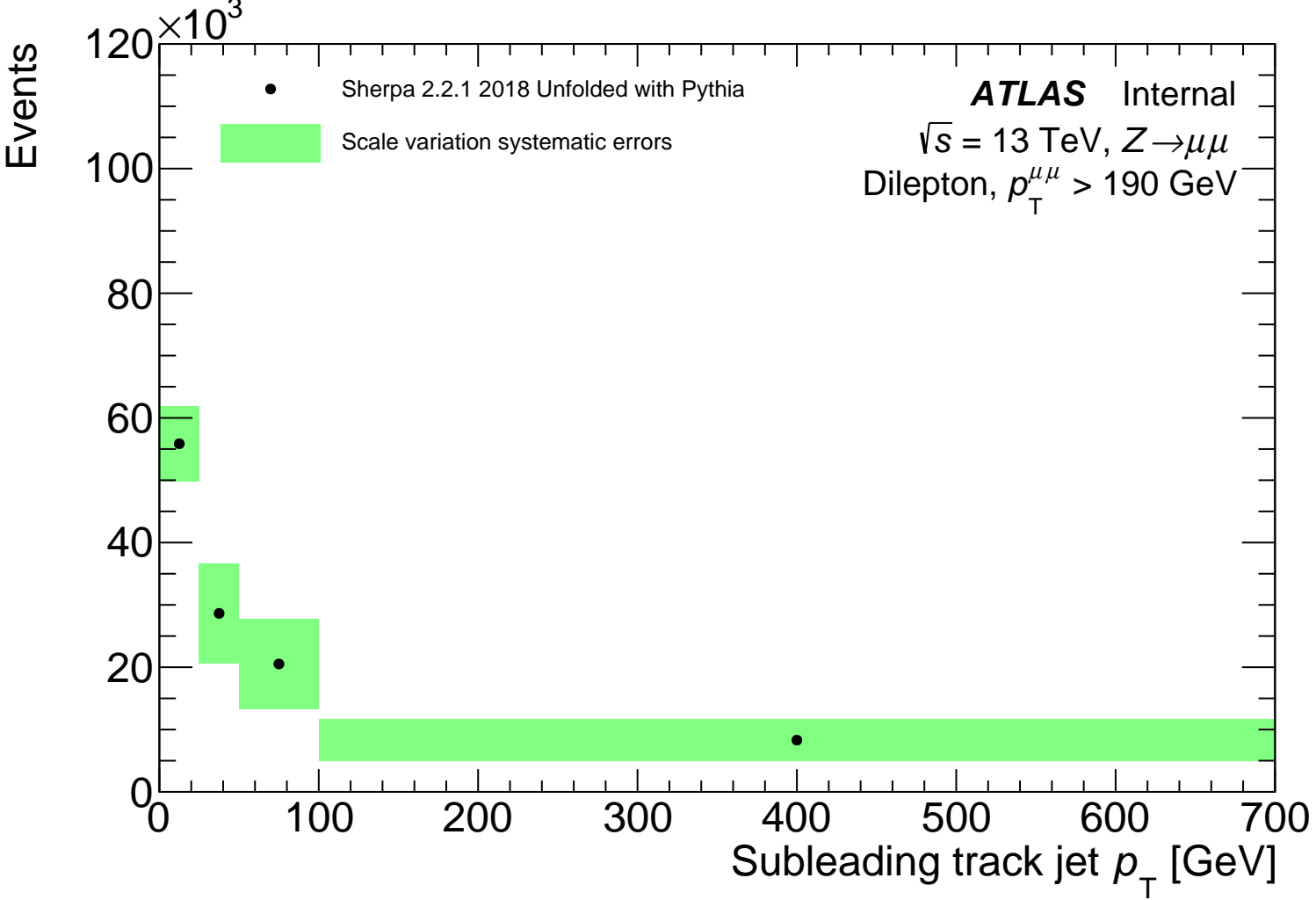


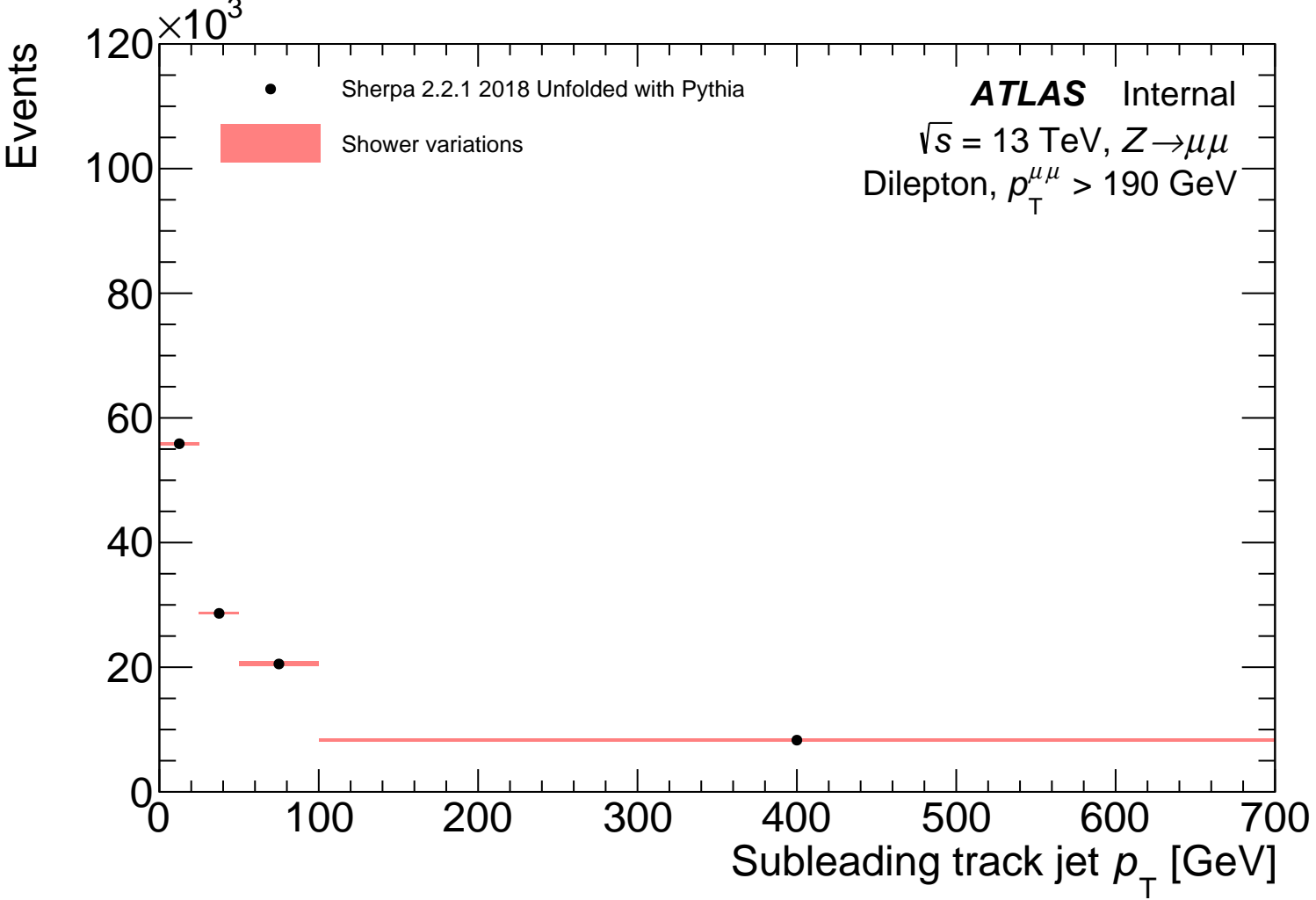


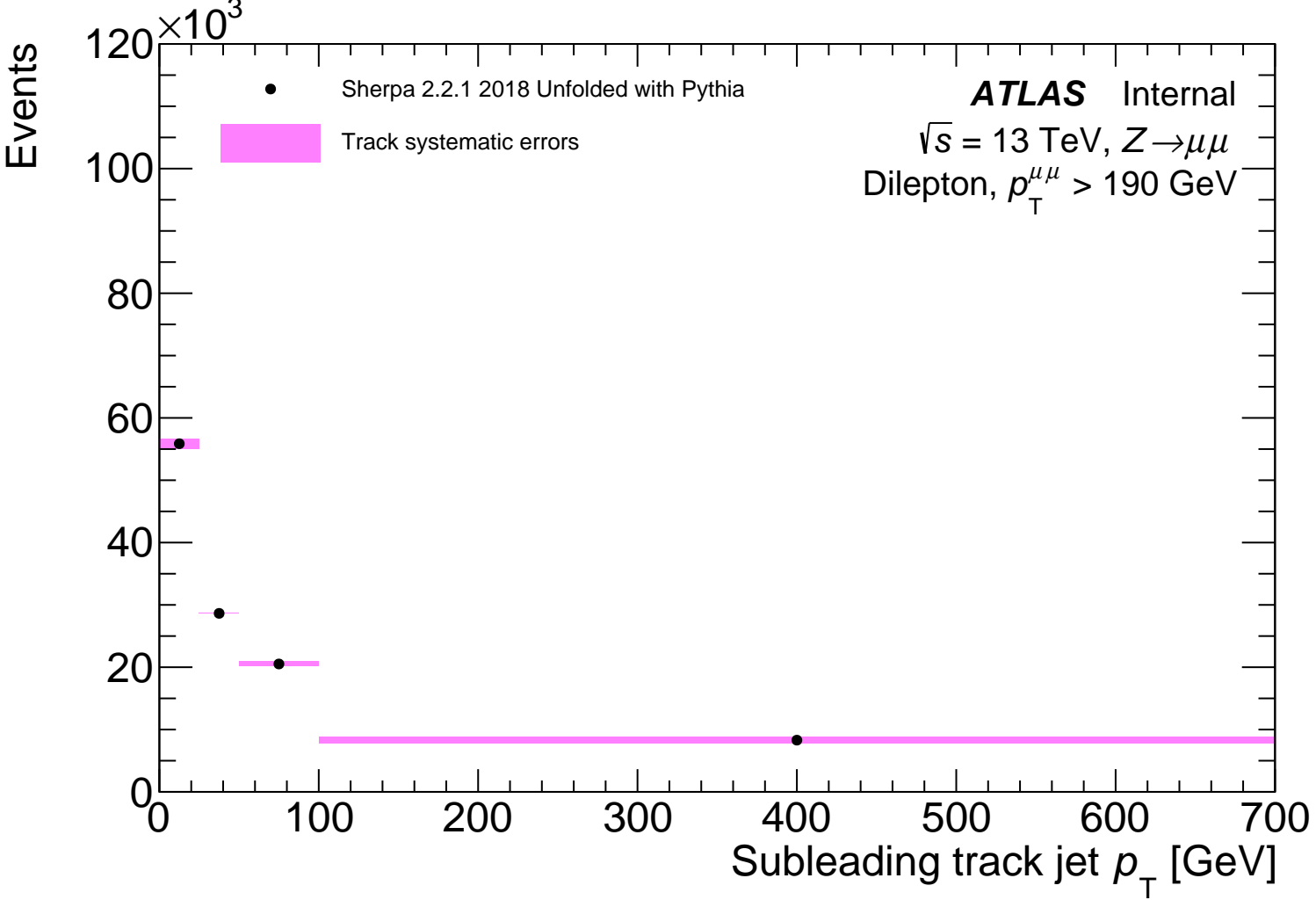




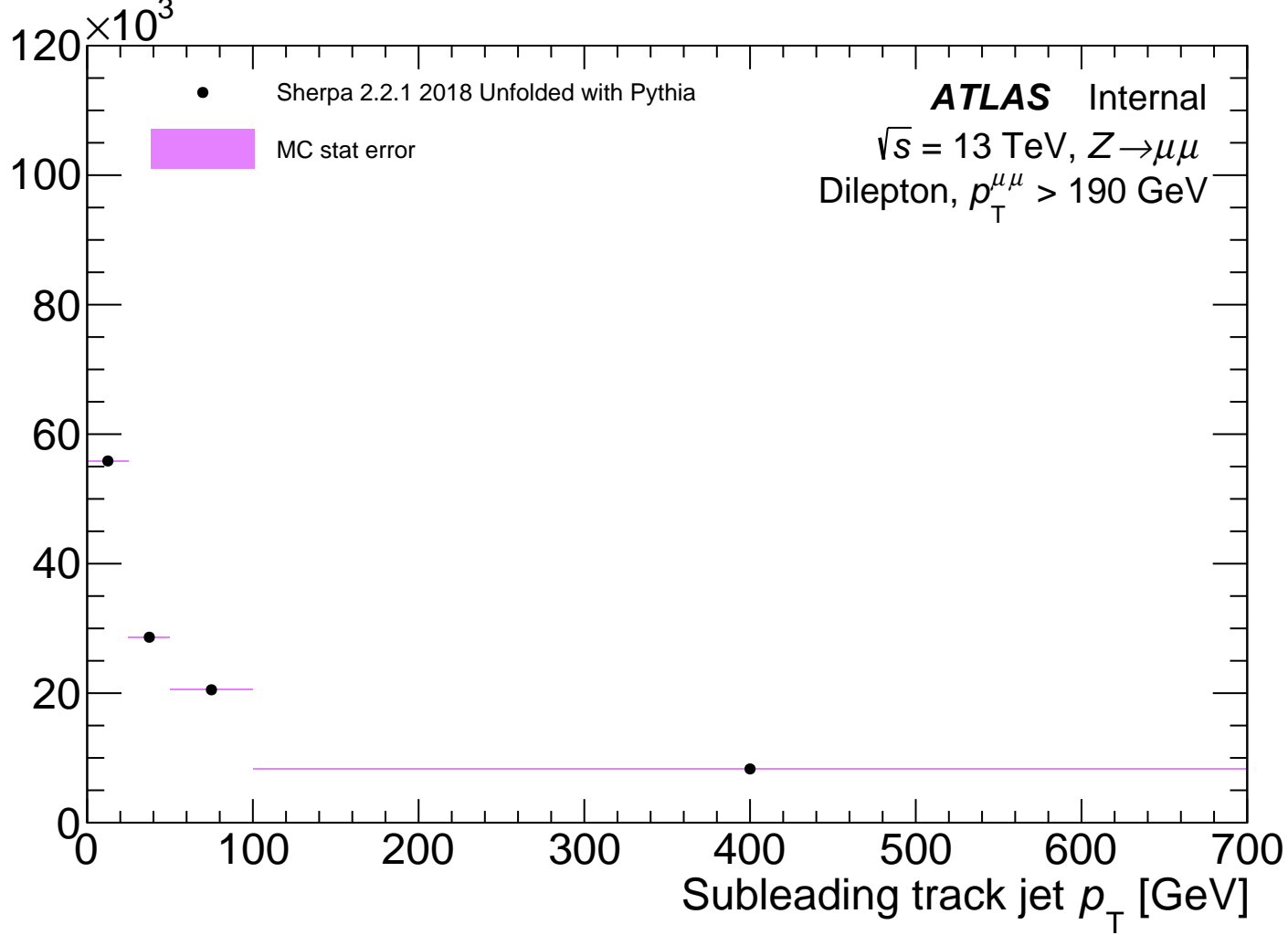


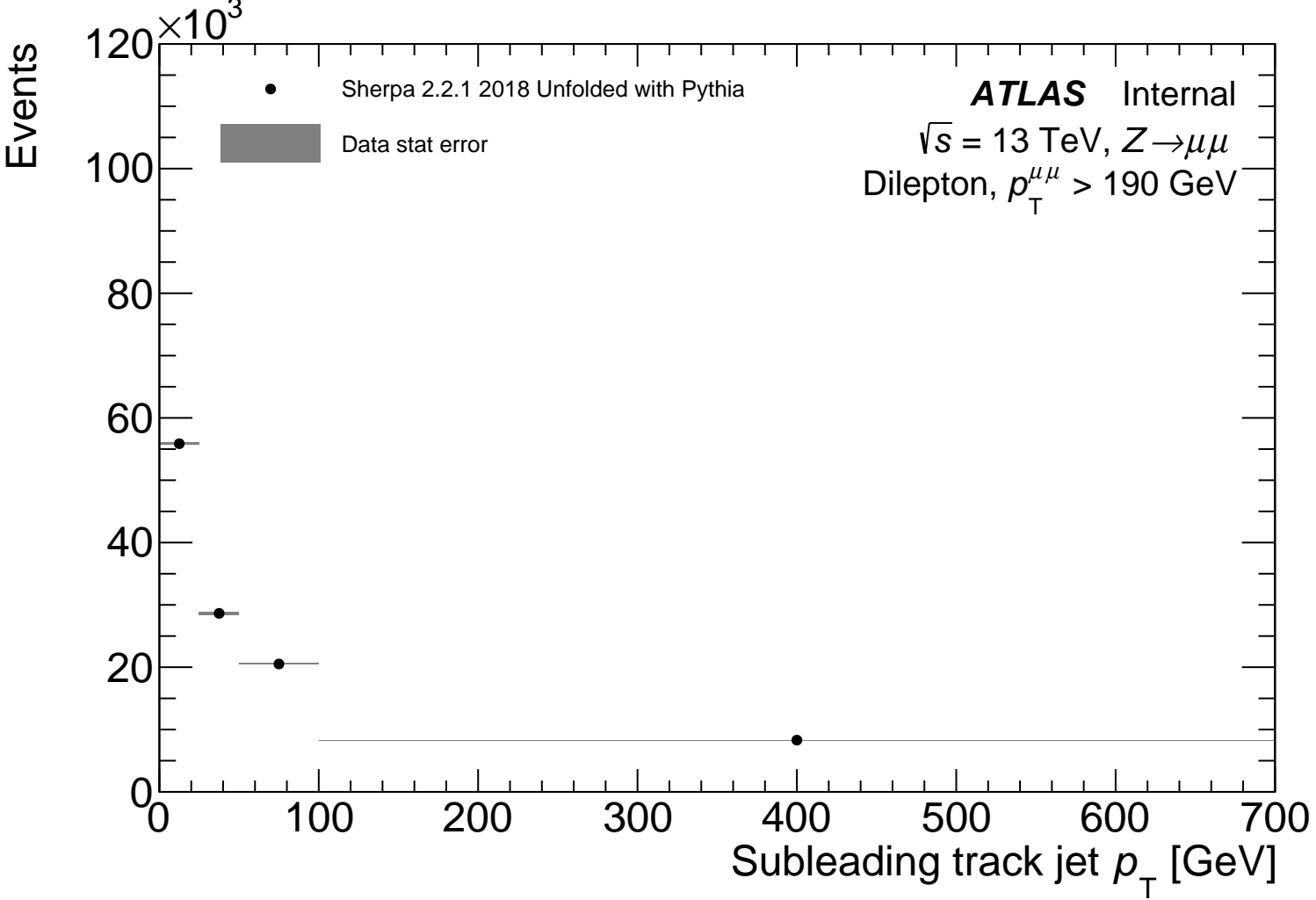


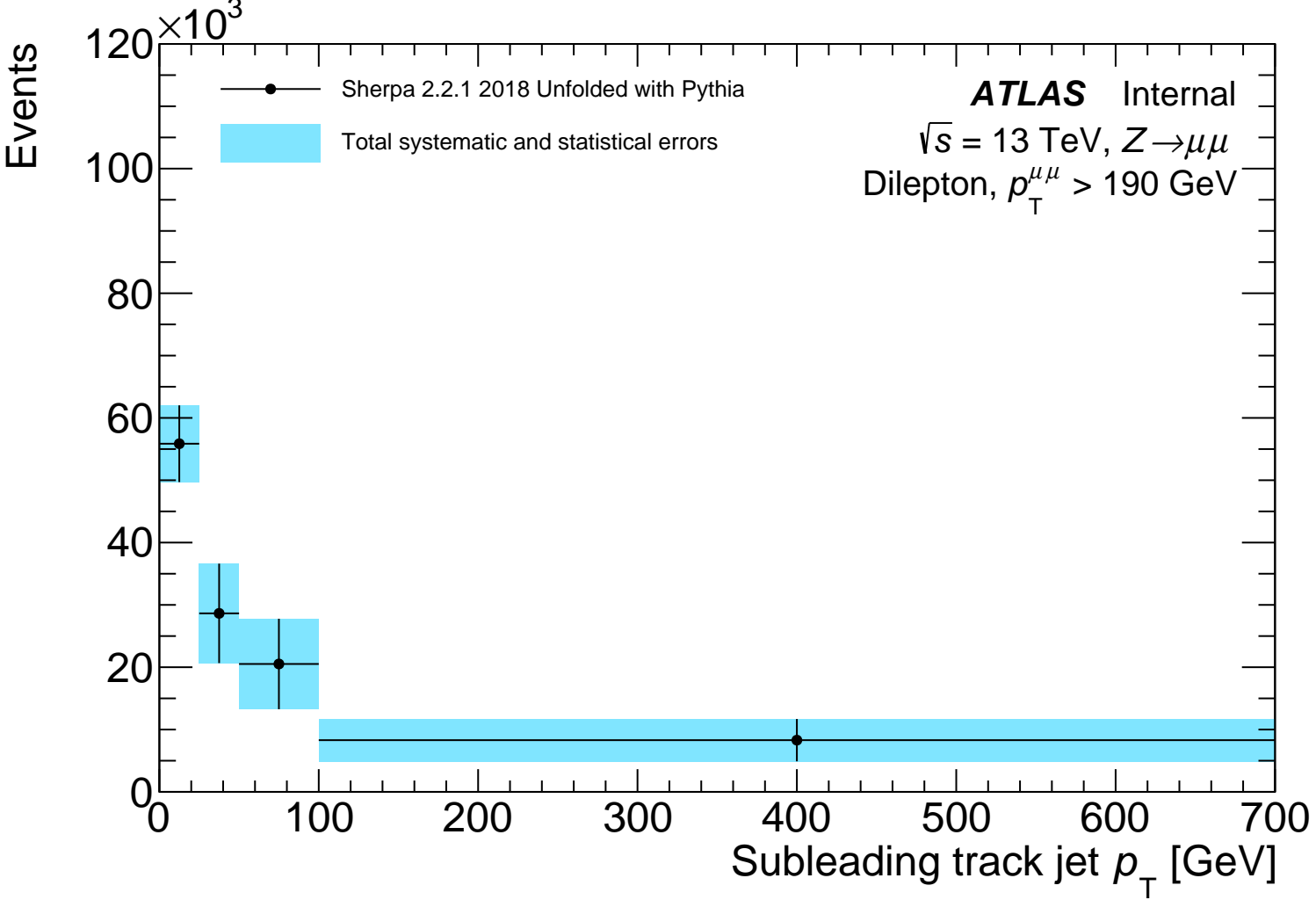


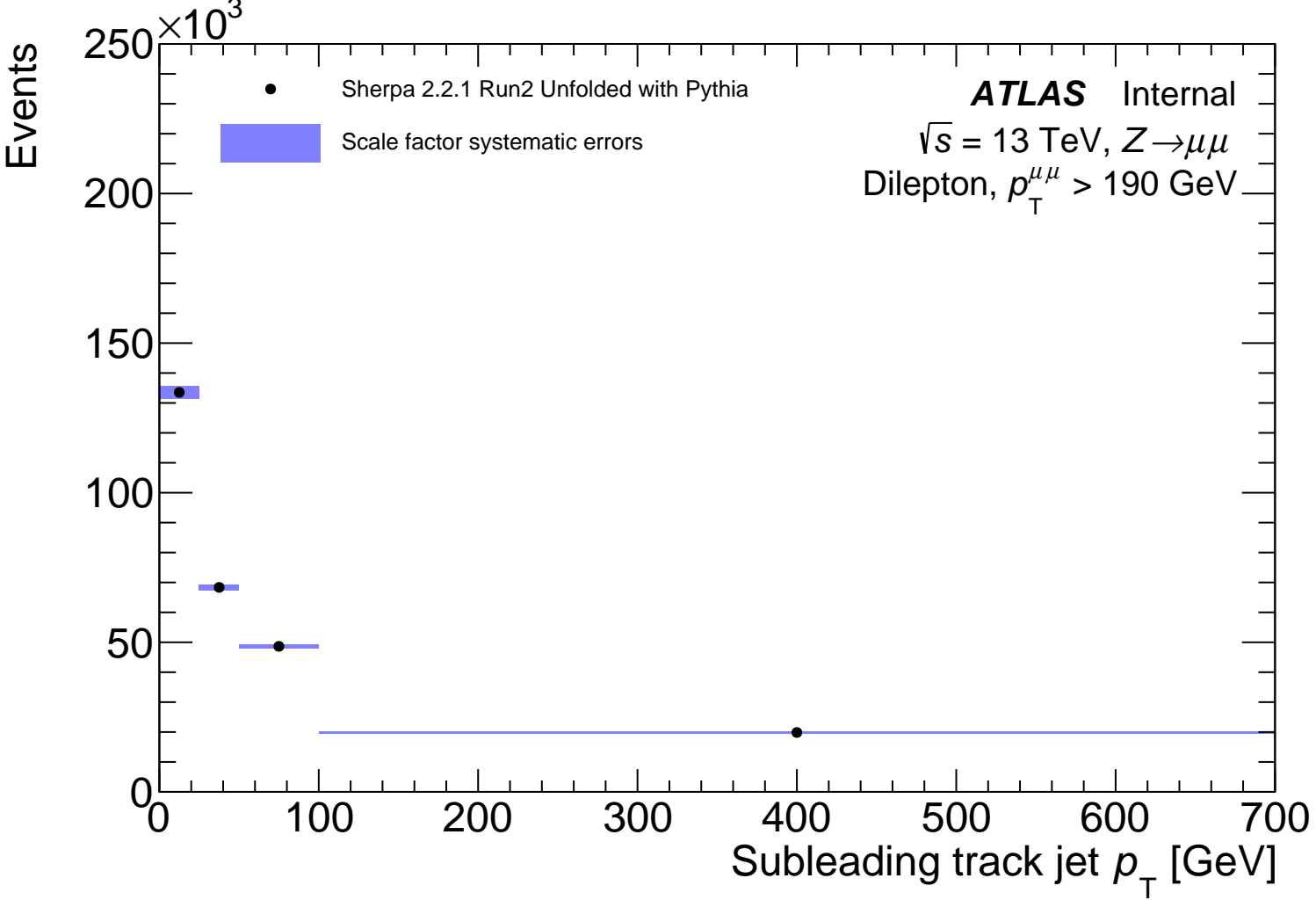


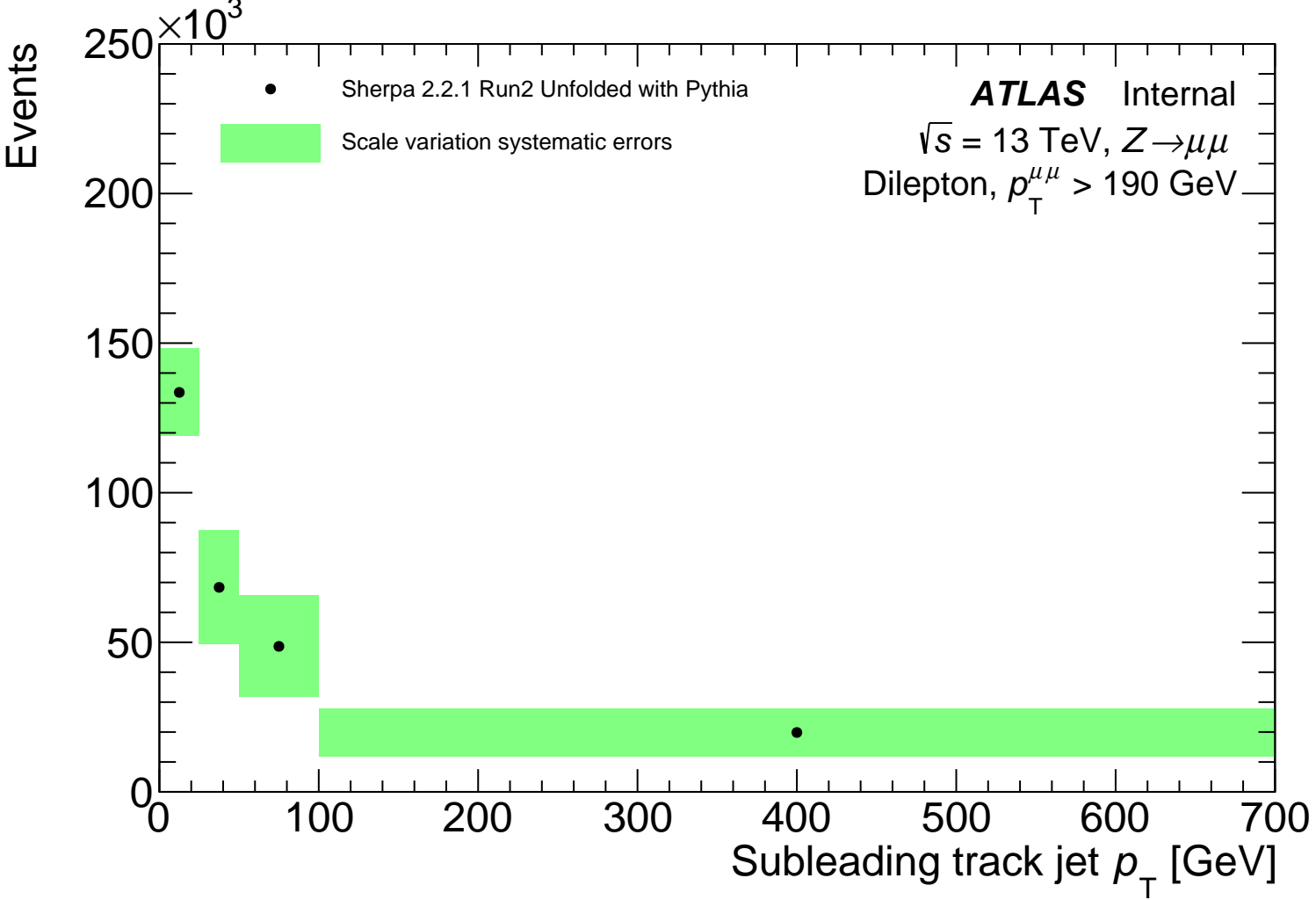
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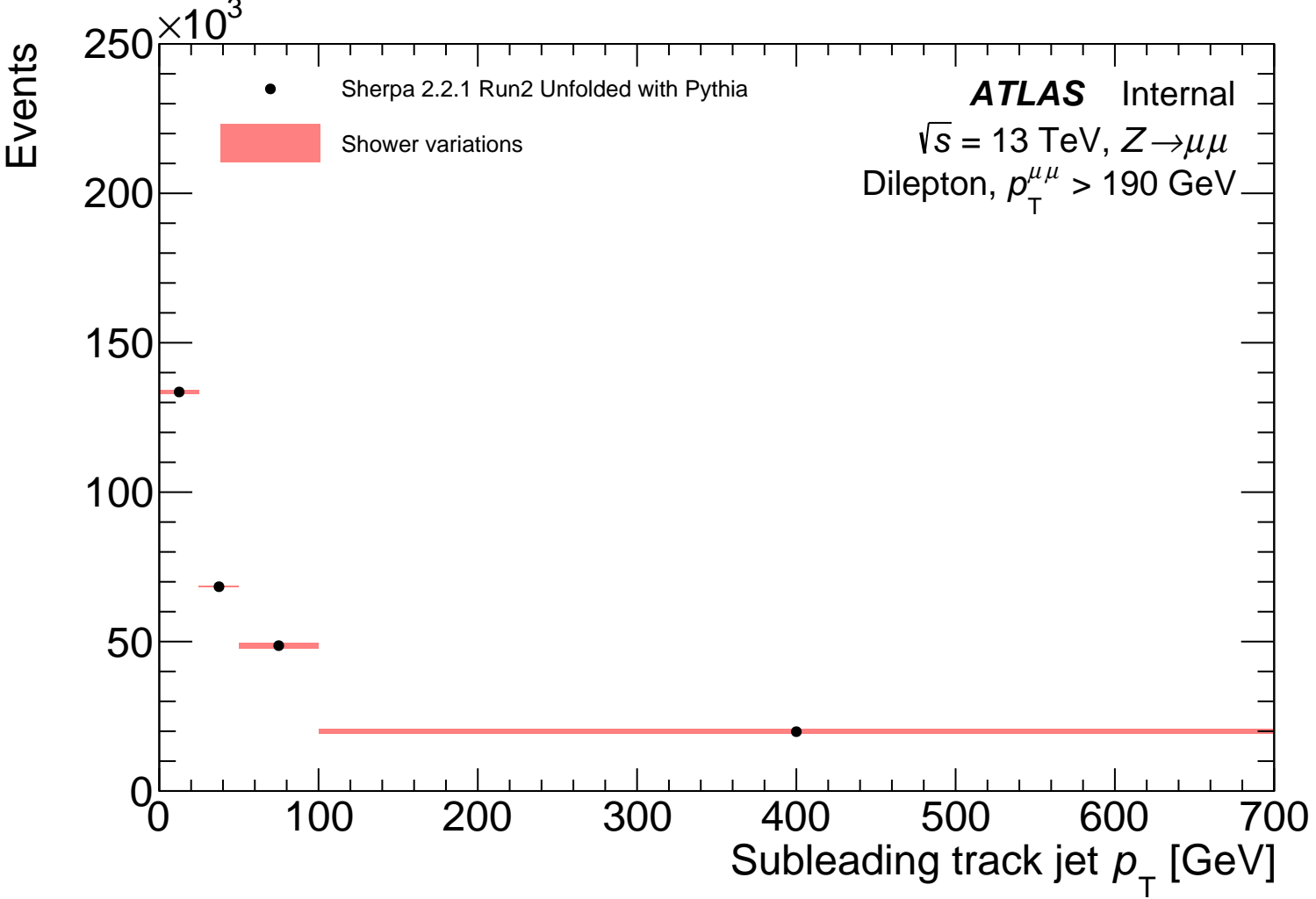


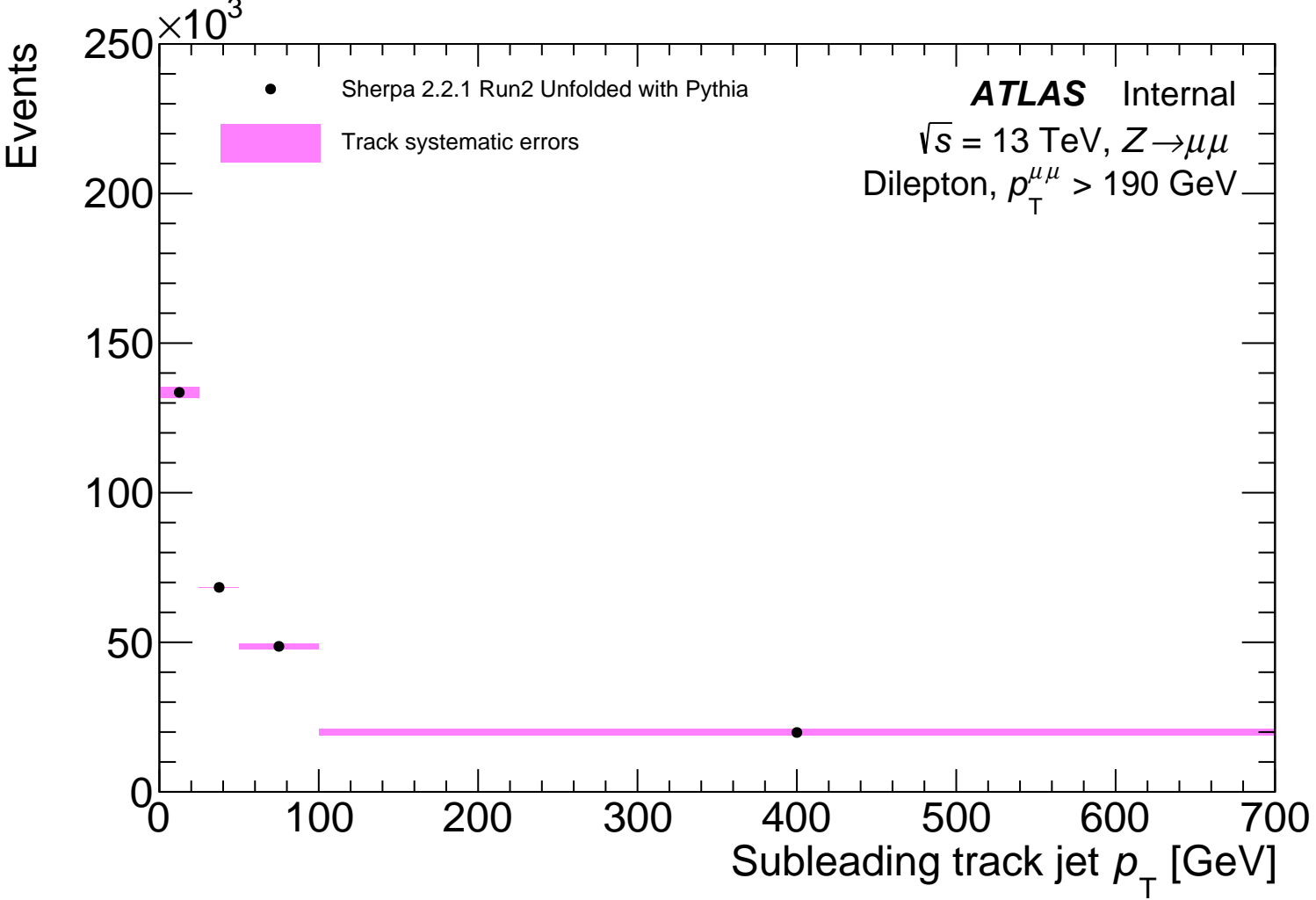


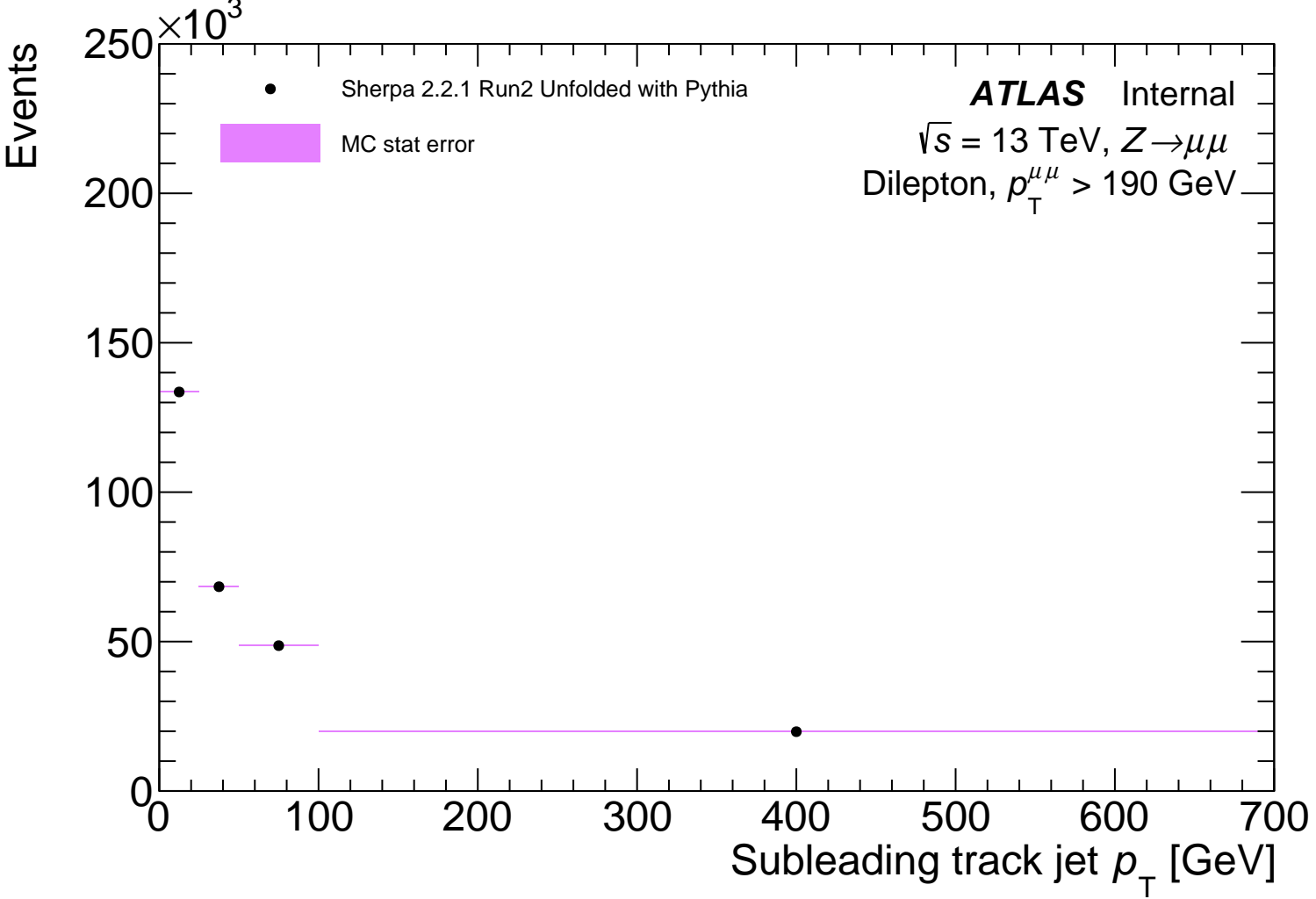


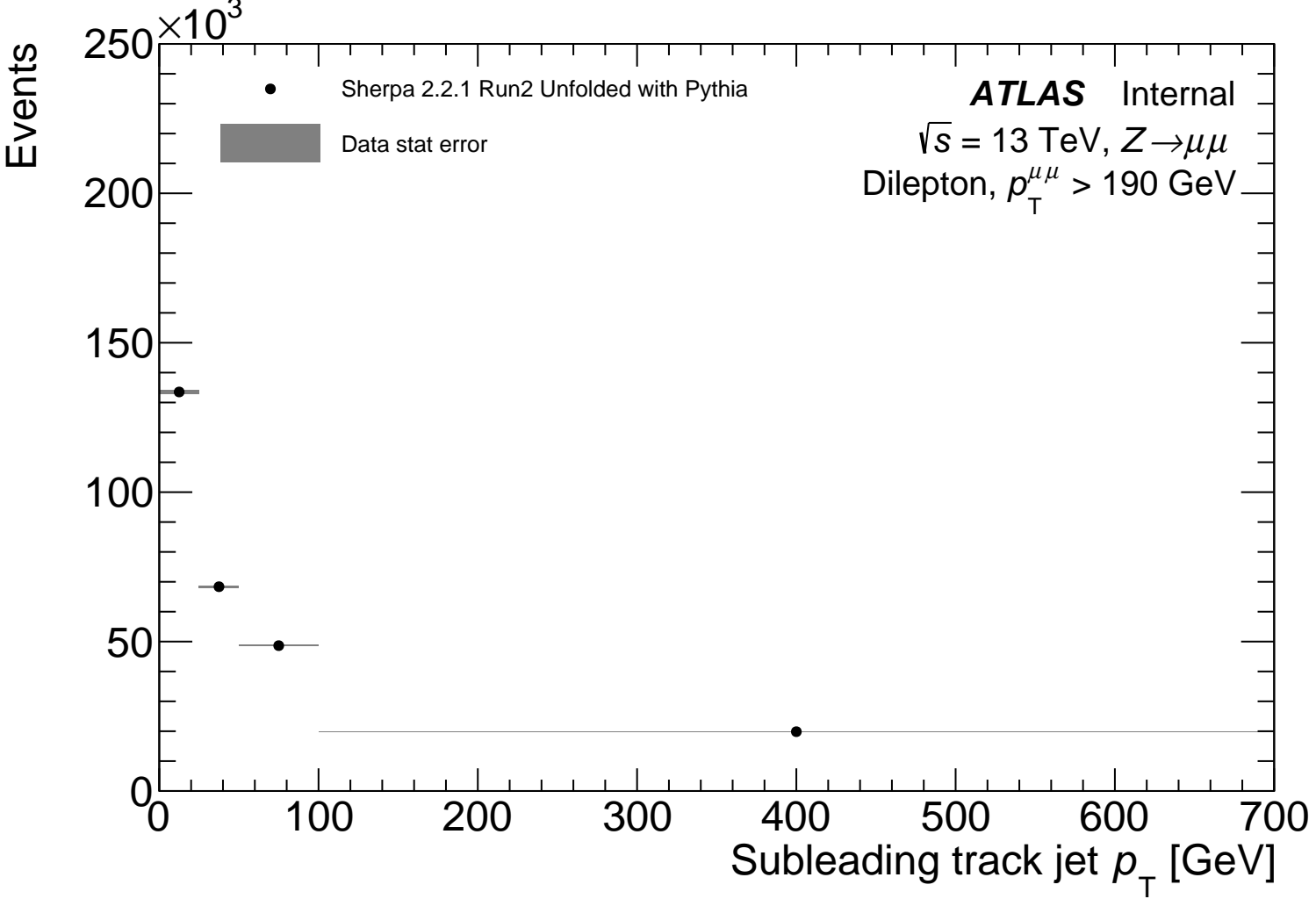


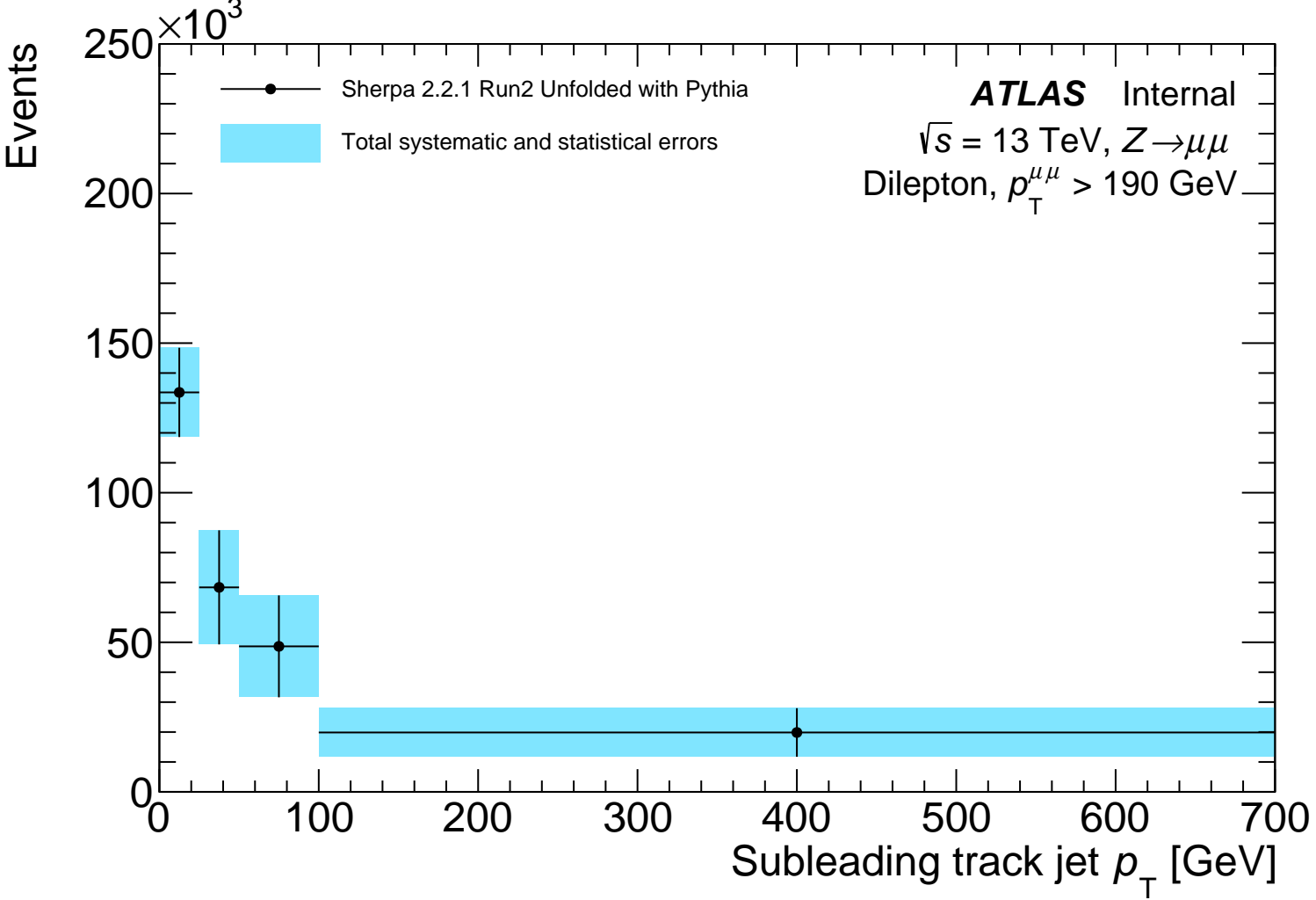




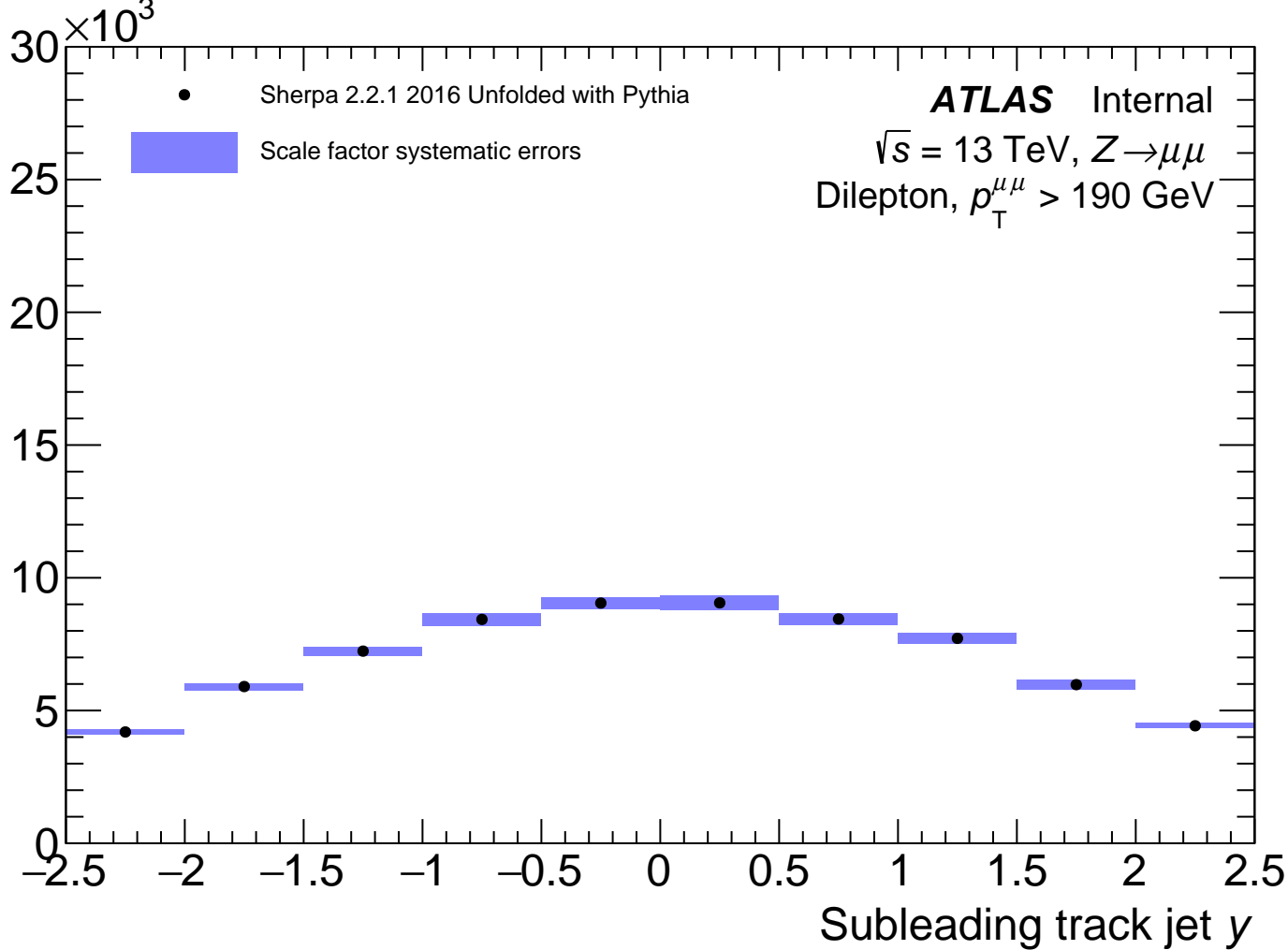




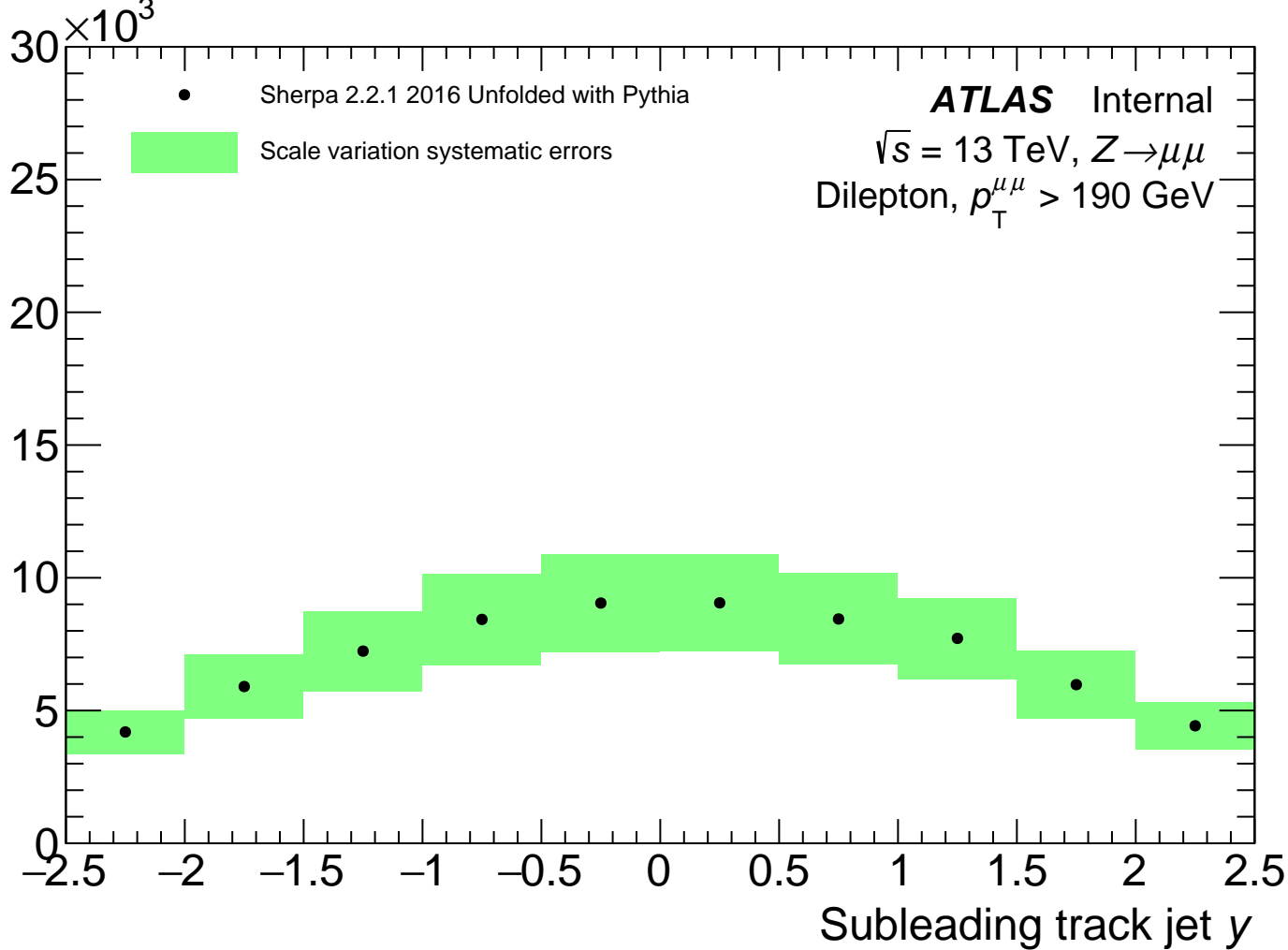




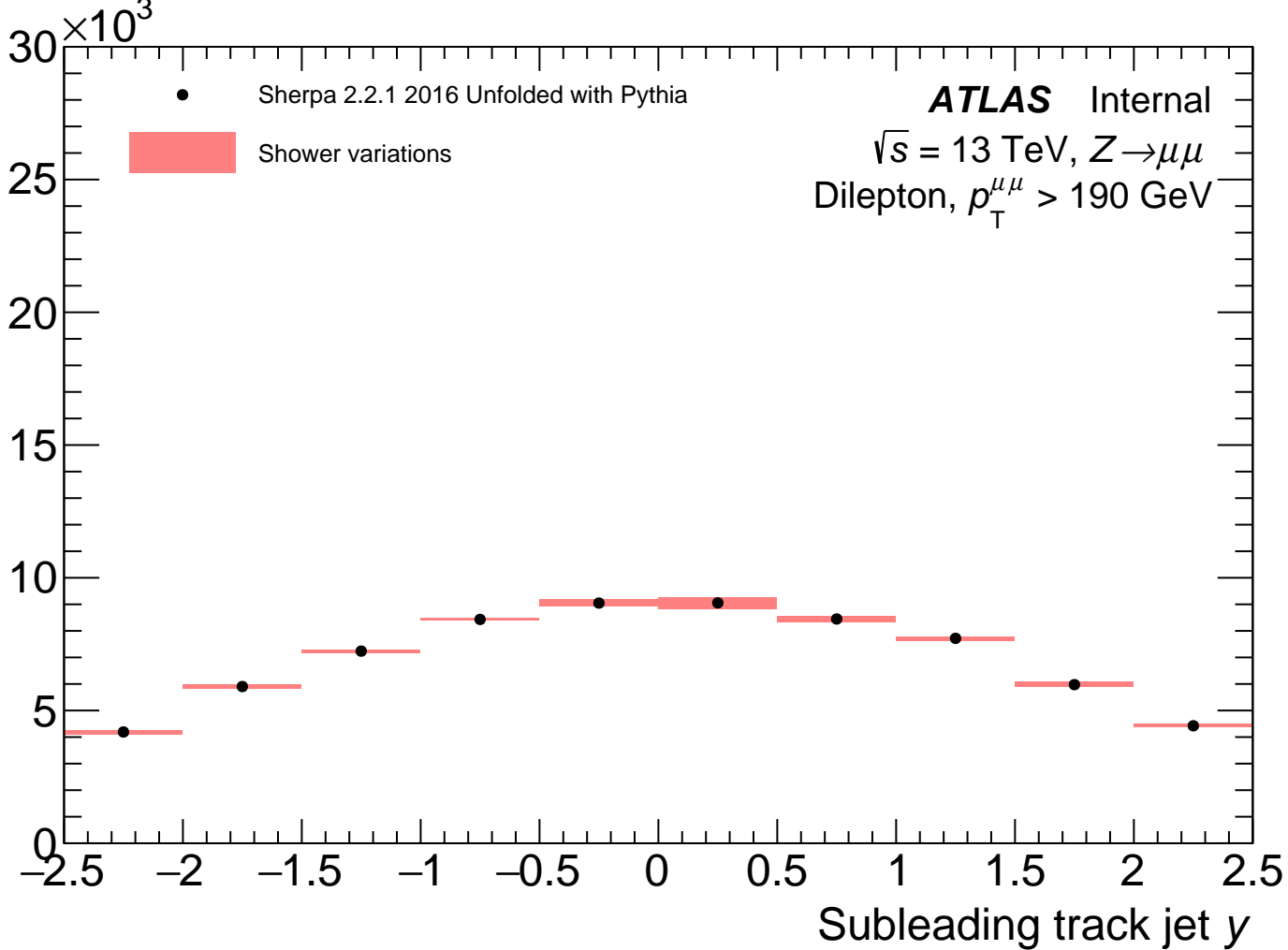
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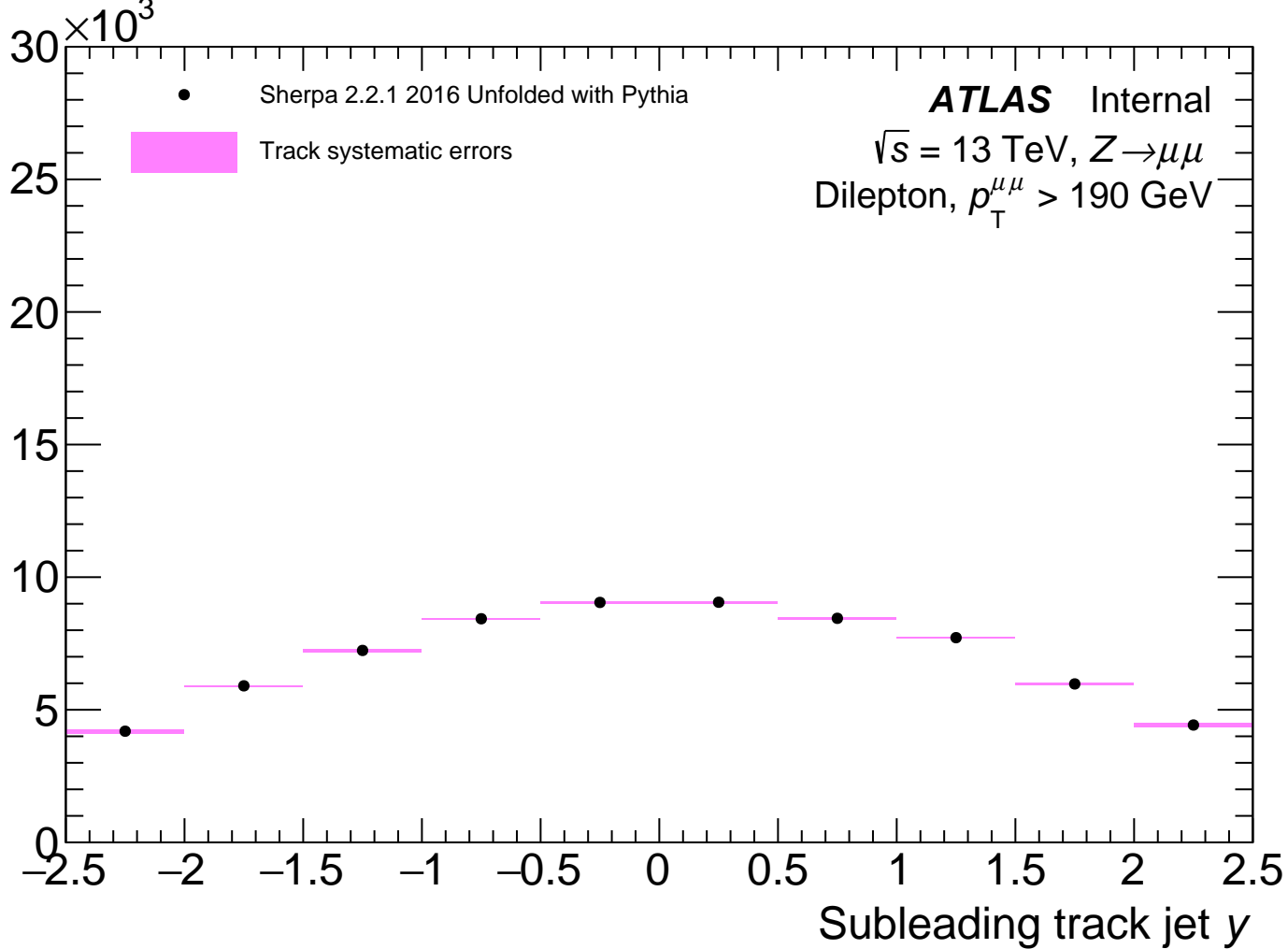
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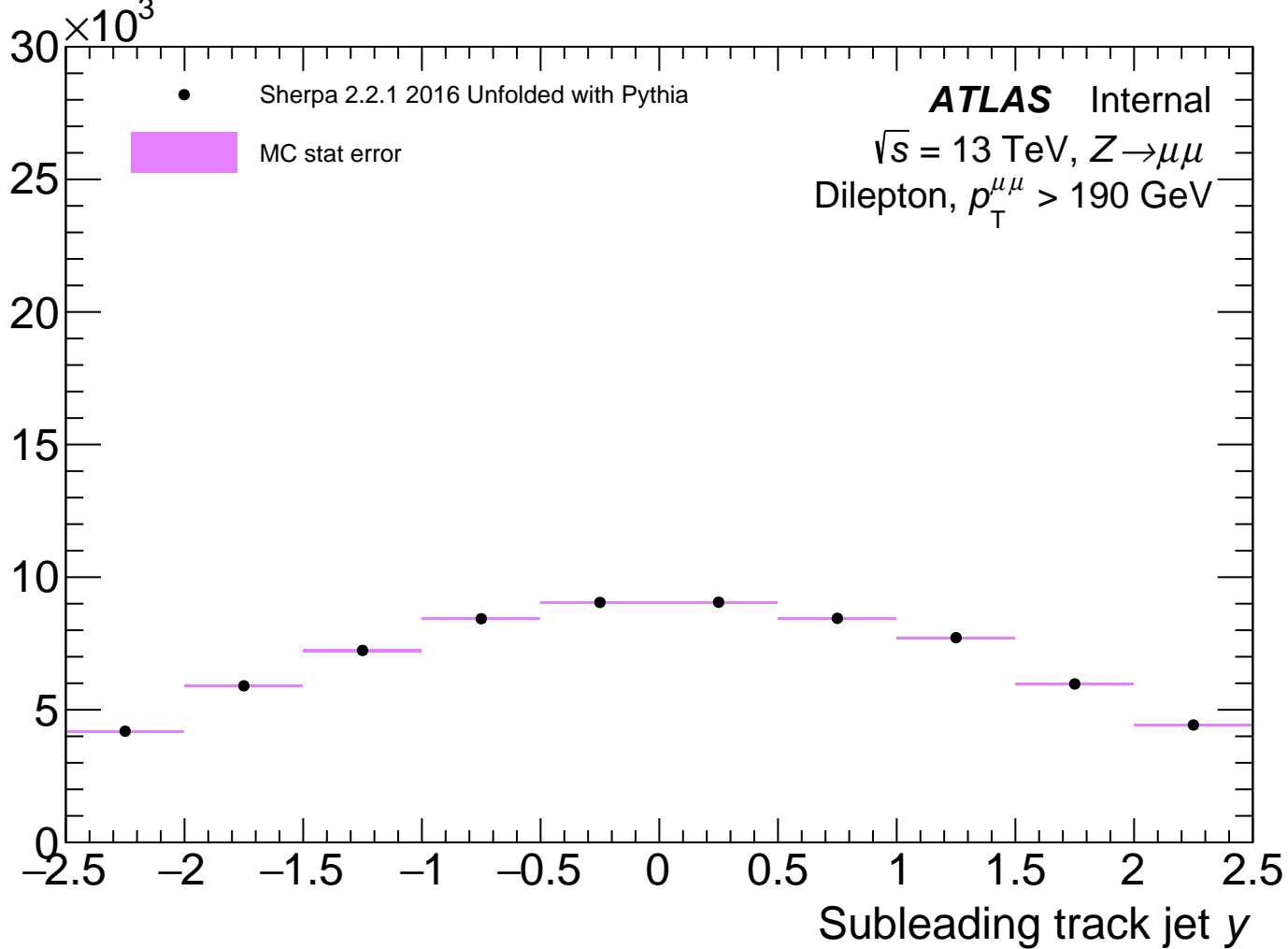
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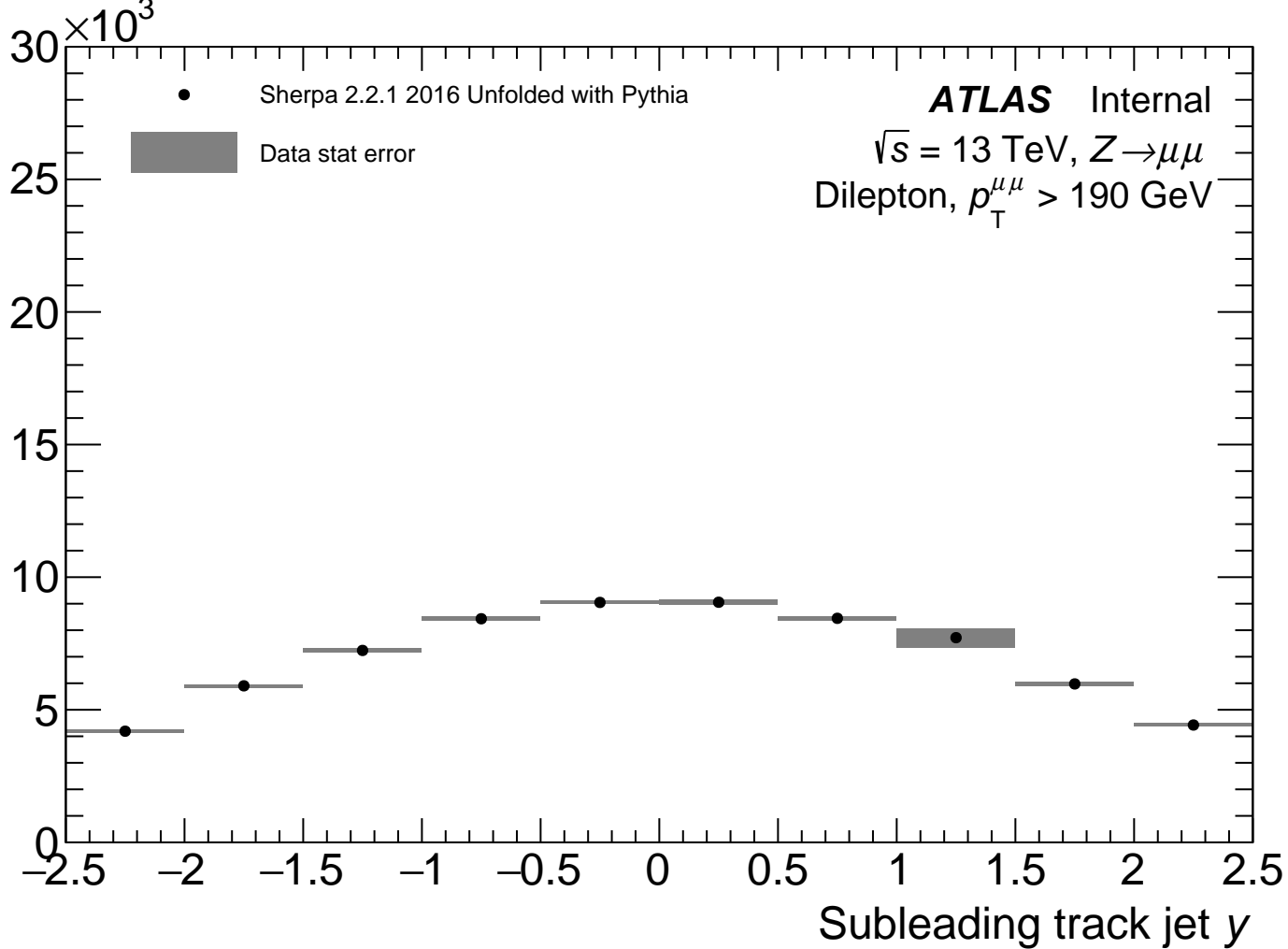
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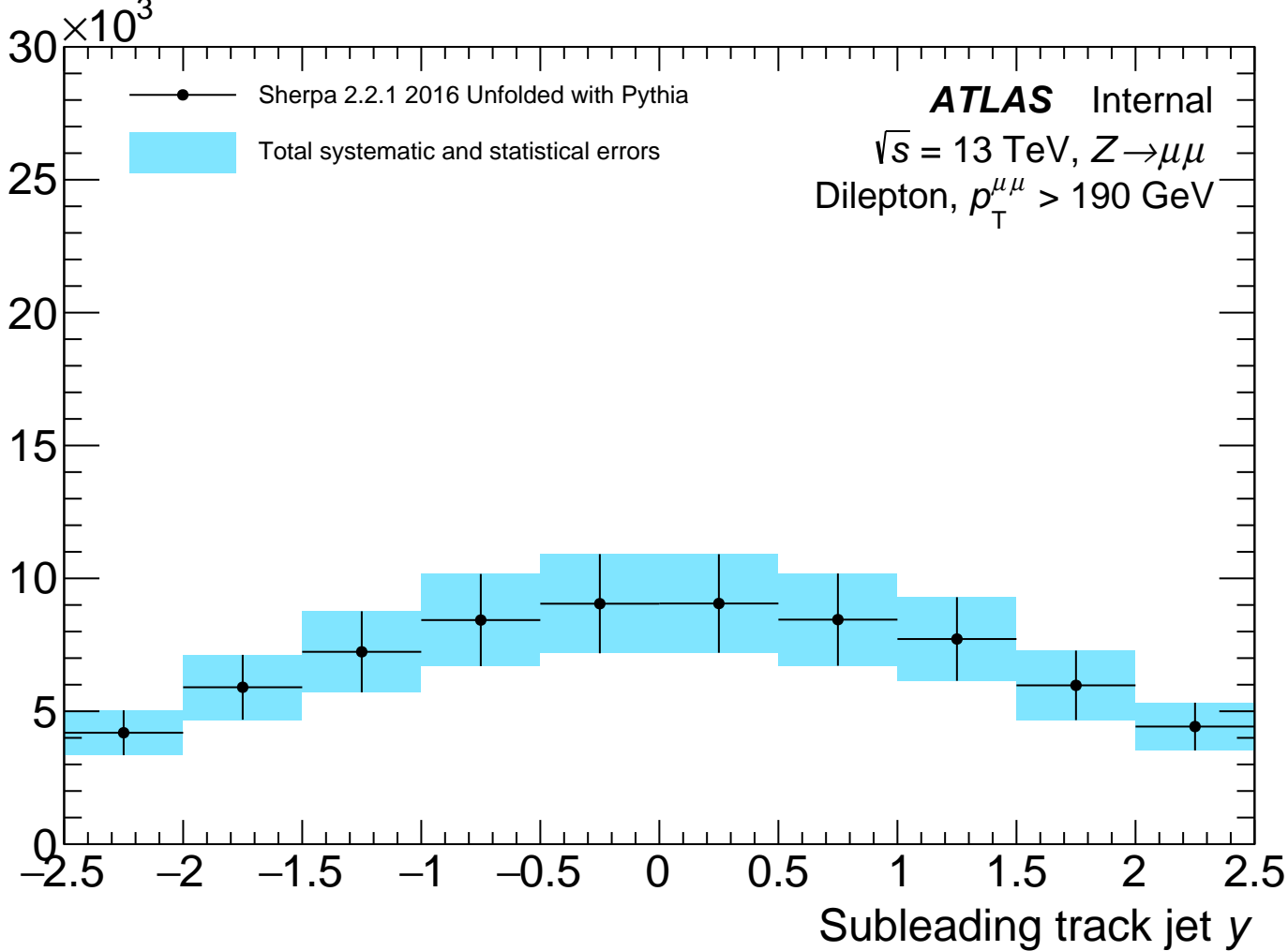
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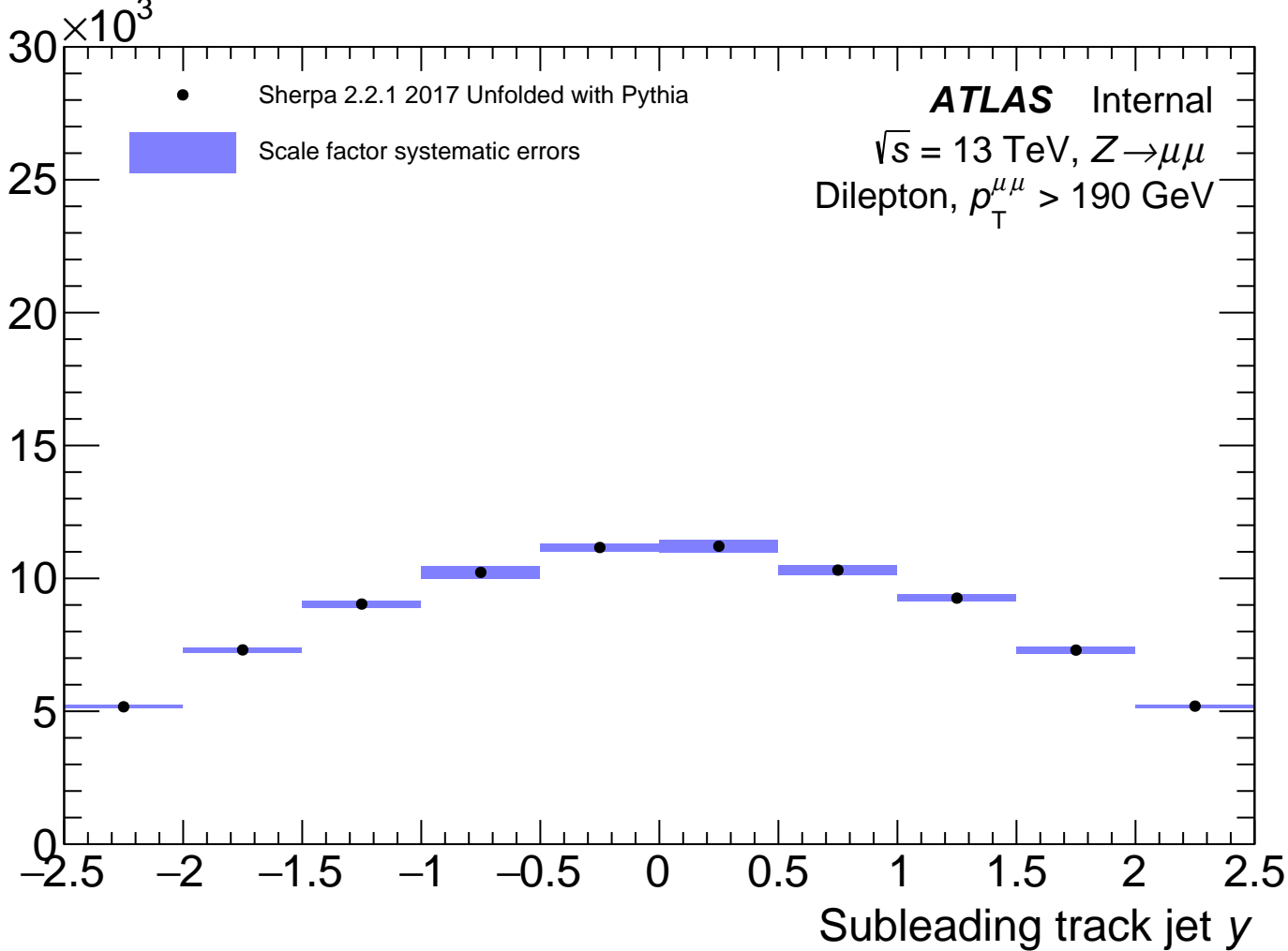
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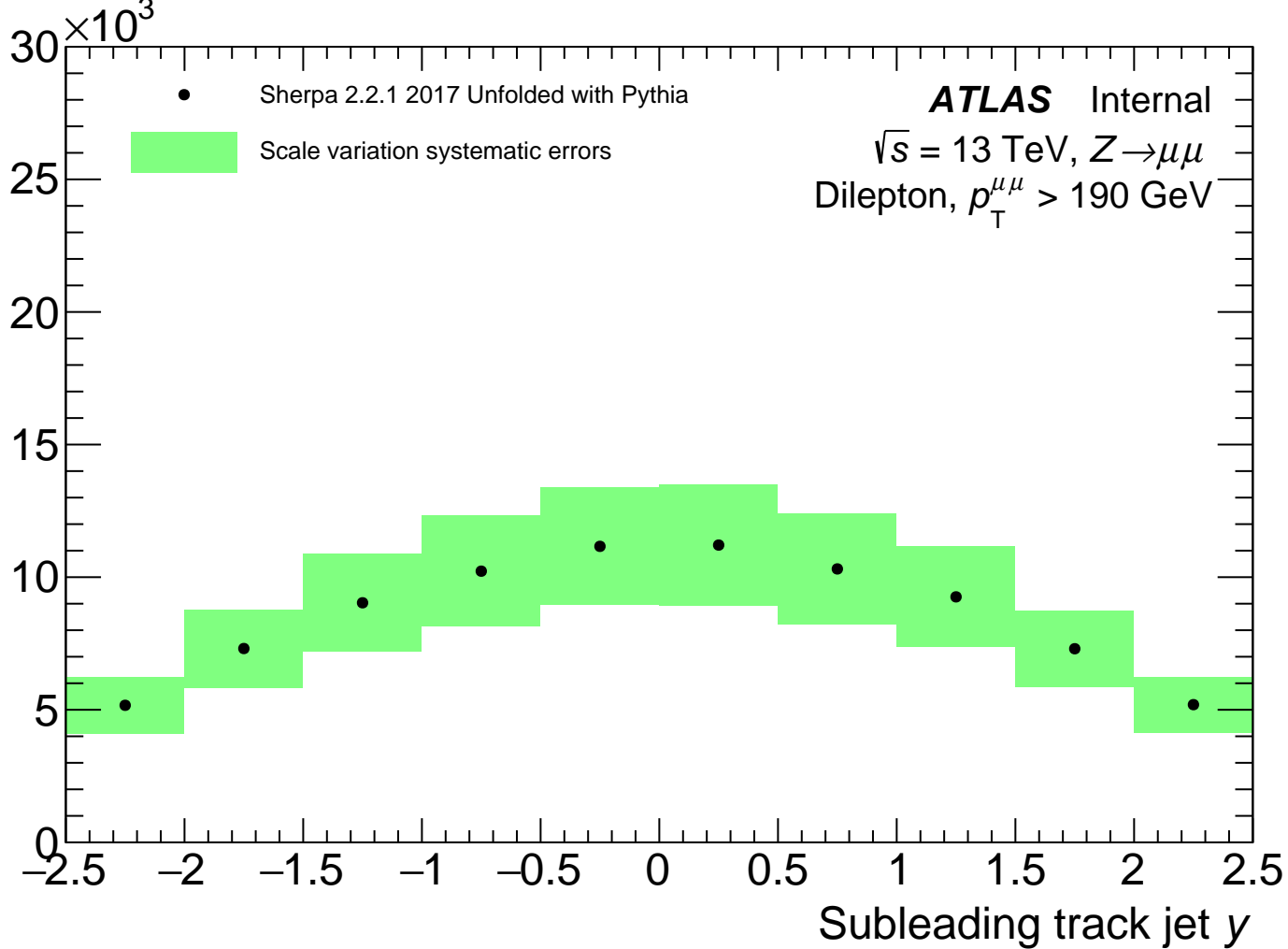
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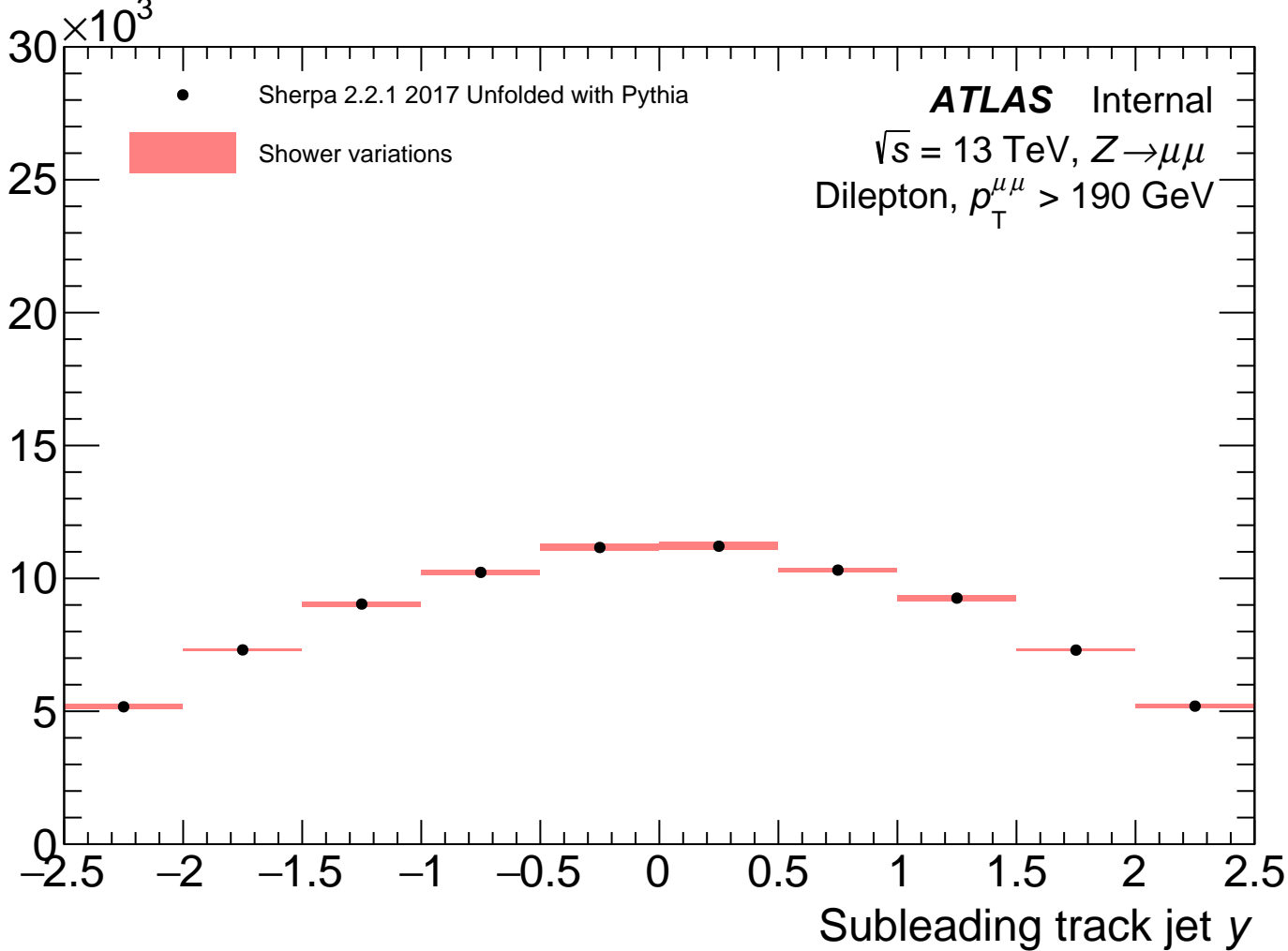
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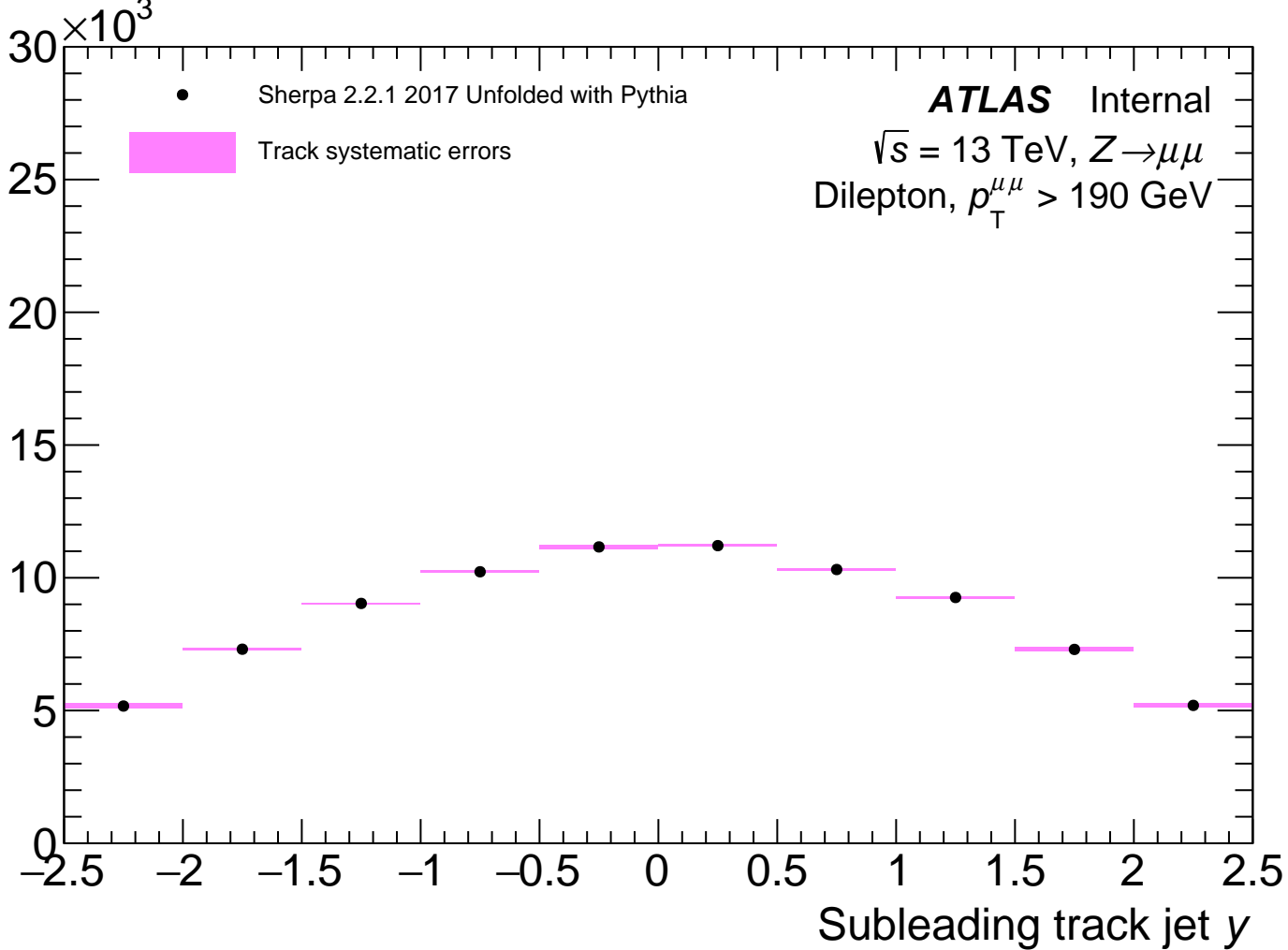
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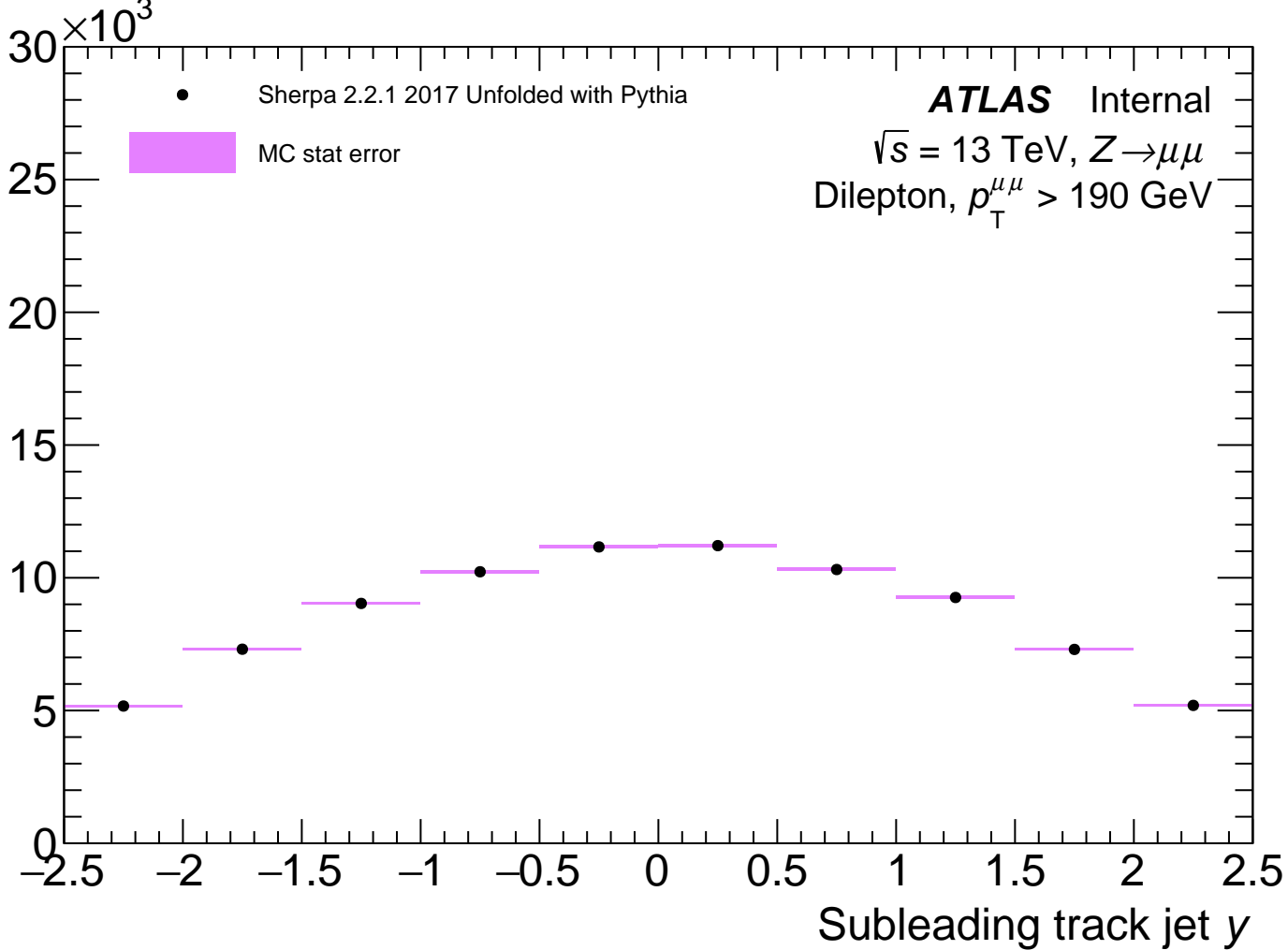
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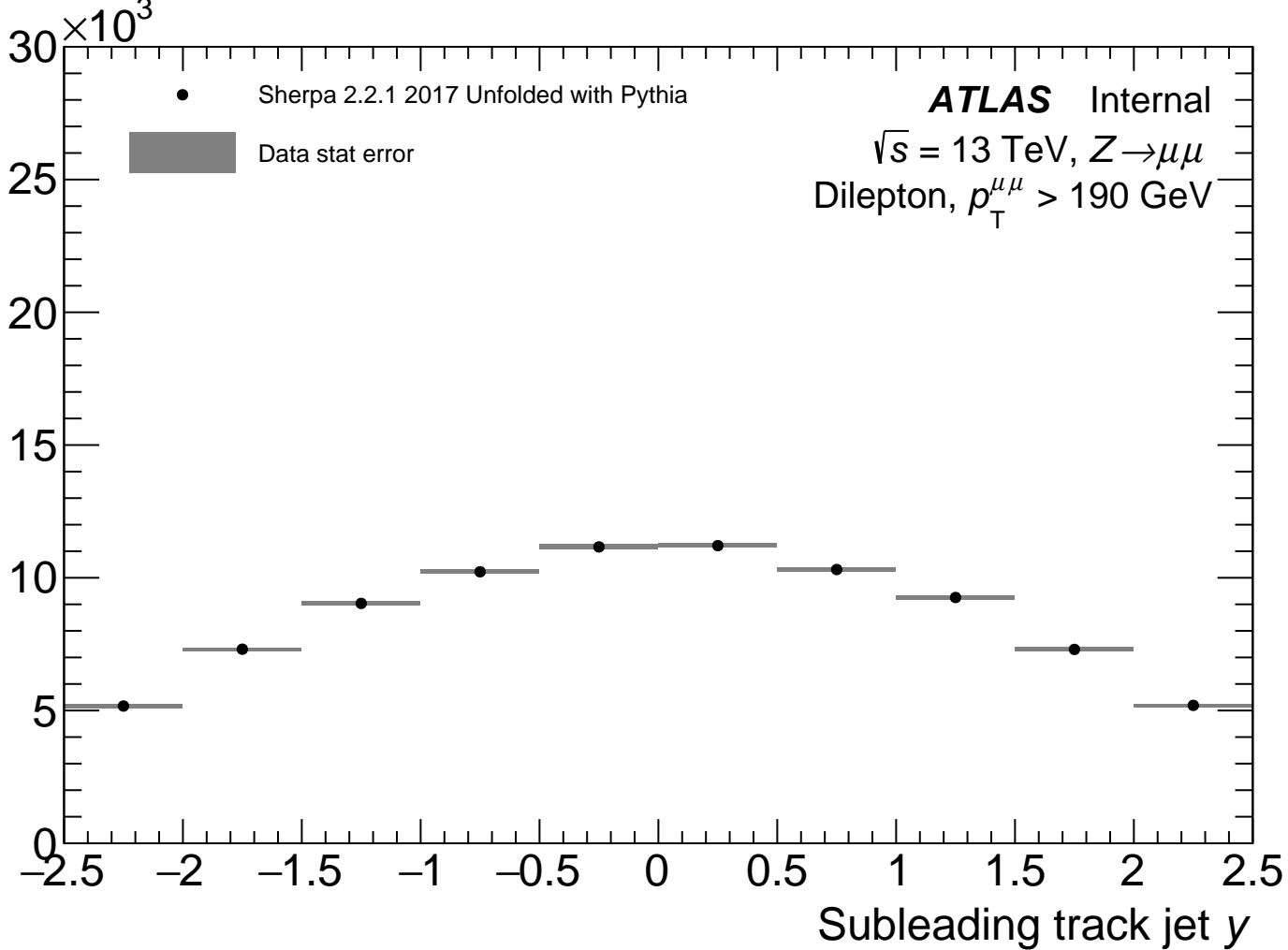
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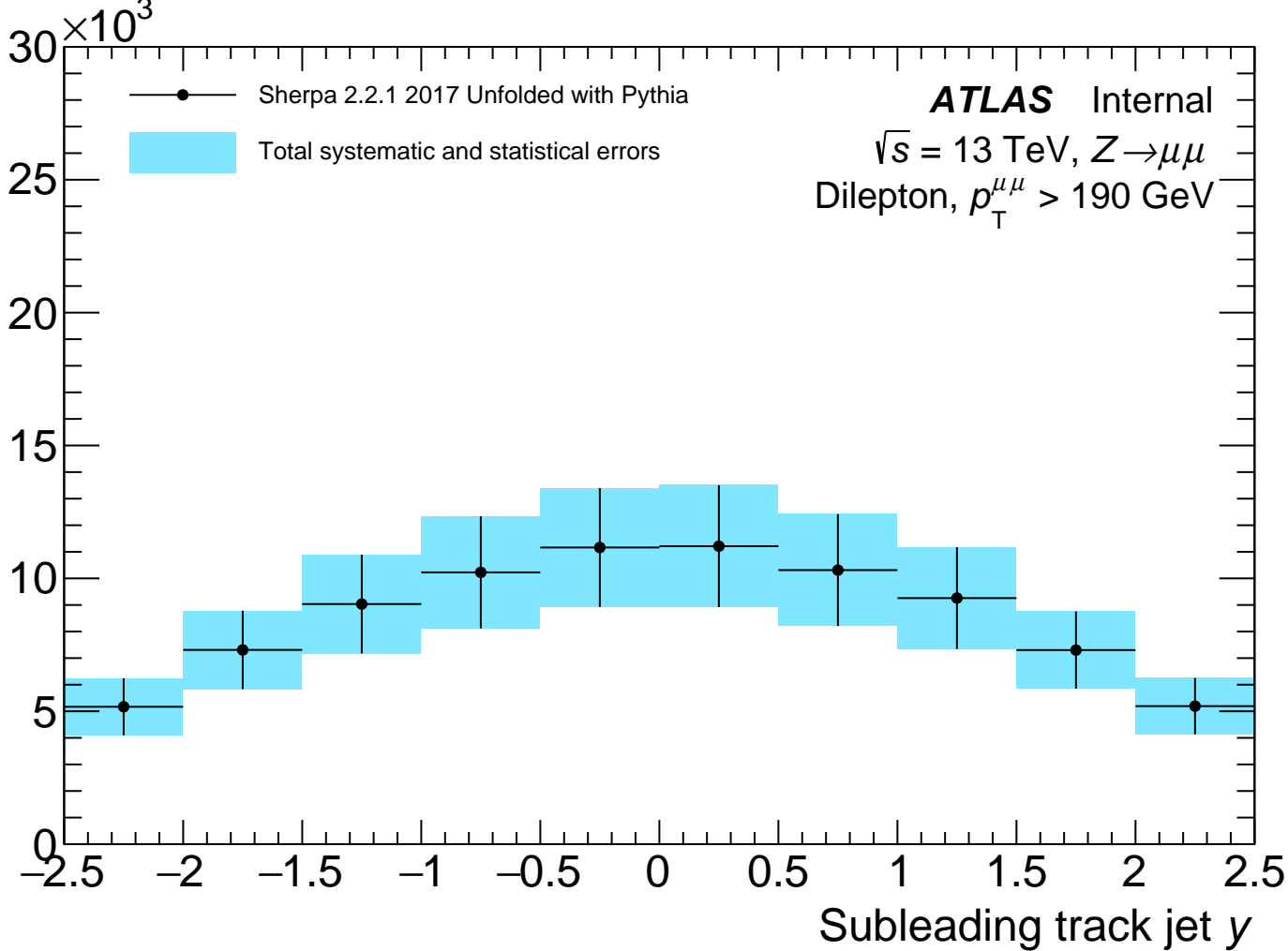
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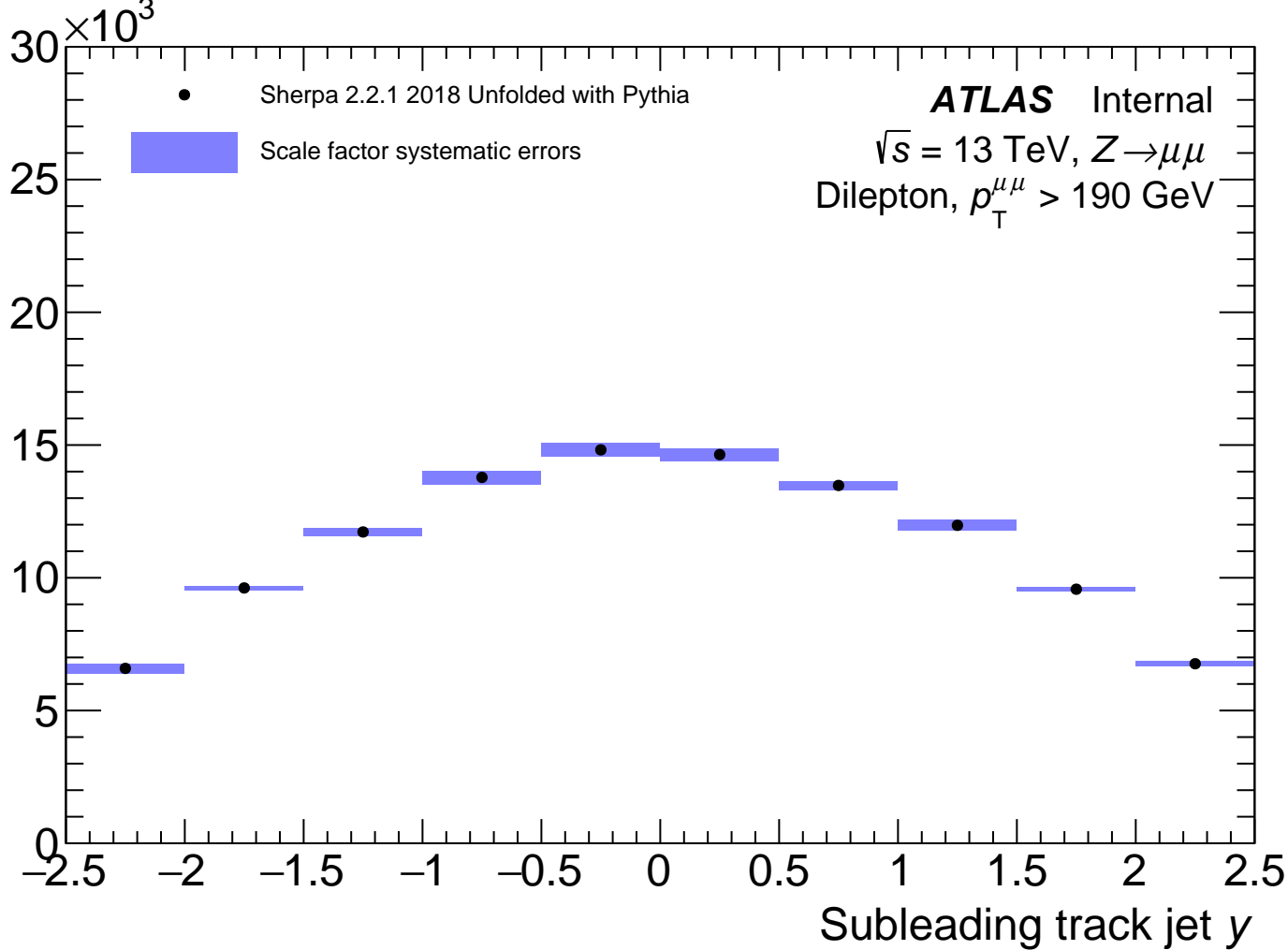
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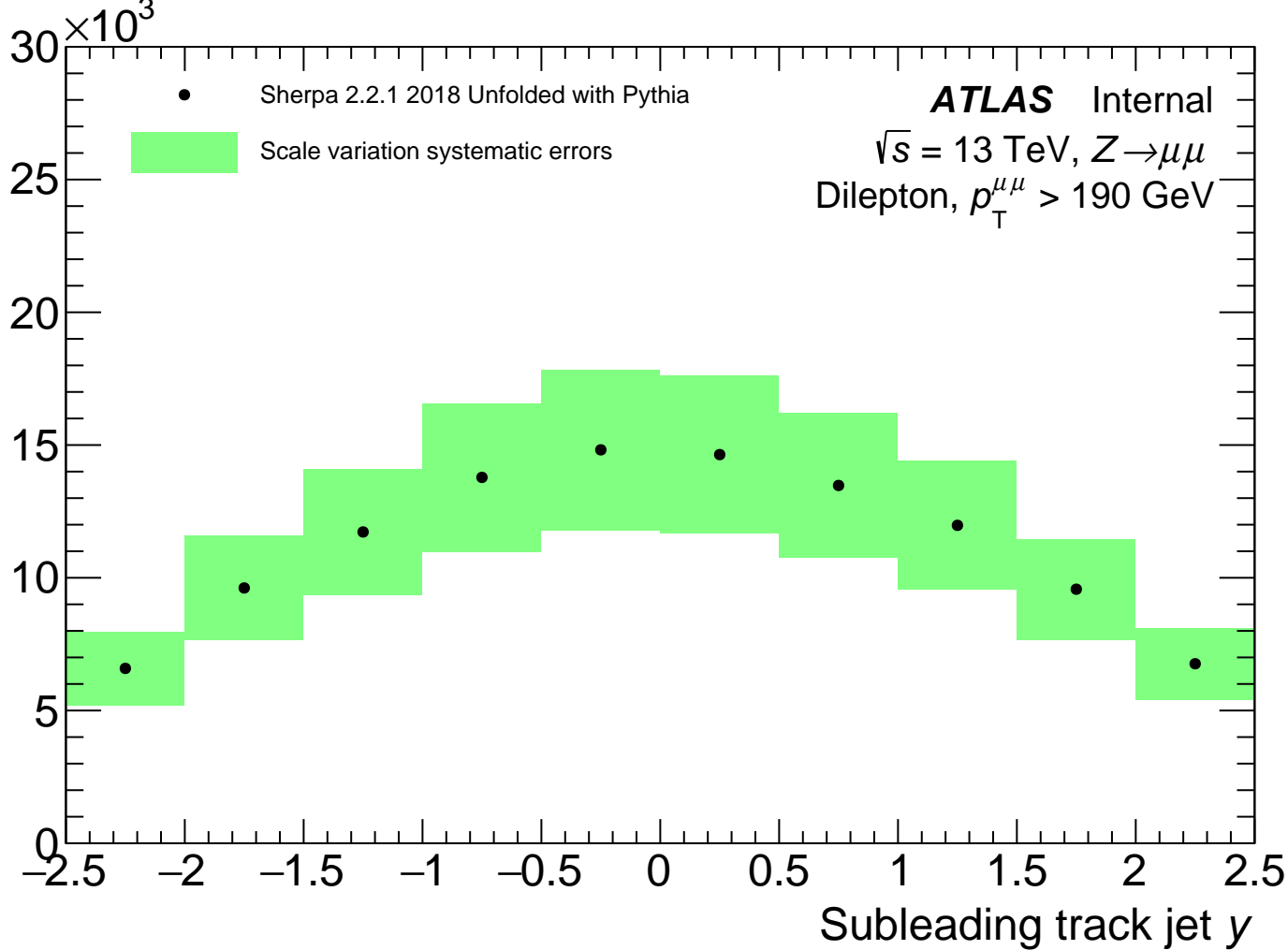
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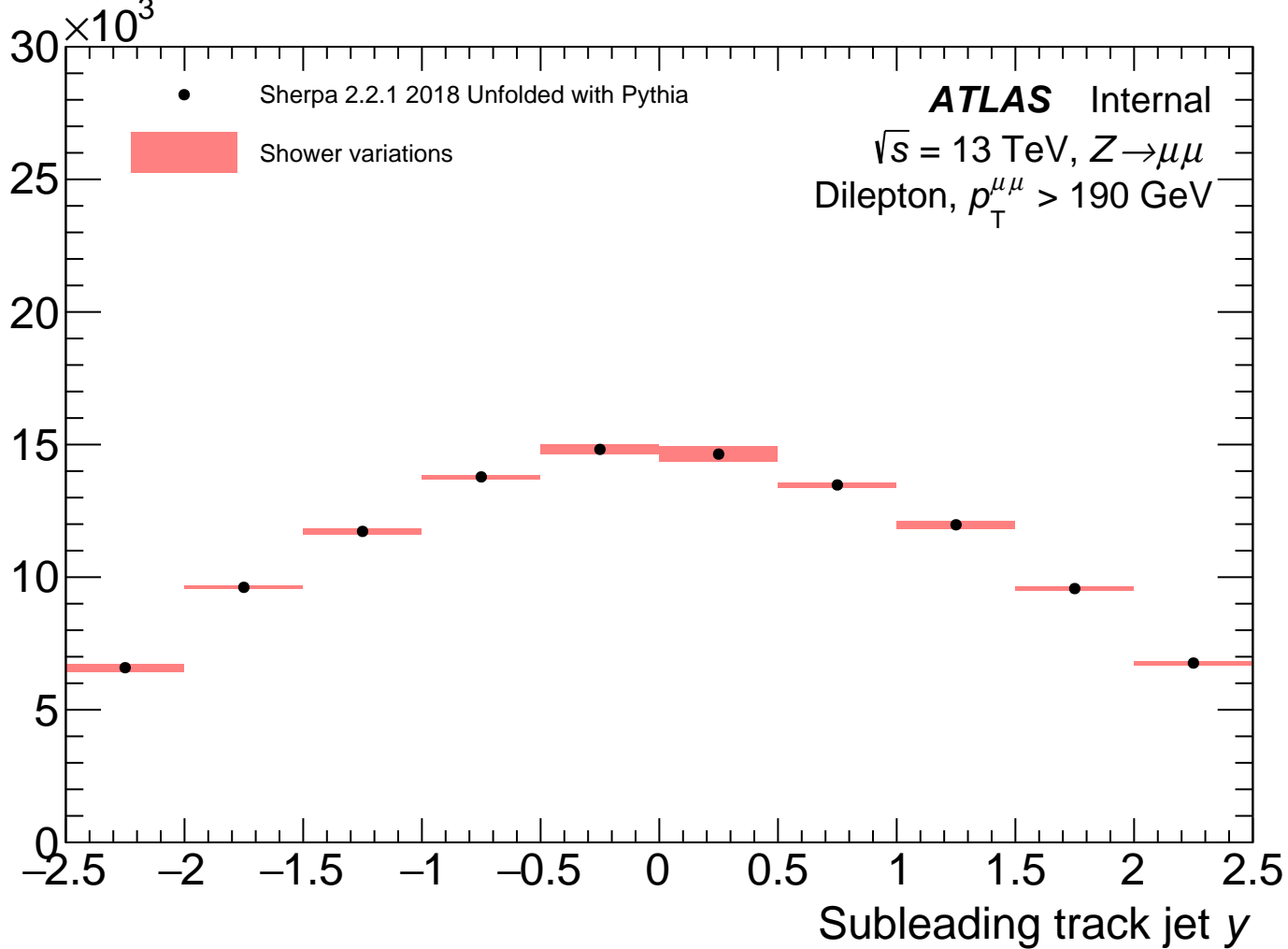
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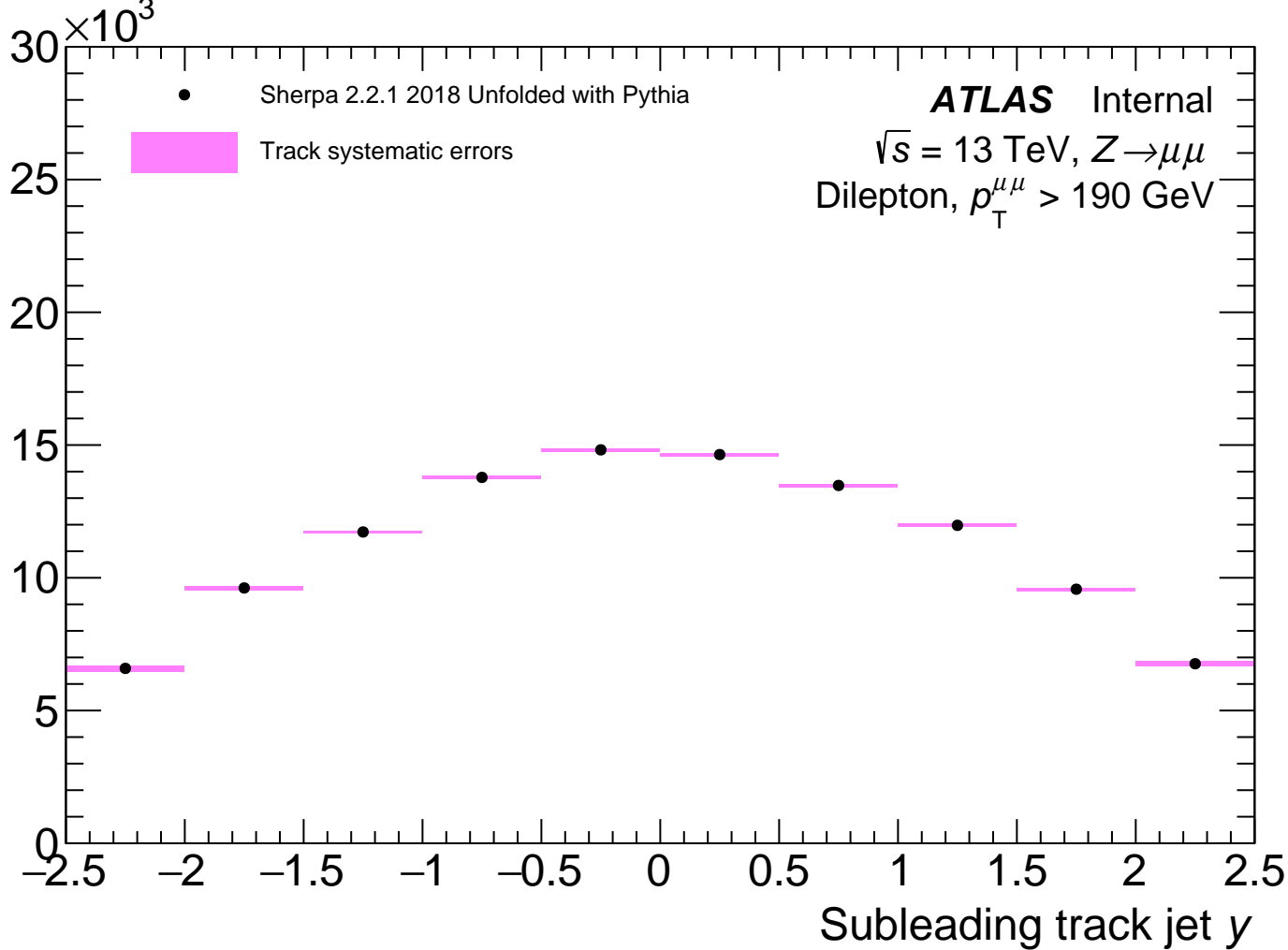
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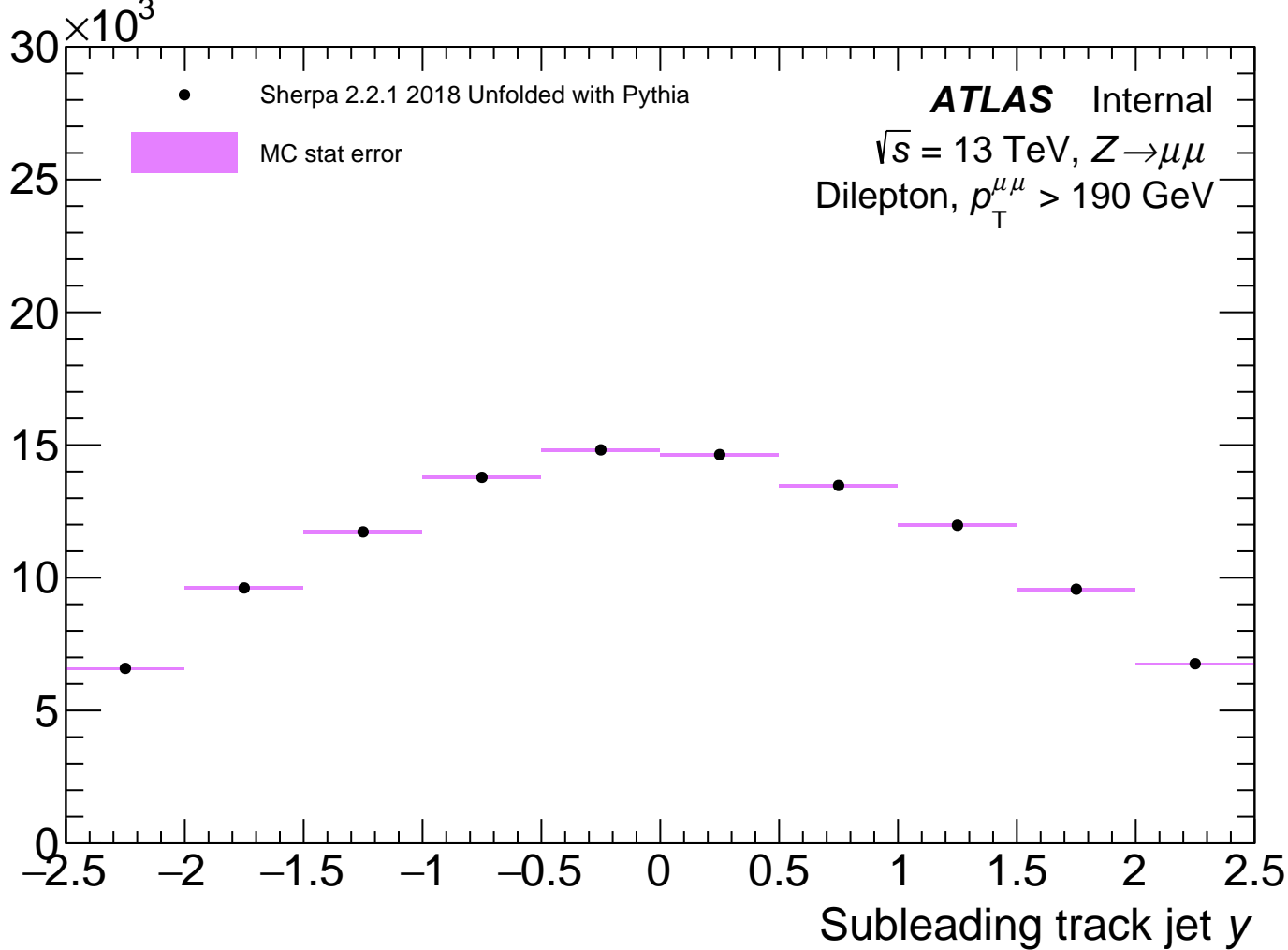
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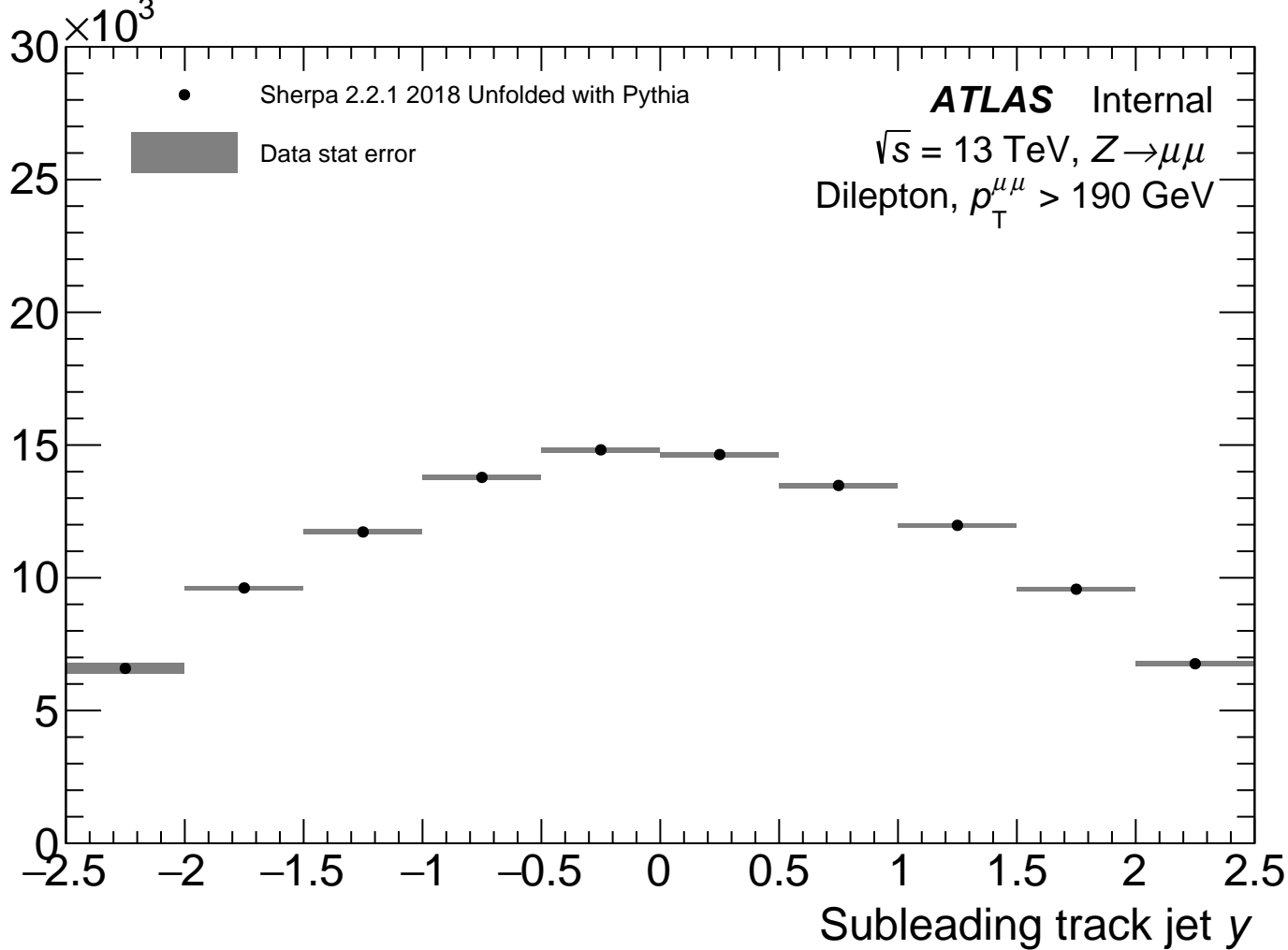
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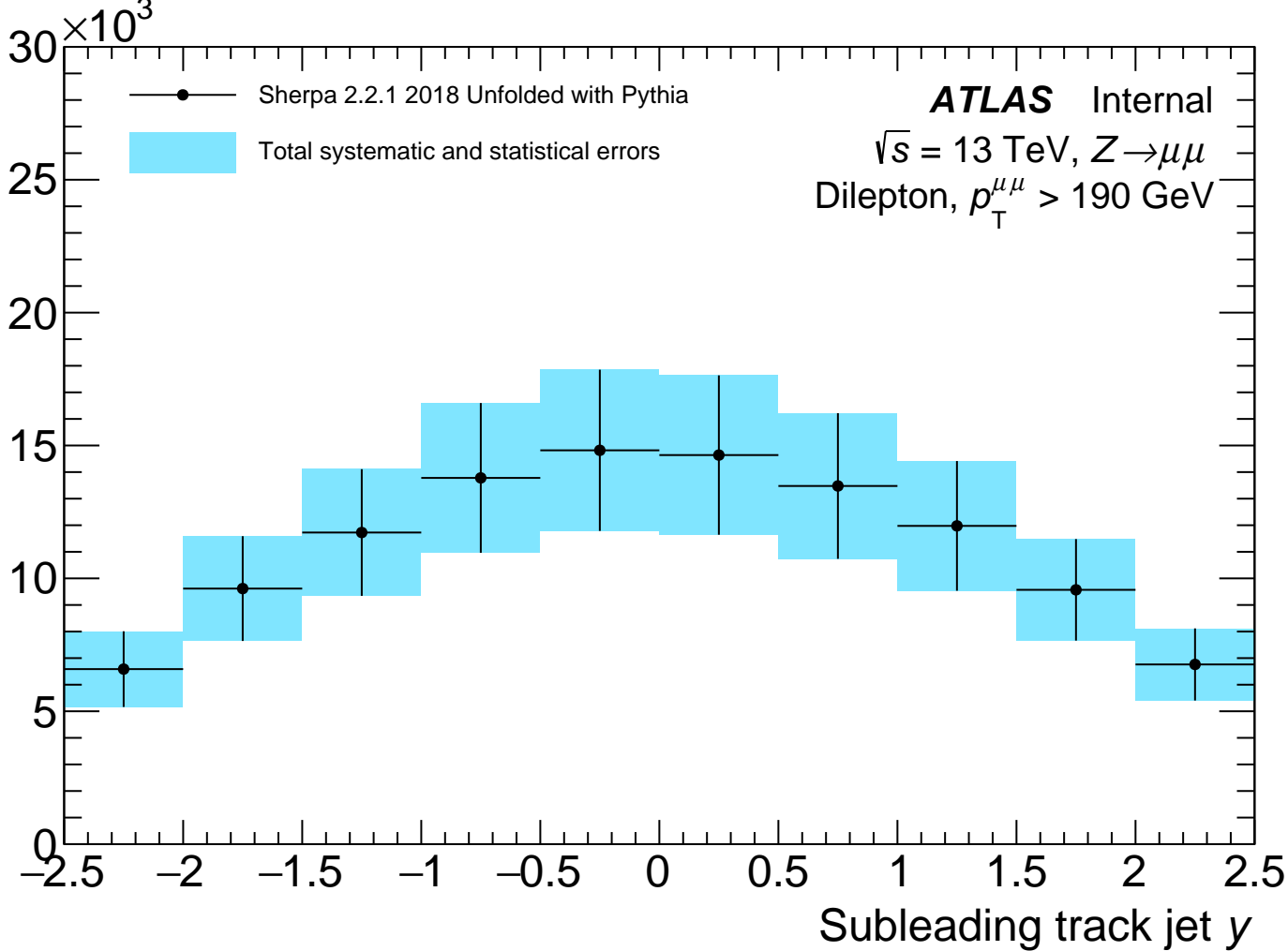
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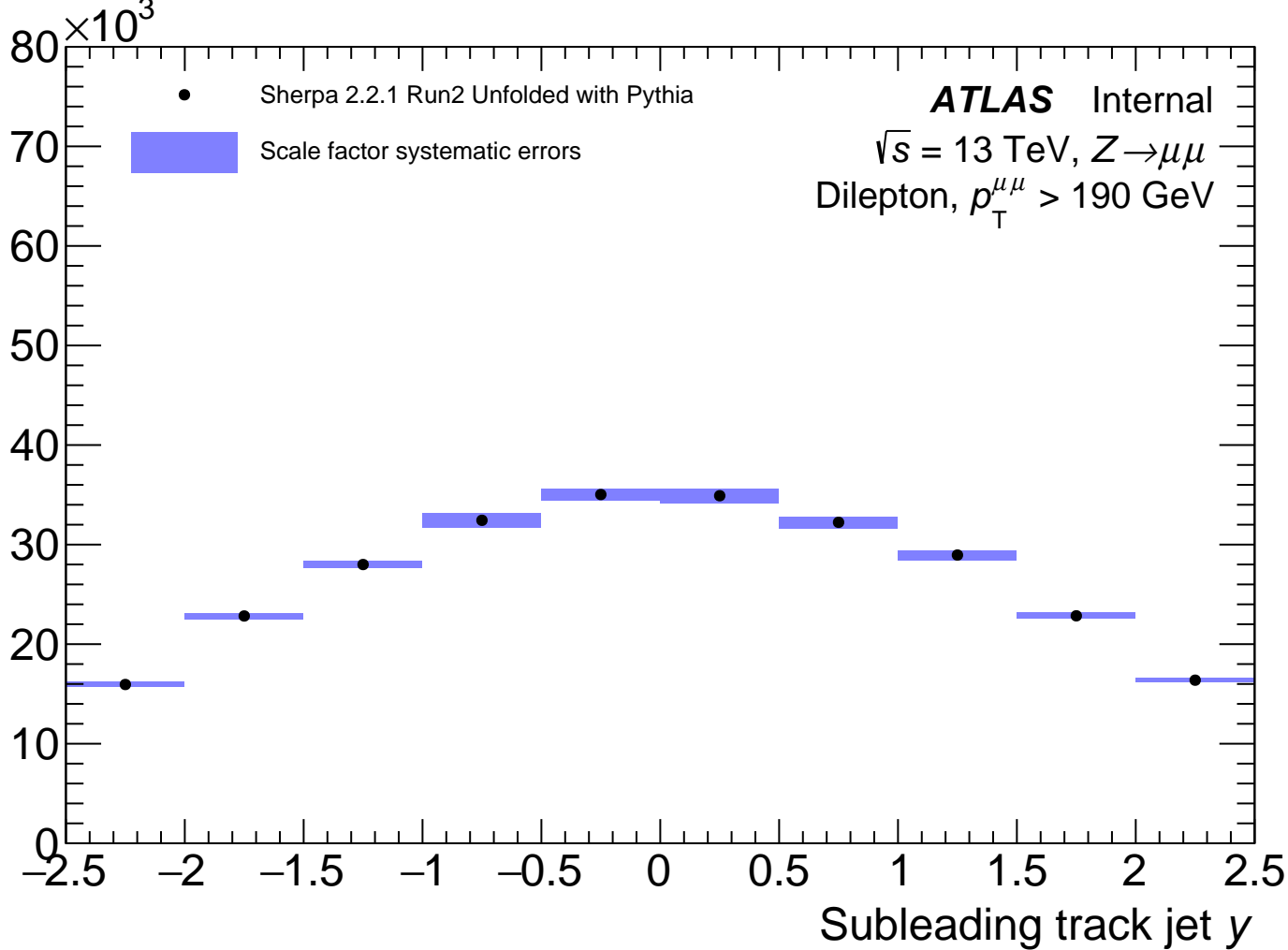
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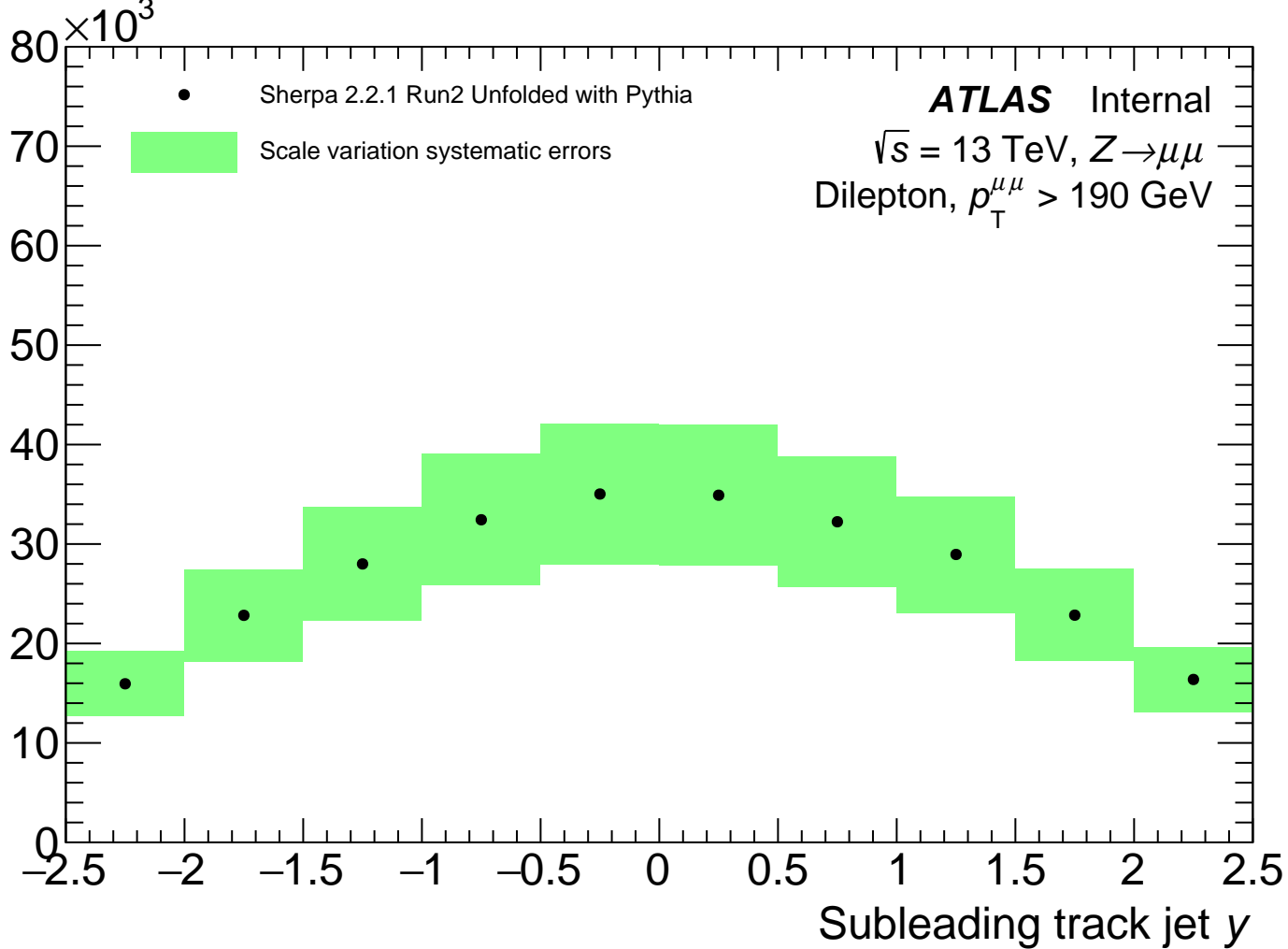
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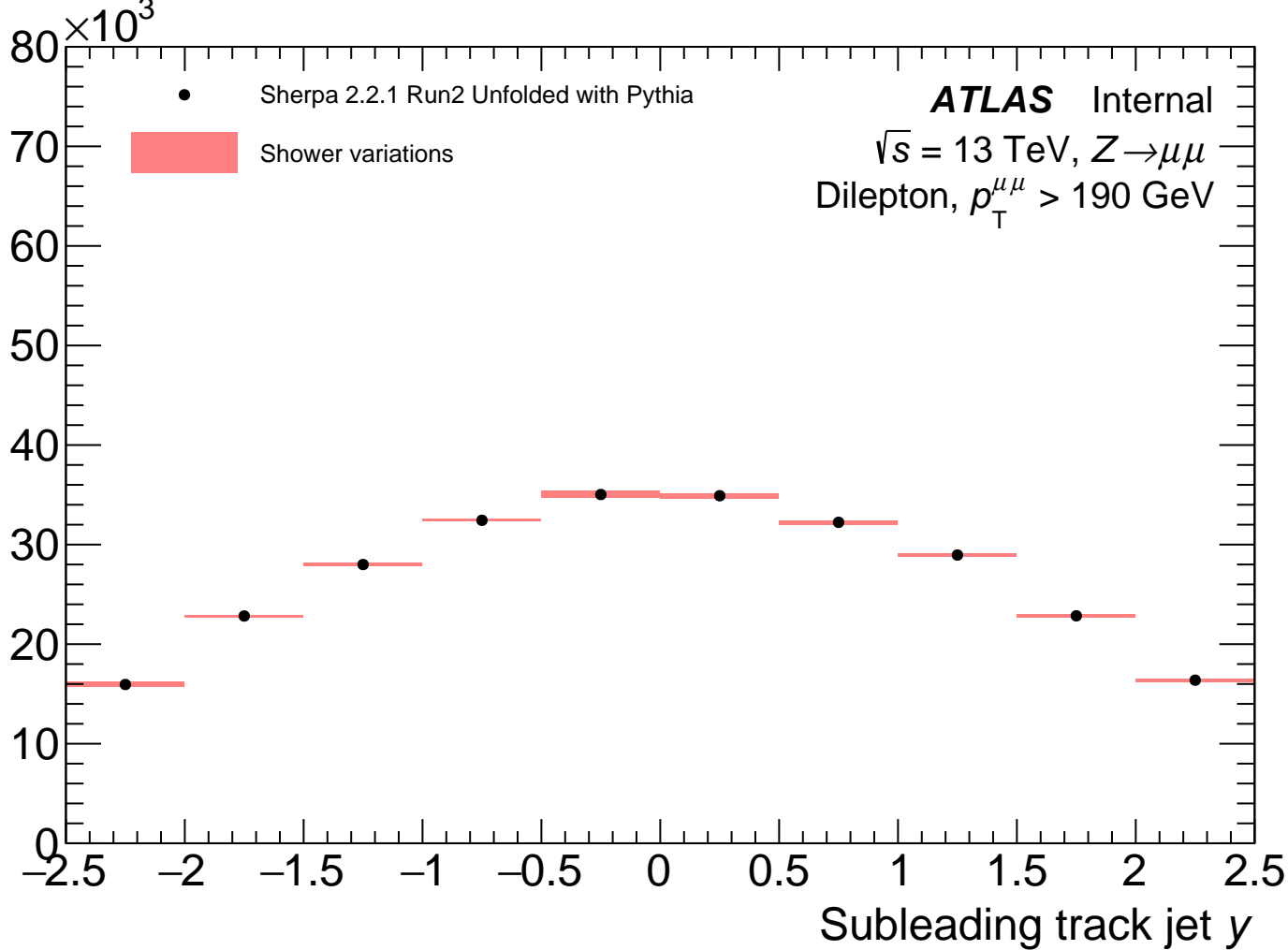
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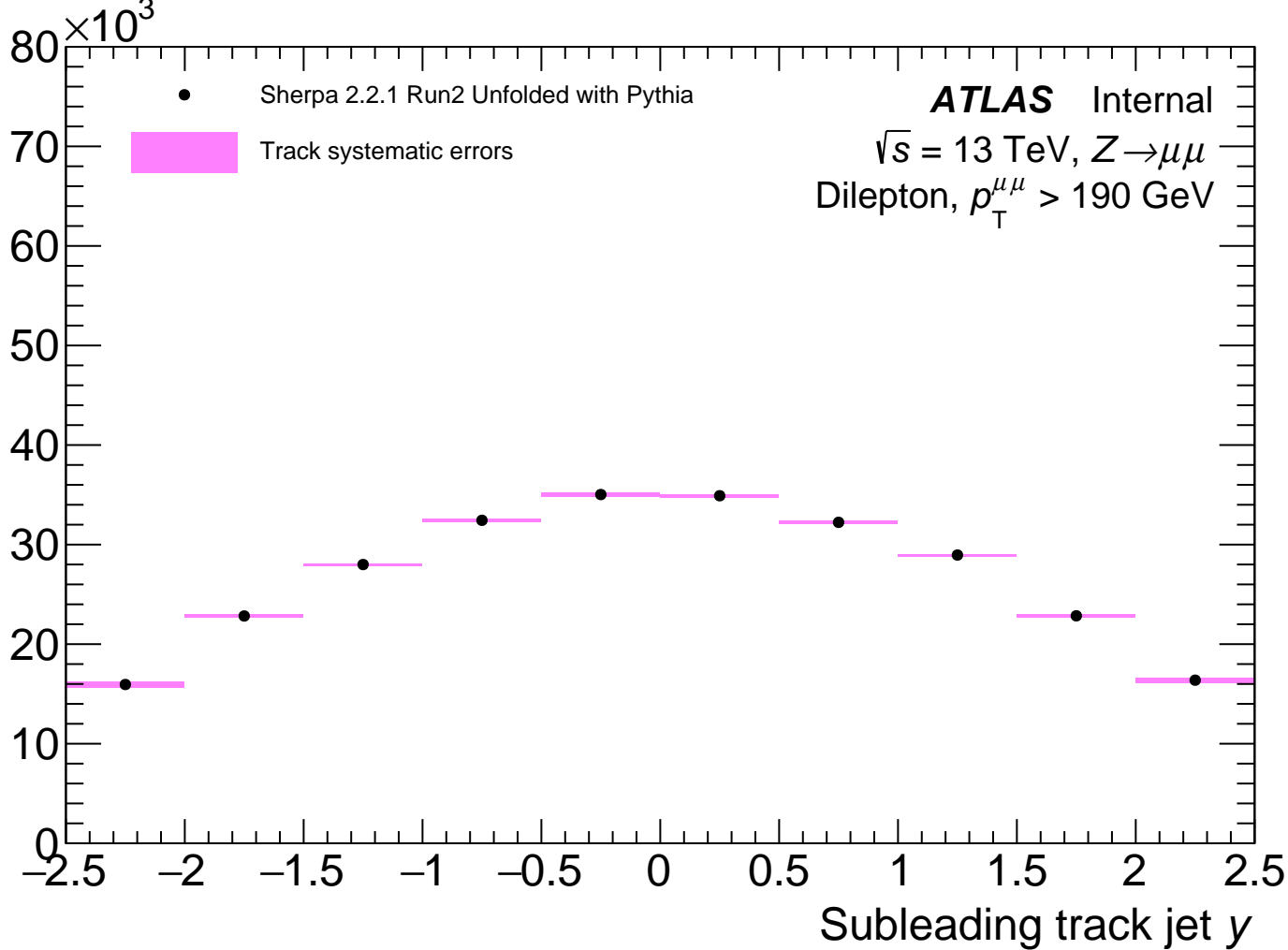
Events



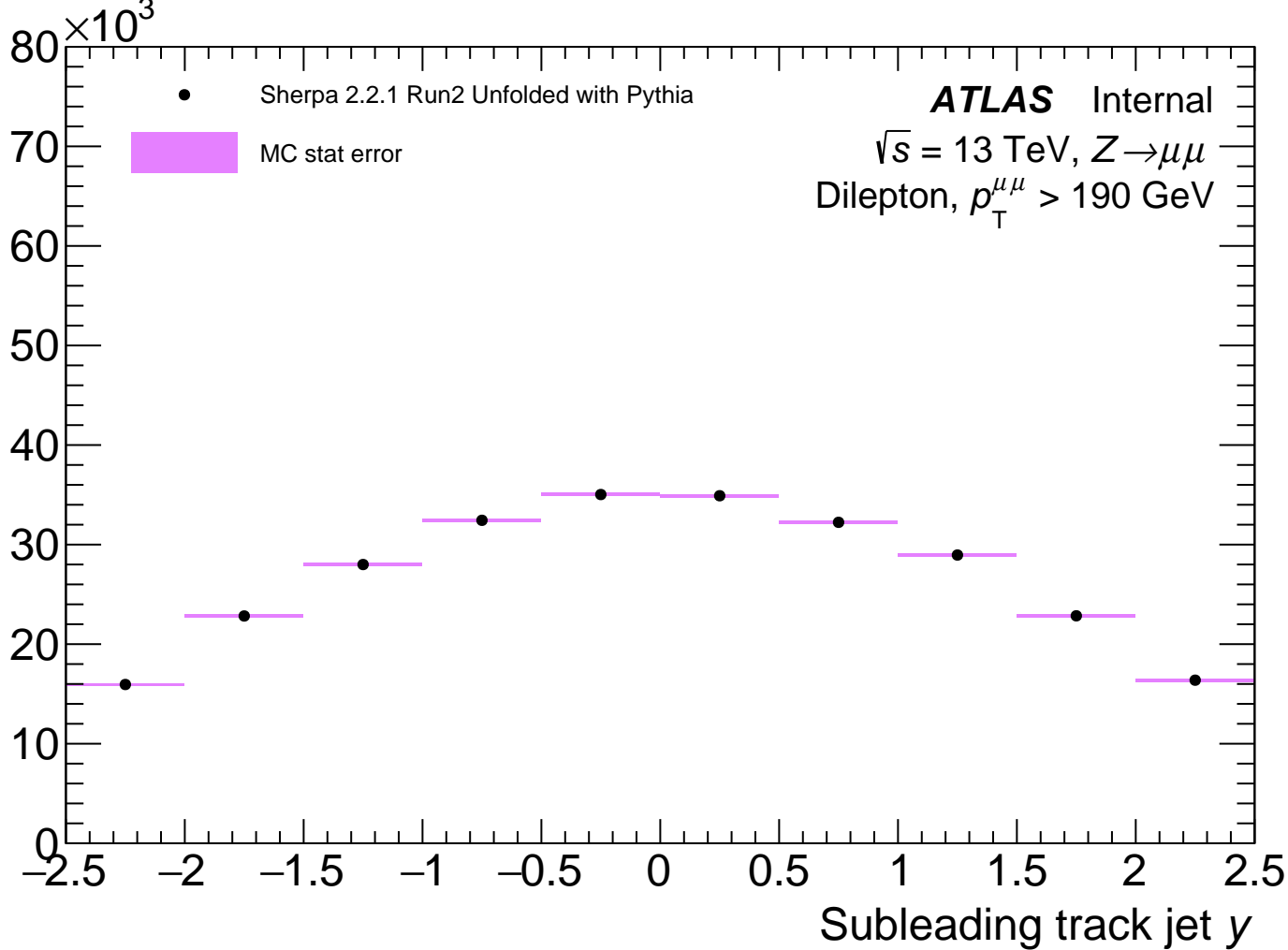
Events



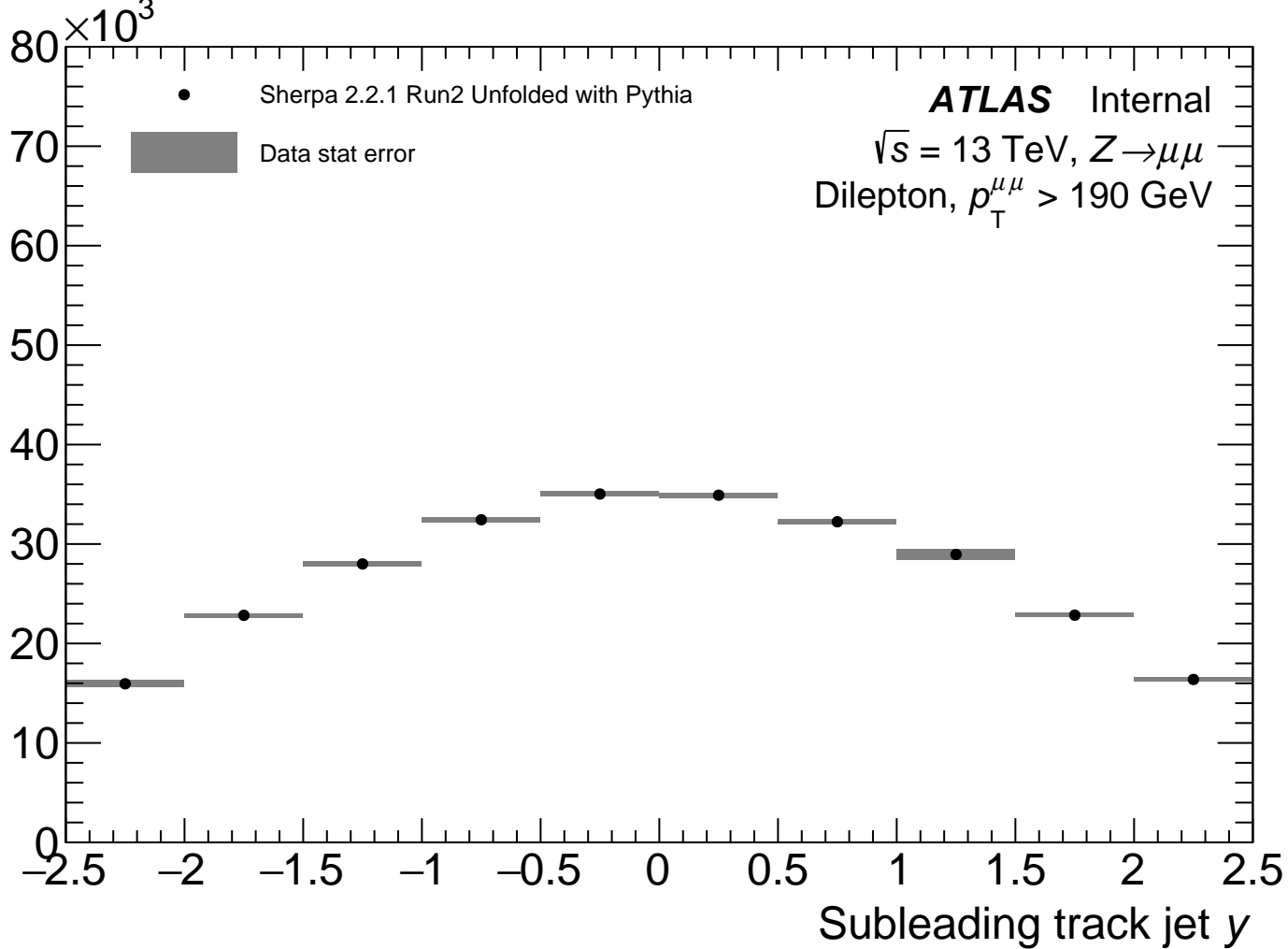
Events



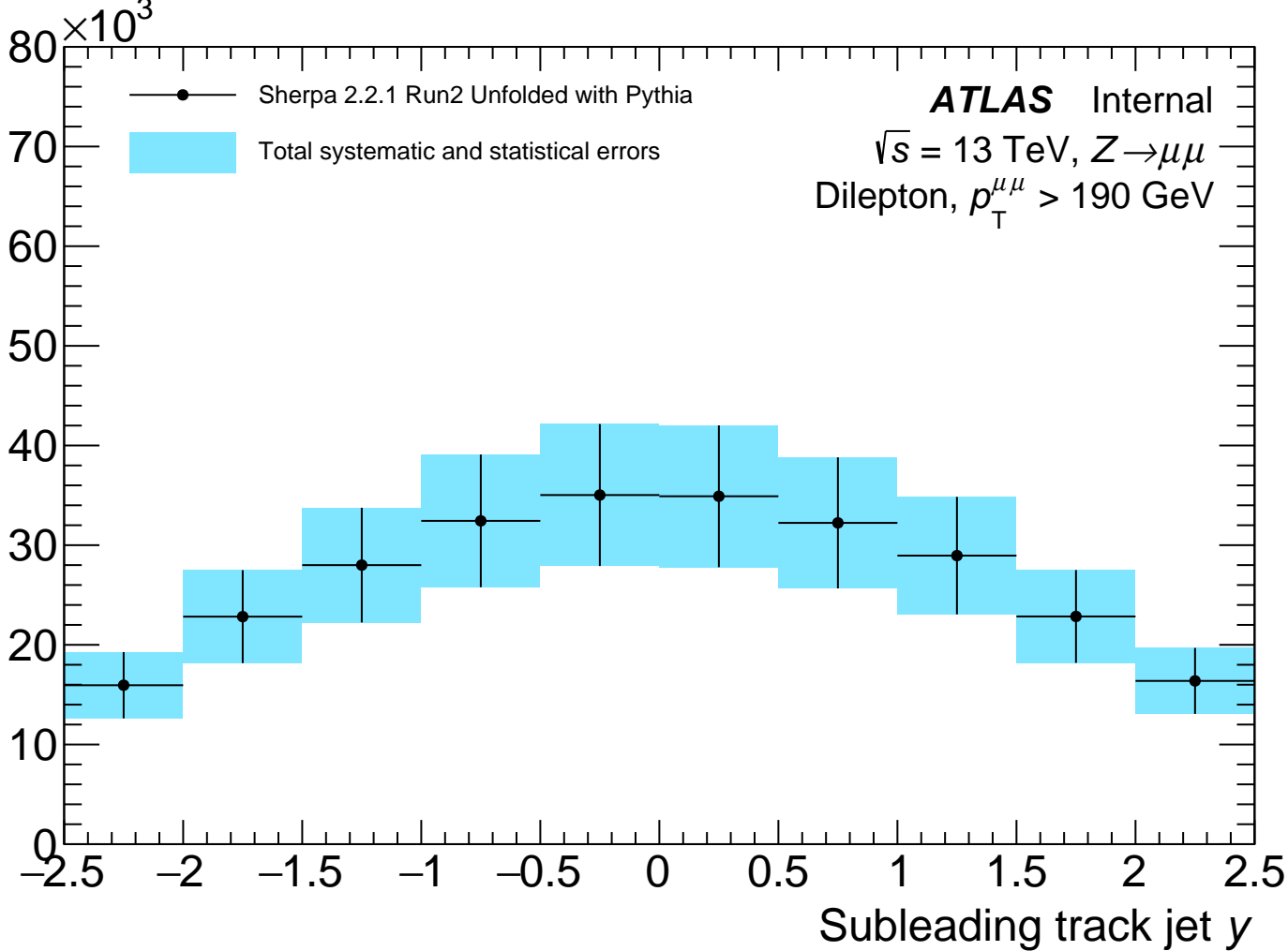
Events



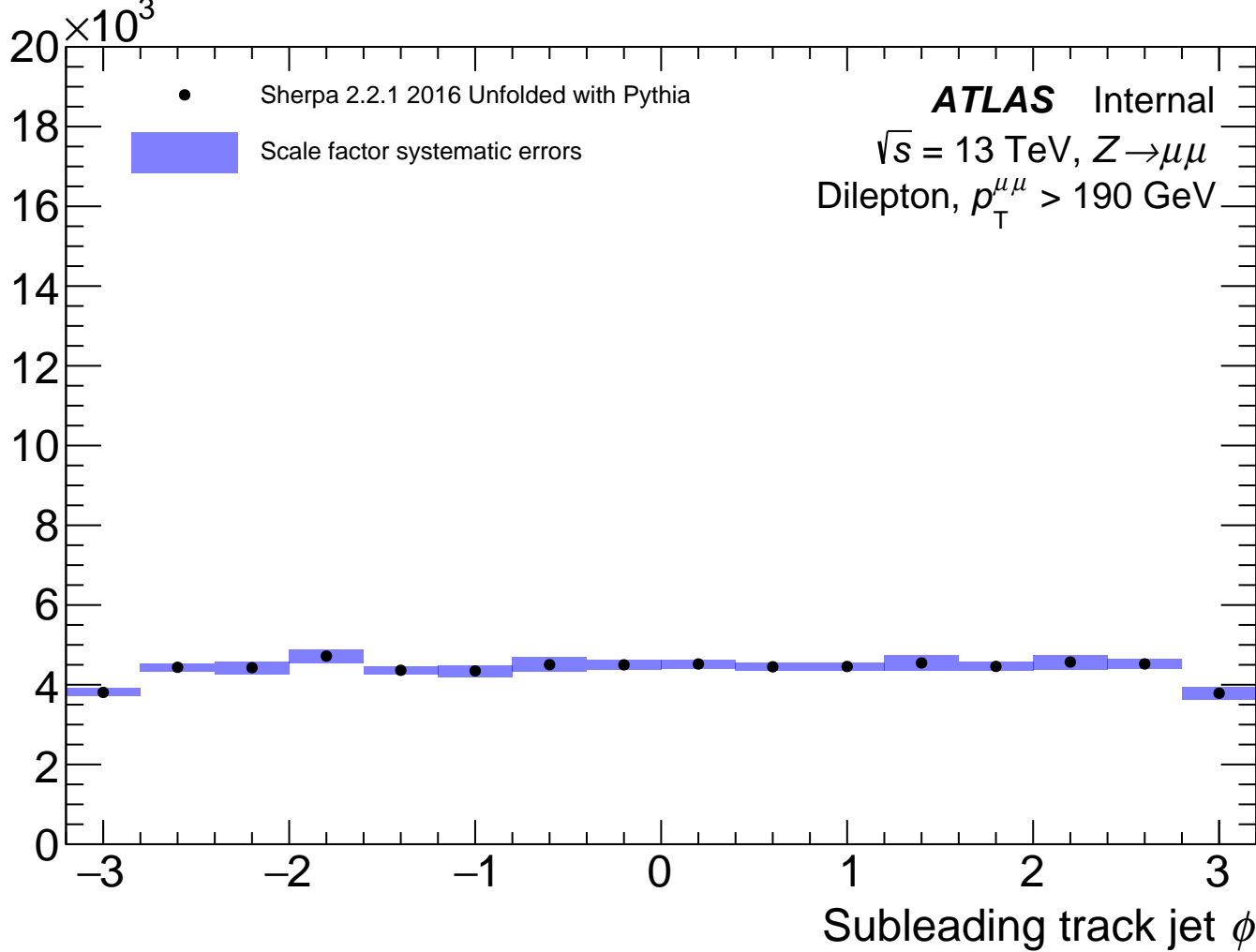
Events



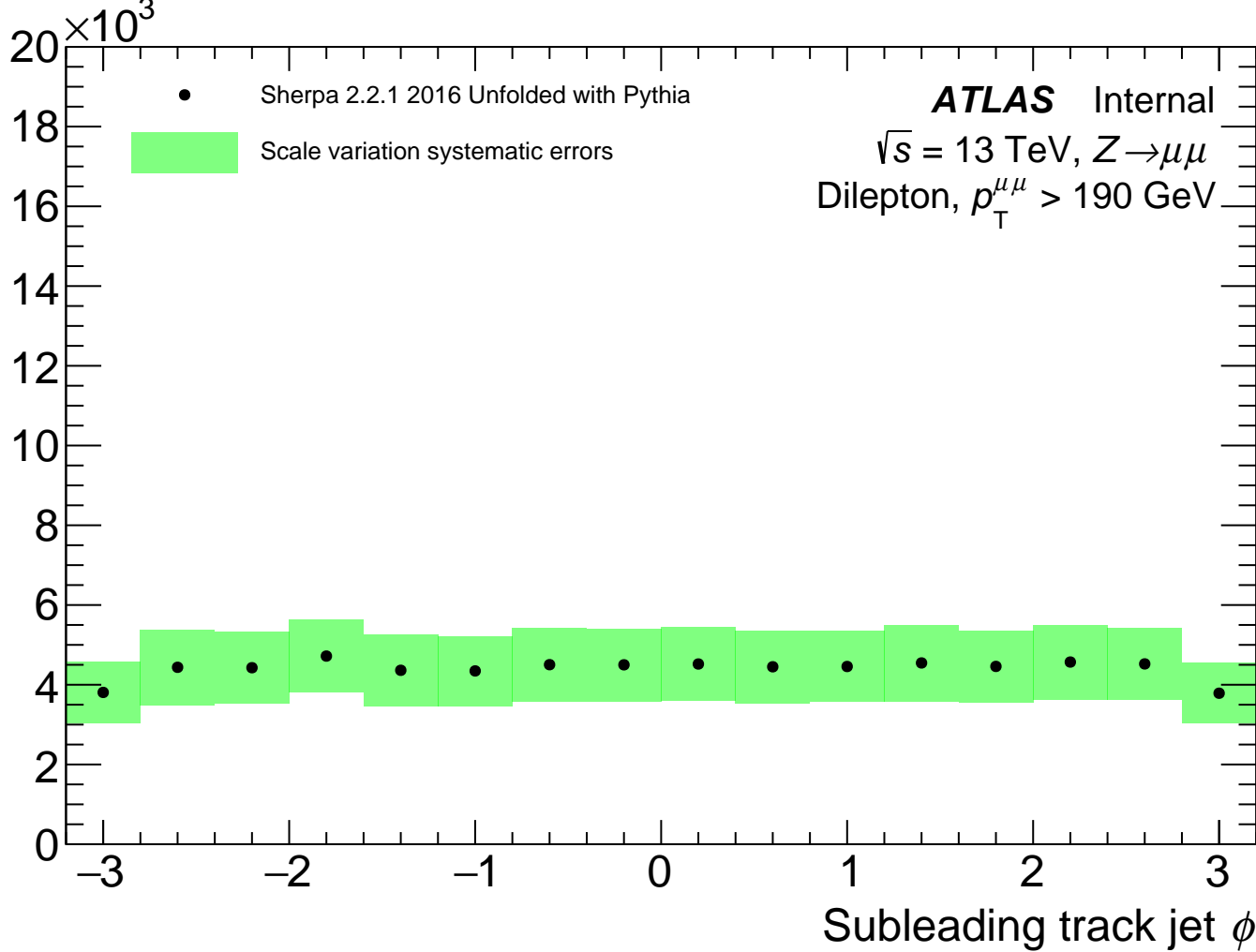
Events



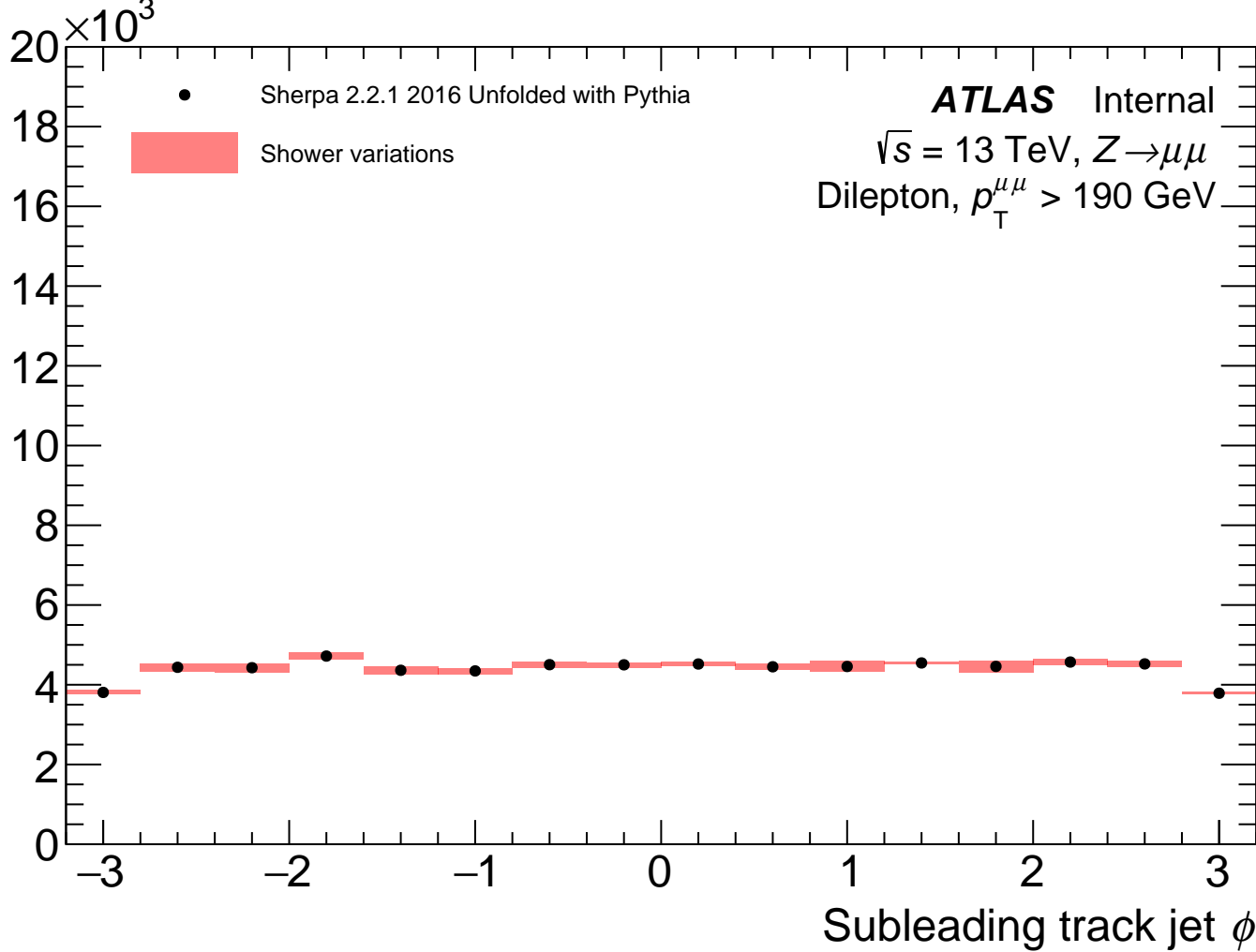
Events



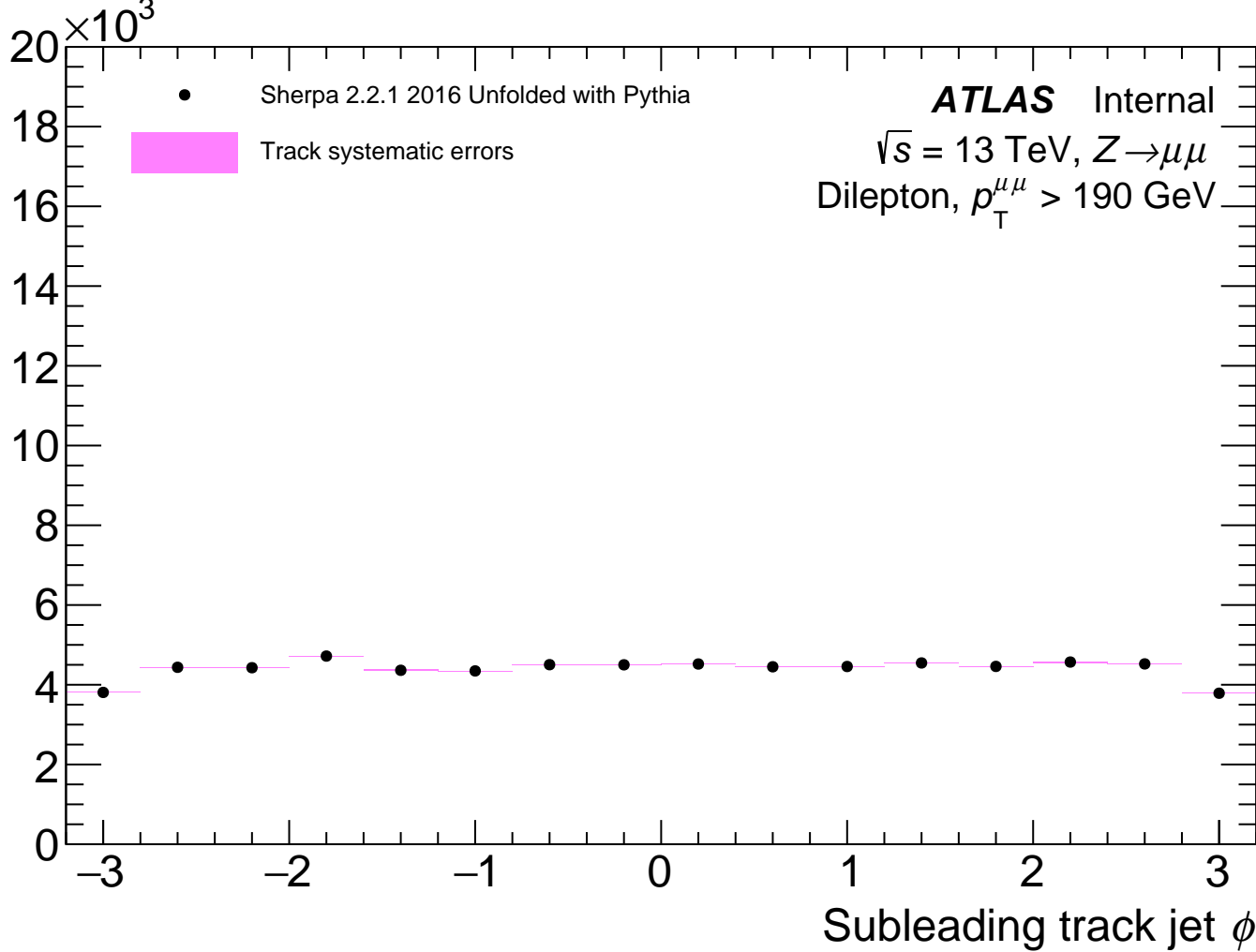
Events



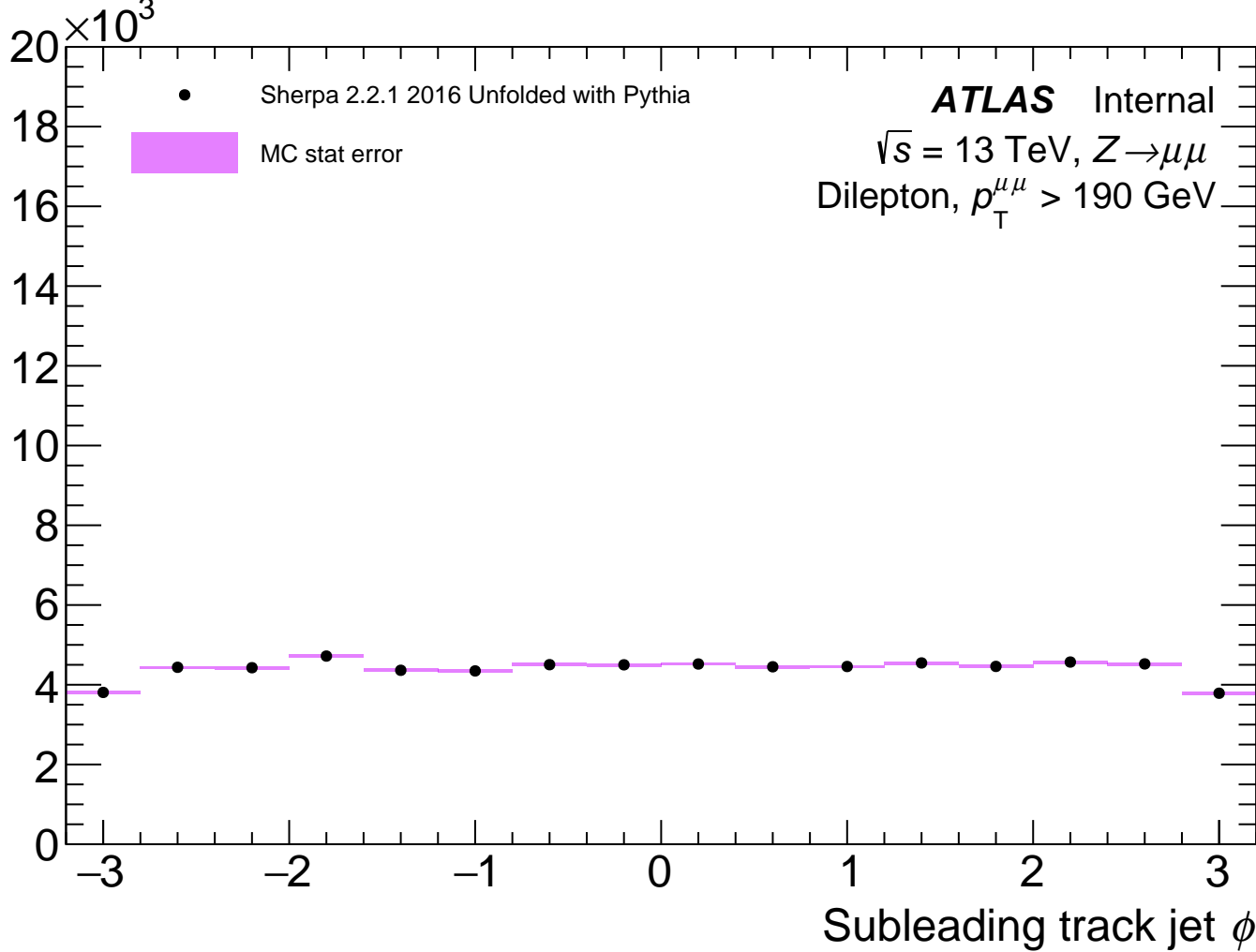
Events



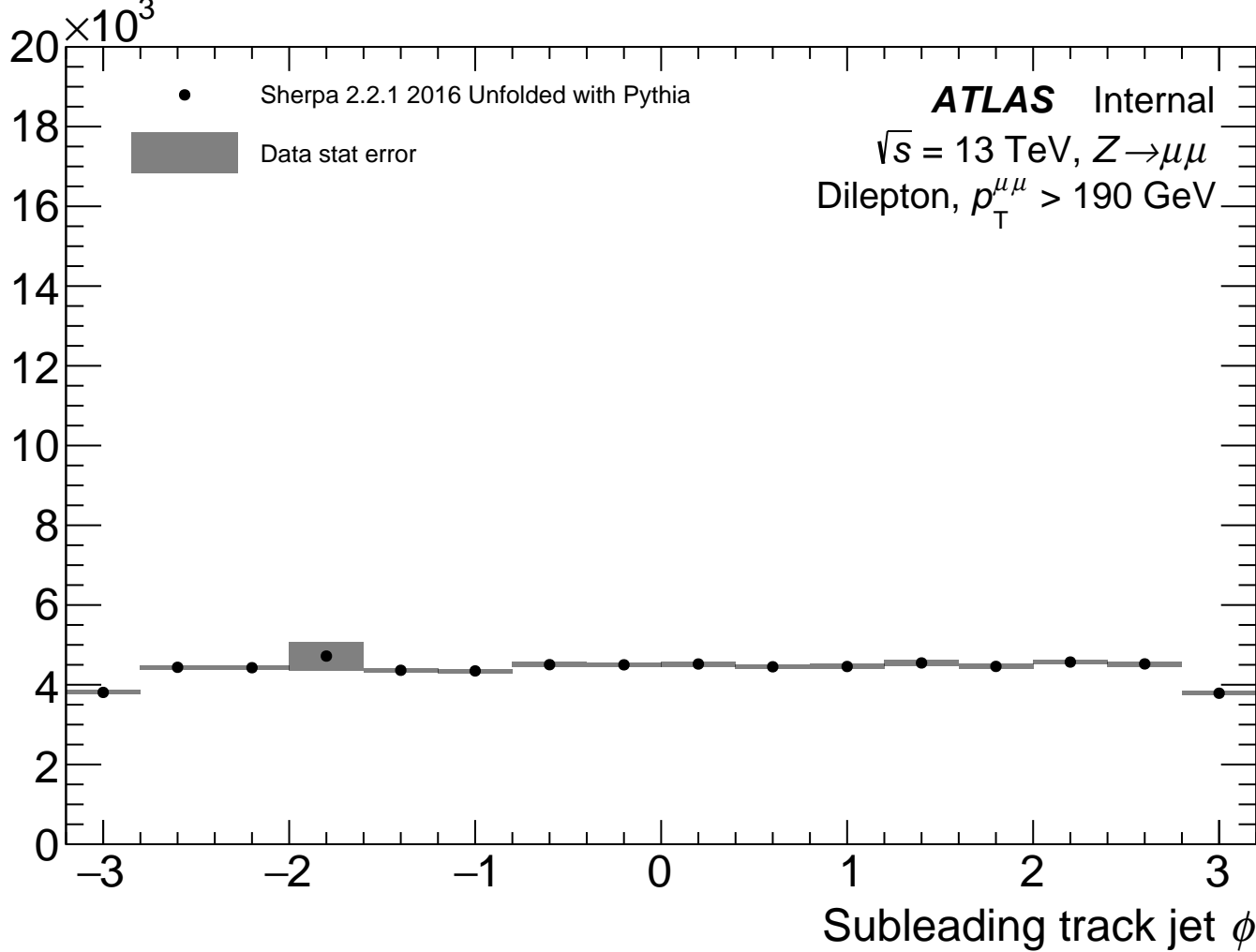
Events



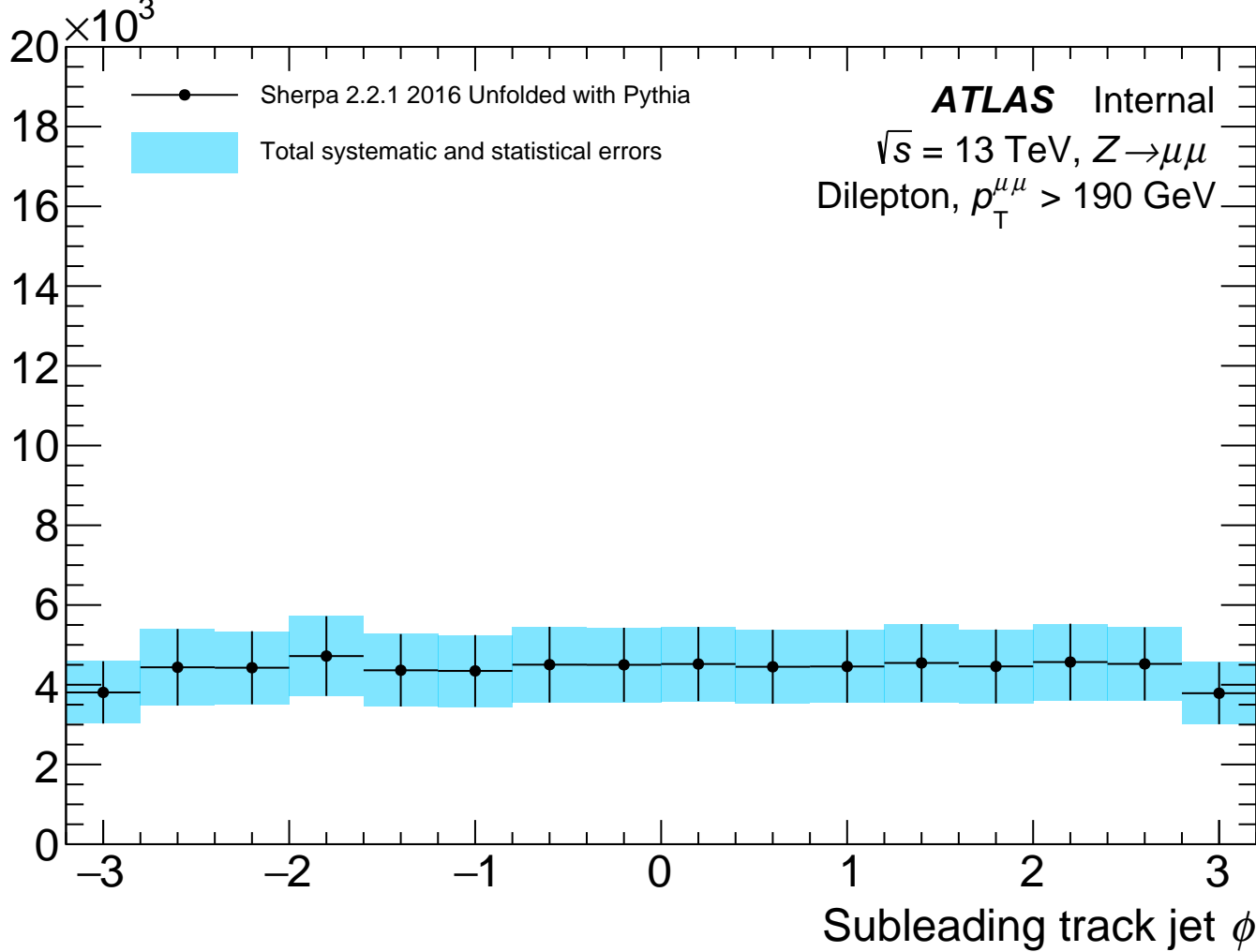
Events



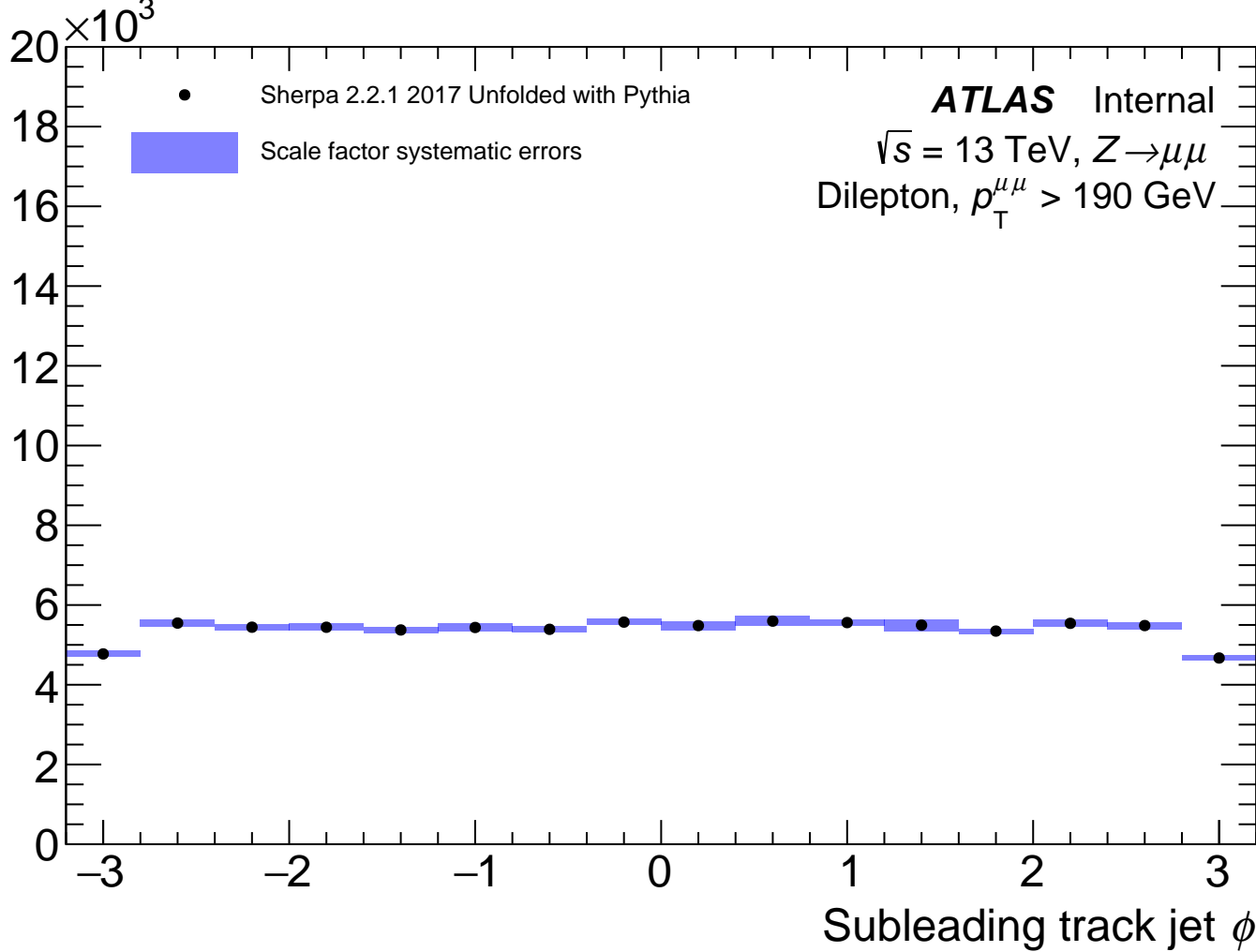
Events



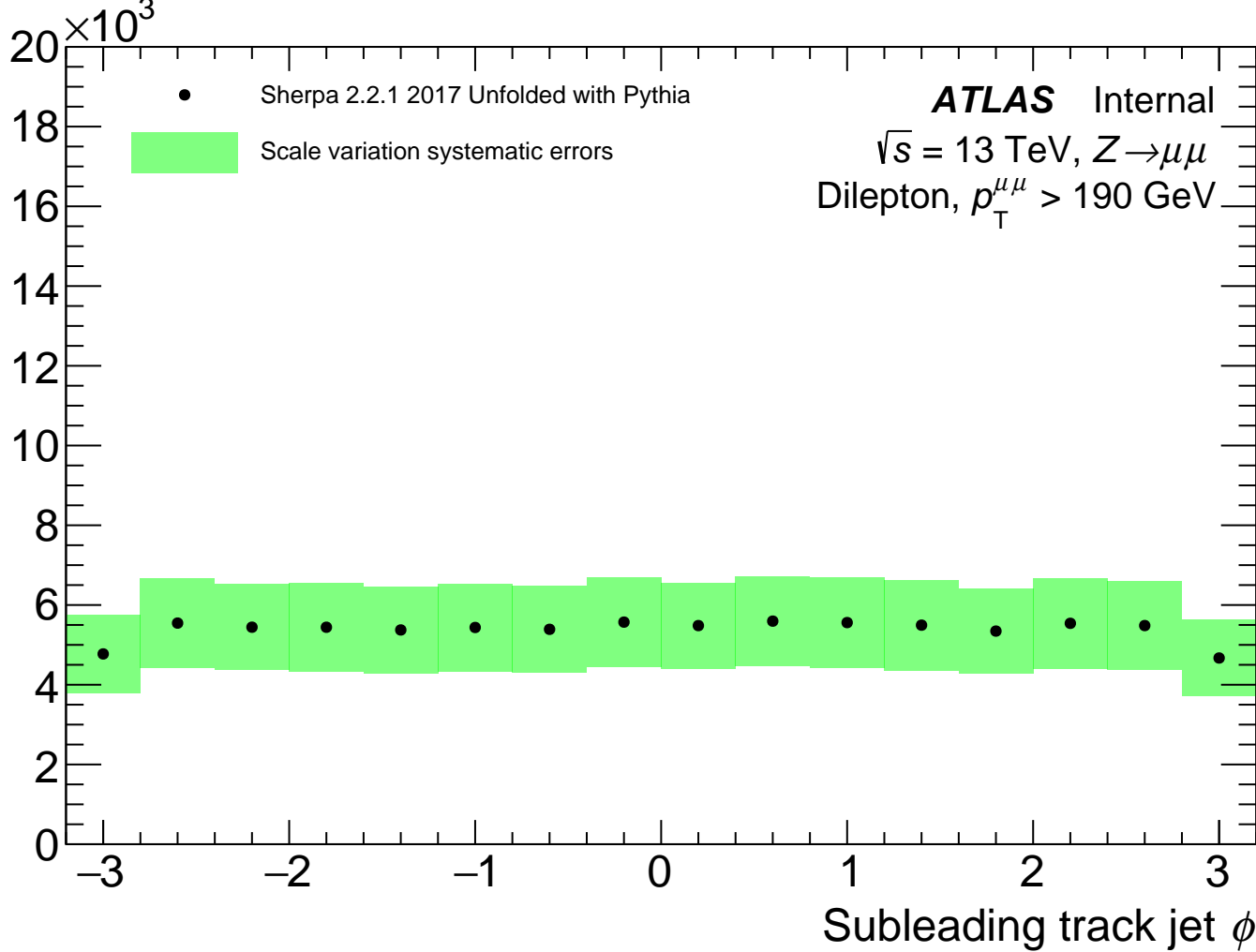
Events



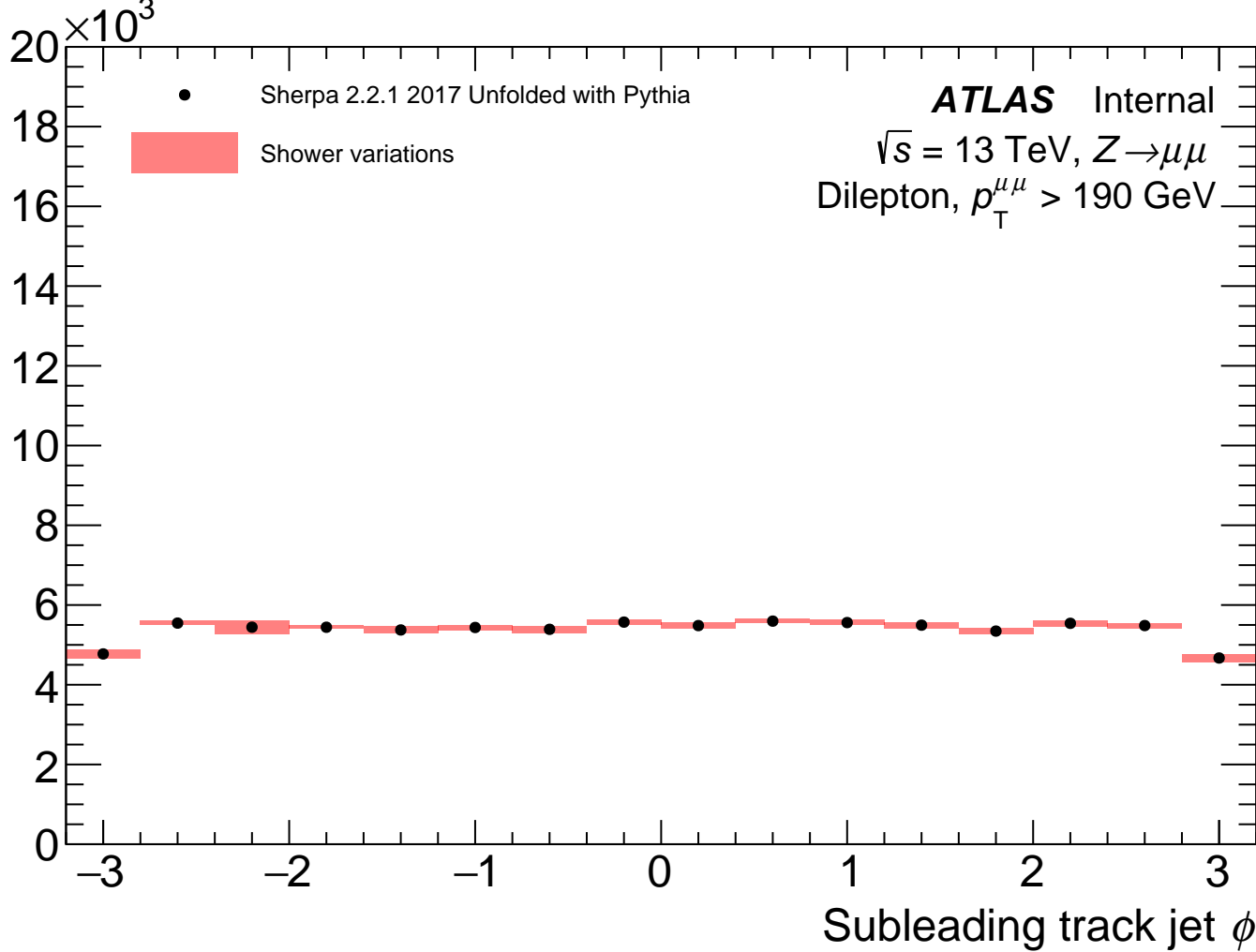
Events



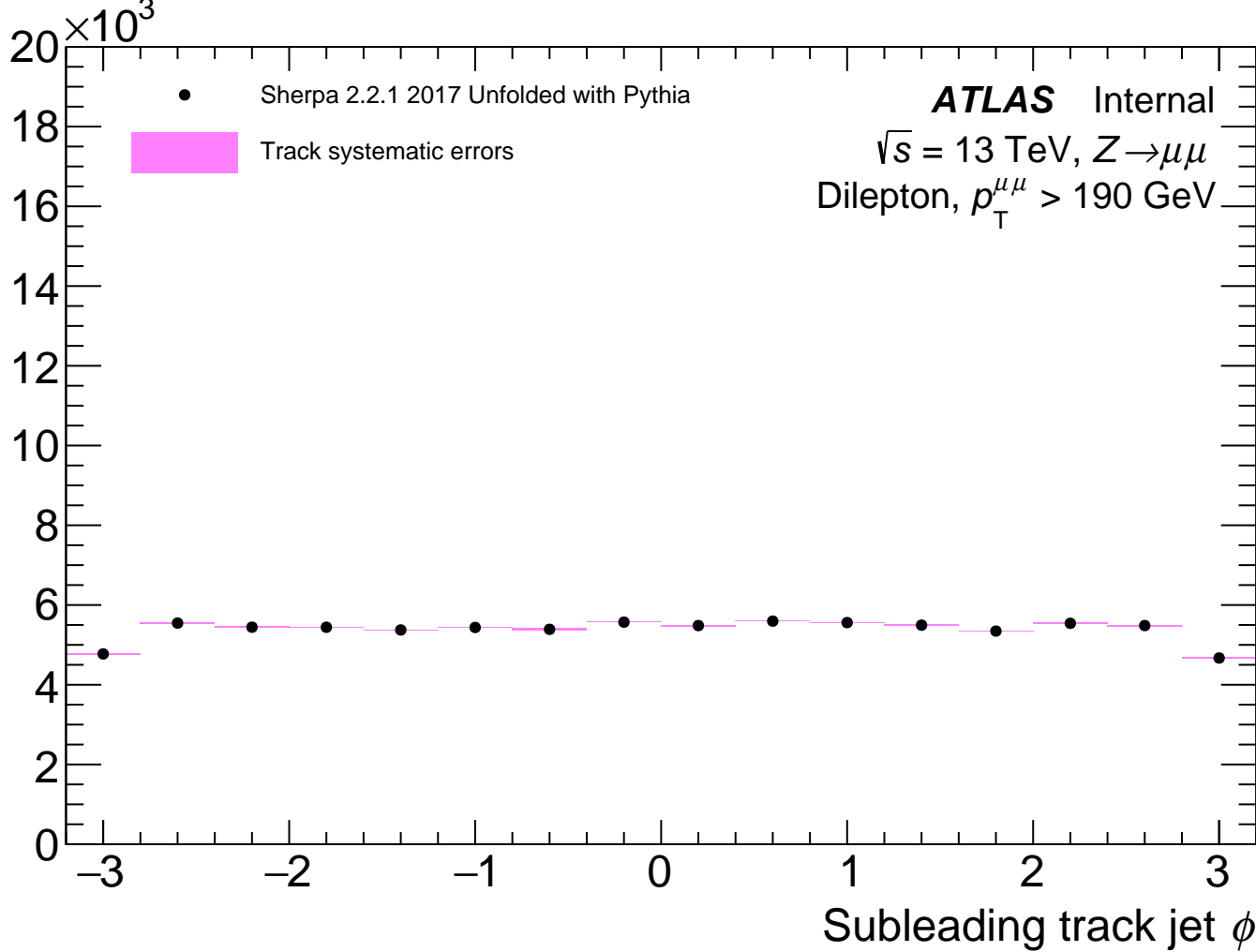
Events



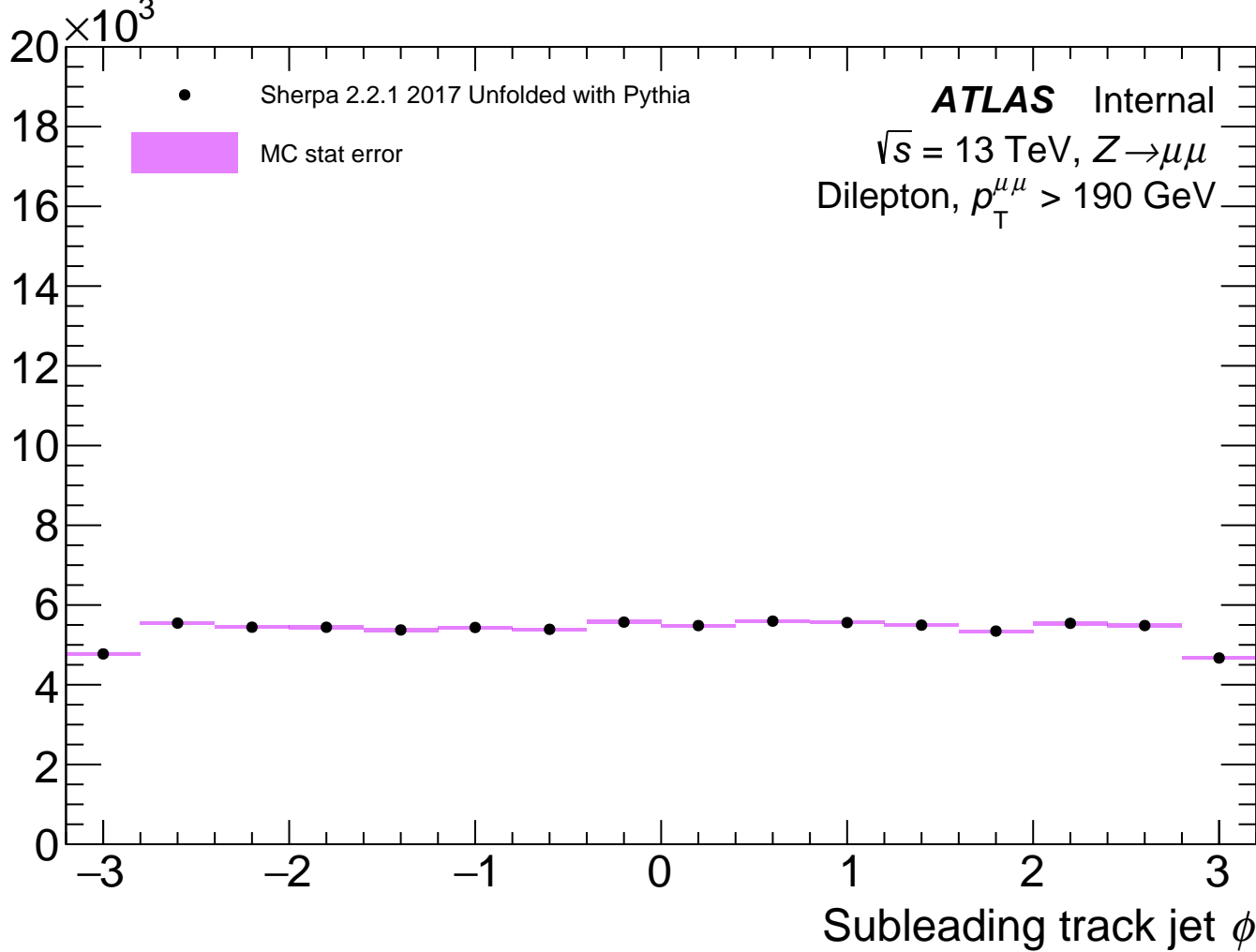
Events



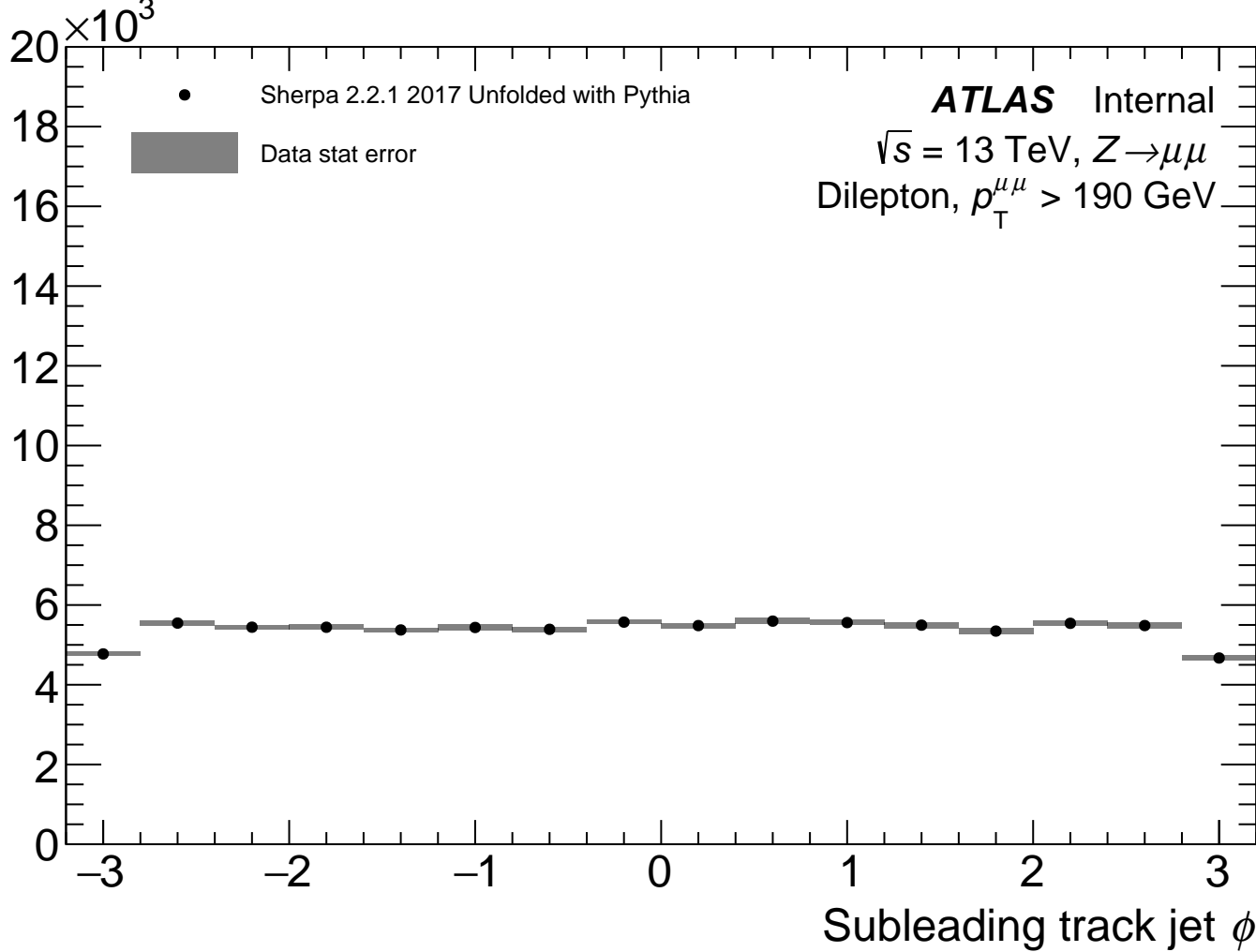
Events



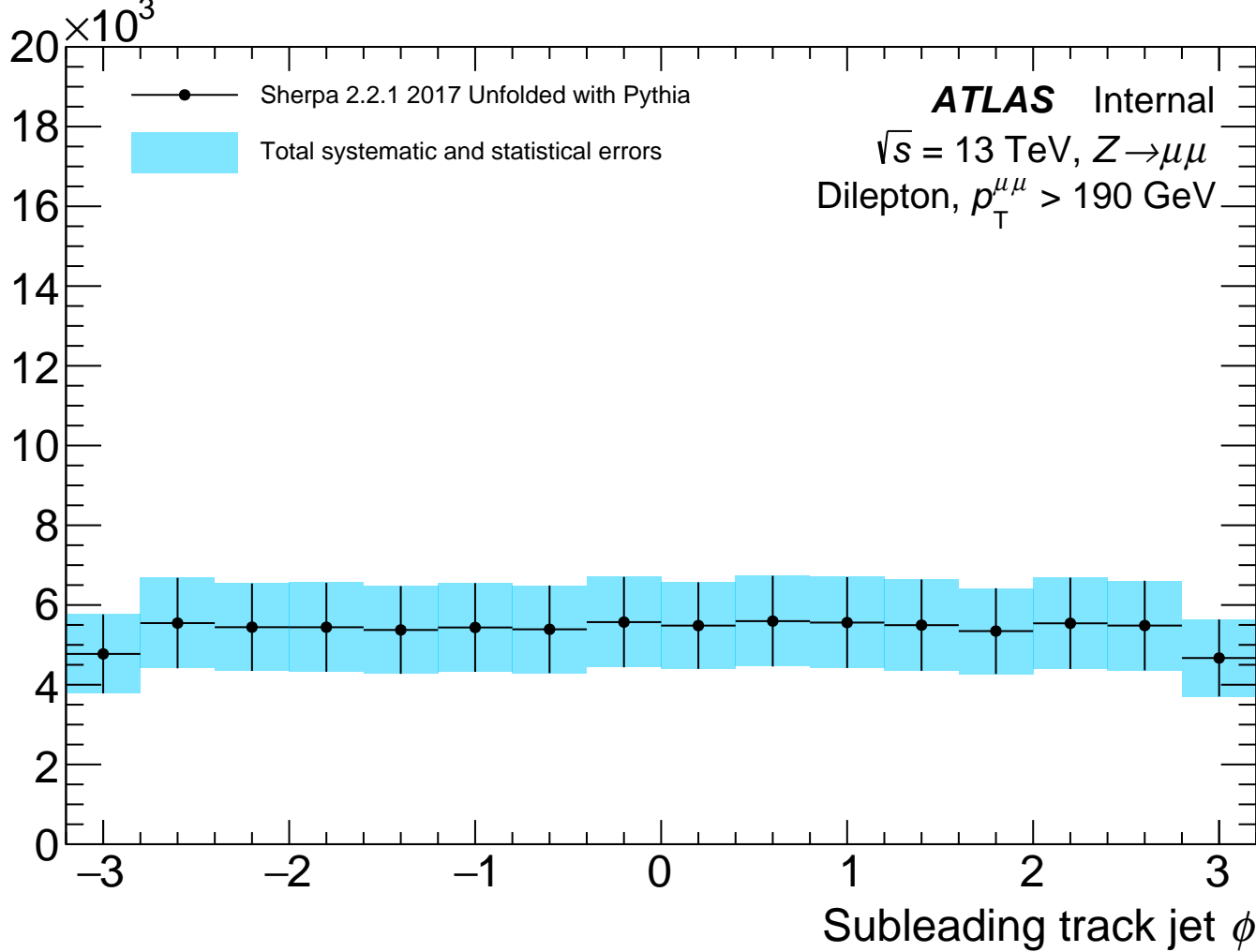
Events



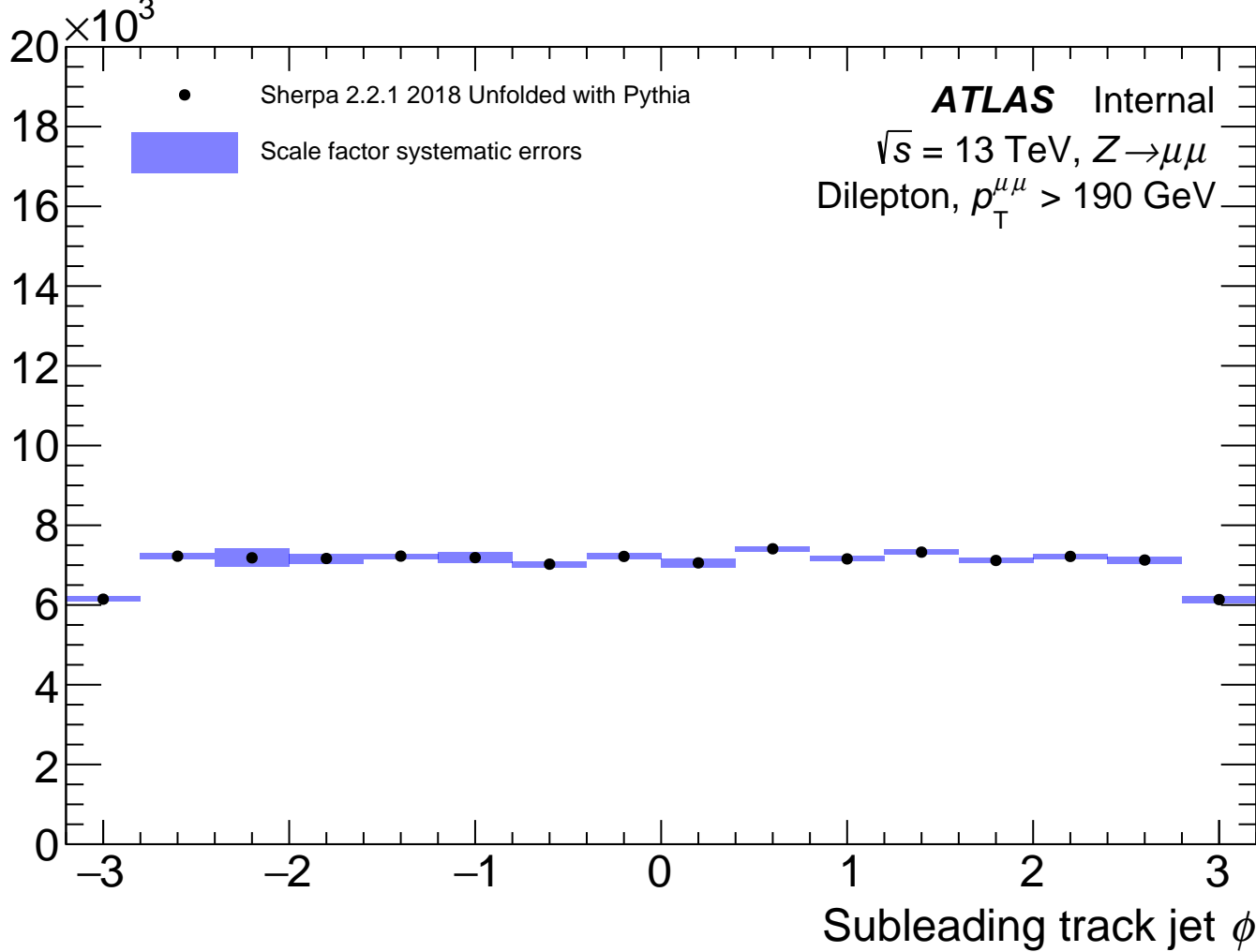
Events



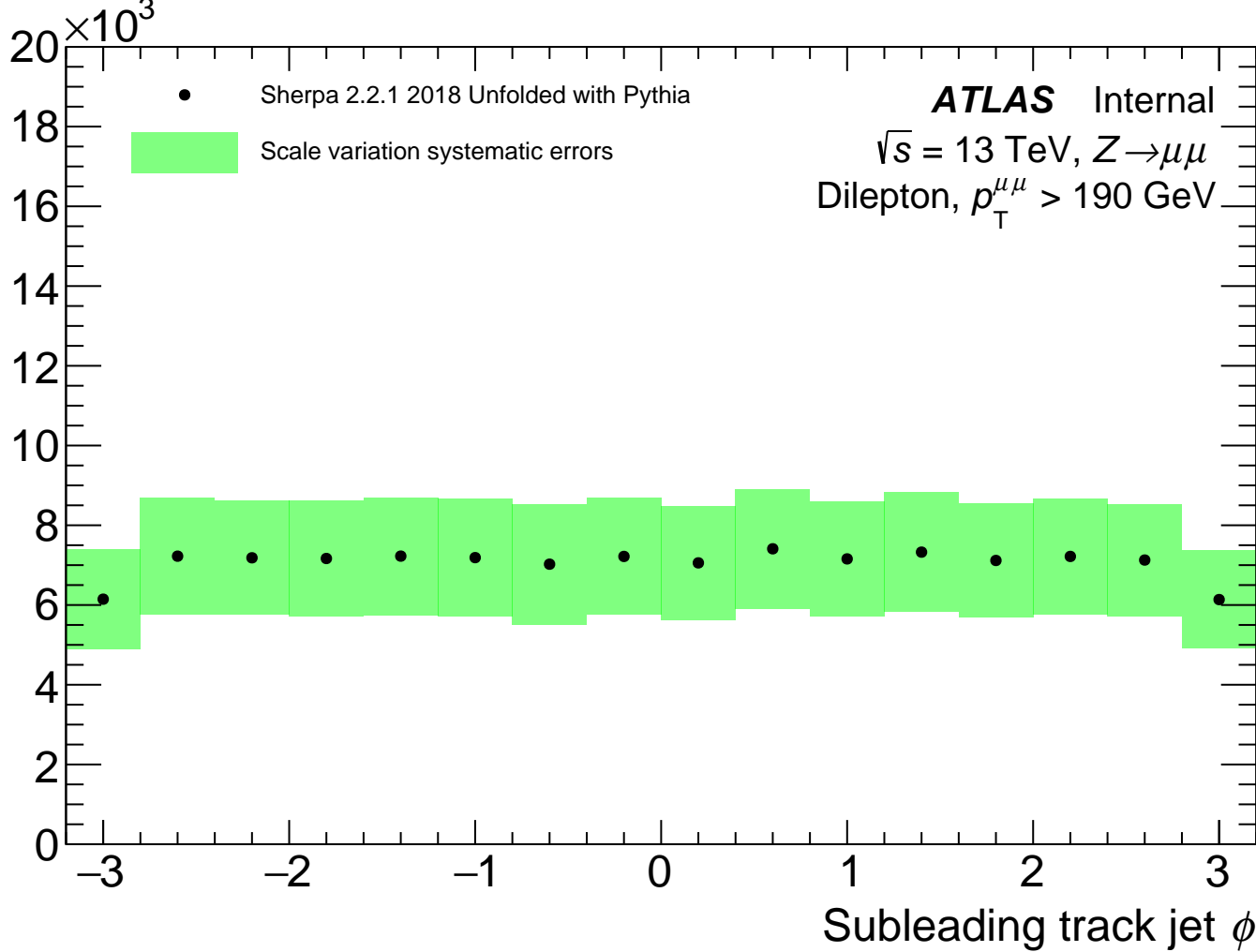
Events



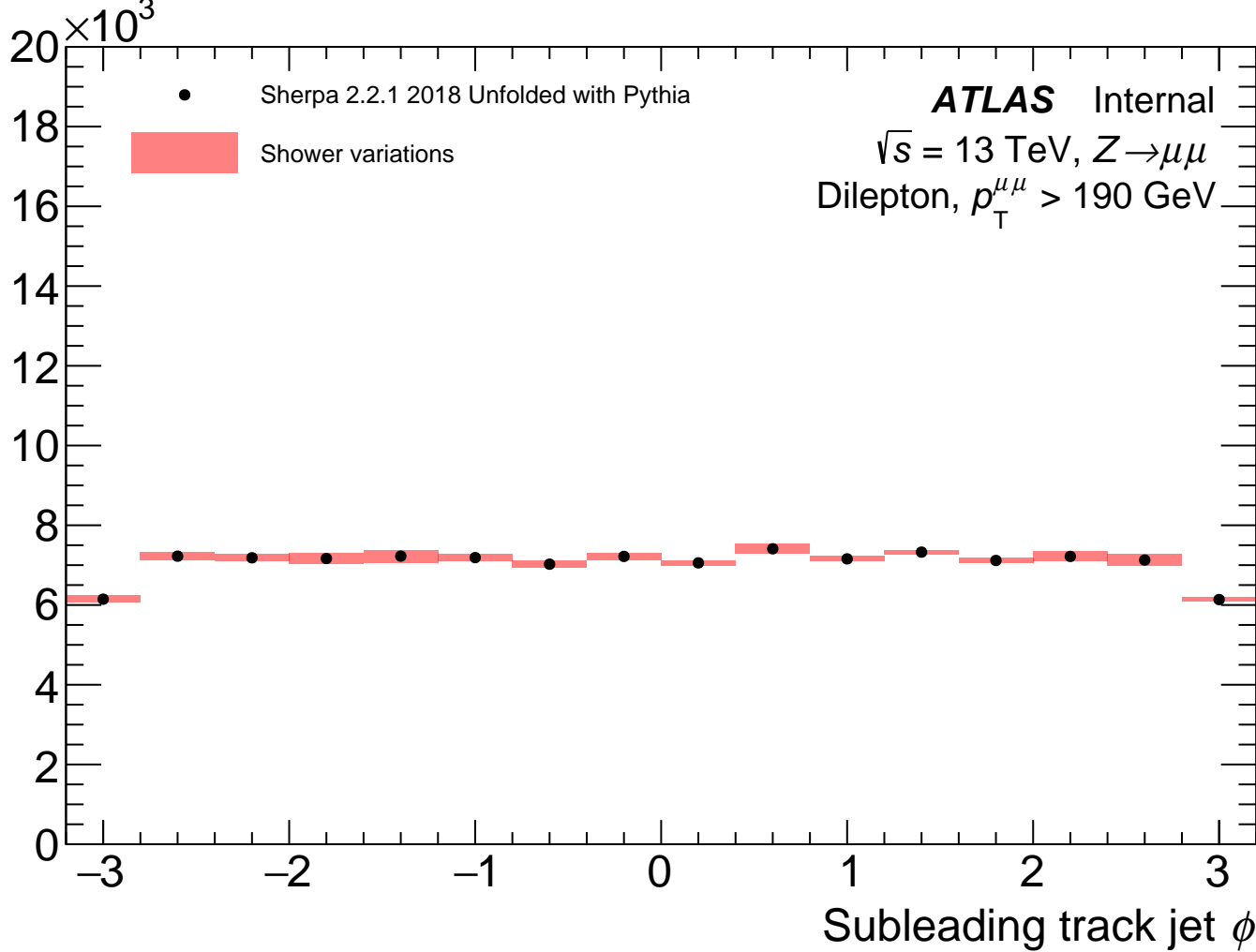
Events



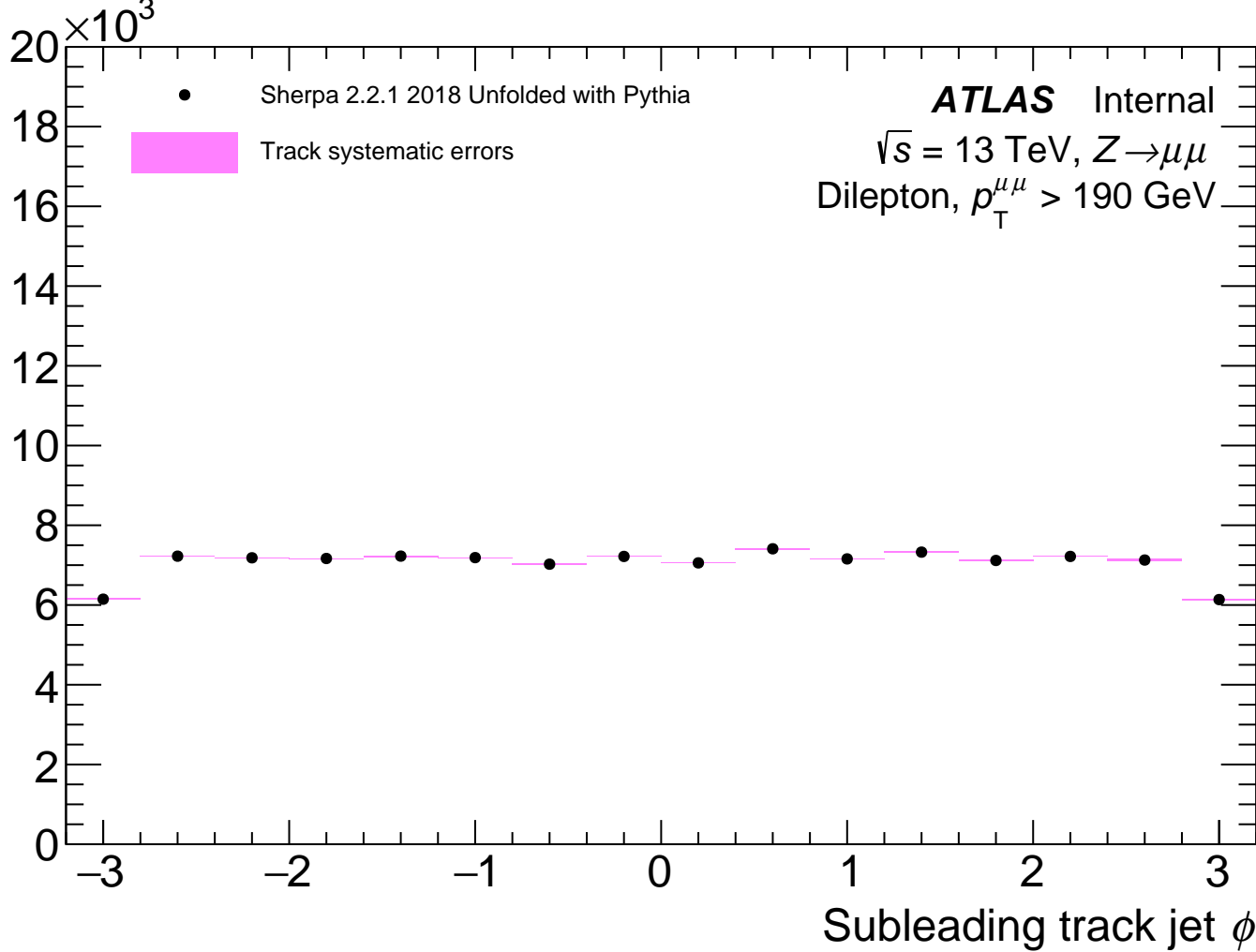
Events



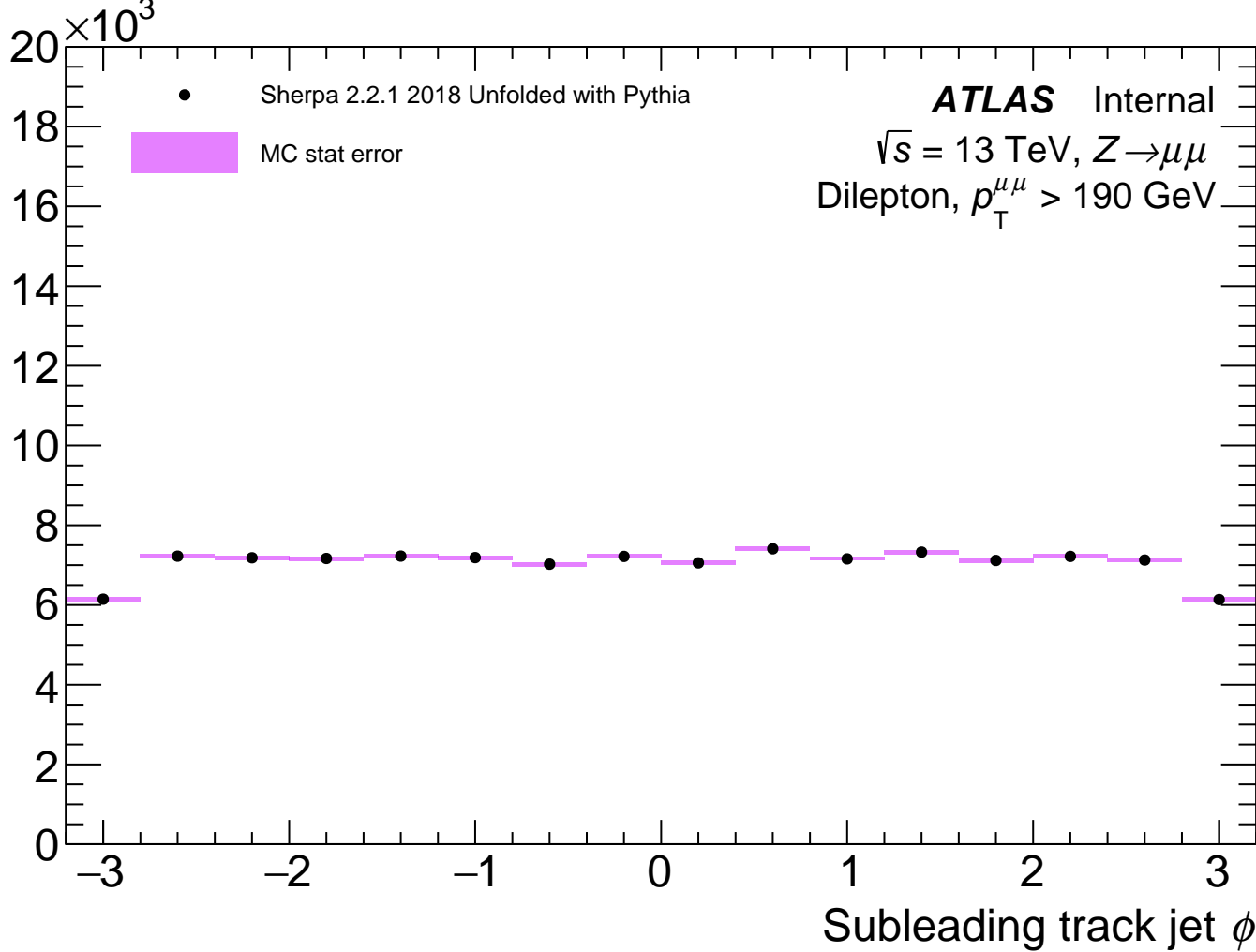
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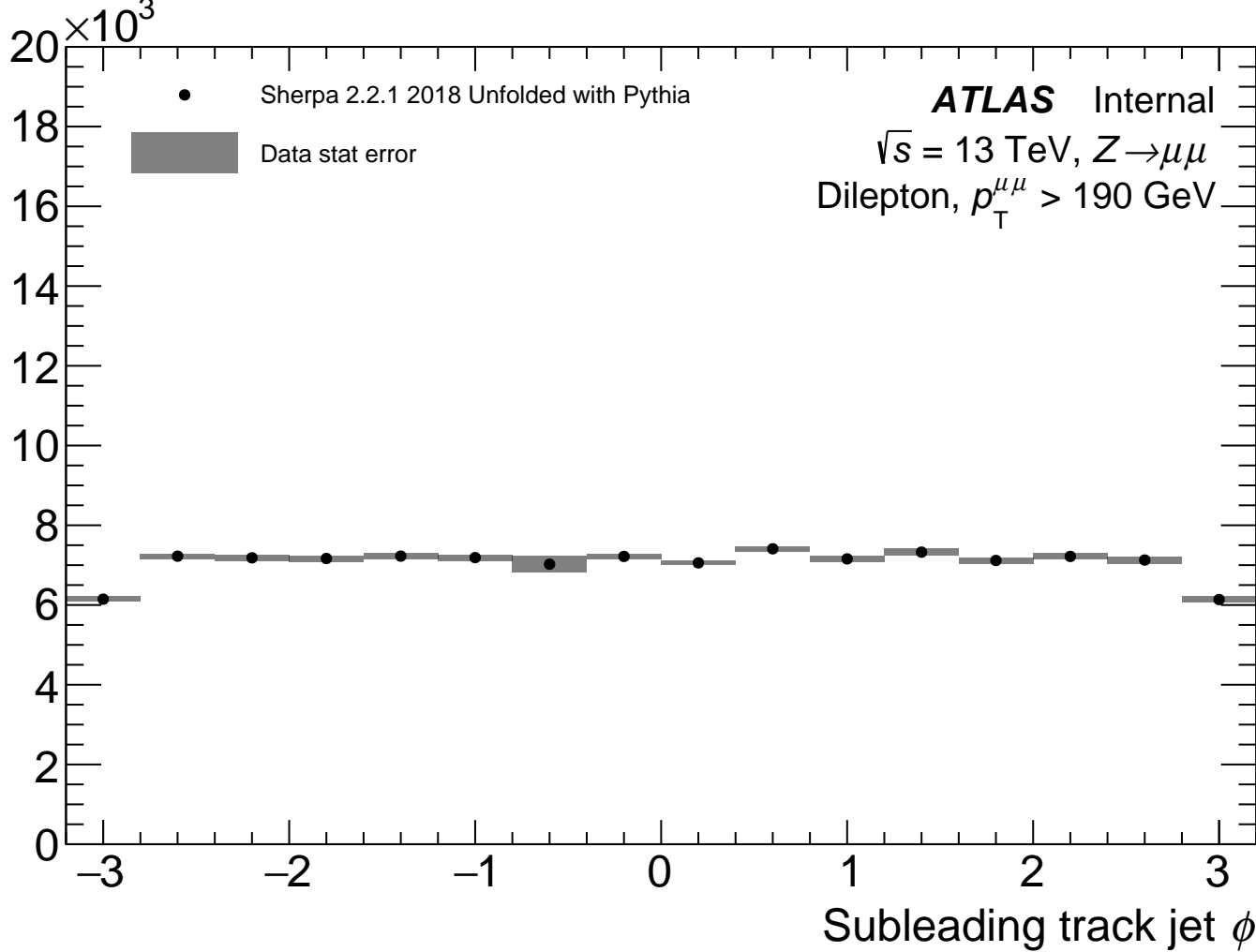
Events



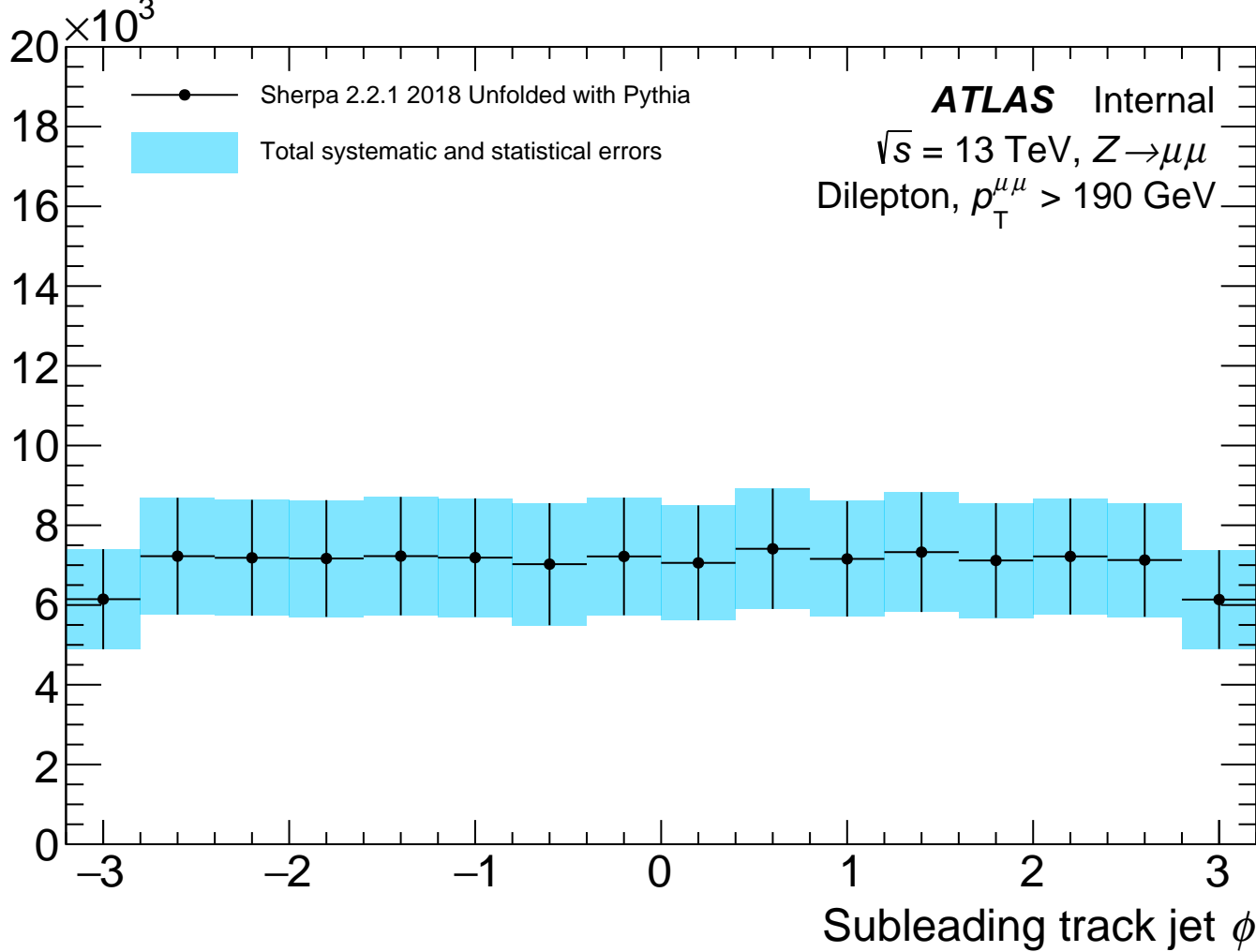
Events



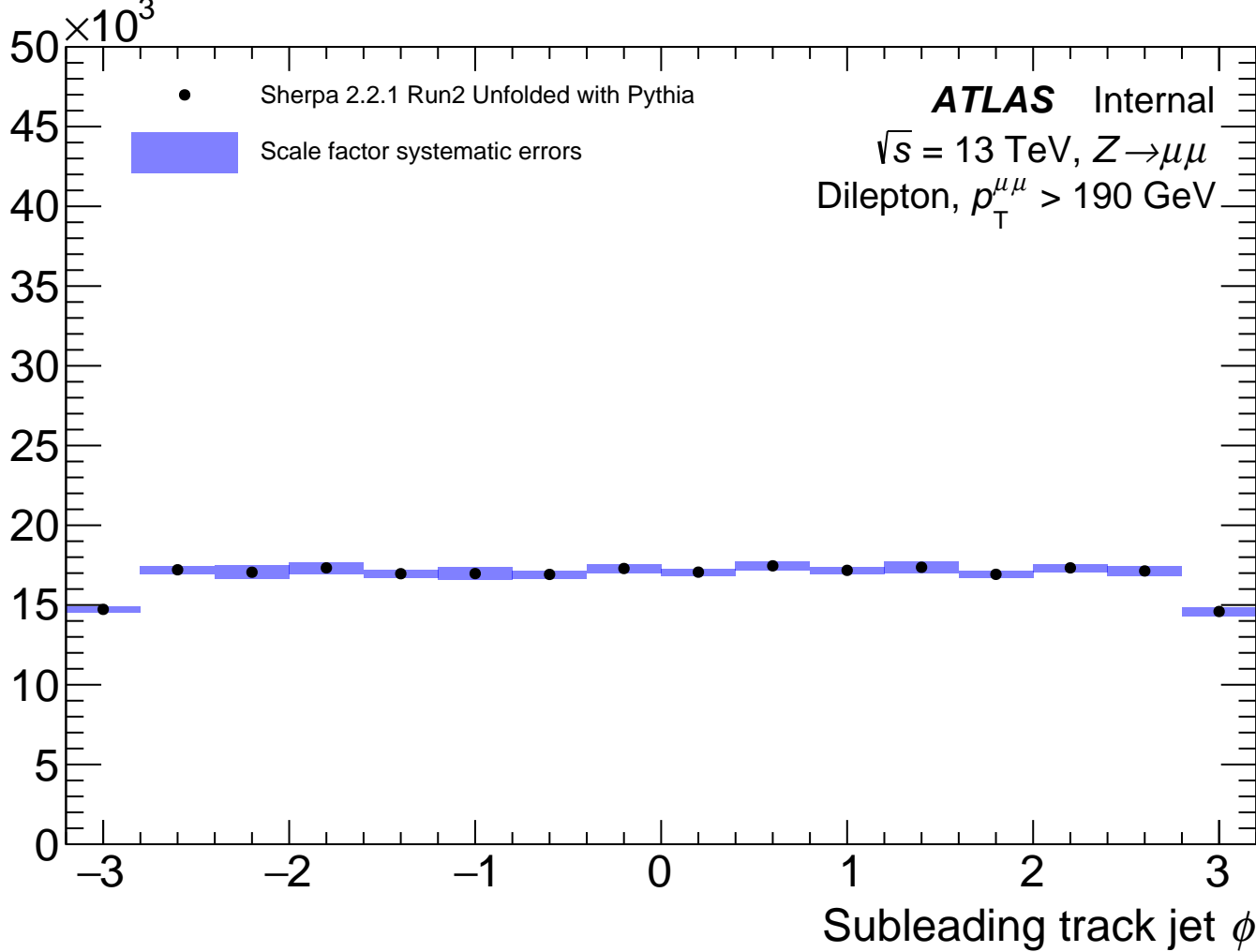
Events



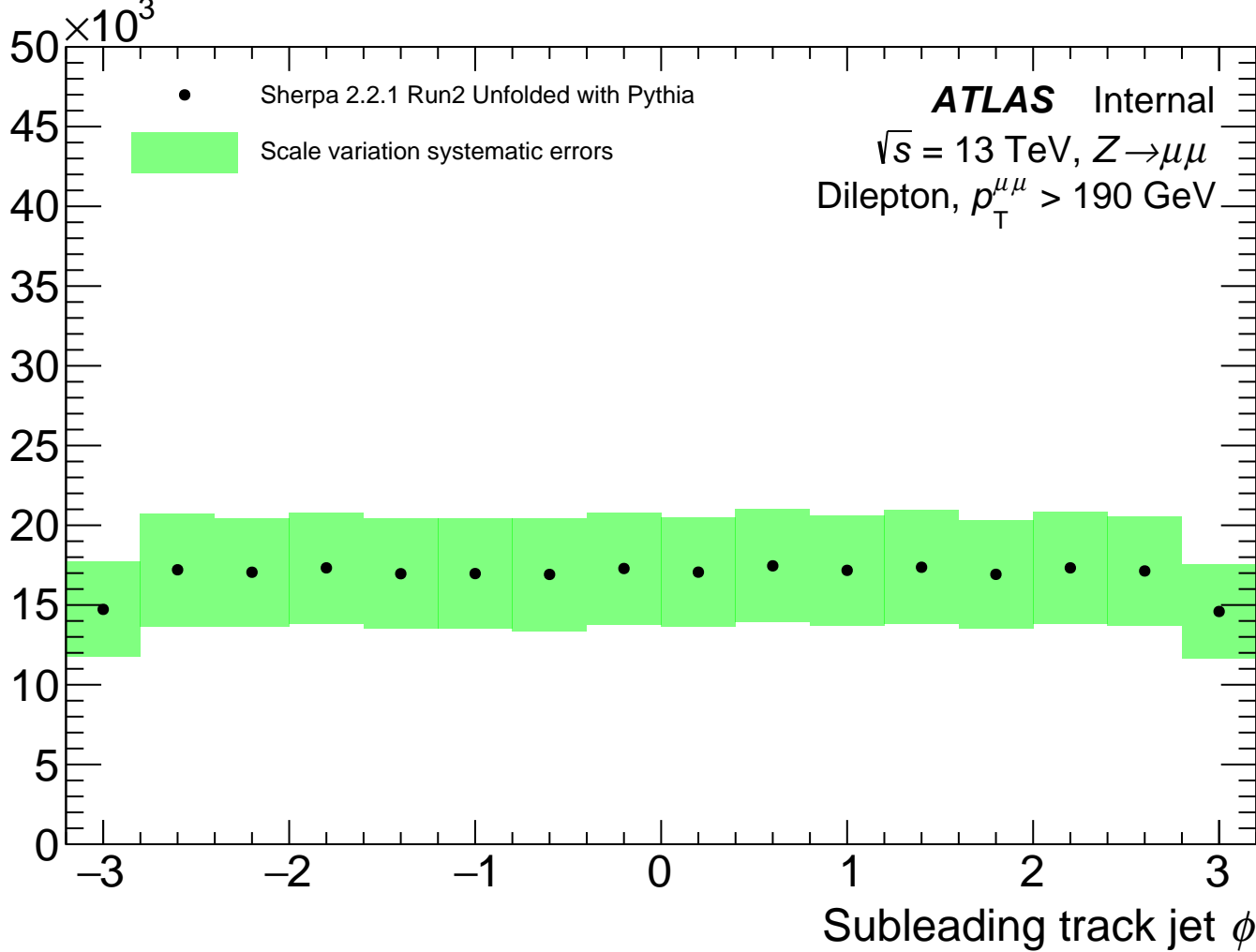
Events



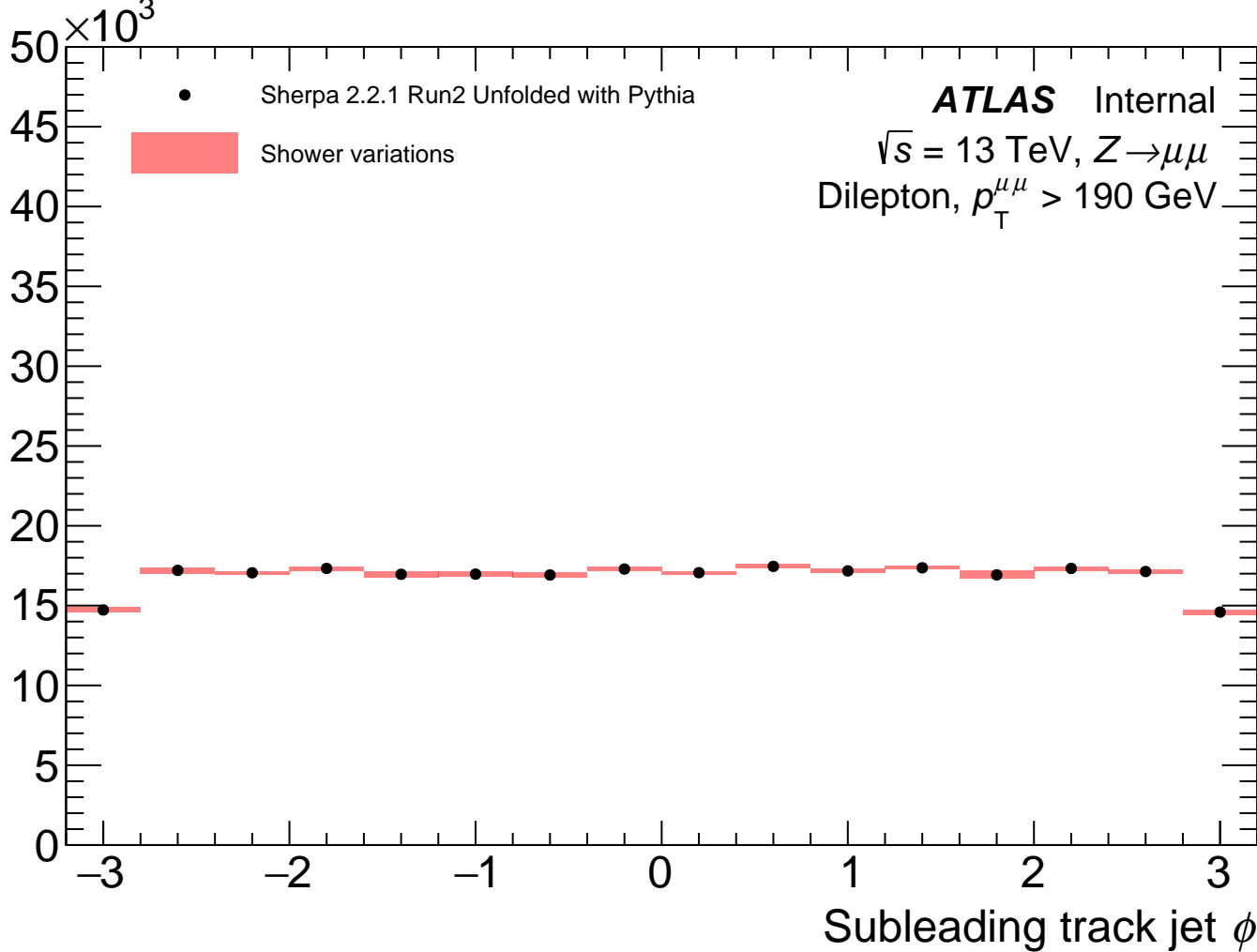
Events



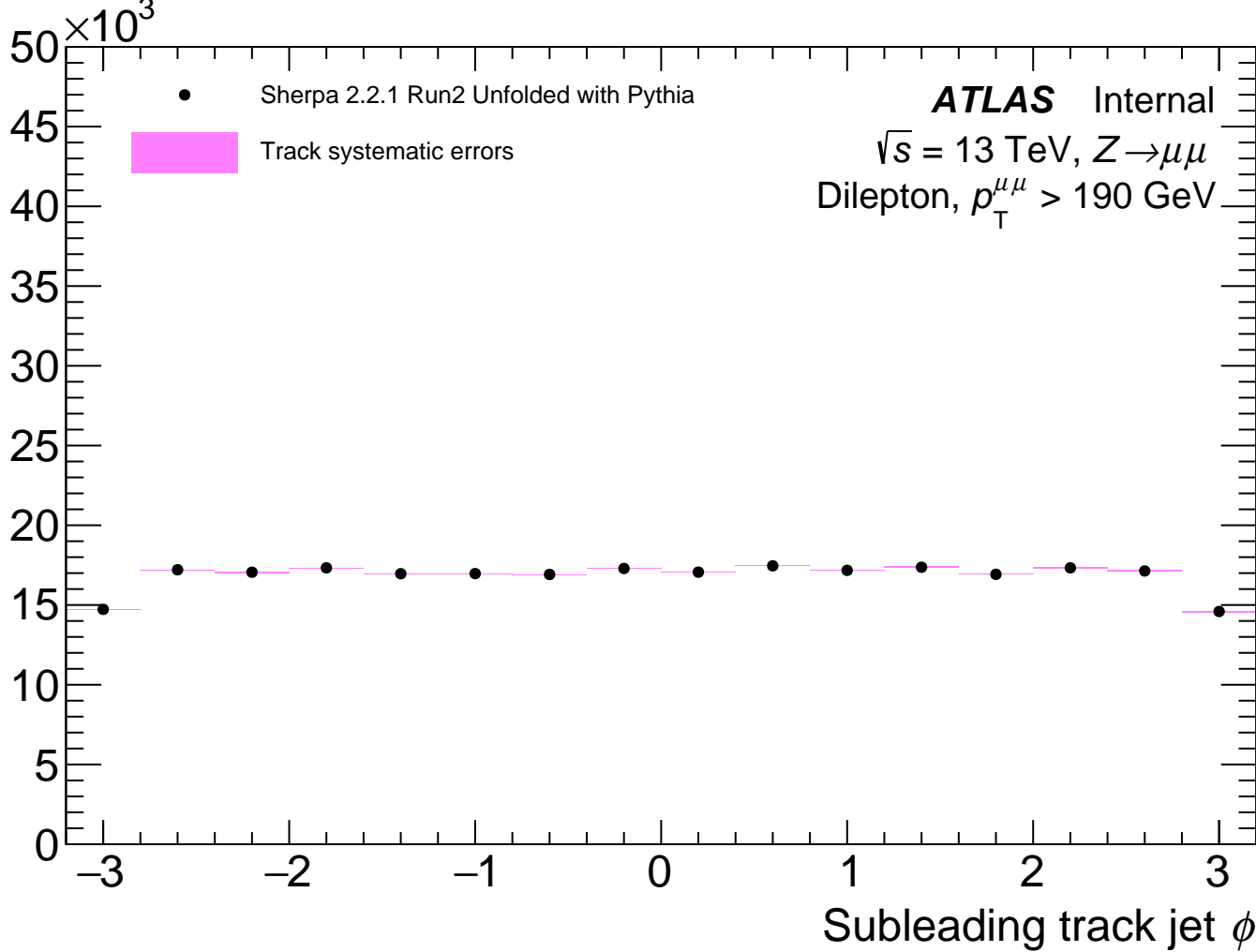
Events



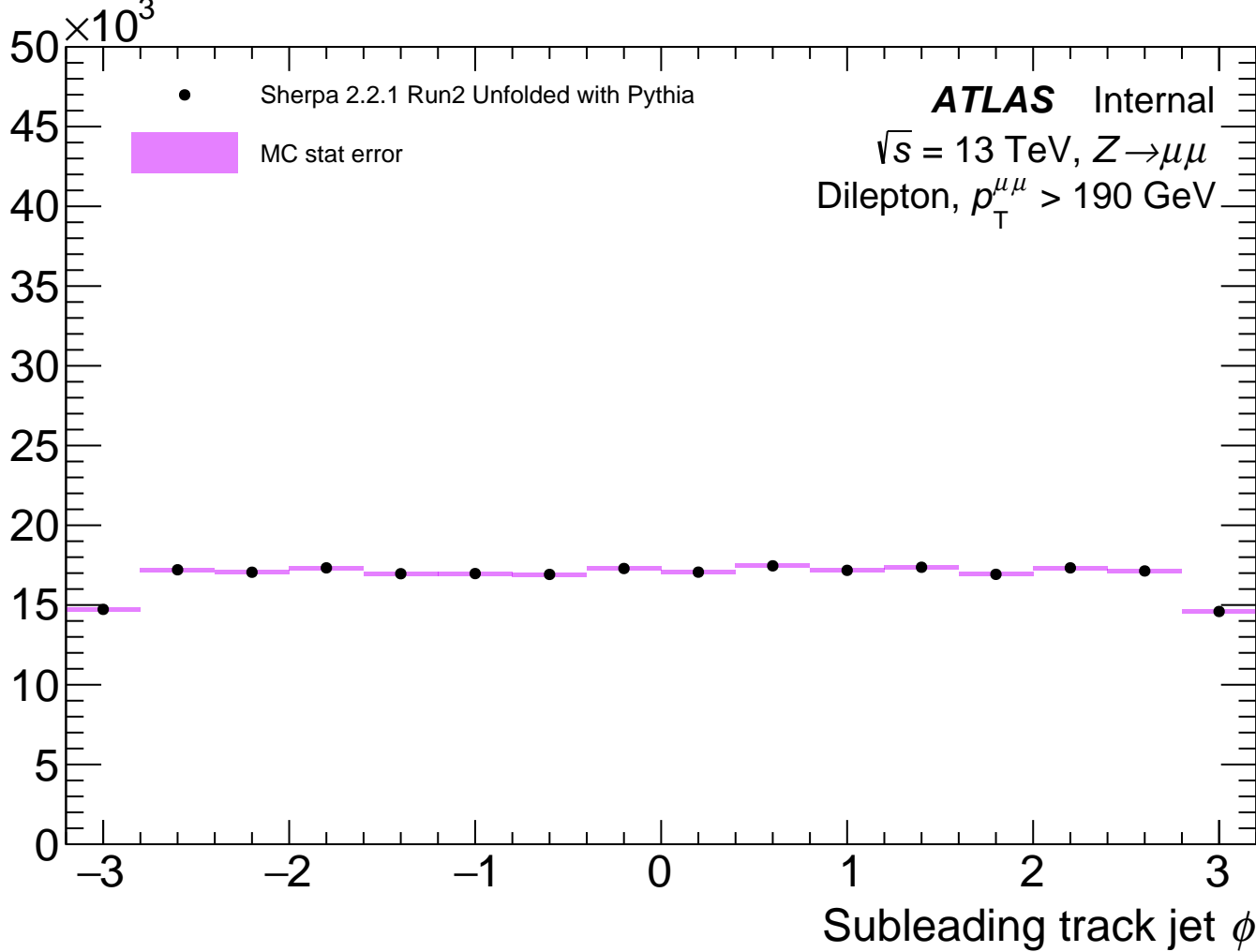
Events



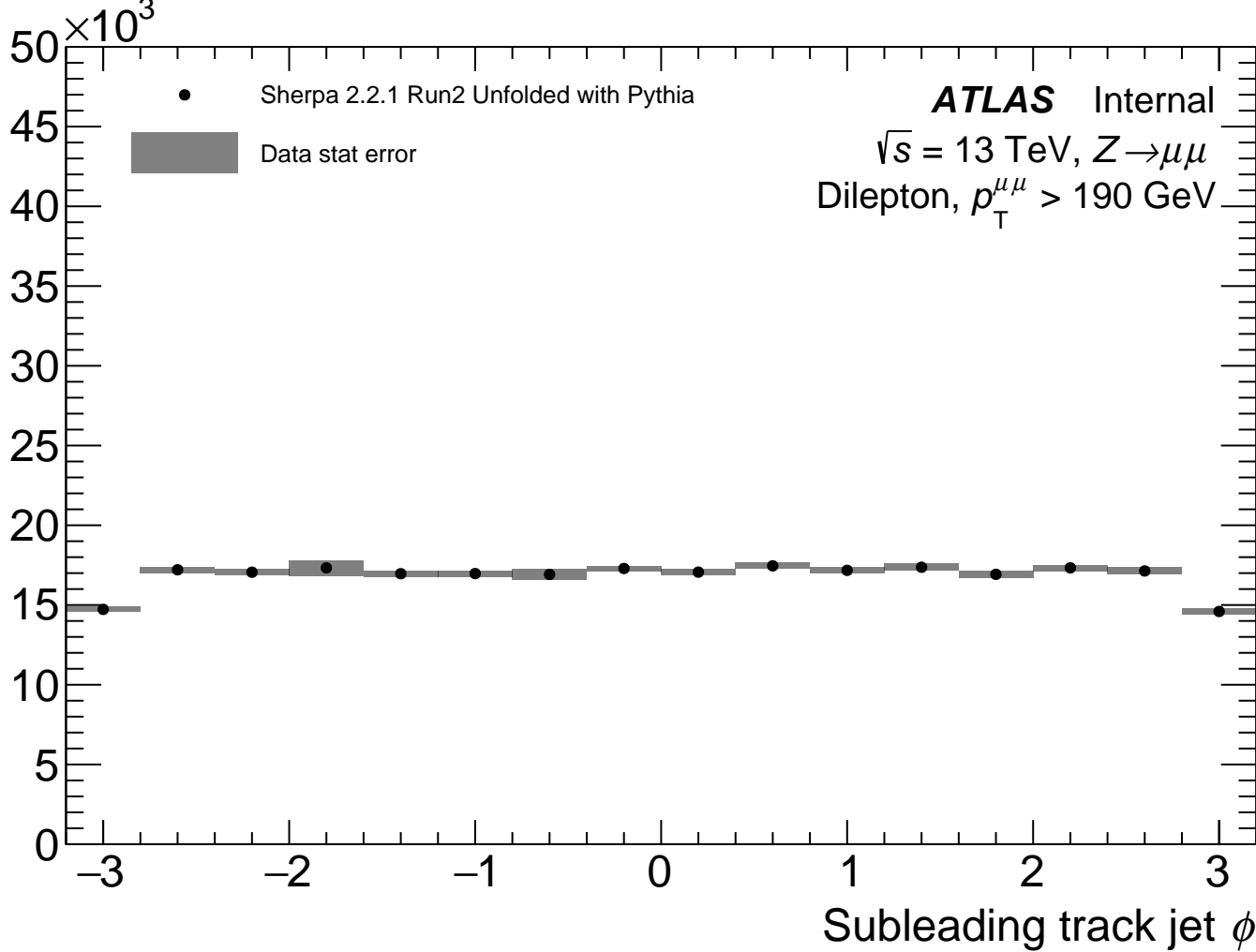
Events



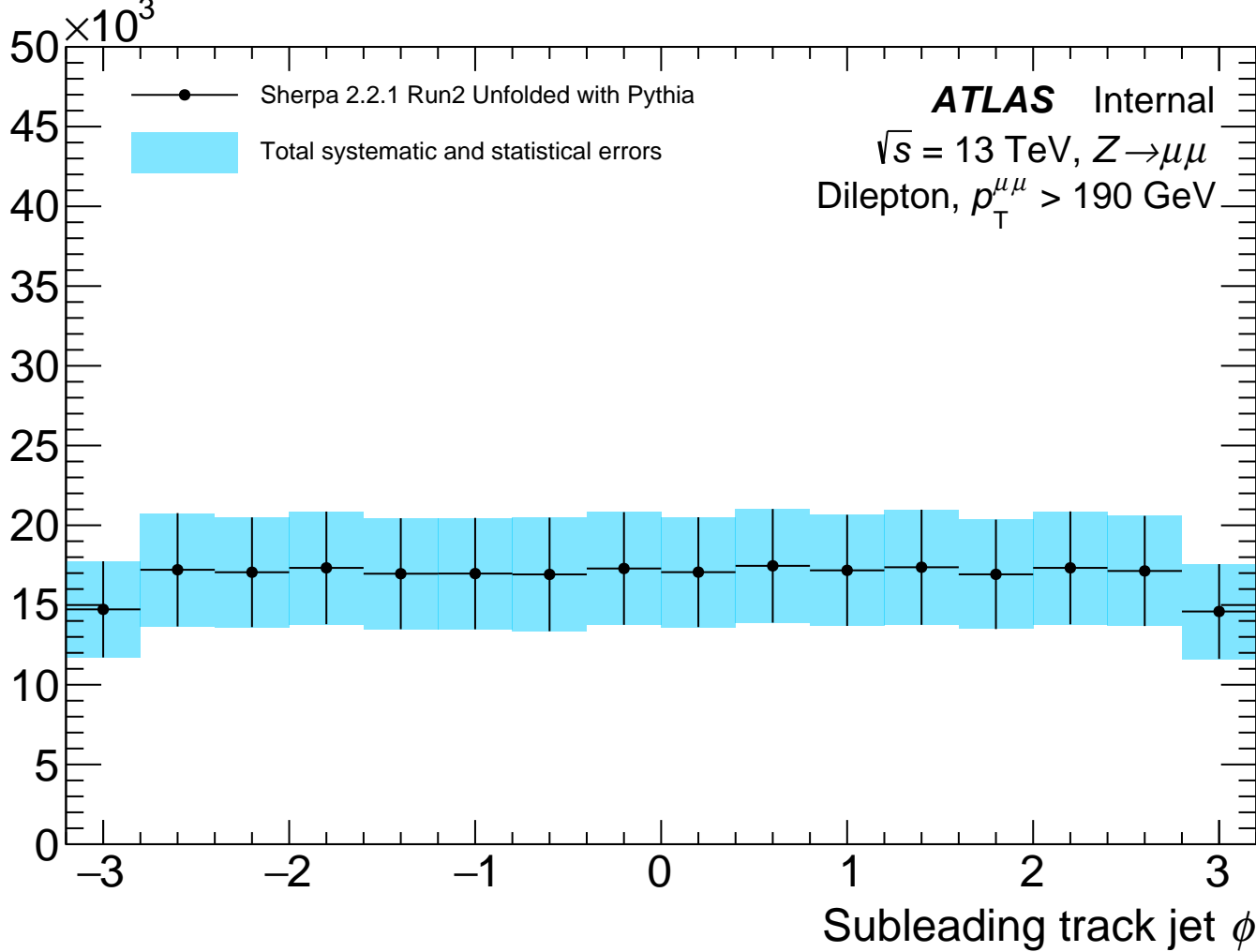
Events



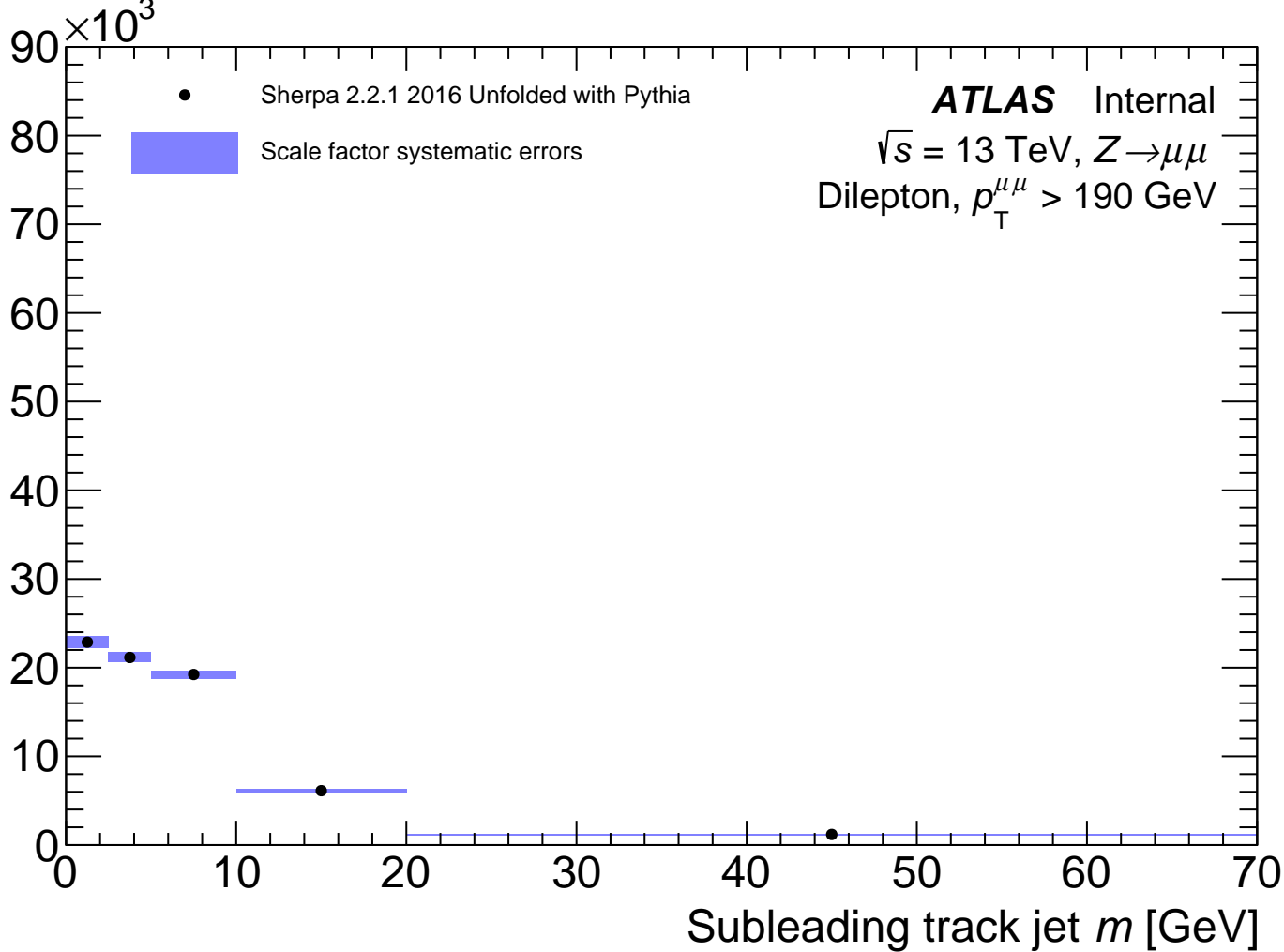
Events



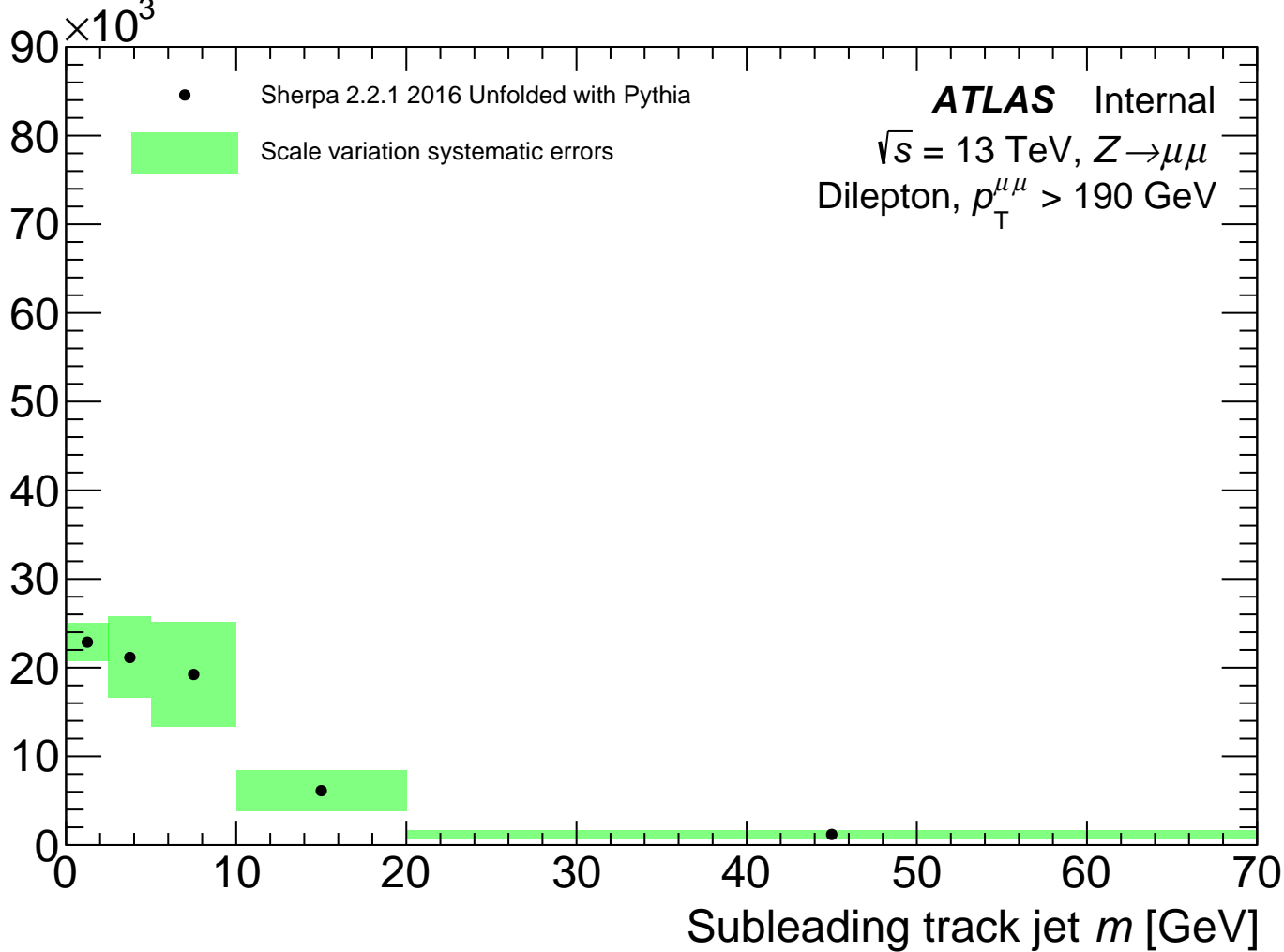
Events



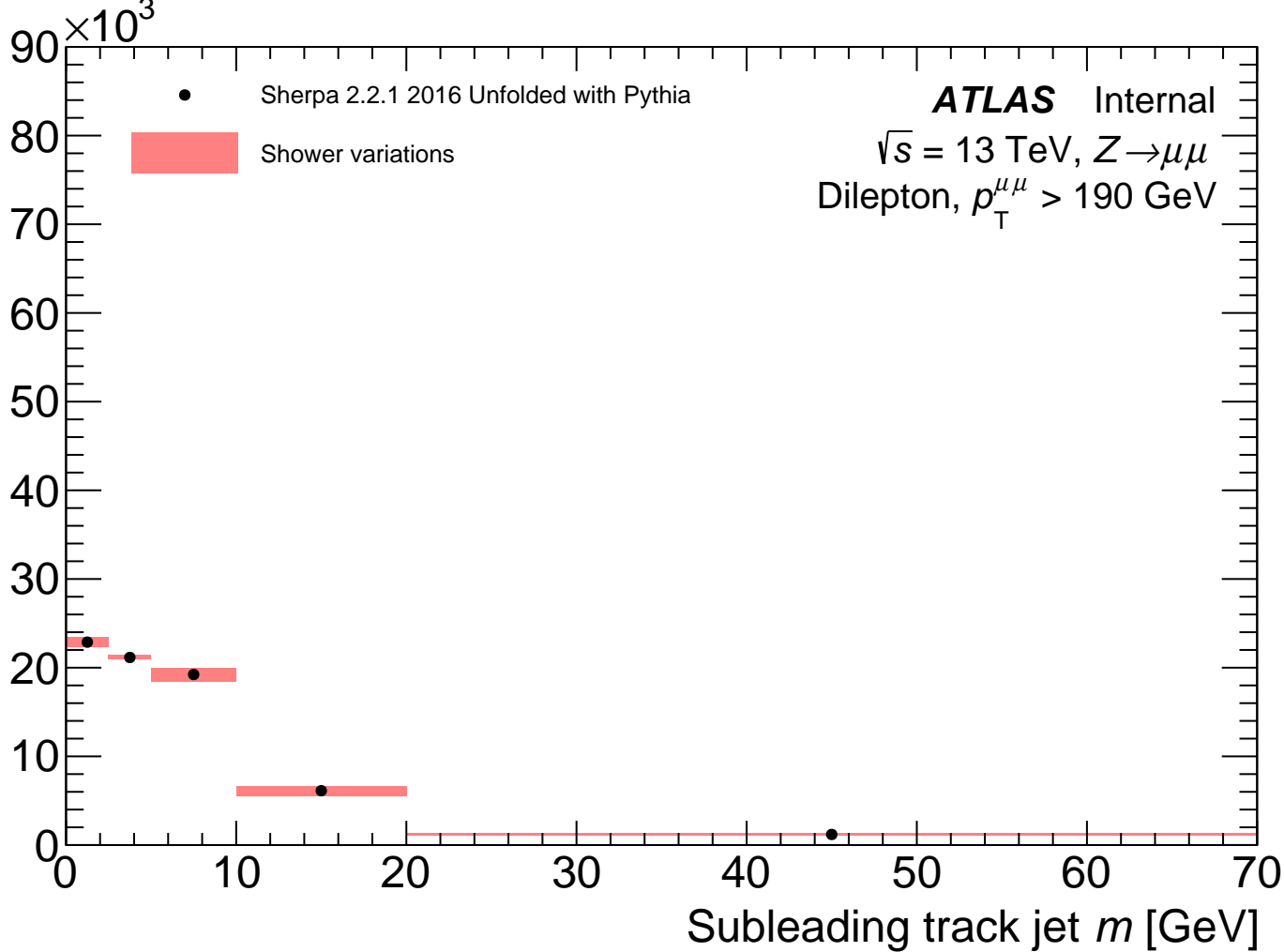
Events



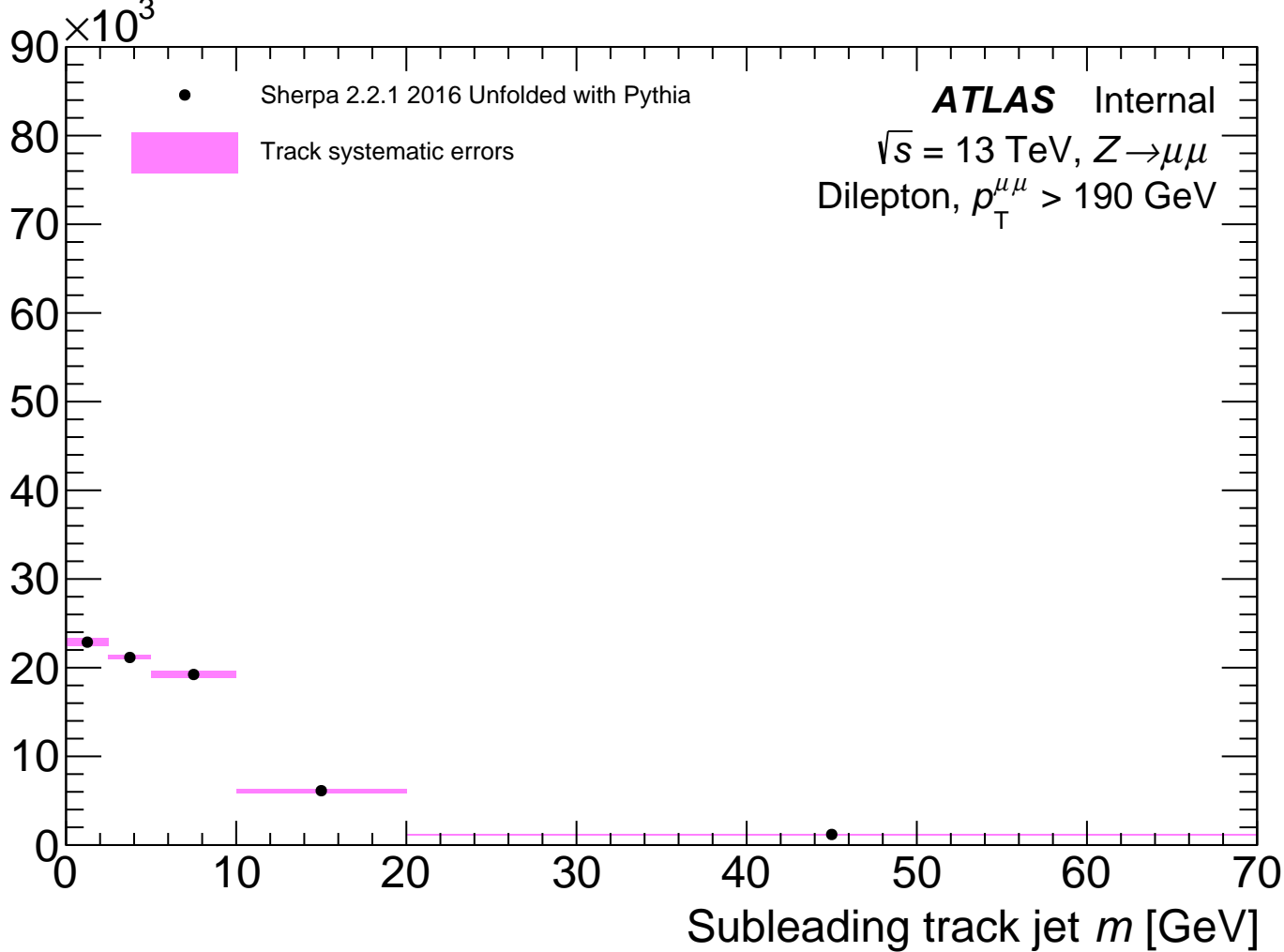
Events



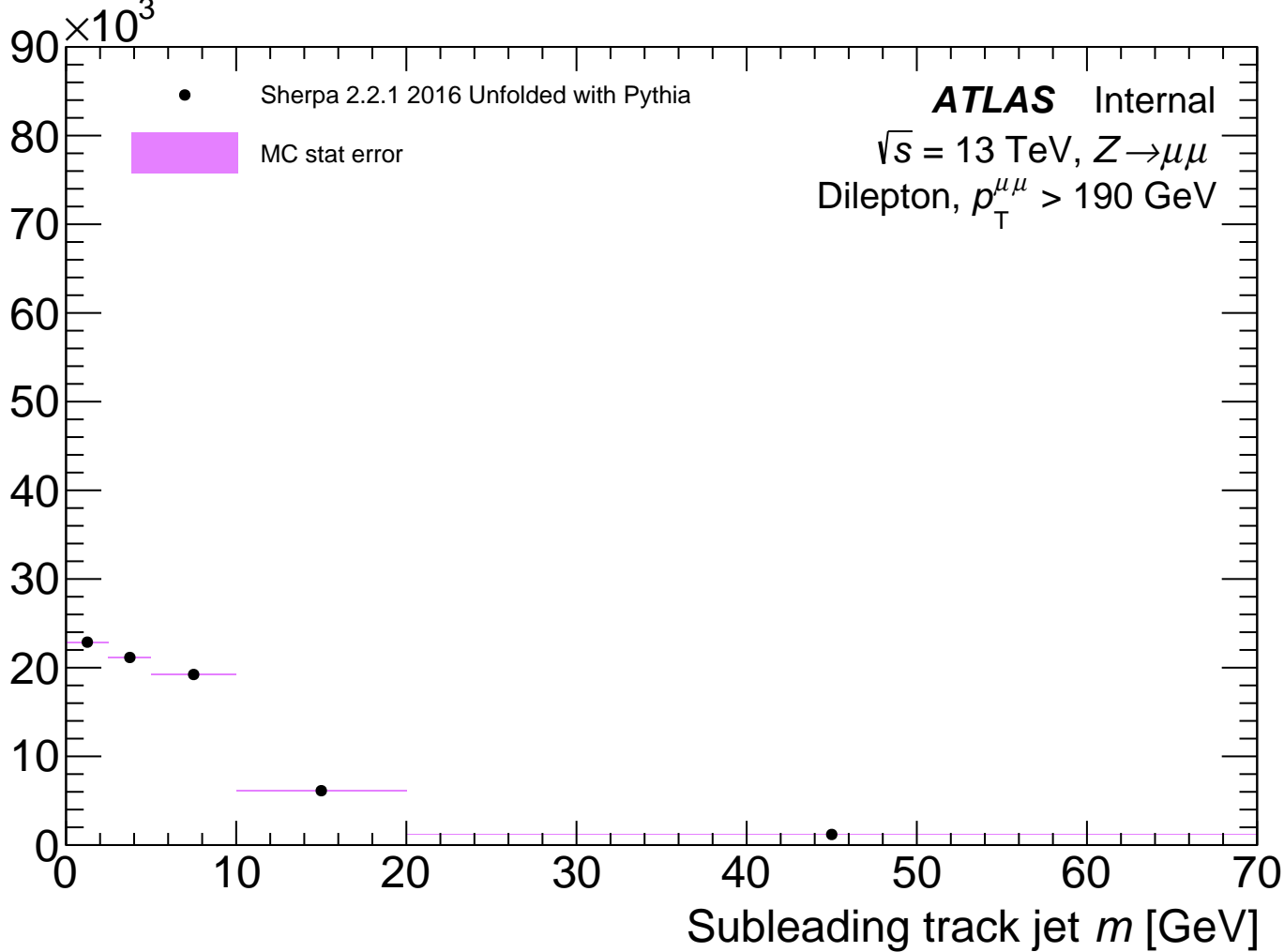
Events



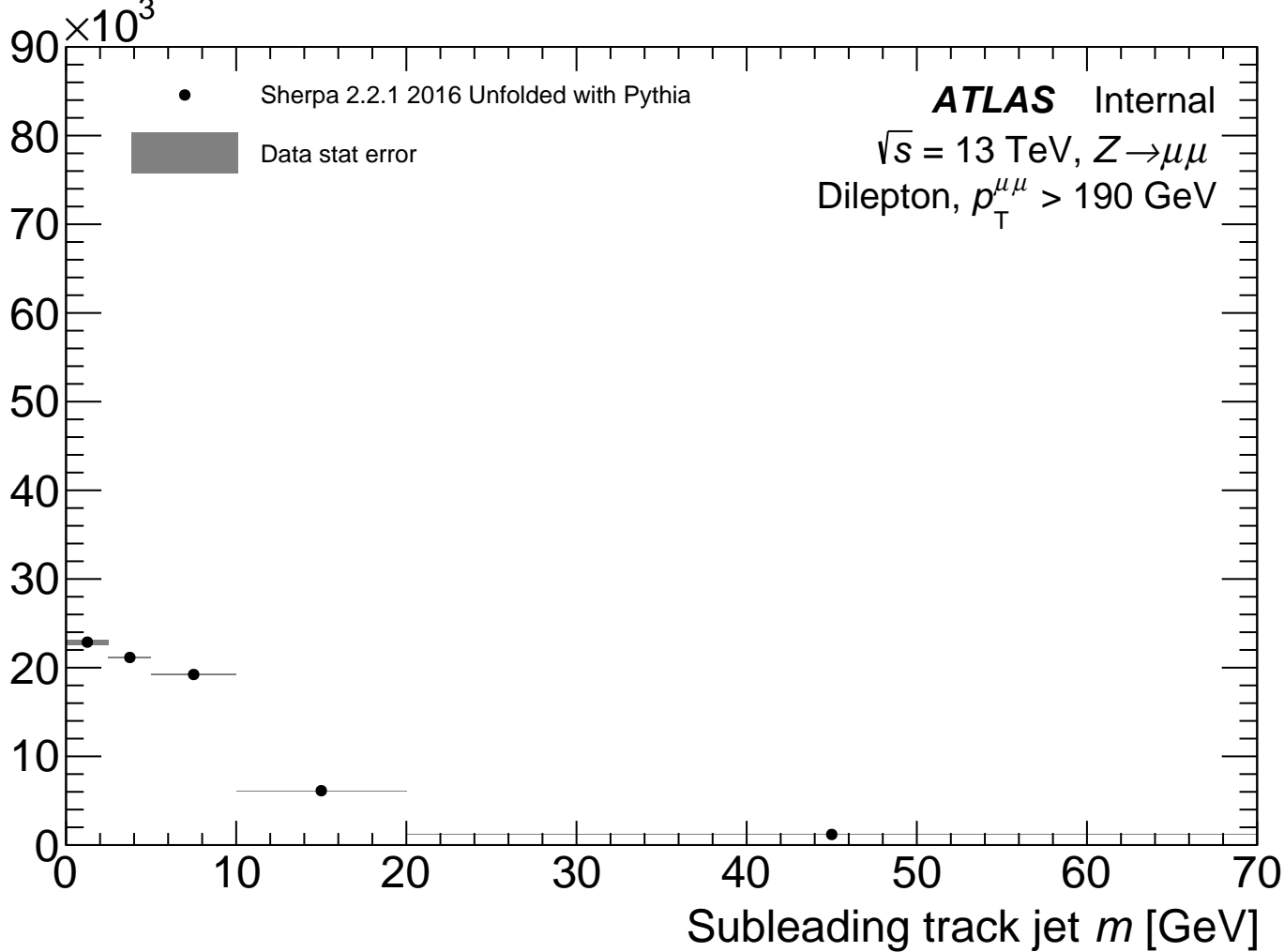
Events



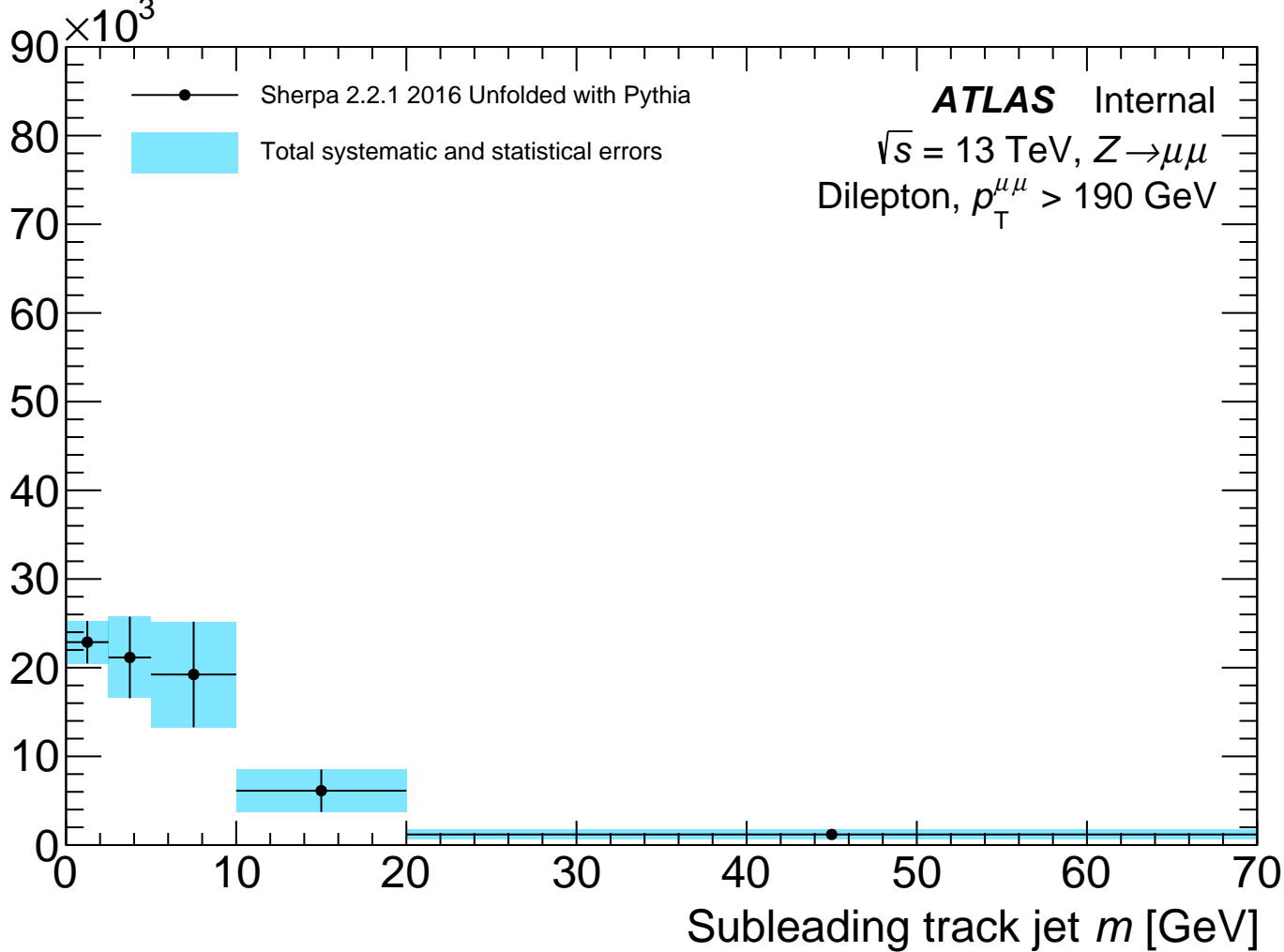
Events



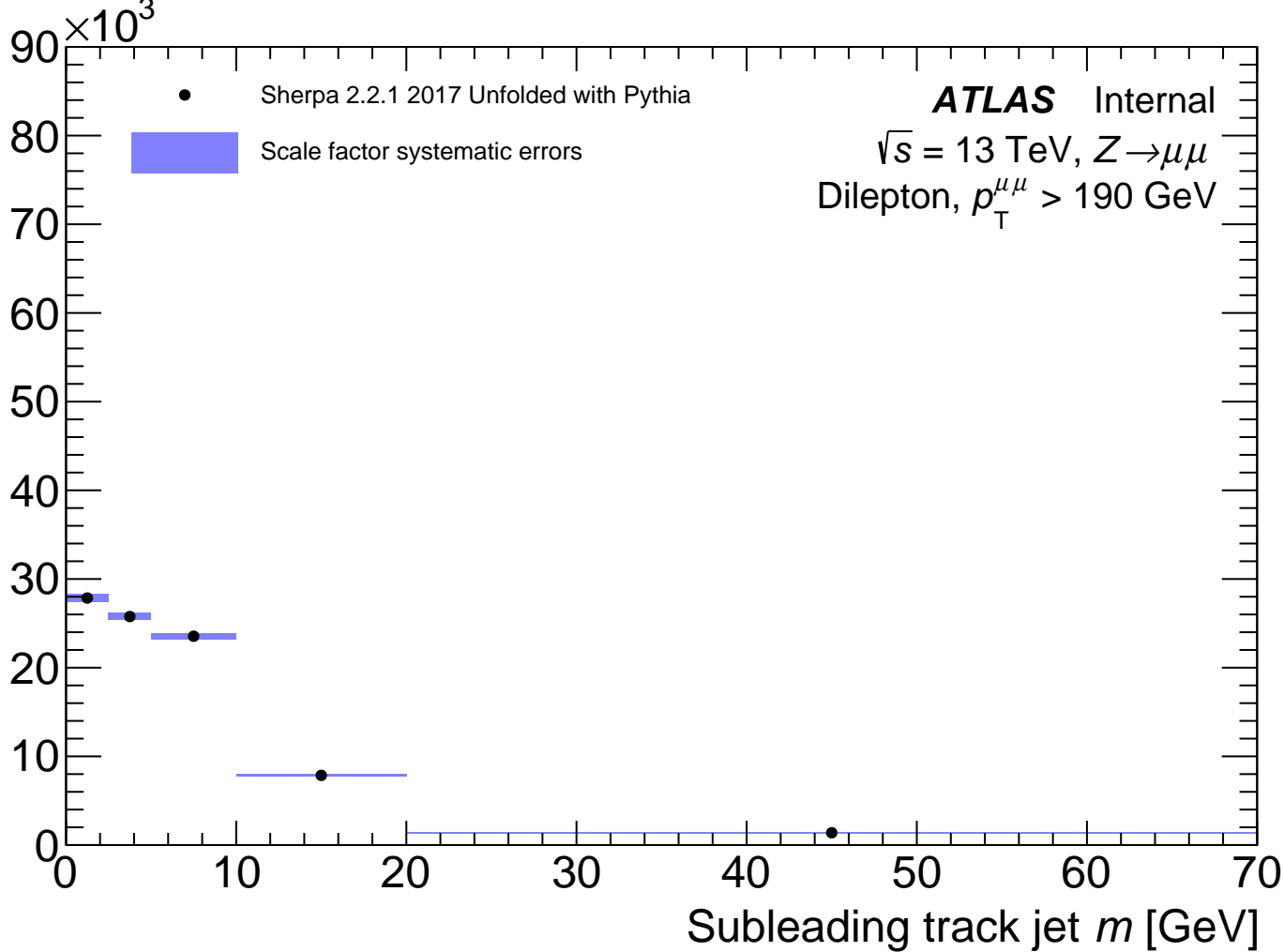
Events



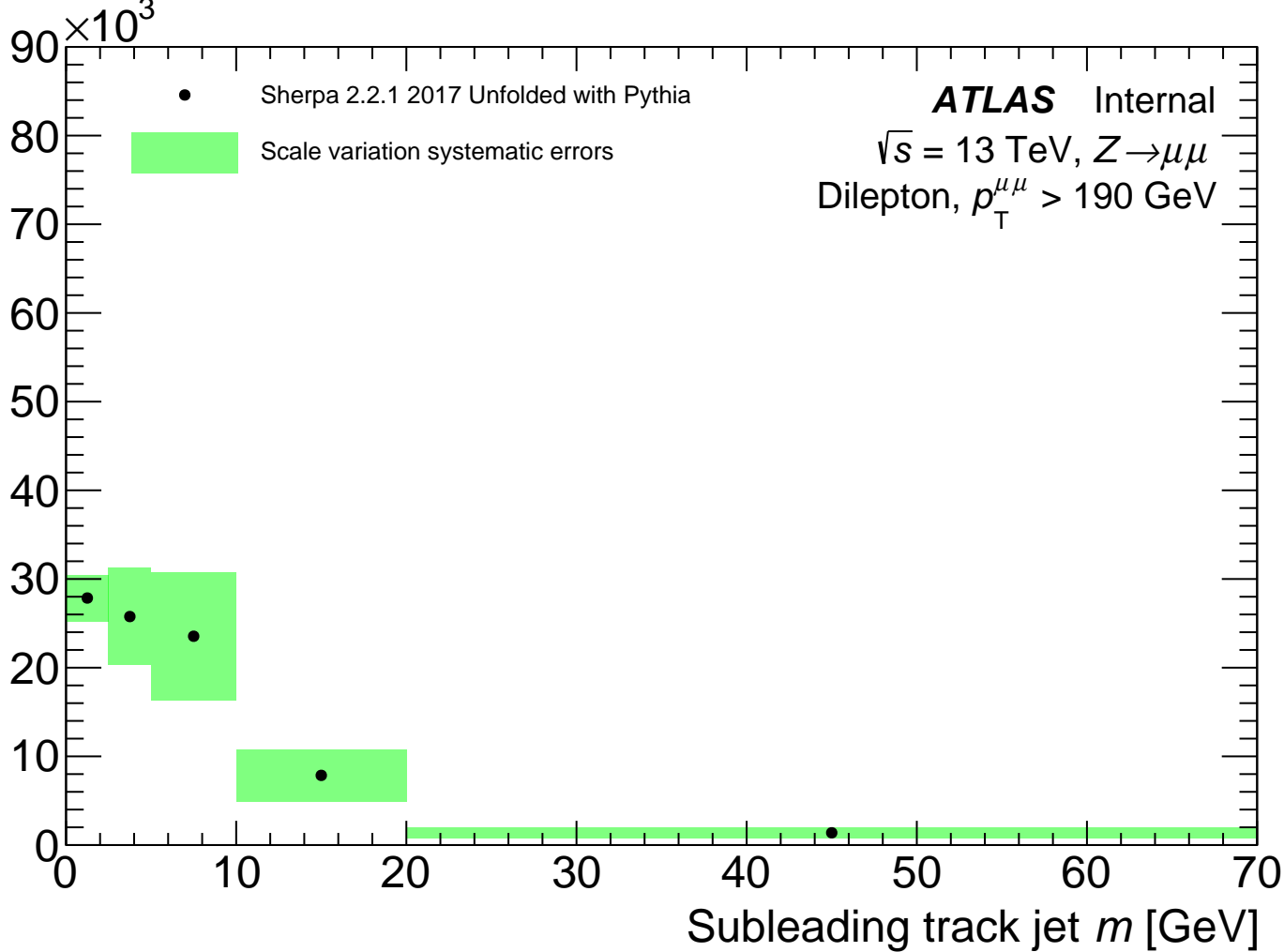
Events



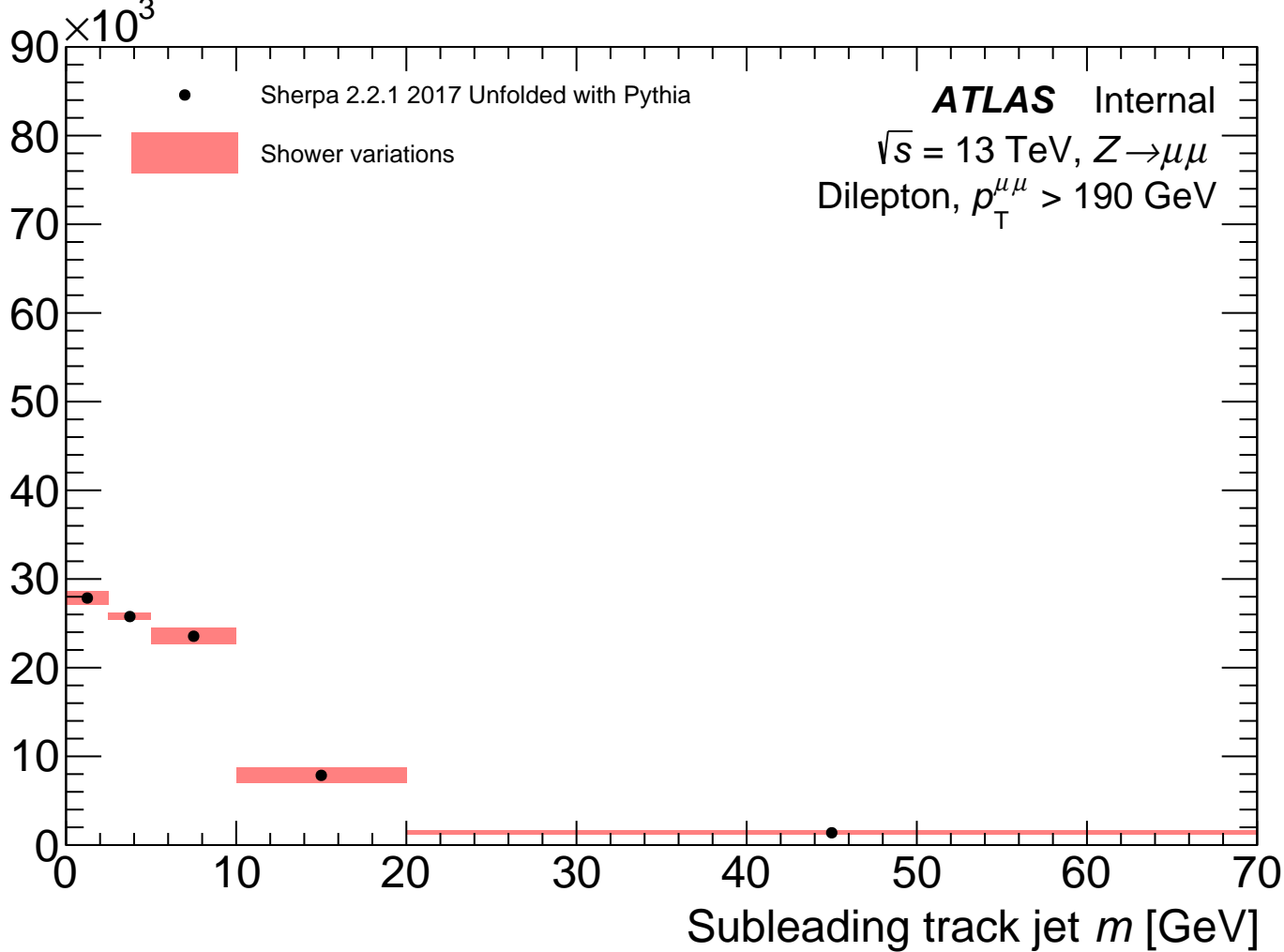
Events



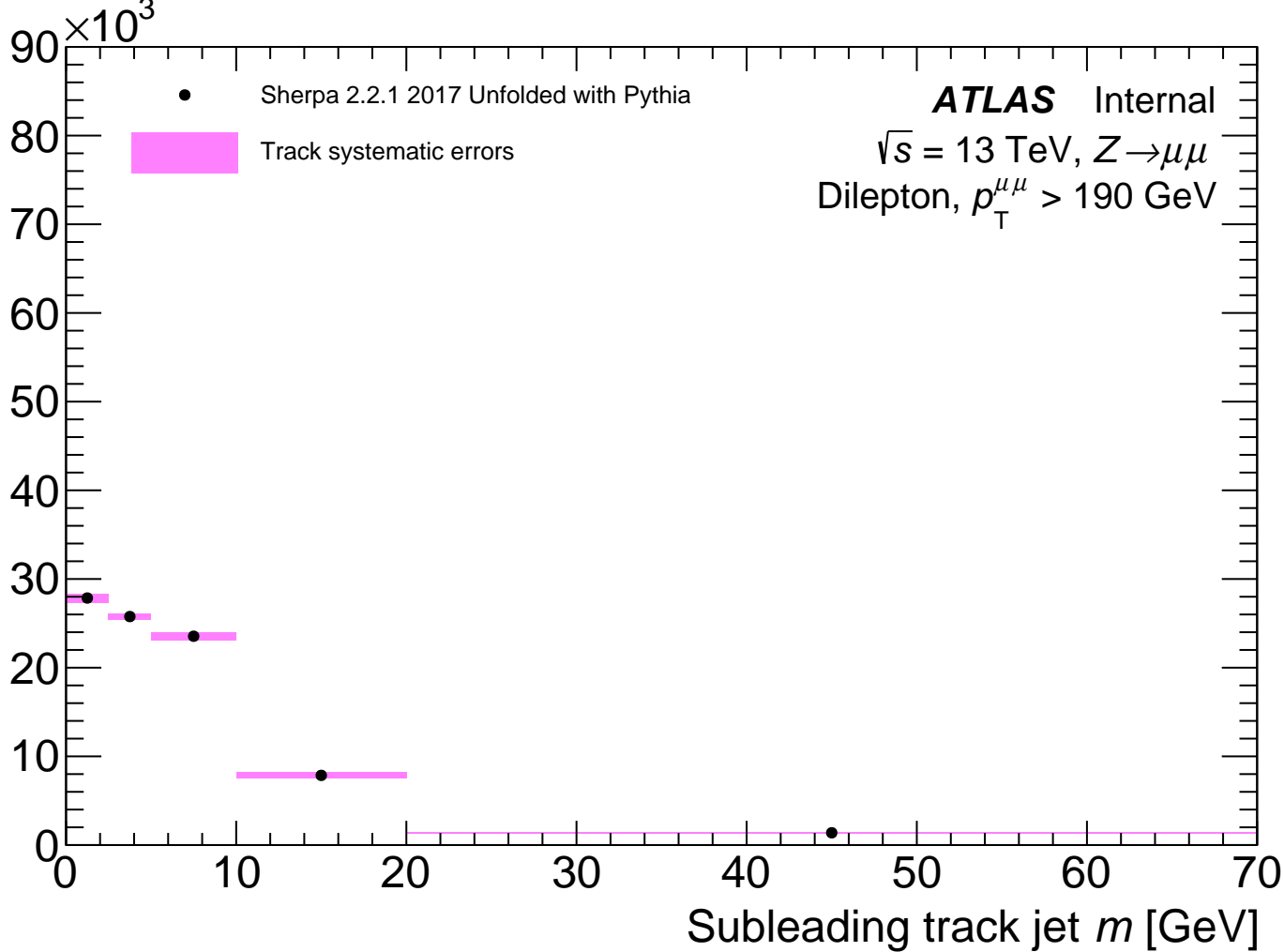
Events



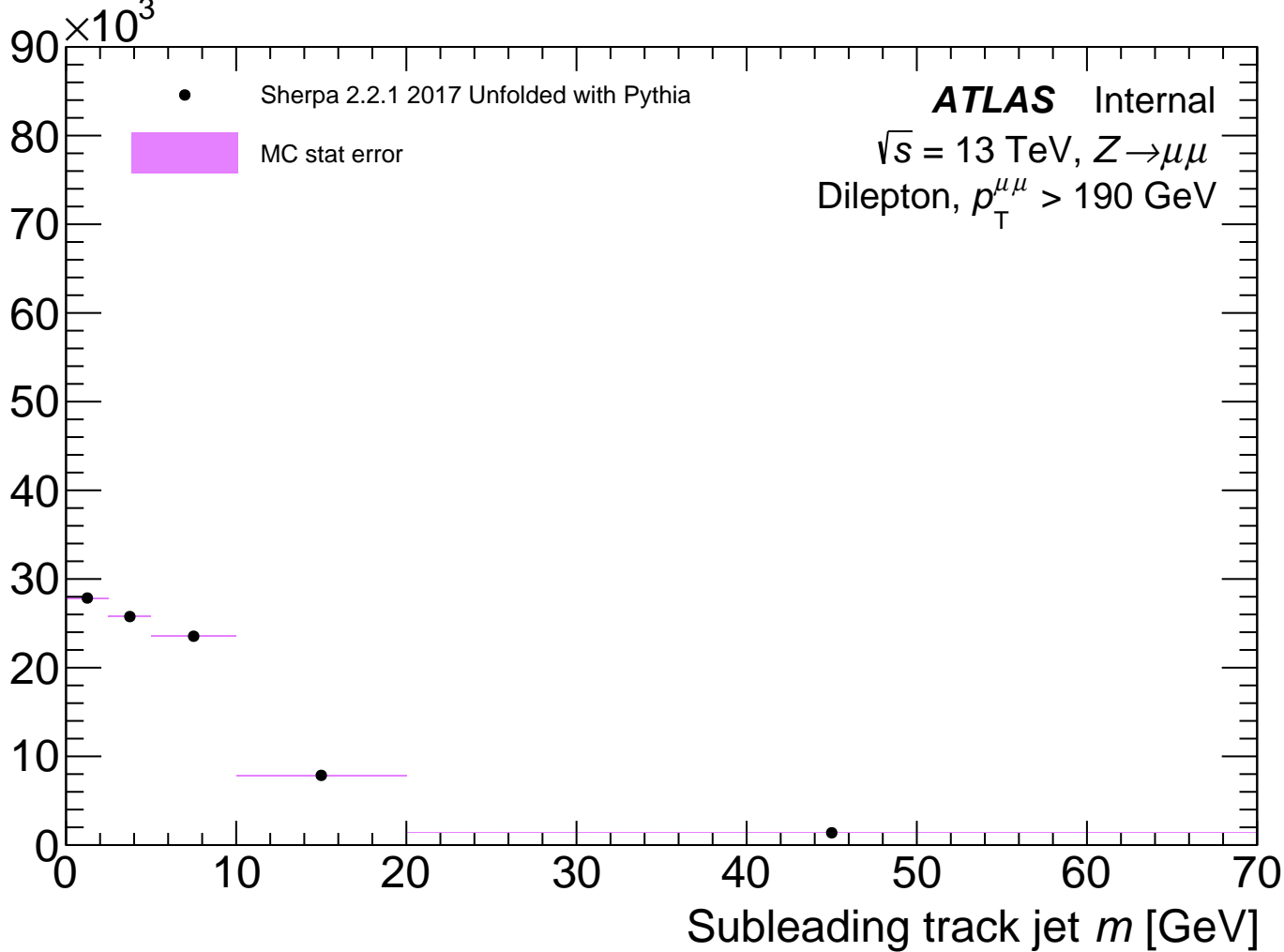
Events



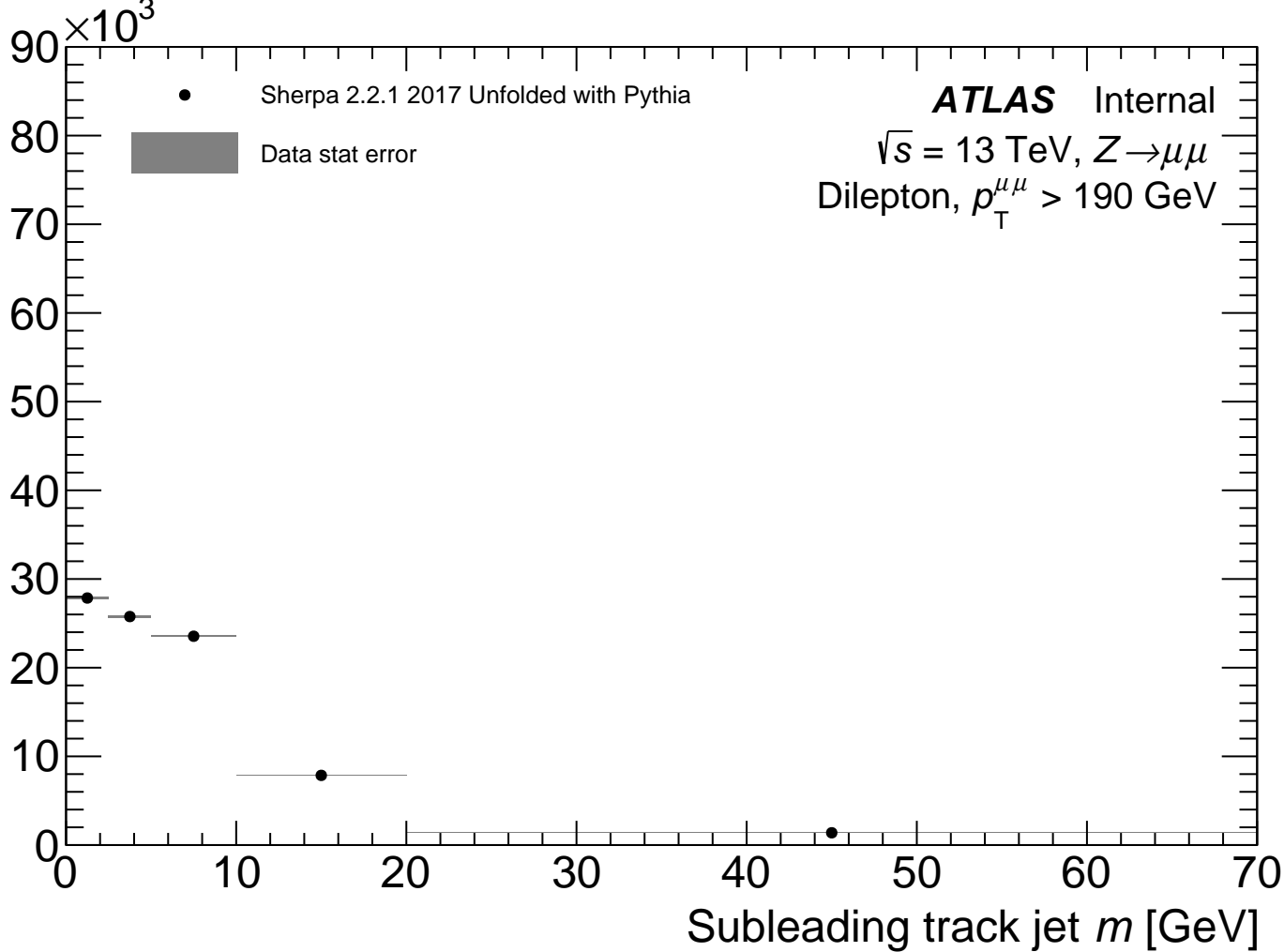
Events



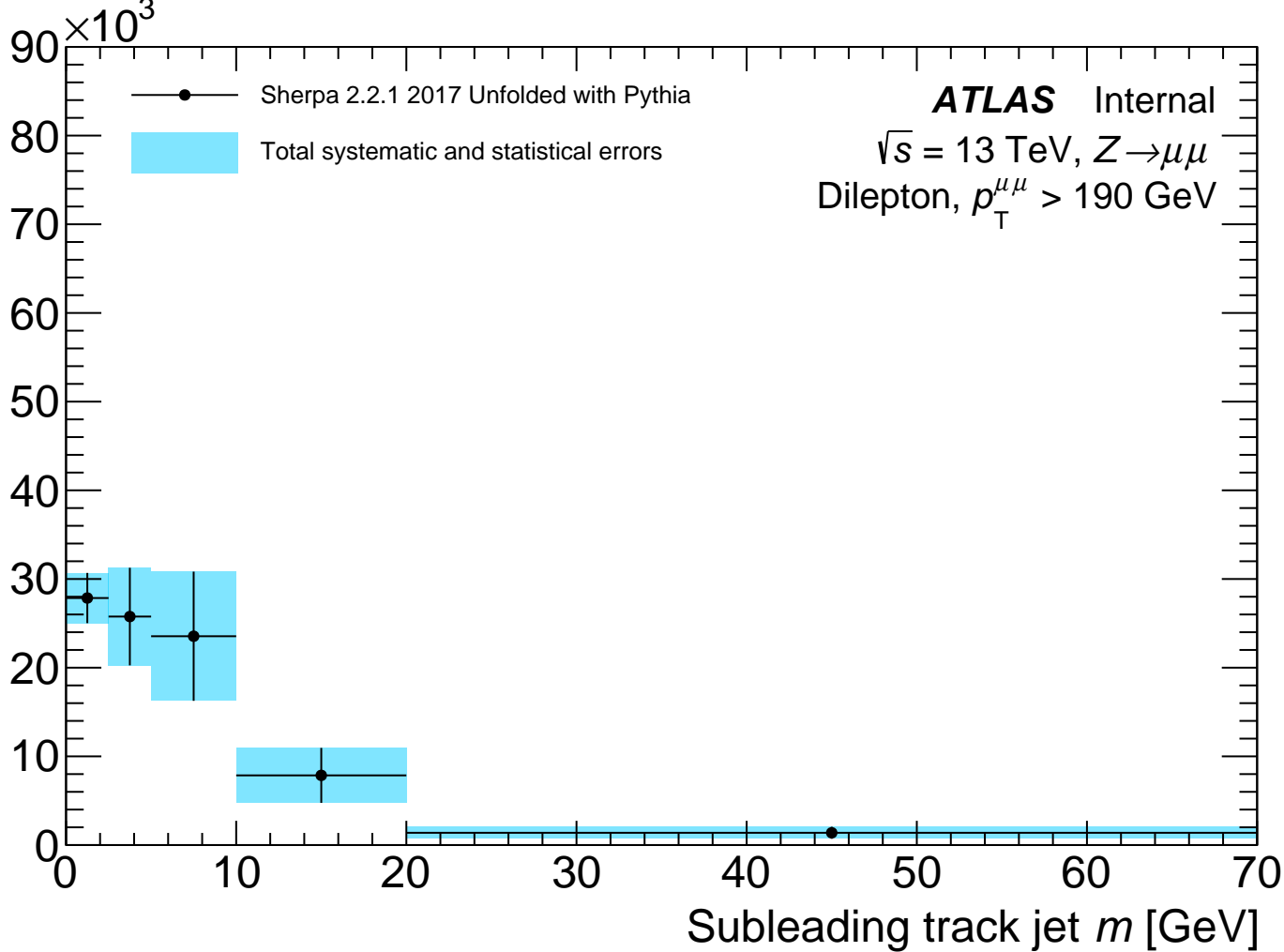
Events



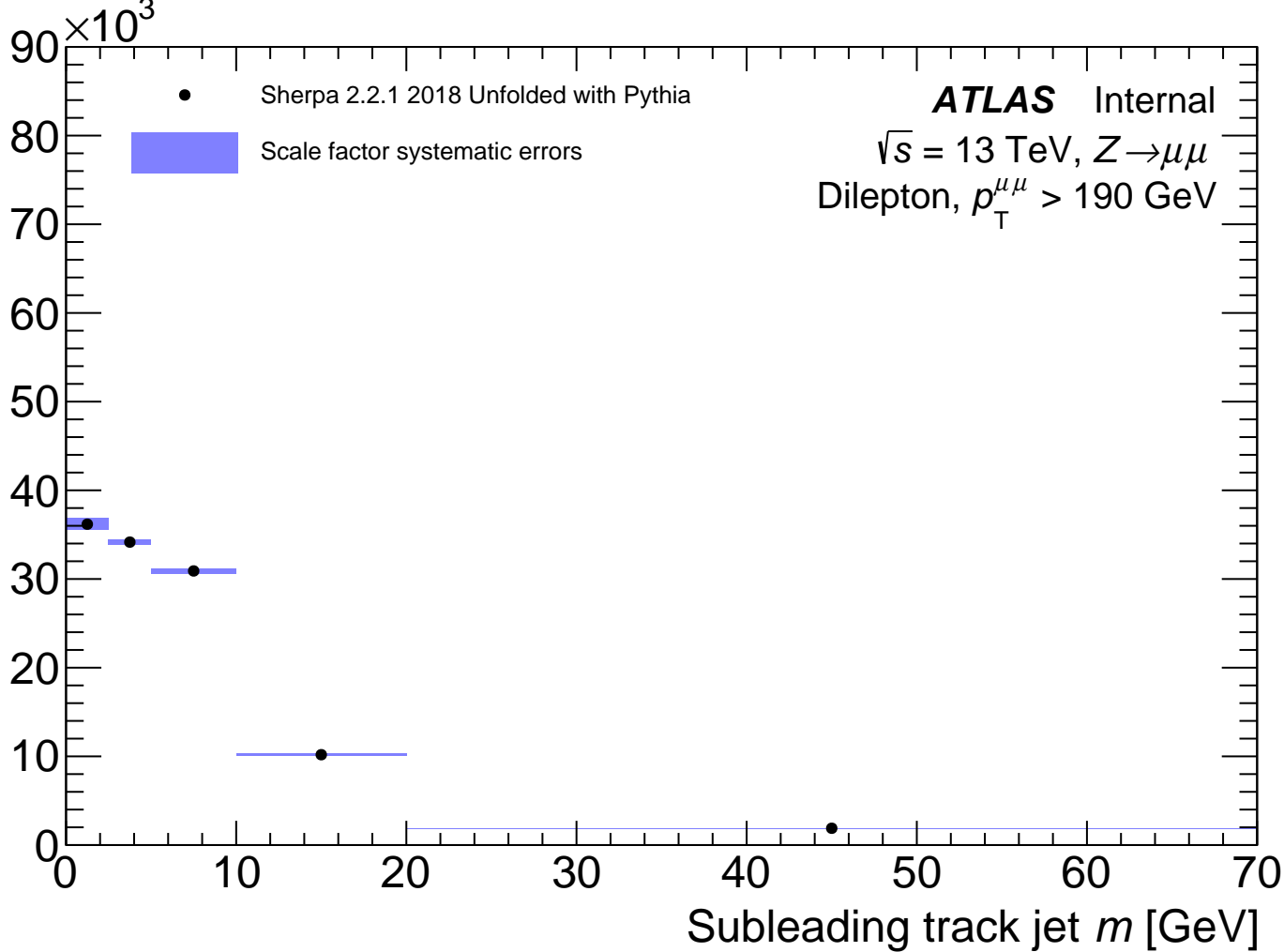
Events



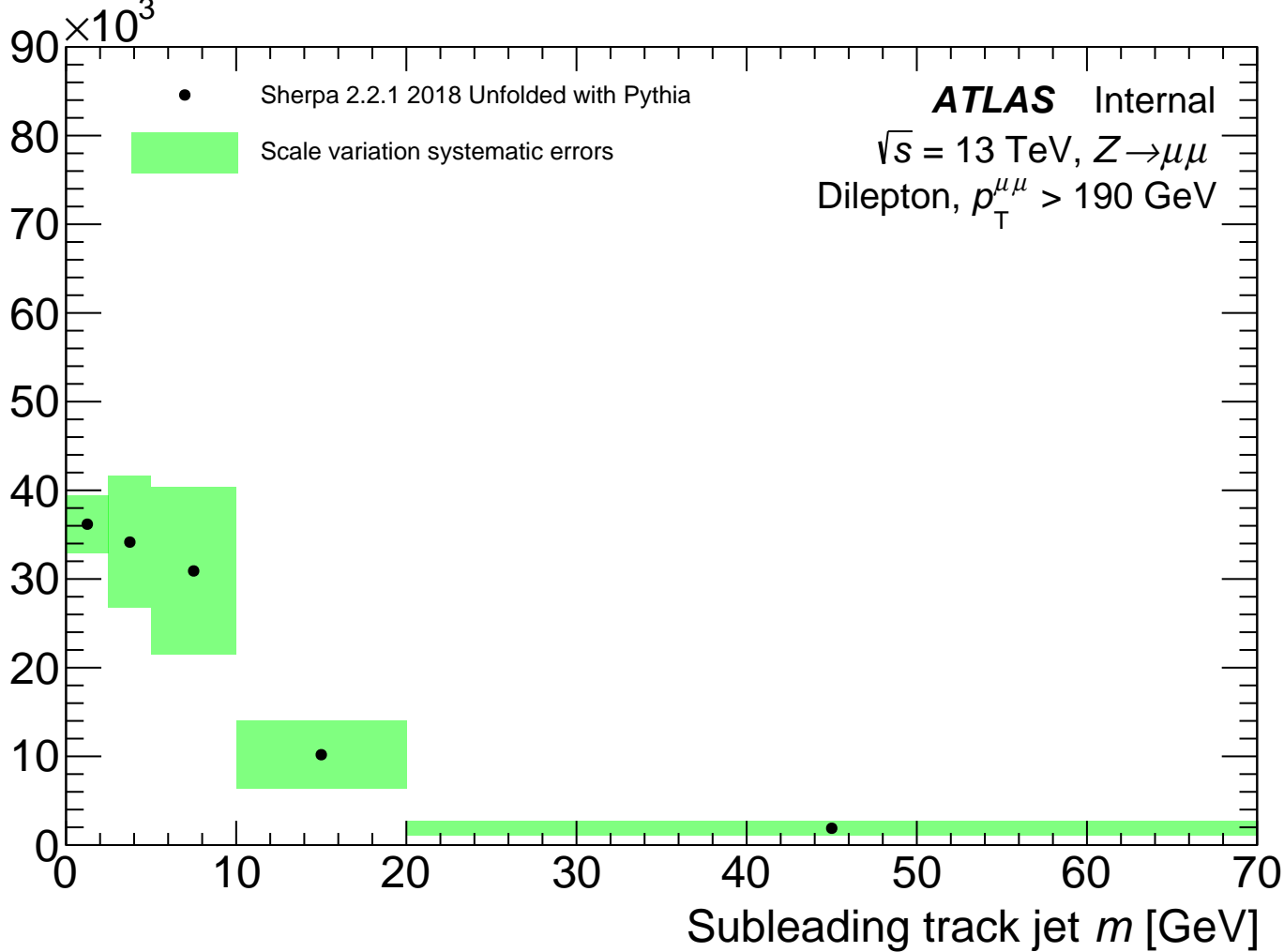
Events



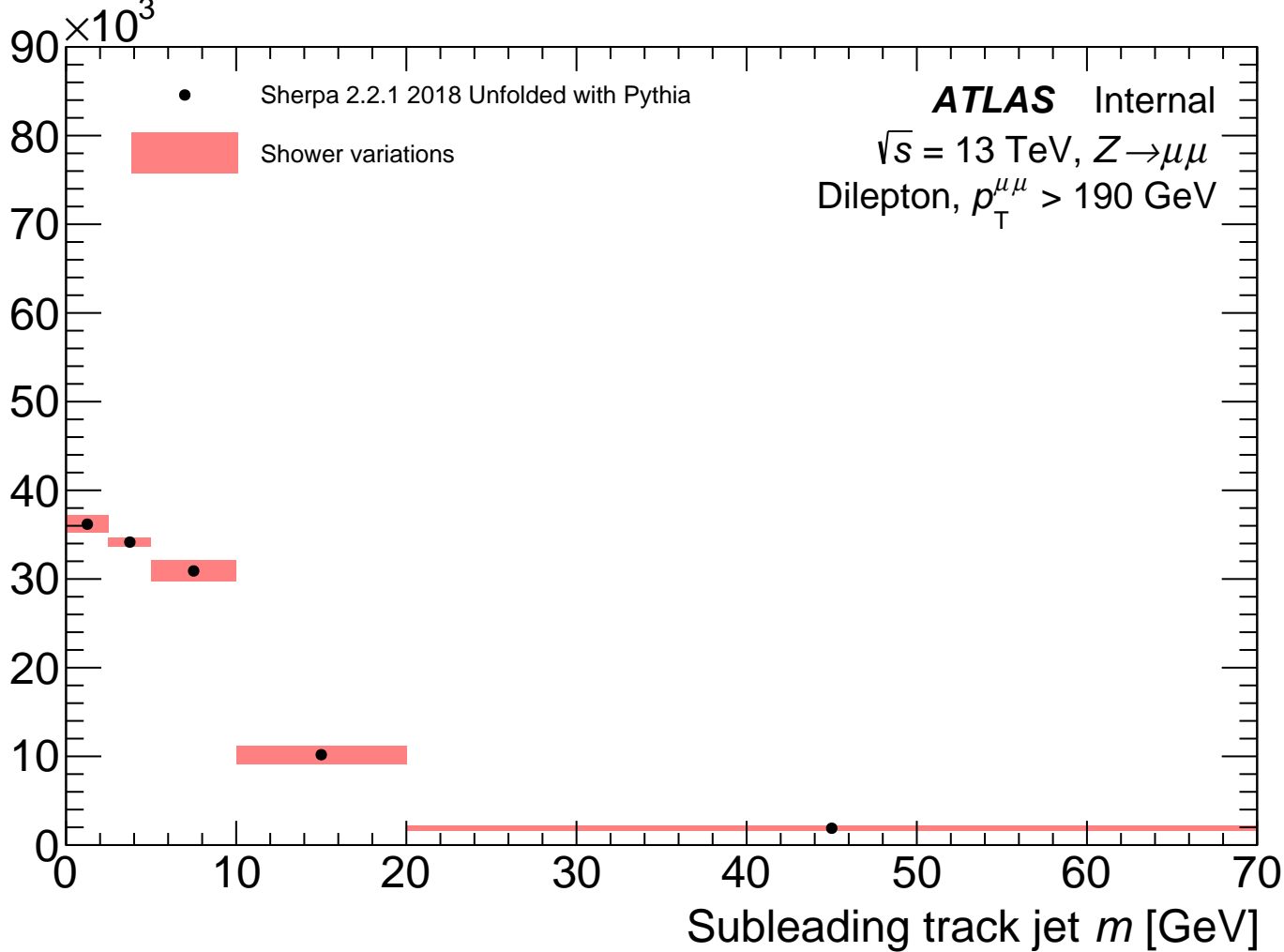
Events



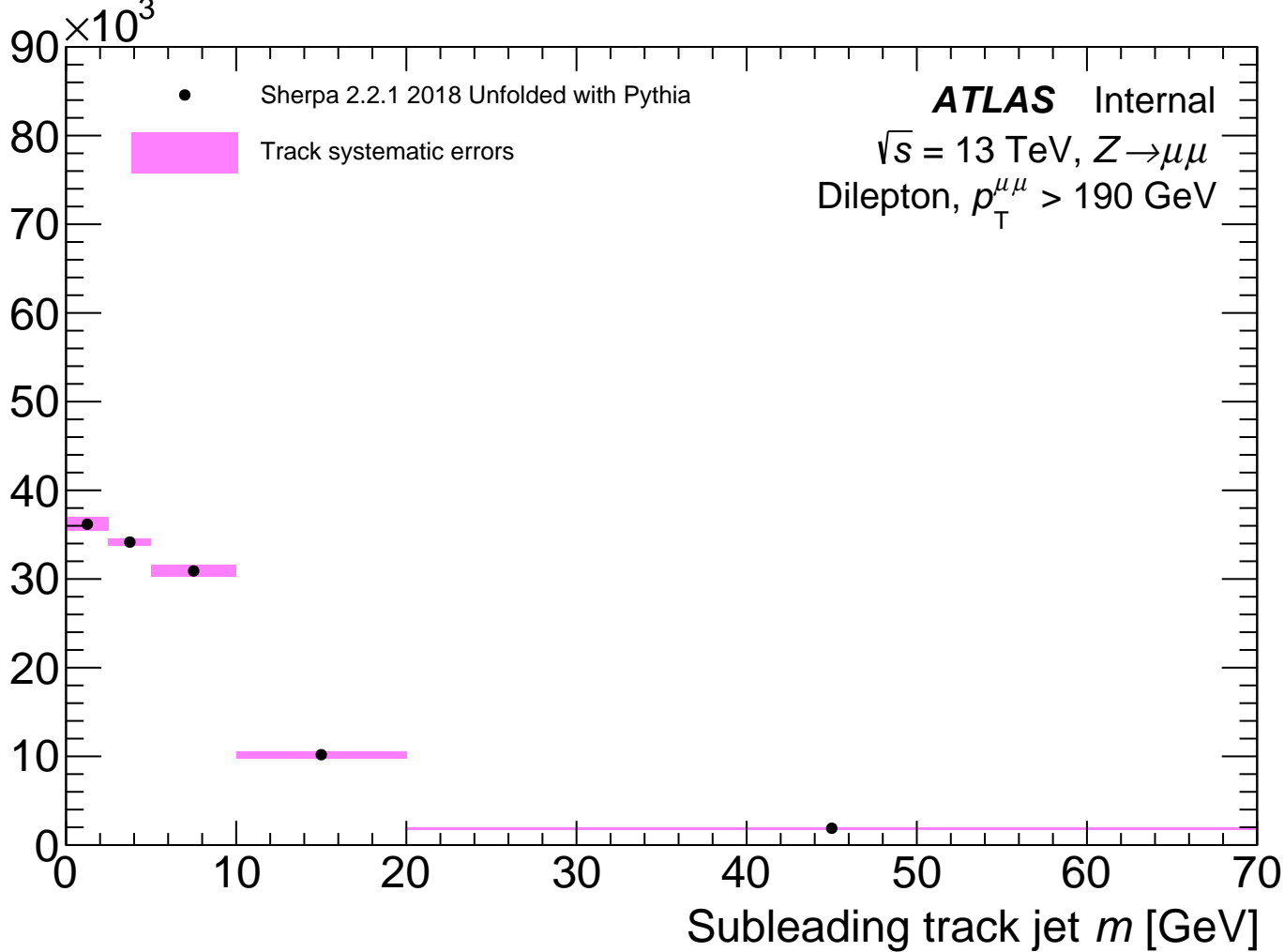
Events



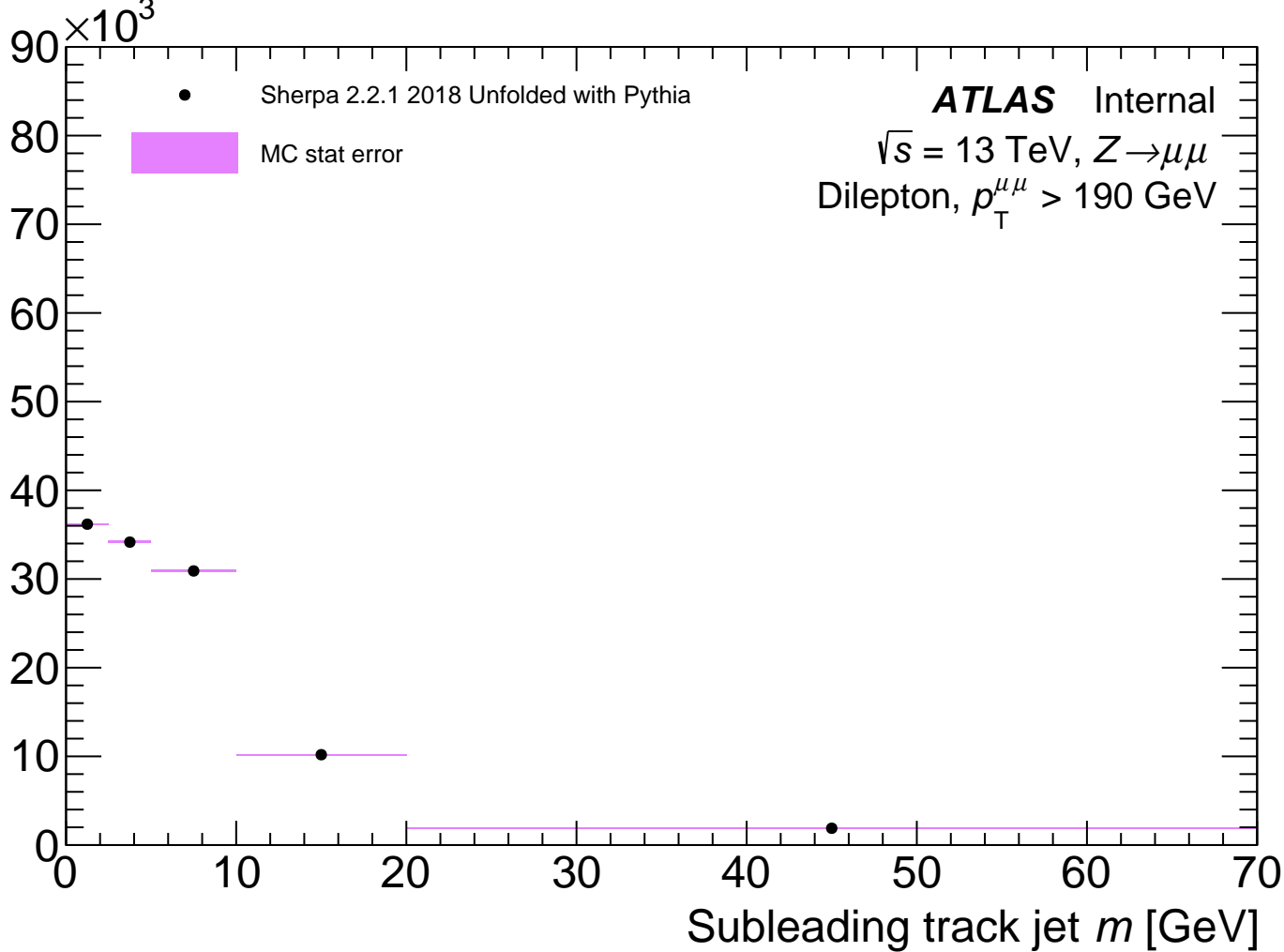
Events



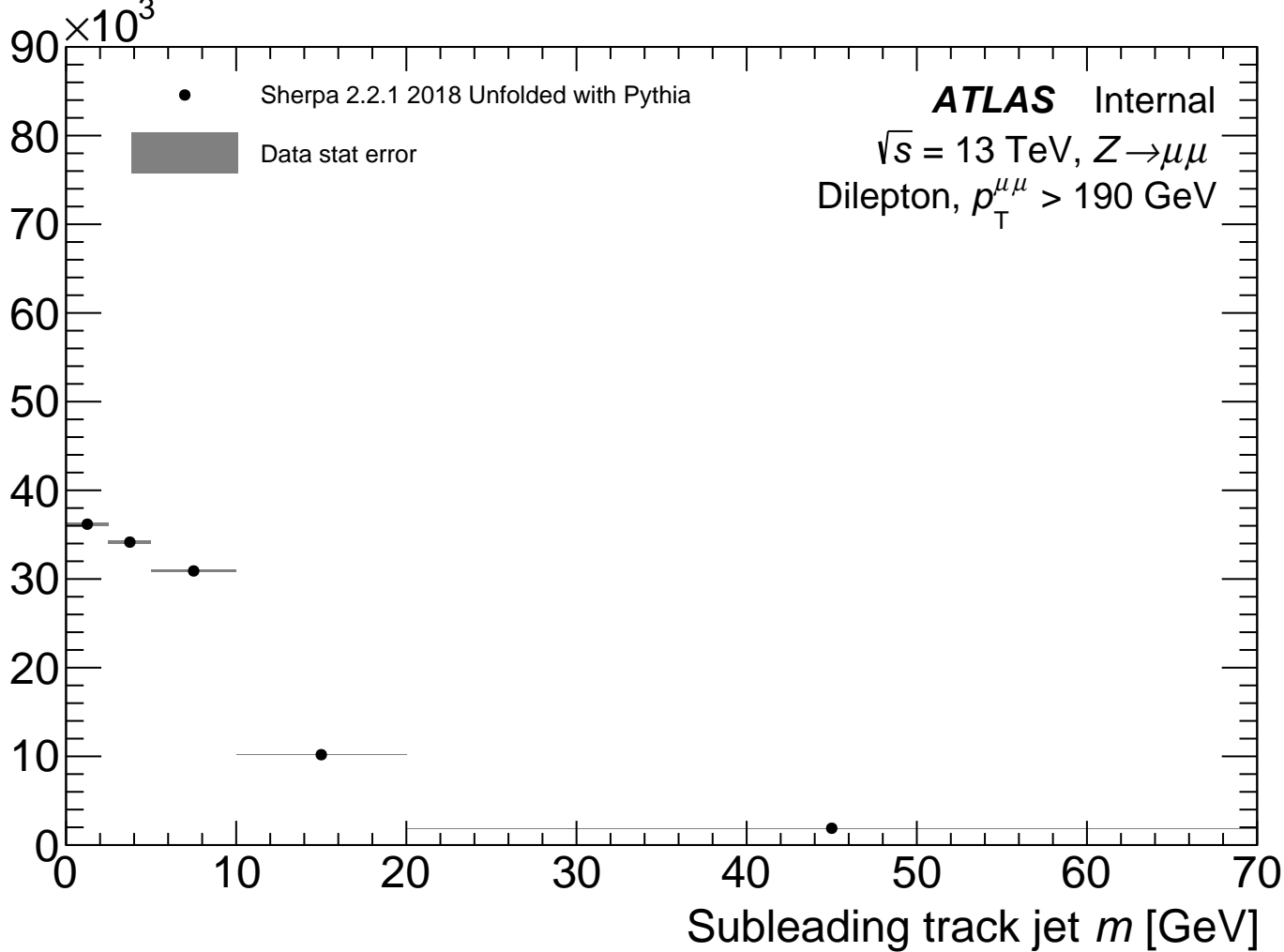
Events



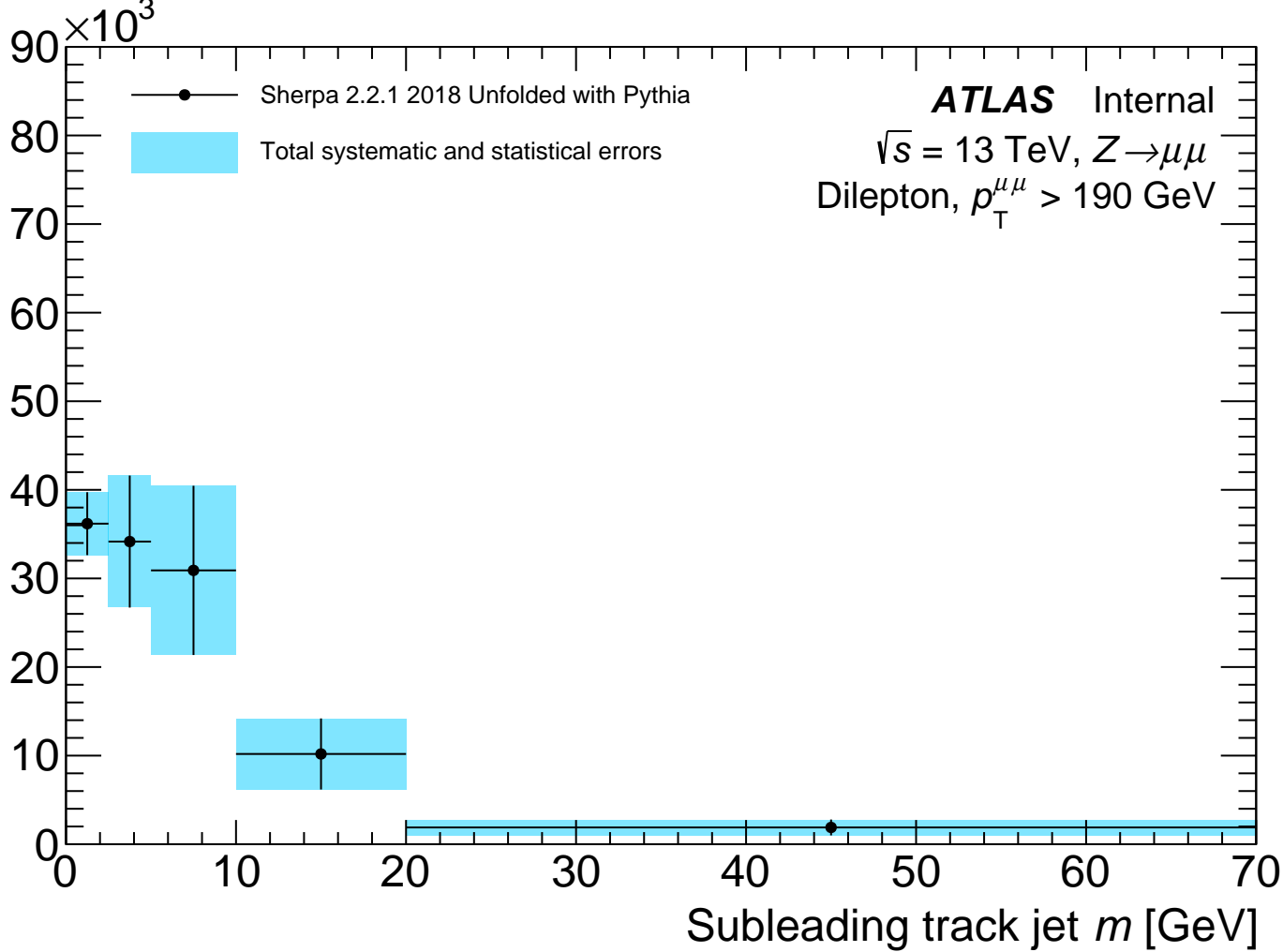
Events



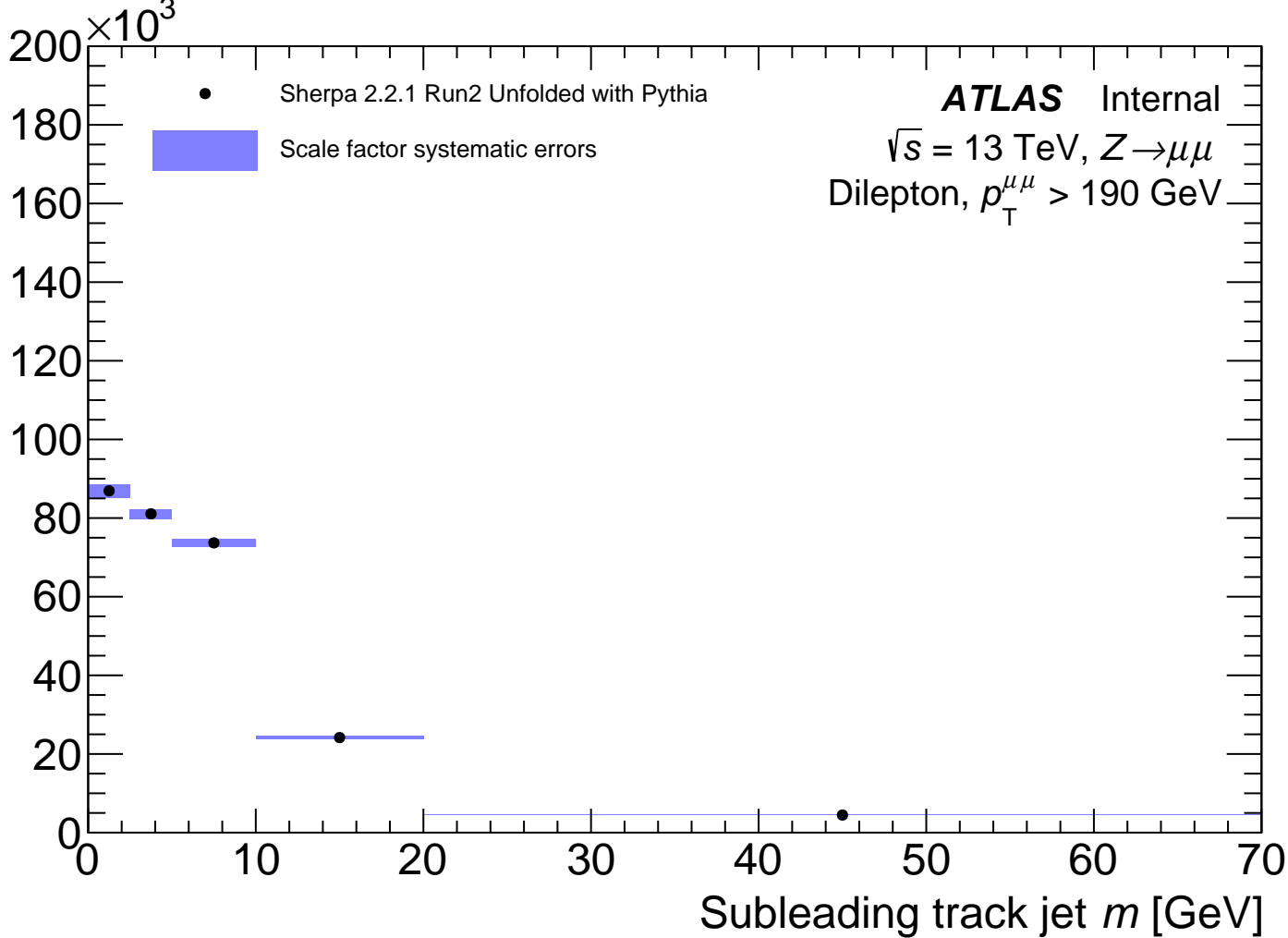
Events



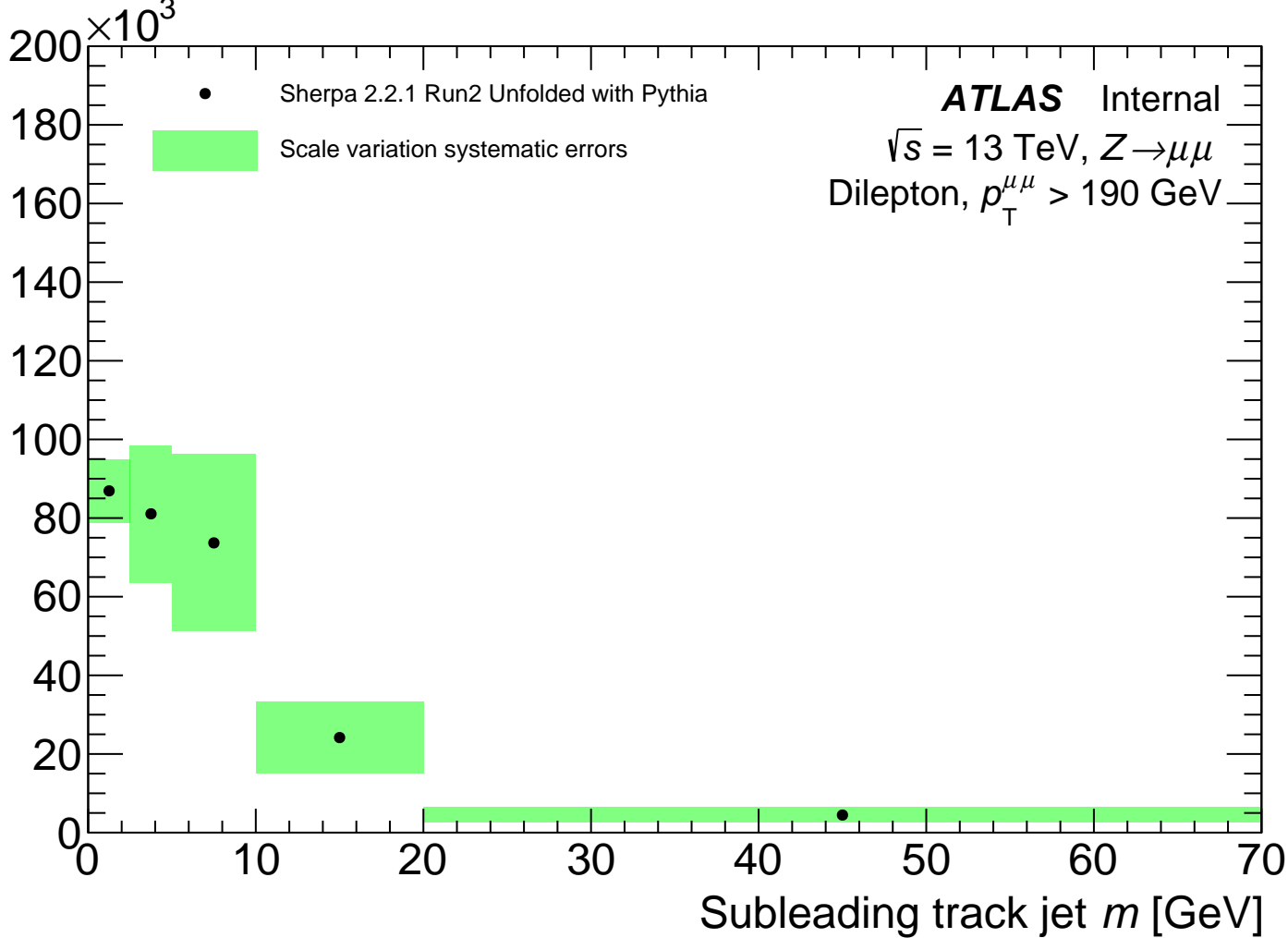
Events

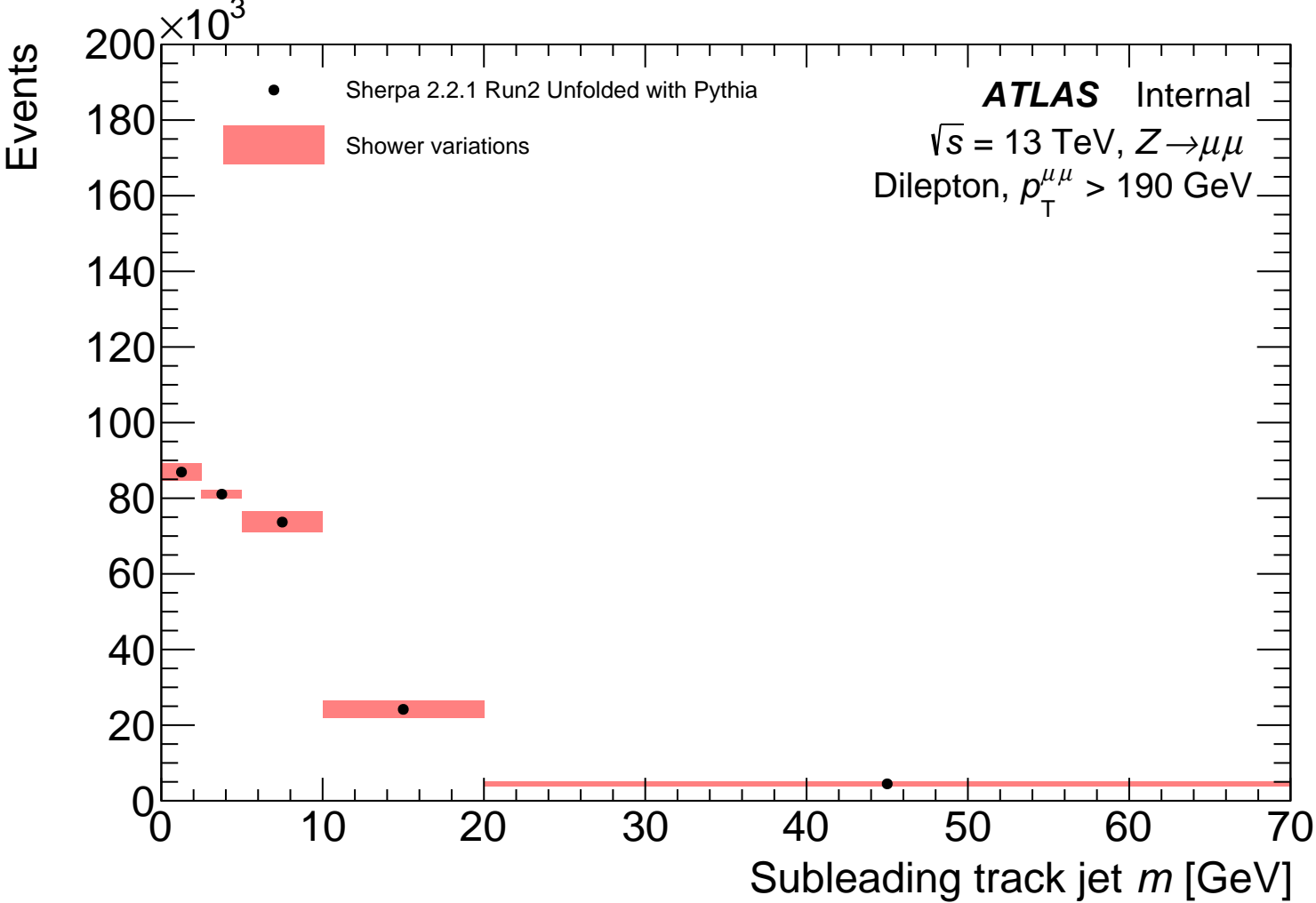


Events

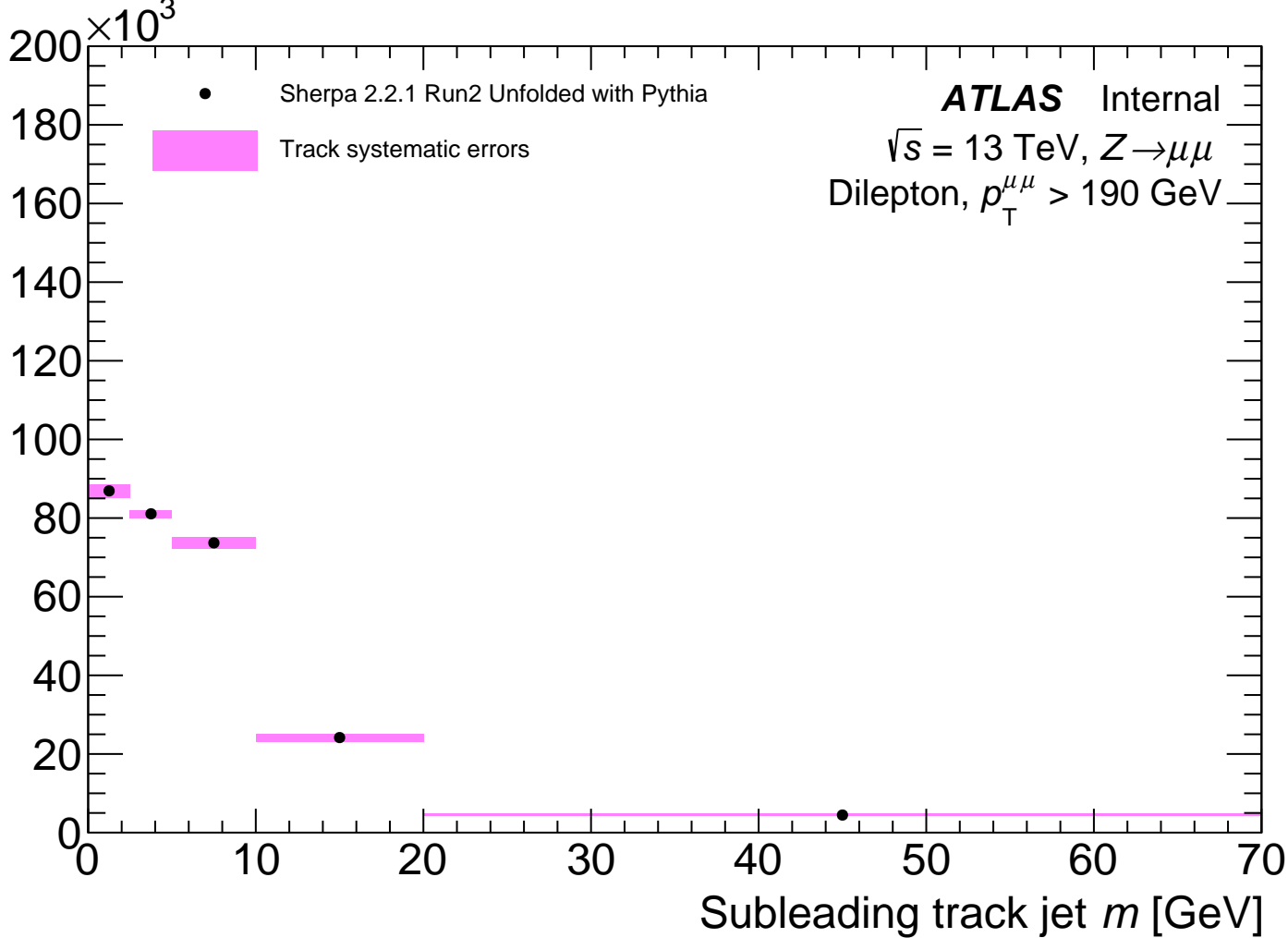


Events

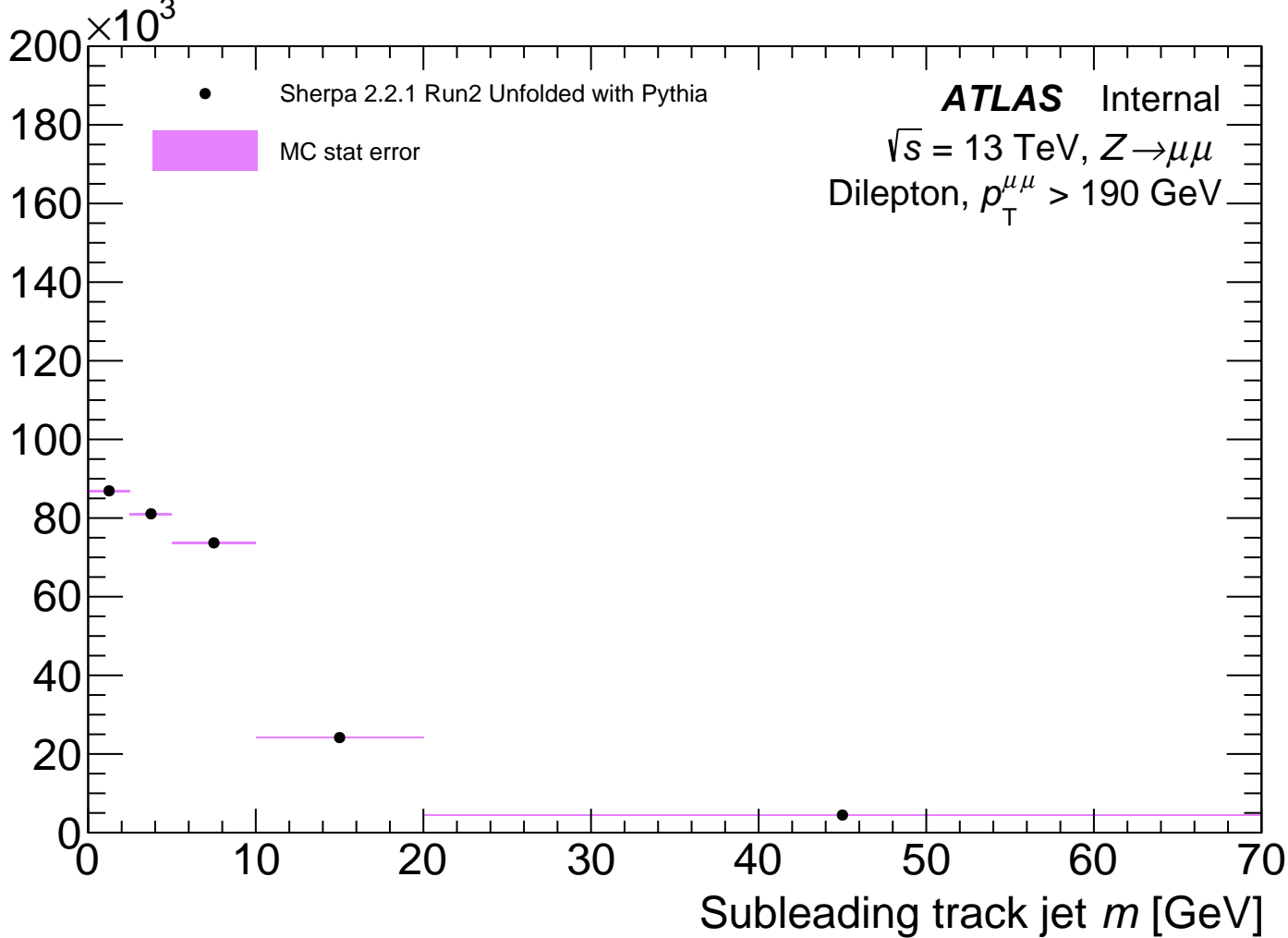


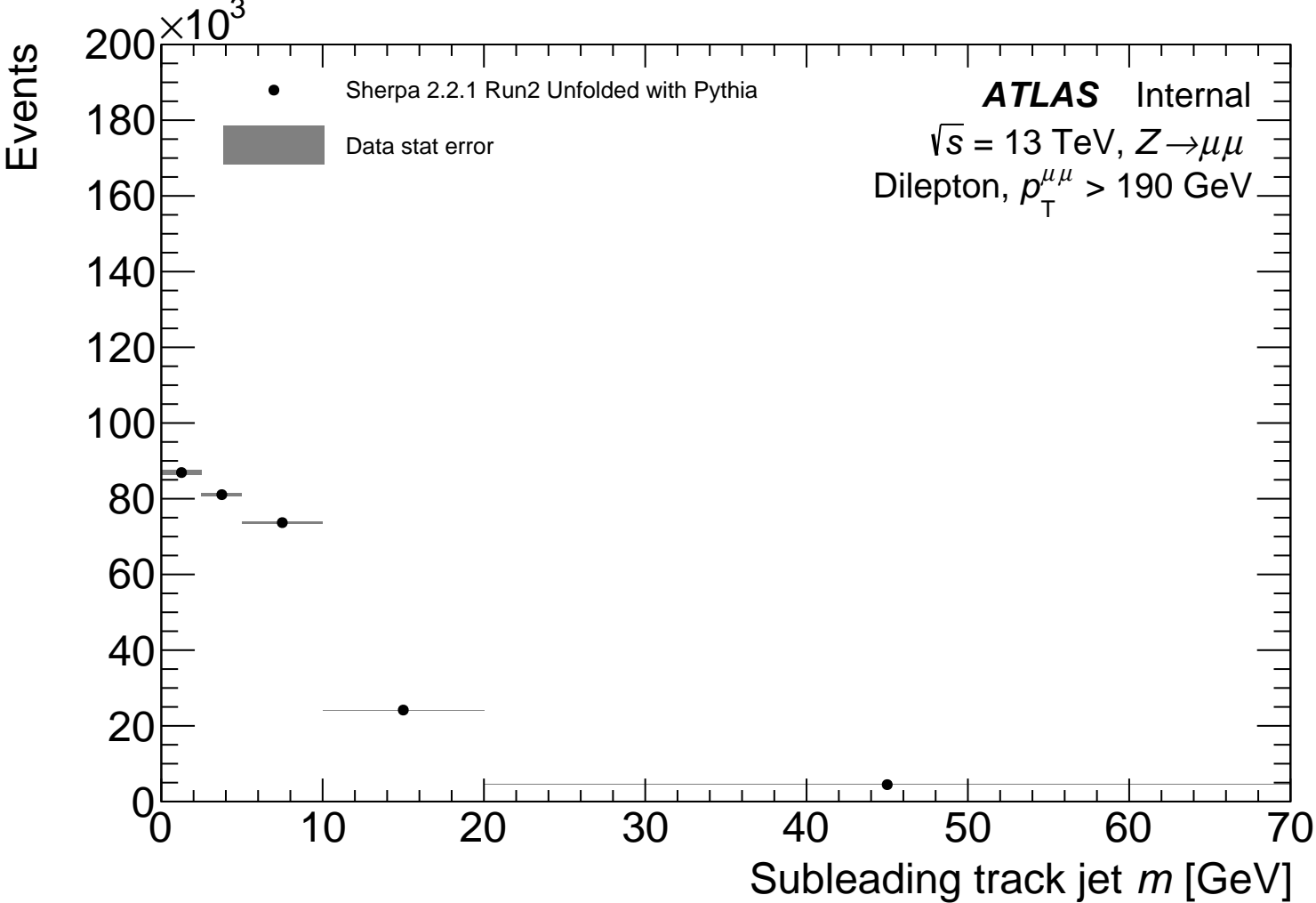


Events

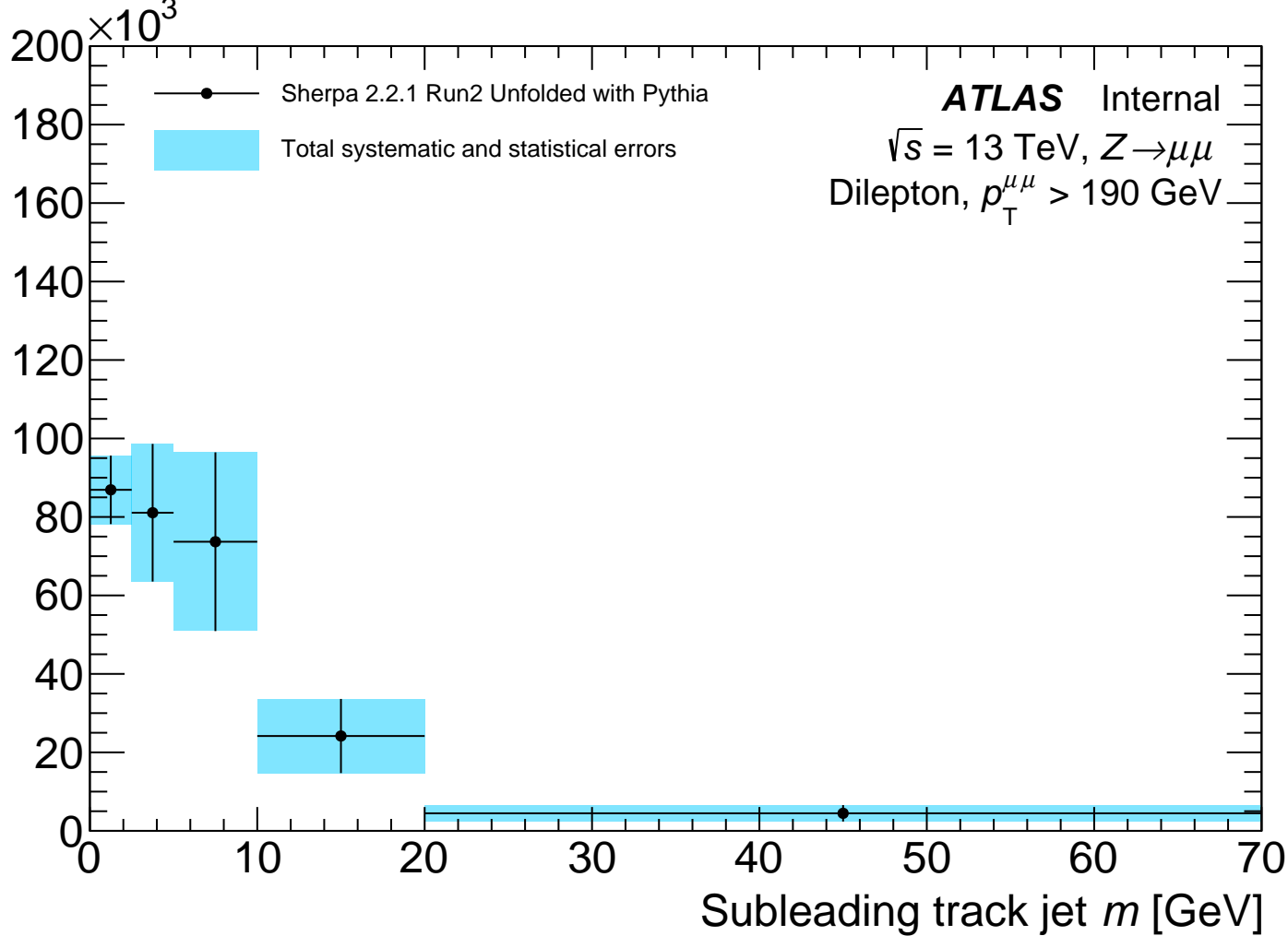


Events





Events



Events

$\times 10^3$

60

50

40

30

20

10

0

• Sherpa 2.2.1 2016 Unfolded with Pythia

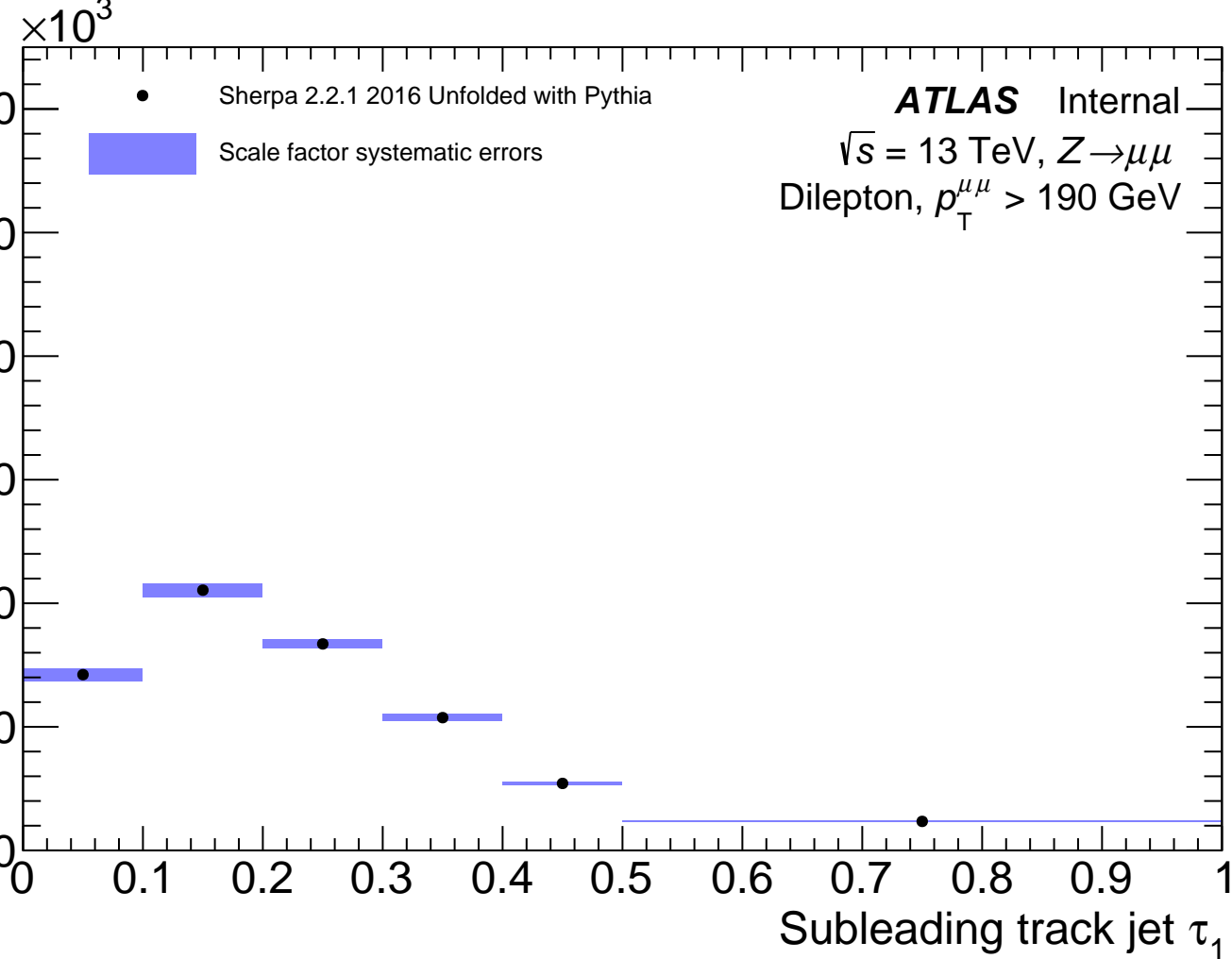
■ Scale factor systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

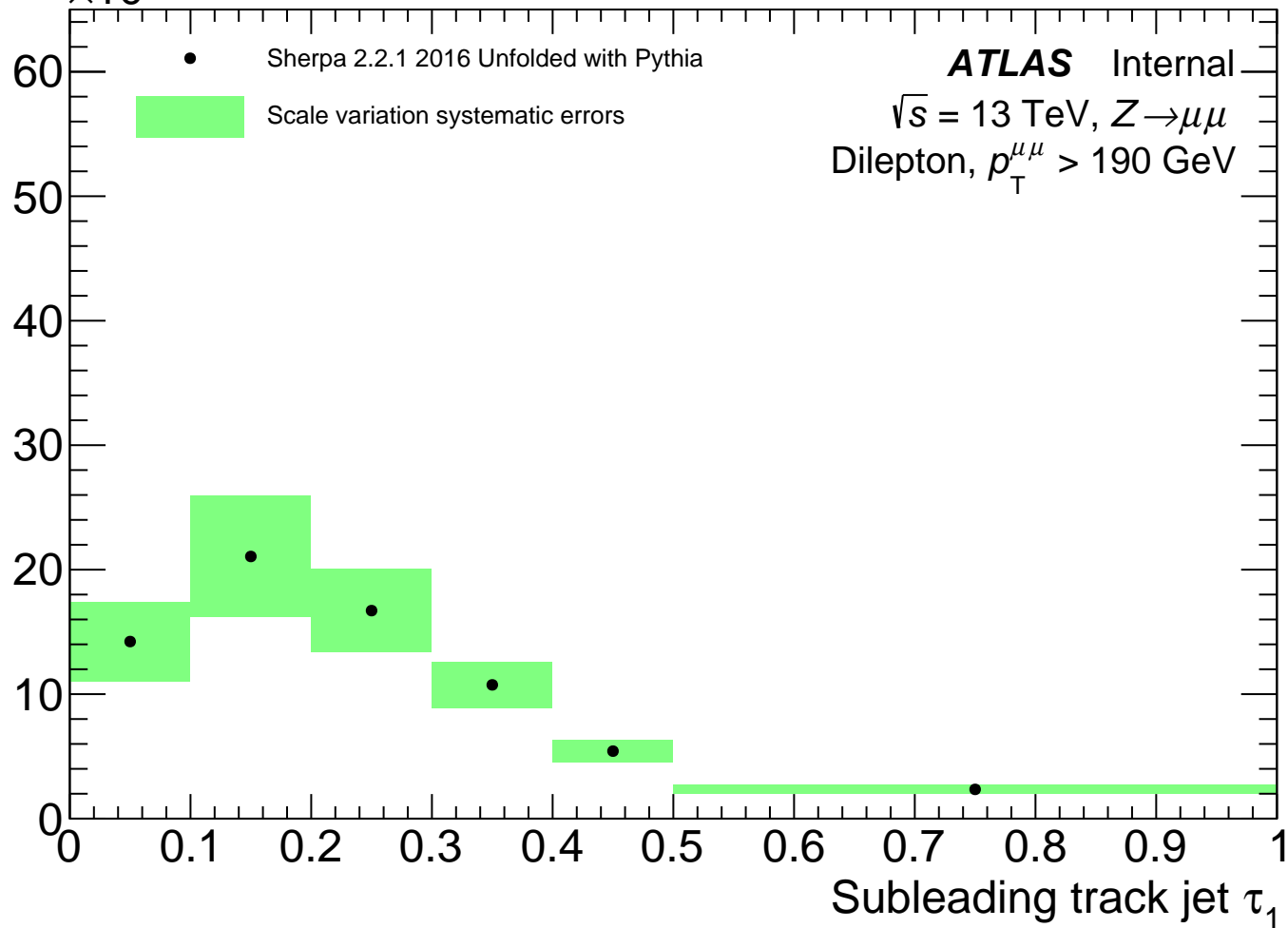
Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet τ_1



Events

$\times 10^3$



Events

$\times 10^3$

60

50

40

30

20

10

0

• Sherpa 2.2.1 2016 Unfolded with Pythia

Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

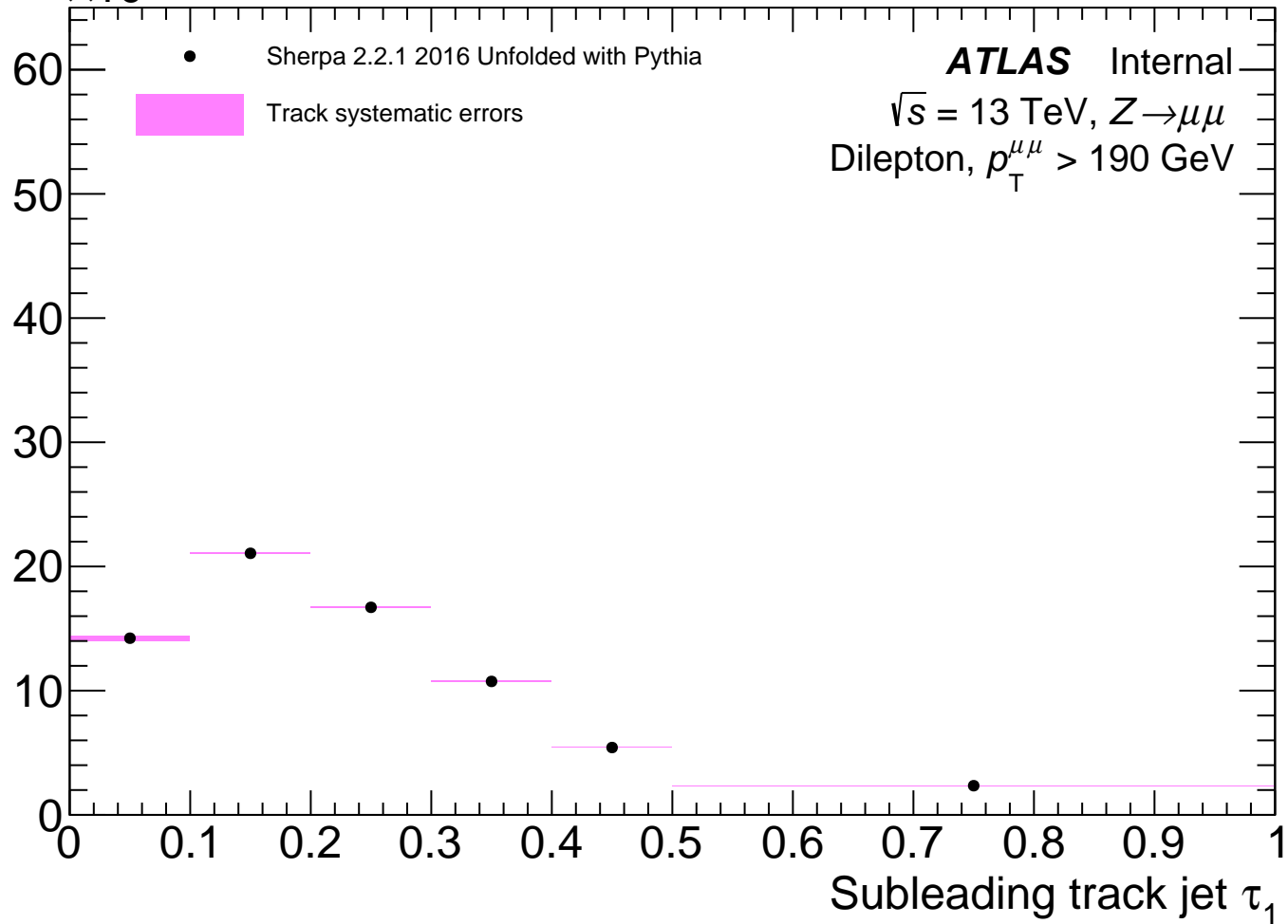
Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet τ_1



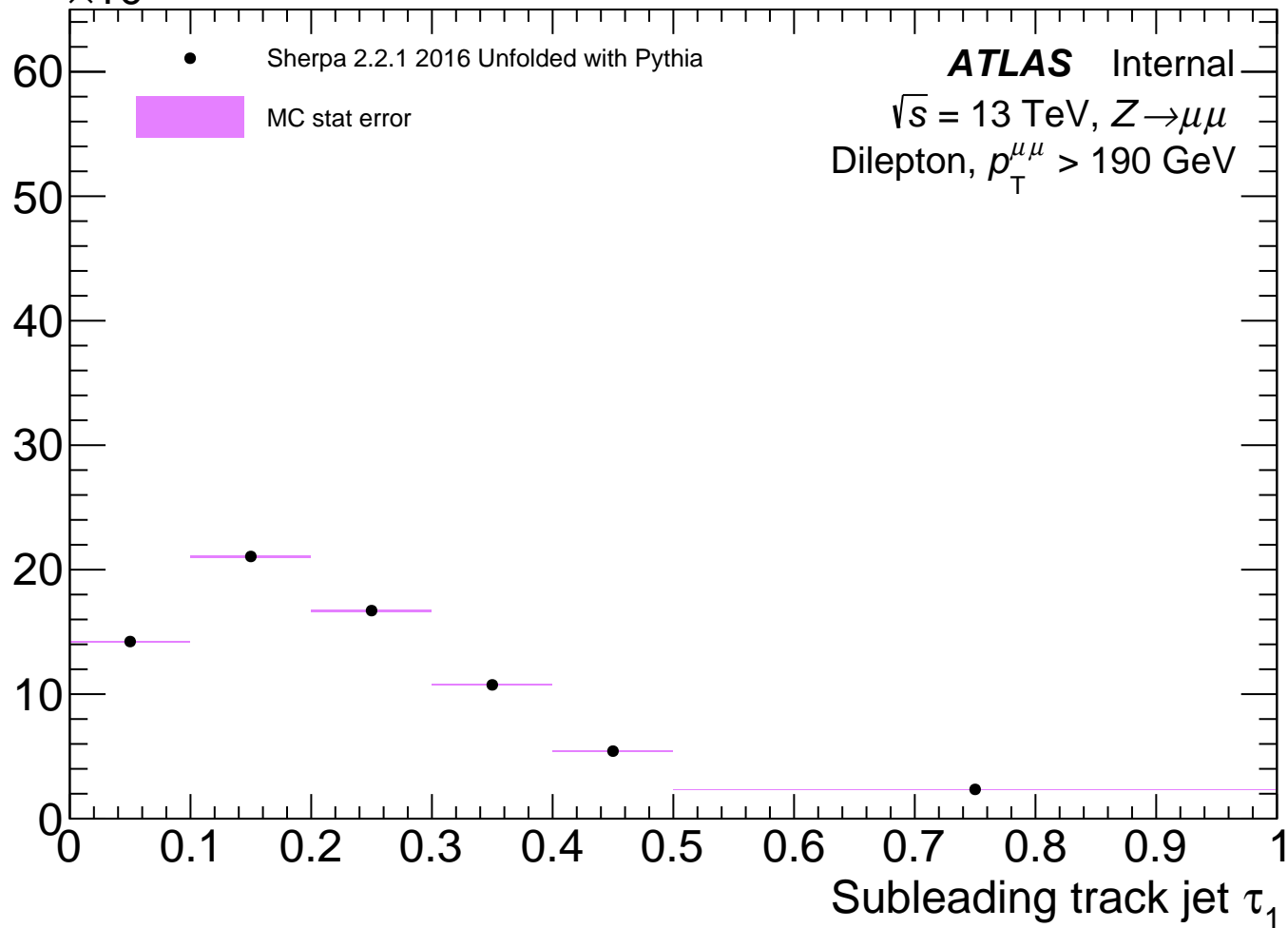
Events

$\times 10^3$



Events

$\times 10^3$



Events

$\times 10^3$

60

50

40

30

20

10

0

• Sherpa 2.2.1 2016 Unfolded with Pythia

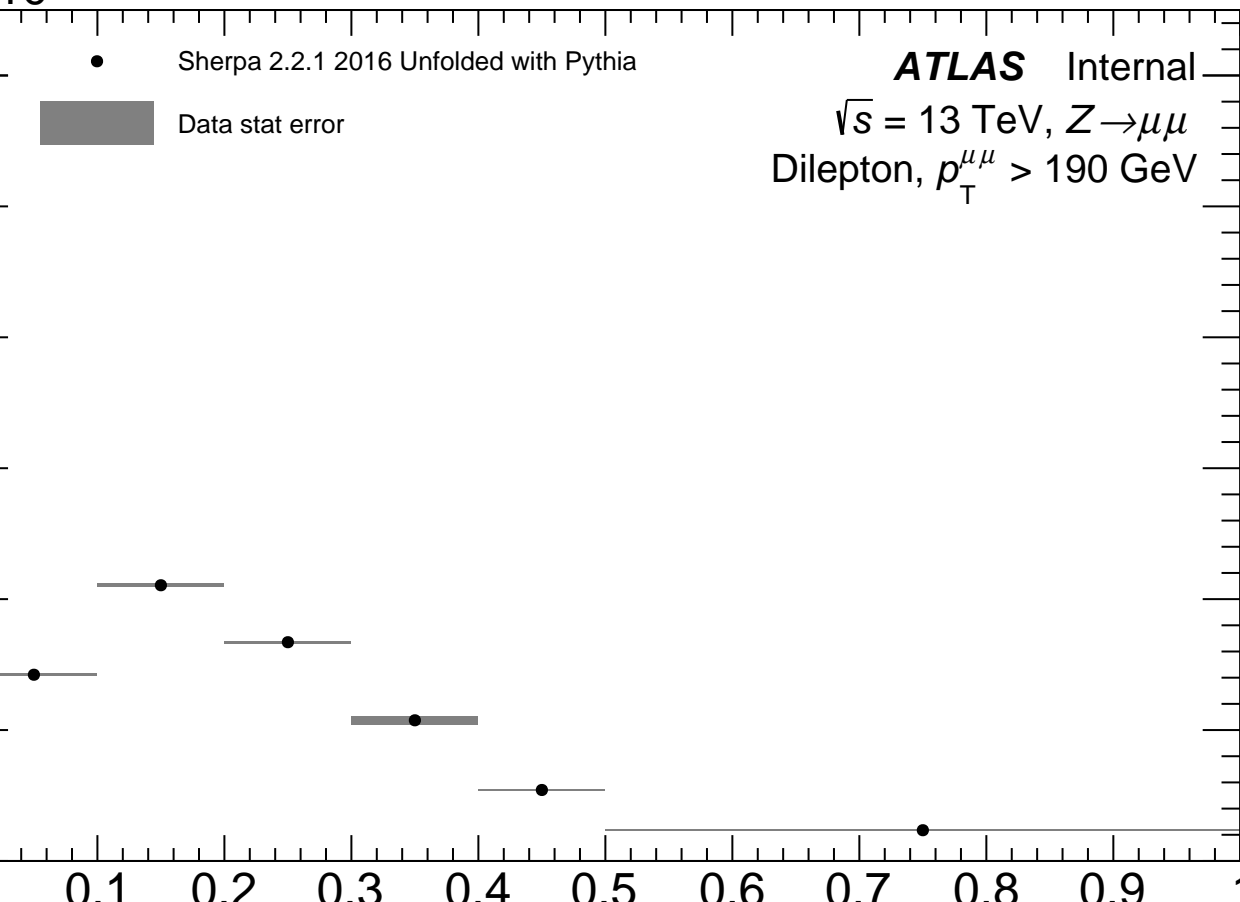
■ Data stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet τ_1



Events

$\times 10^3$

60

50

40

30

20

10

0



Sherpa 2.2.1 2016 Unfolded with Pythia



Total systematic and statistical errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

0

0.1

0.2

0.3

0.4

0.5

0.6

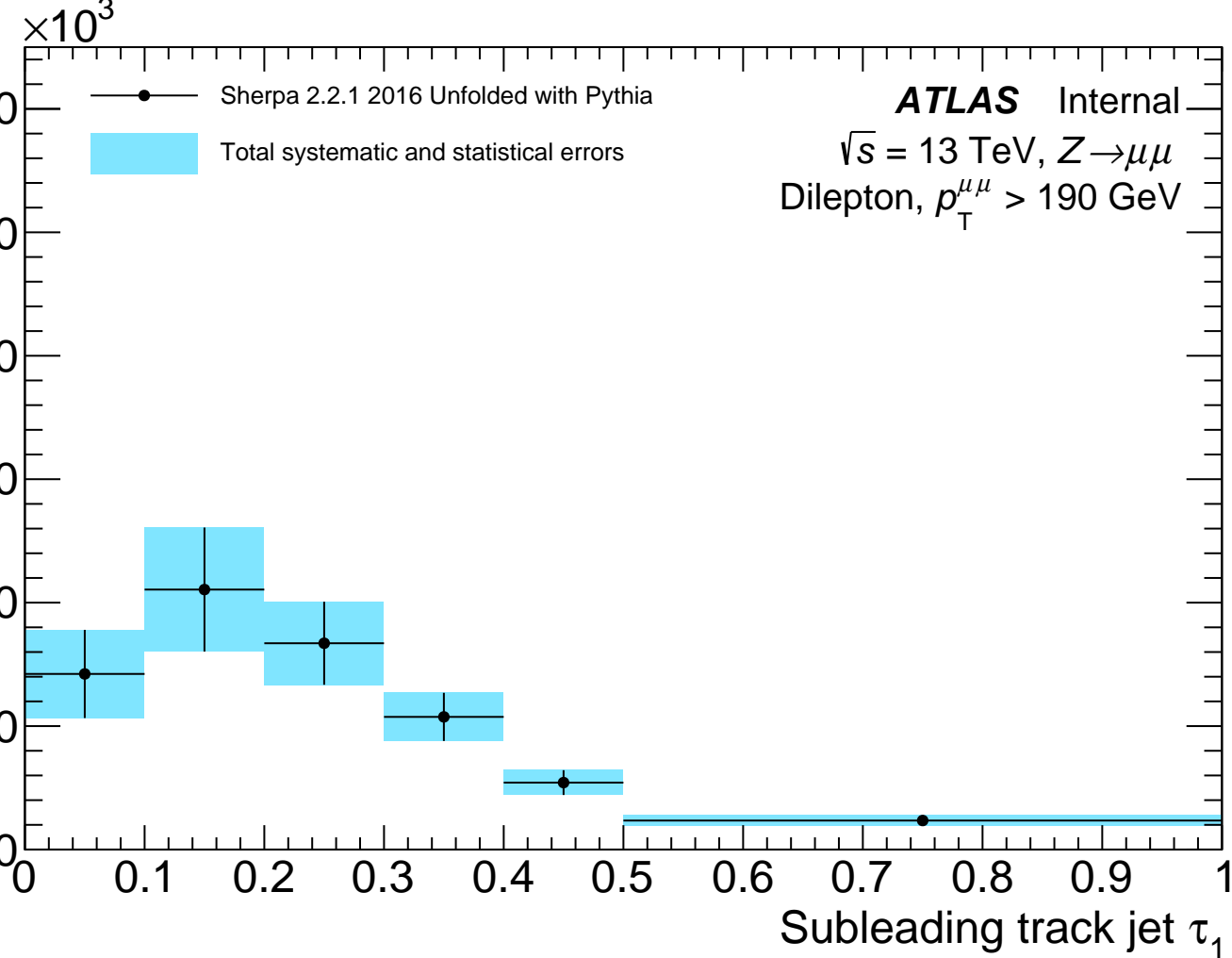
0.7

0.8

0.9

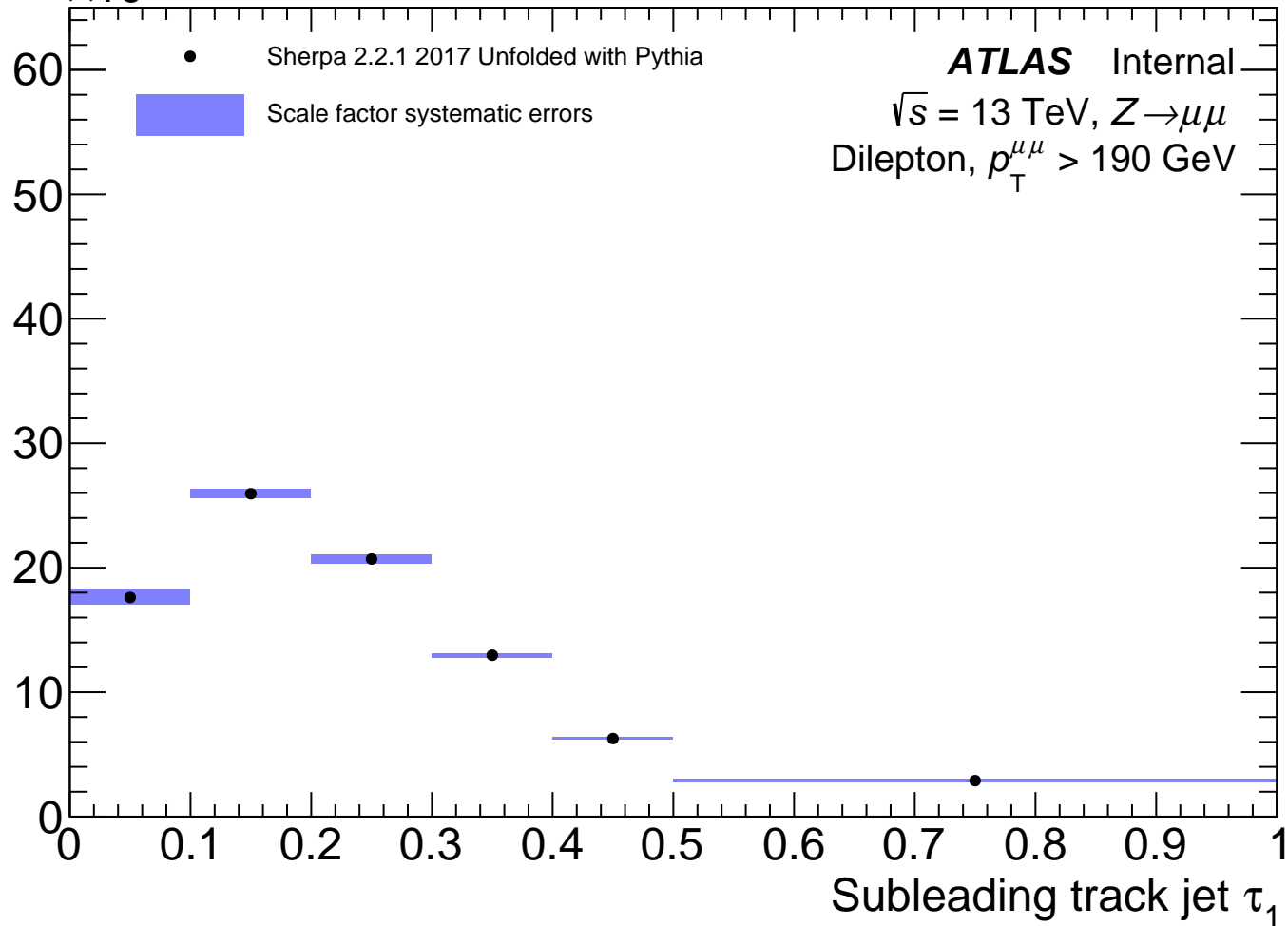
1

Subleading track jet τ_1



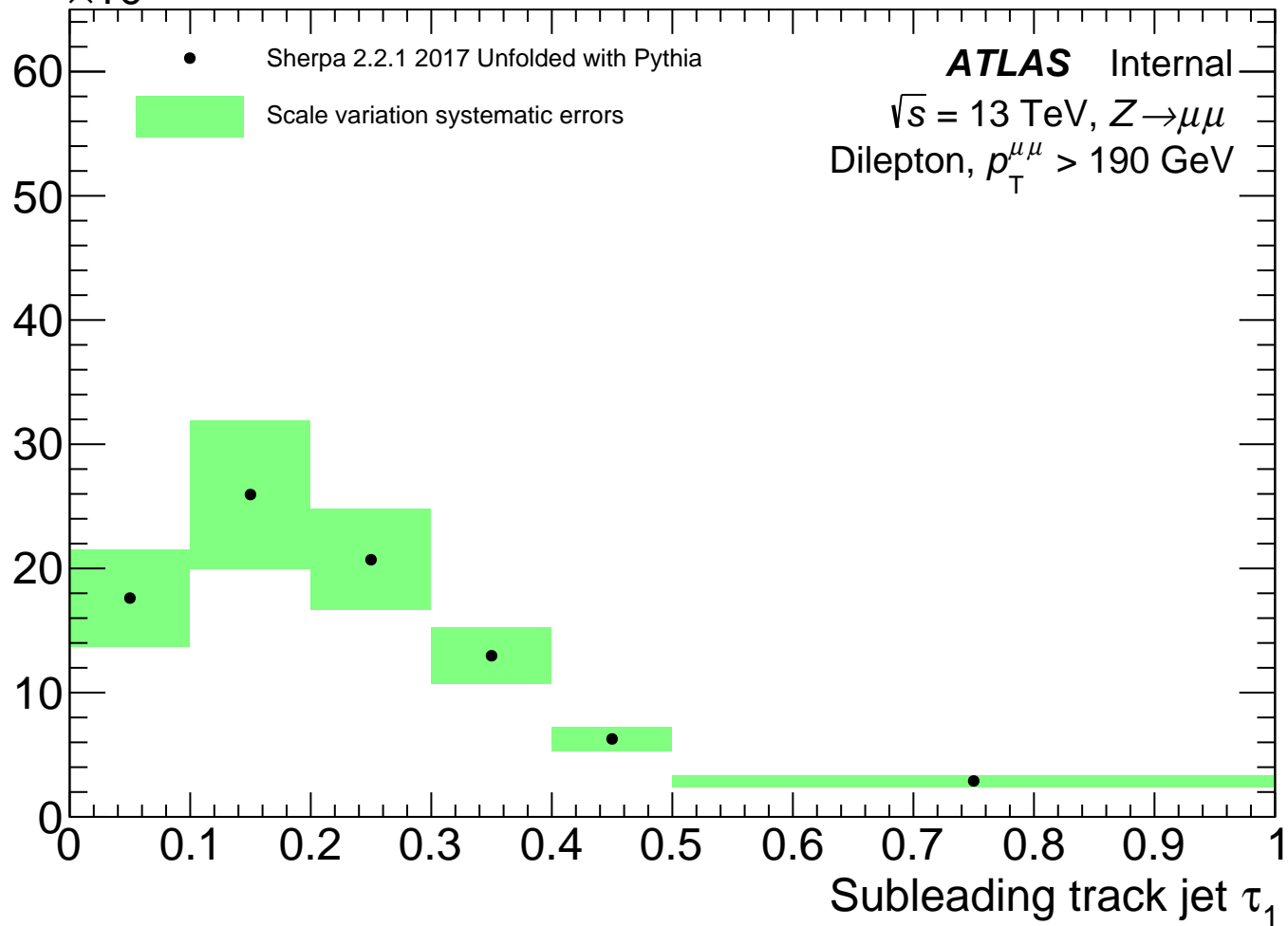
Events

$\times 10^3$



Events

$\times 10^3$



Events

$\times 10^3$

60

50

40

30

20

10

0

• Sherpa 2.2.1 2017 Unfolded with Pythia

Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet τ_1



Events

$\times 10^3$

60

50

40

30

20

10

0

• Sherpa 2.2.1 2017 Unfolded with Pythia

Track systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet τ_1



Events

$\times 10^3$

60

50

40

30

20

10

0

• Sherpa 2.2.1 2017 Unfolded with Pythia

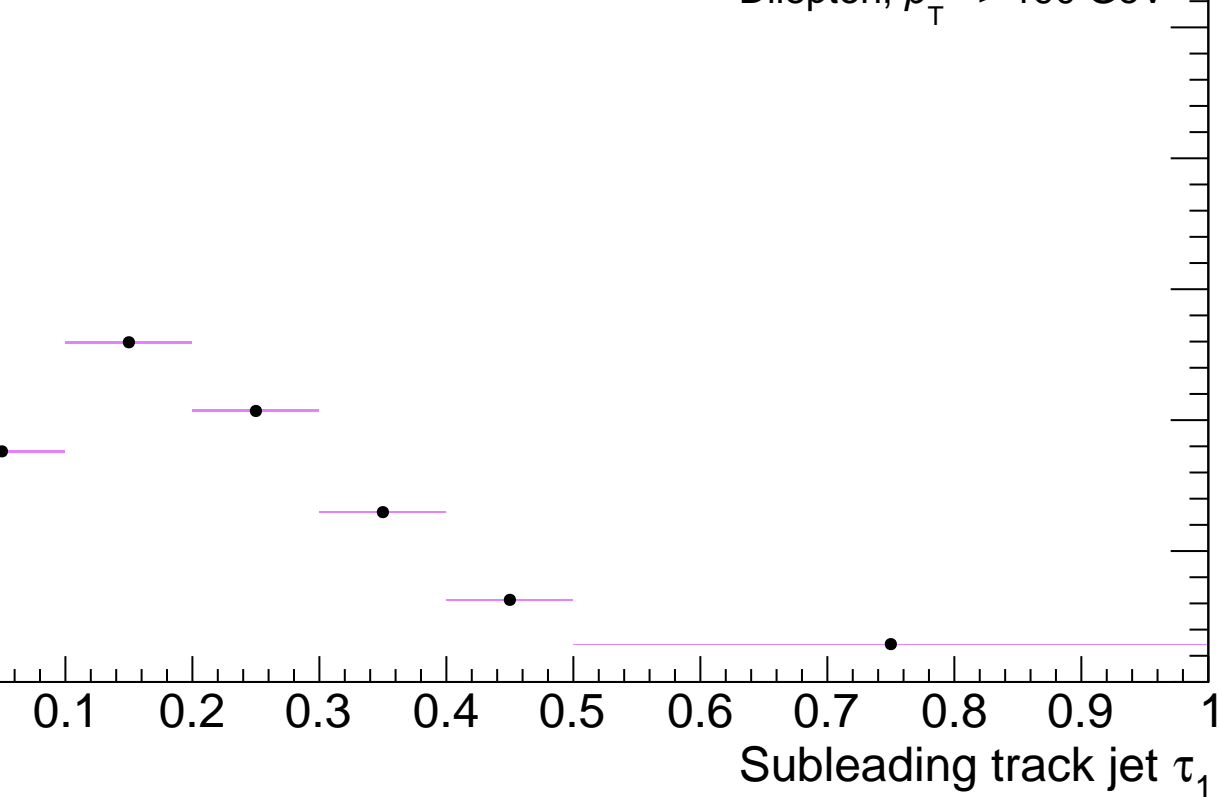
MC stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet τ_1



Events

$\times 10^3$

60

50

40

30

20

10

0

• Sherpa 2.2.1 2017 Unfolded with Pythia

■ Data stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

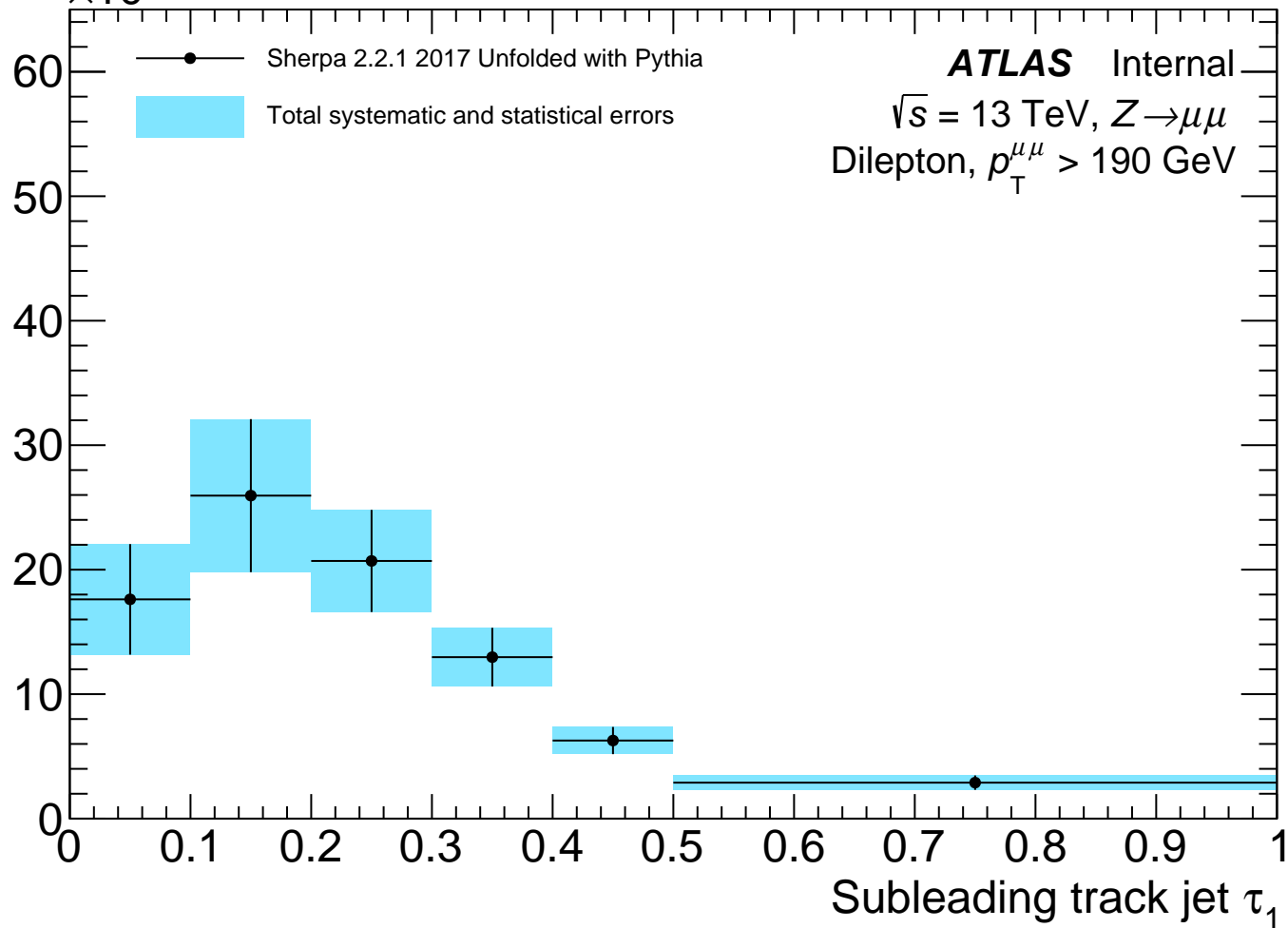
Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet τ_1



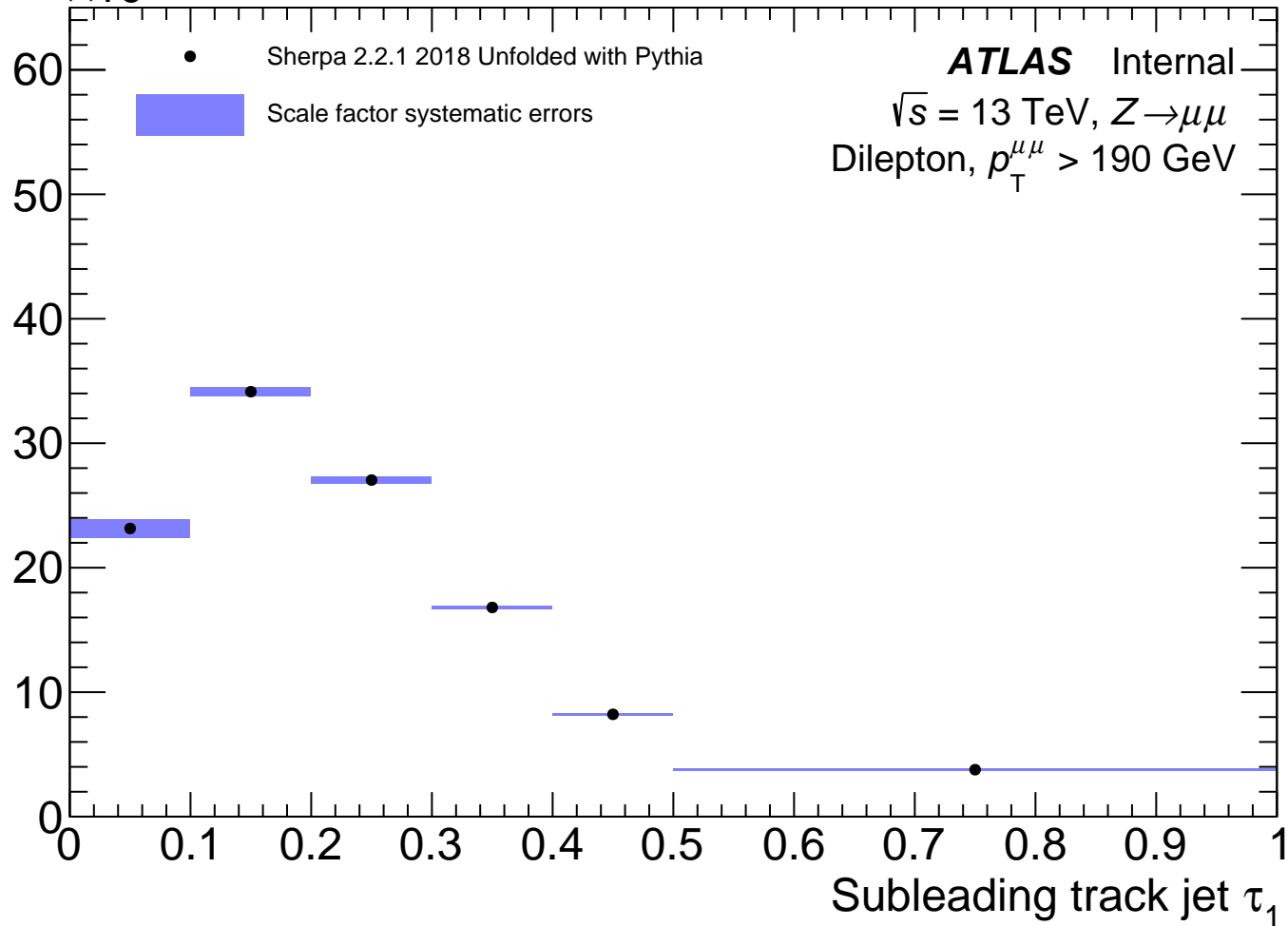
Events

$\times 10^3$



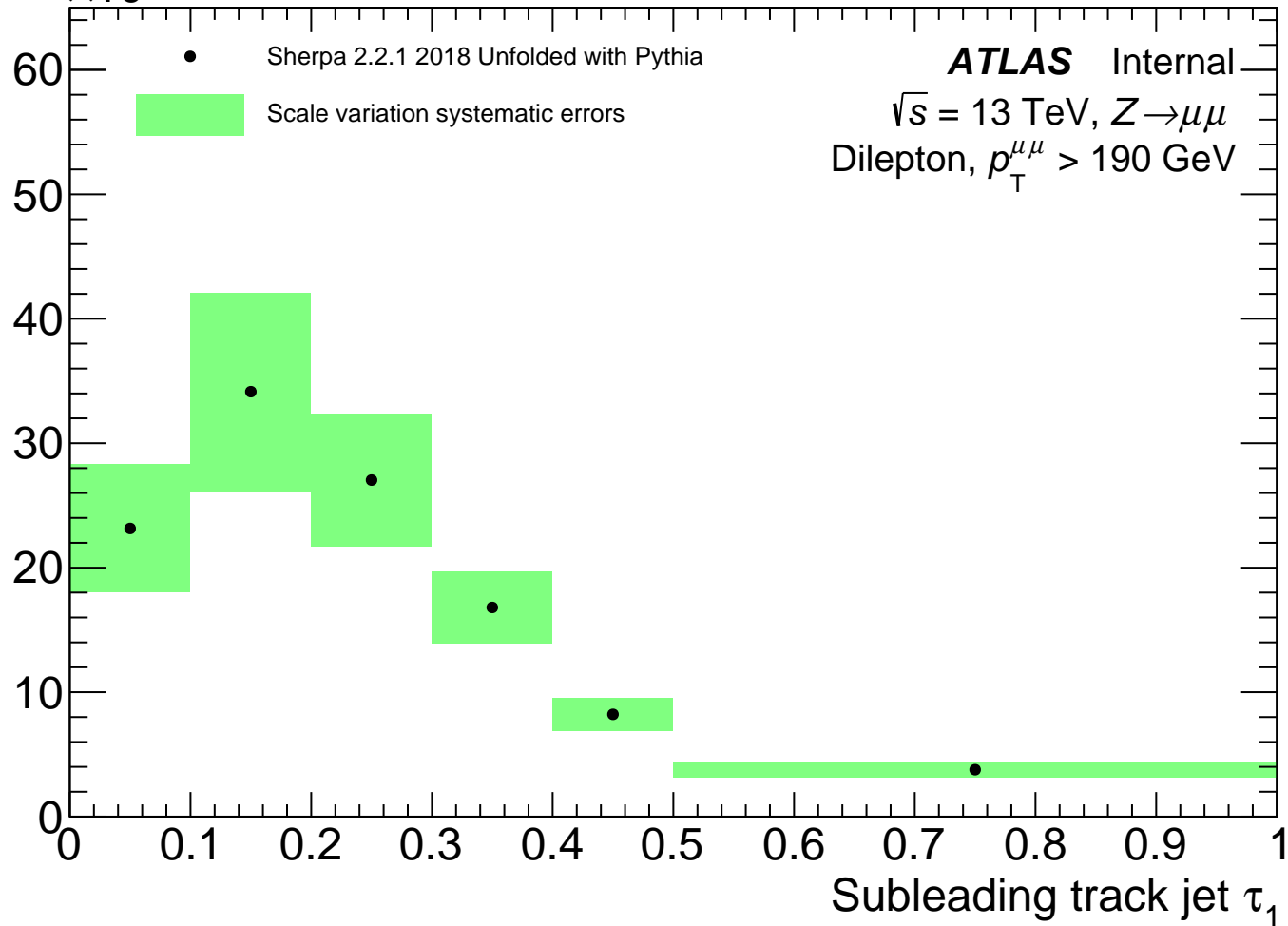
Events

$\times 10^3$



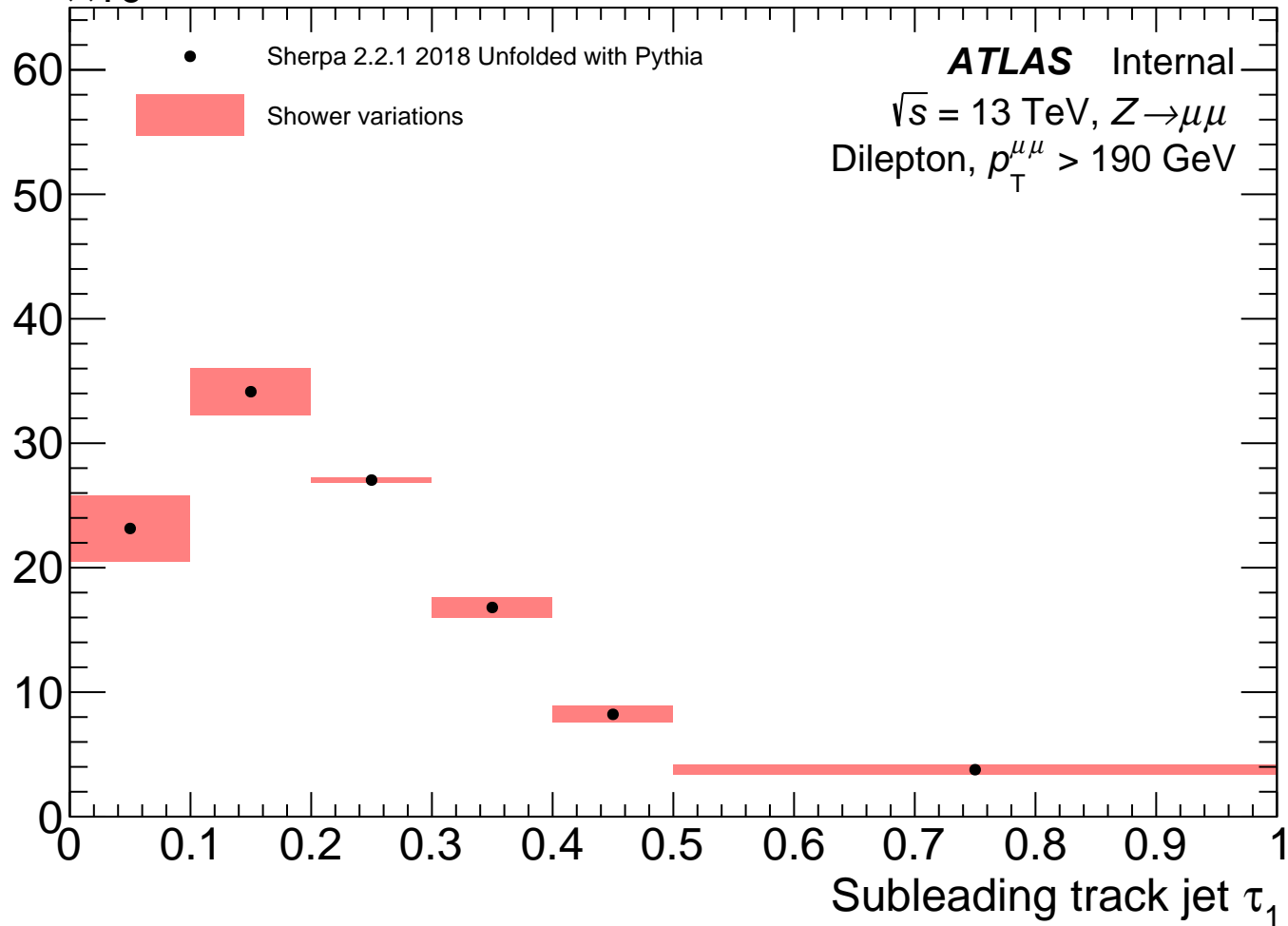
Events

$\times 10^3$



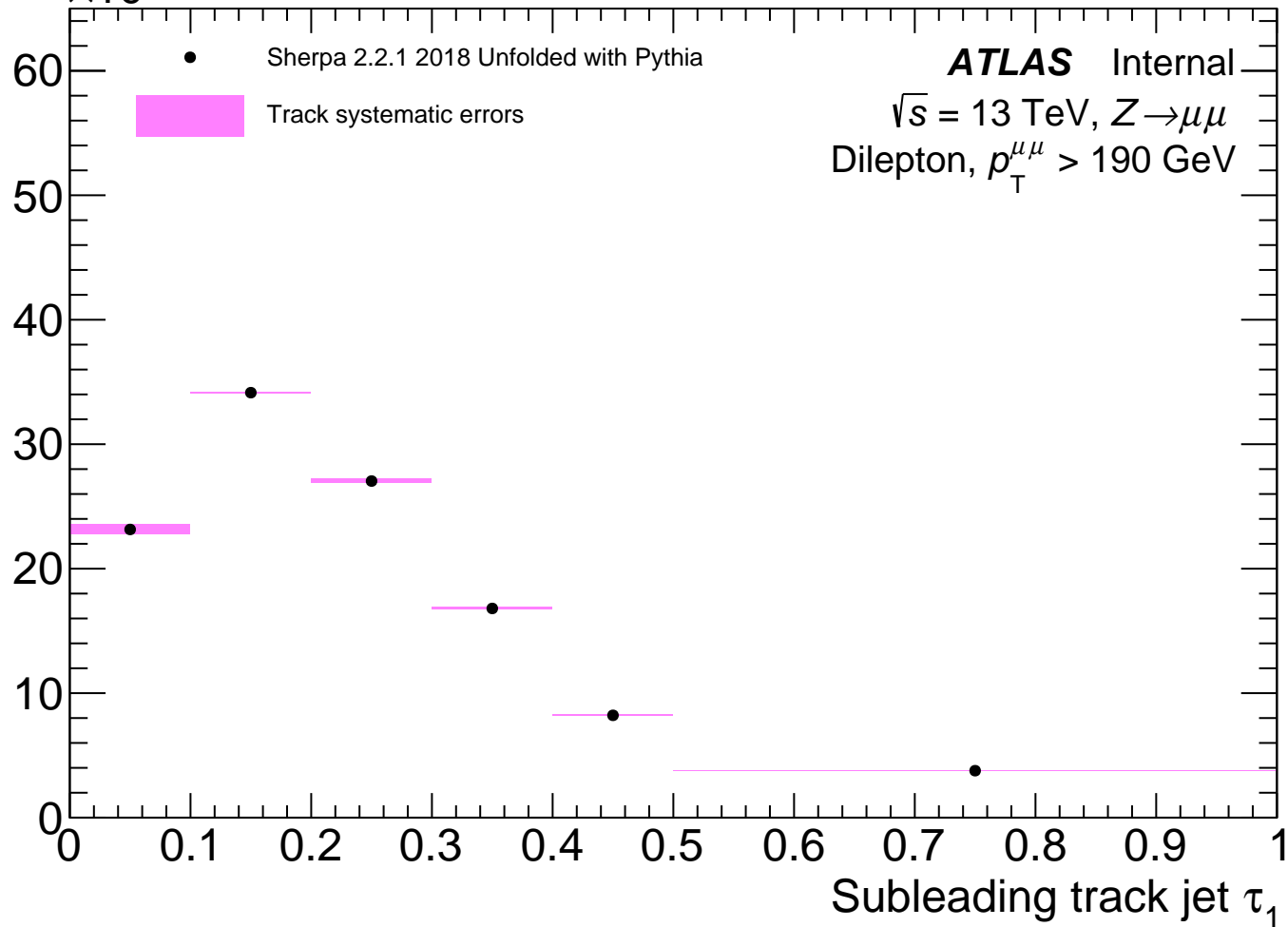
Events

$\times 10^3$



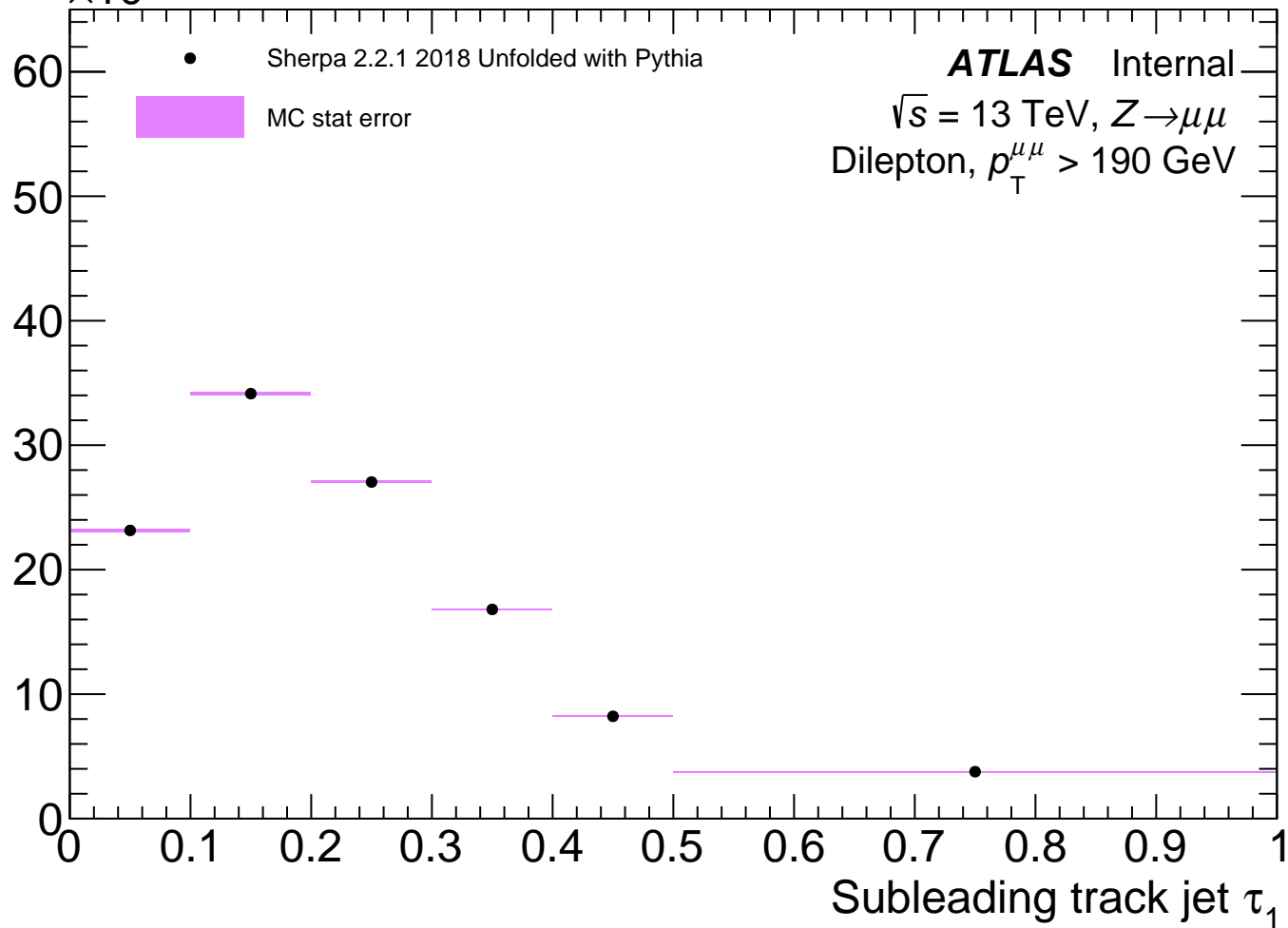
Events

$\times 10^3$



Events

$\times 10^3$



Events

$\times 10^3$

60

50

40

30

20

10

0

•

Sherpa 2.2.1 2018 Unfolded with Pythia



Data stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

0

0.1

0.2

0.3

0.4

0.5

0.6

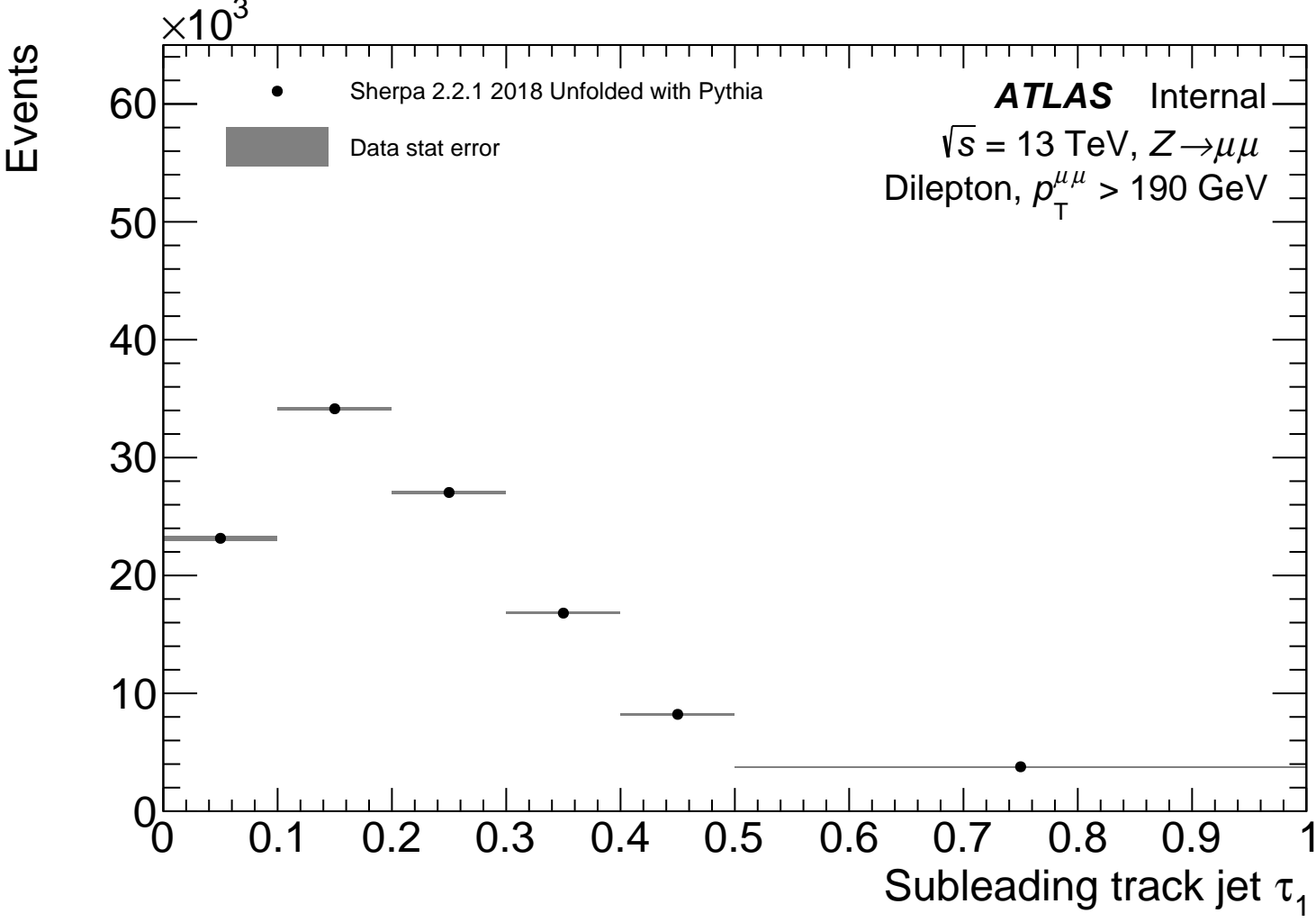
0.7

0.8

0.9

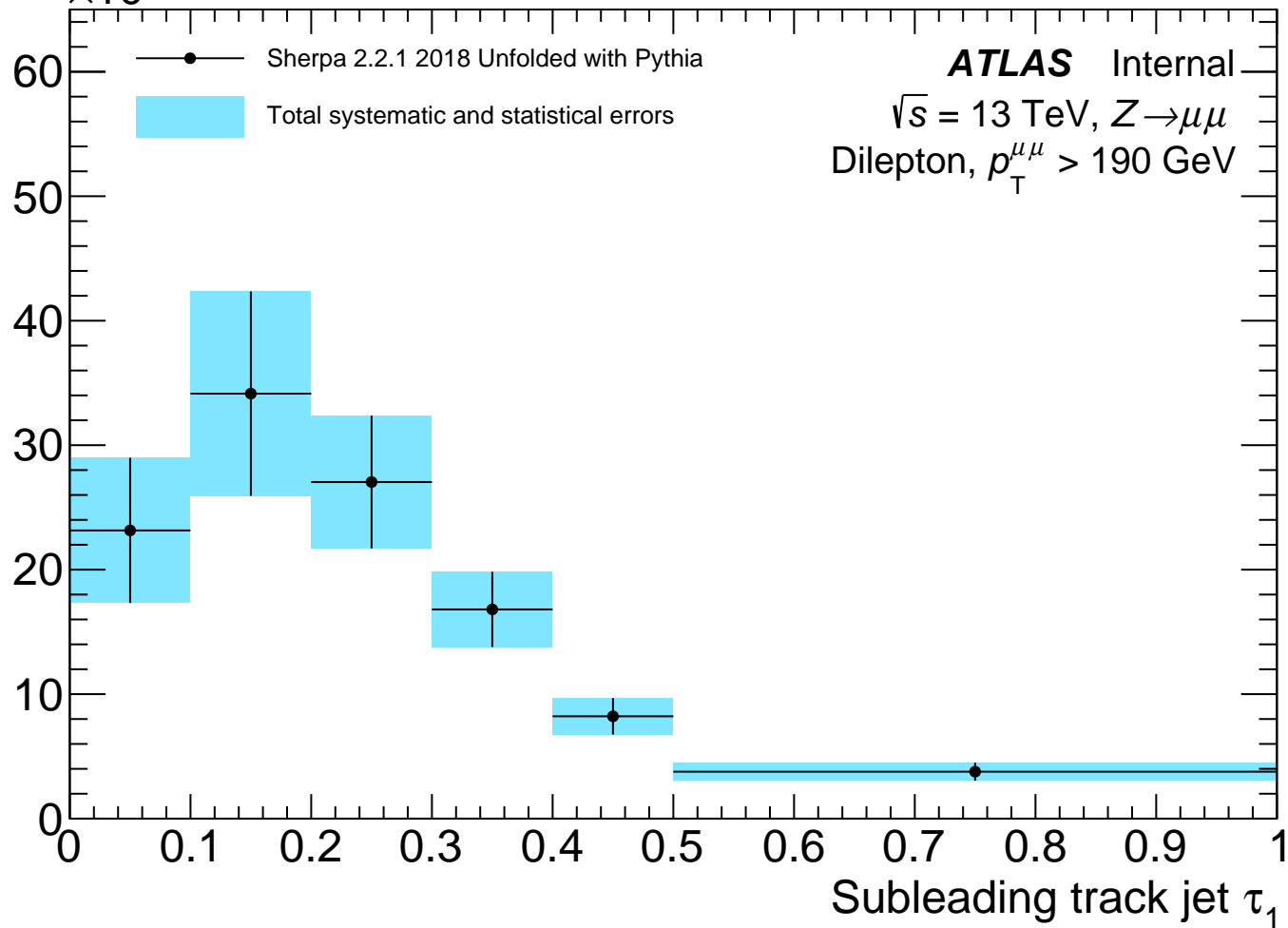
1

Subleading track jet τ_1

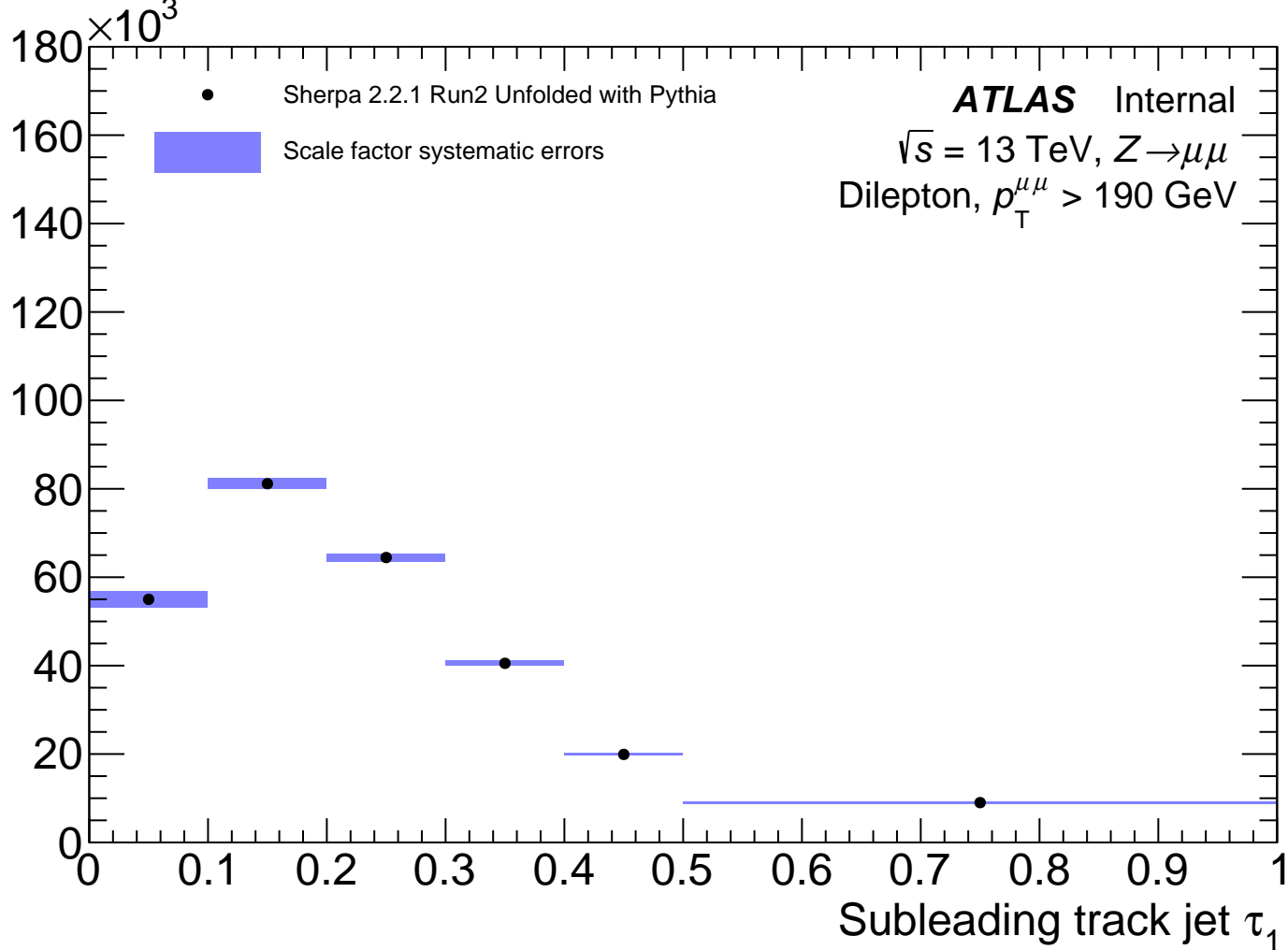


Events

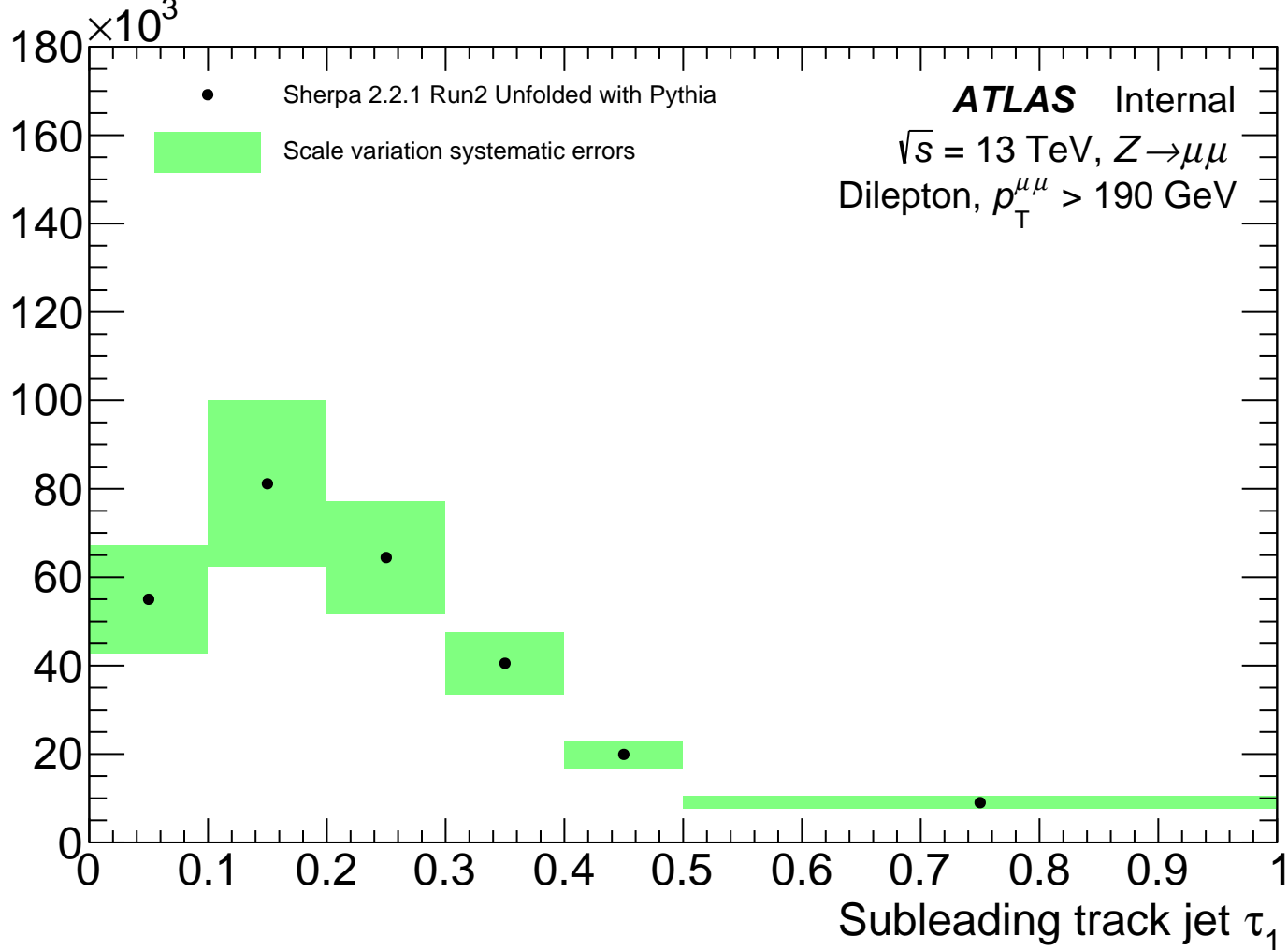
$\times 10^3$



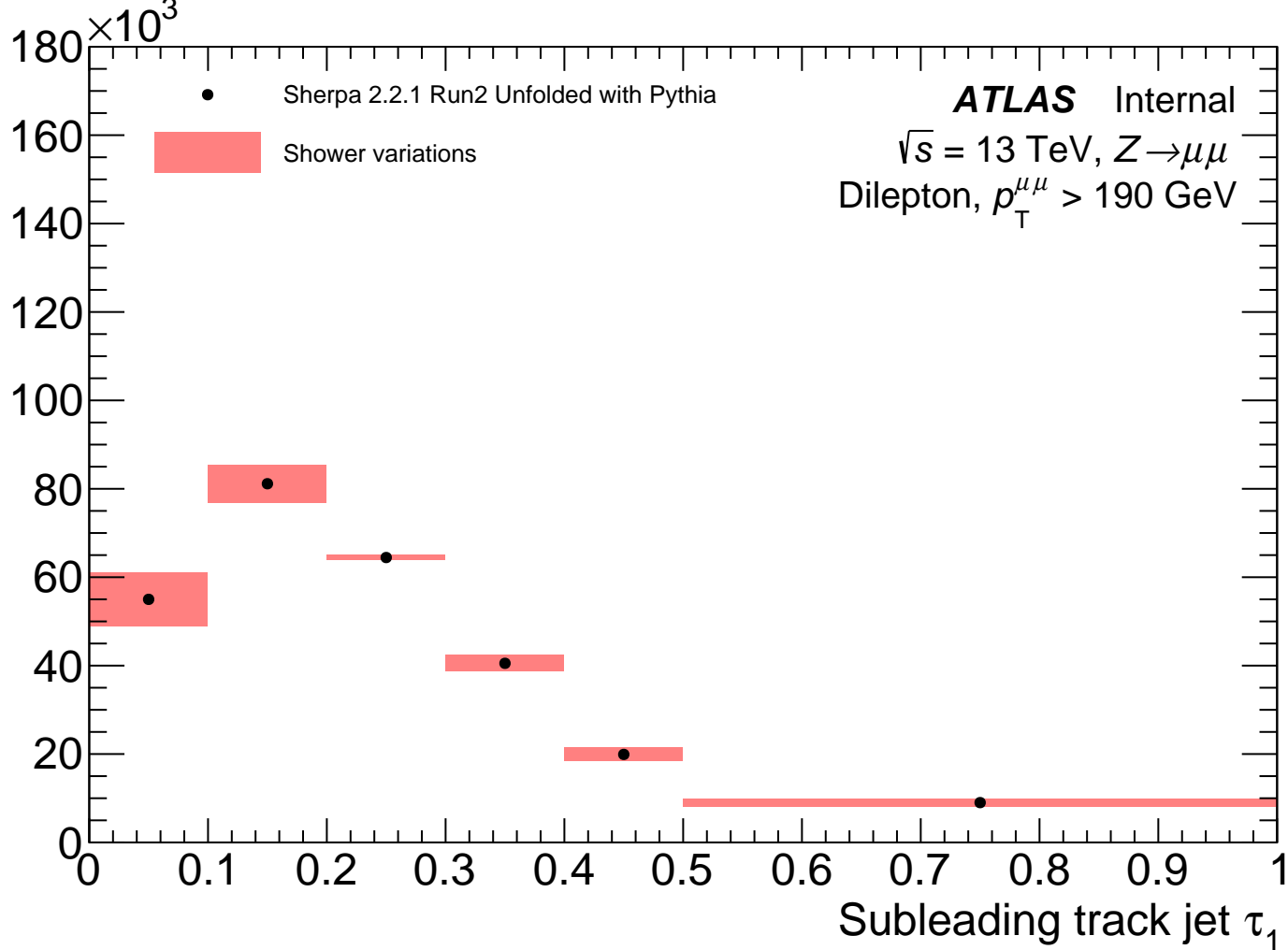
Events



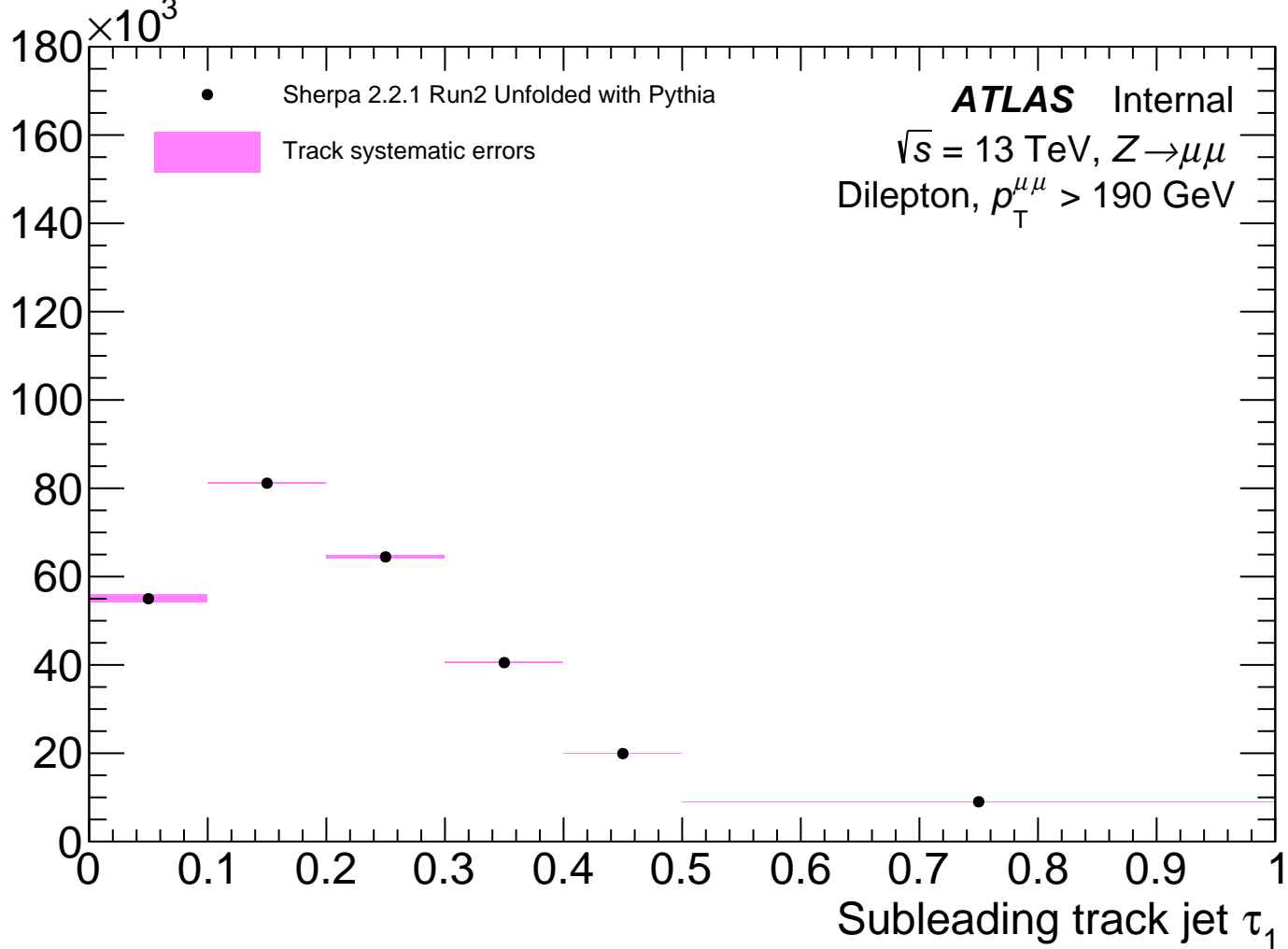
Events



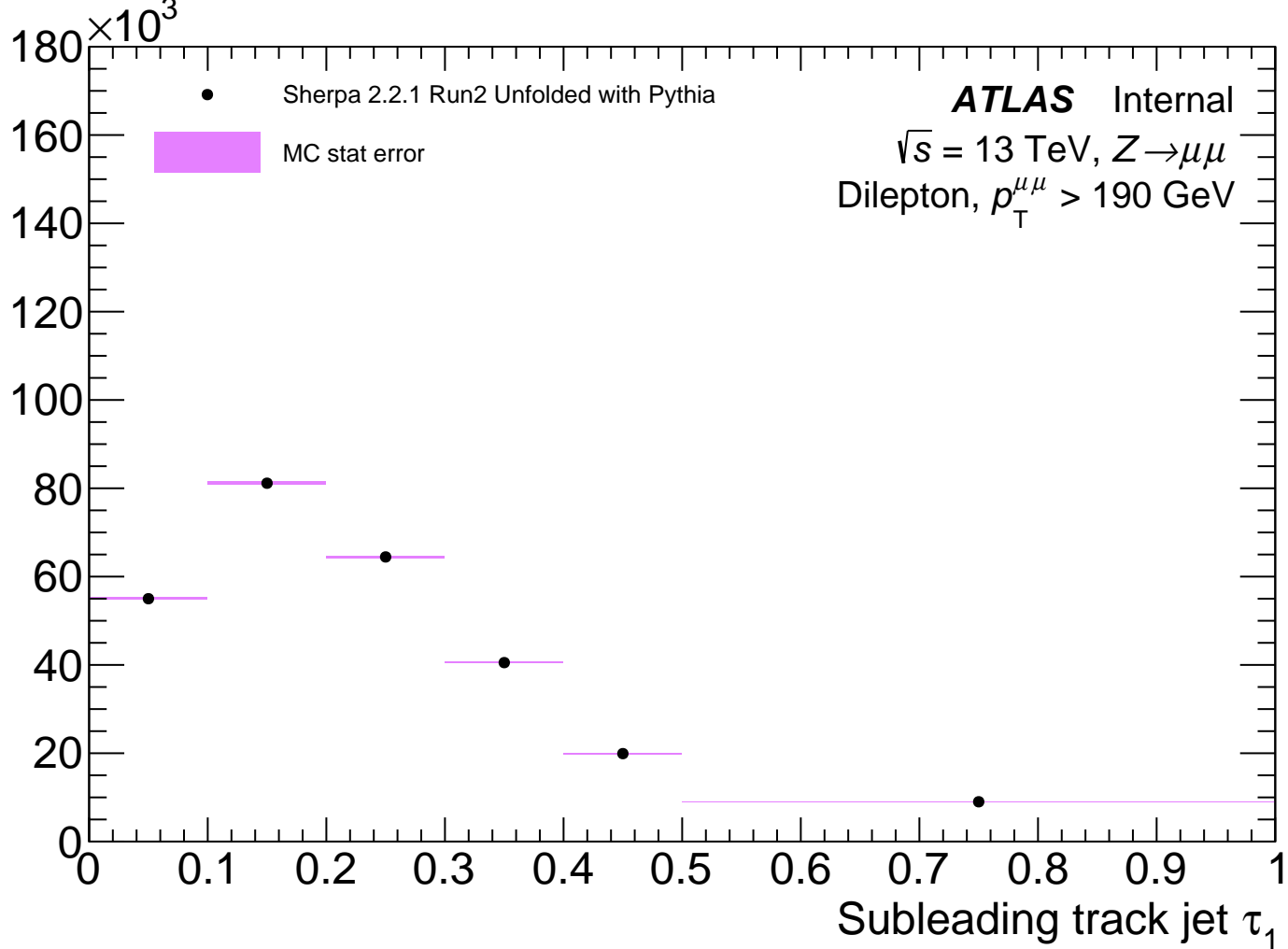
Events



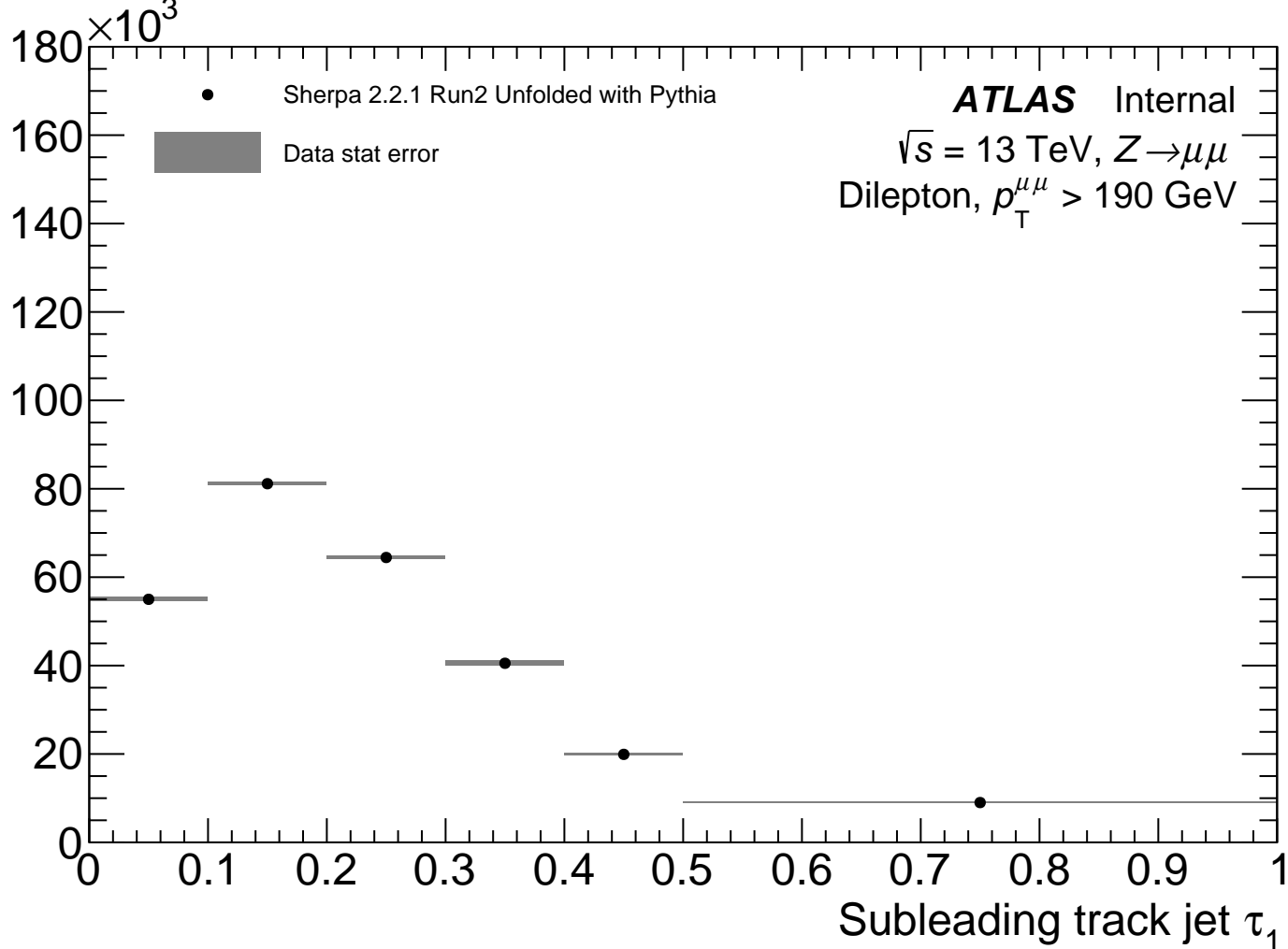
Events



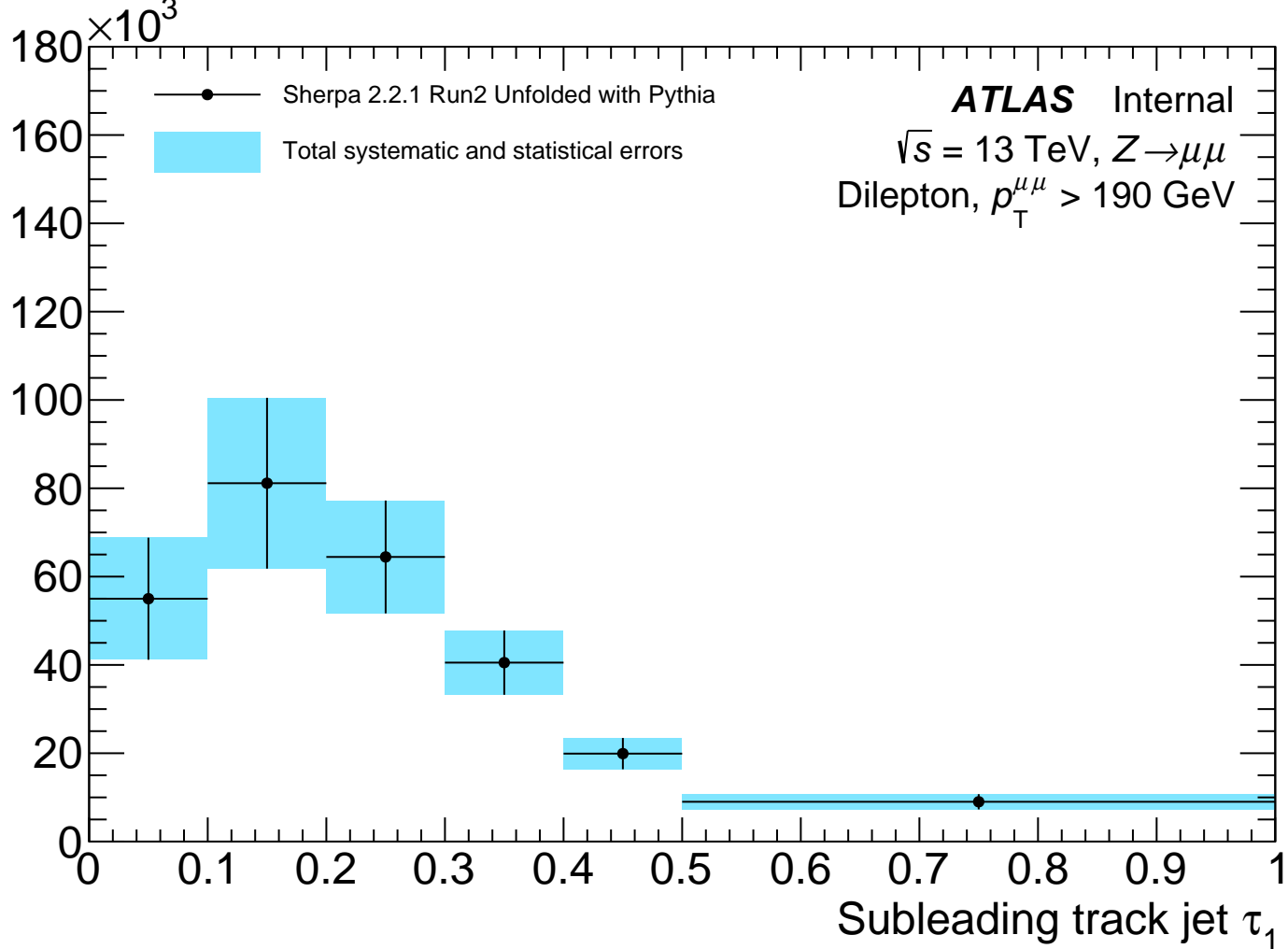
Events



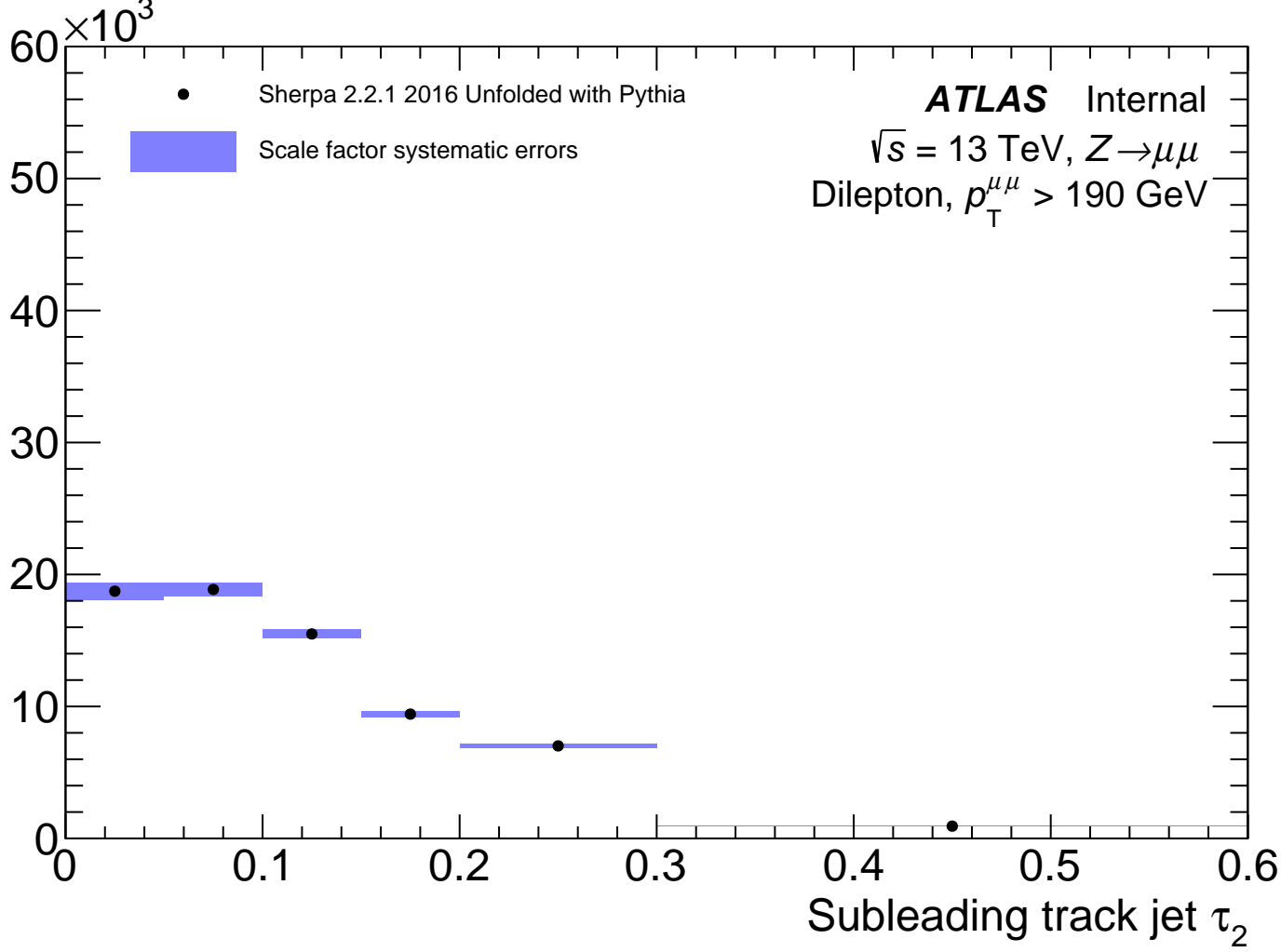
Events



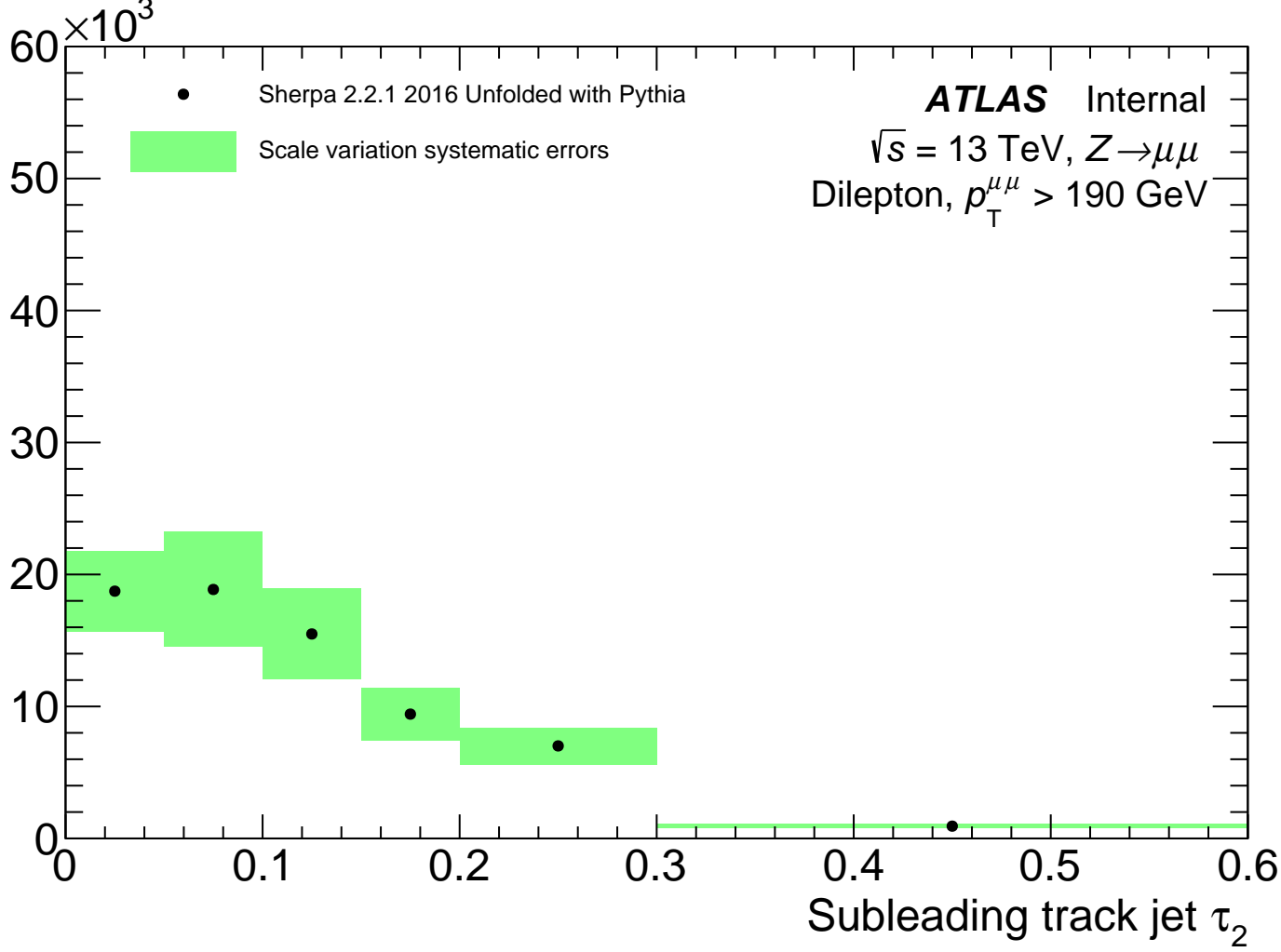
Events



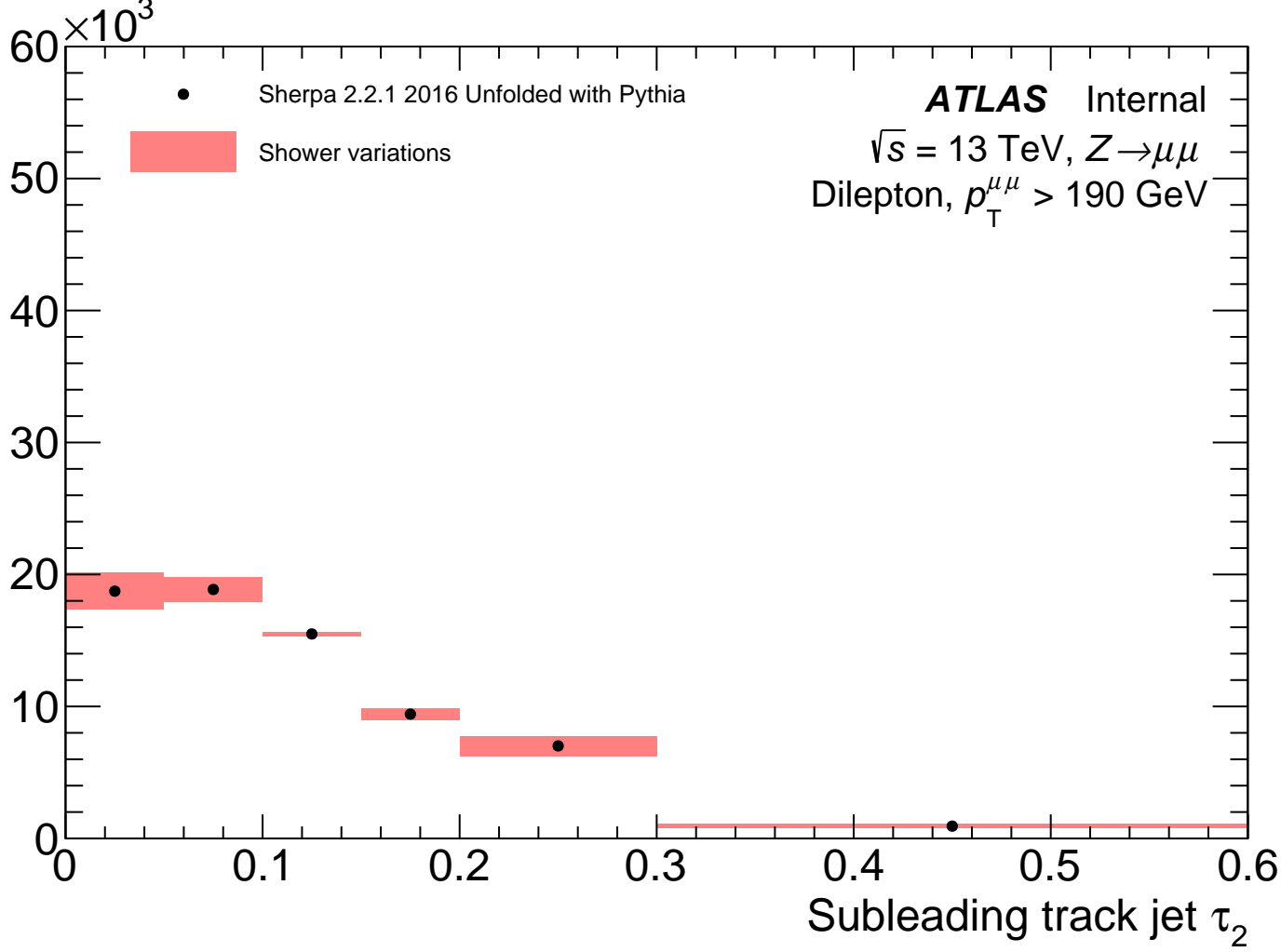
Events



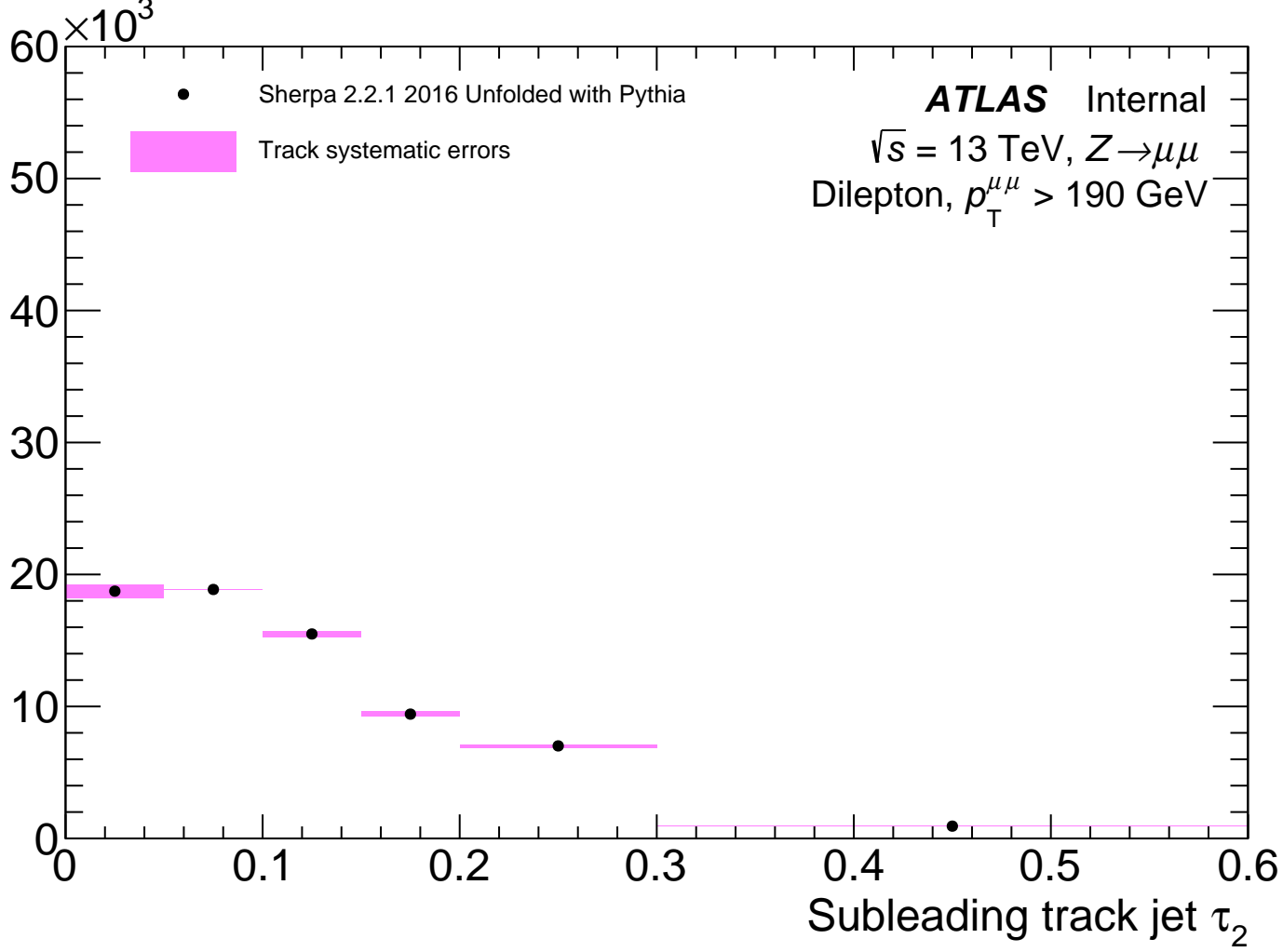
Events



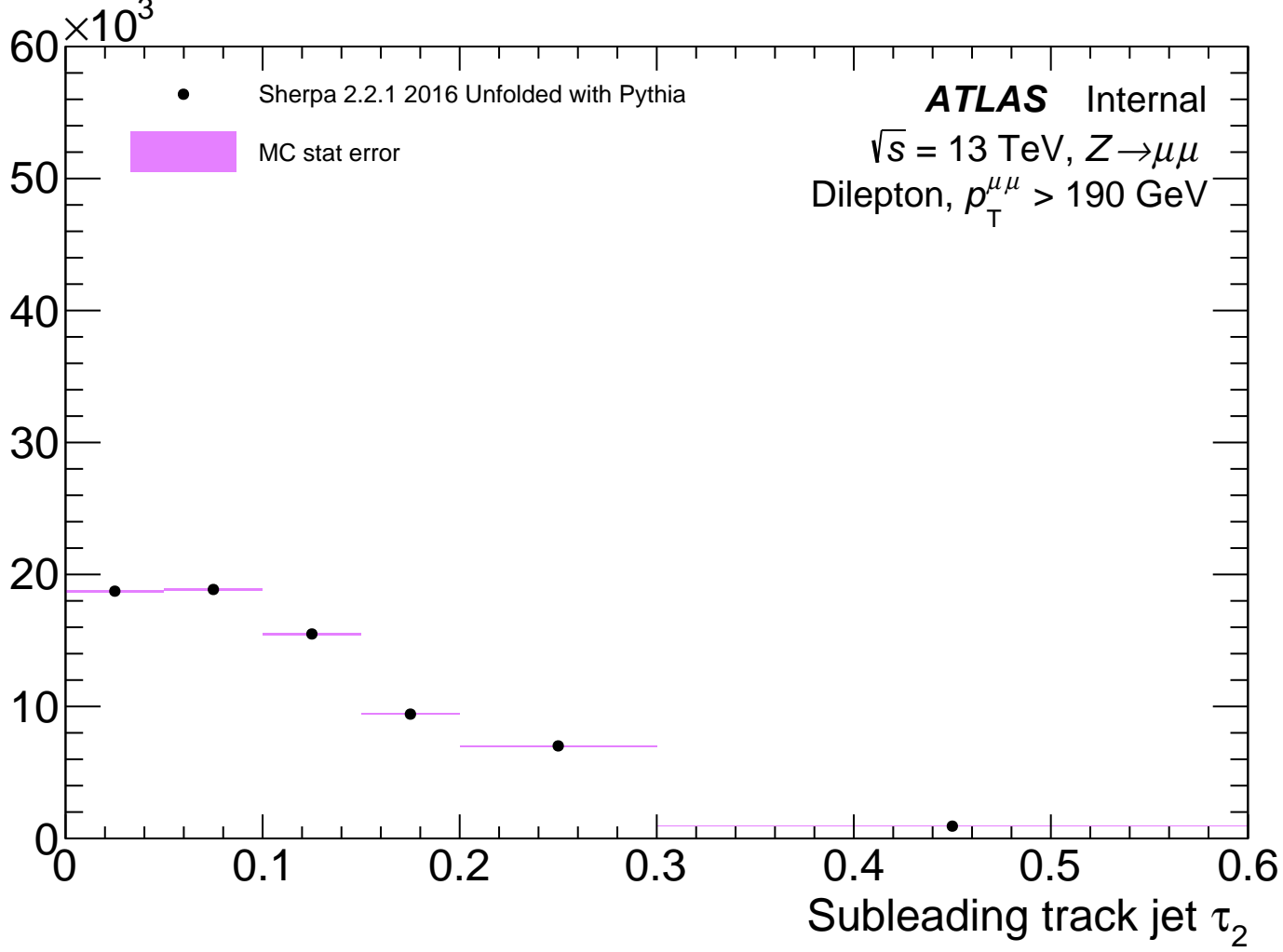
Events



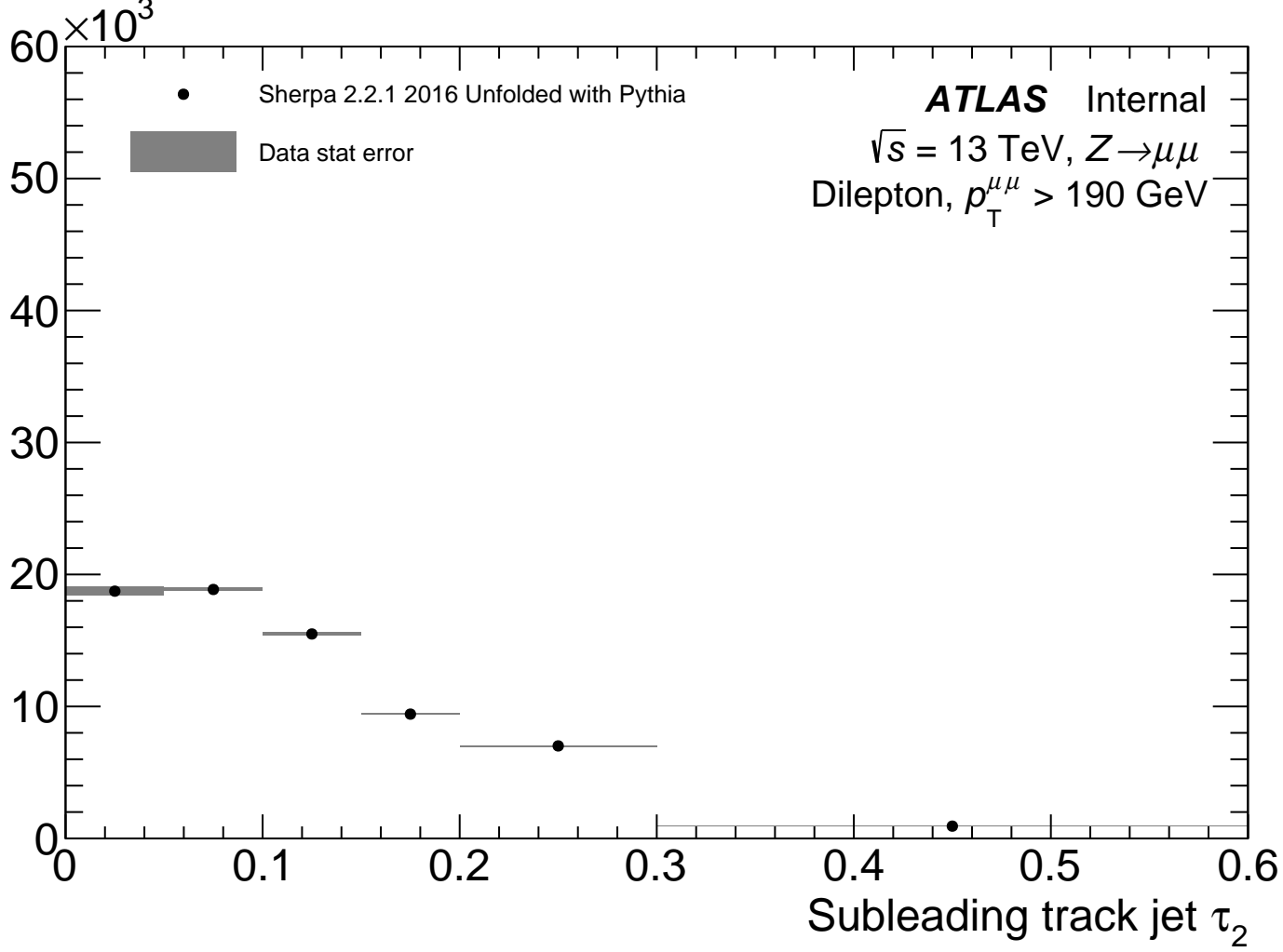
Events



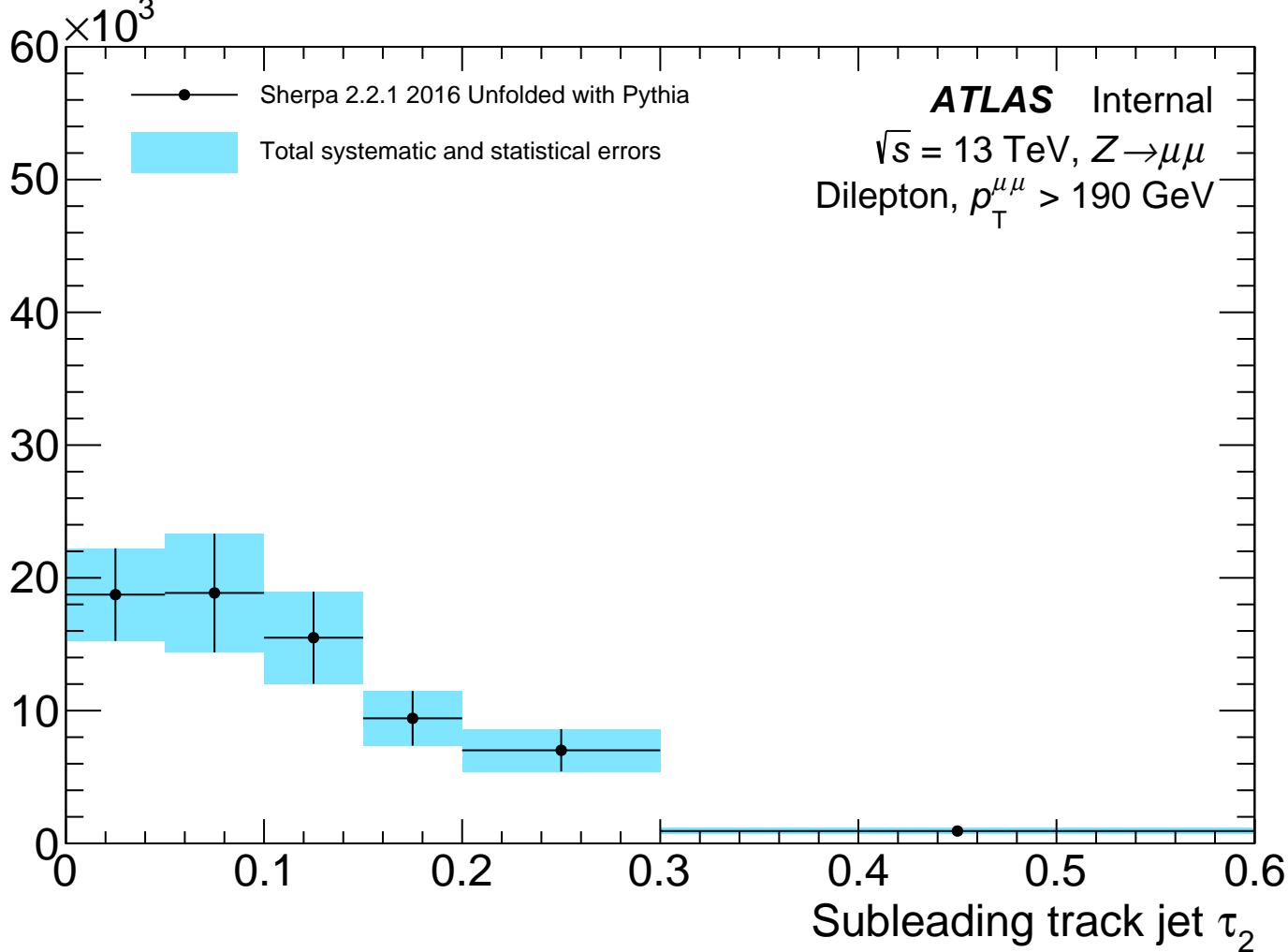
Events



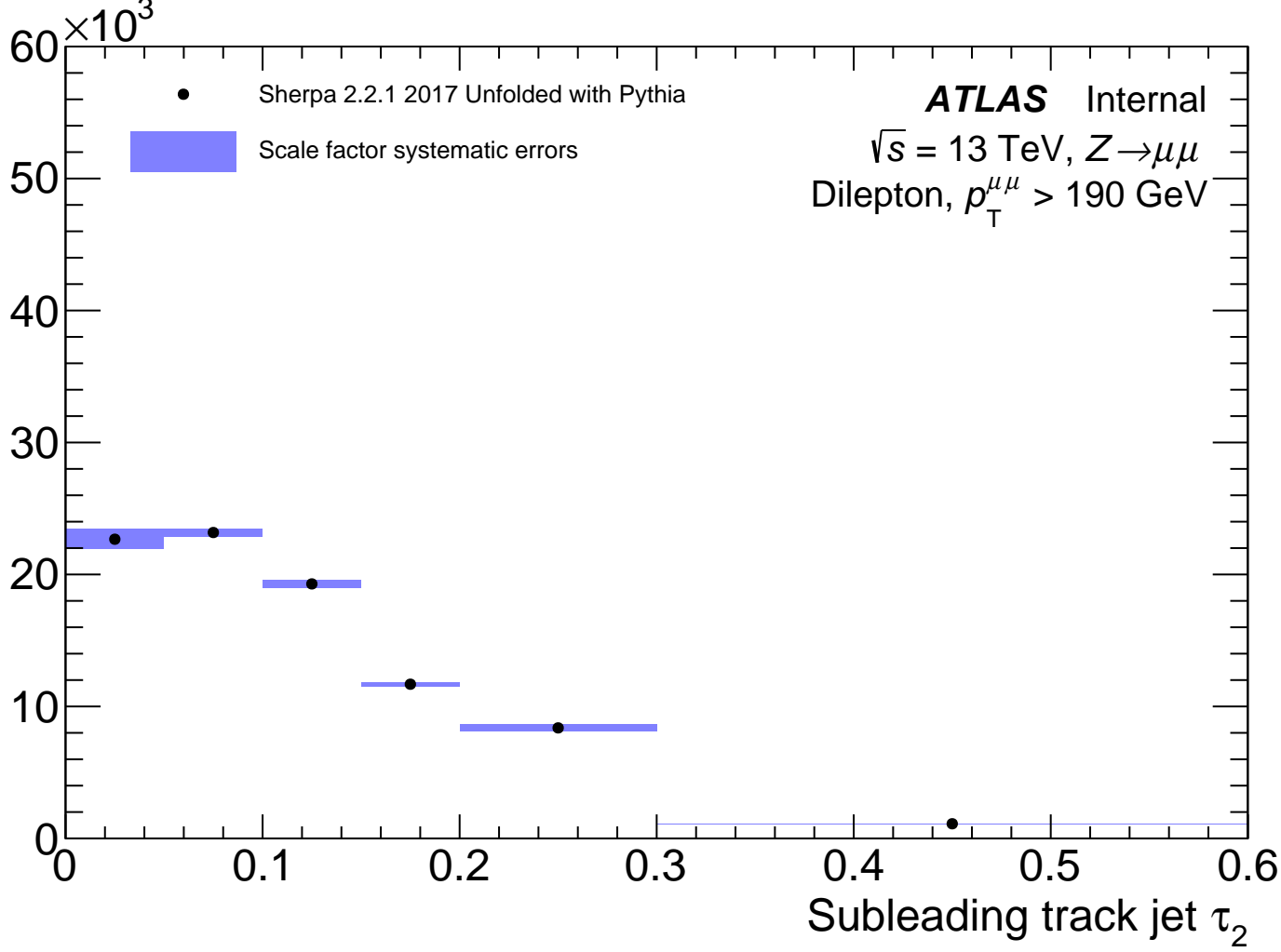
Events



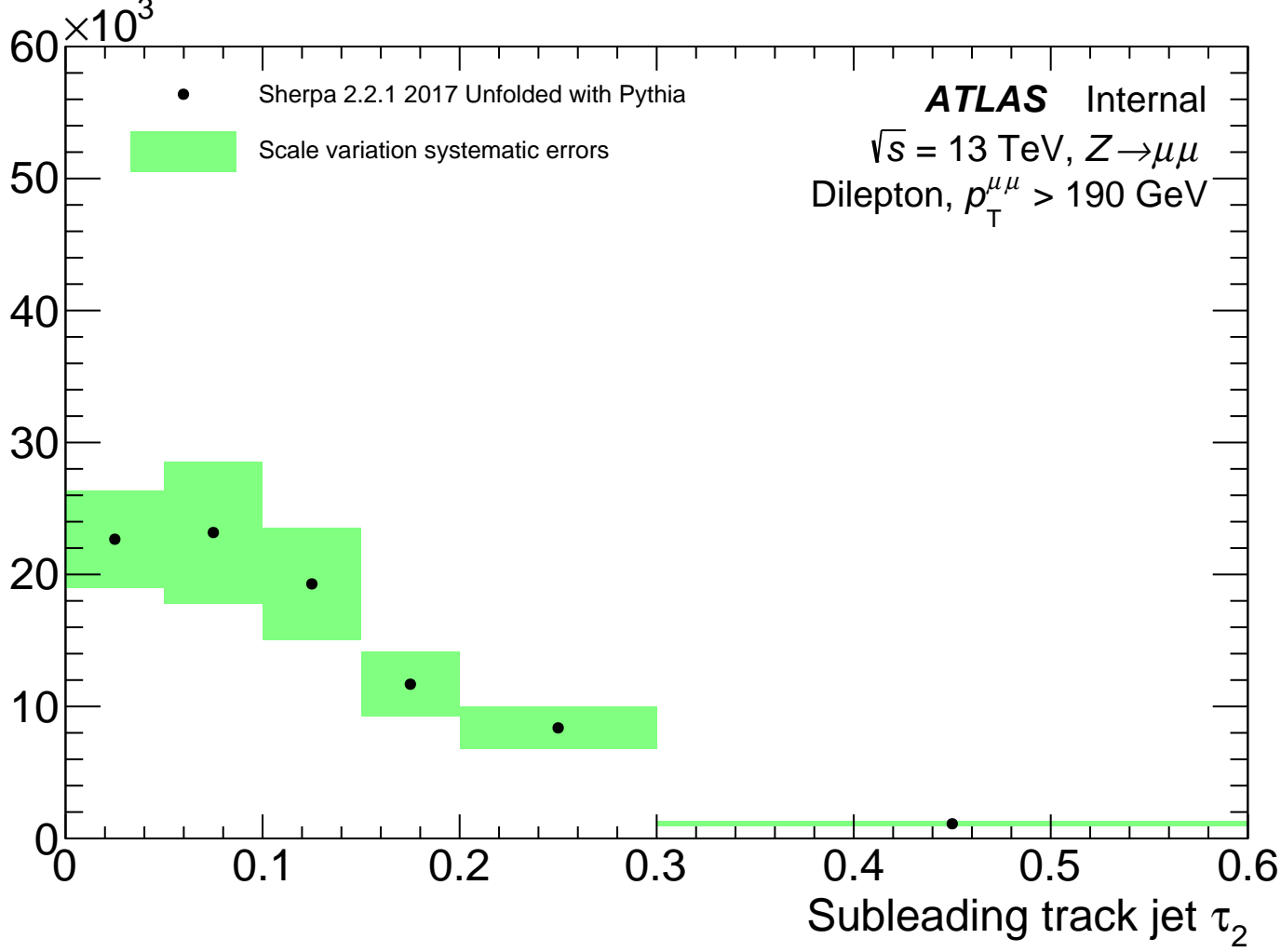
Events



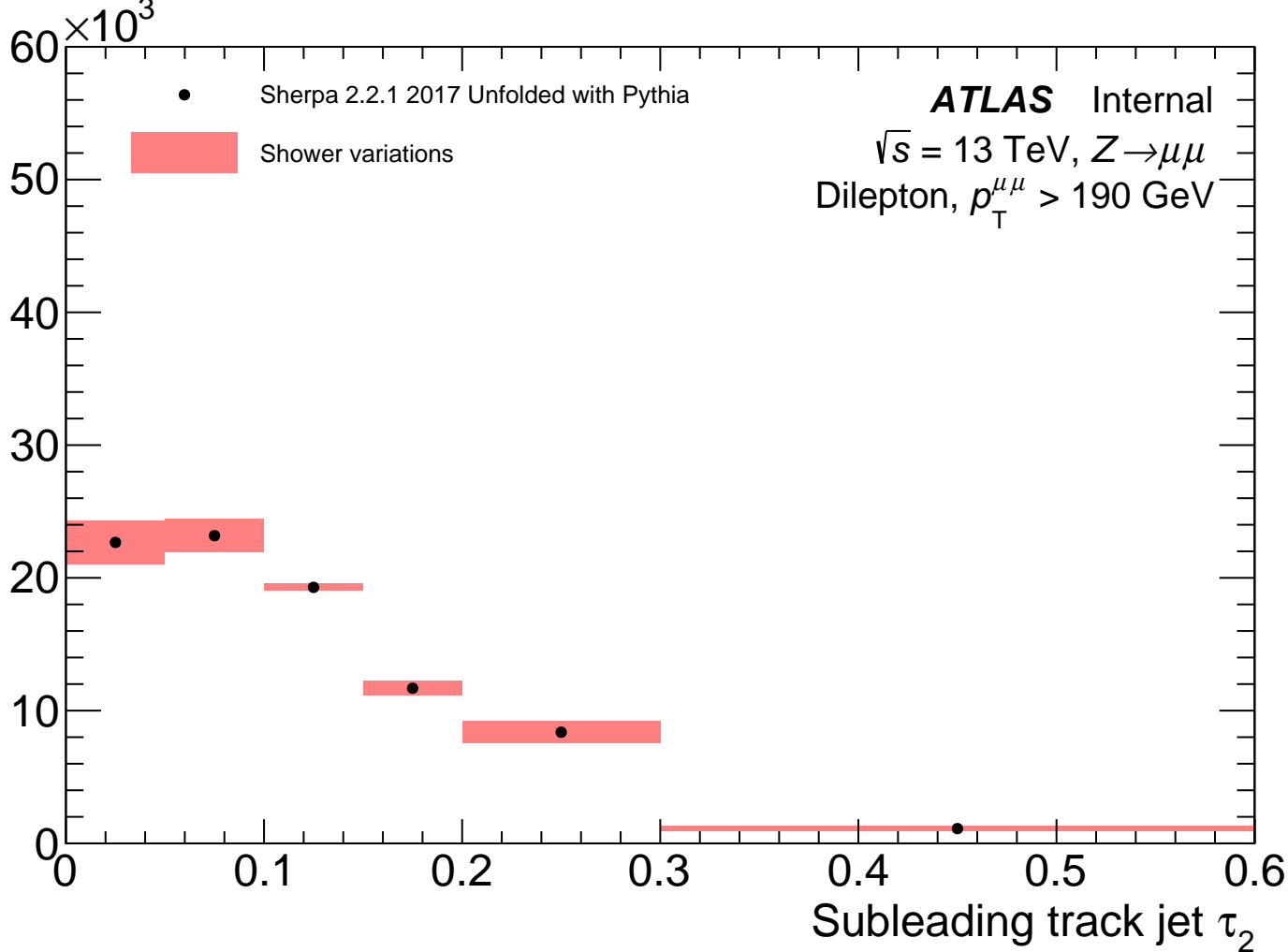
Events



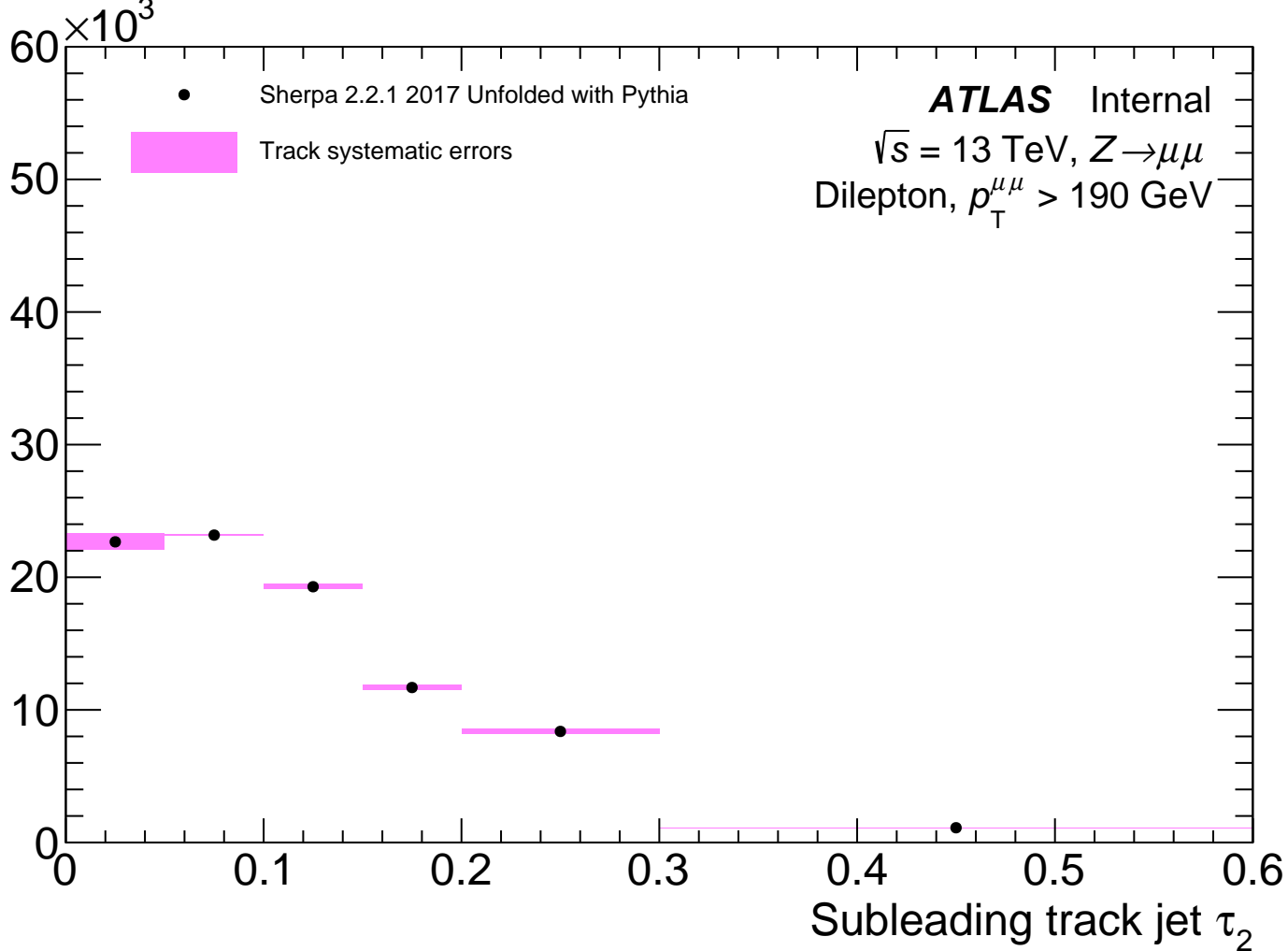
Events



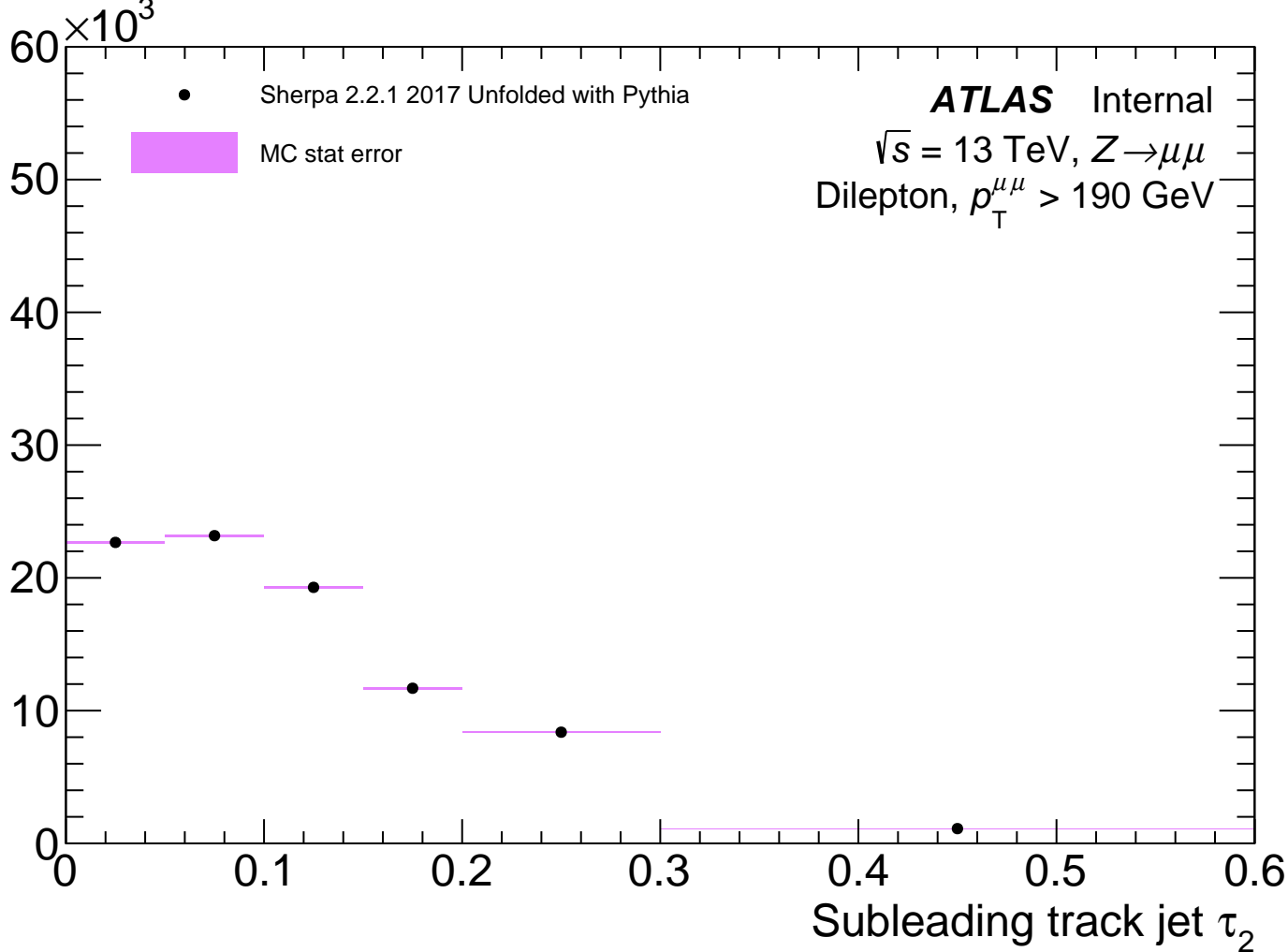
Events



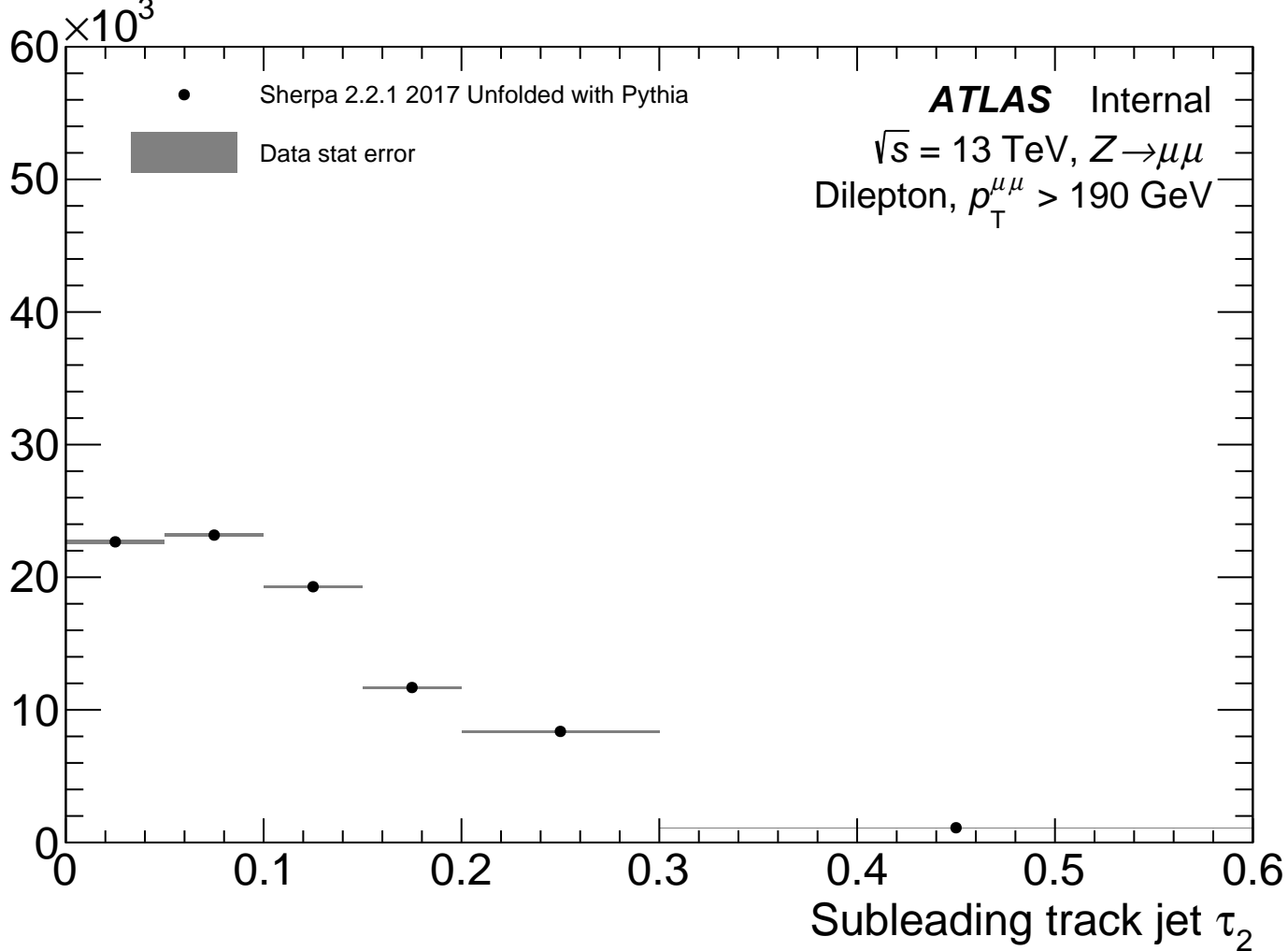
Events



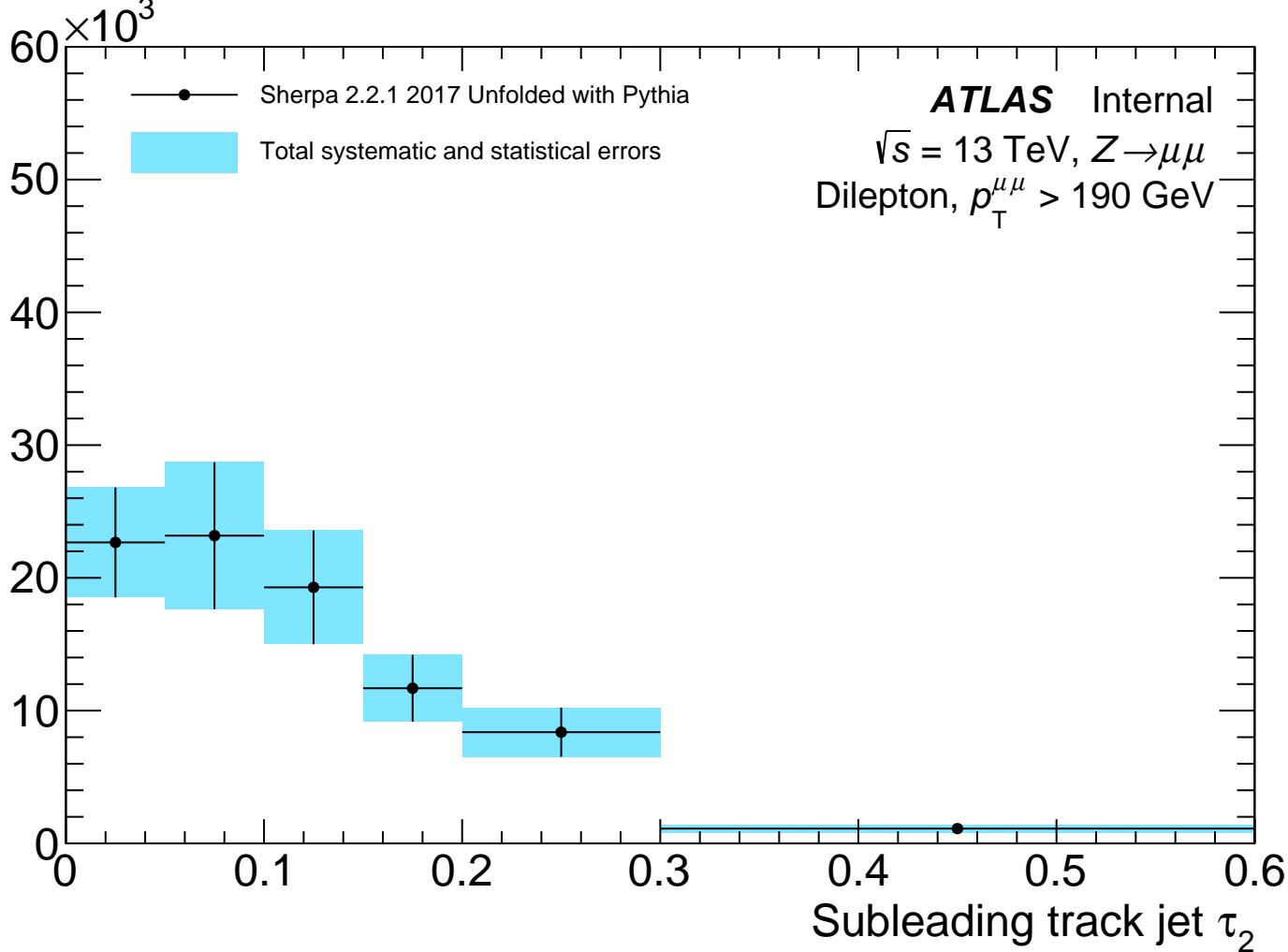
Events



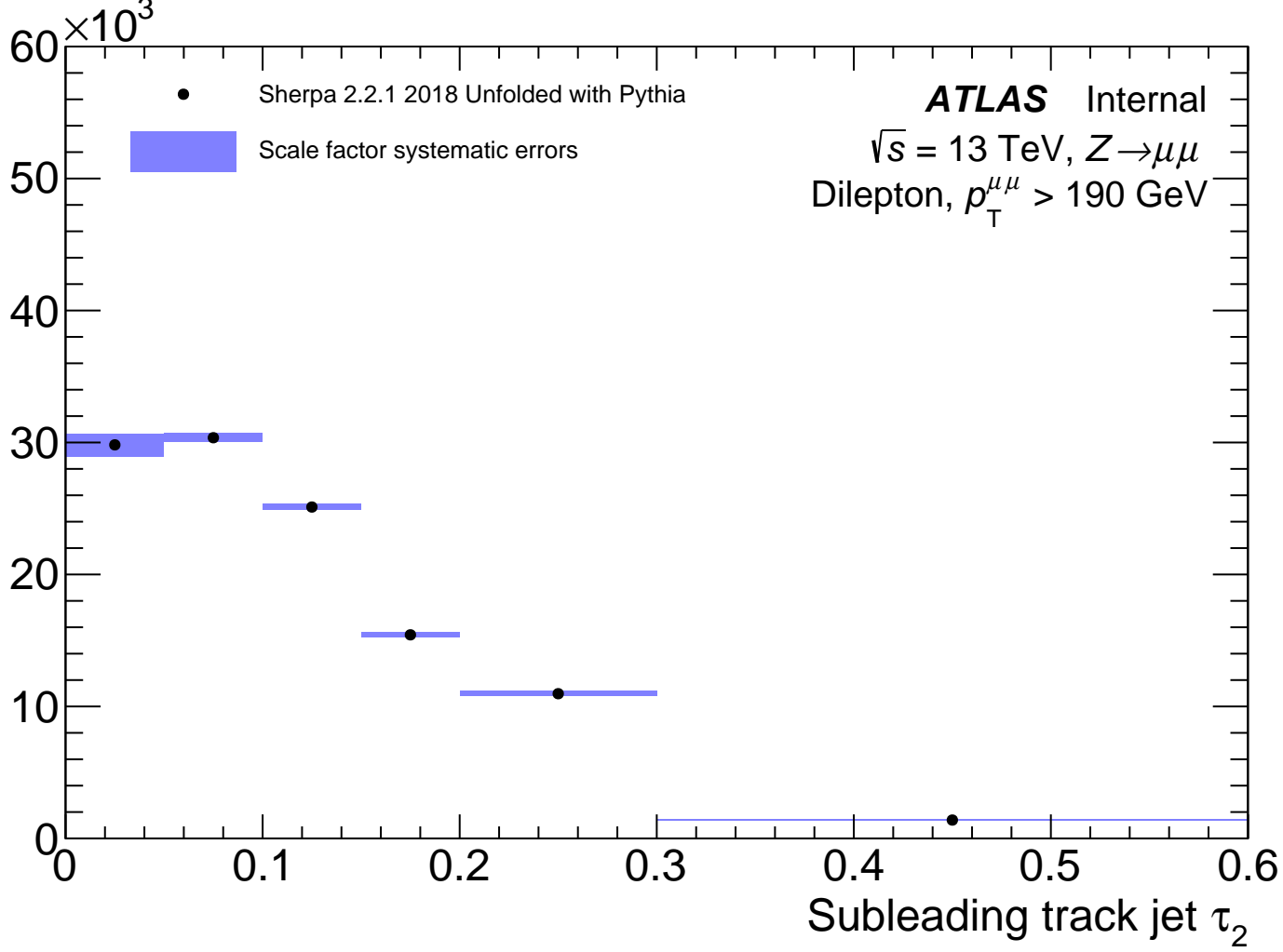
Events



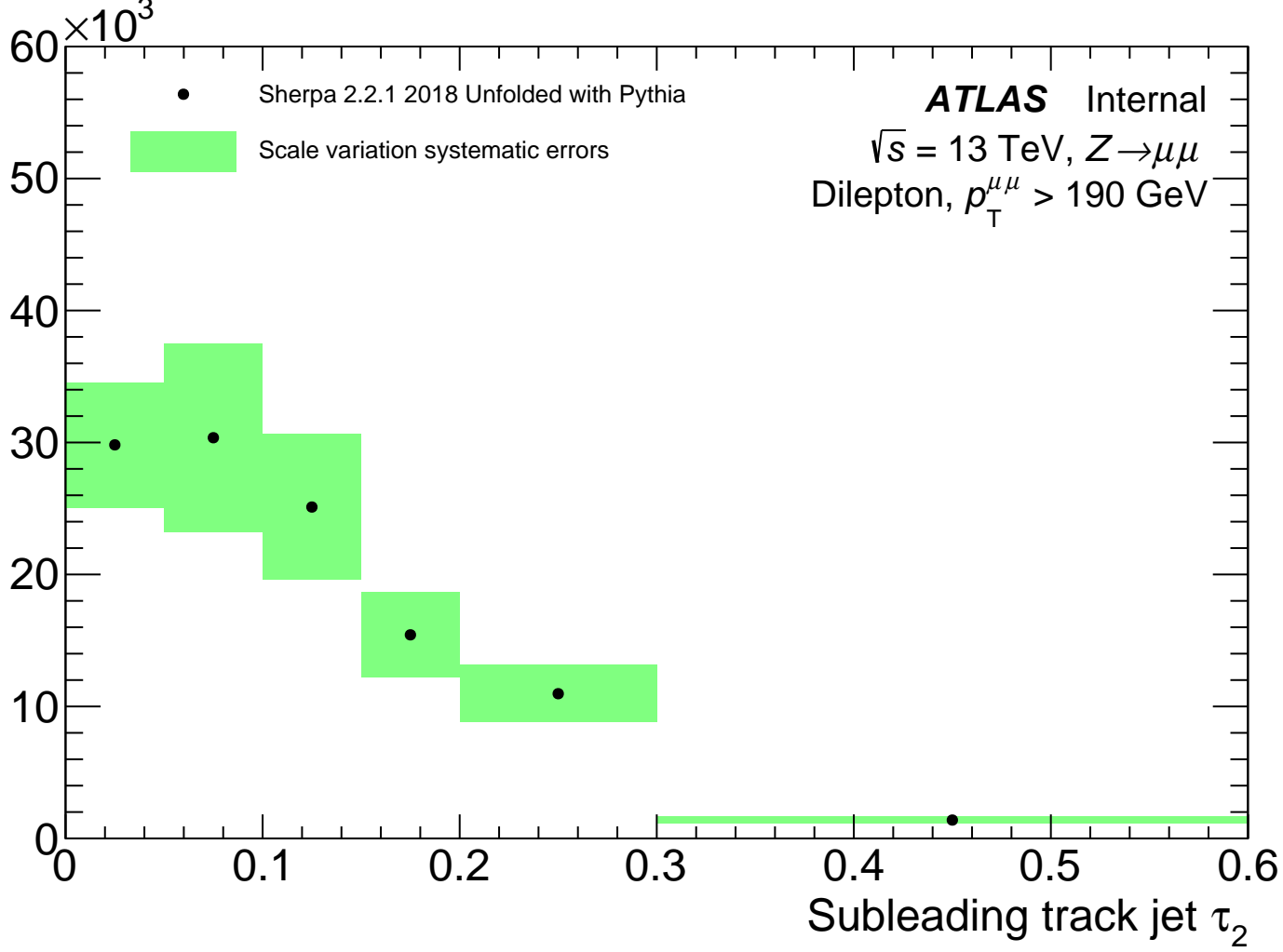
Events



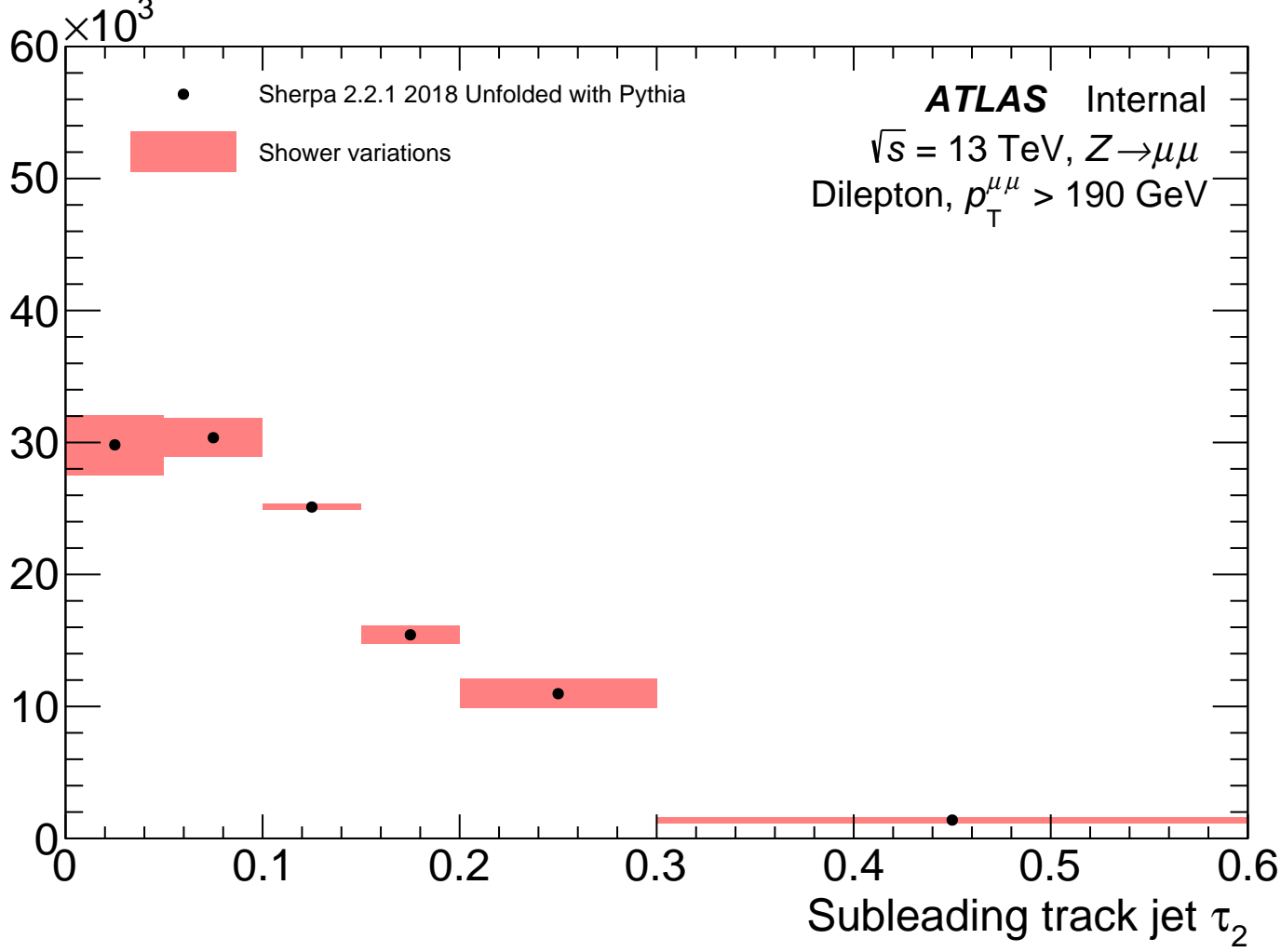
Events



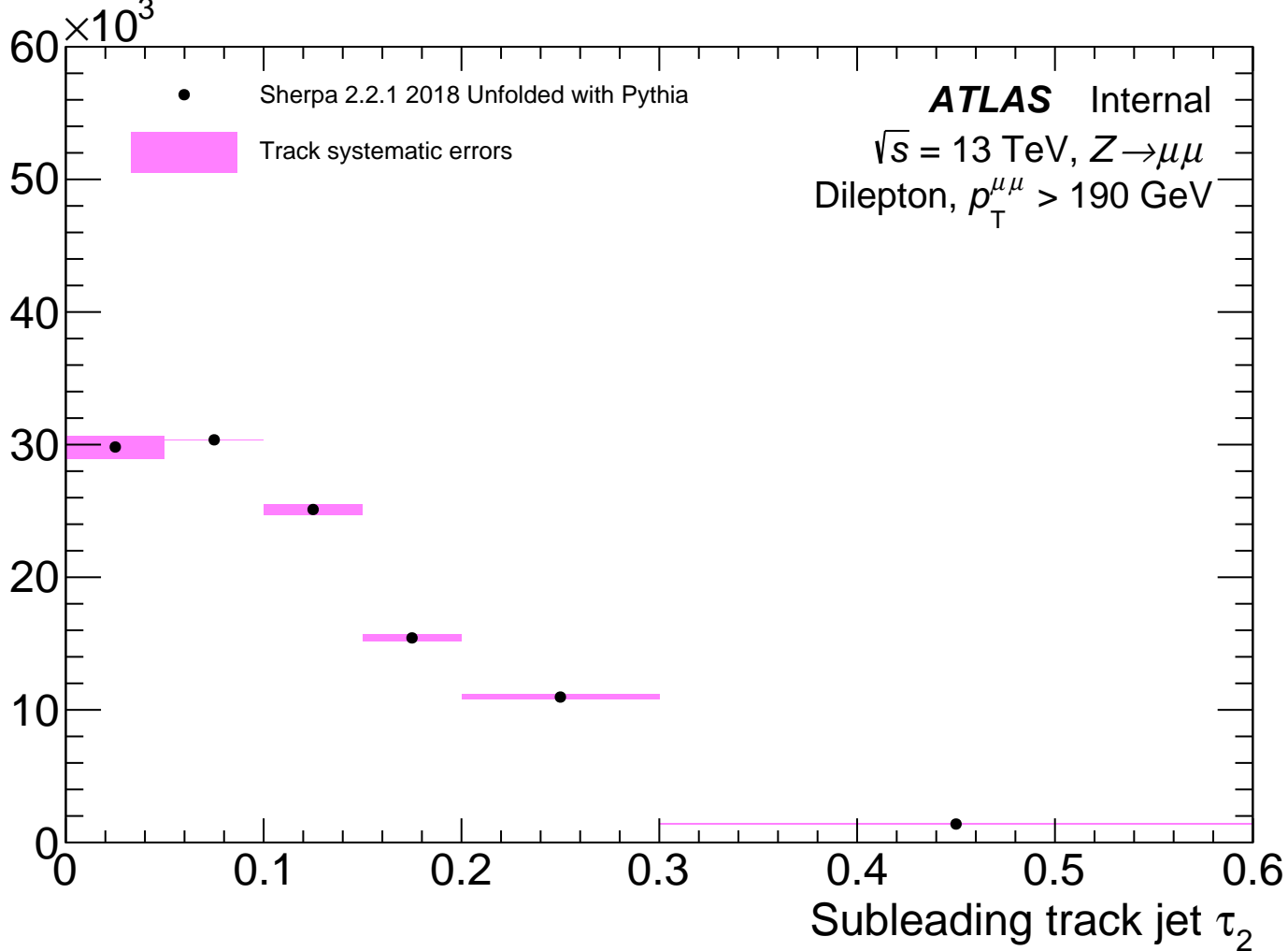
Events



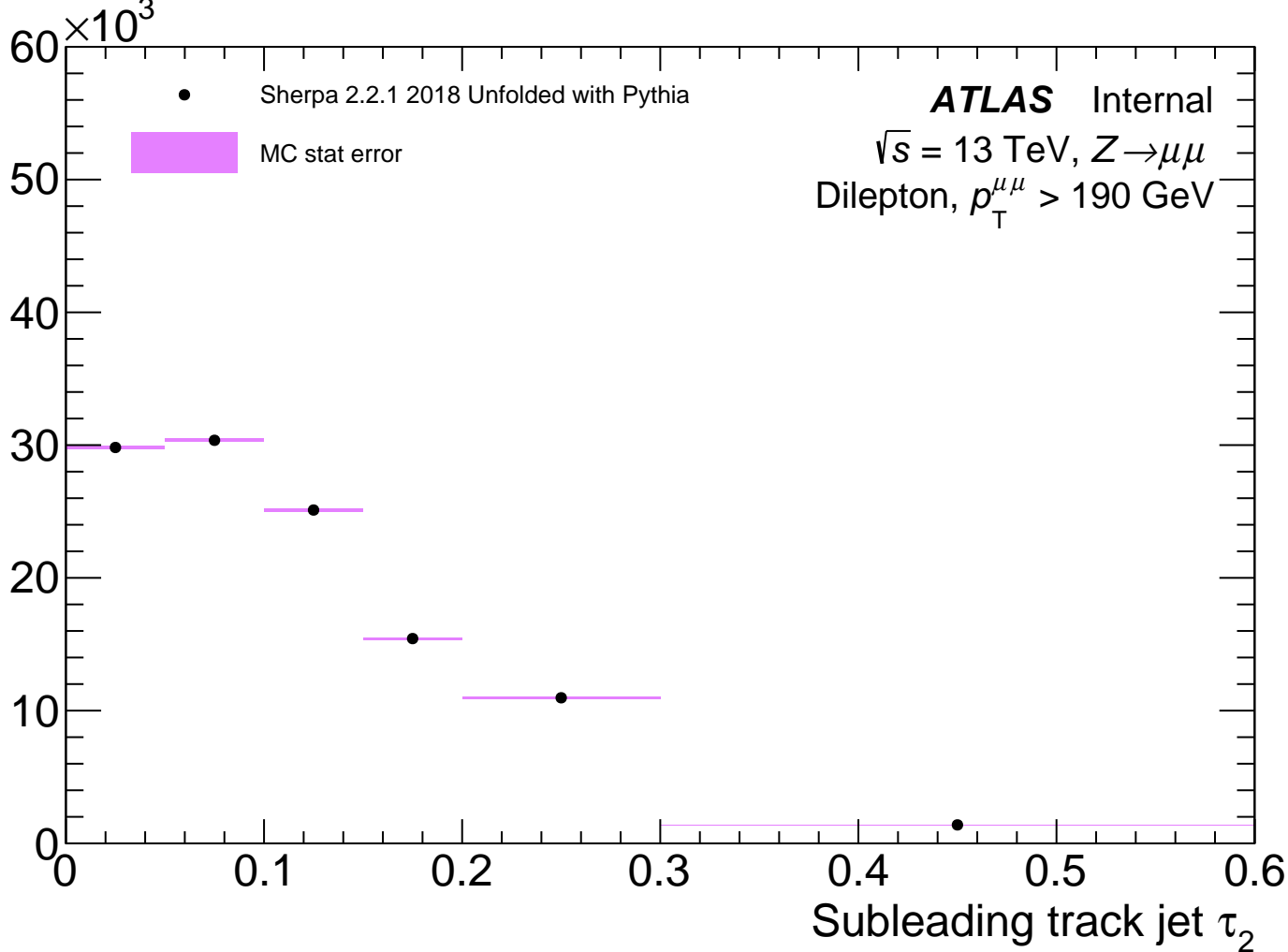
Events



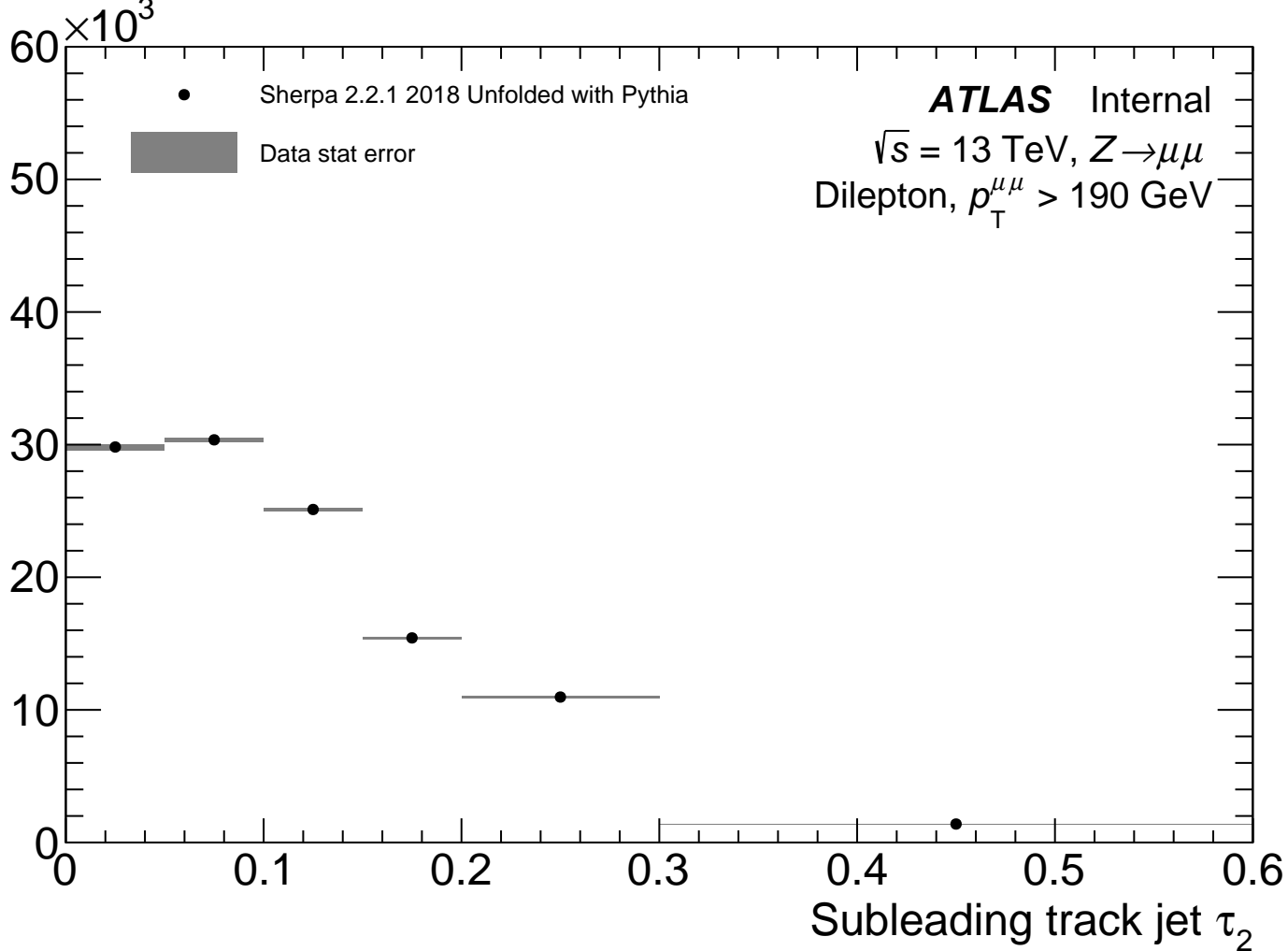
Events



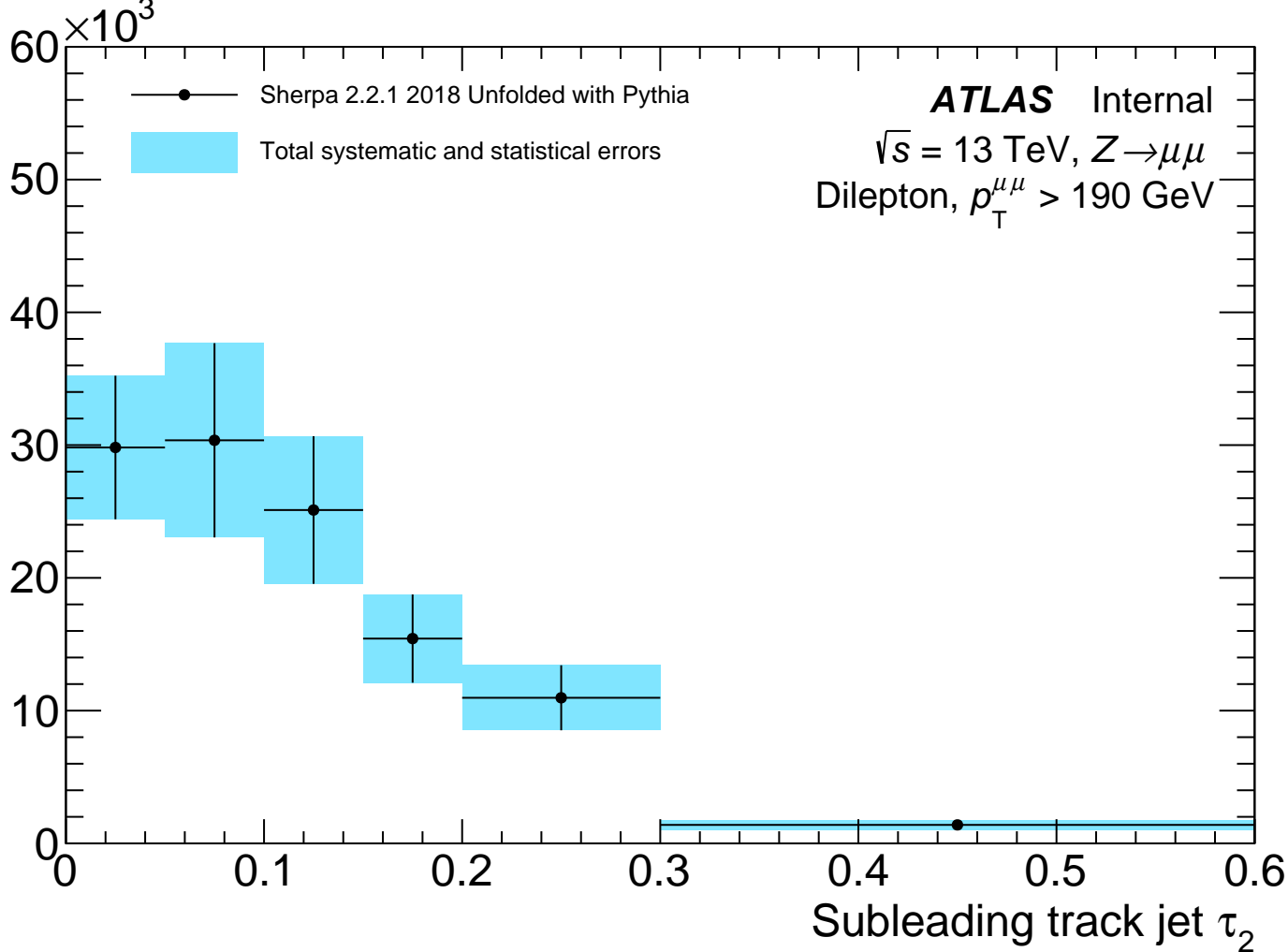
Events



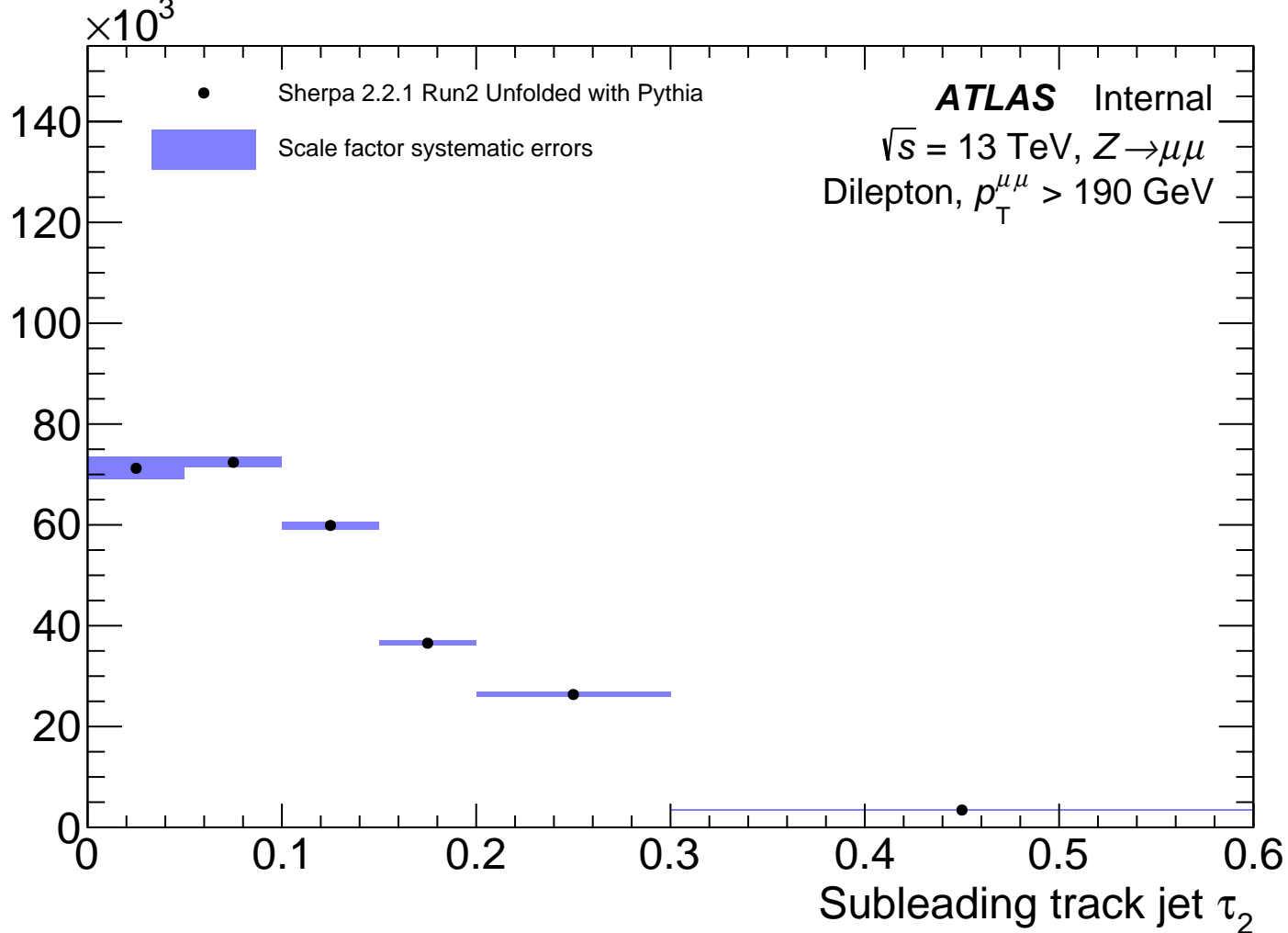
Events



Events

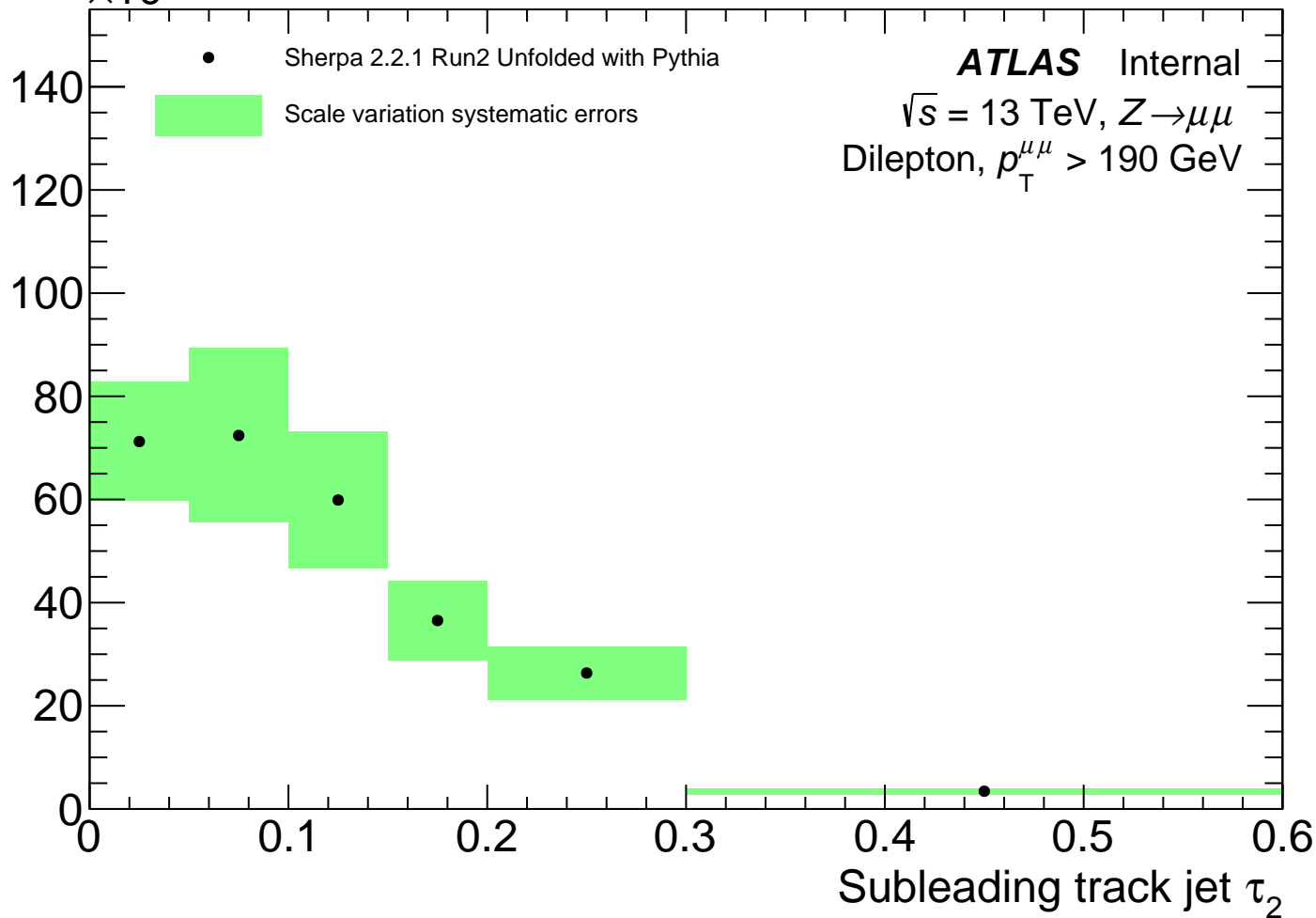


Events



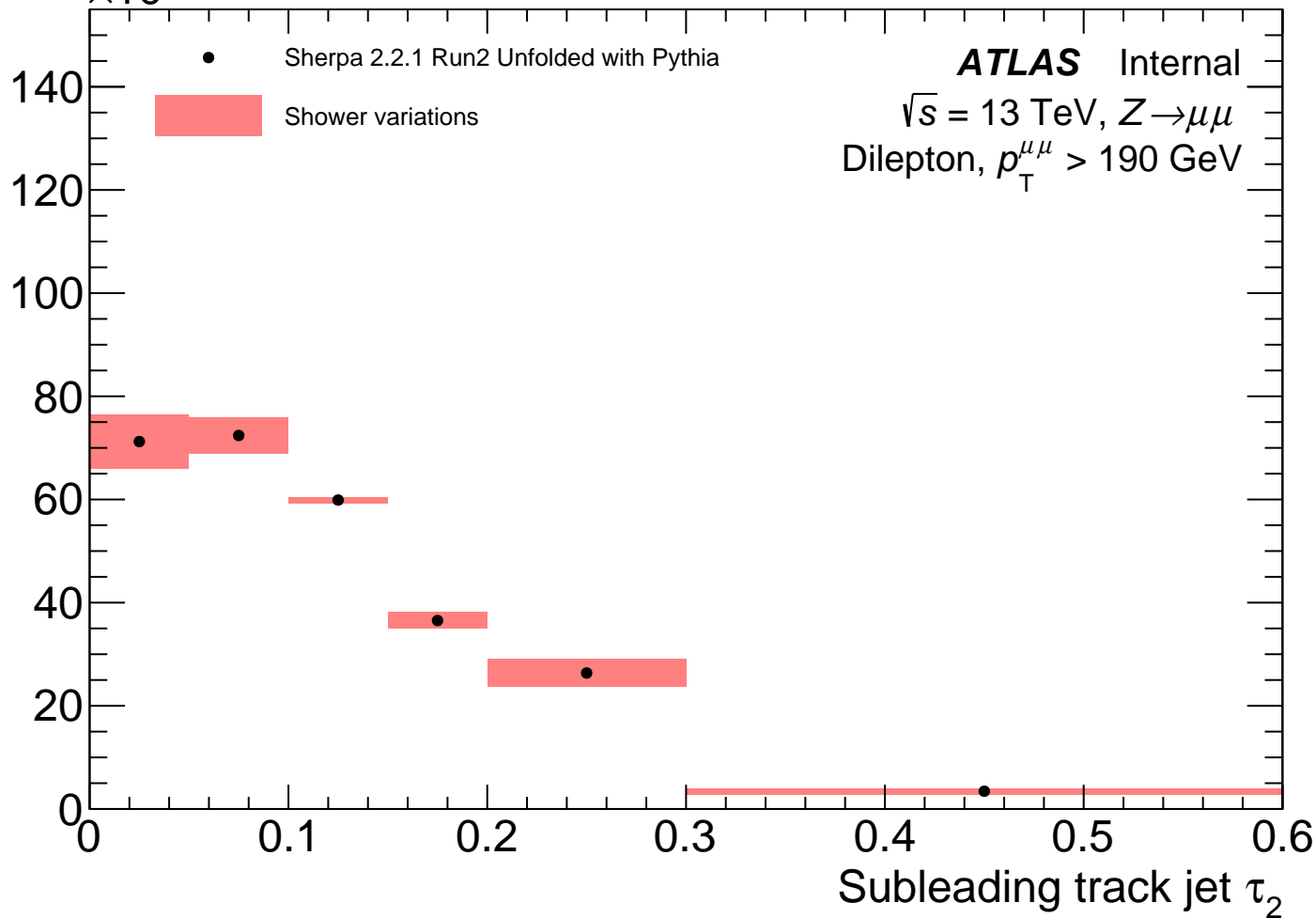
Events

$\times 10^3$



Events

$\times 10^3$



Events

$\times 10^3$

• Sherpa 2.2.1 Run2 Unfolded with Pythia

Track systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

140

120

100

80

60

40

20

0

0.1

0.2

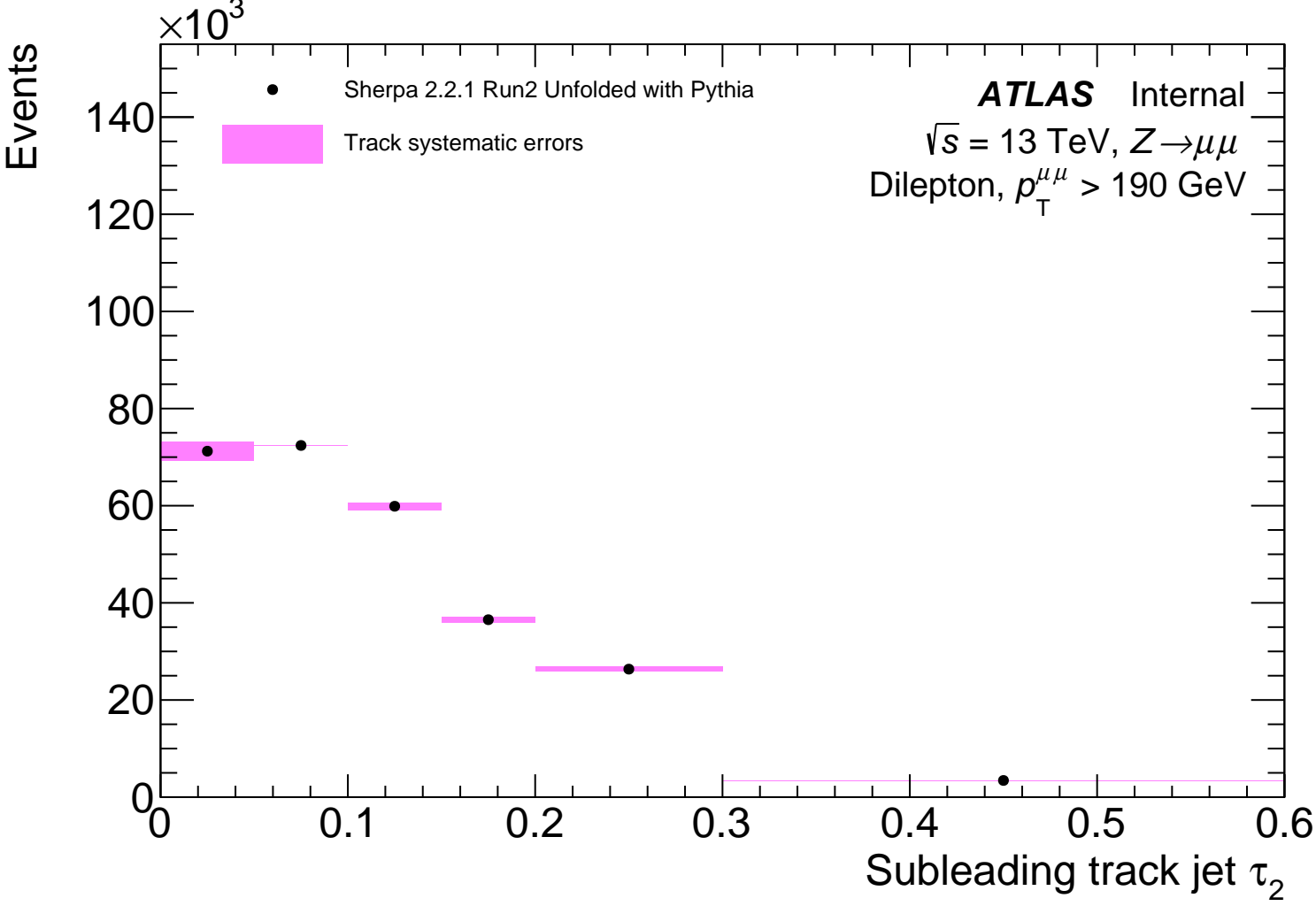
0.3

0.4

0.5

0.6

Subleading track jet τ_2



Events

$\times 10^3$

•

Sherpa 2.2.1 Run2 Unfolded with Pythia

MC stat error

ATLAS Internal

$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

140

120

100

80

60

40

20

0

0.1

0.2

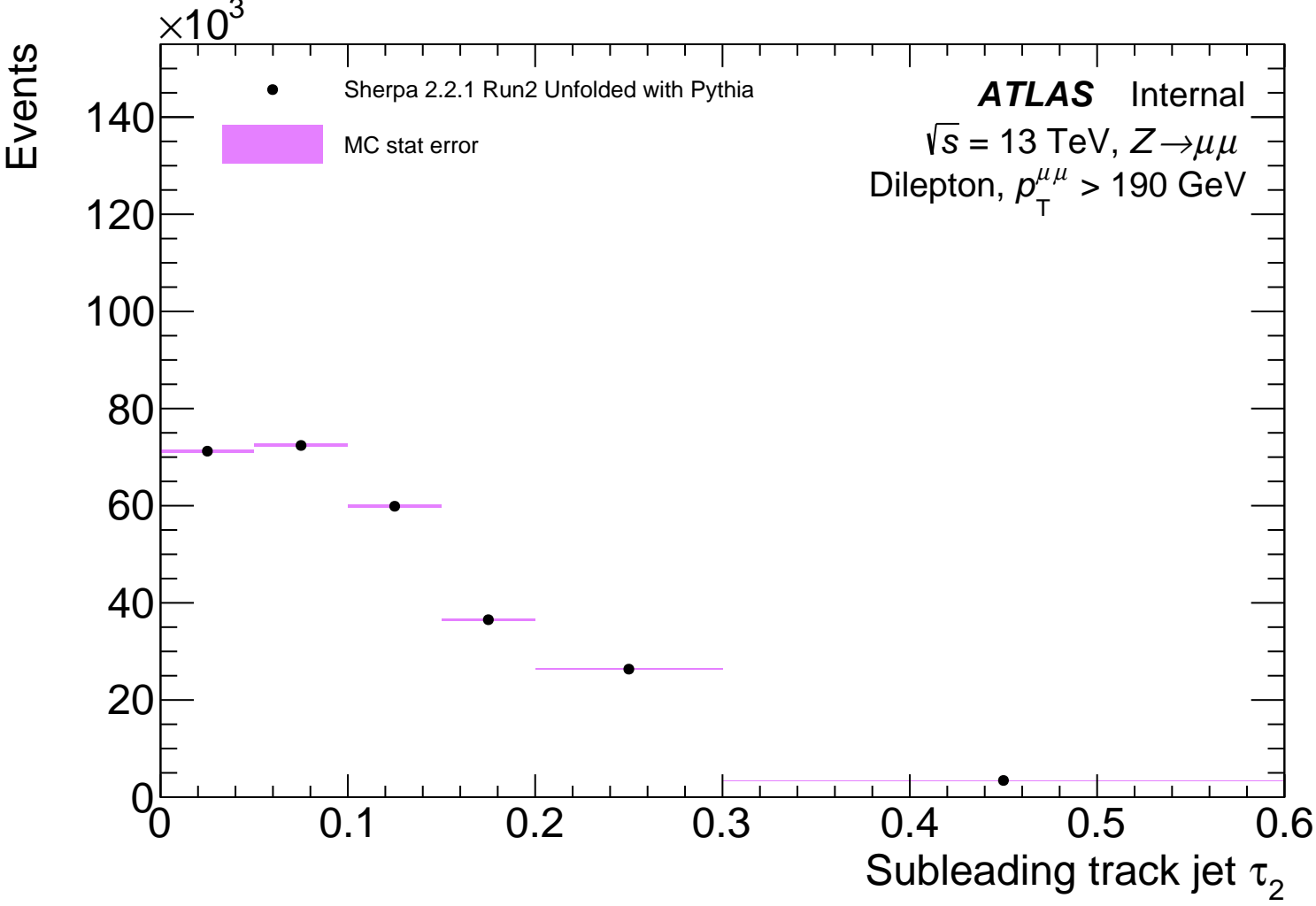
0.3

0.4

0.5

0.6

Subleading track jet τ_2



Events

$\times 10^3$

•

Sherpa 2.2.1 Run2 Unfolded with Pythia



Data stat error

ATLAS Internal

$\sqrt{s} = 13$ TeV, $Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190$ GeV

140

120

100

80

60

40

20

0

0.1

0.2

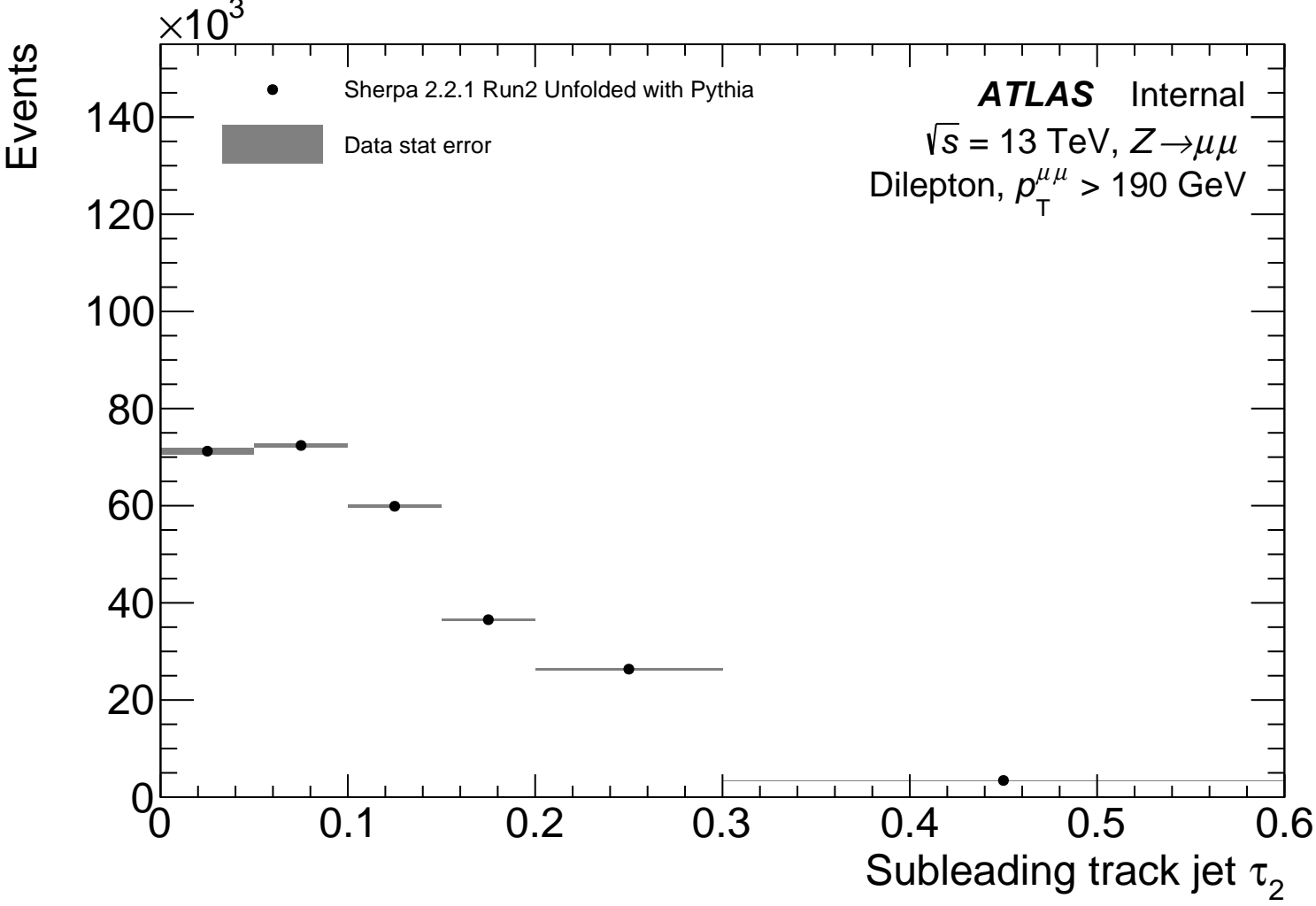
0.3

0.4

0.5

0.6

Subleading track jet τ_2



Events

 $\times 10^3$

—●— Sherpa 2.2.1 Run2 Unfolded with Pythia

Total systematic and statistical errors

ATLAS Internal $\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$ Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

140

120

100

80

60

40

20

0

0.1

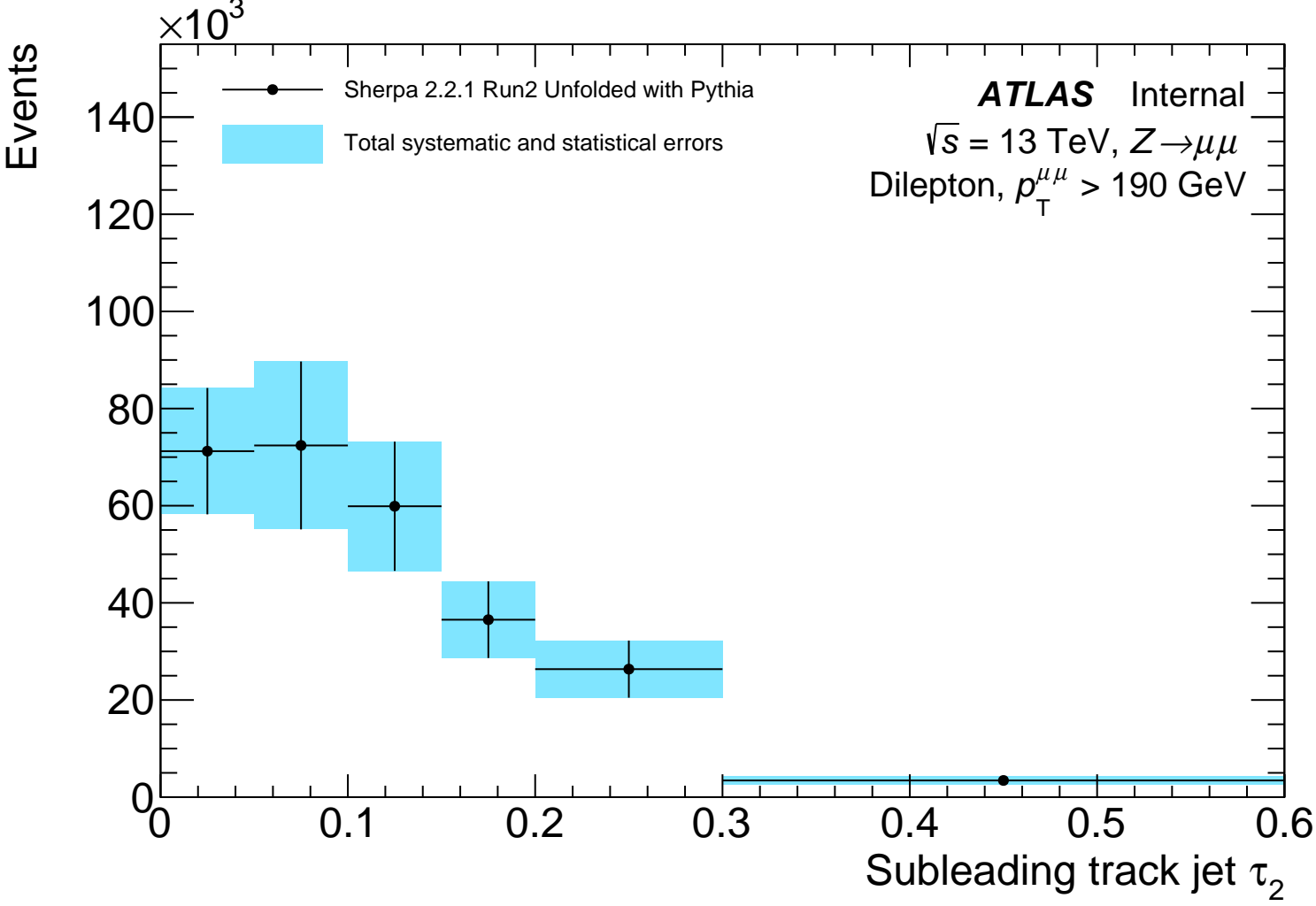
0.2

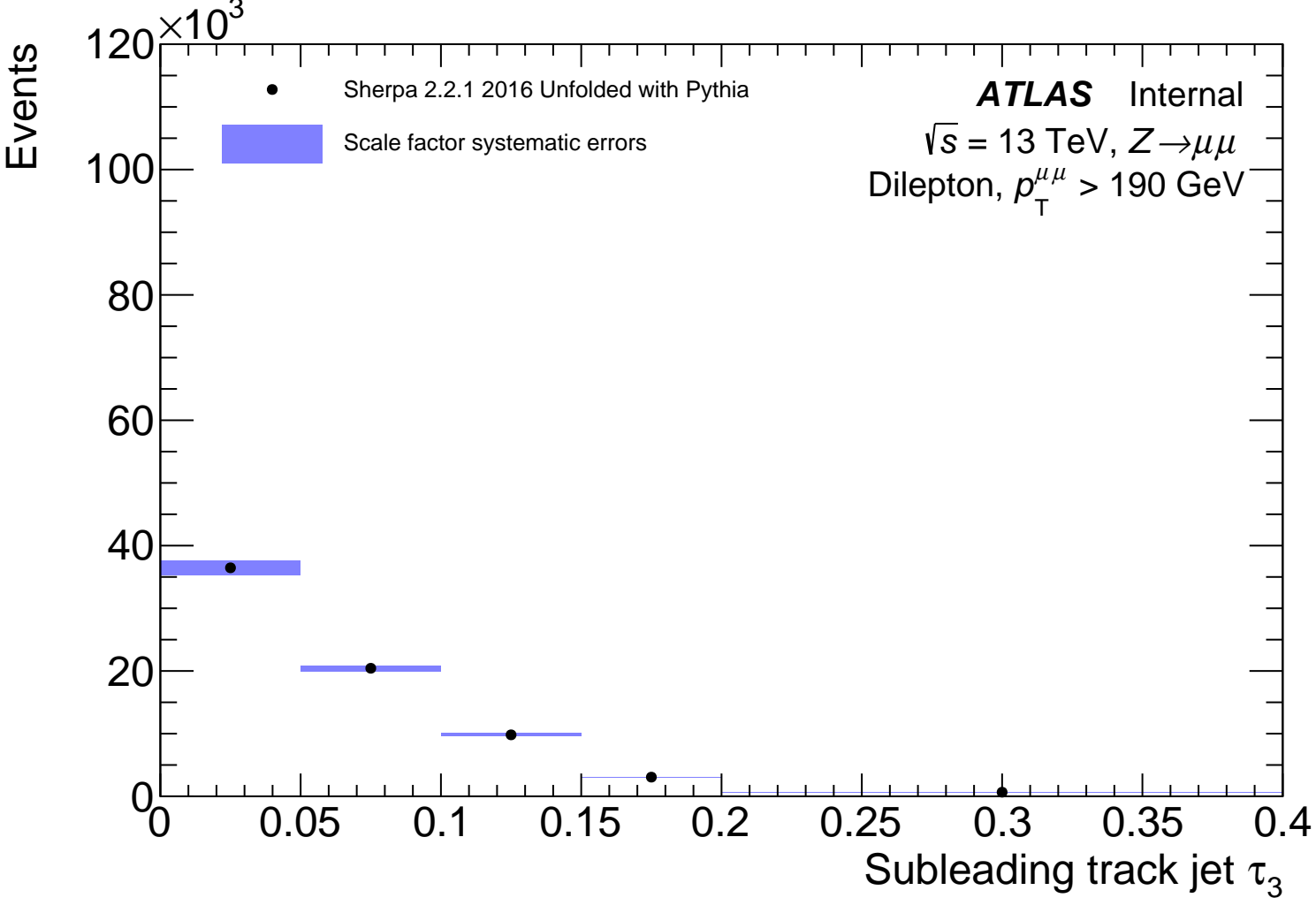
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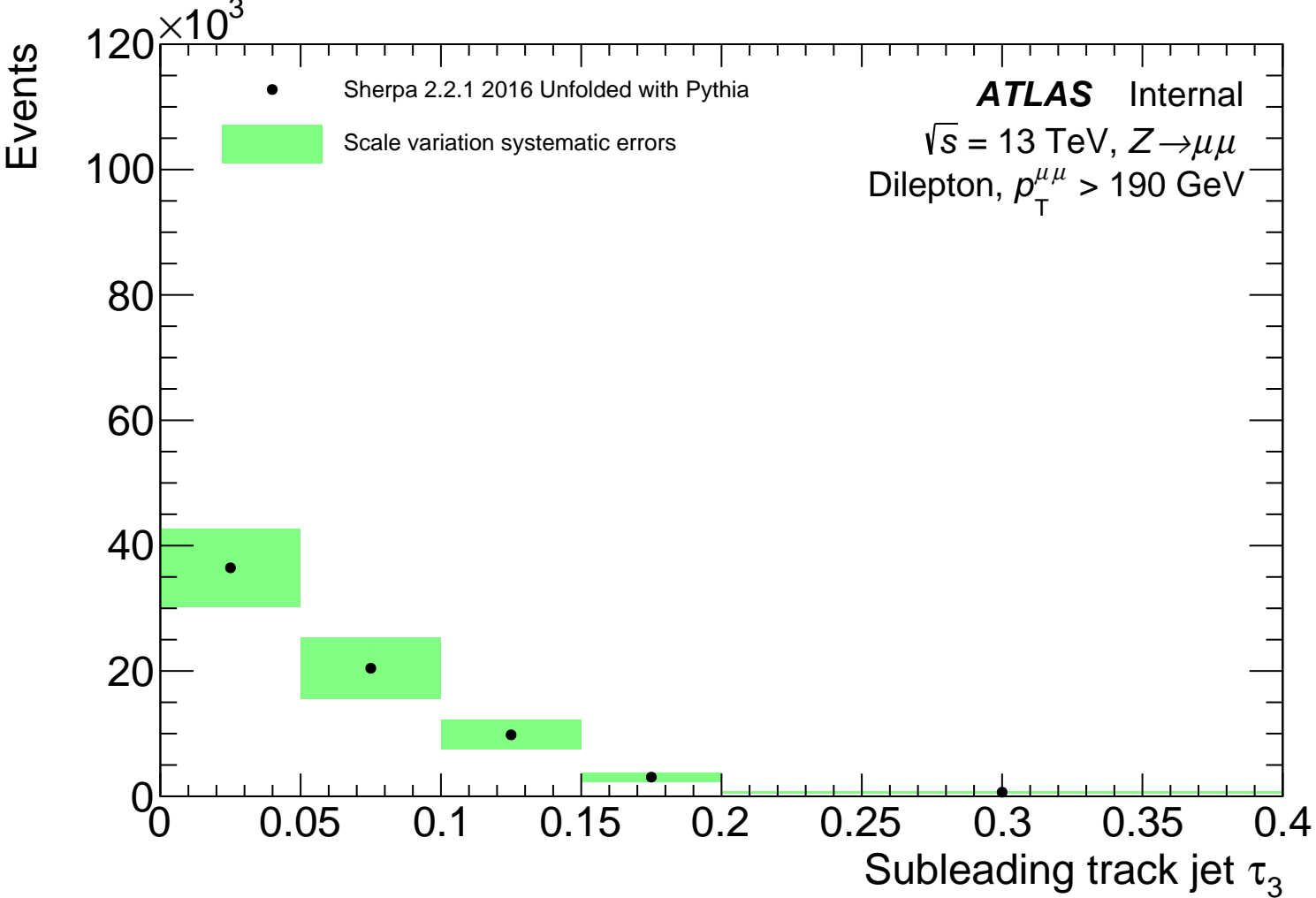
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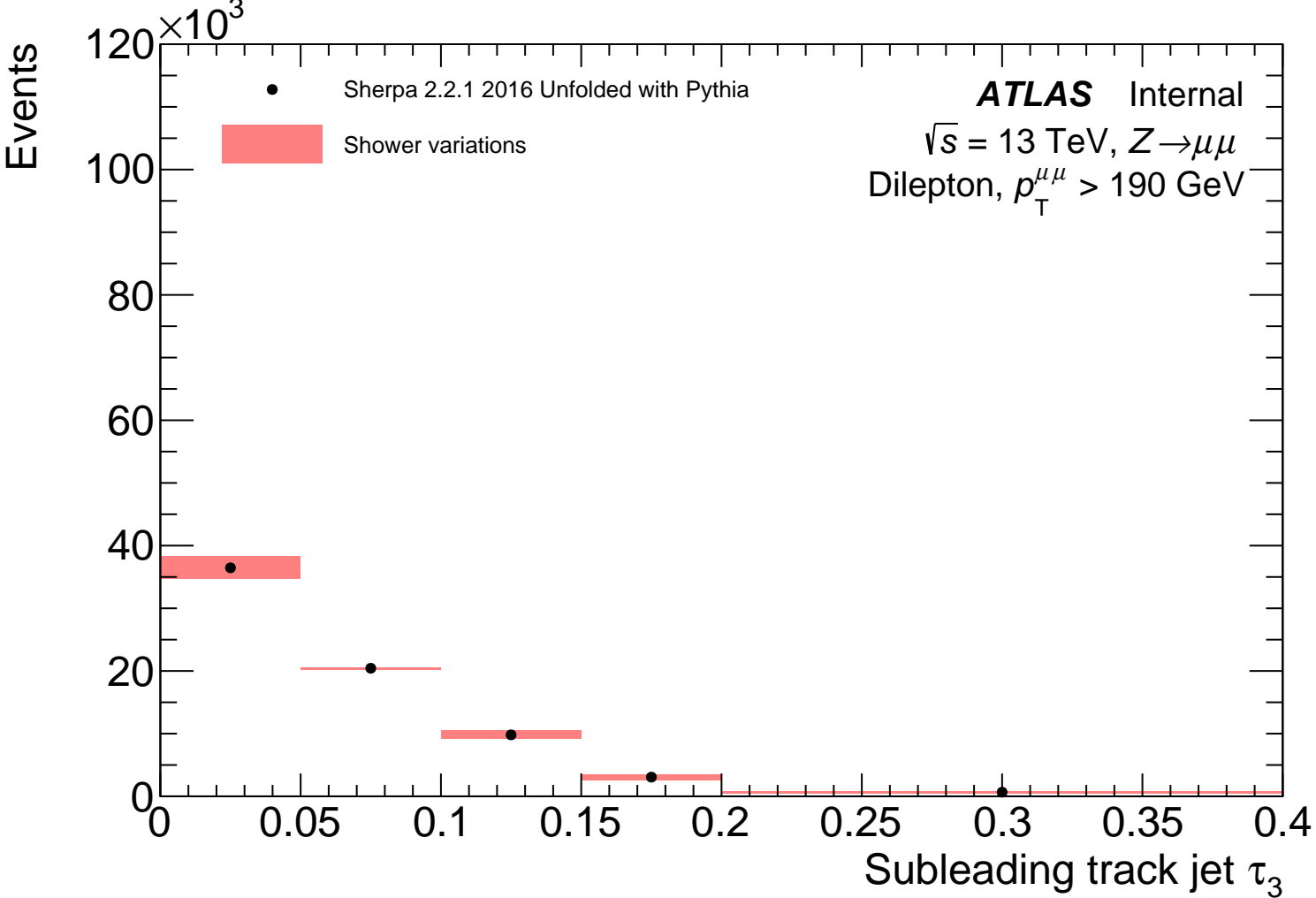
0.5

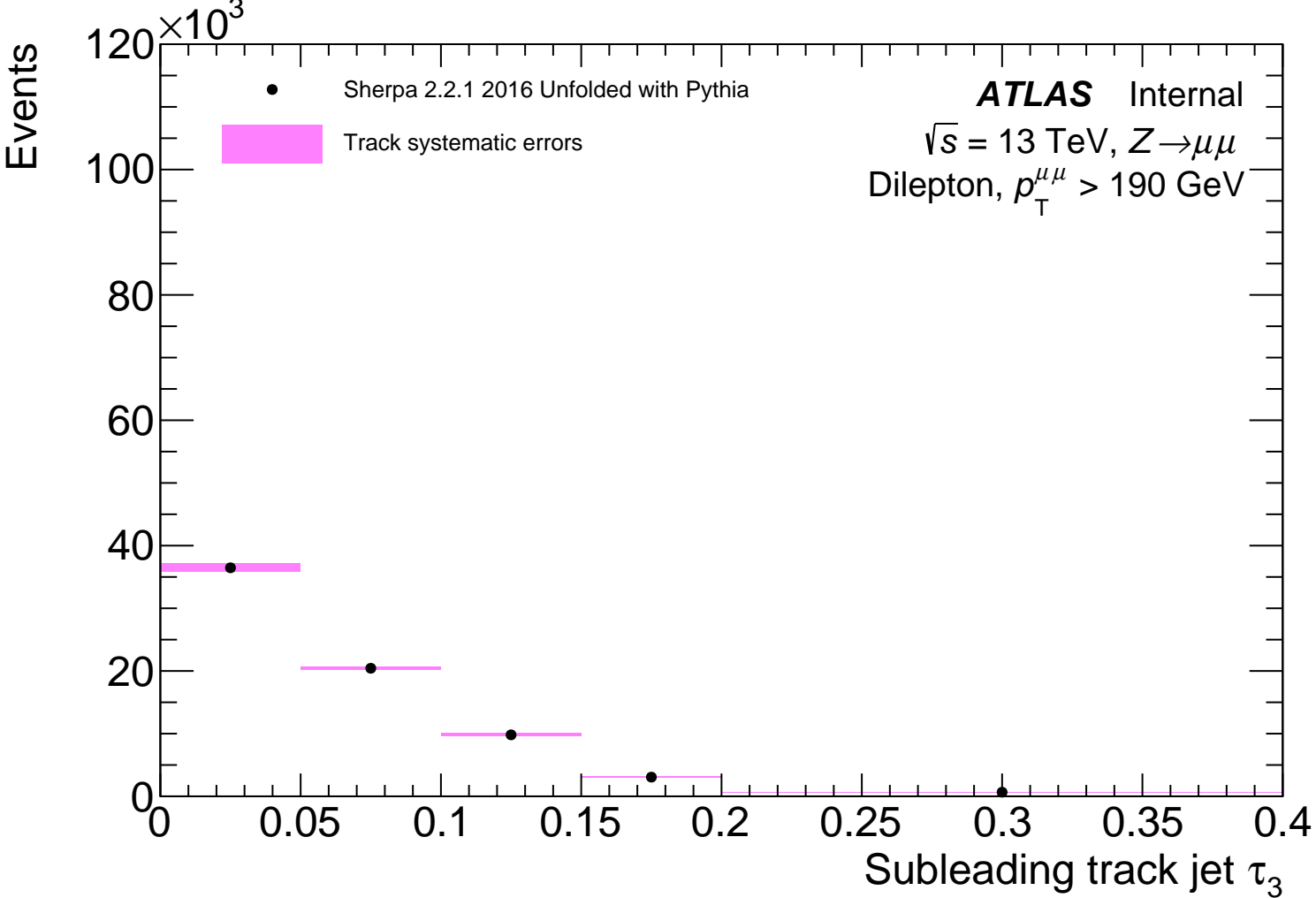
0.6

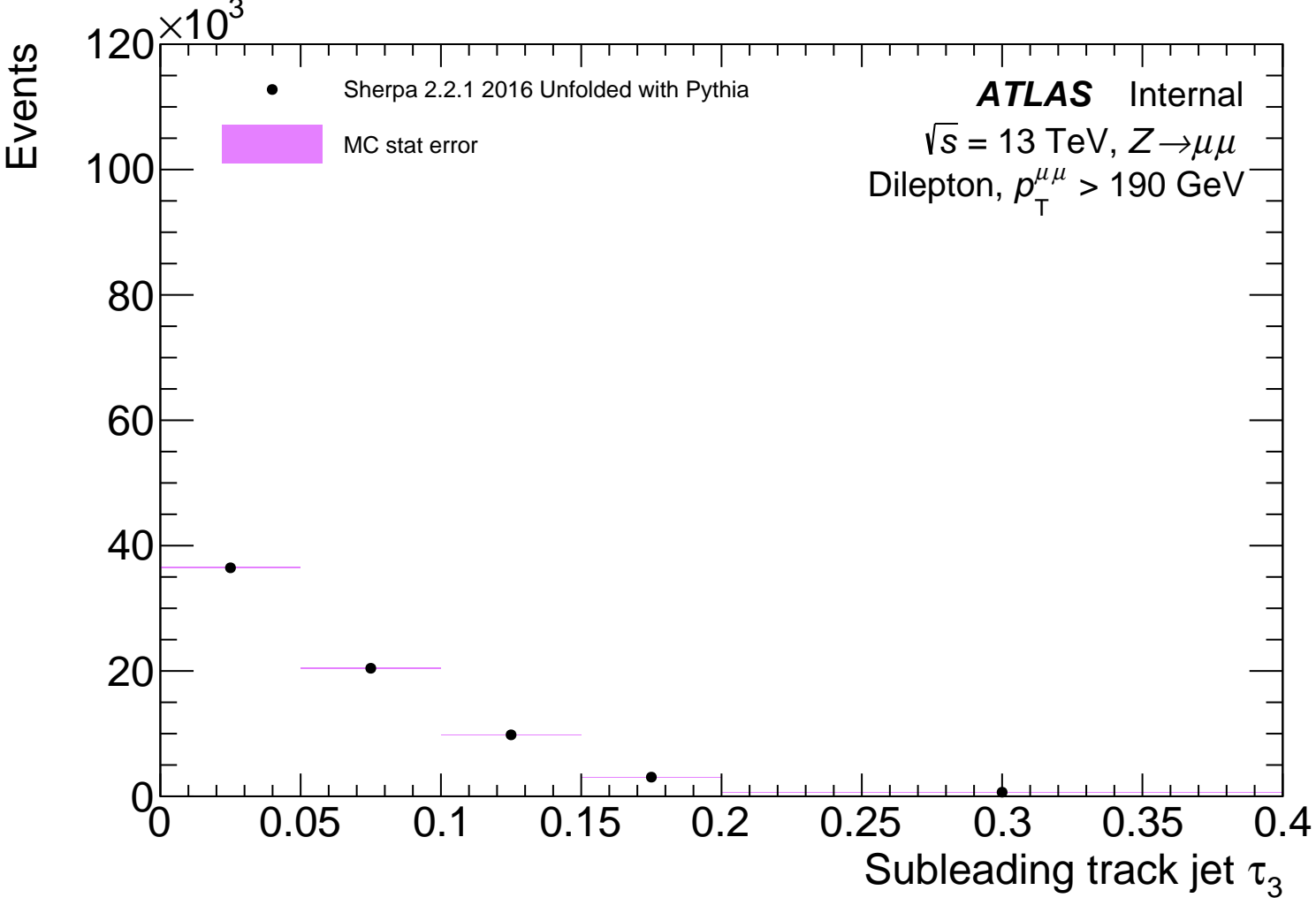
Subleading track jet τ_2 

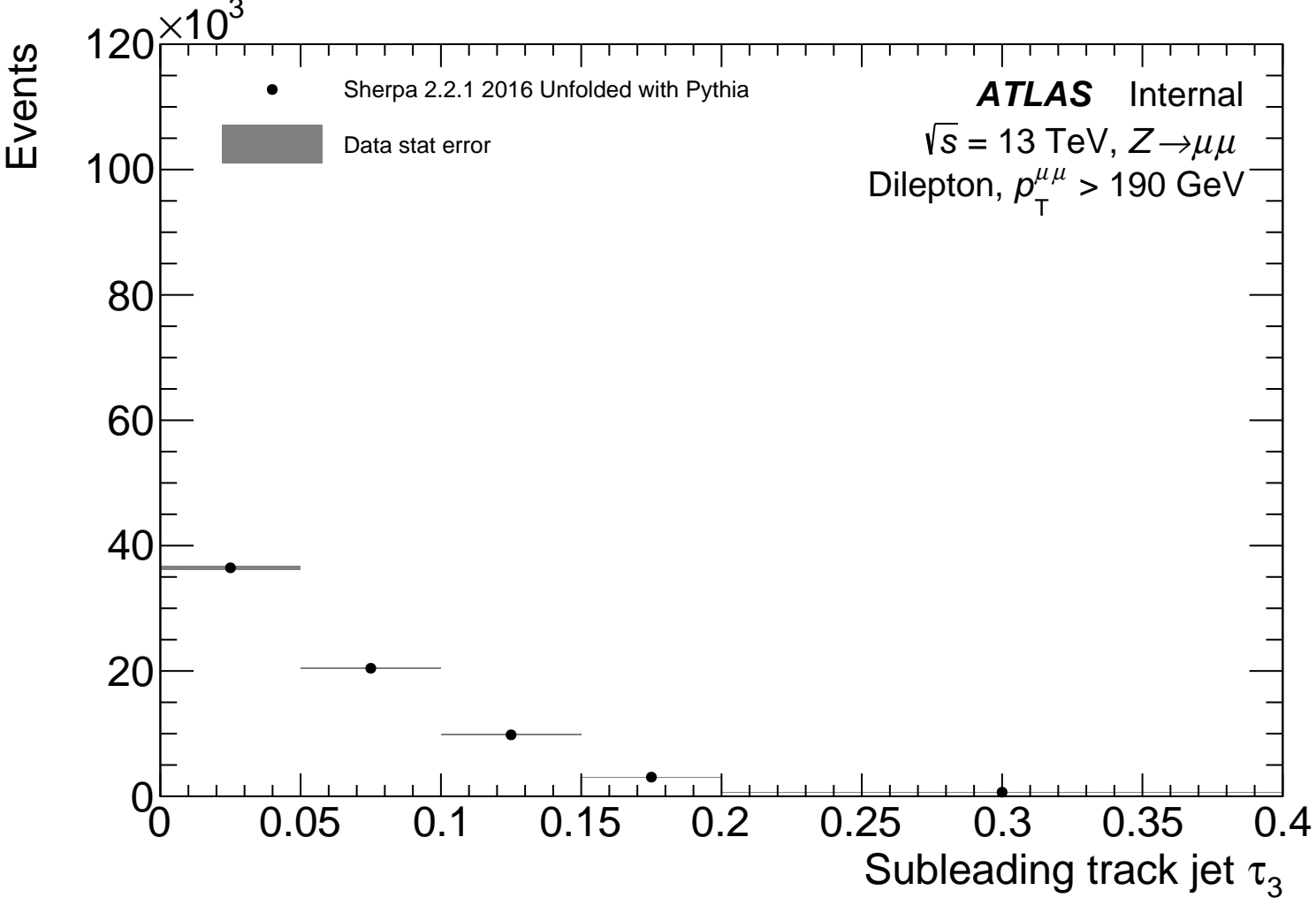


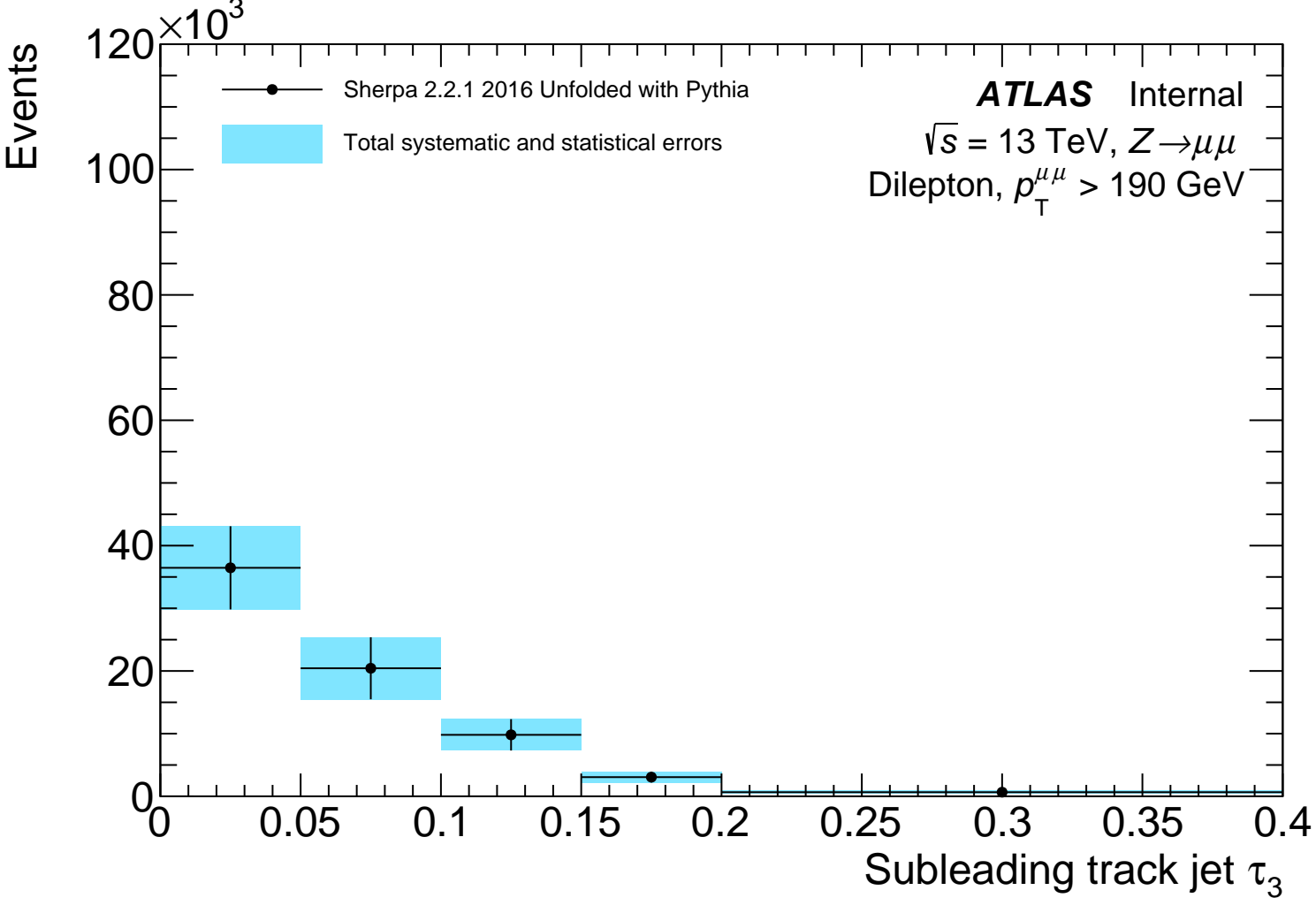


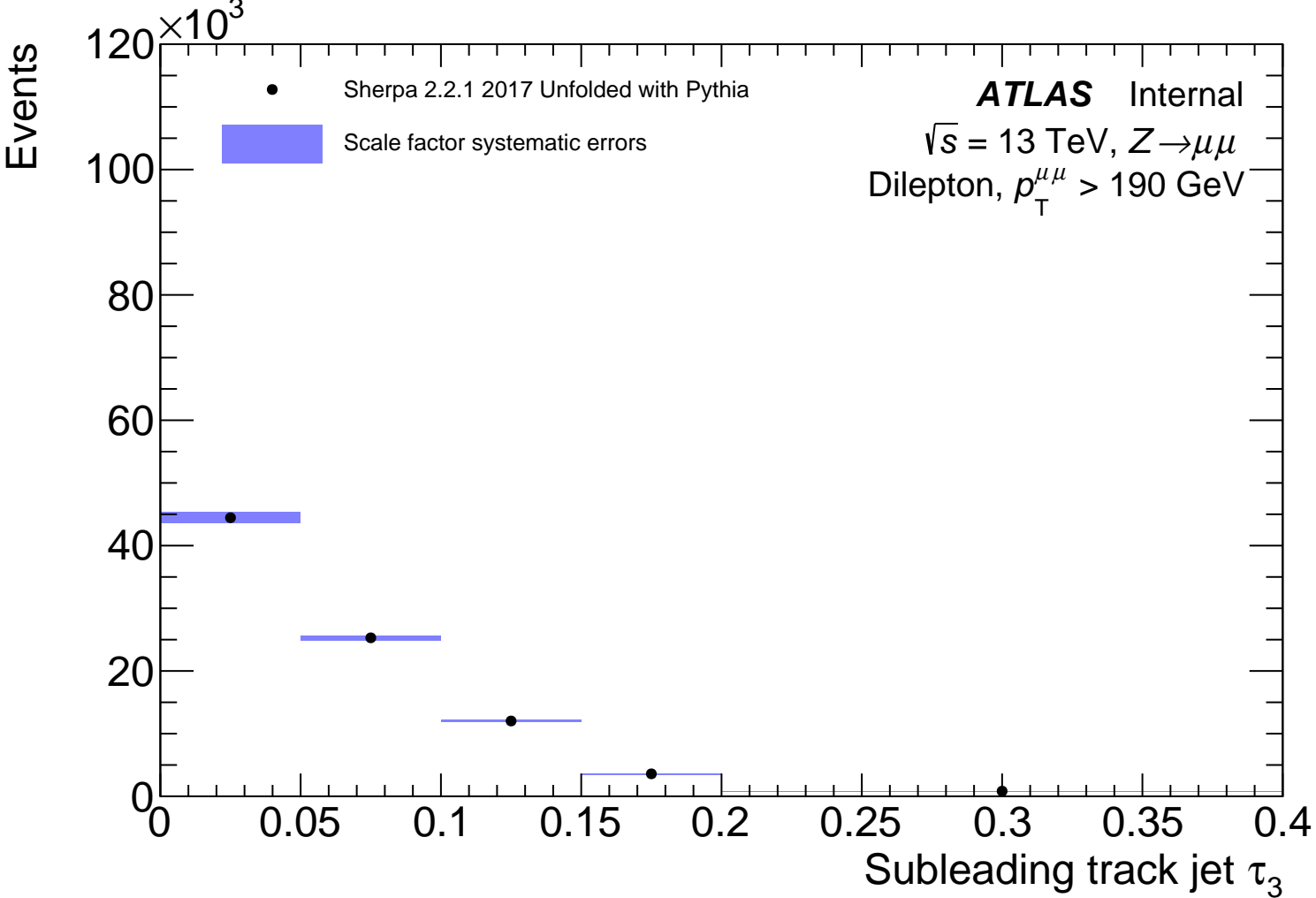


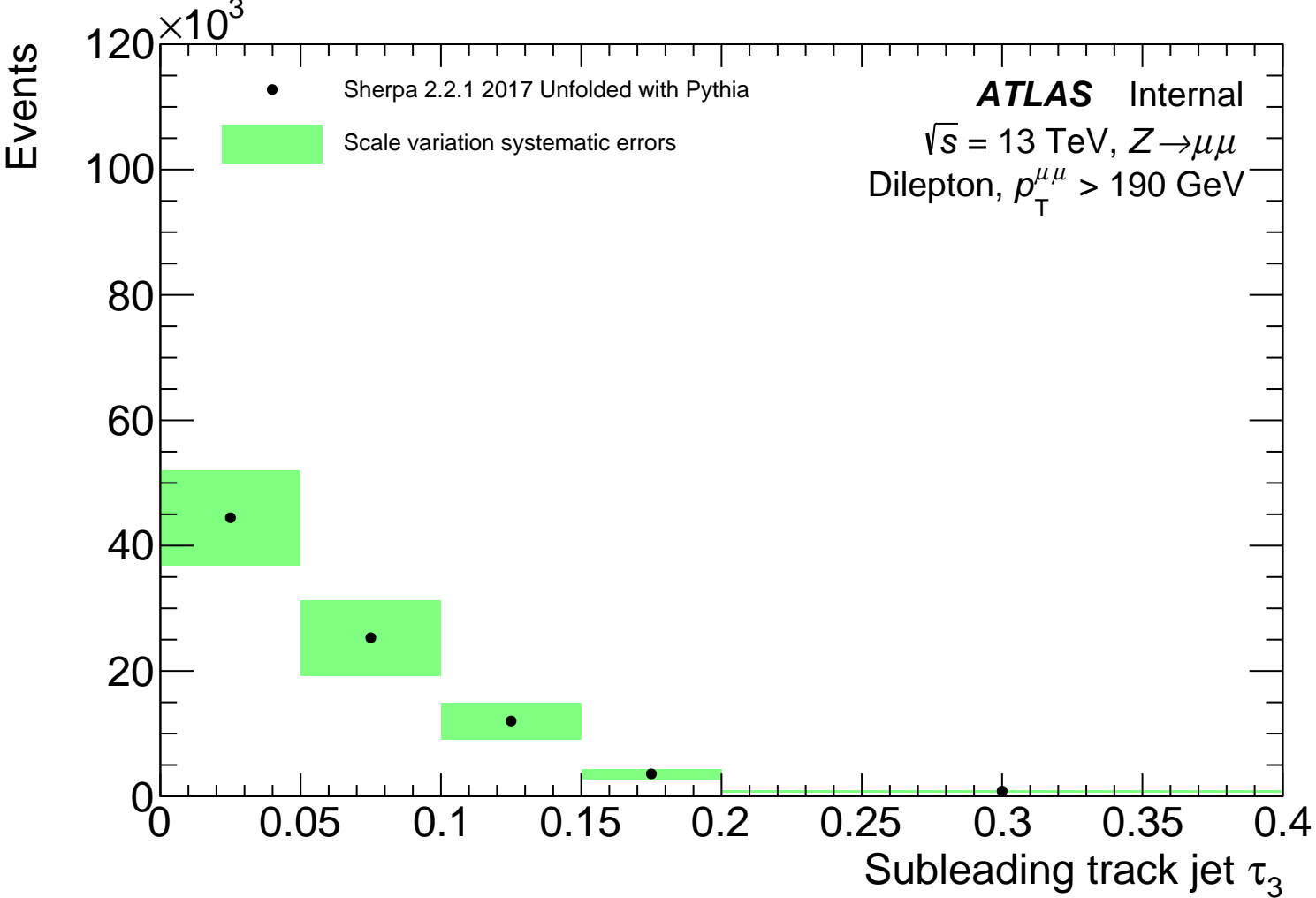


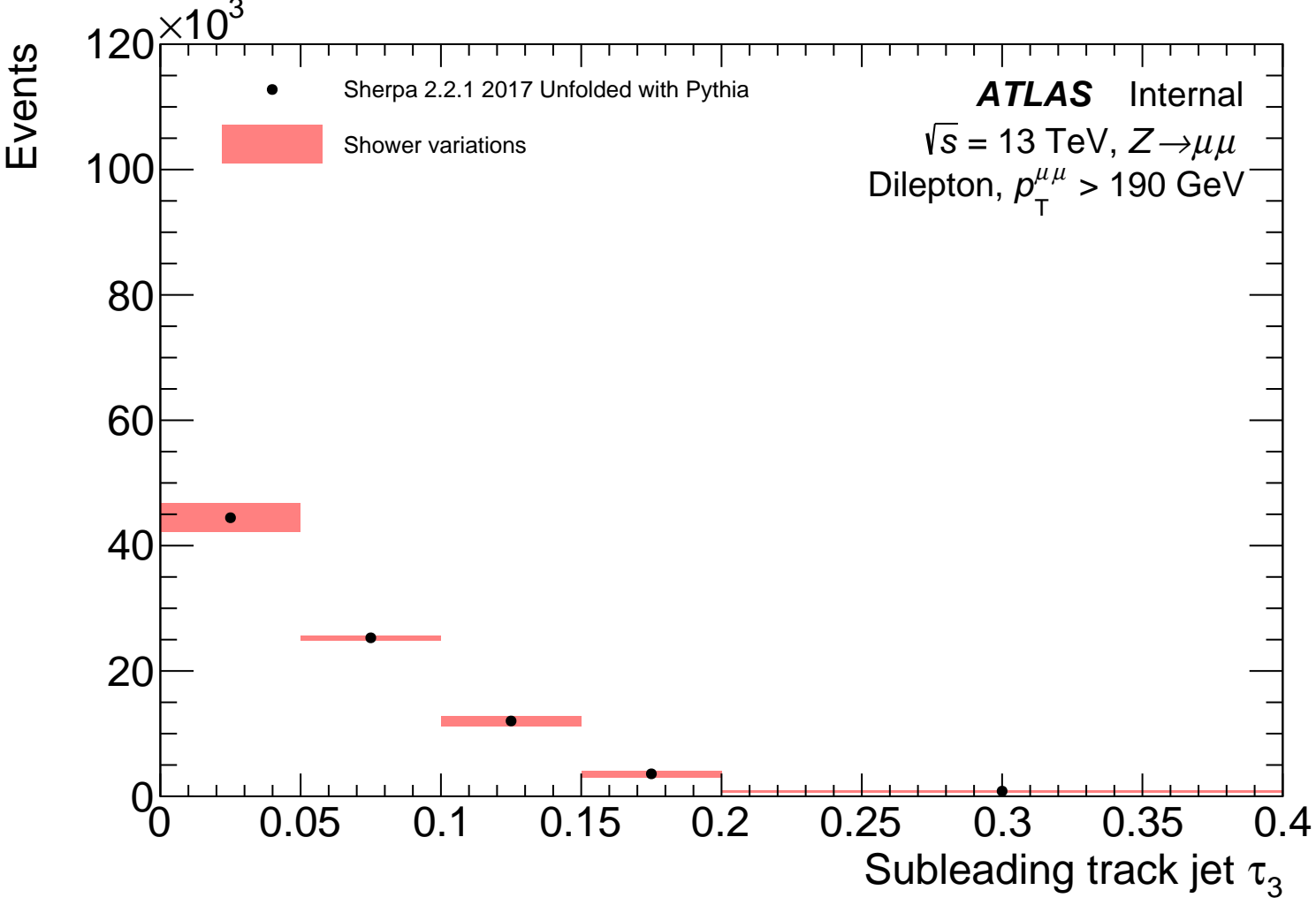


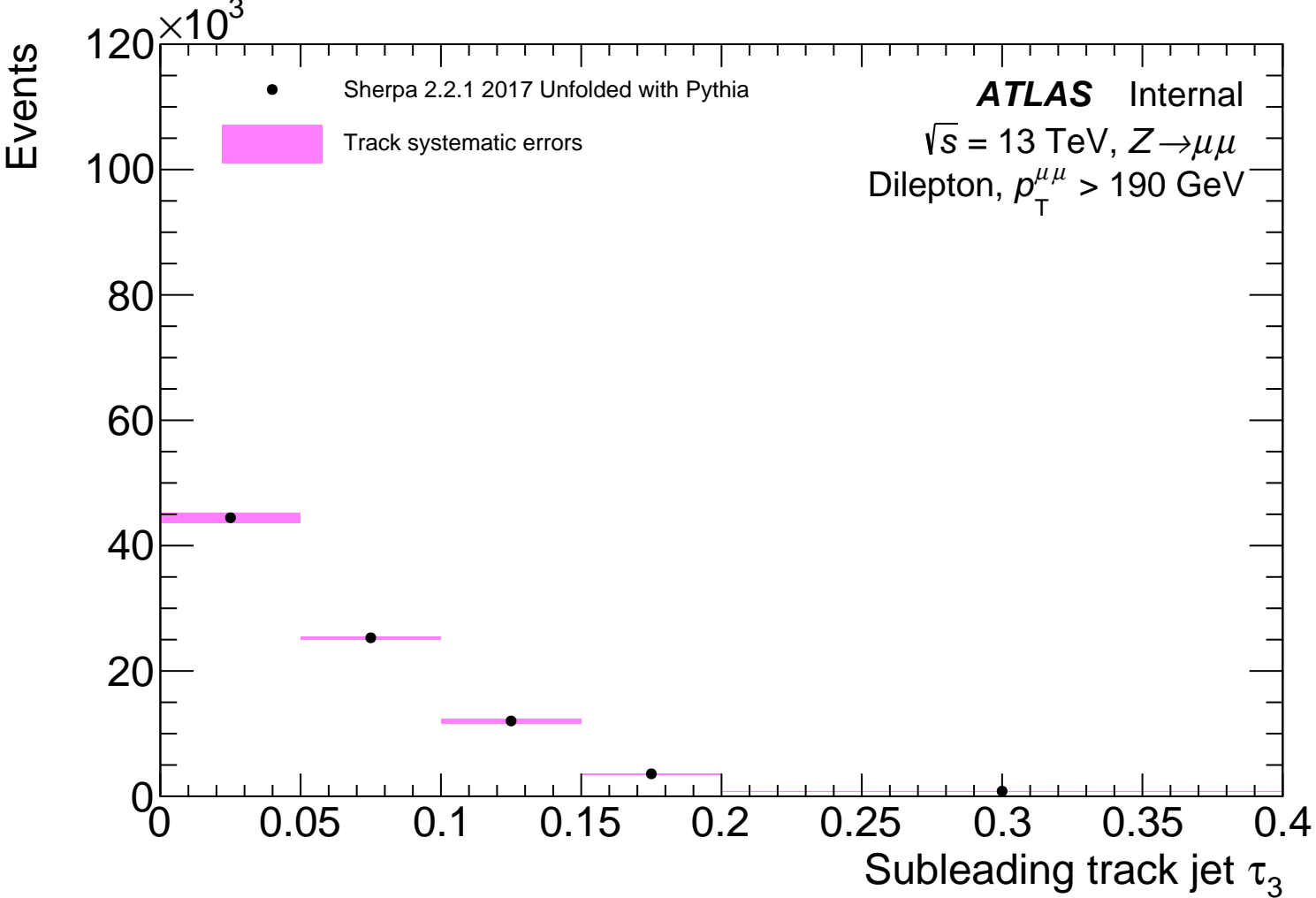




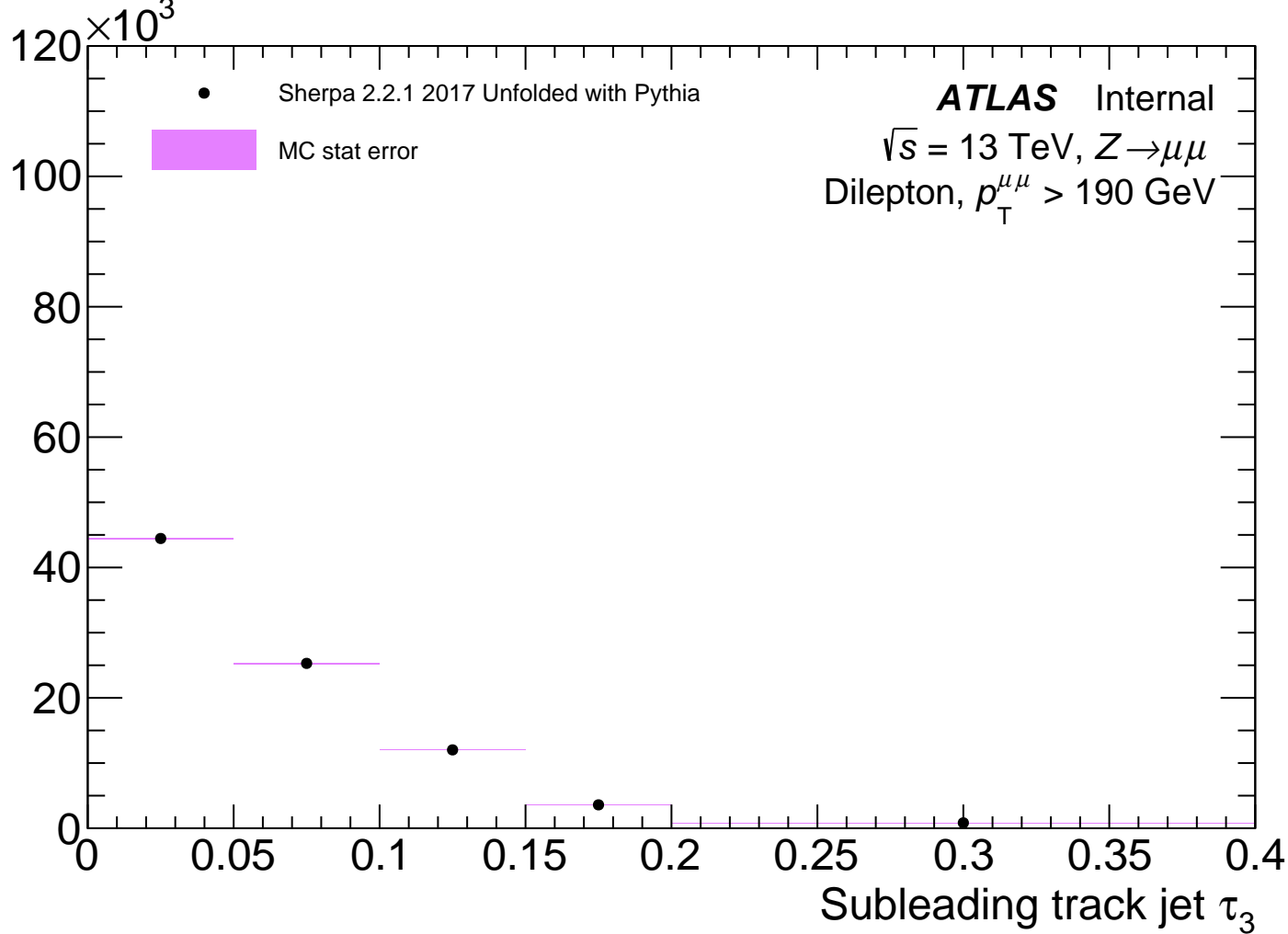


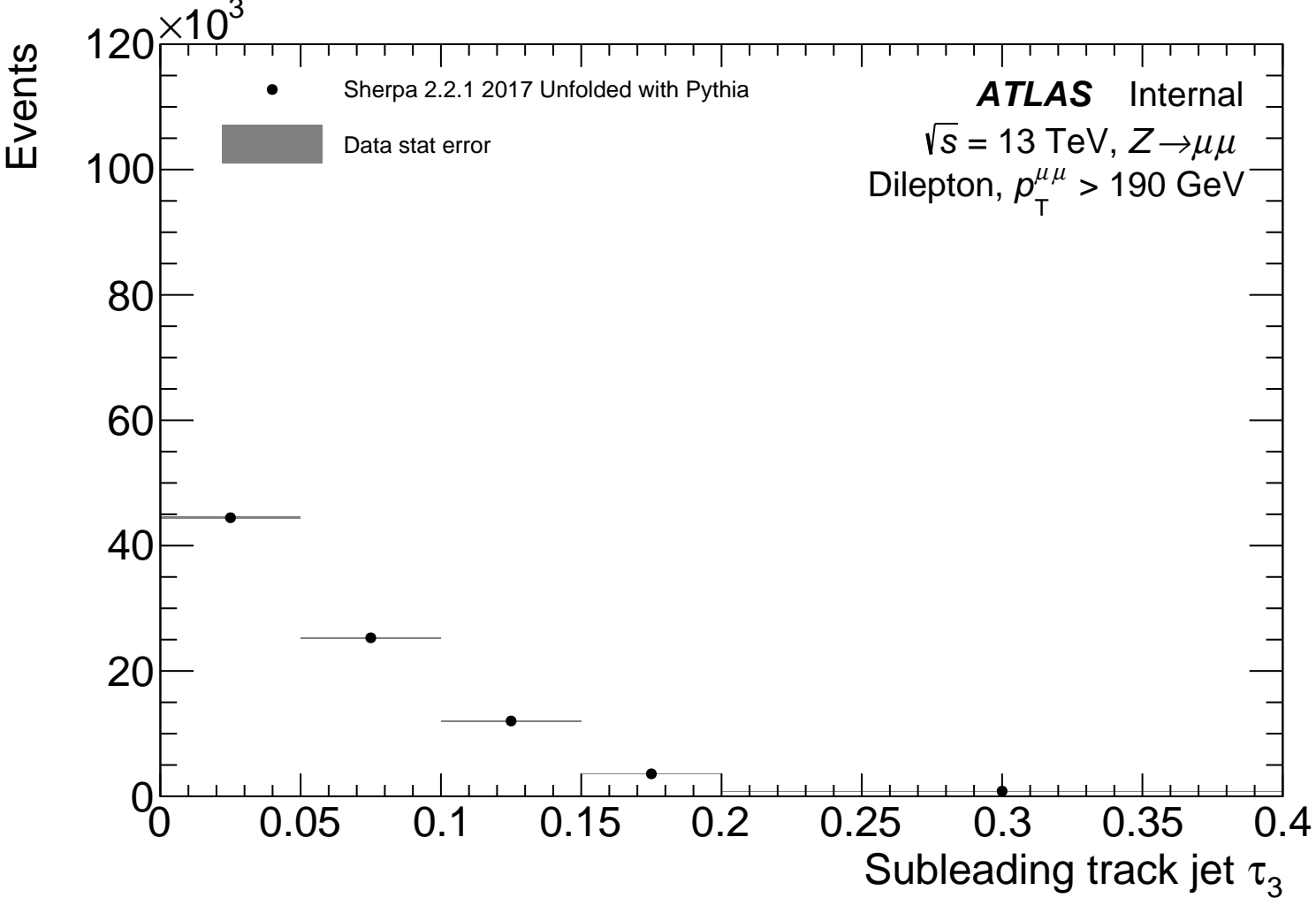


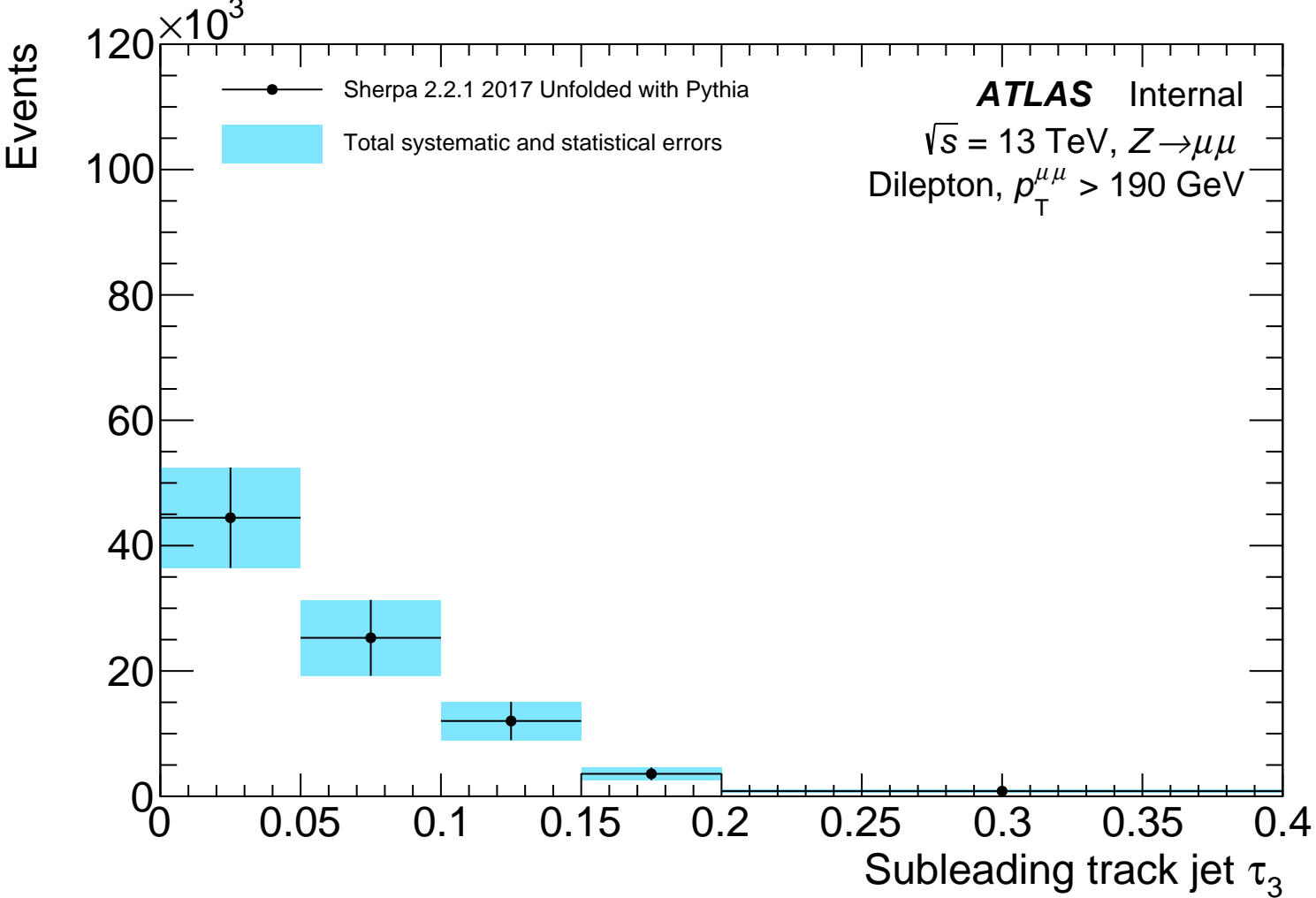


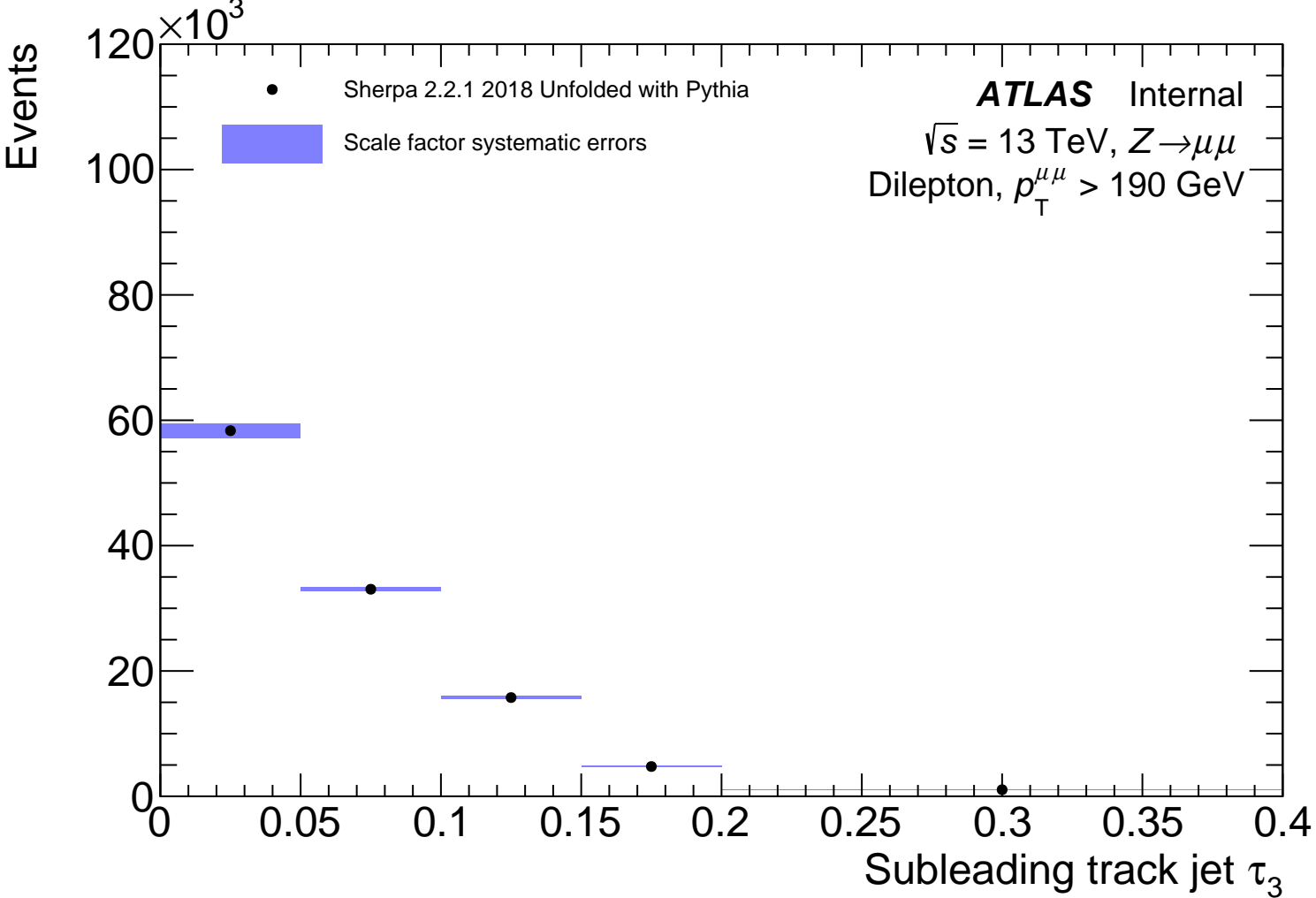


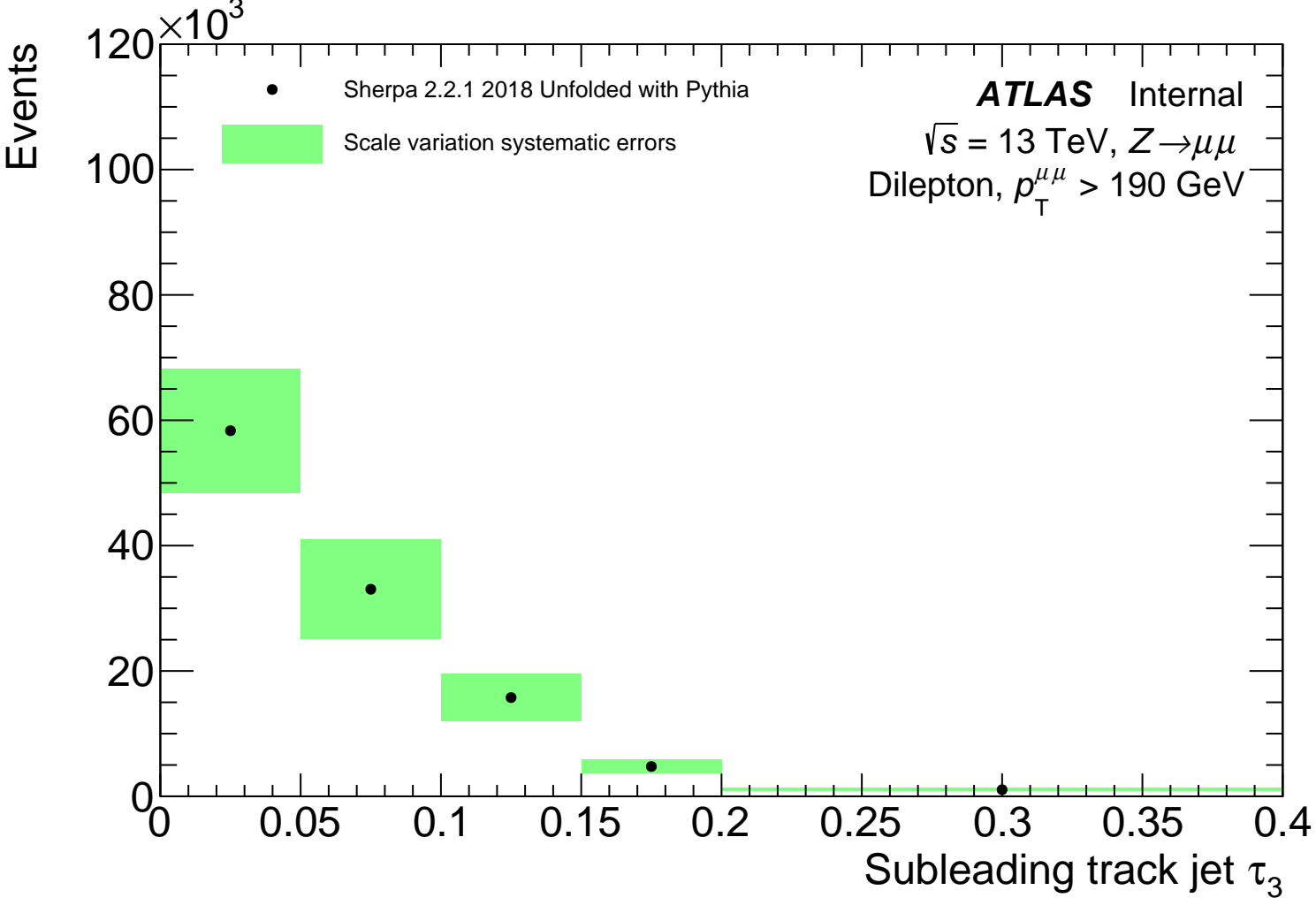
Events



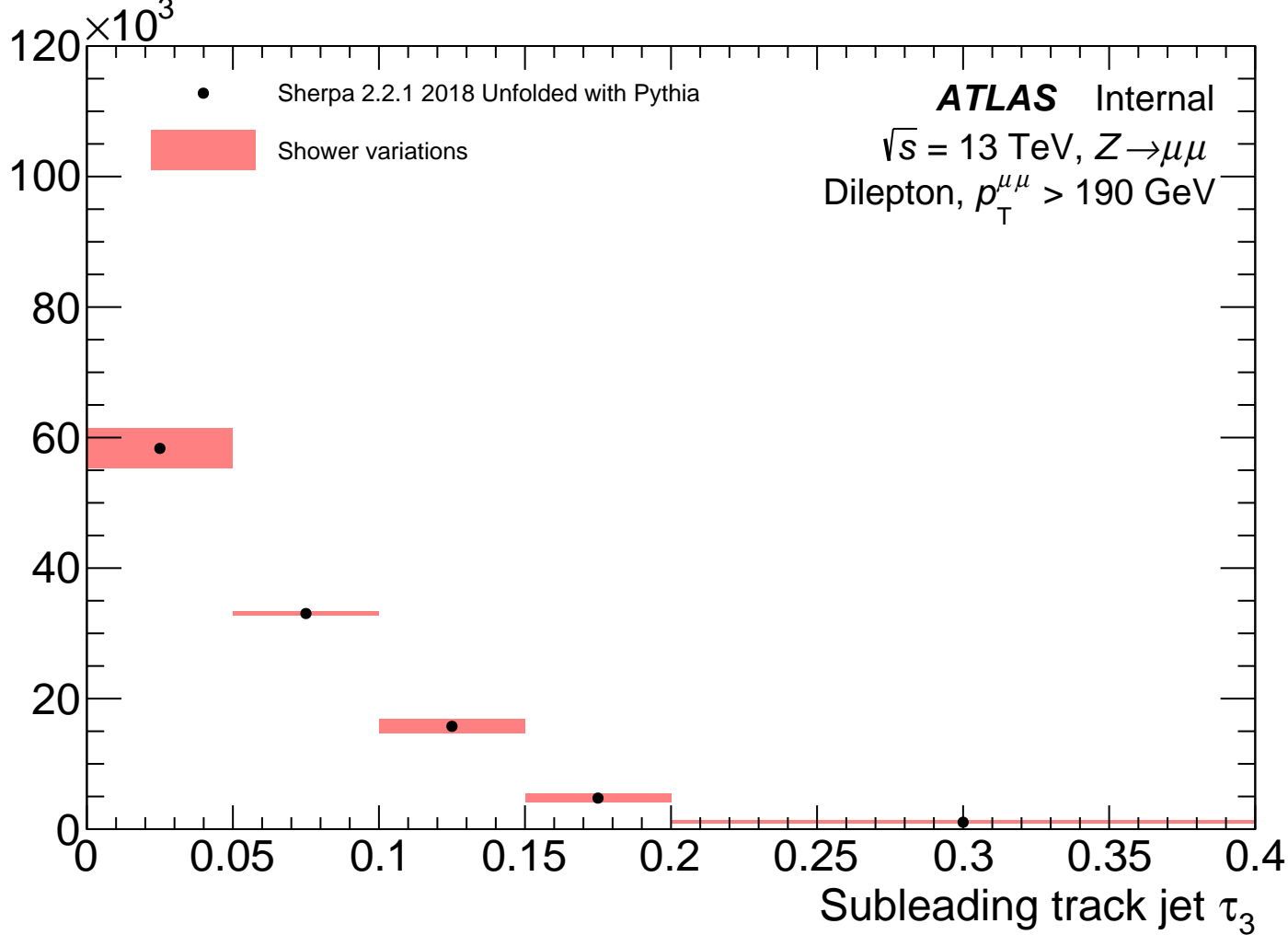


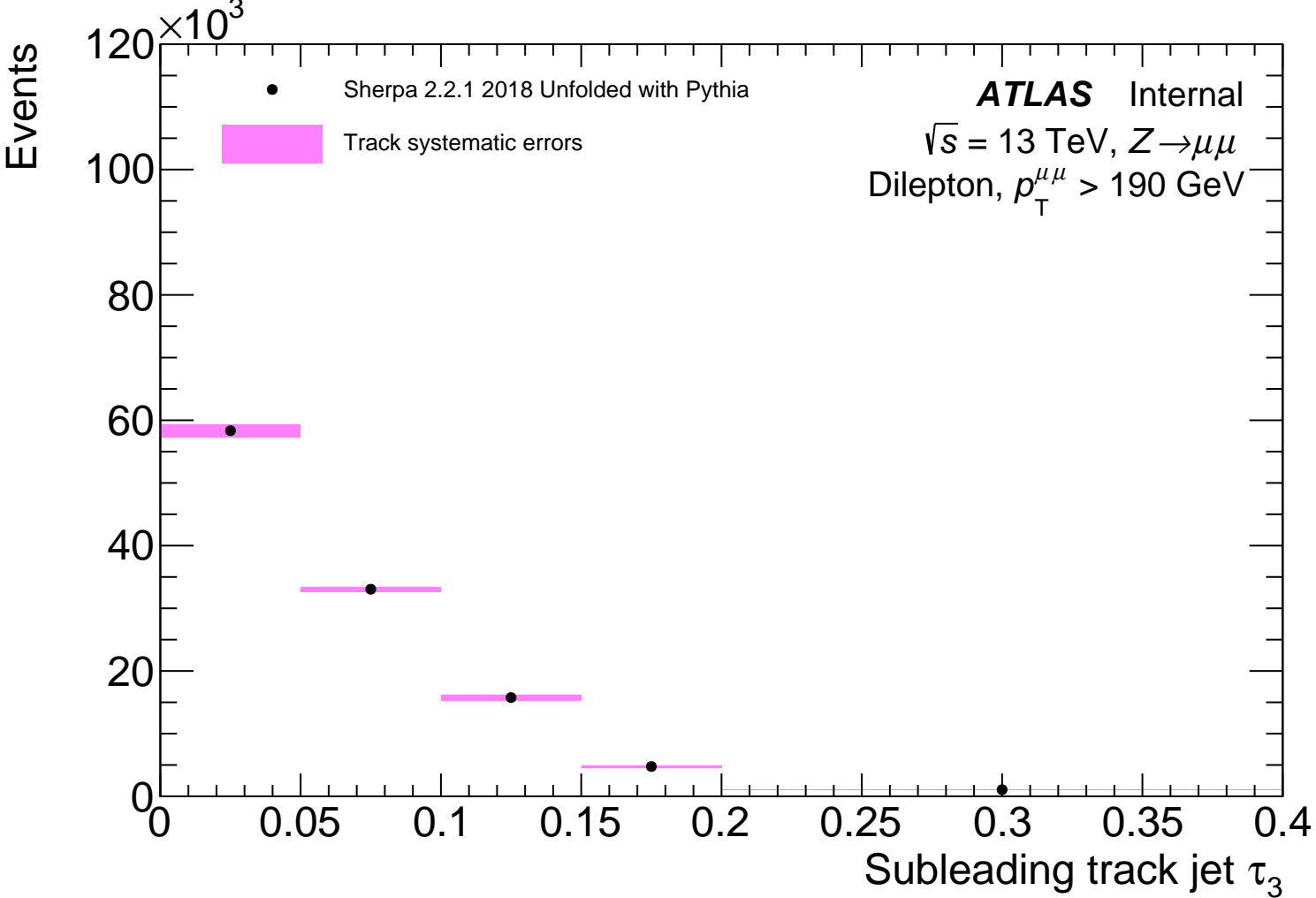


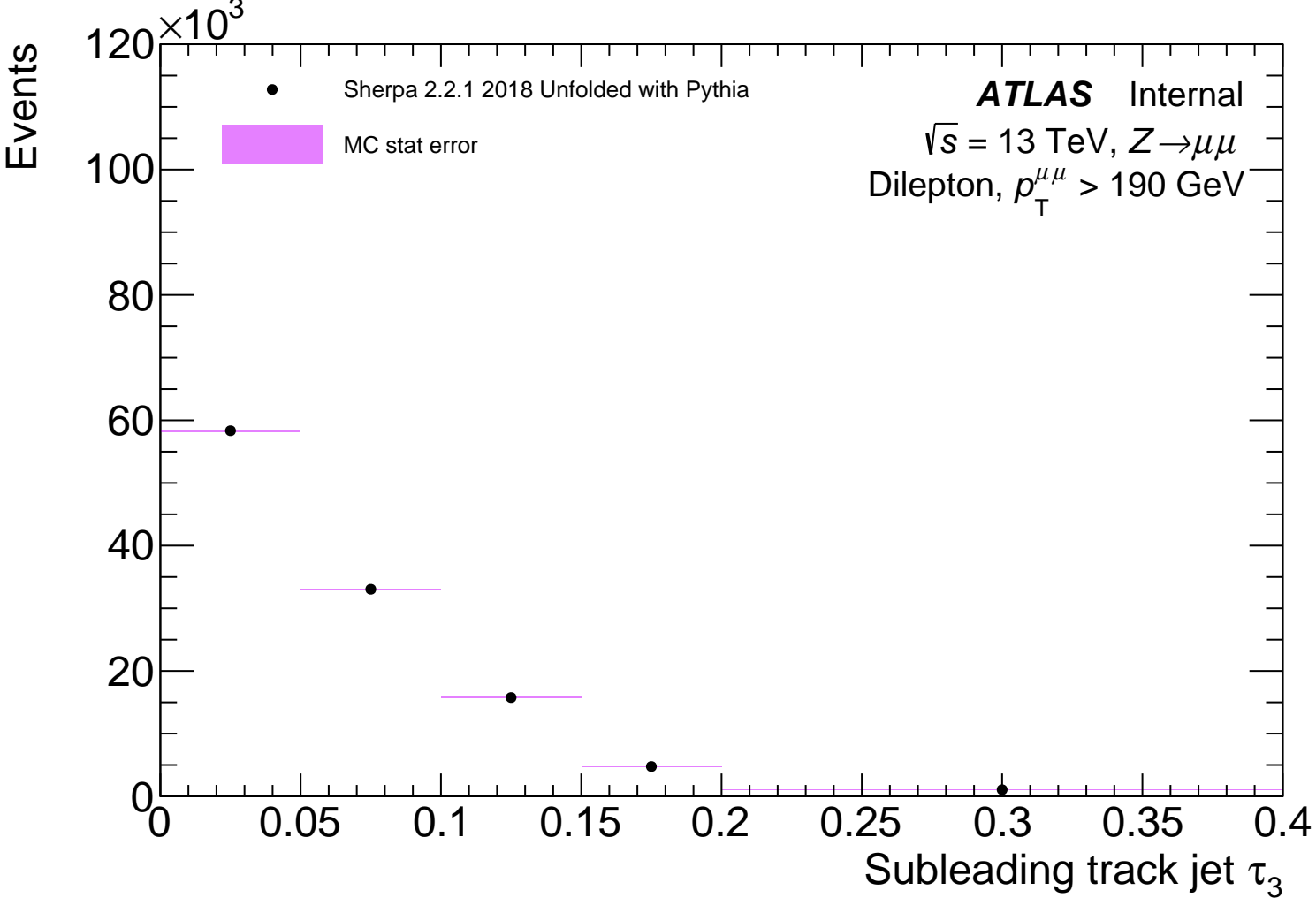


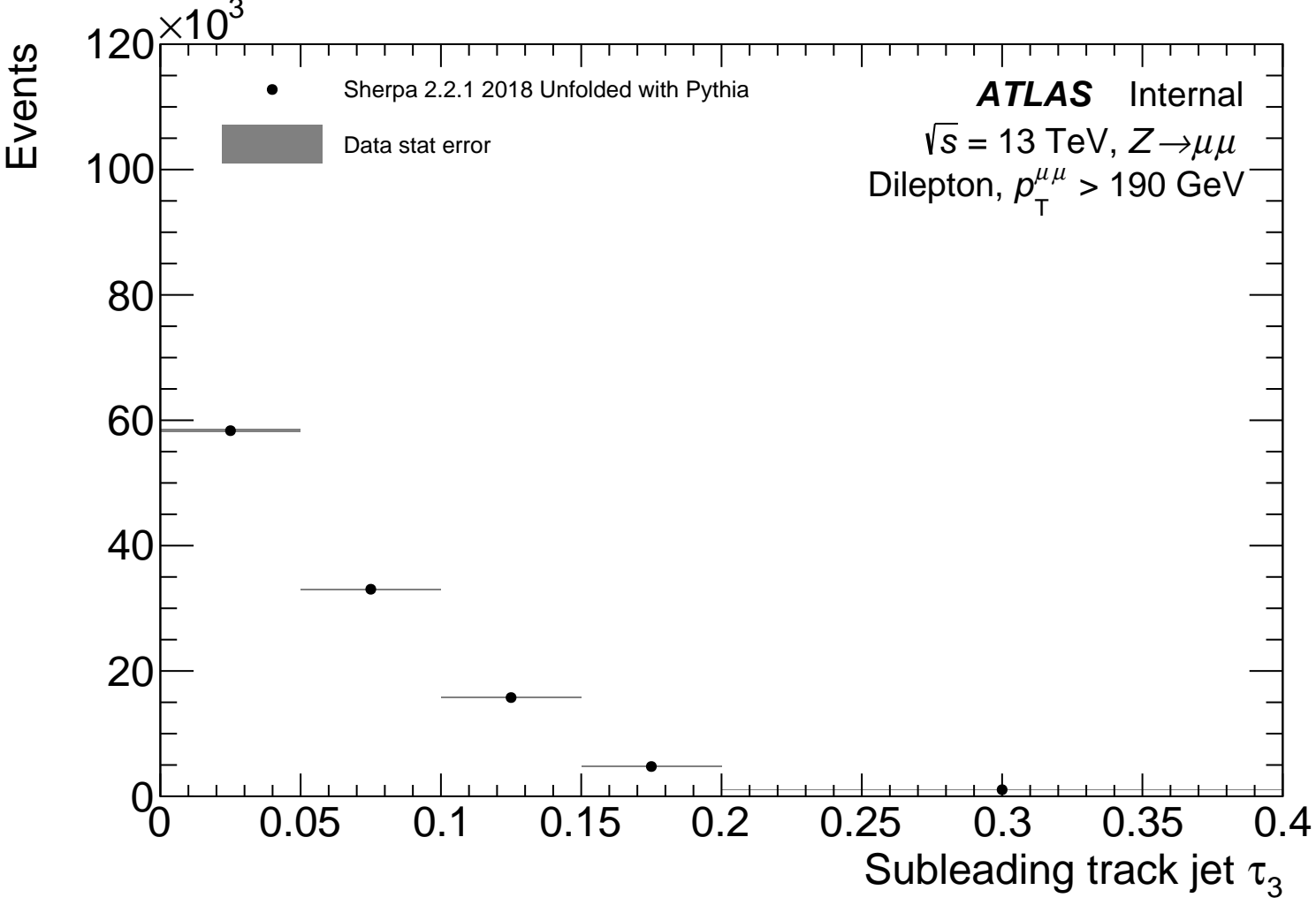


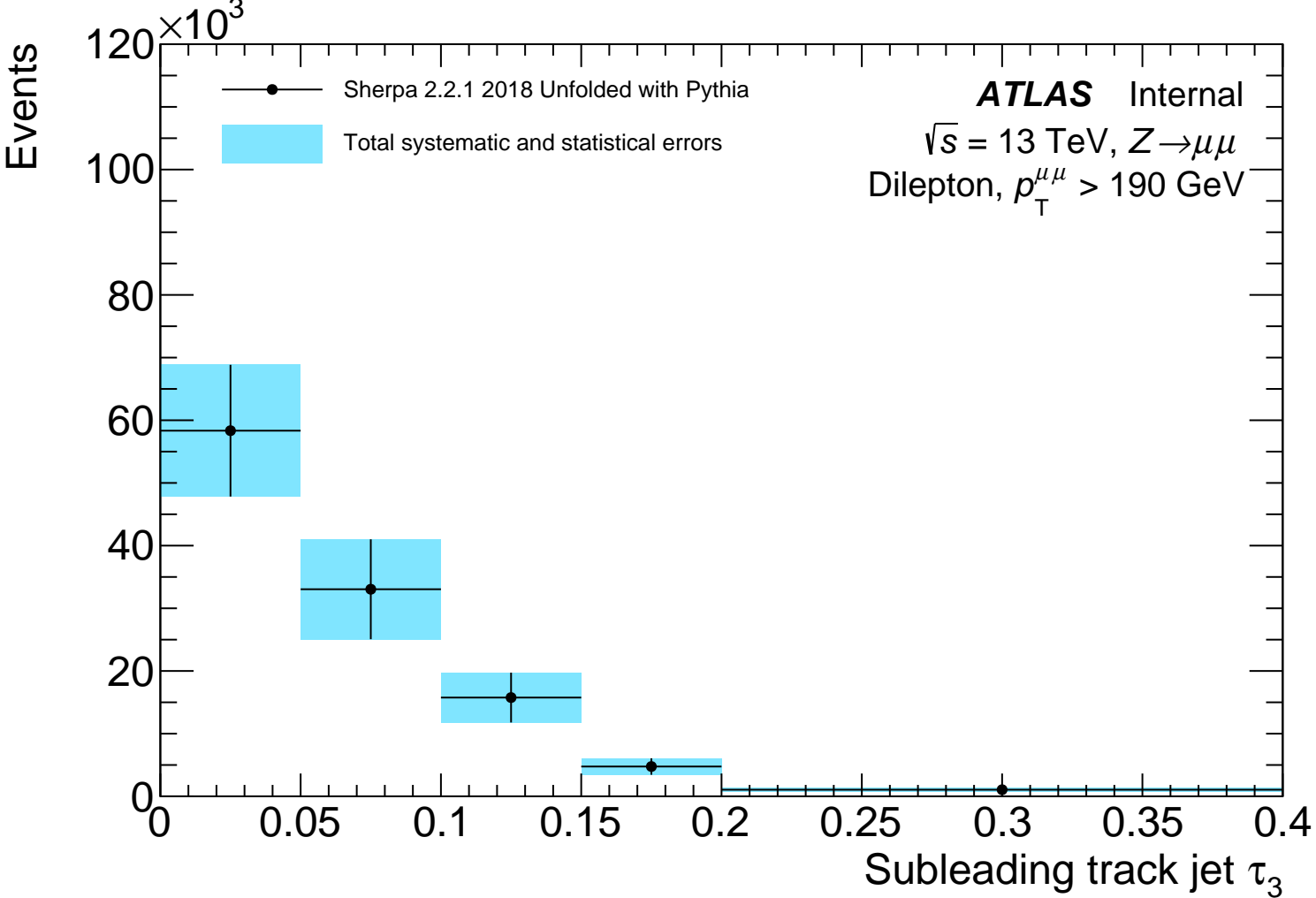
Events

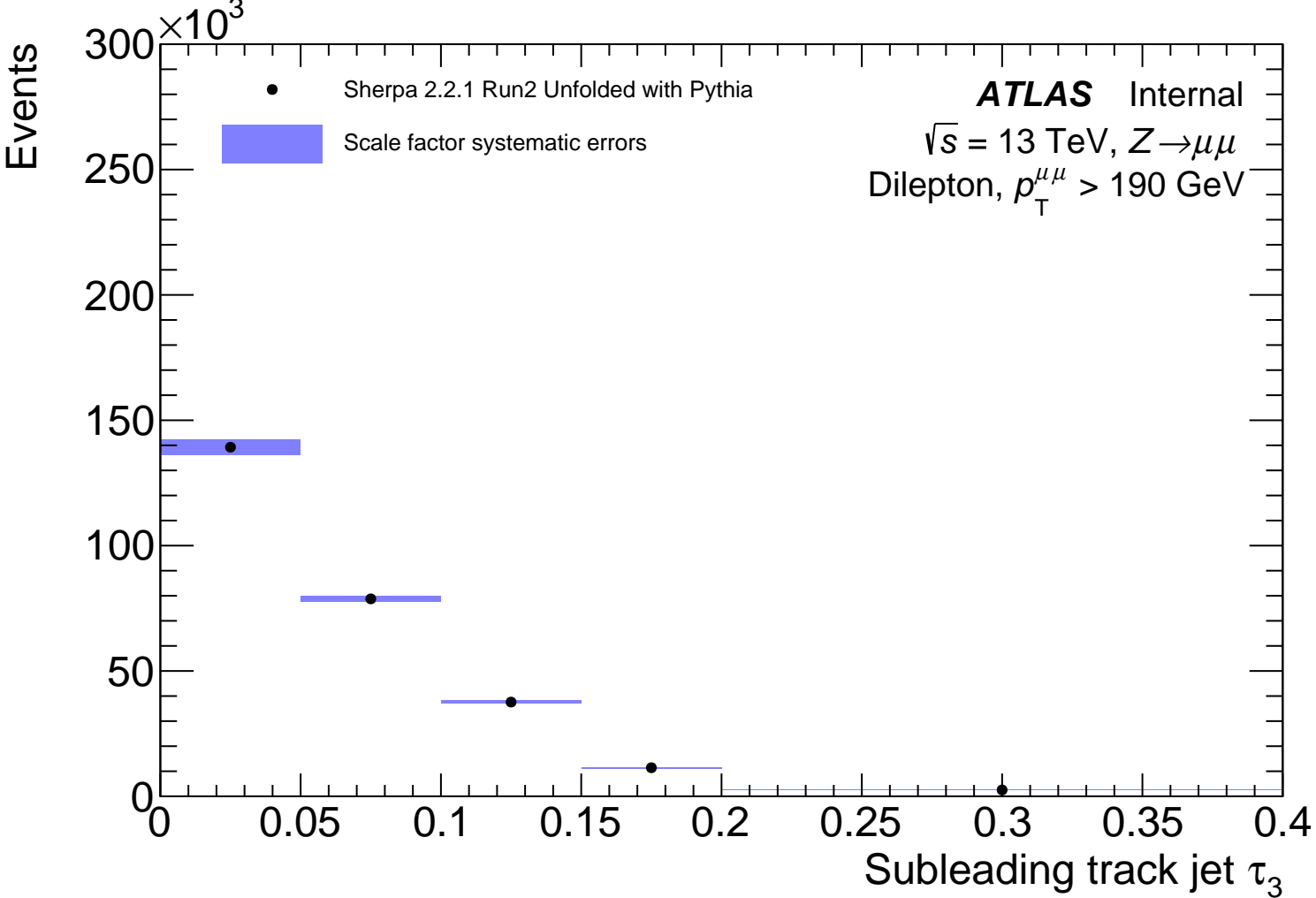


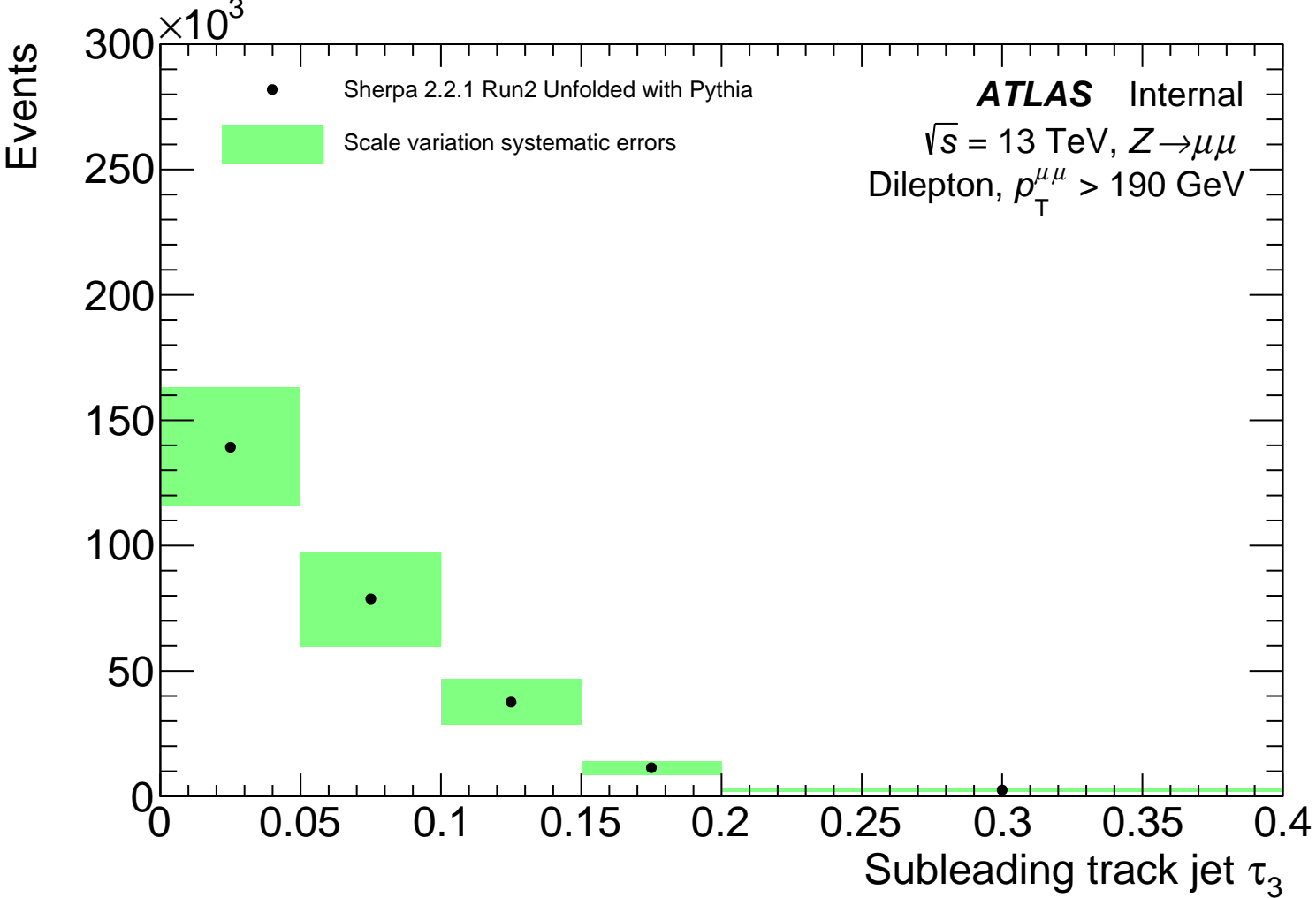


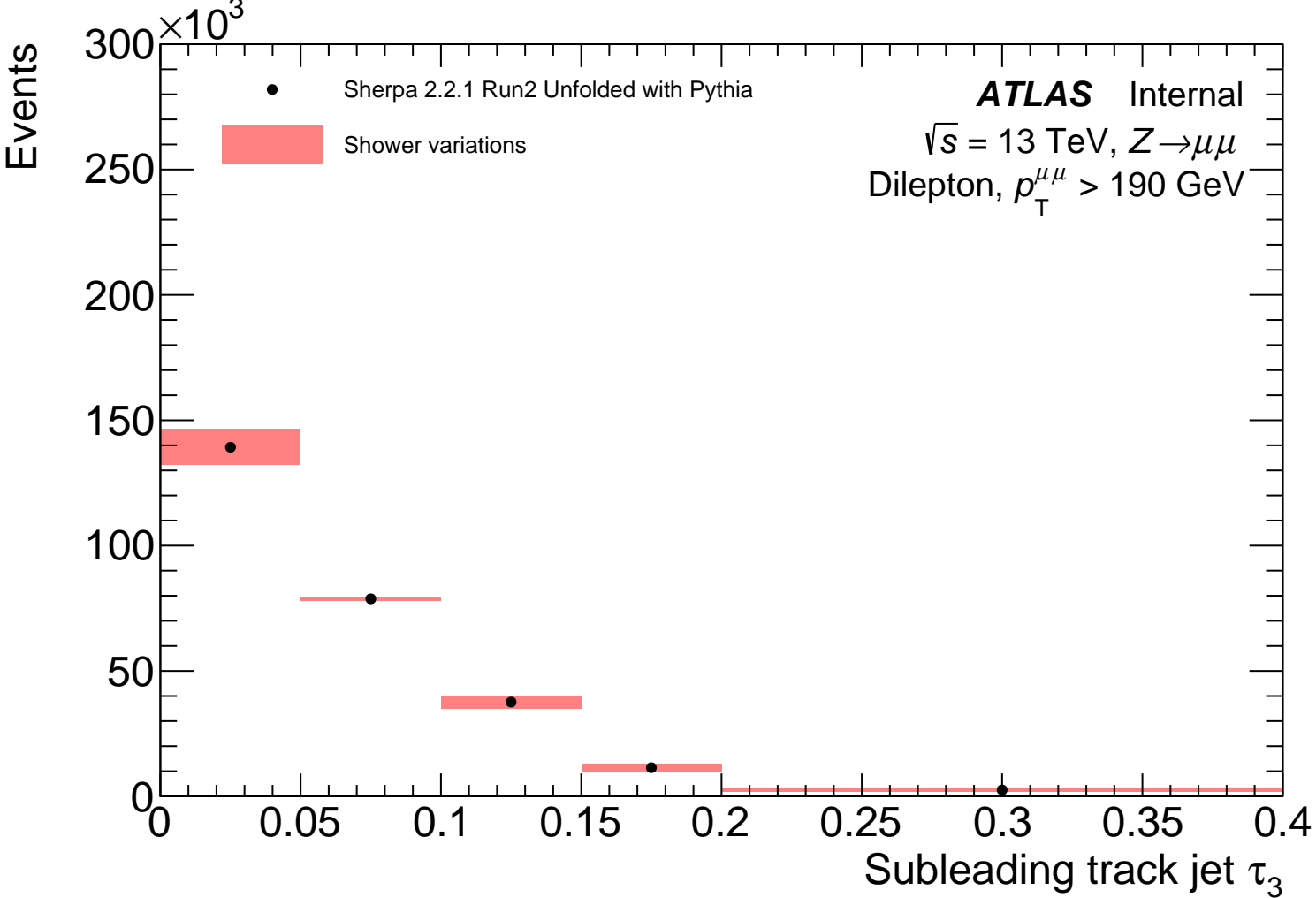


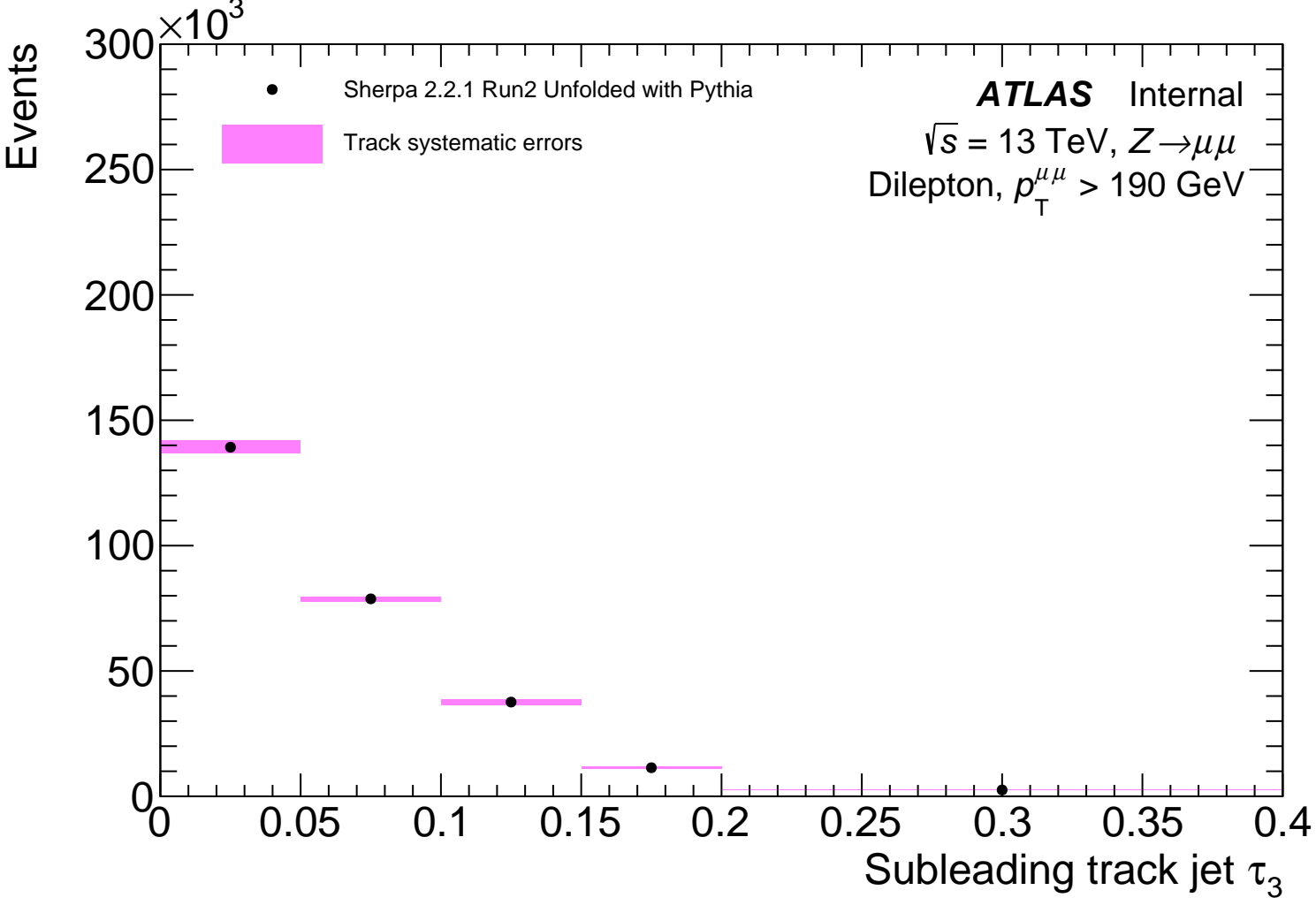


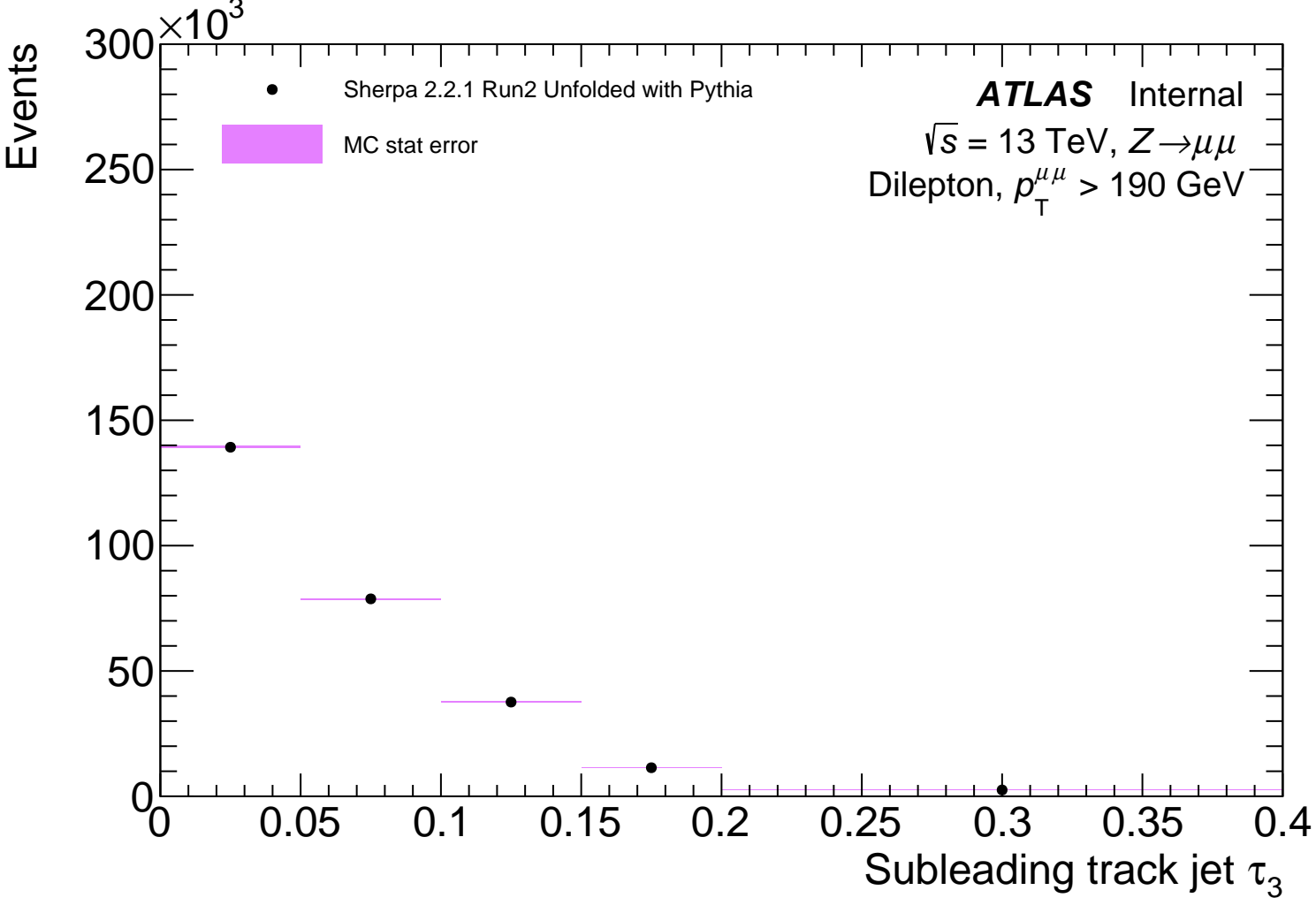


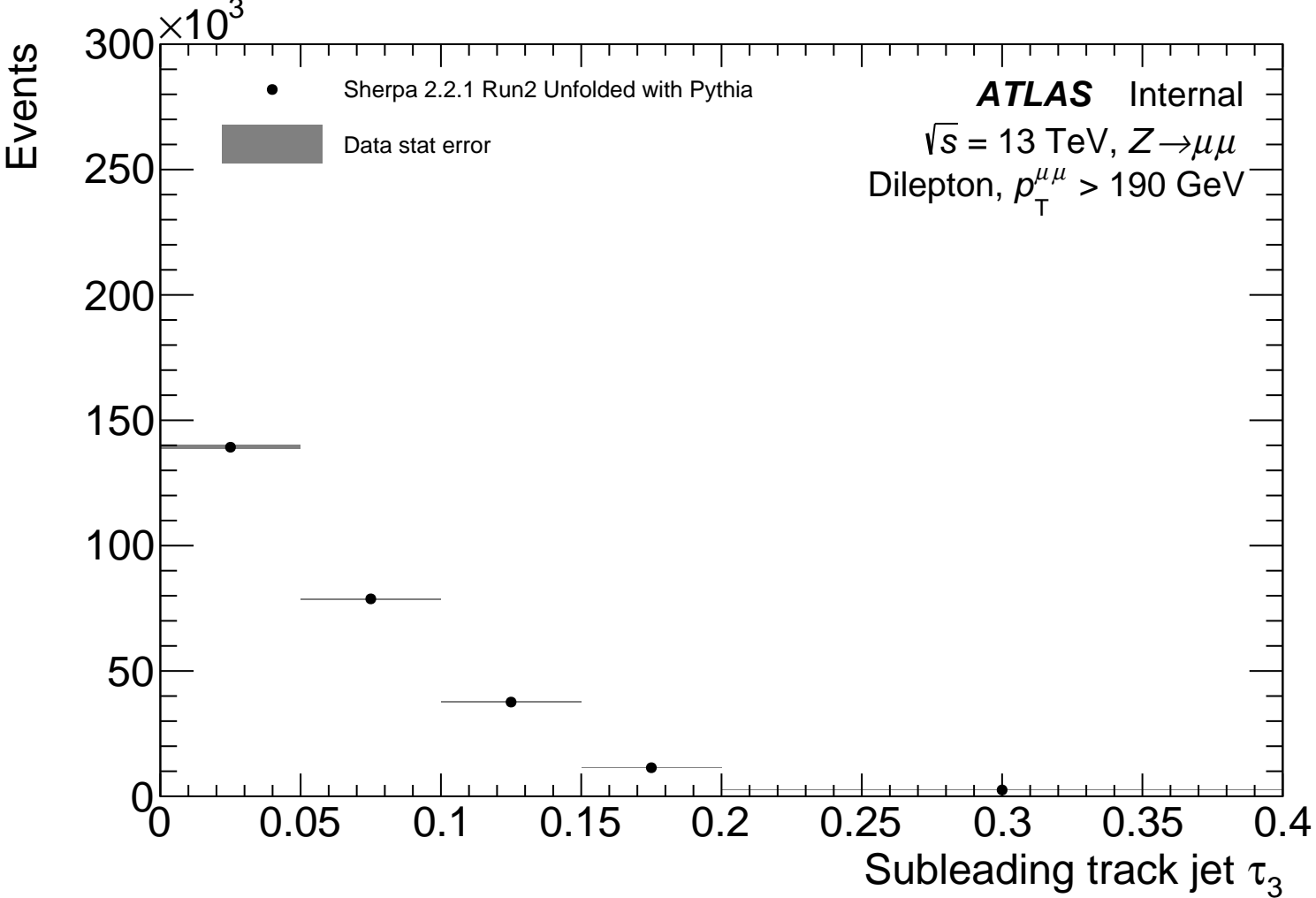


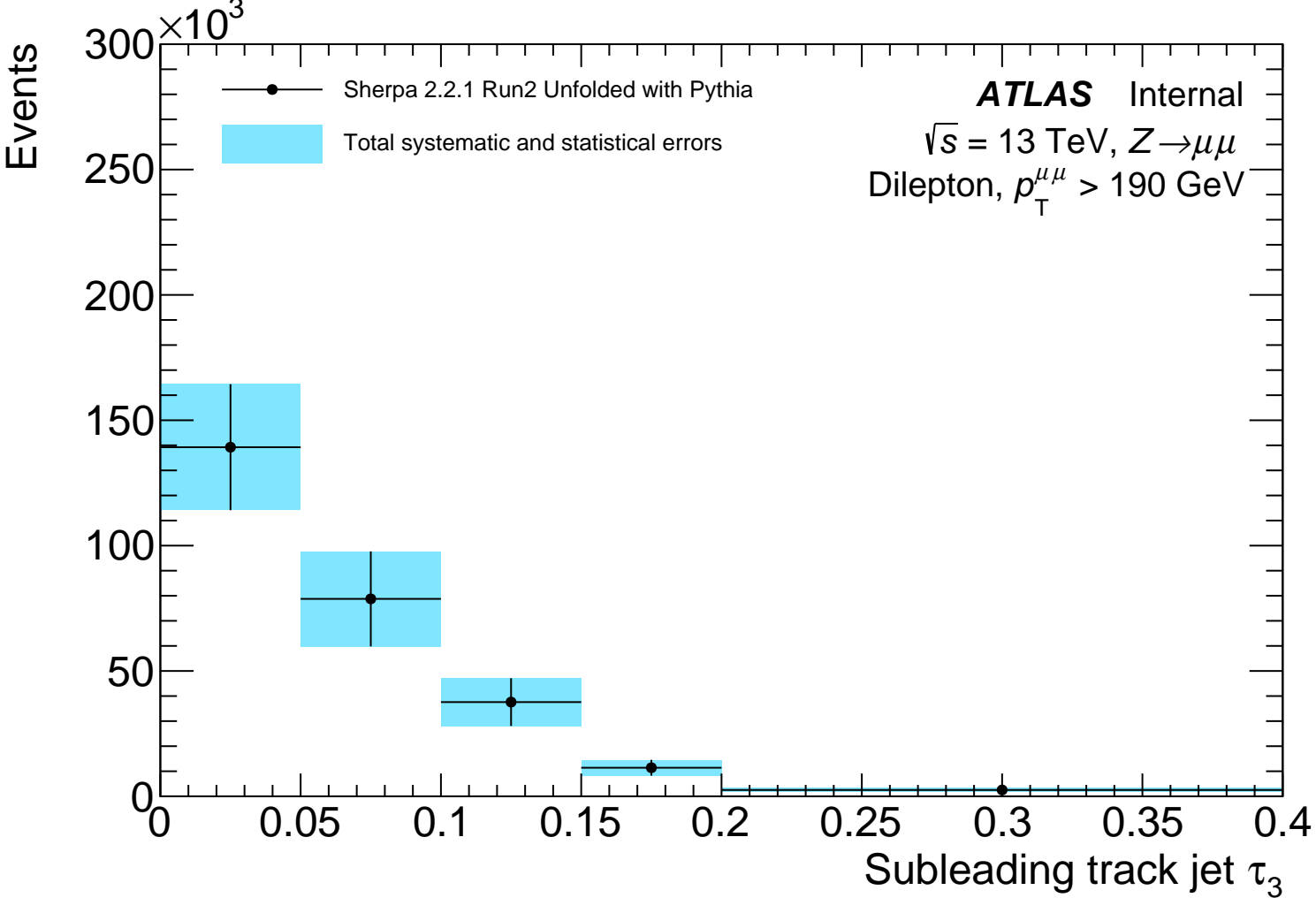




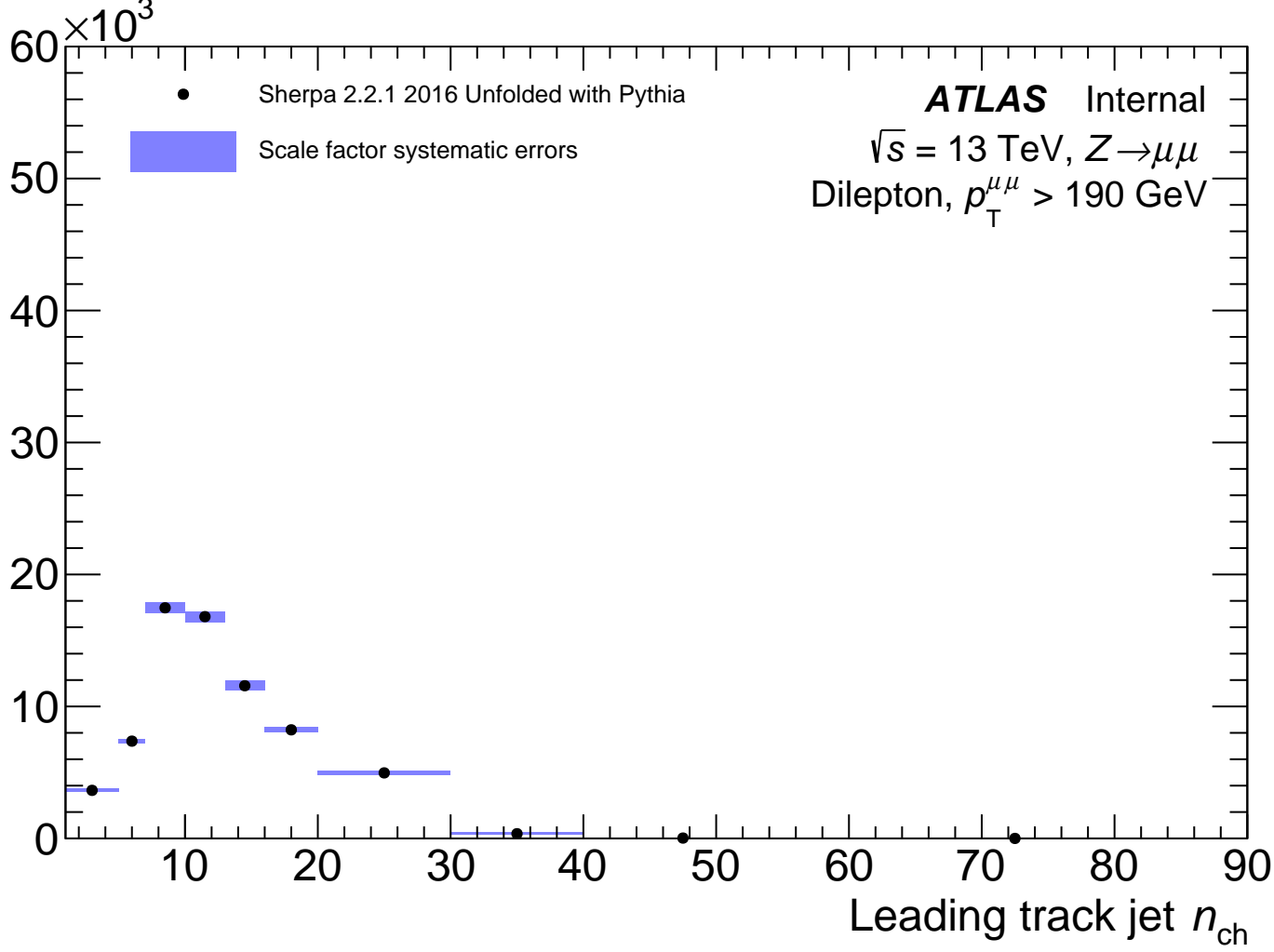




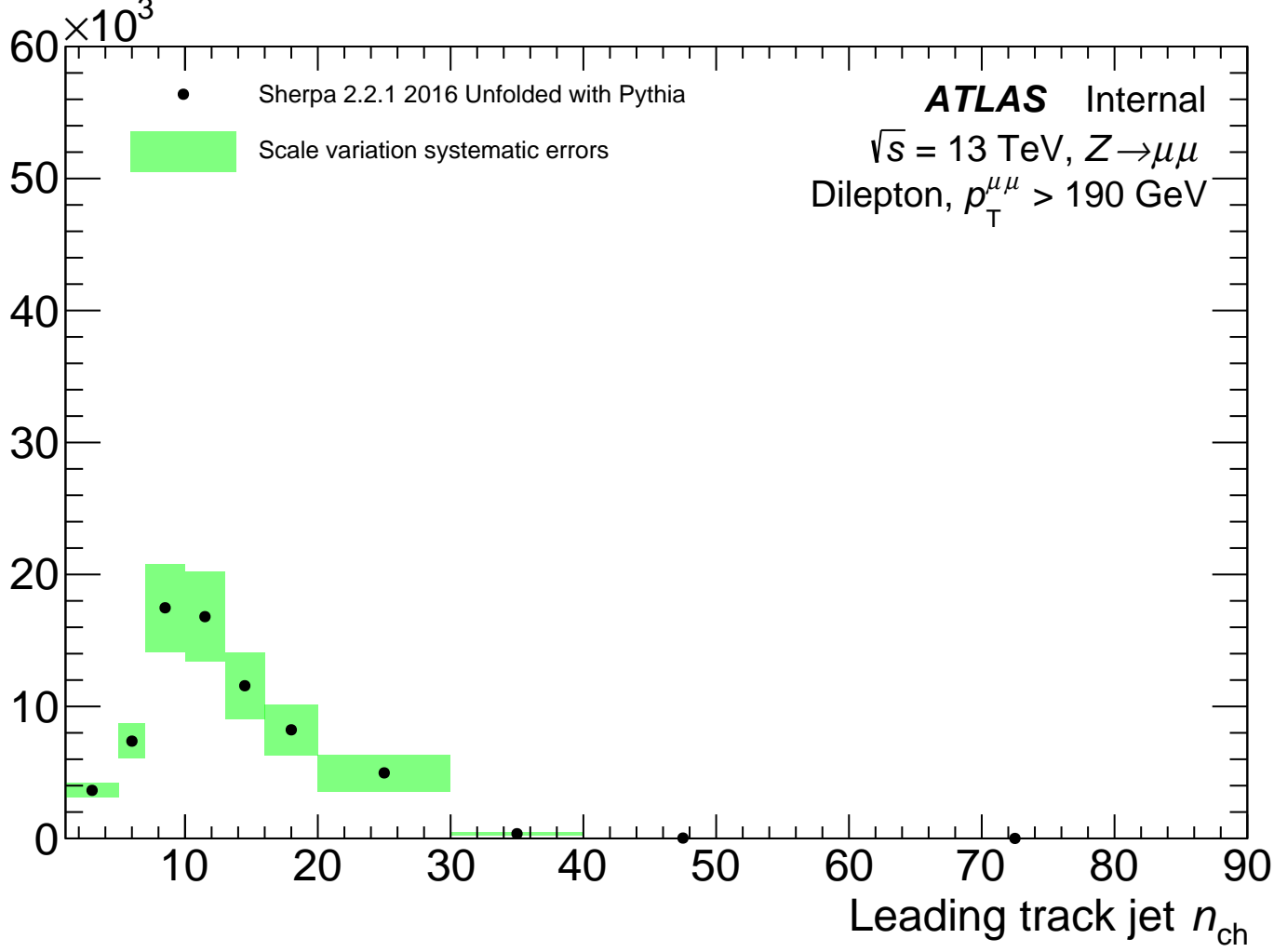




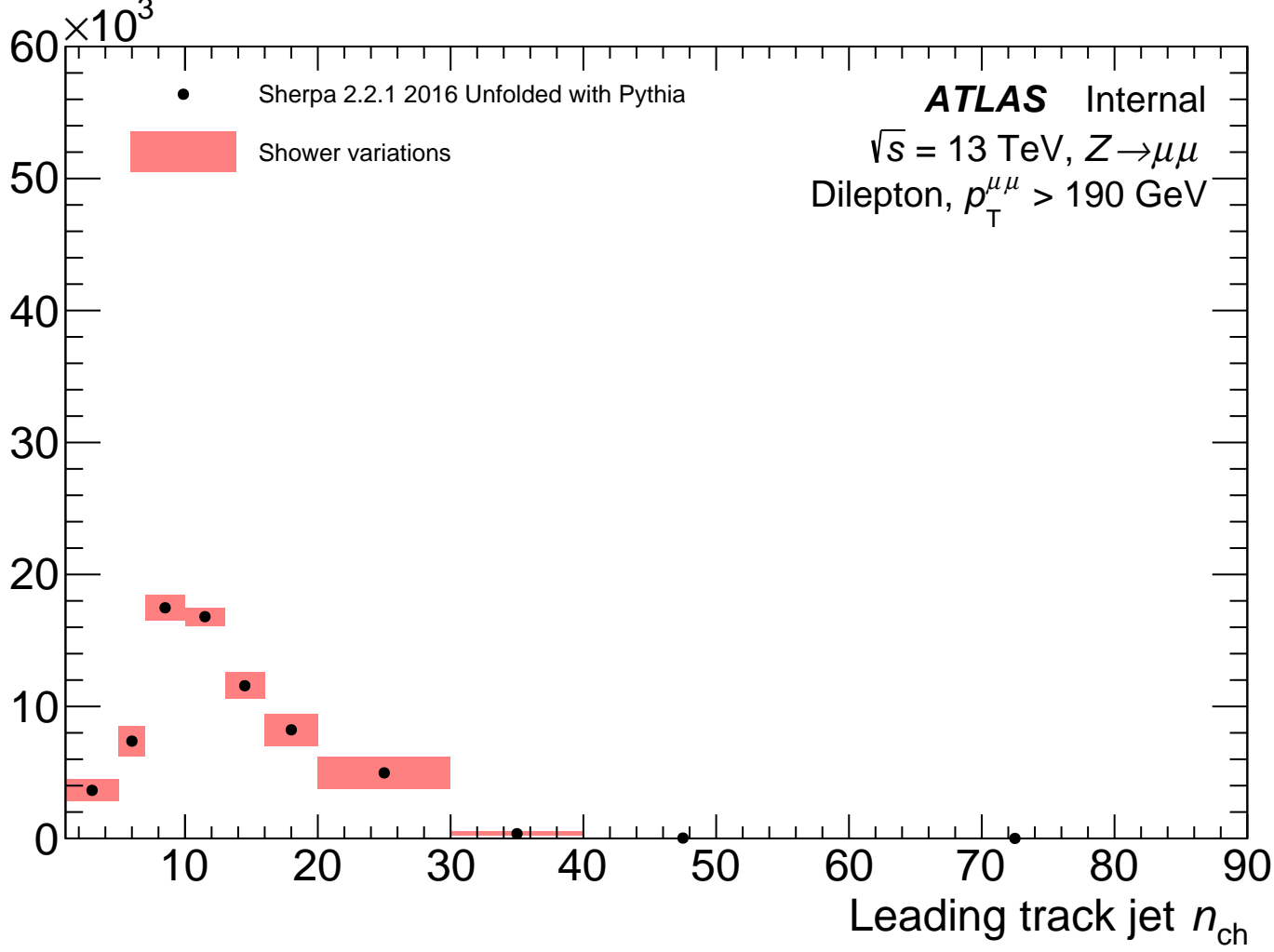
Events



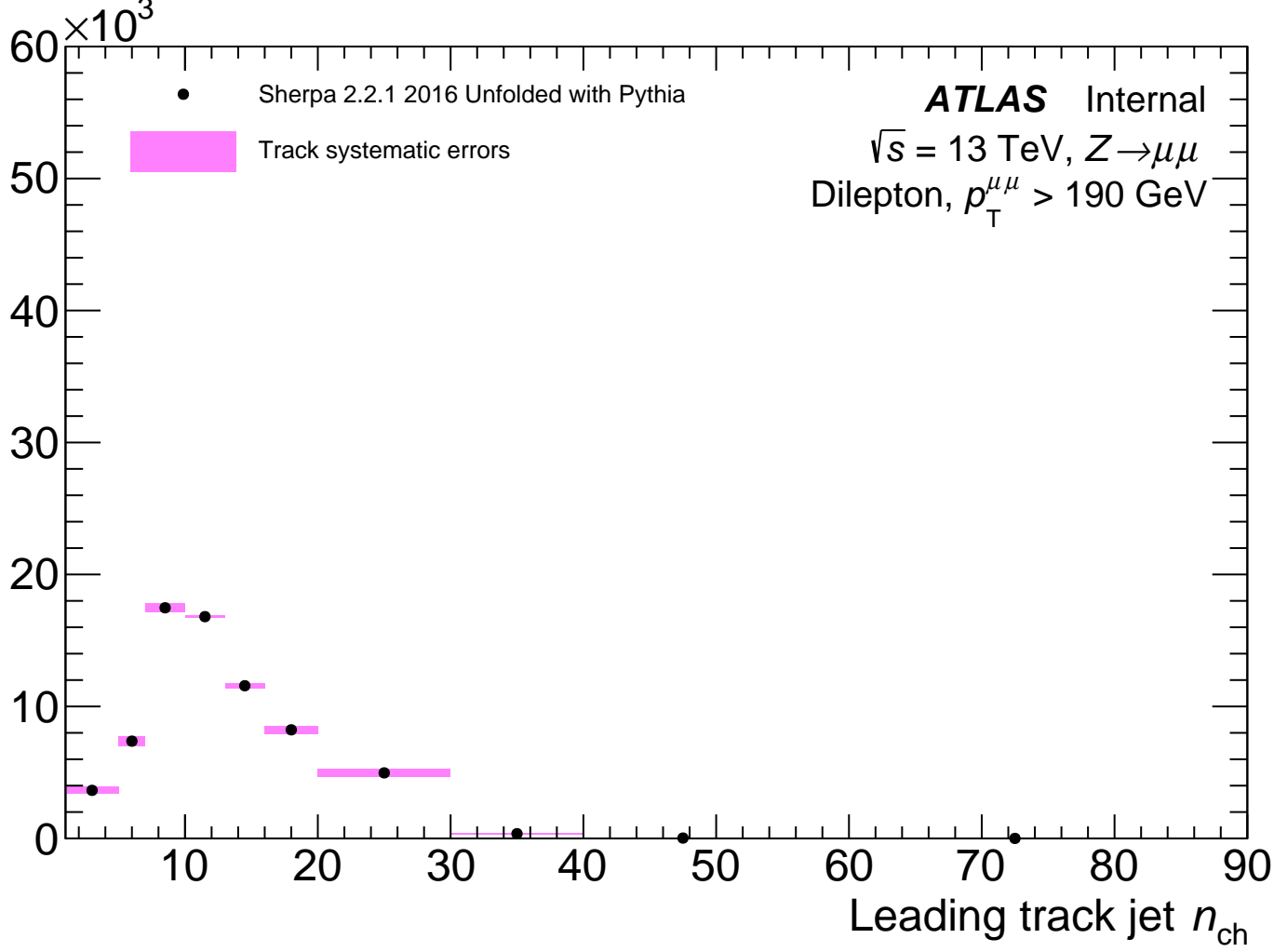
Events



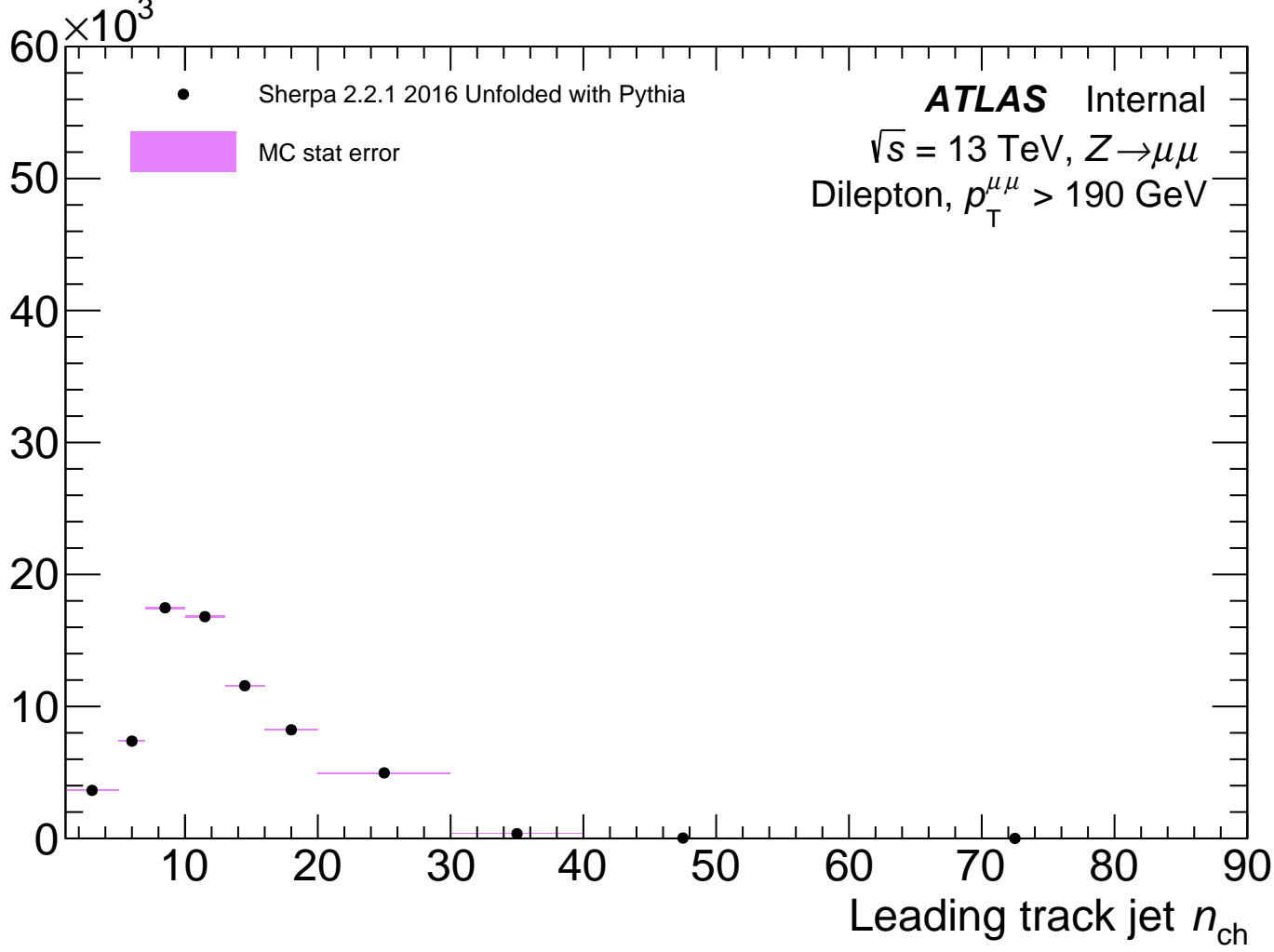
Events



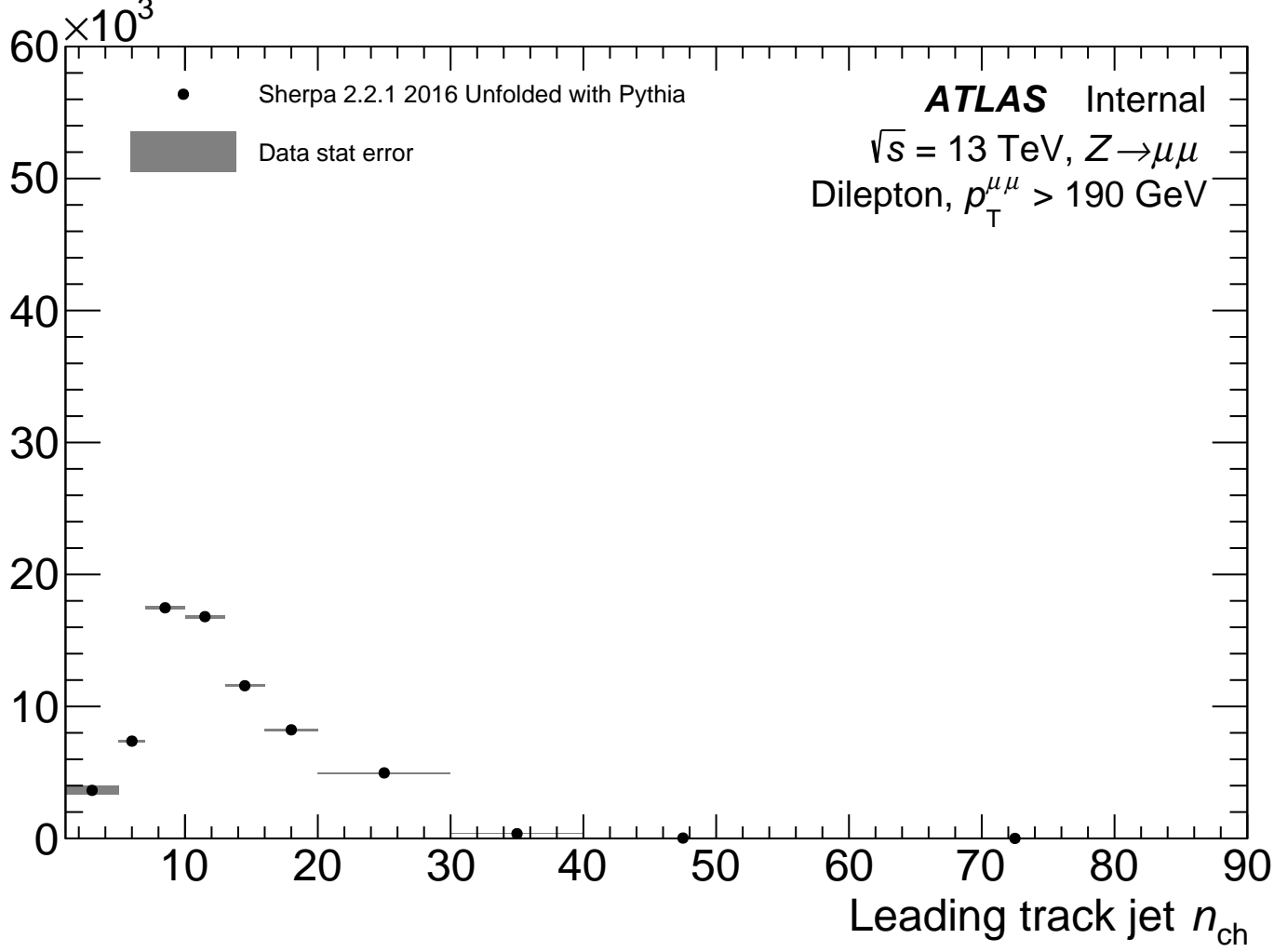
Events



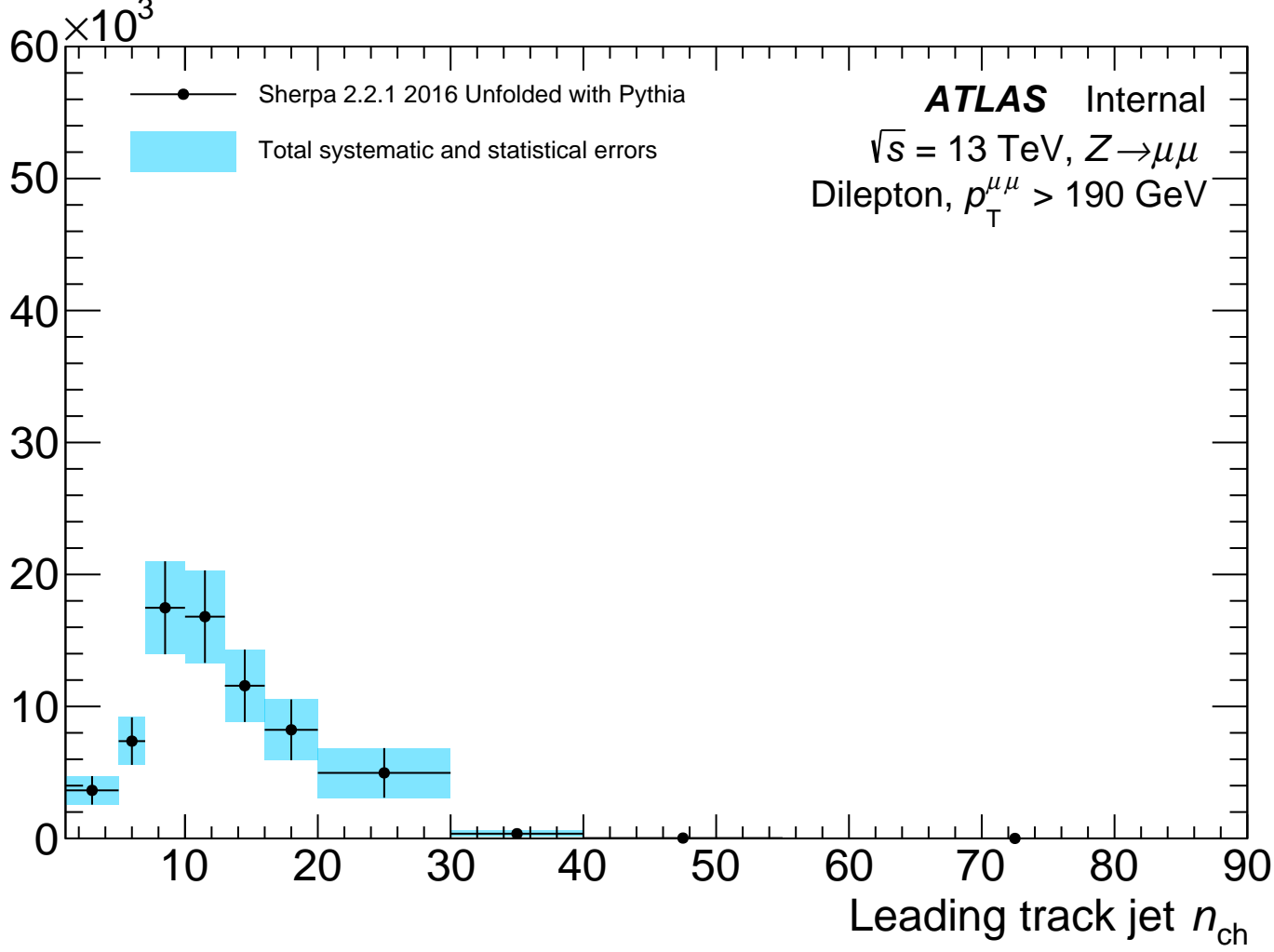
Events



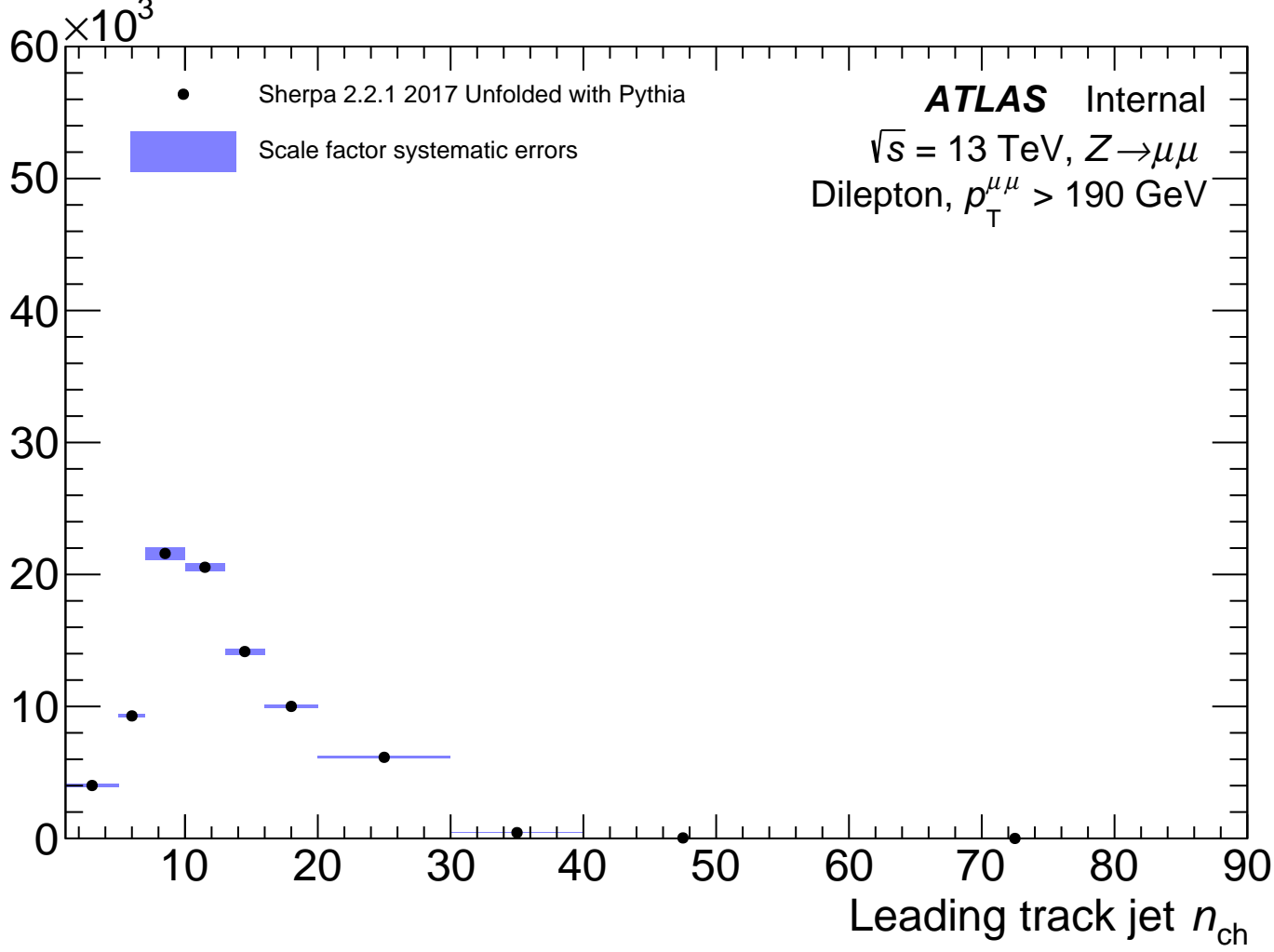
Events



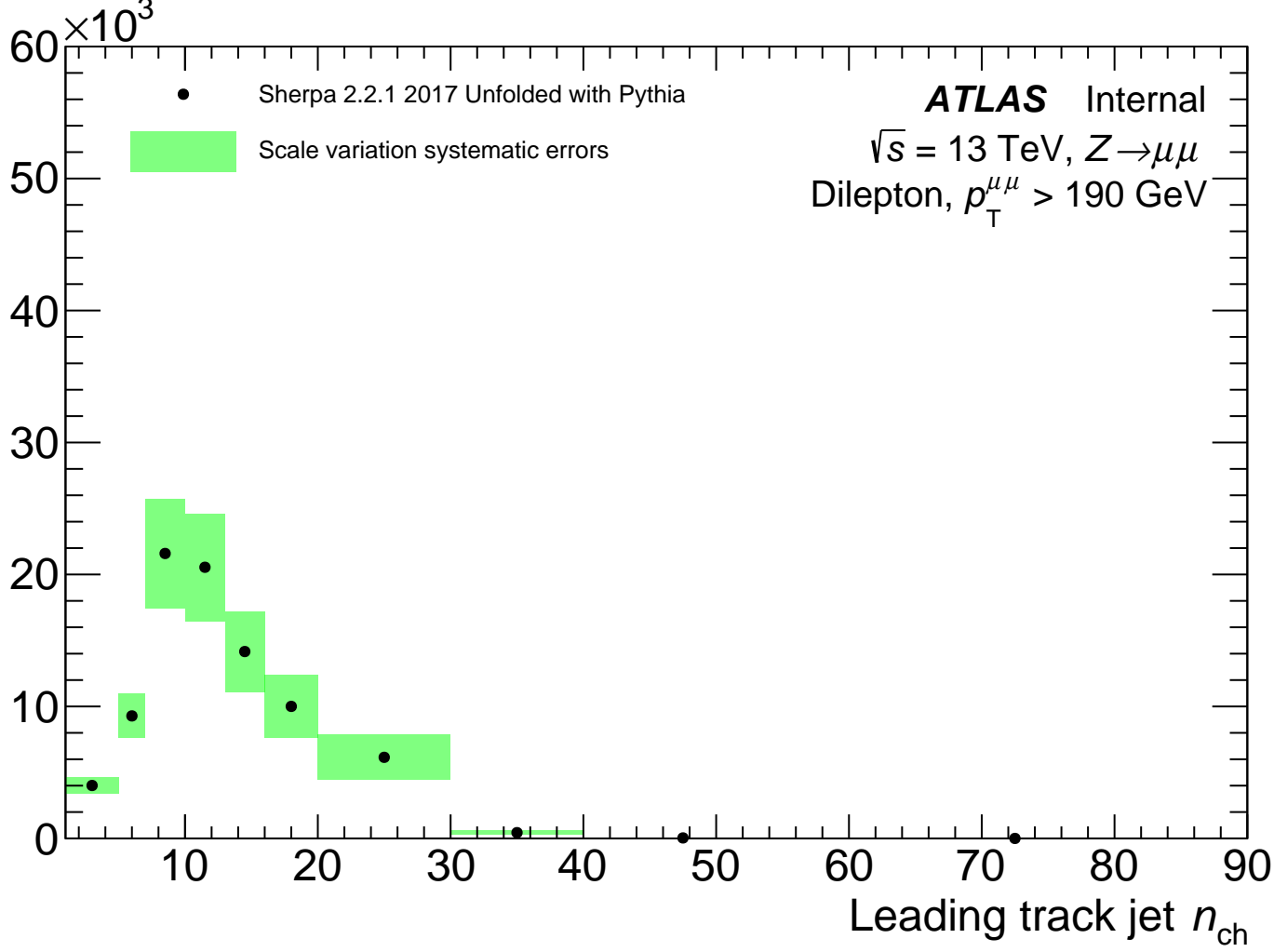
Events



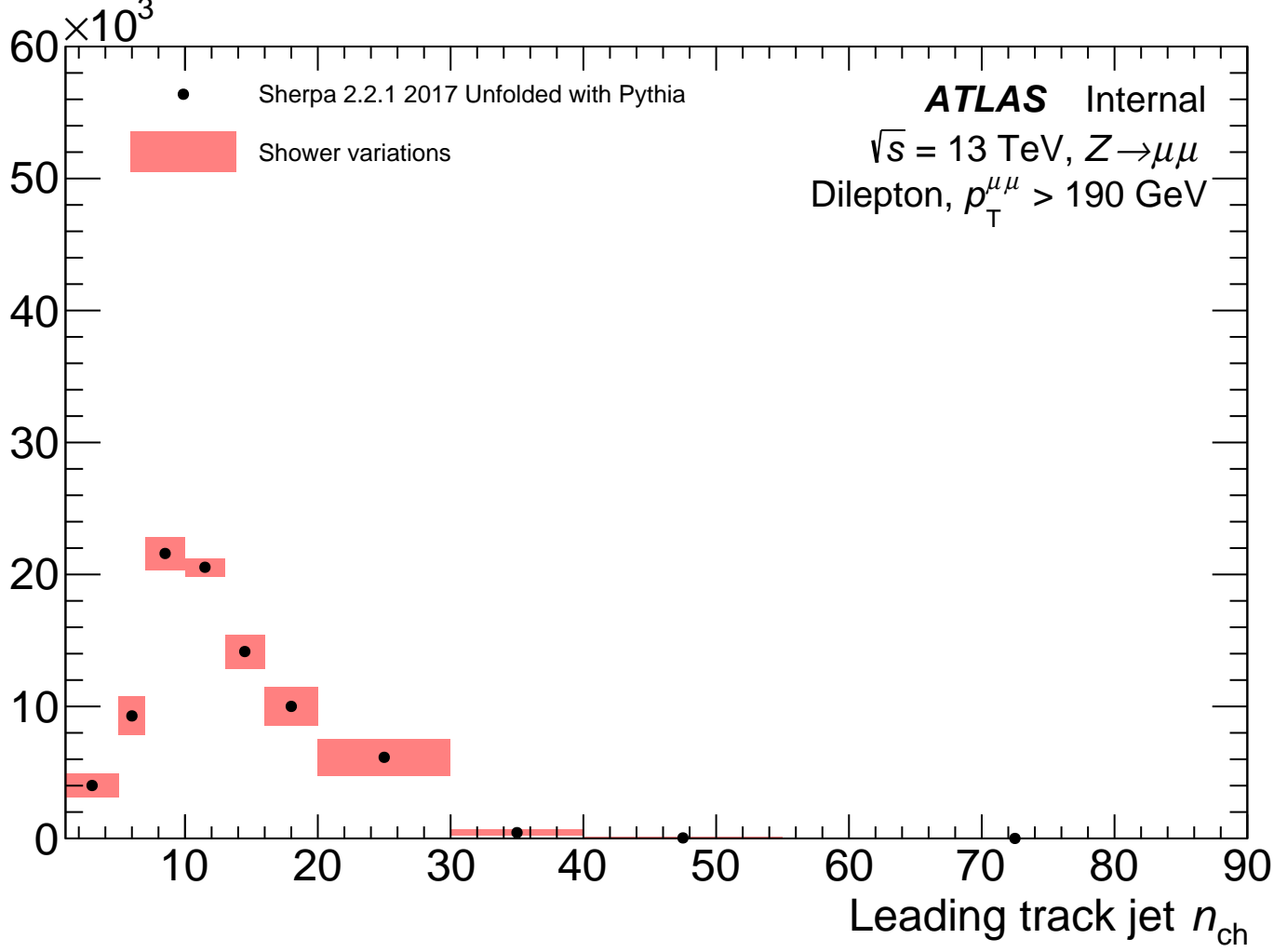
Events



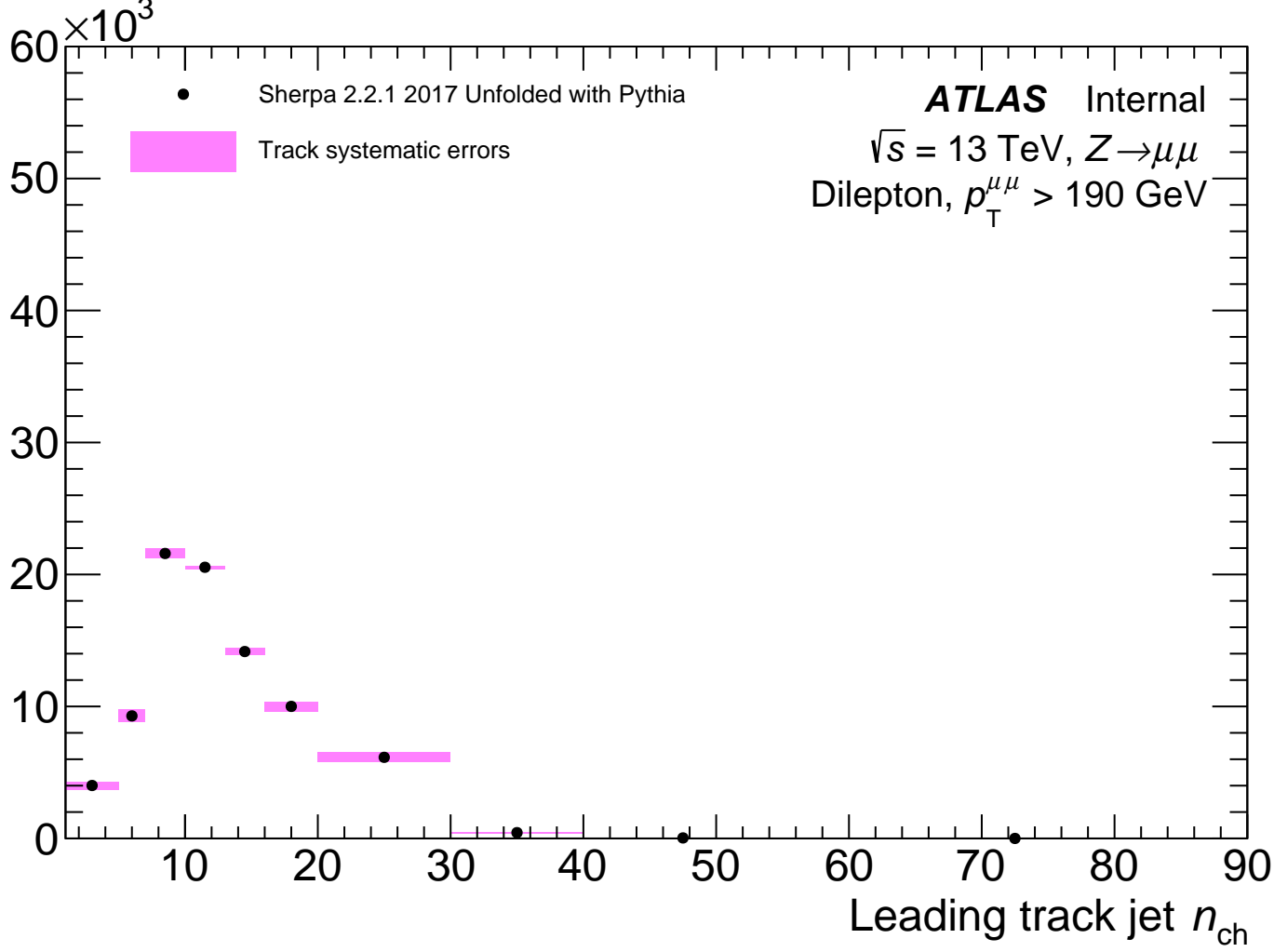
Events



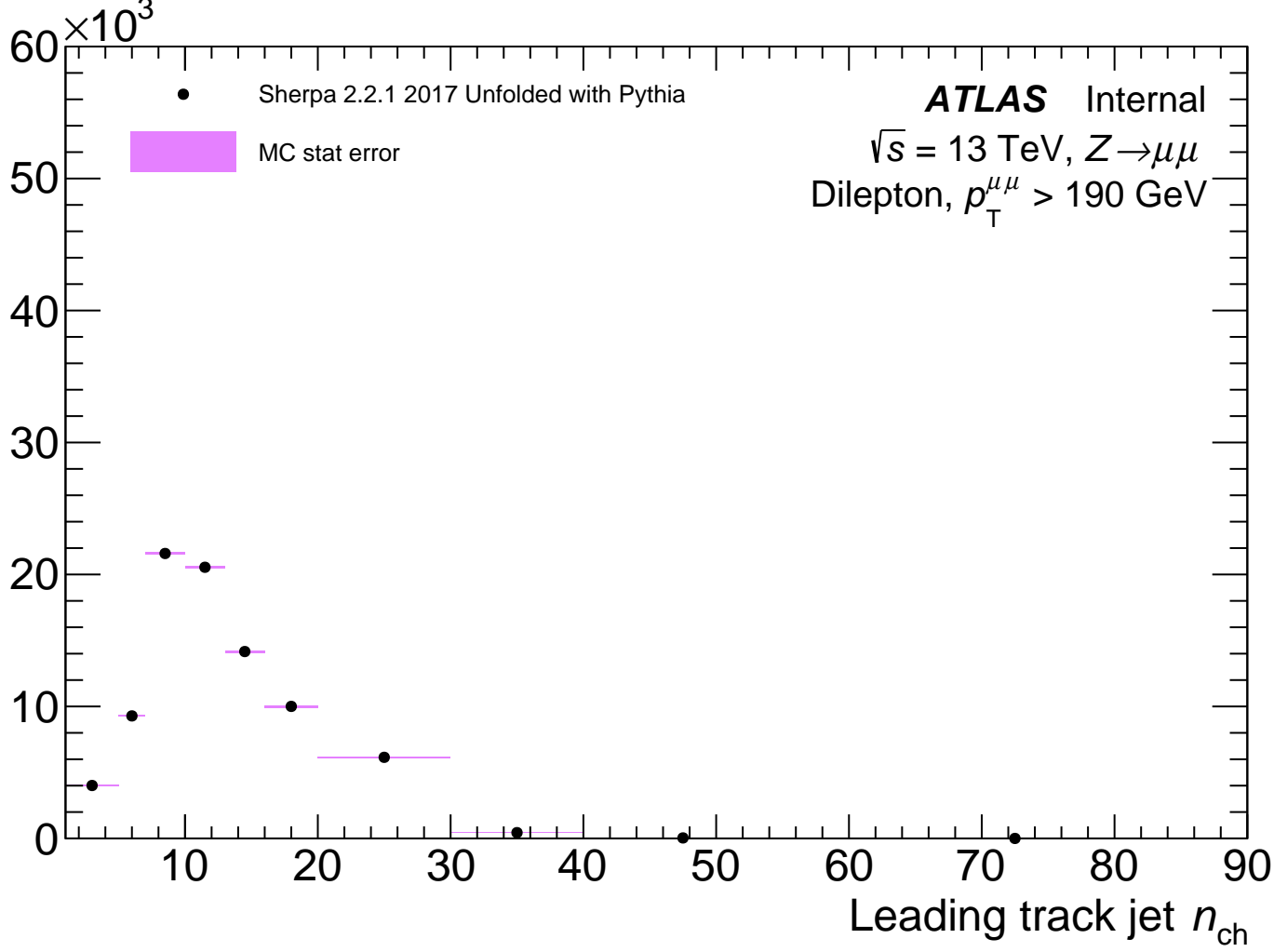
Events



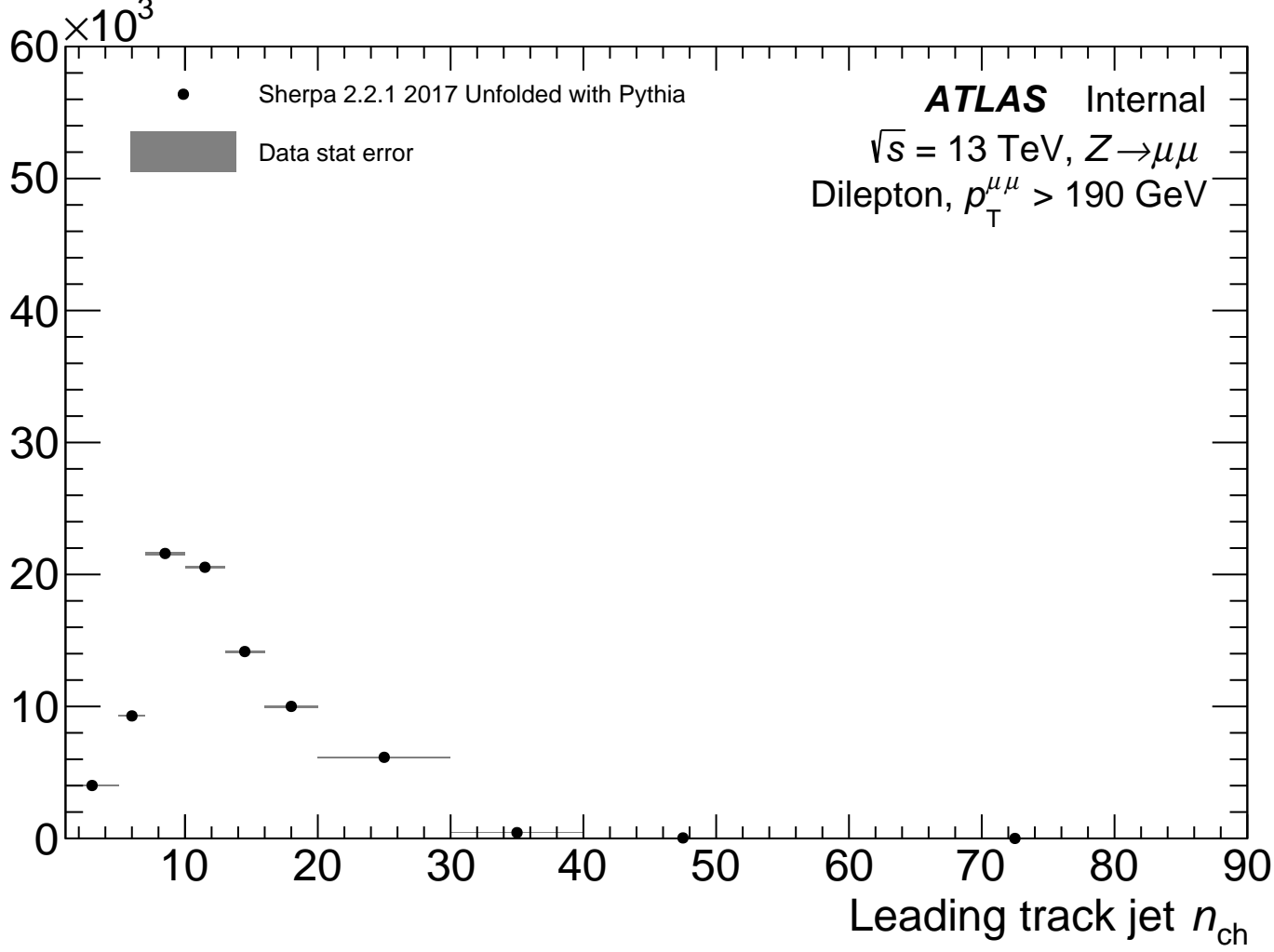
Events



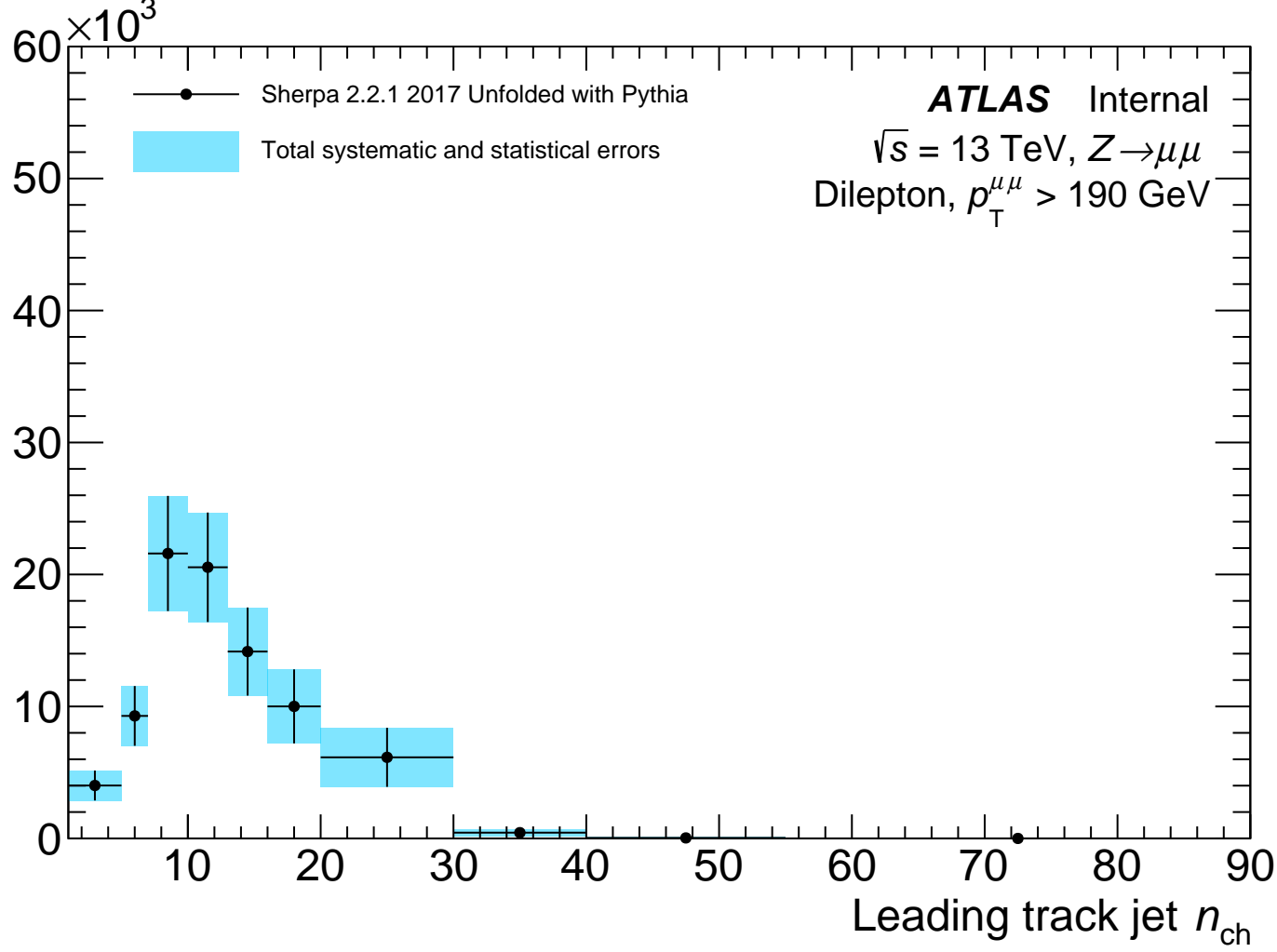
Events



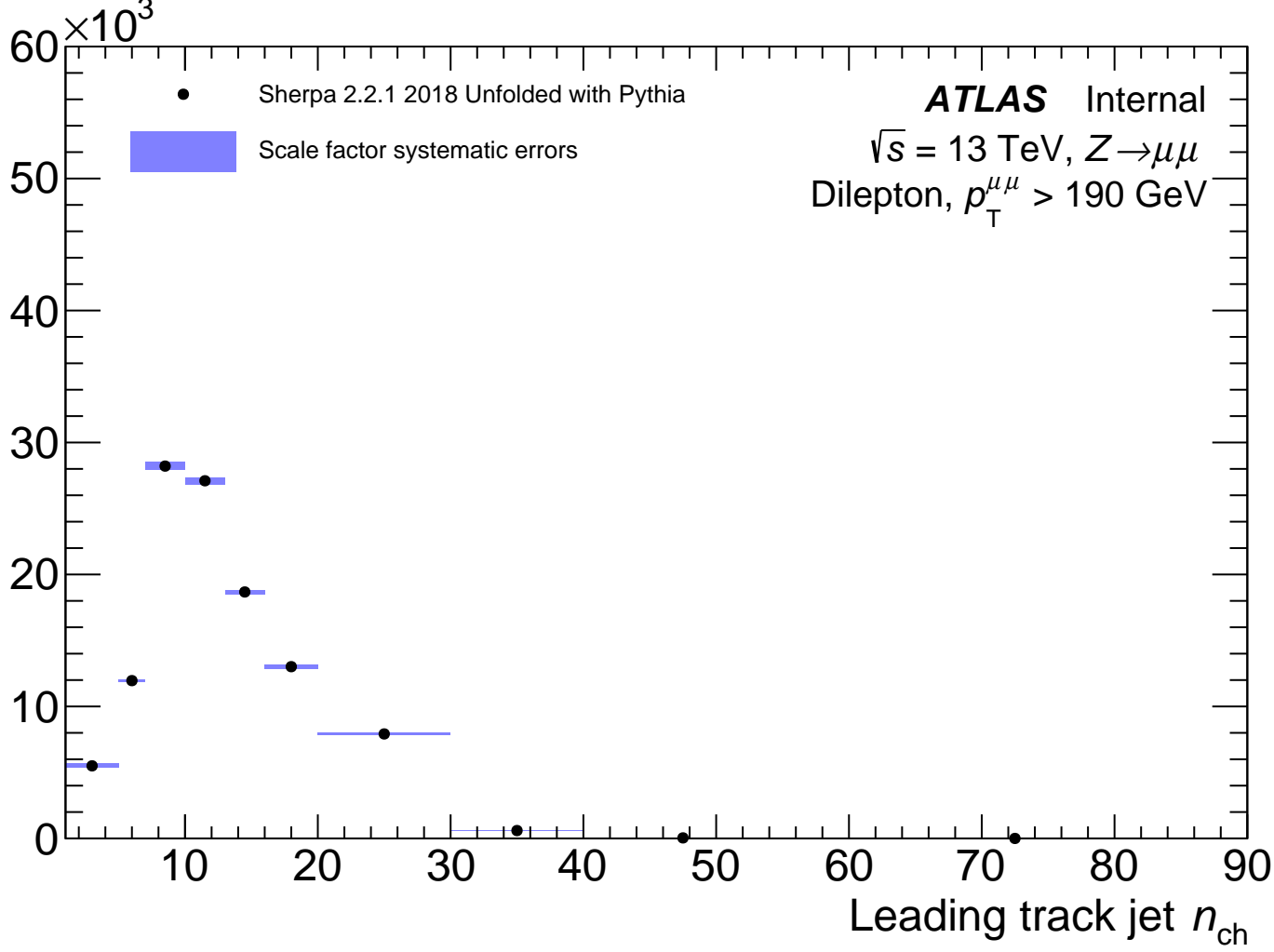
Events



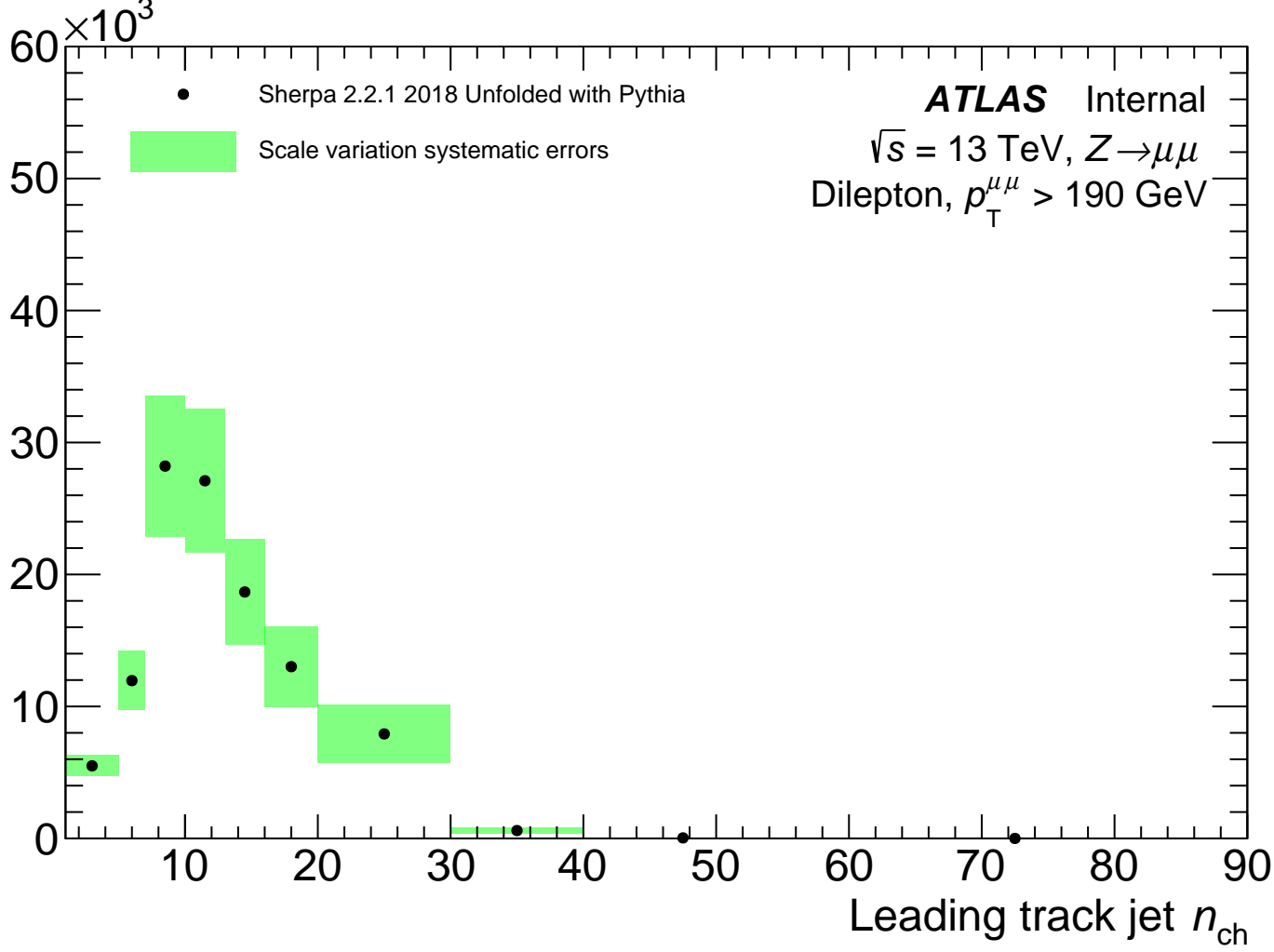
Events



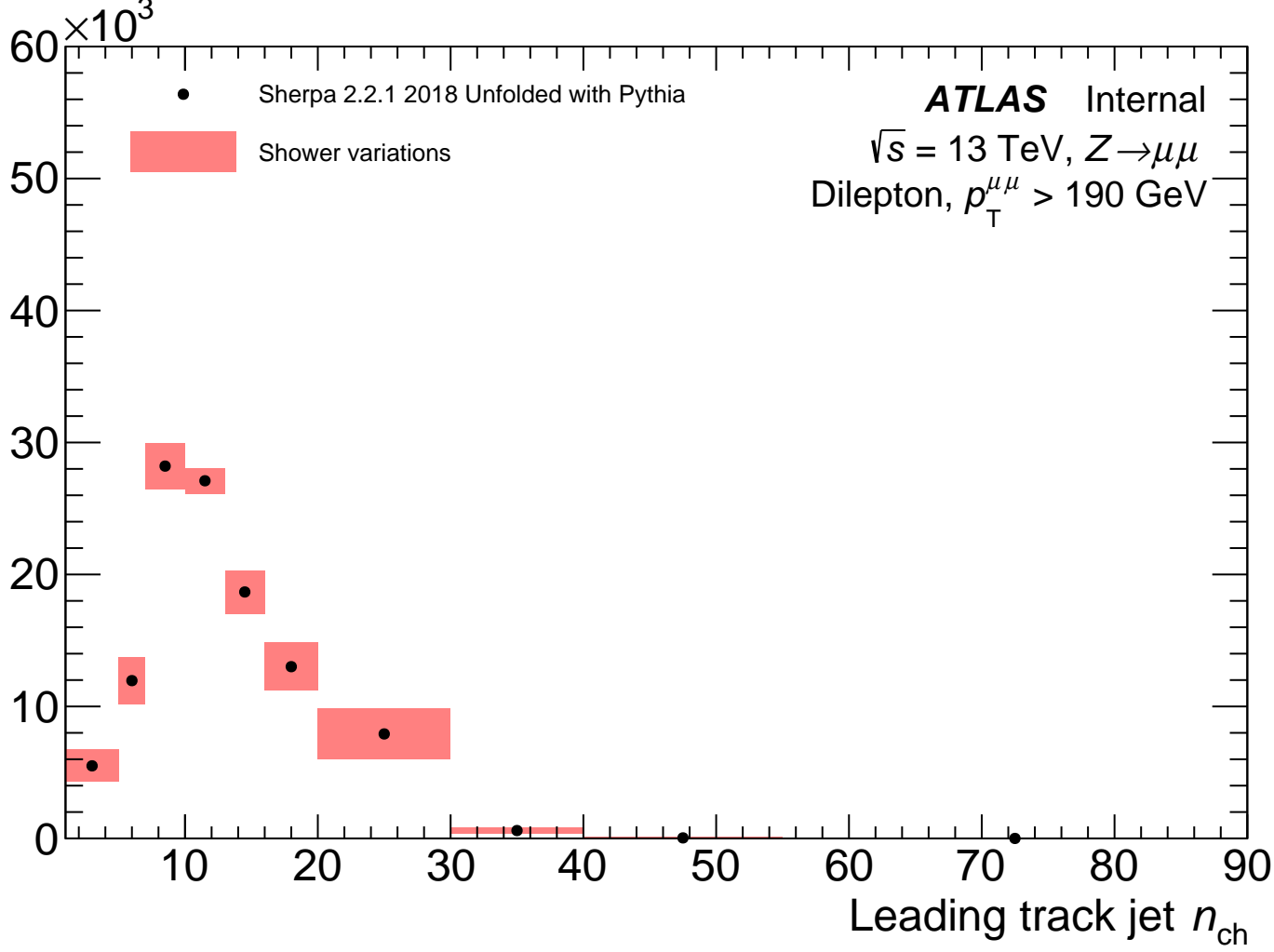
Events



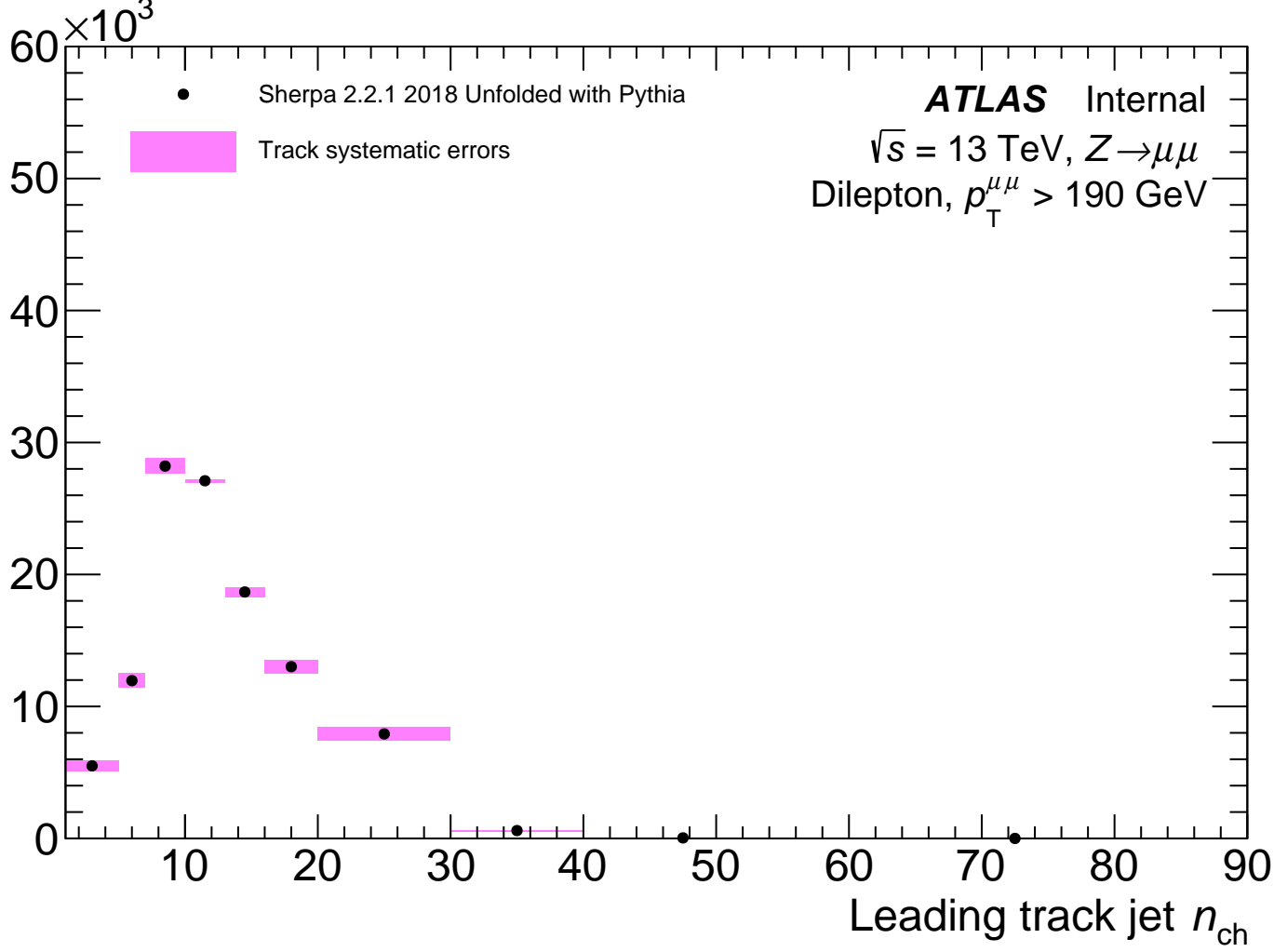
Events



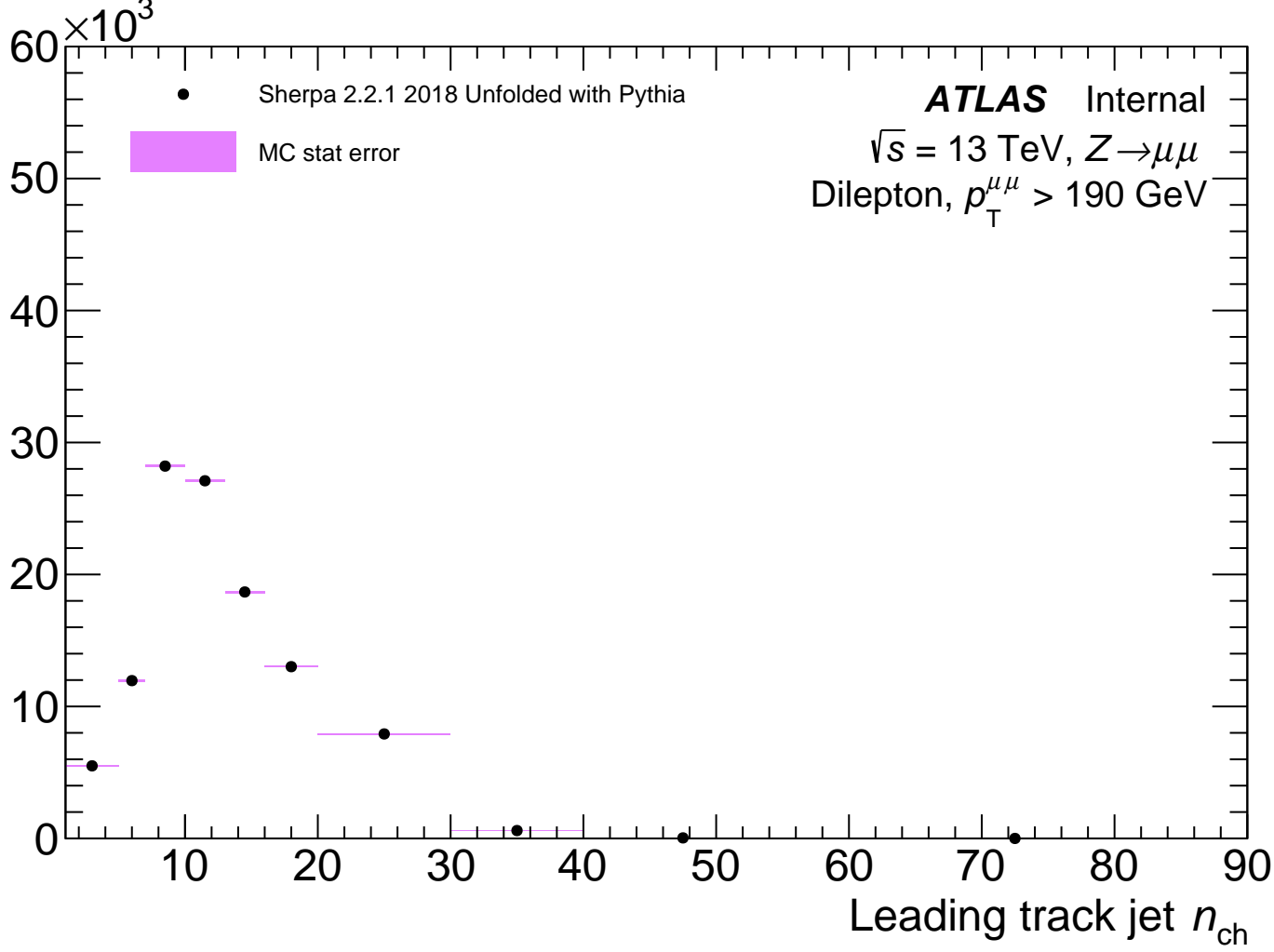
Events



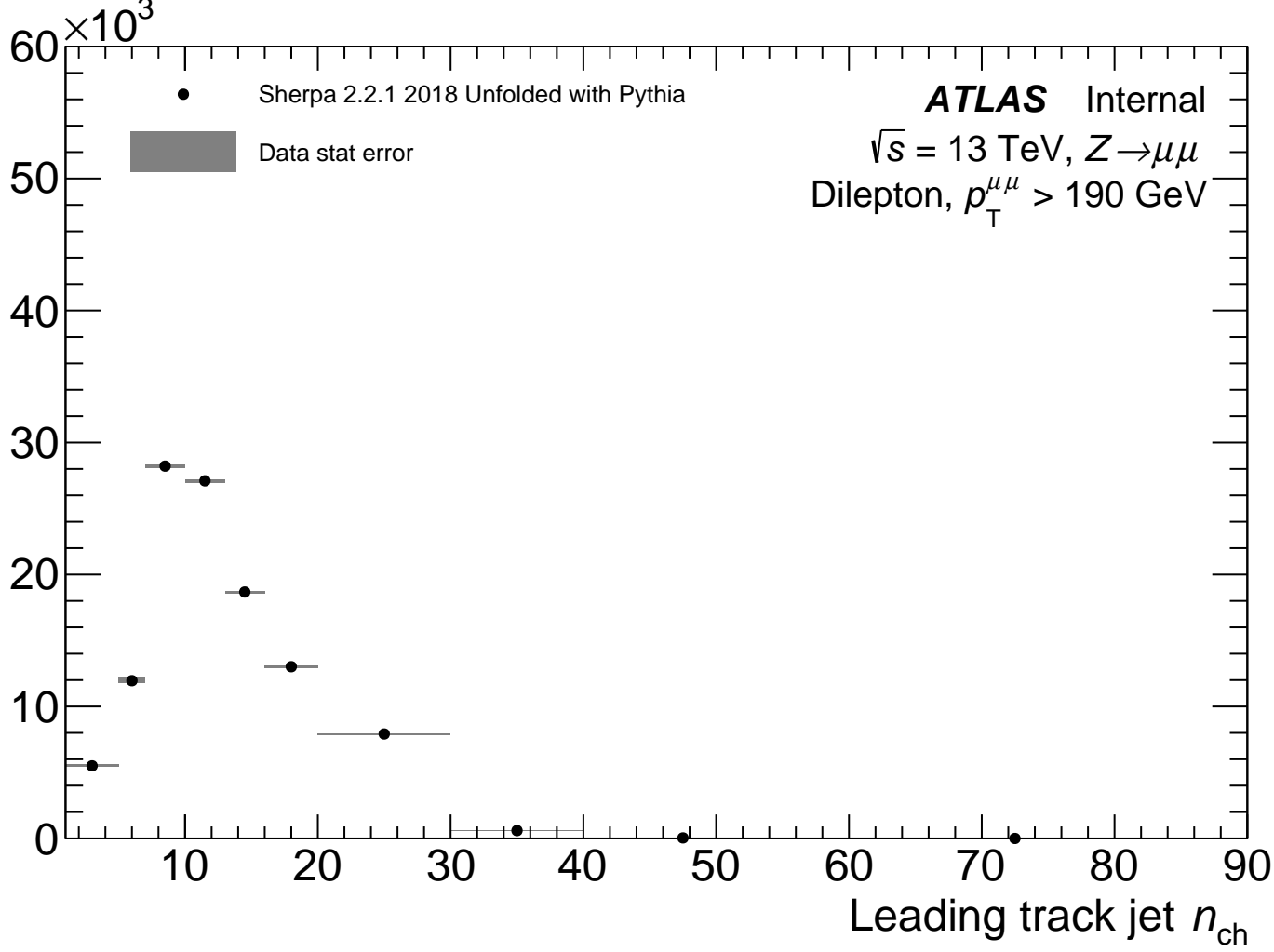
Events



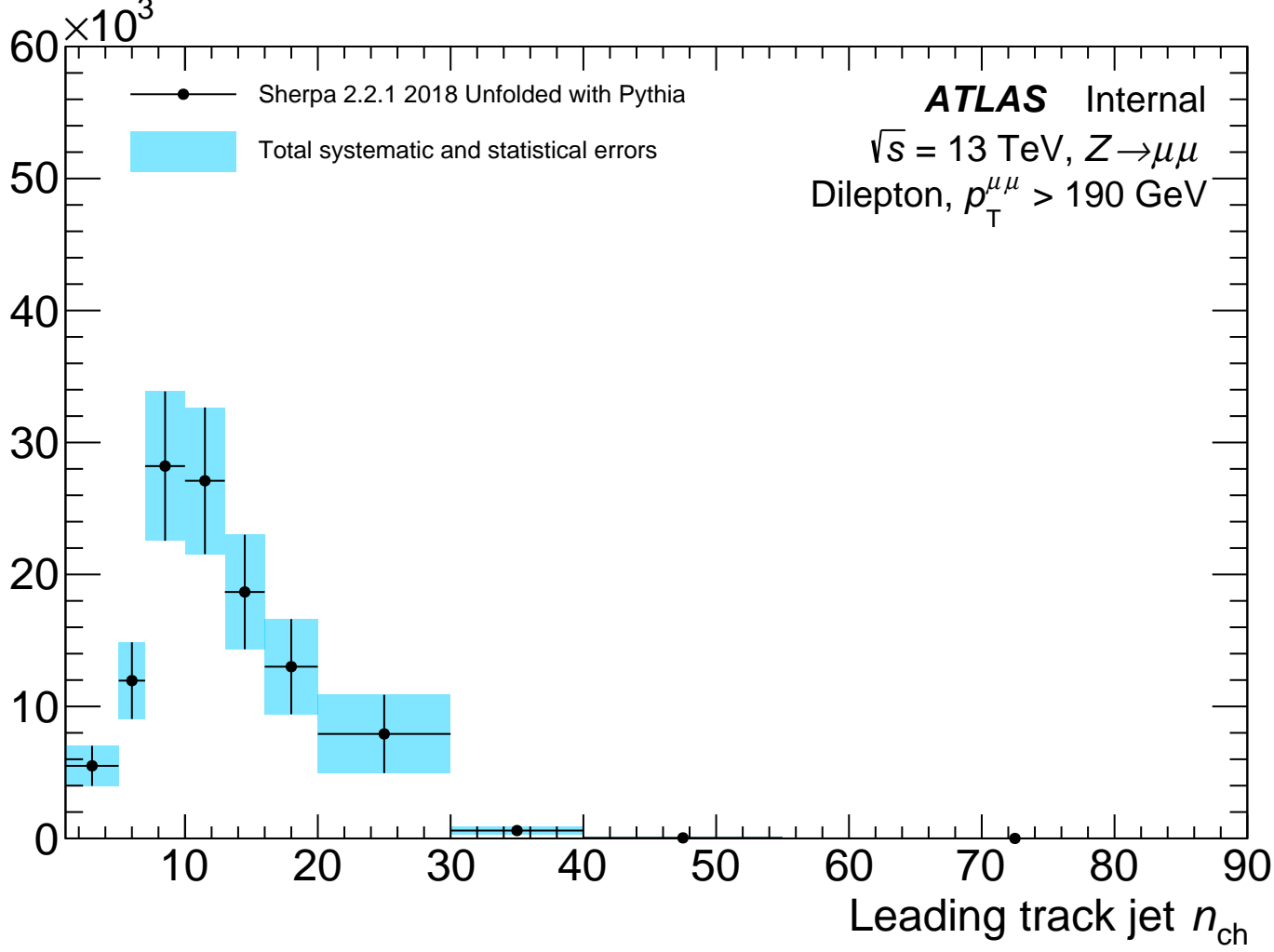
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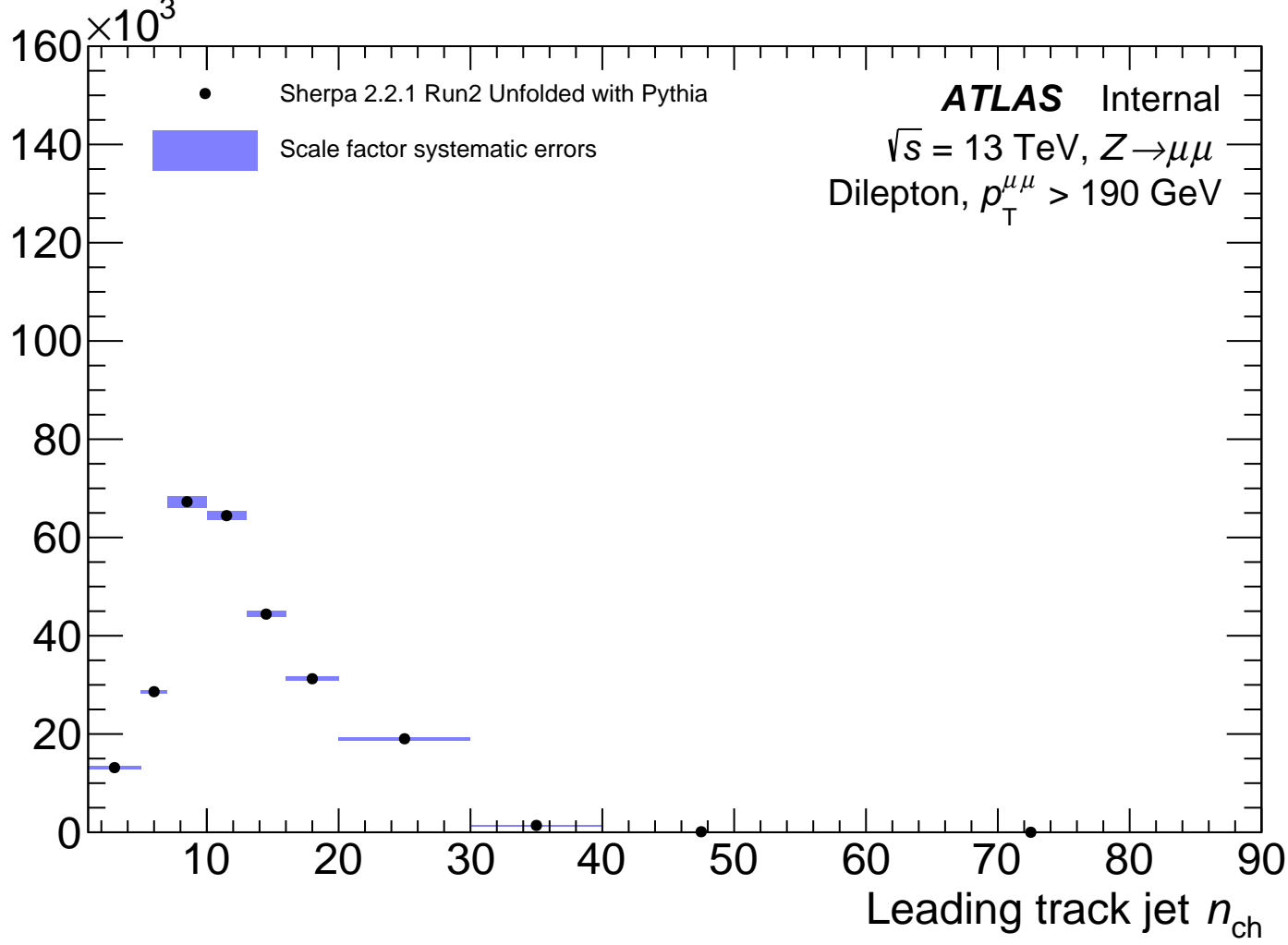
Events



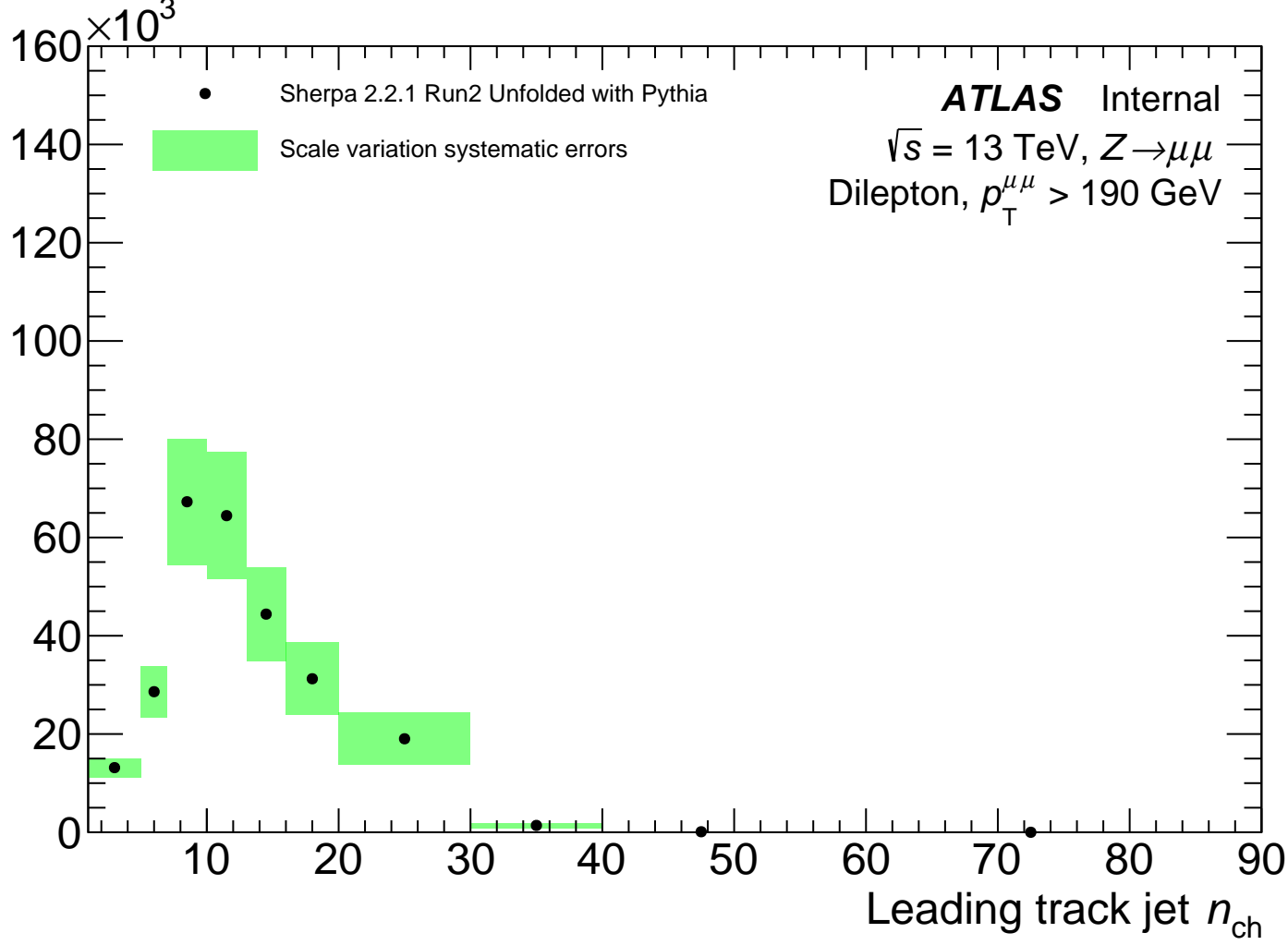
Events



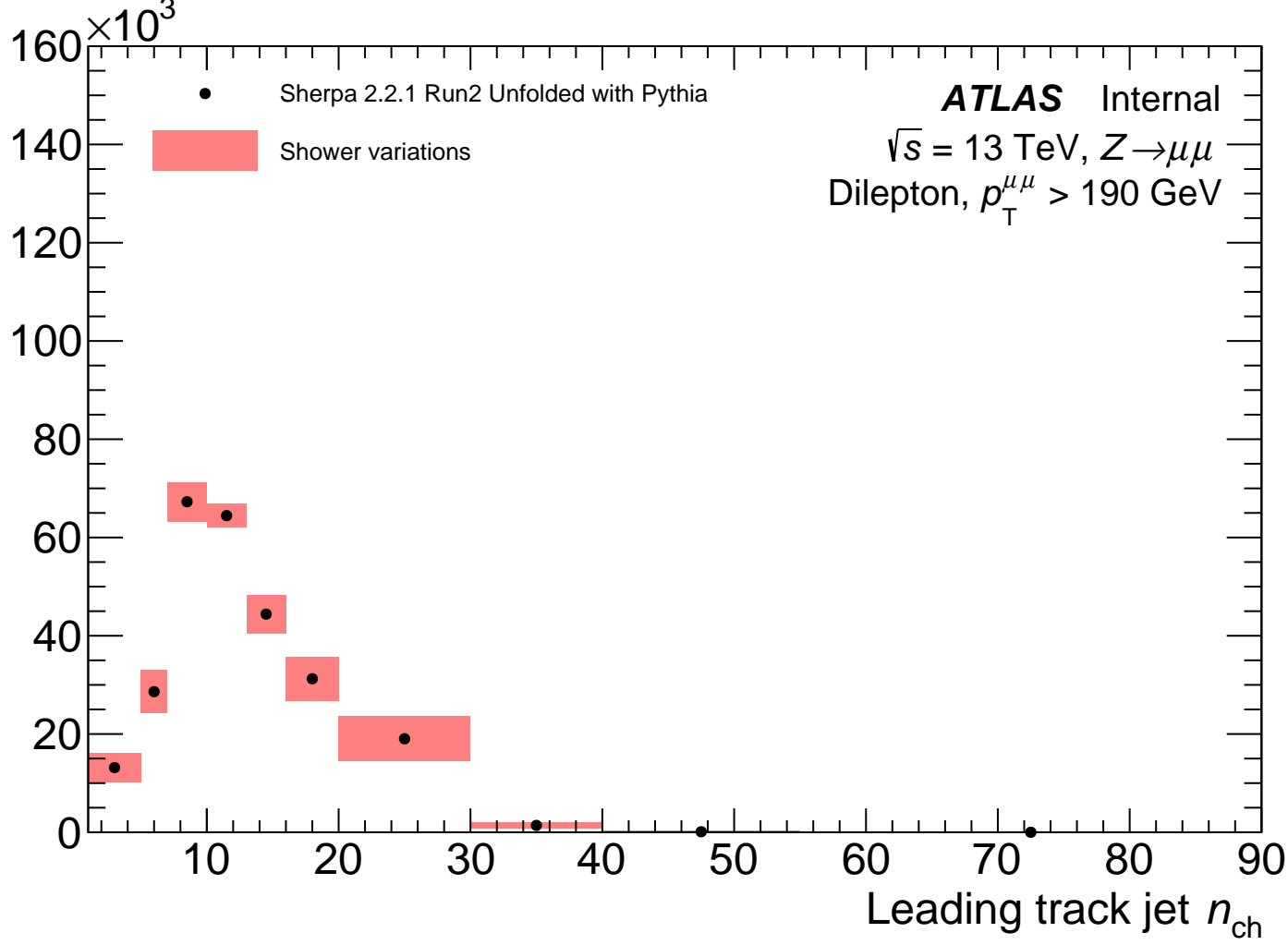
Events



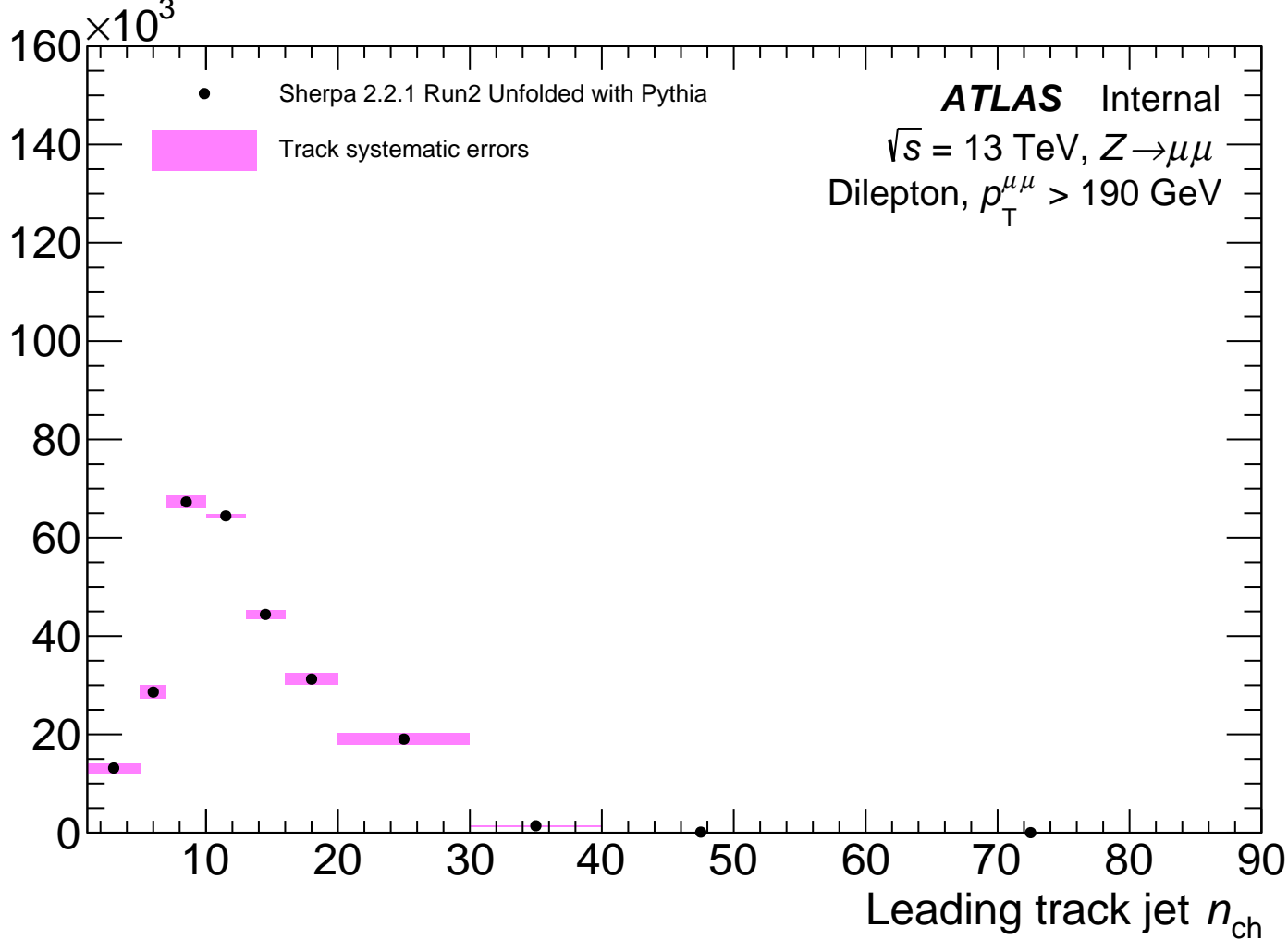
Events



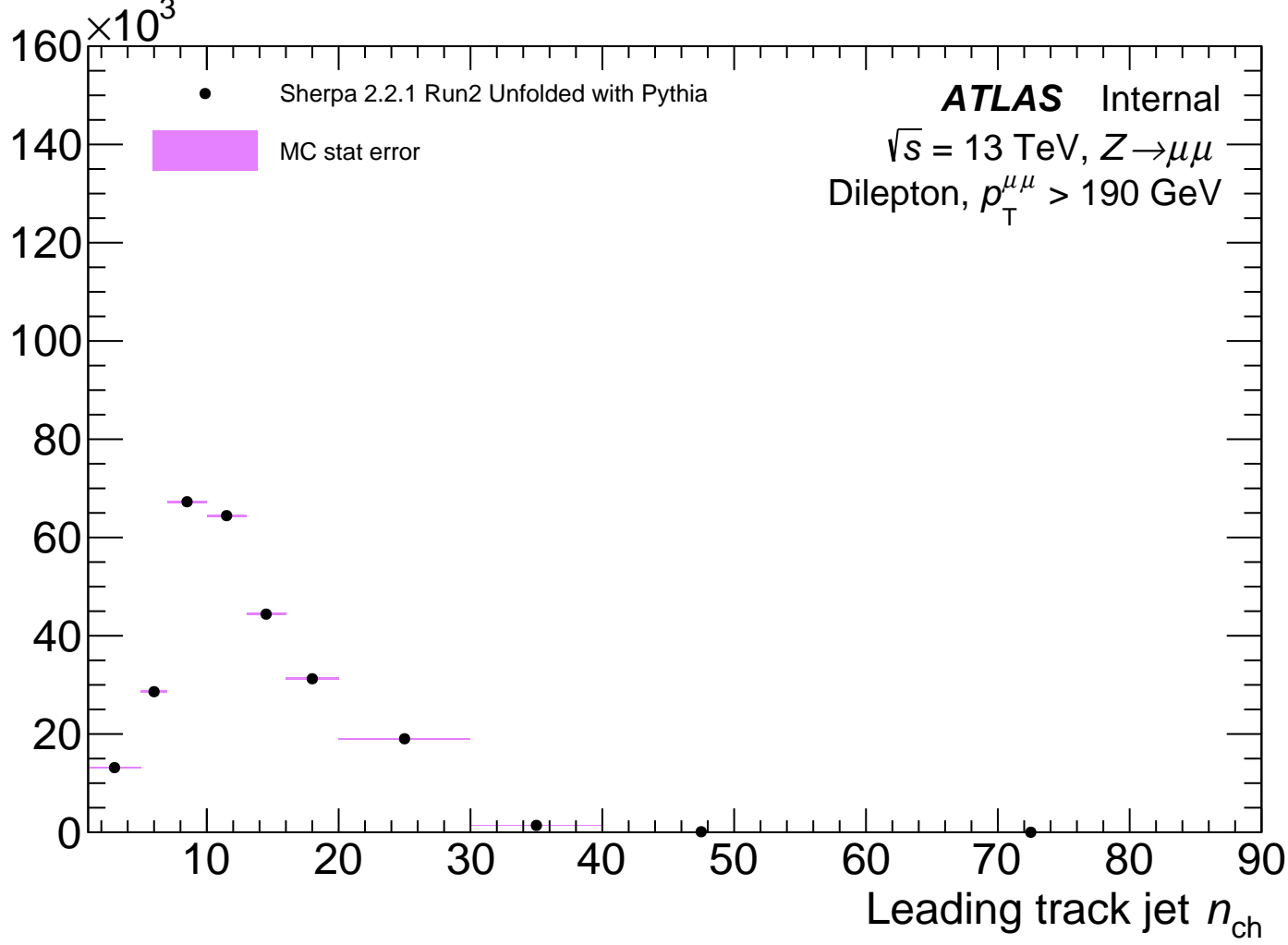
Events



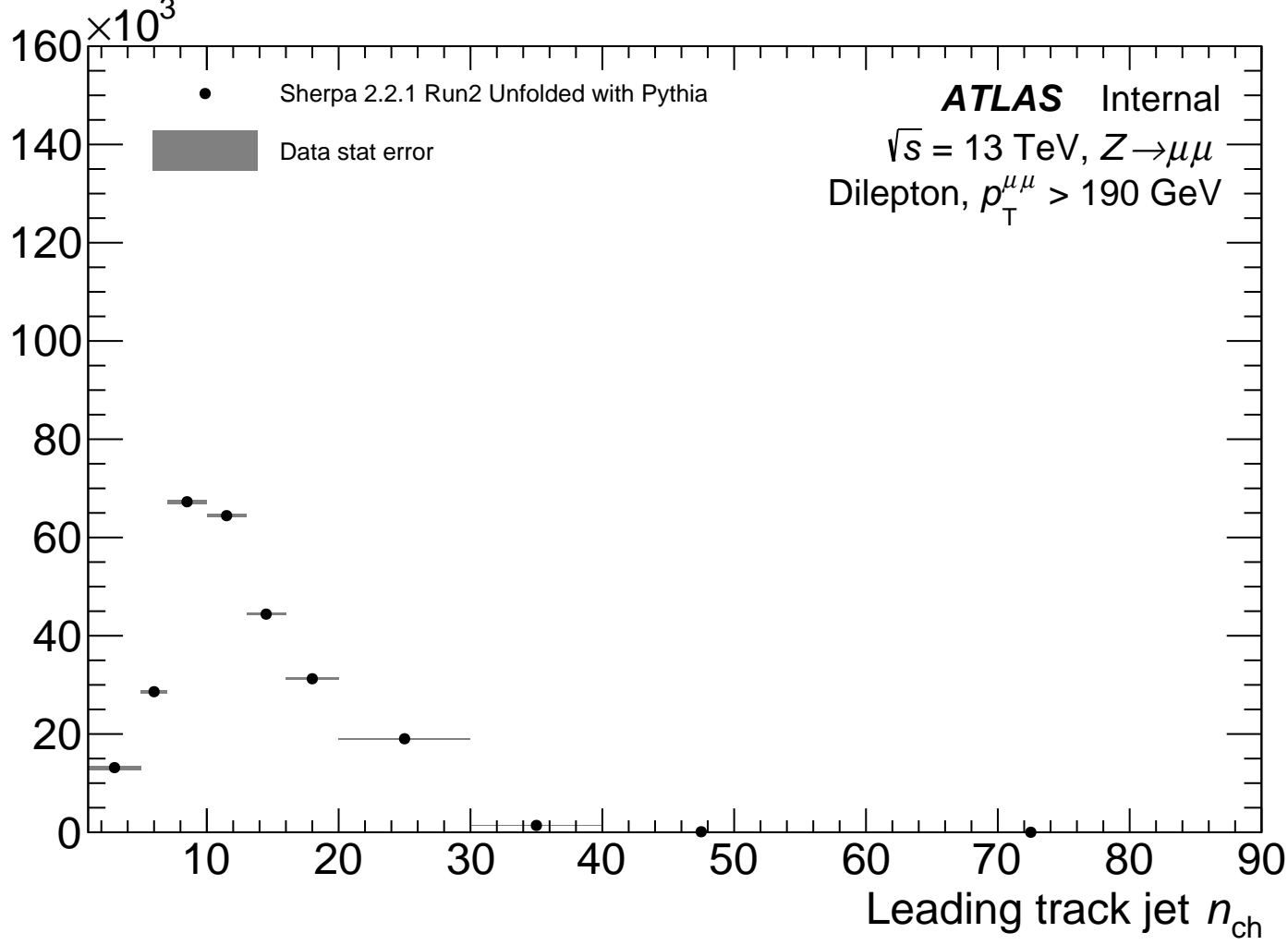
Events



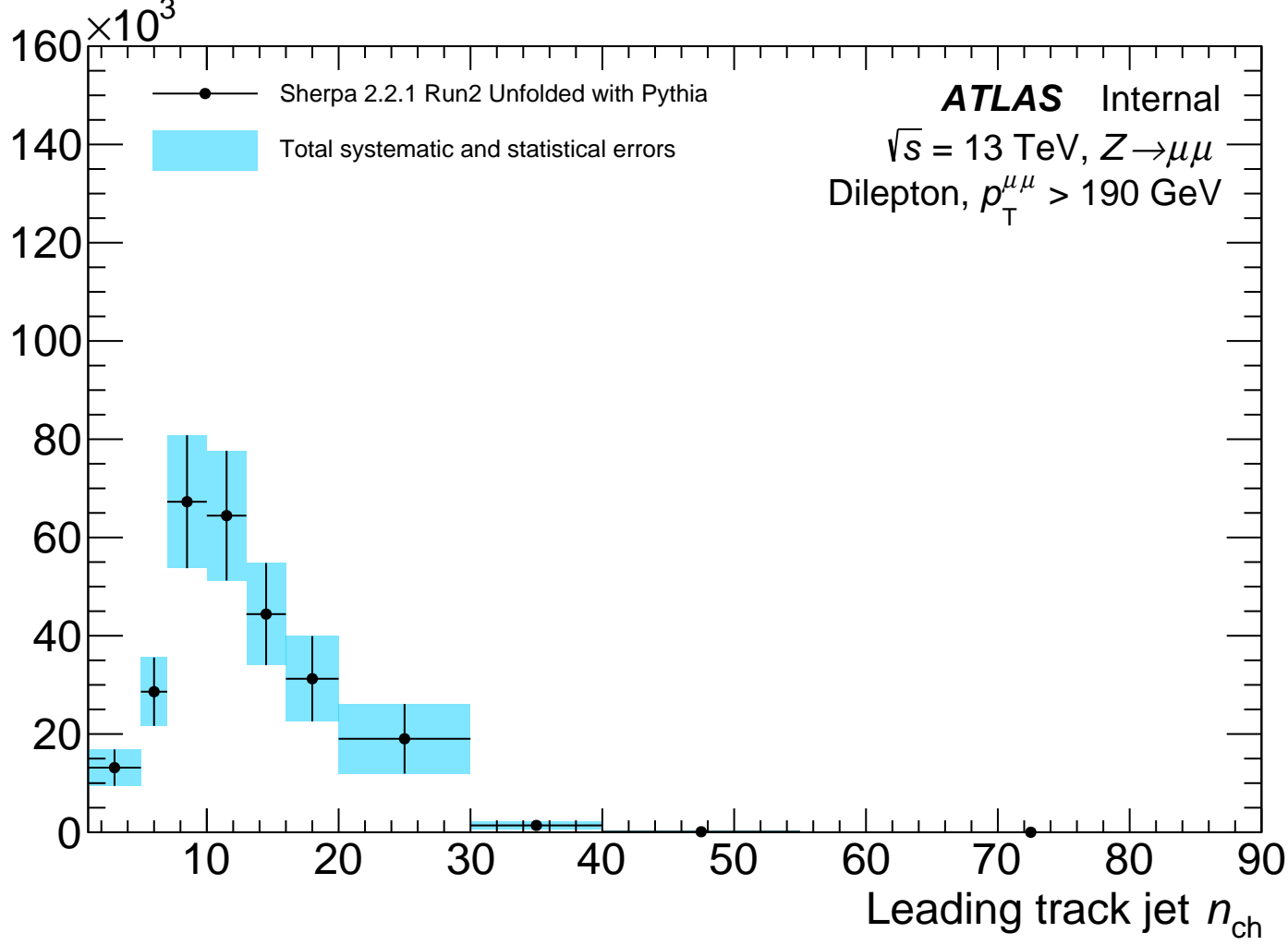
Events



Events



Events



Events

$\times 10^3$

50

40

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Sherpa 2.2.1 2016 Unfolded with Pythia

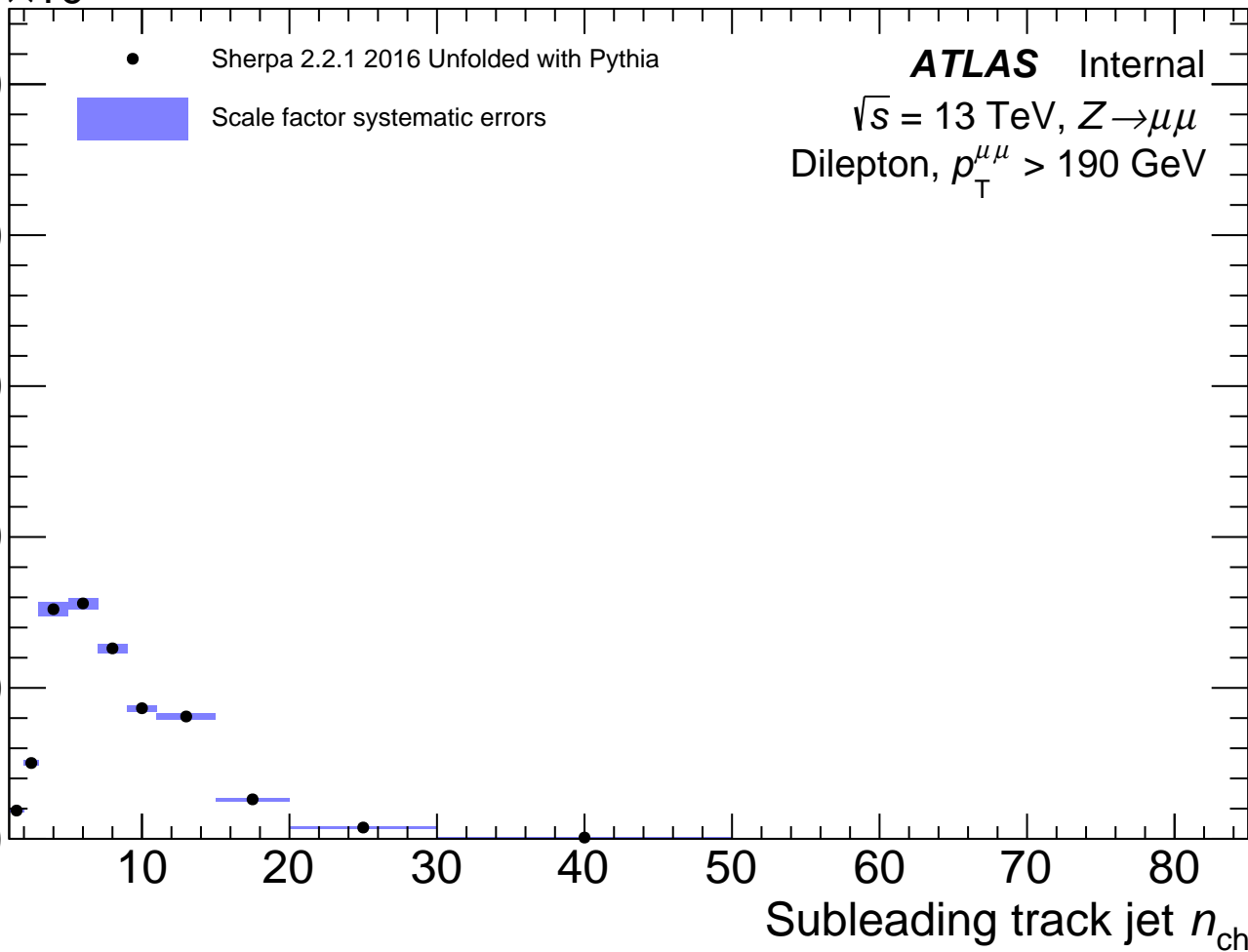
Scale factor systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

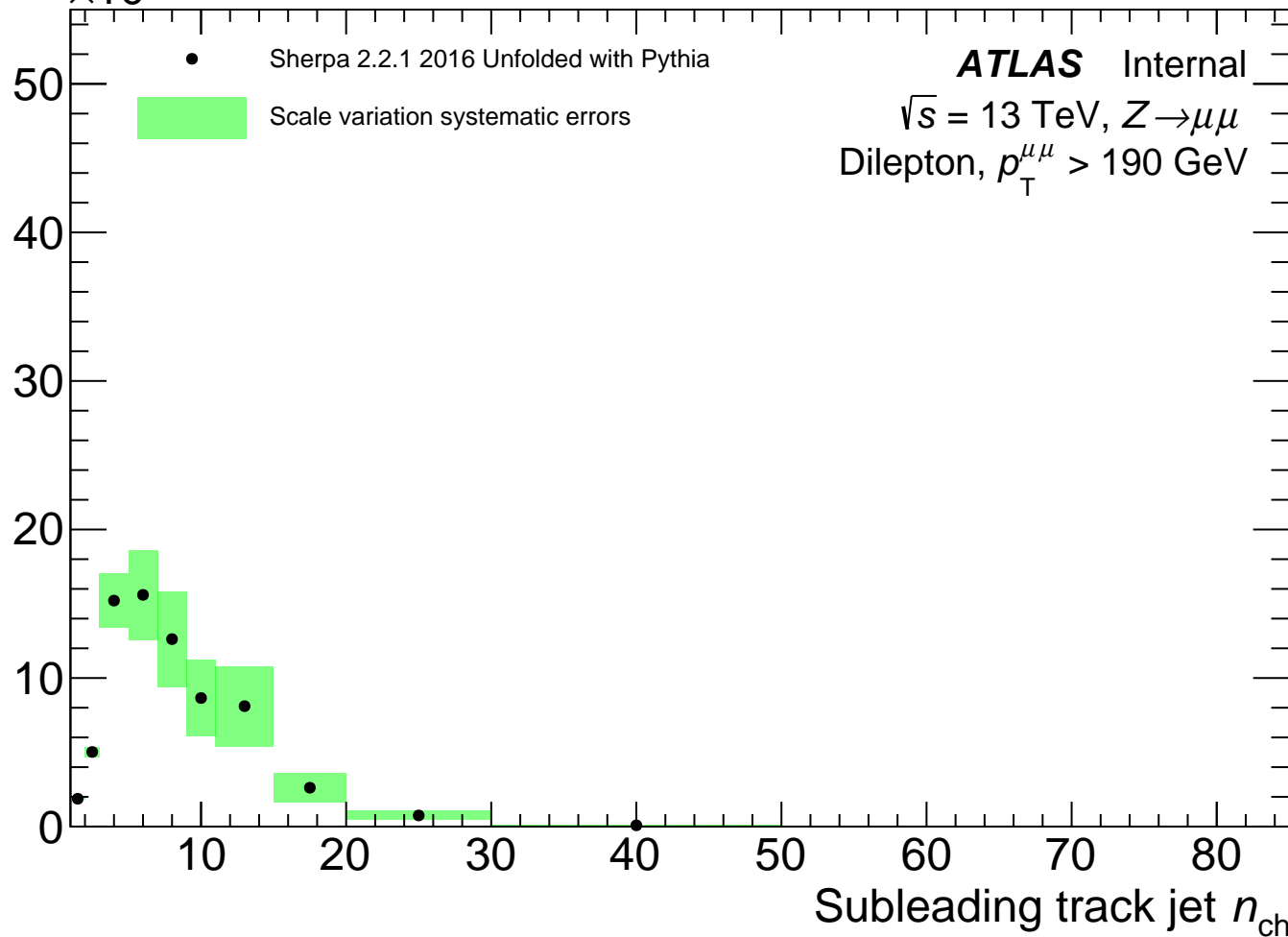
Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet n_{ch}



Events

$\times 10^3$



Events

$\times 10^3$

50

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Sherpa 2.2.1 2016 Unfolded with Pythia

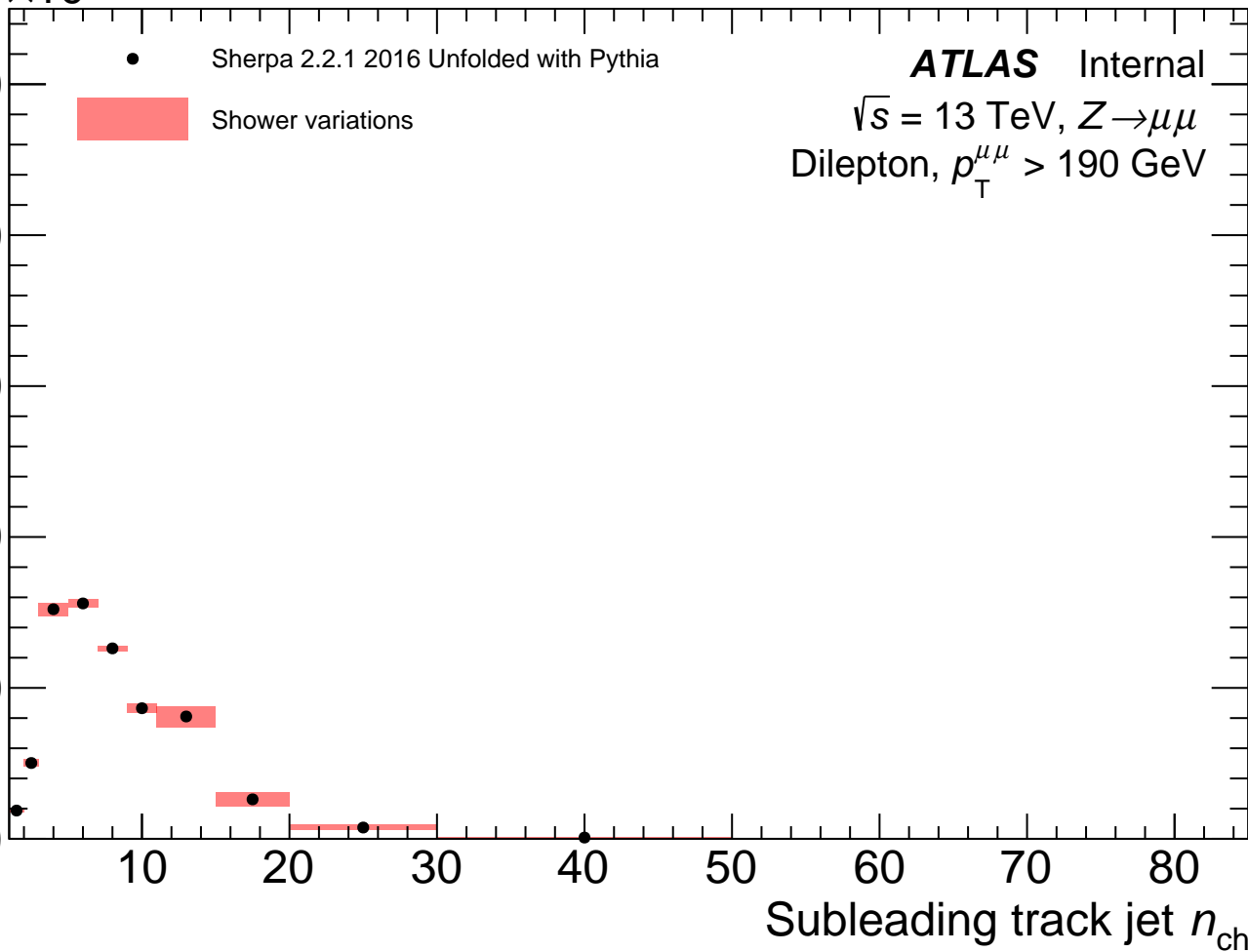
Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

Subleading track jet n_{ch}



Events

$\times 10^3$

Sherpa 2.2.1 2016 Unfolded with Pythia

Track systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

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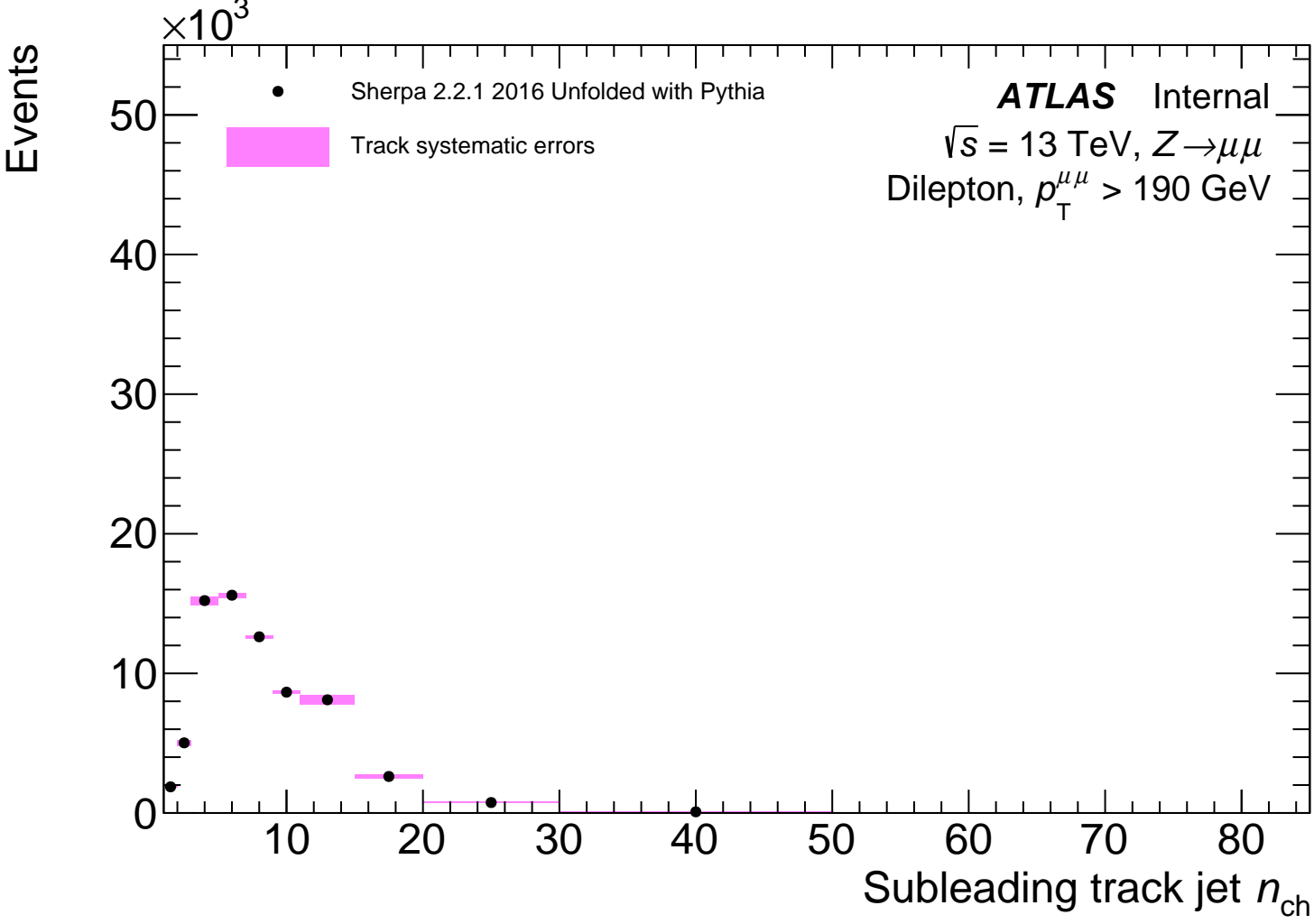
50

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80

Subleading track jet n_{ch}



Events

$\times 10^3$

Sherpa 2.2.1 2016 Unfolded with Pythia

MC stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

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Subleading track jet n_{ch}

n_{ch}

Events

$\times 10^3$

Sherpa 2.2.1 2016 Unfolded with Pythia

Data stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

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50

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Subleading track jet n_{ch}

Events

 $\times 10^3$

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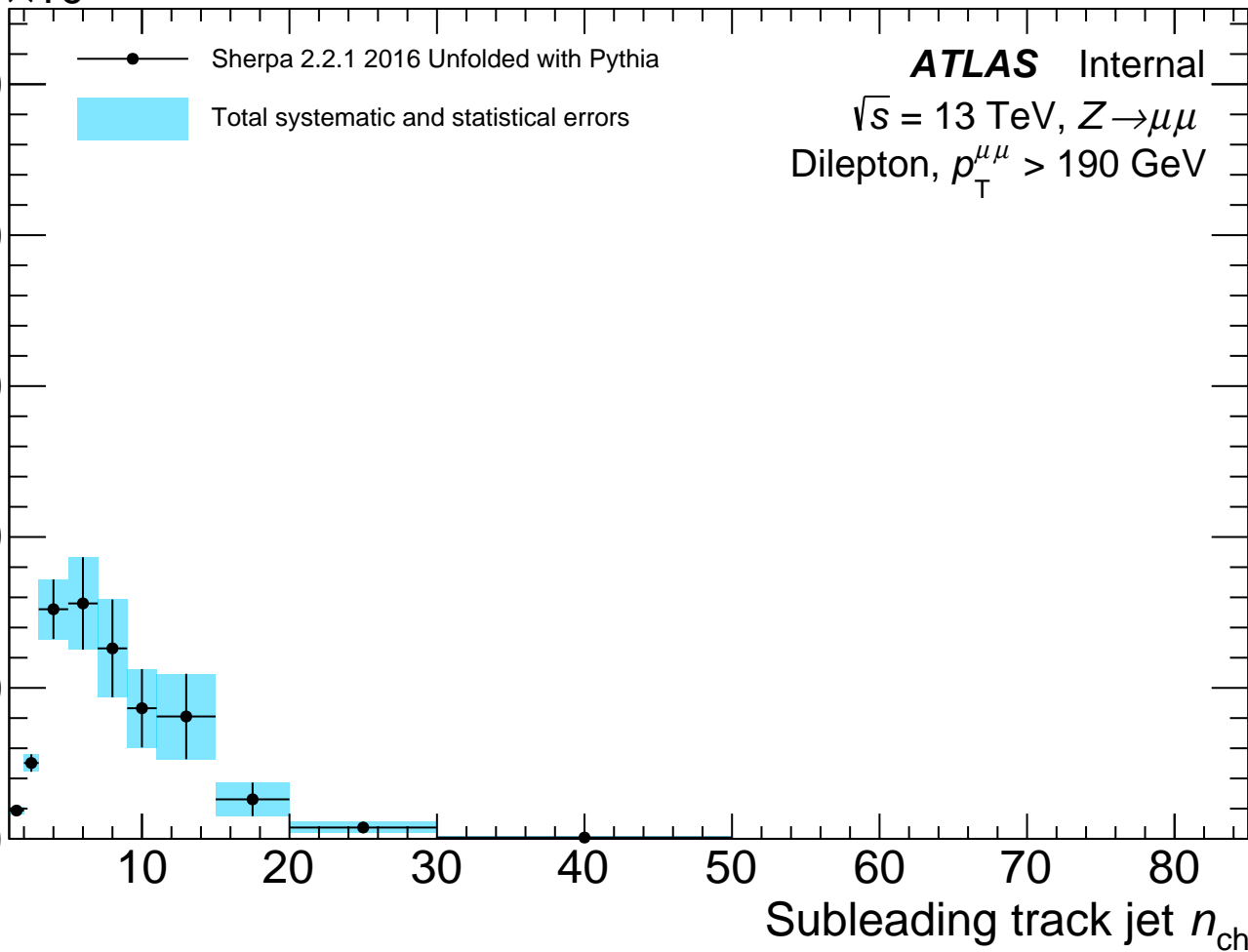
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Sherpa 2.2.1 2016 Unfolded with Pythia

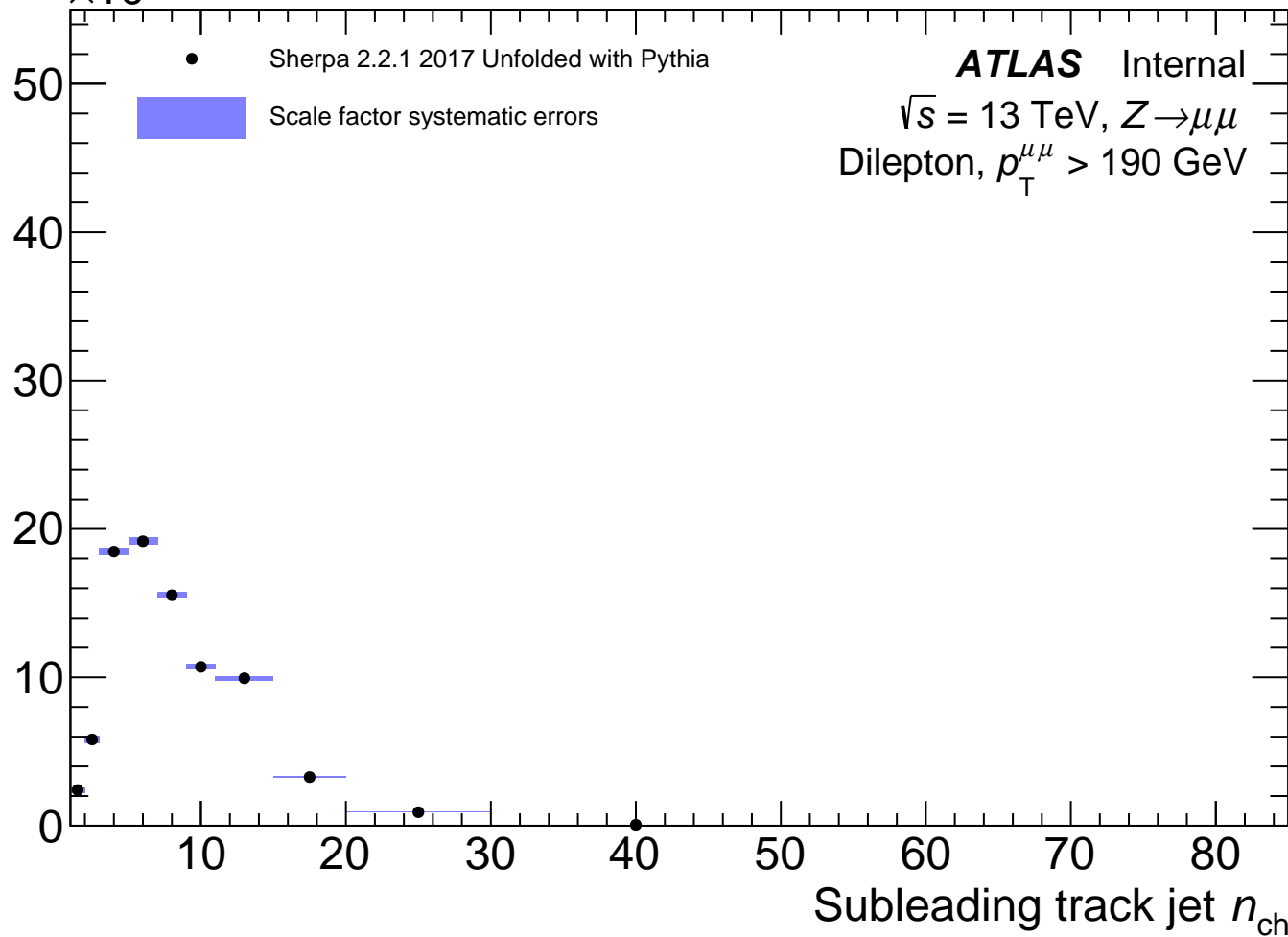


Total systematic and statistical errors

ATLAS Internal $\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$ Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$ Subleading track jet n_{ch}

Events

$\times 10^3$



Events

 $\times 10^3$

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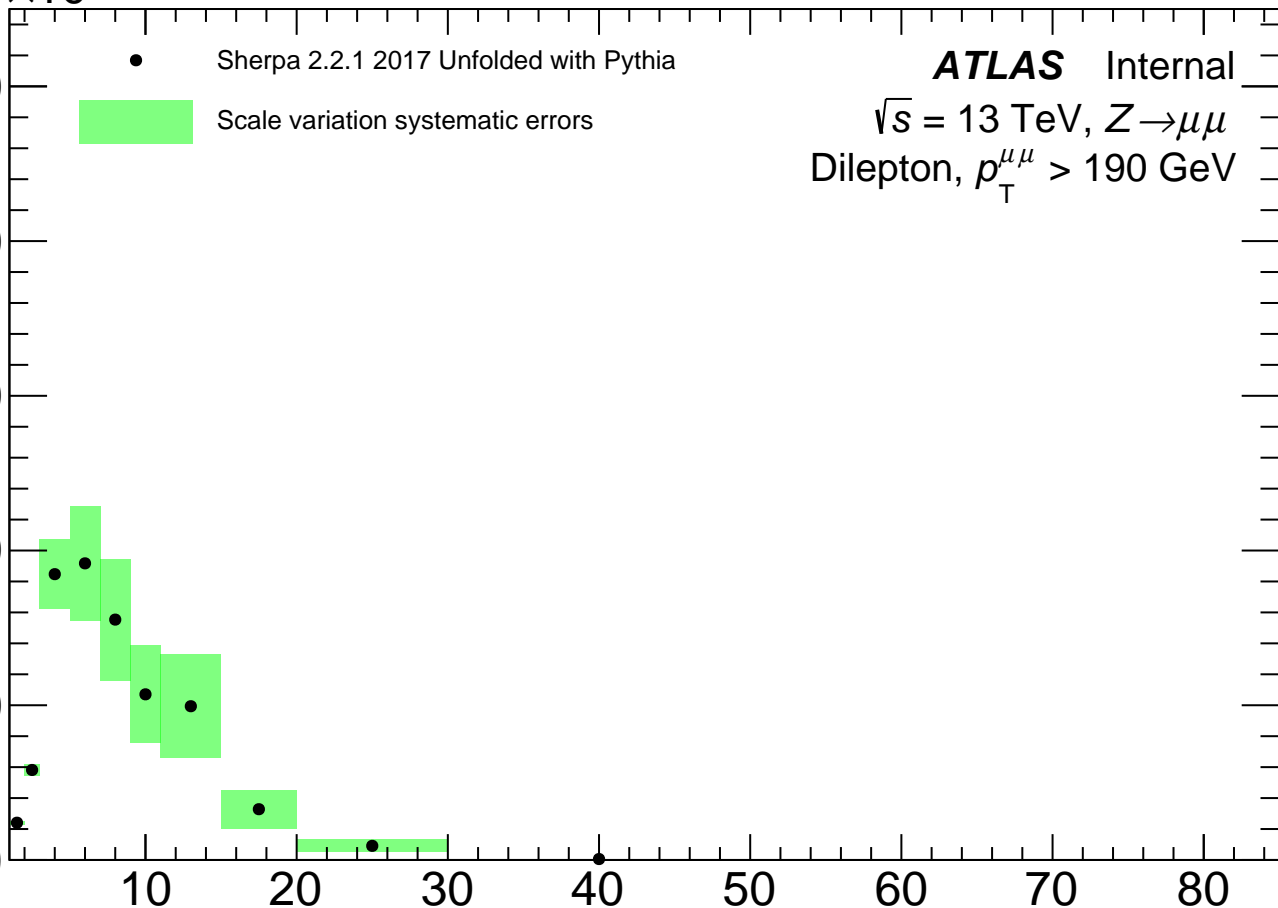
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Sherpa 2.2.1 2017 Unfolded with Pythia

Scale variation systematic errors

ATLAS Internal $\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$ Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$ Subleading track jet n_{ch} 

Events

$\times 10^3$

Sherpa 2.2.1 2017 Unfolded with Pythia

Shower variations

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$

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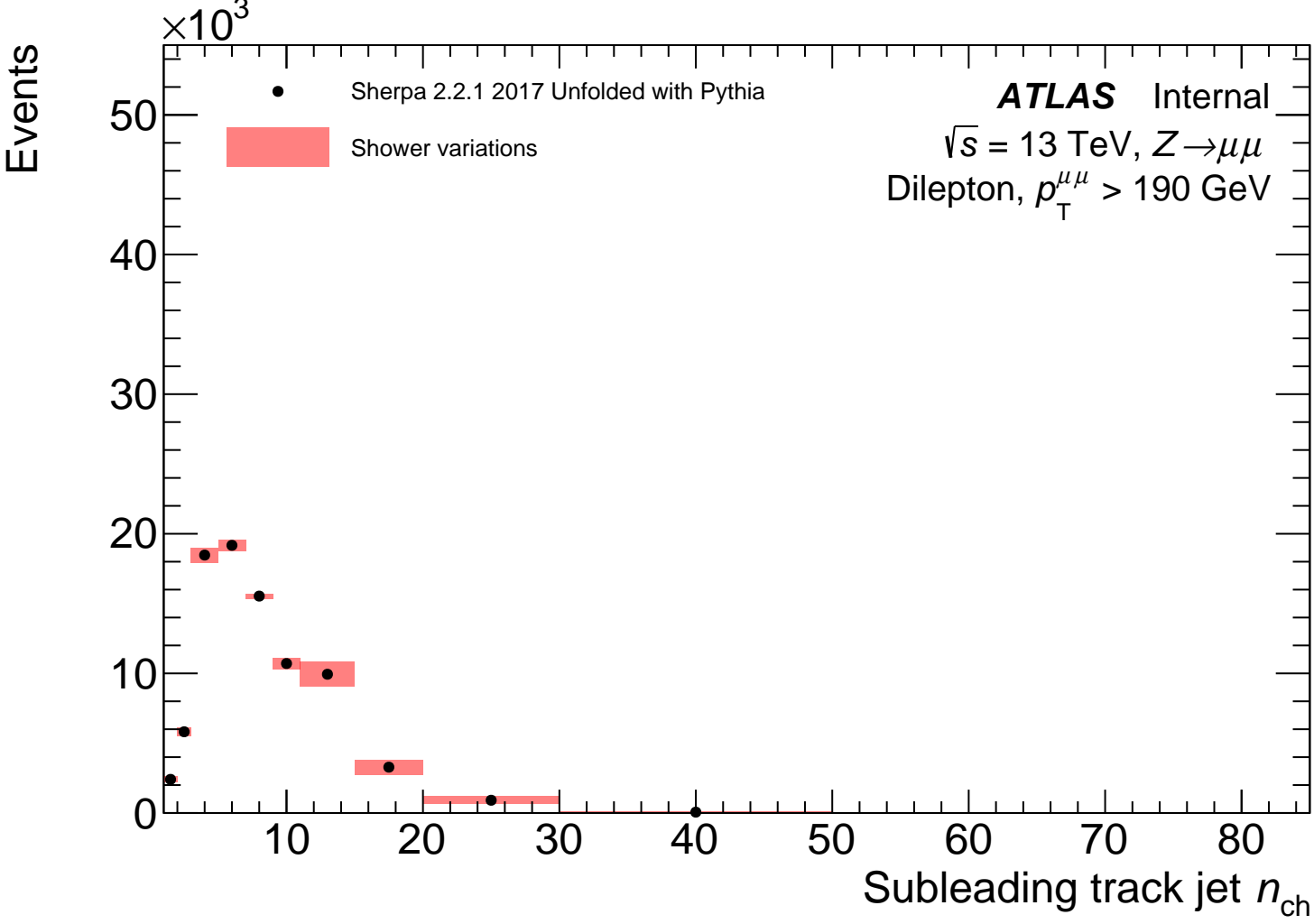
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Subleading track jet n_{ch}



Events

$\times 10^3$

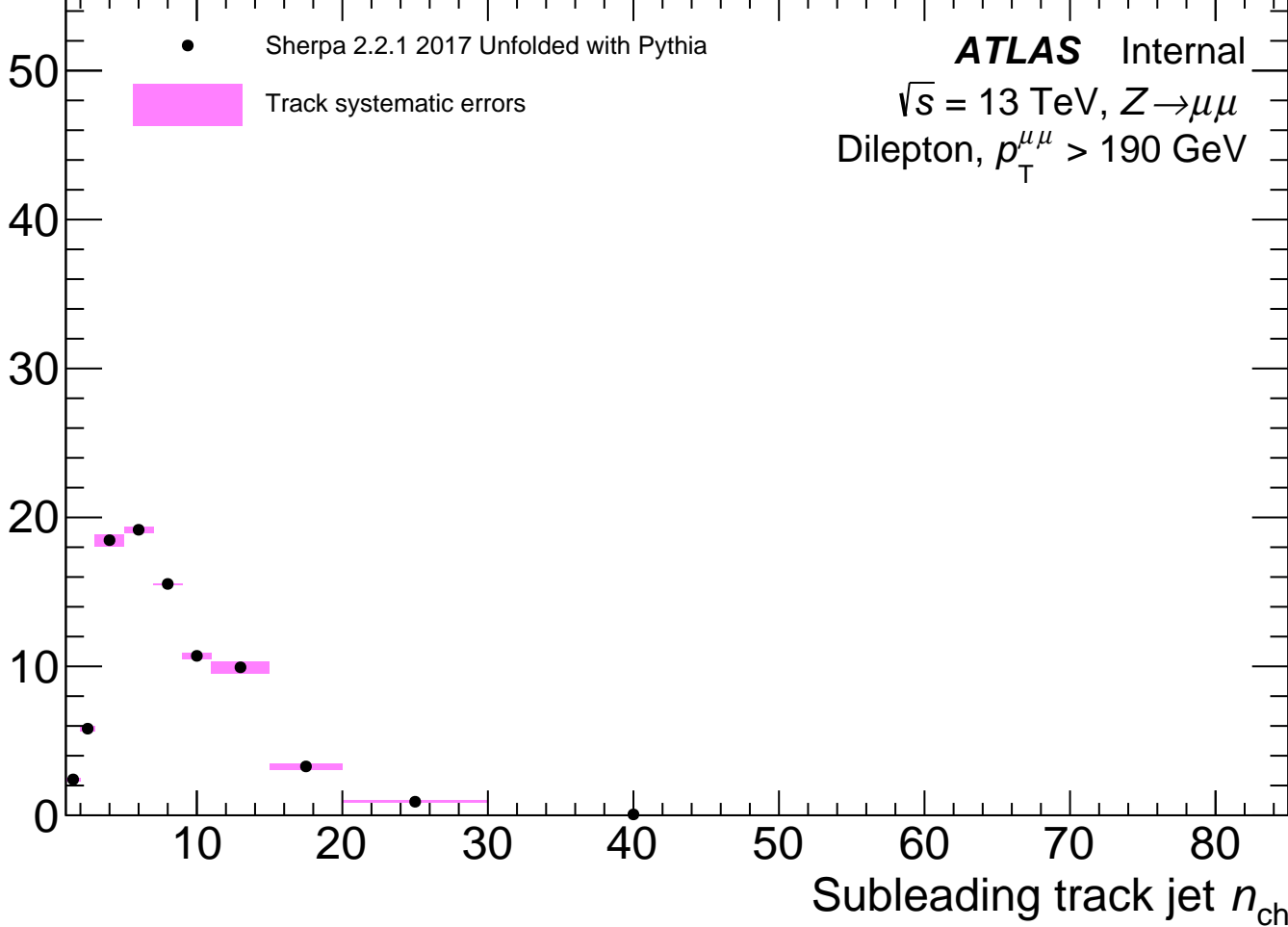
Sherpa 2.2.1 2017 Unfolded with Pythia

Track systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Events

$\times 10^3$

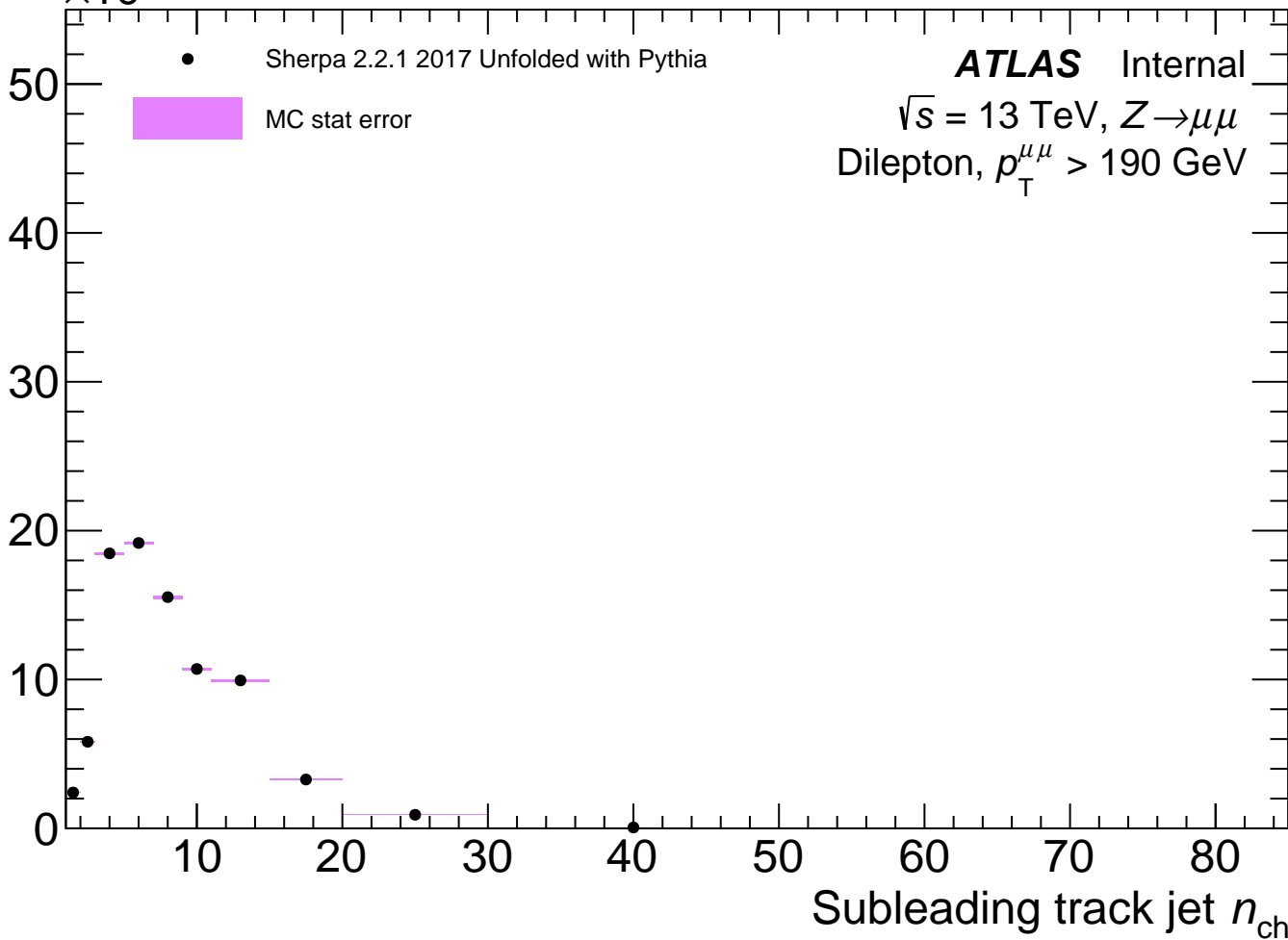
Sherpa 2.2.1 2017 Unfolded with Pythia

MC stat error

ATLAS Internal

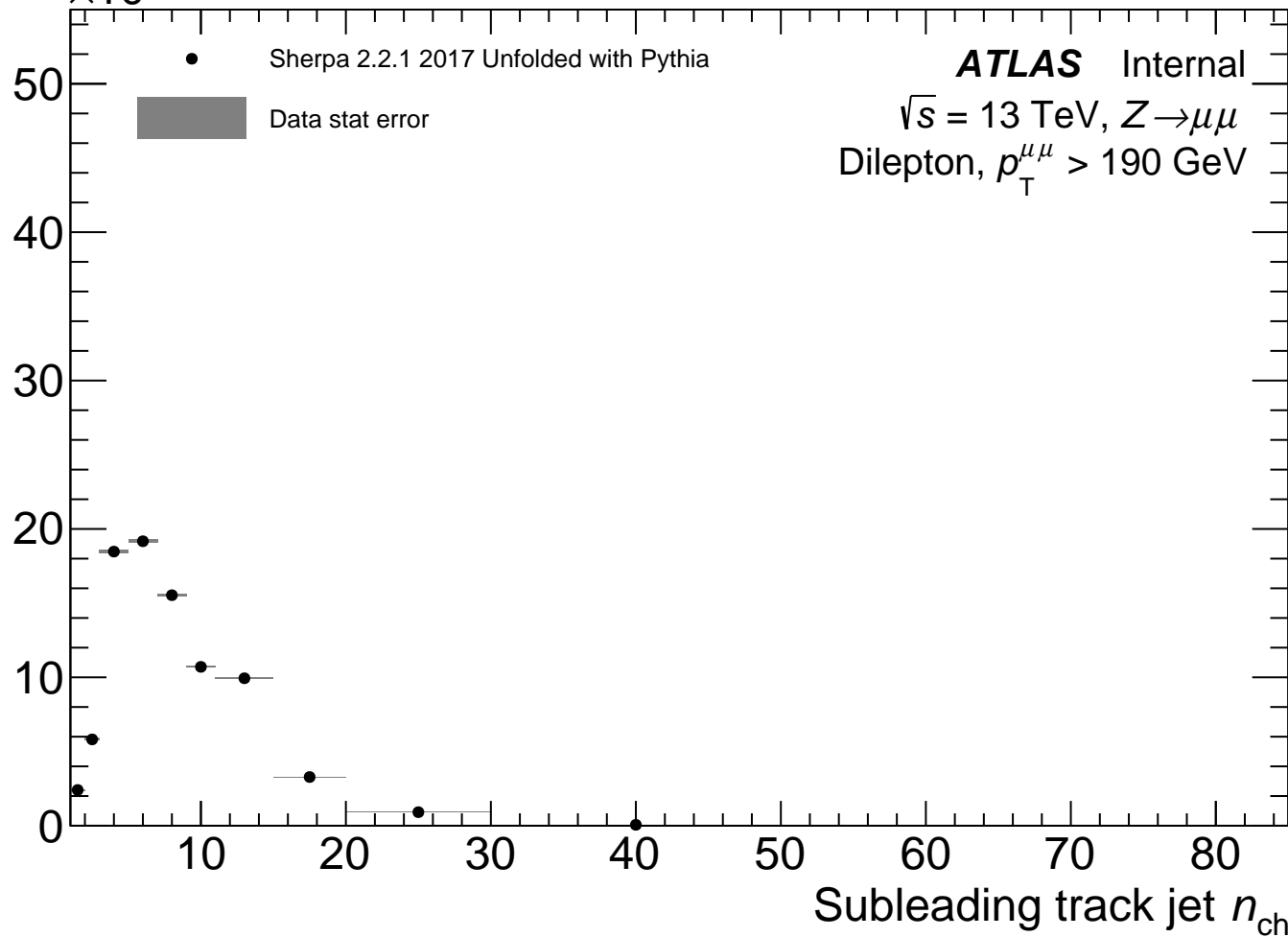
$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Events

$\times 10^3$



Events

$\times 10^3$

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Sherpa 2.2.1 2017 Unfolded with Pythia

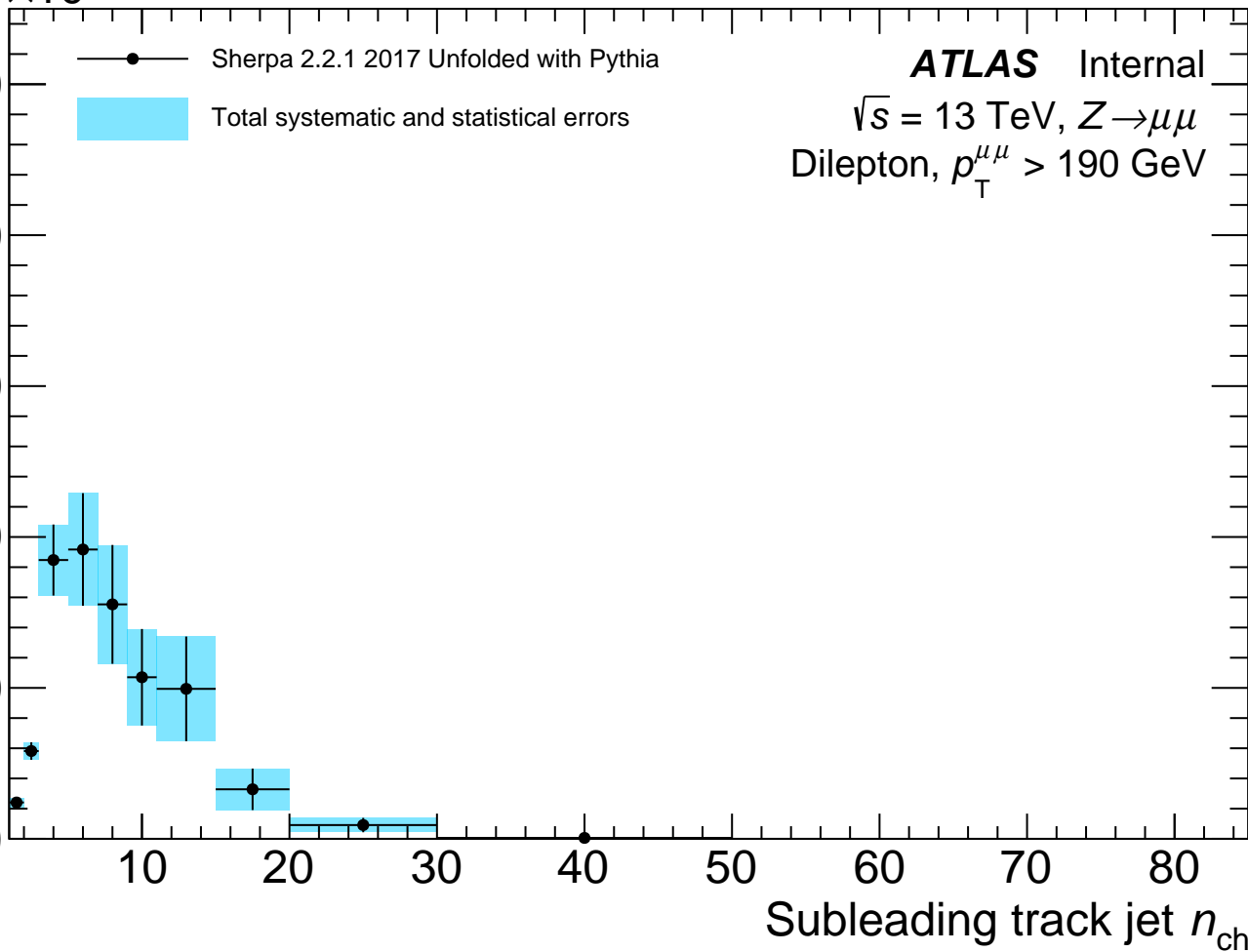


Total systematic and statistical errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

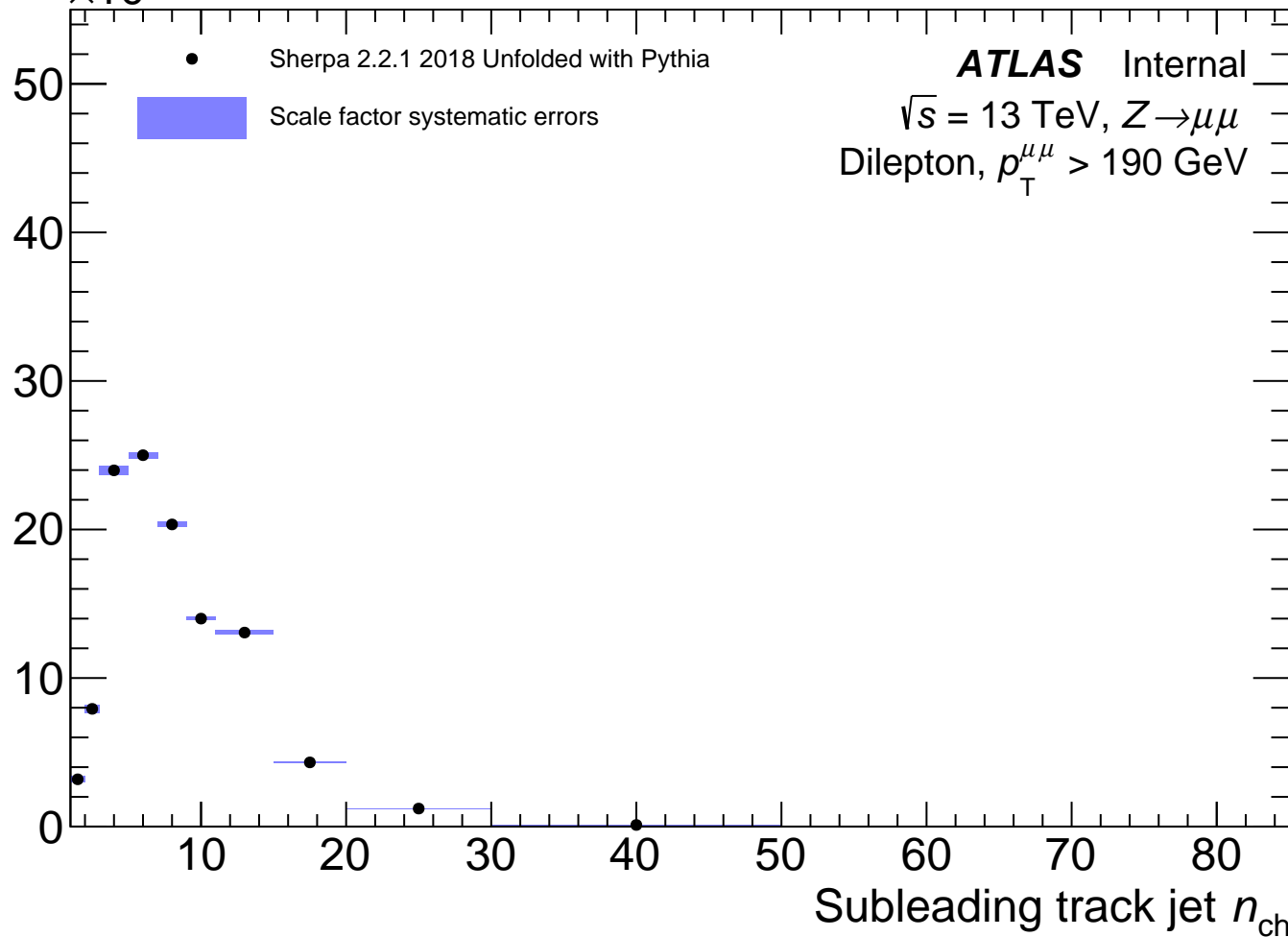
Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Subleading track jet n_{ch}

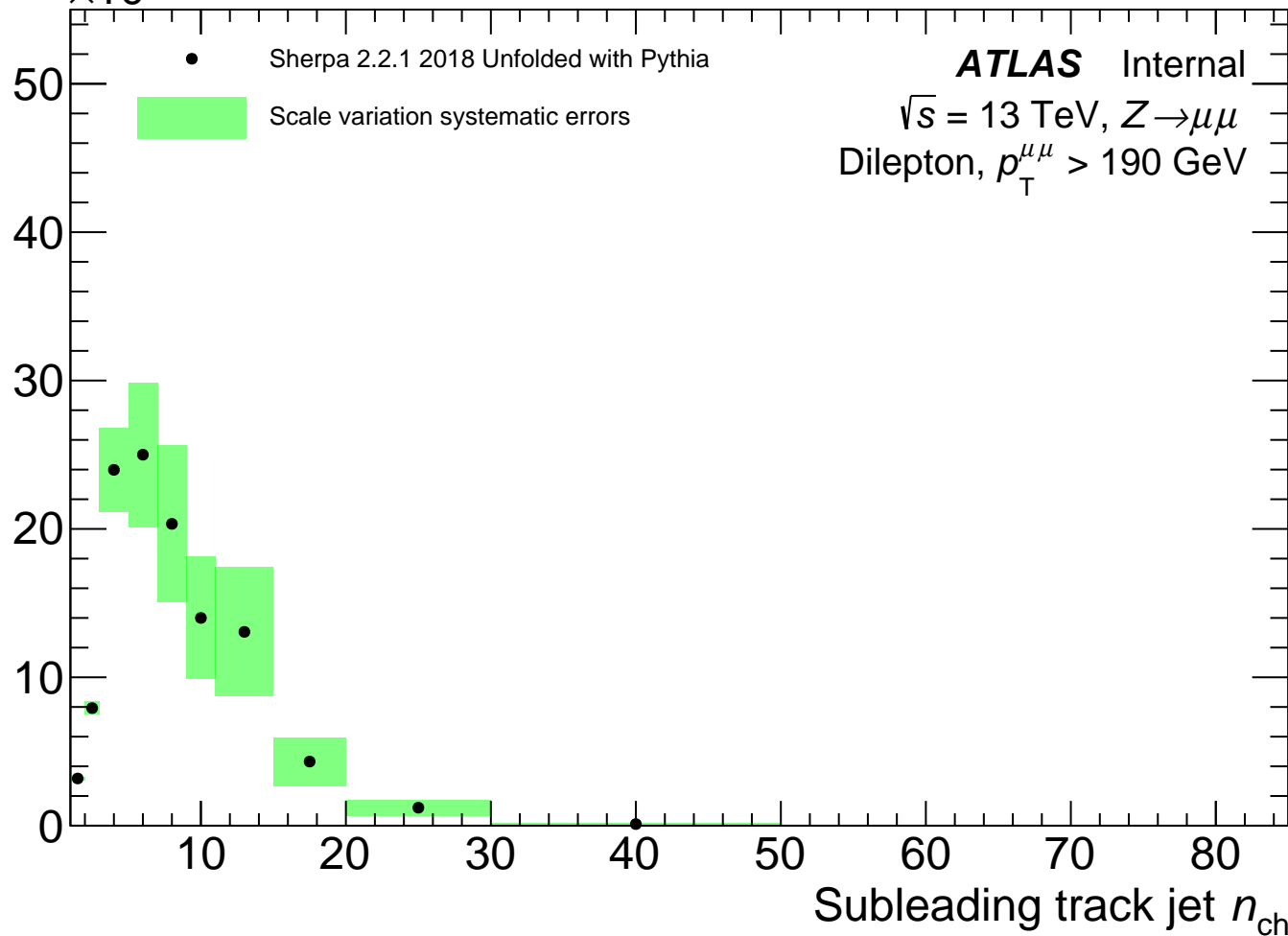
Events

$\times 10^3$



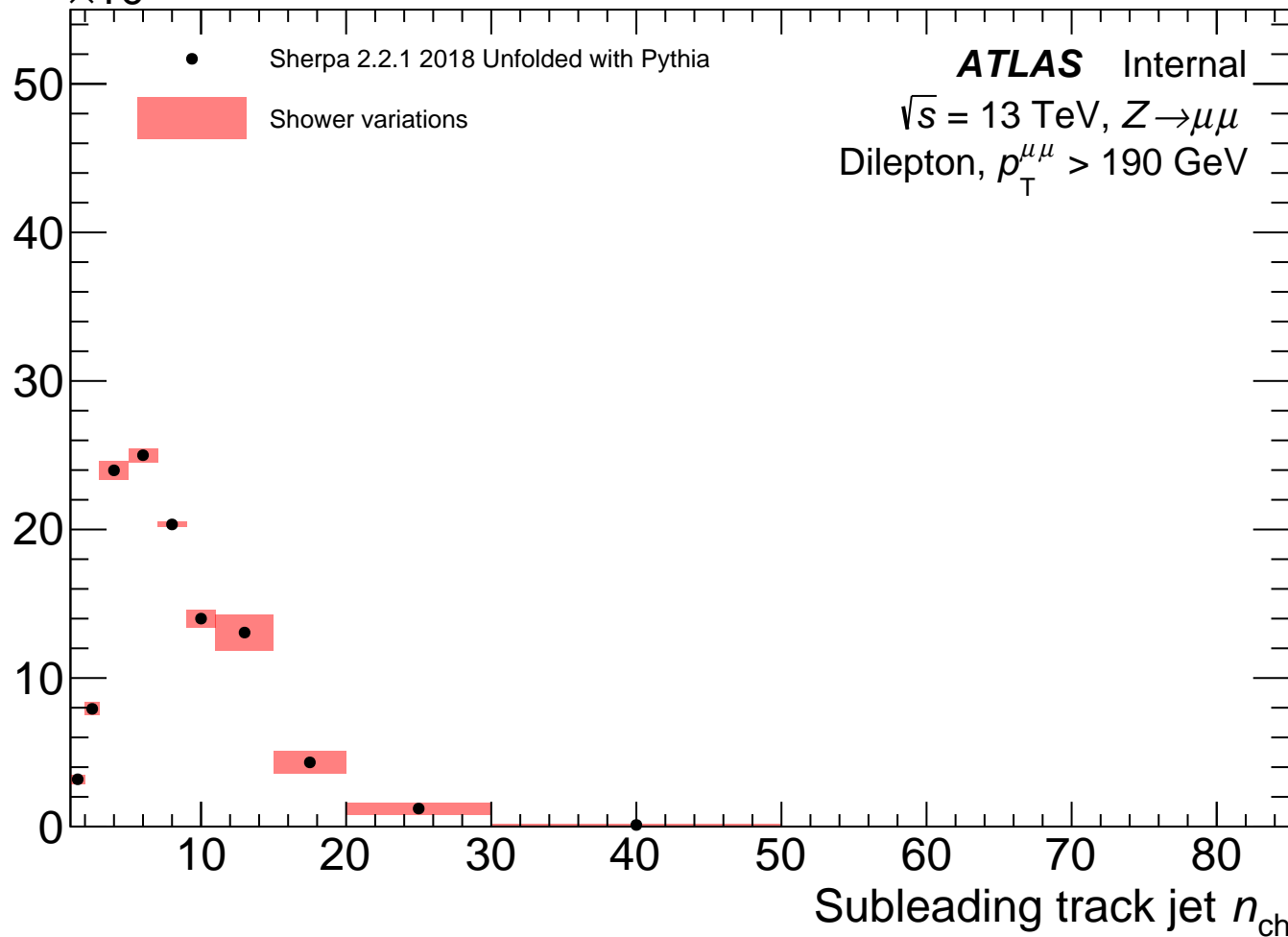
Events

$\times 10^3$



Events

$\times 10^3$



Events

$\times 10^3$

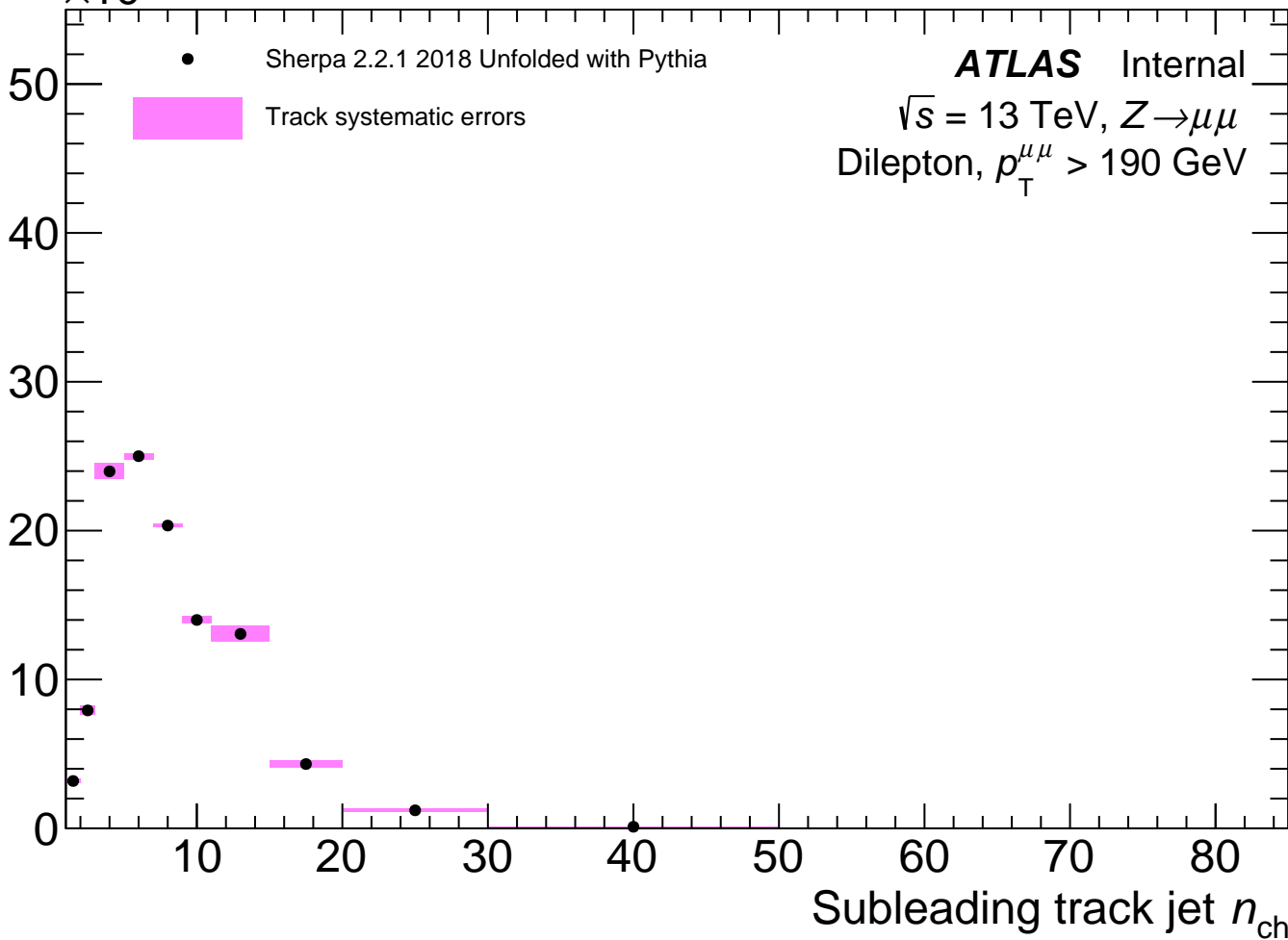
Sherpa 2.2.1 2018 Unfolded with Pythia

Track systematic errors

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Events

$\times 10^3$

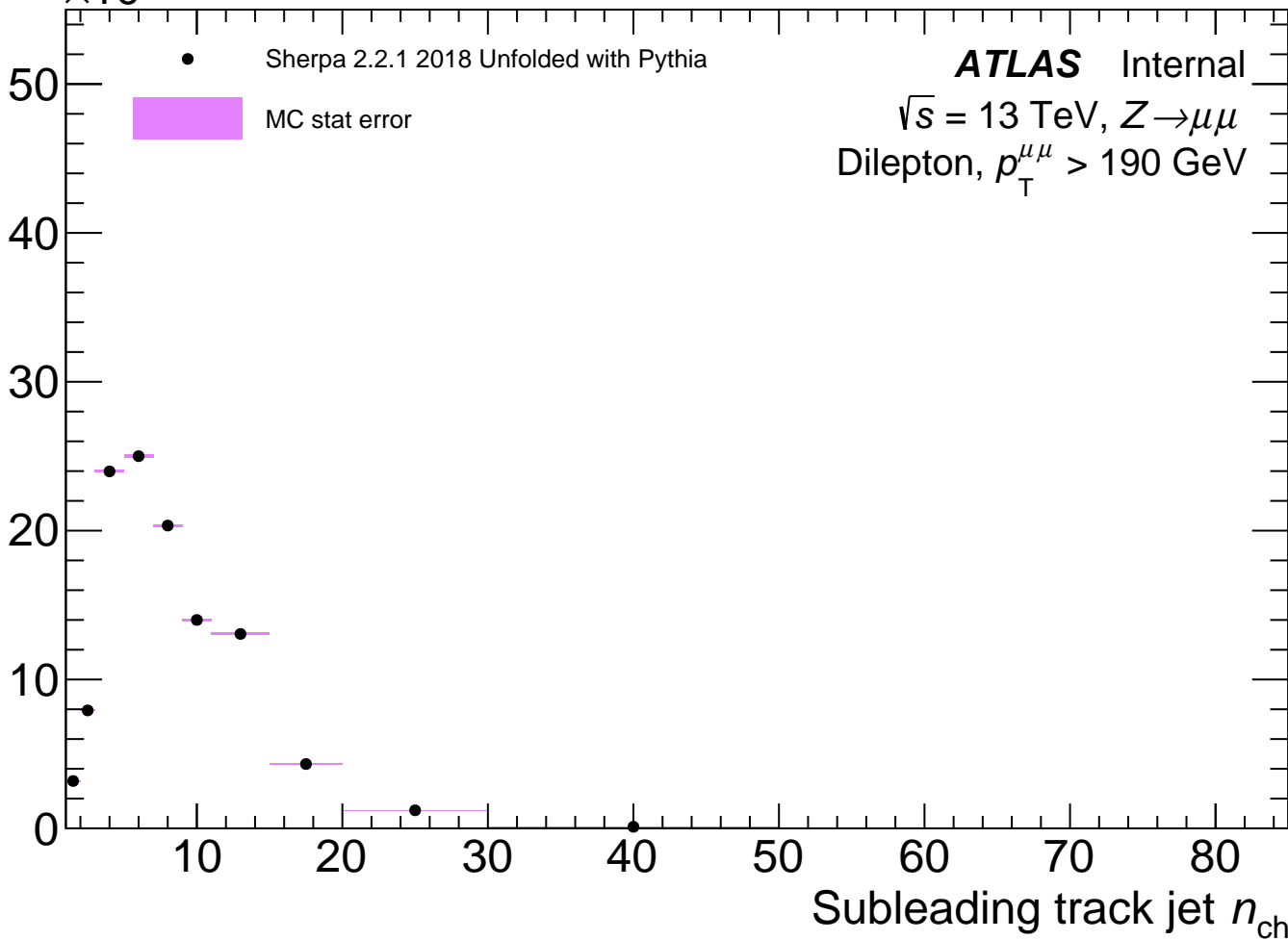
Sherpa 2.2.1 2018 Unfolded with Pythia

MC stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Events

$\times 10^3$

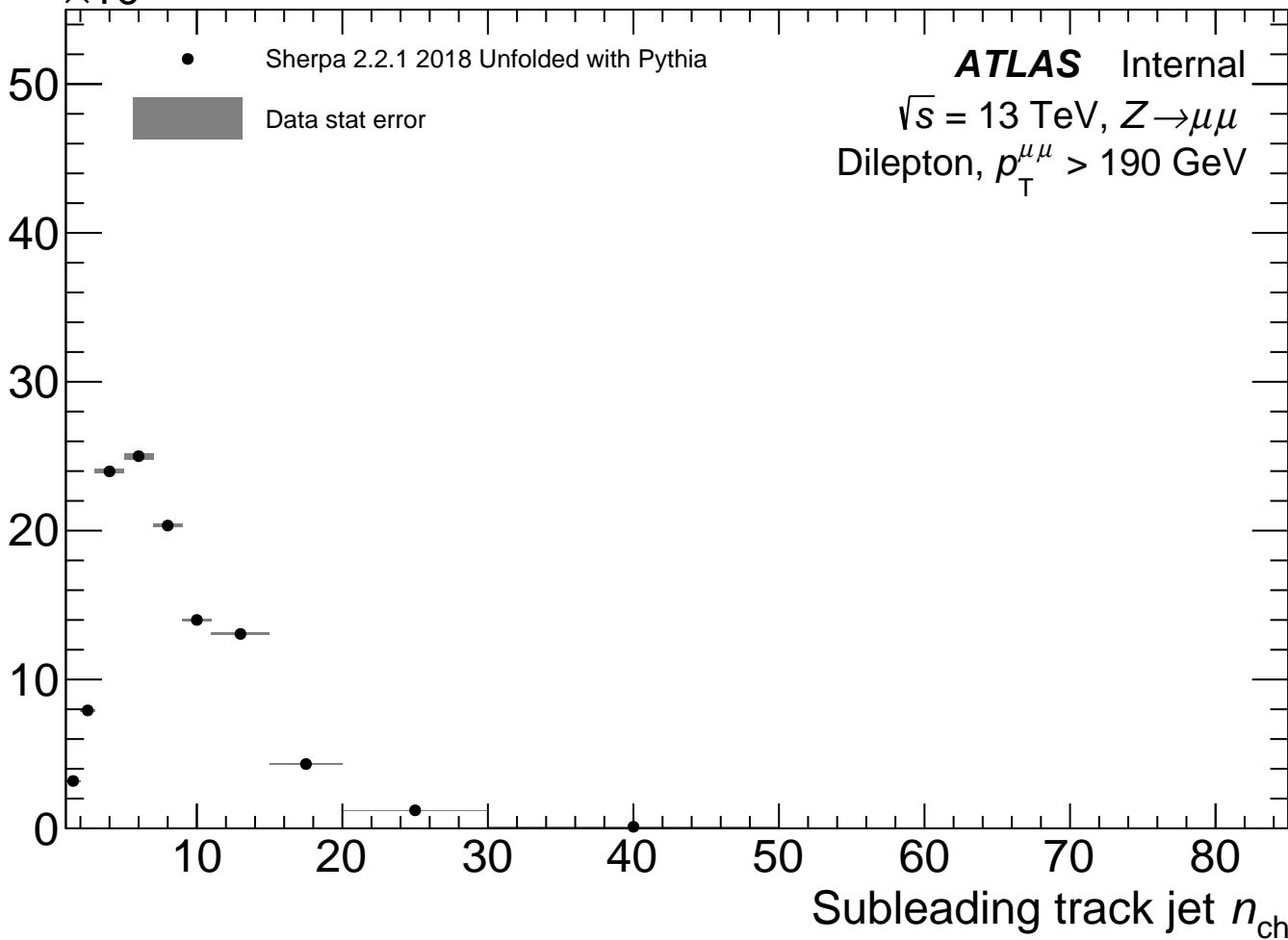
Sherpa 2.2.1 2018 Unfolded with Pythia

Data stat error

ATLAS Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$

Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$



Events

 $\times 10^3$

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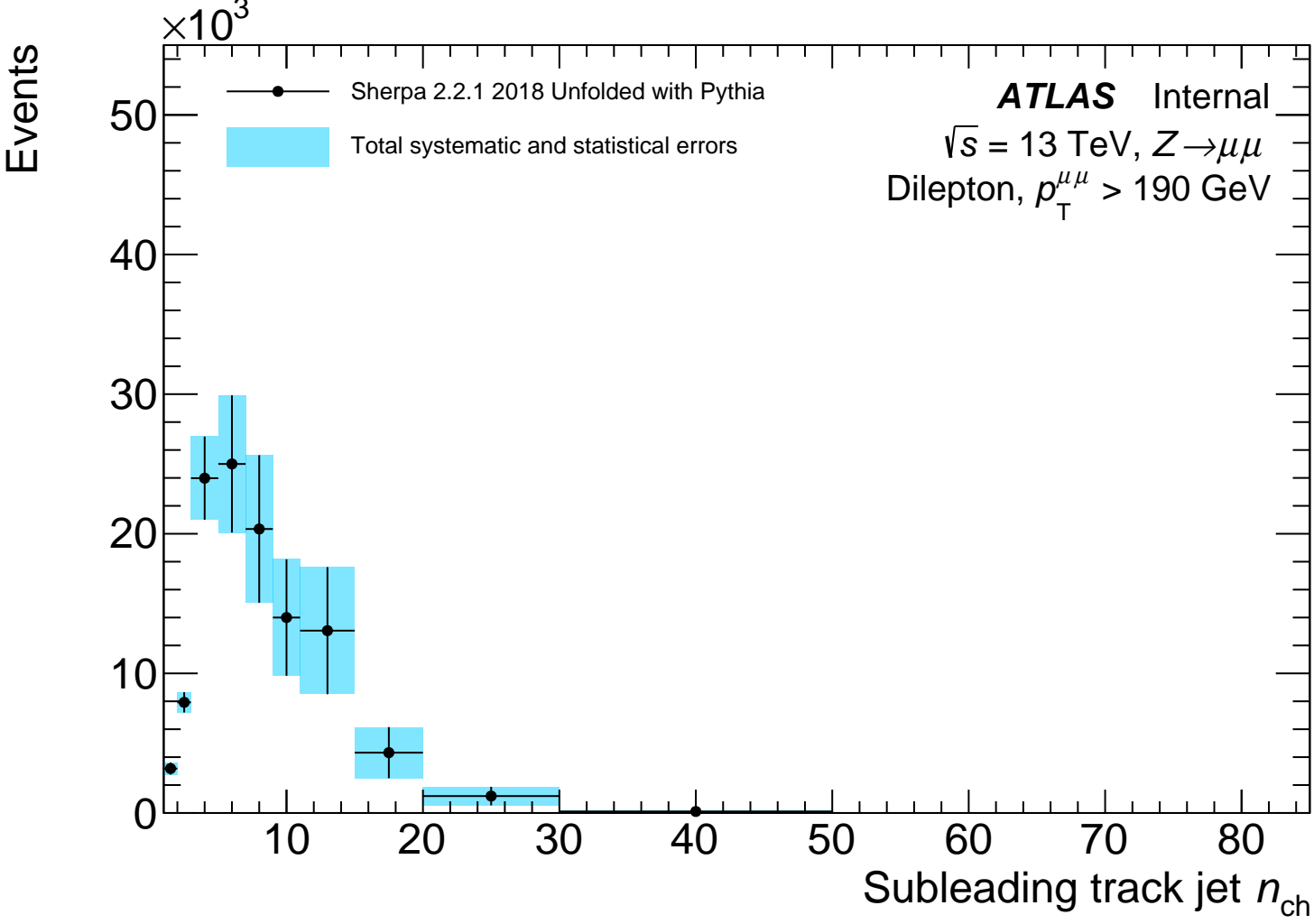
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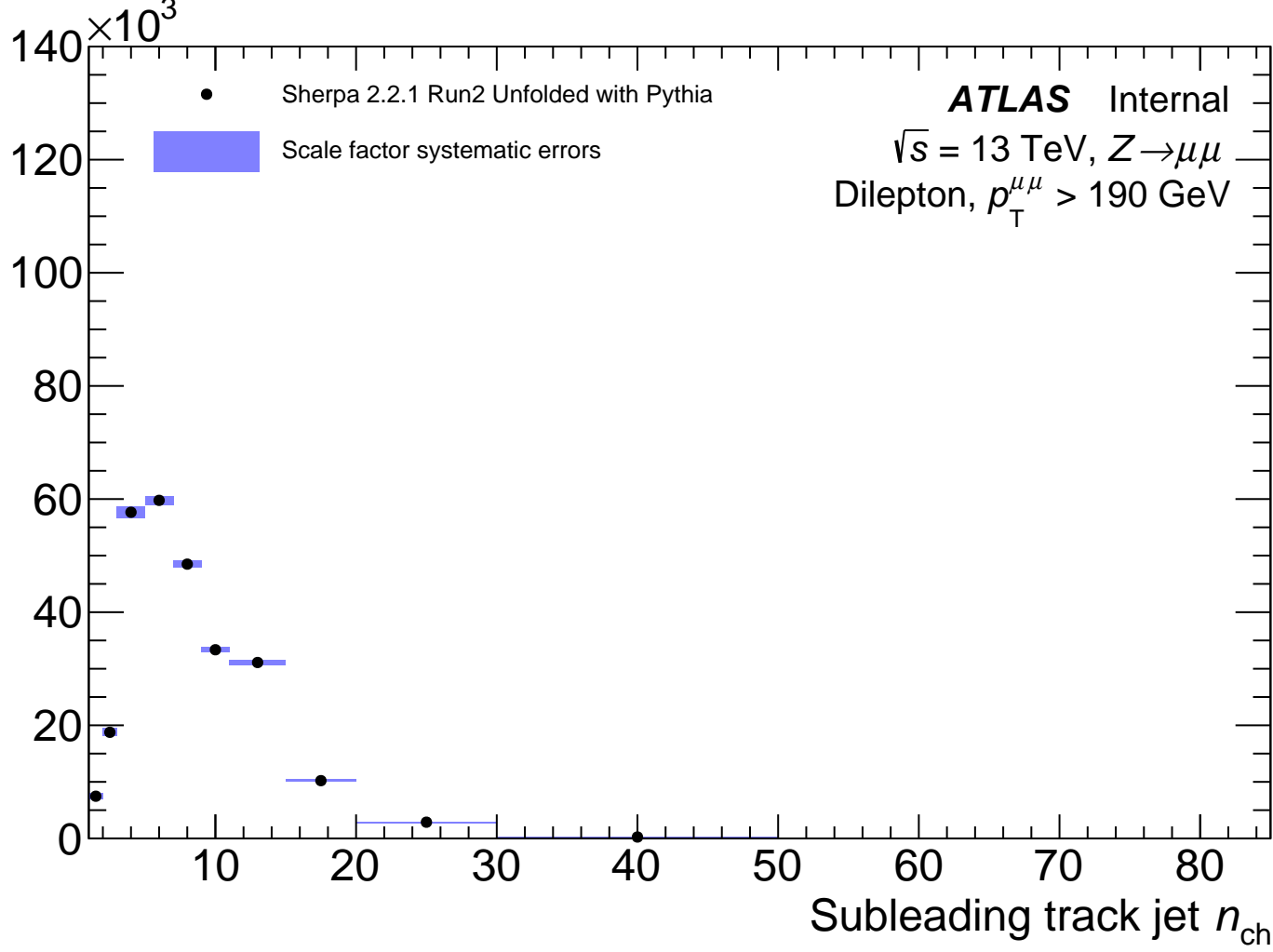


Sherpa 2.2.1 2018 Unfolded with Pythia

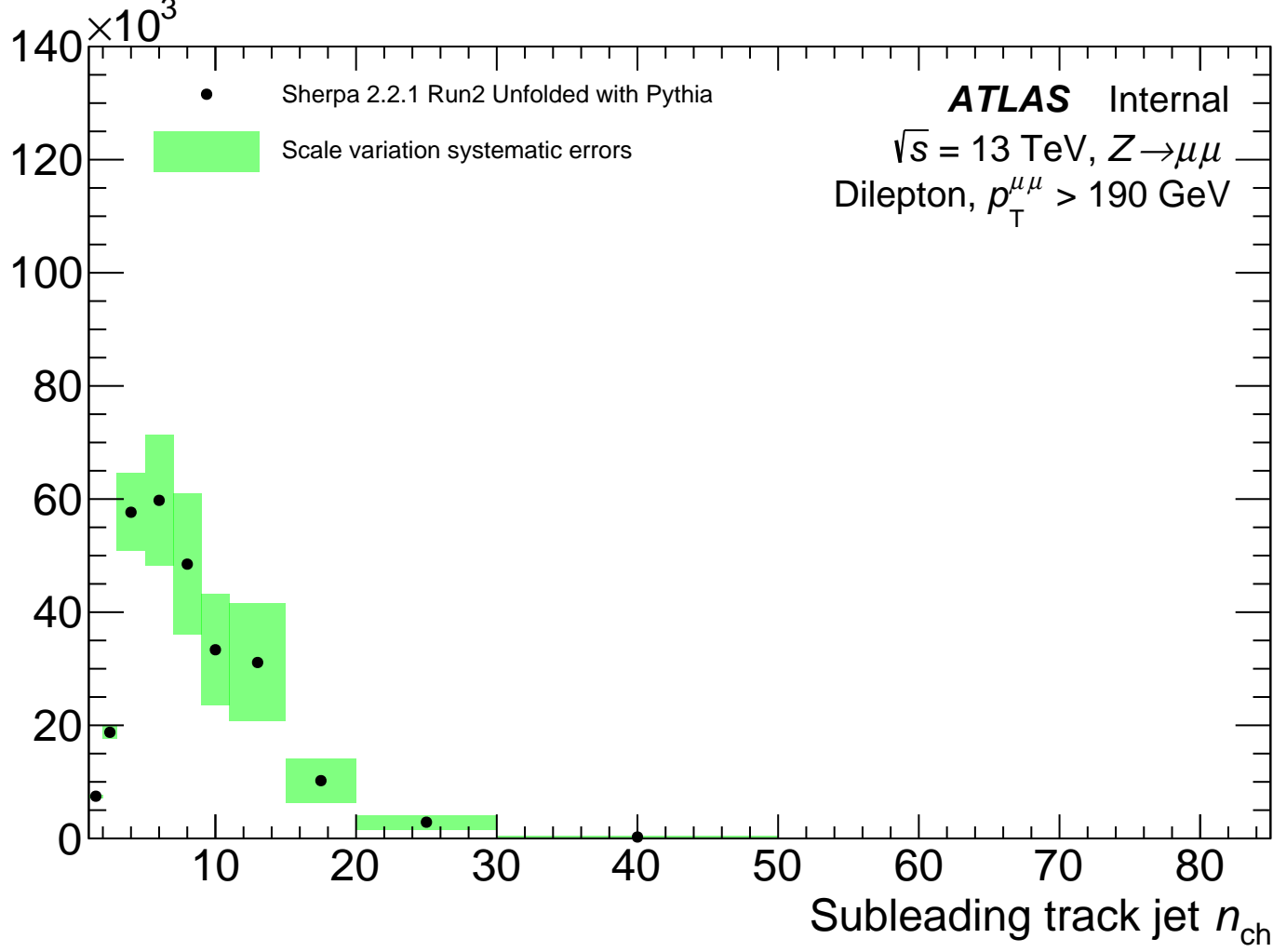
Total systematic and statistical errors

ATLAS Internal $\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu$ Dilepton, $p_{\text{T}}^{\mu\mu} > 190 \text{ GeV}$ Subleading track jet n_{ch} 

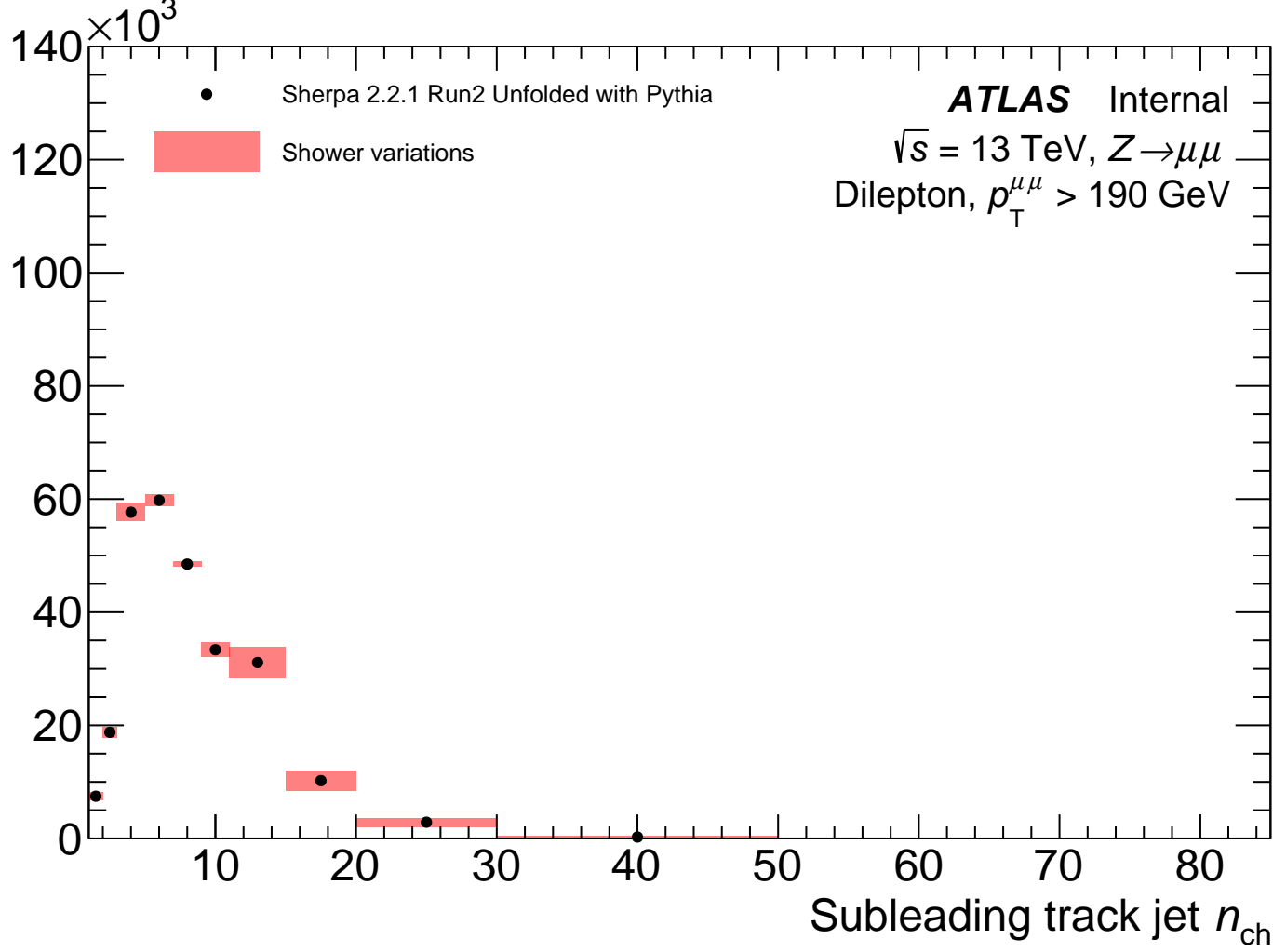
Events



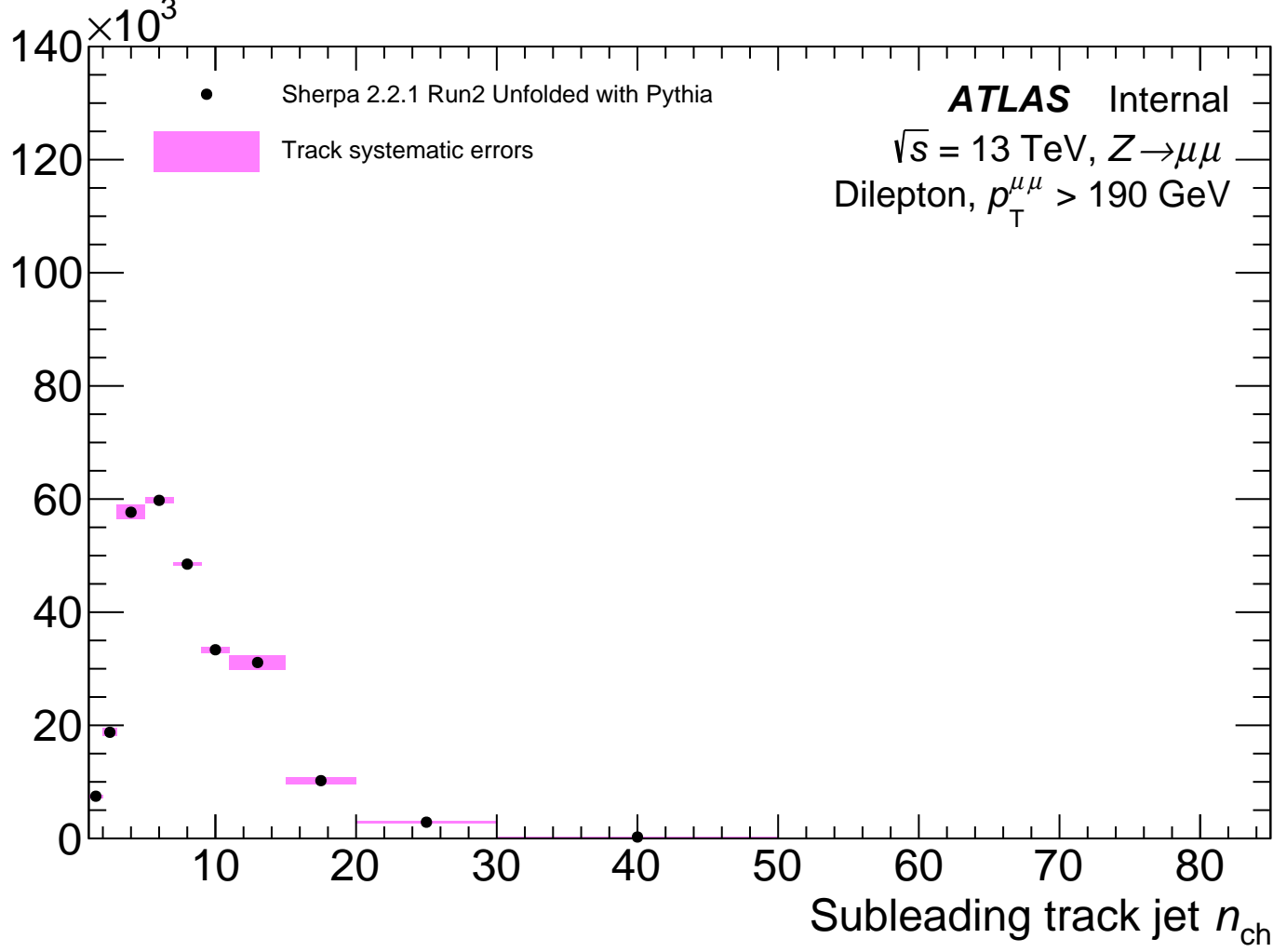
Events



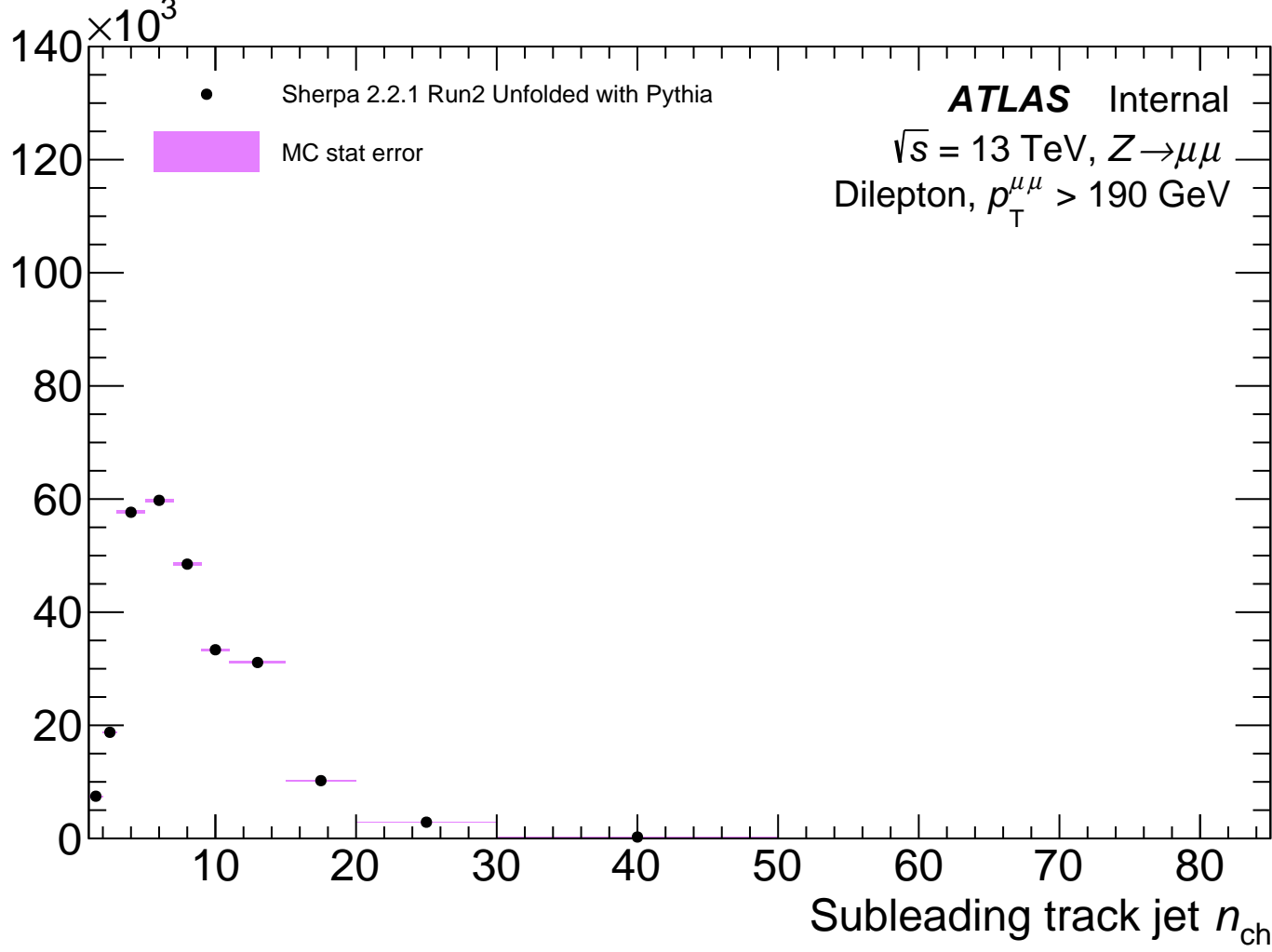
Events



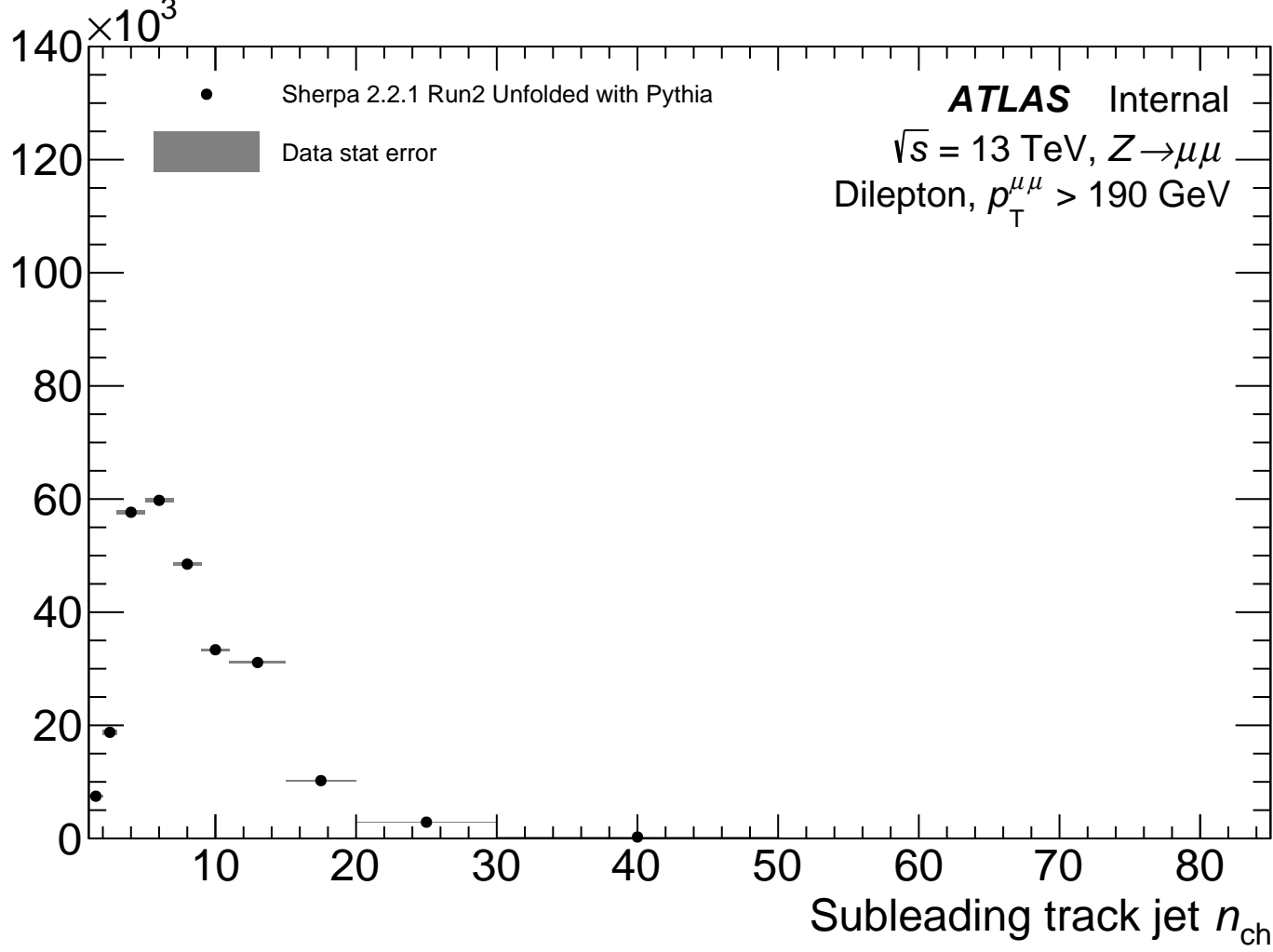
Events



Events



Events



Events

