

Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_isoSFDown

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

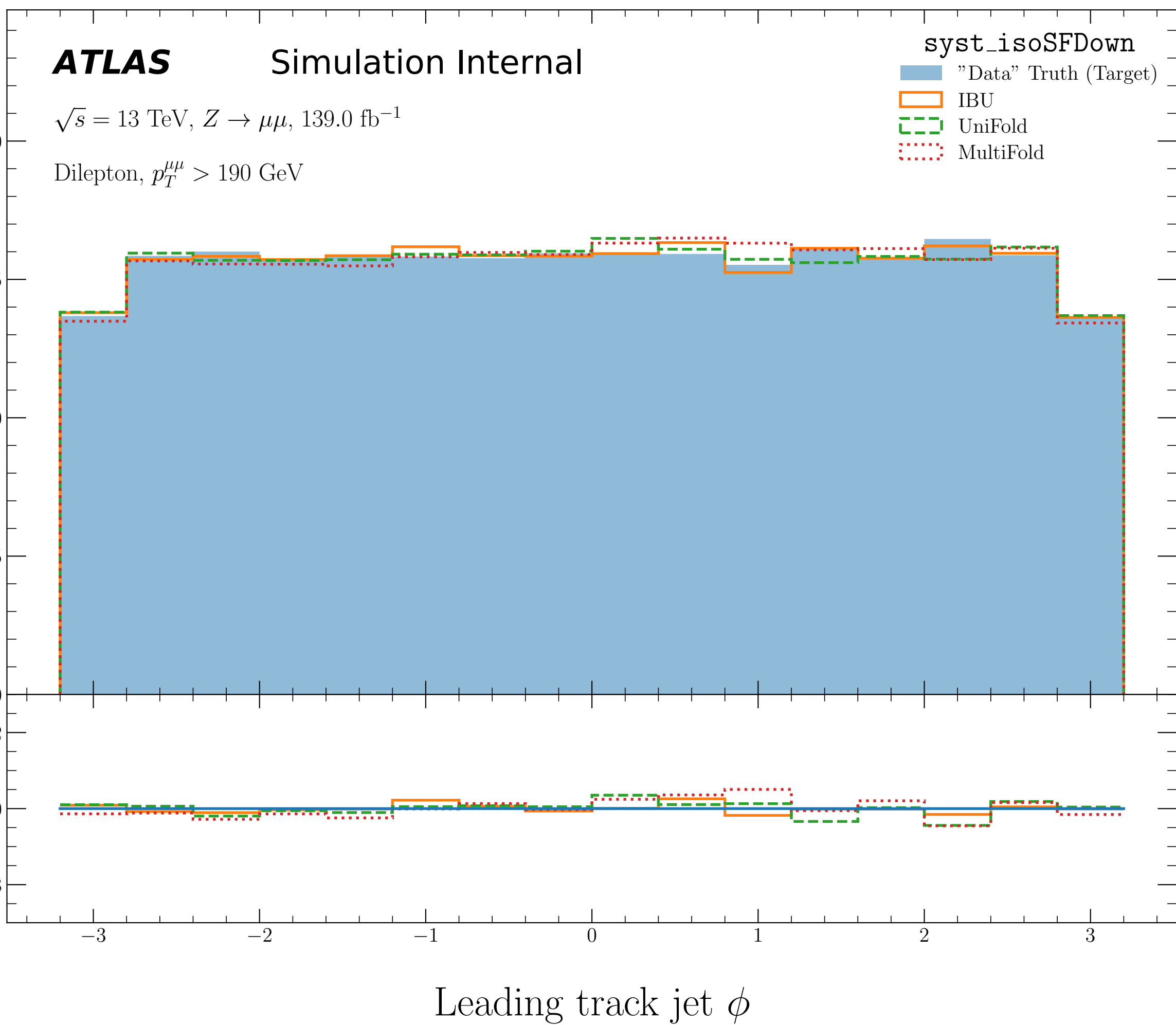
0

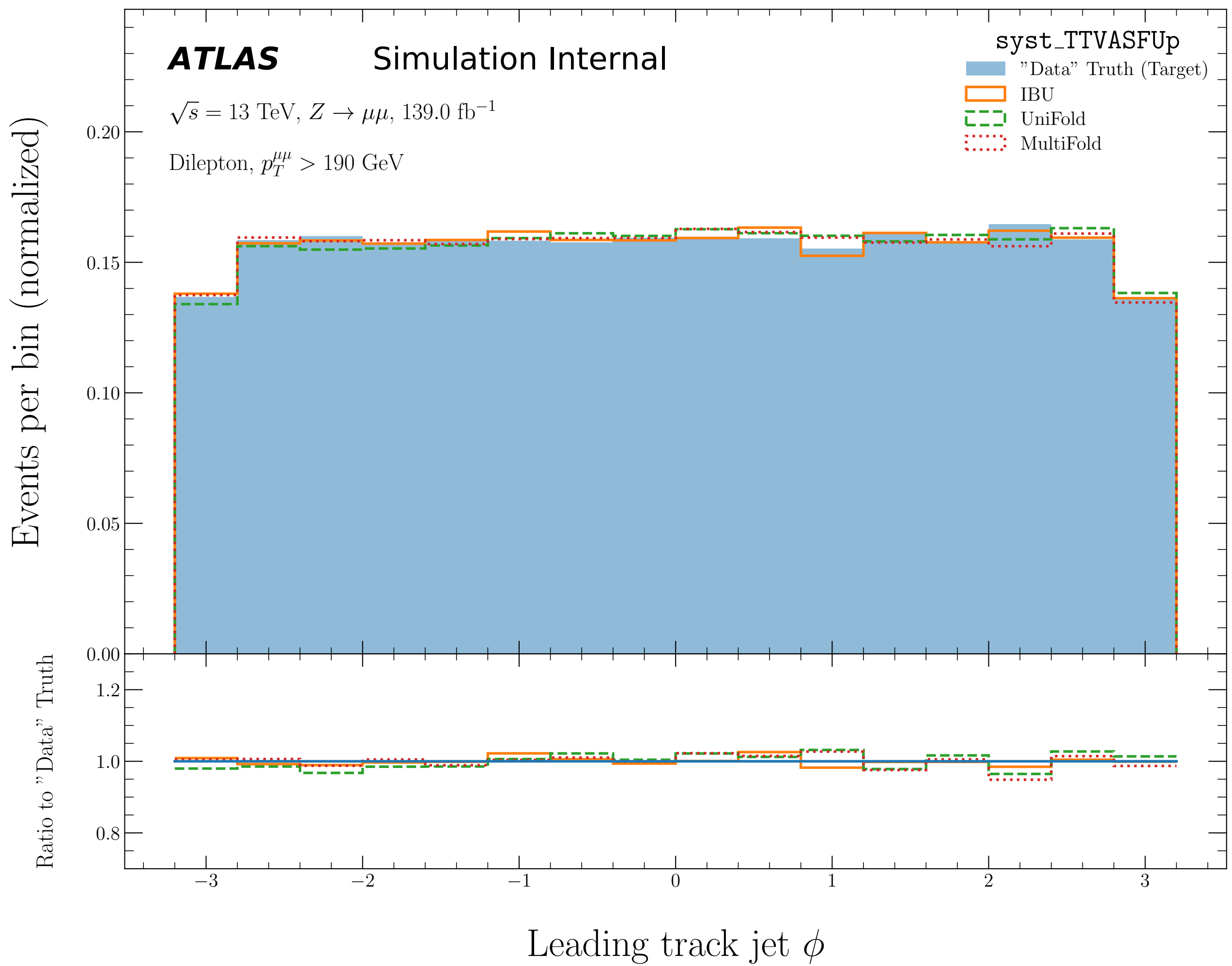
1

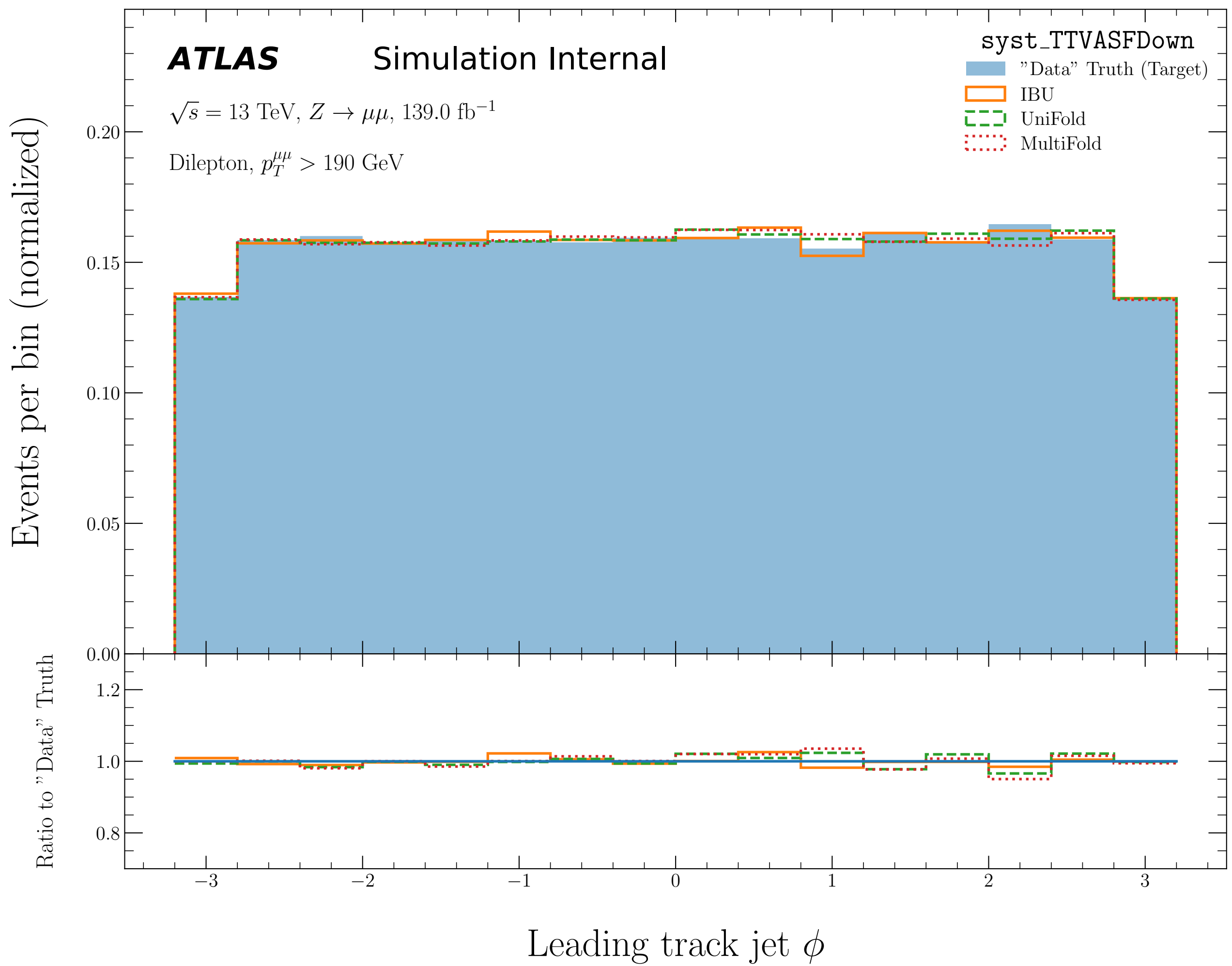
2

3

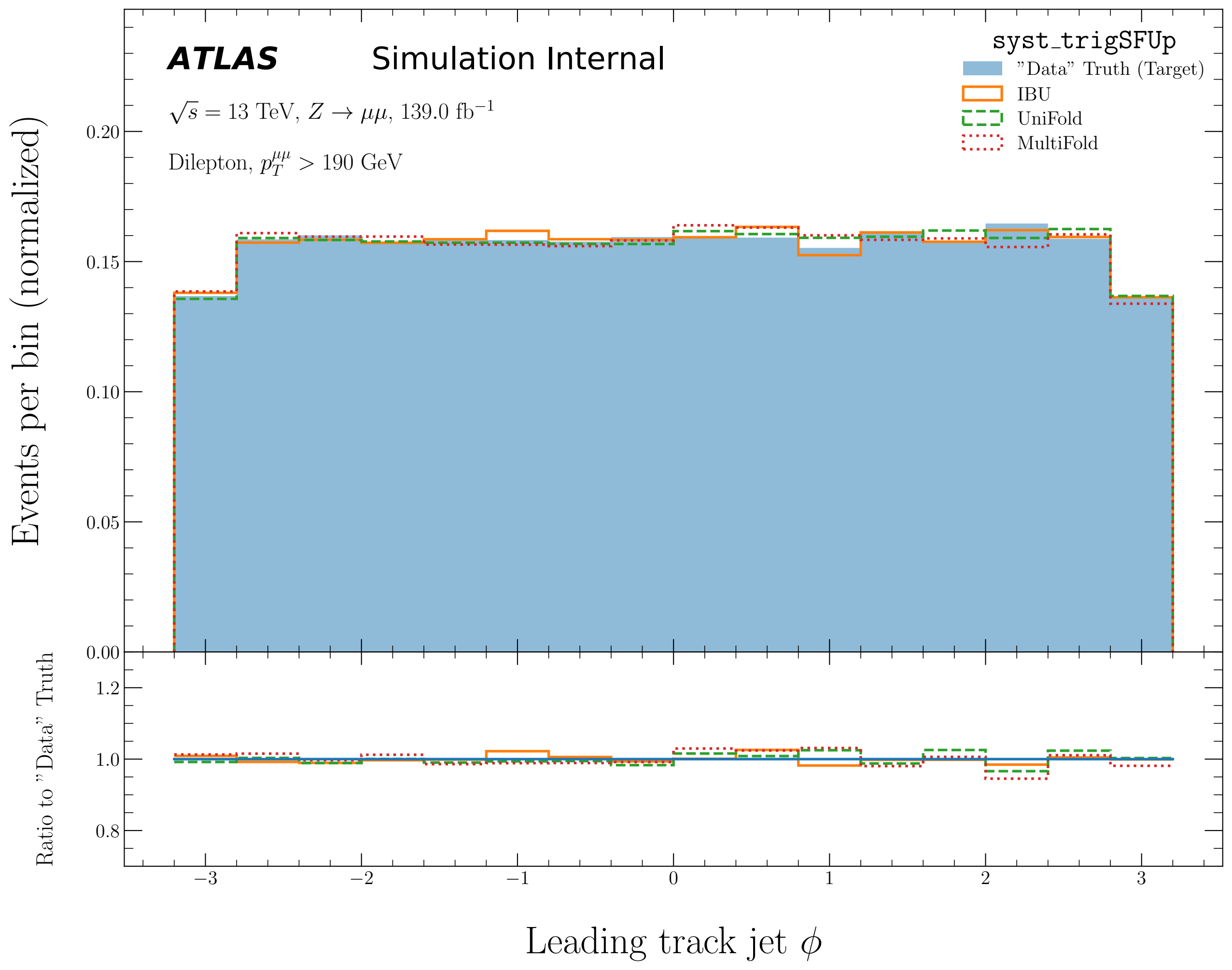
Leading track jet  $\phi$

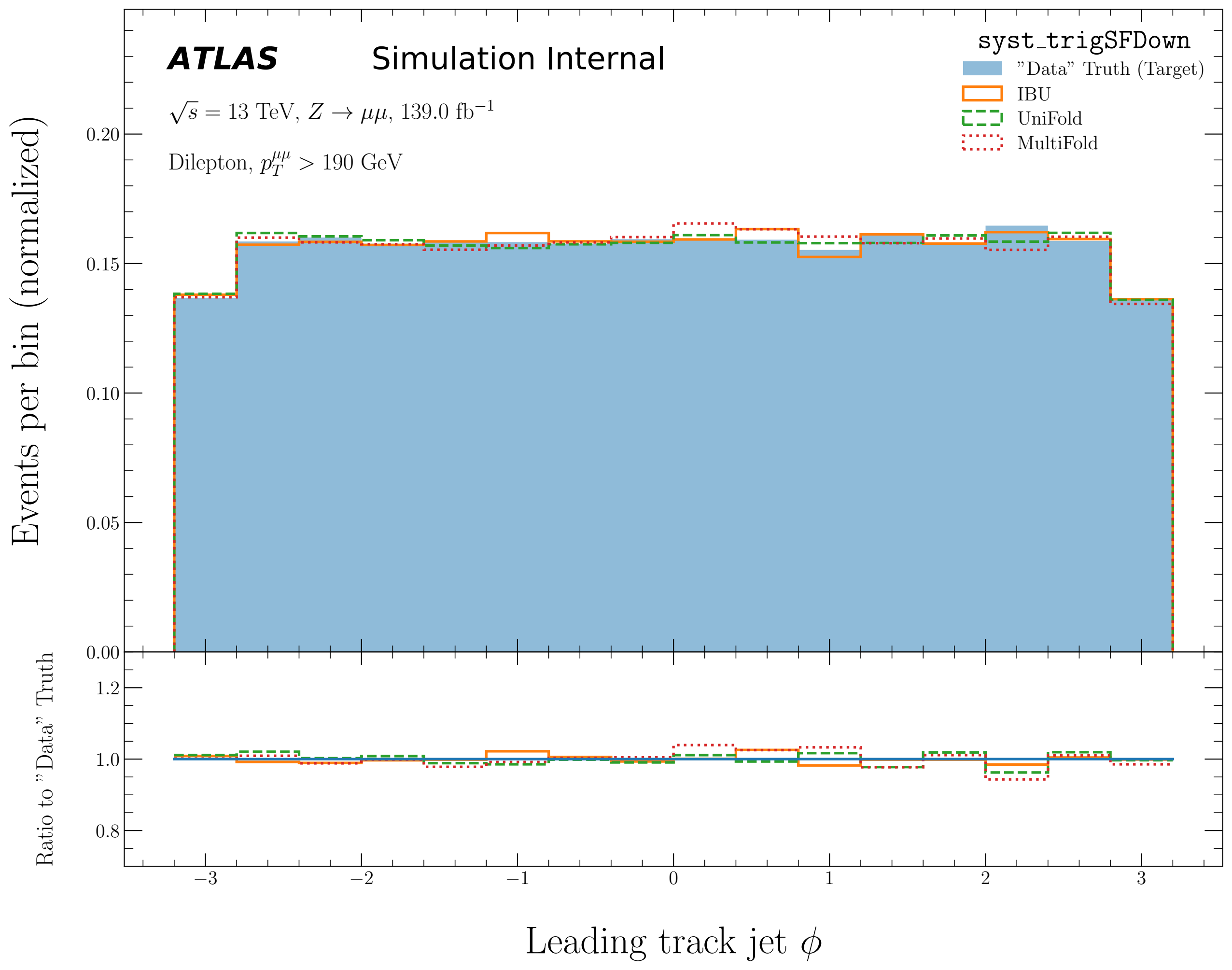


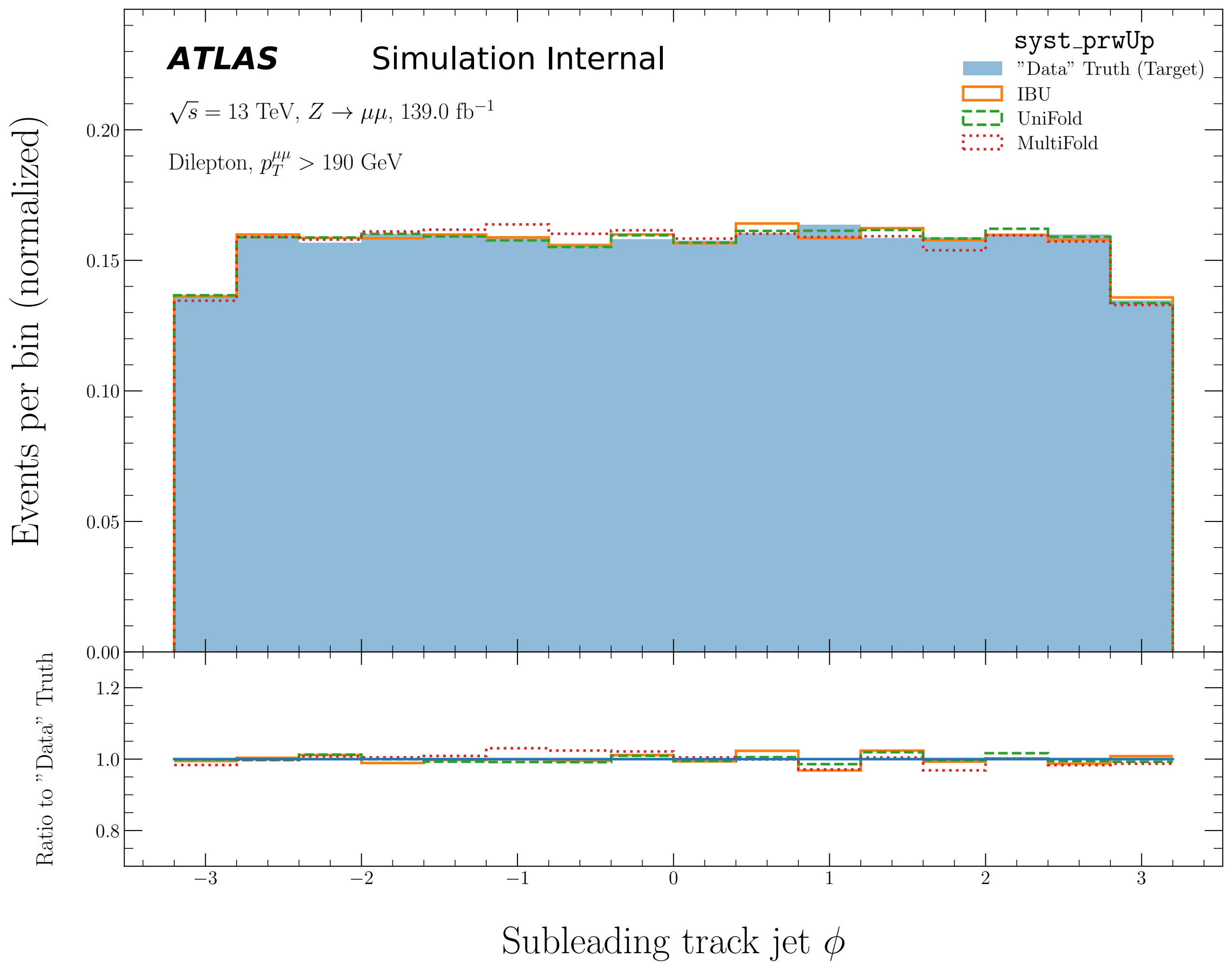


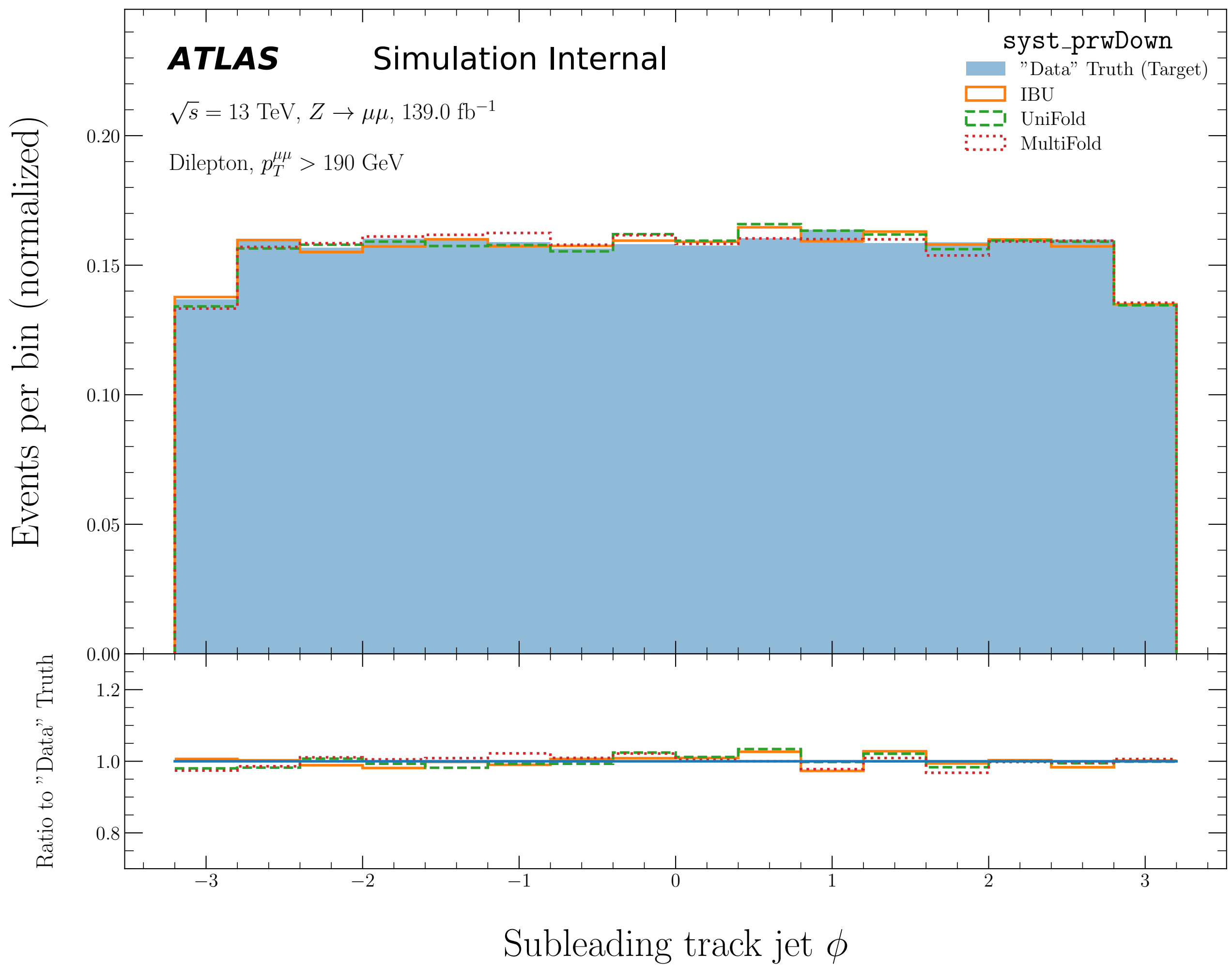


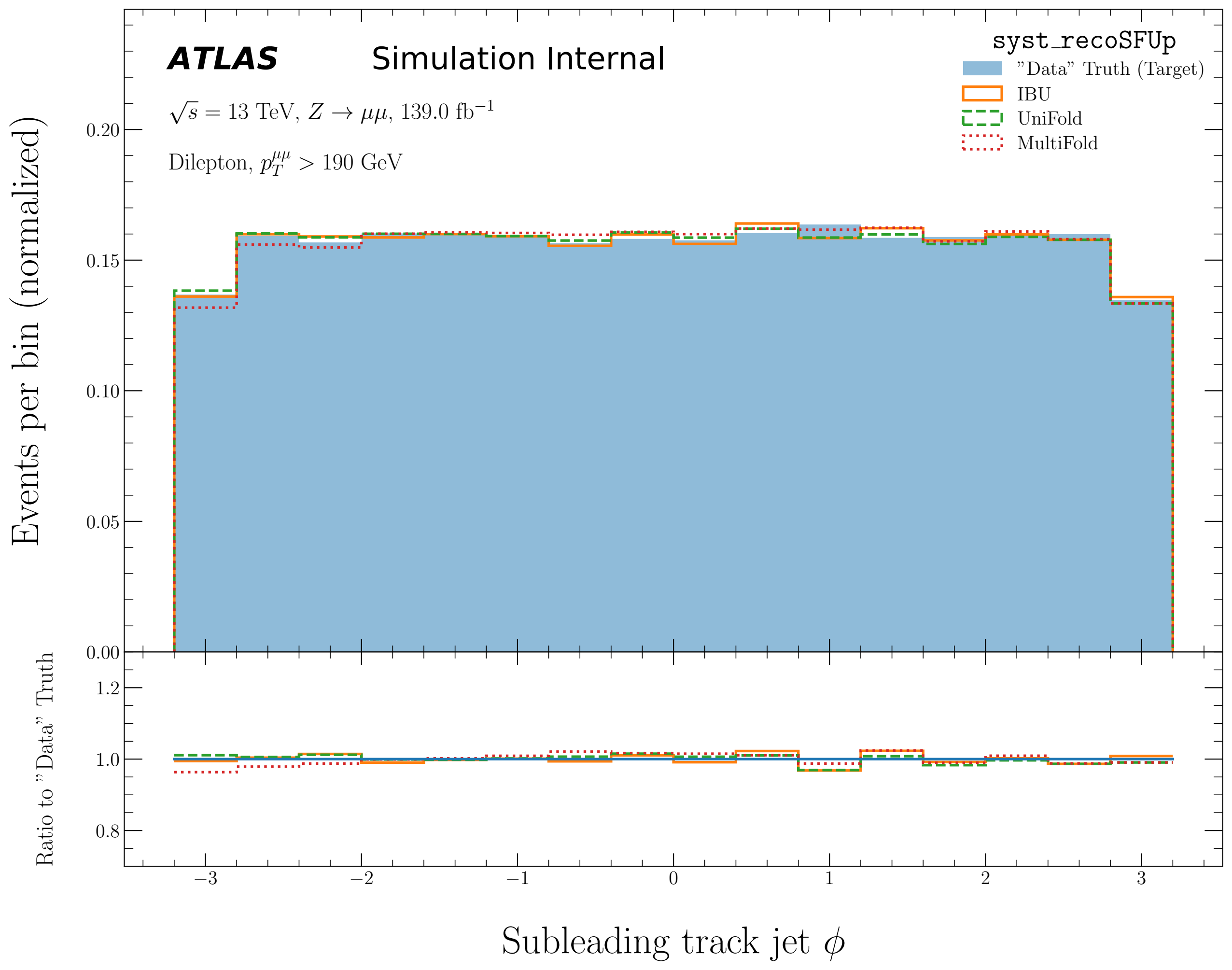


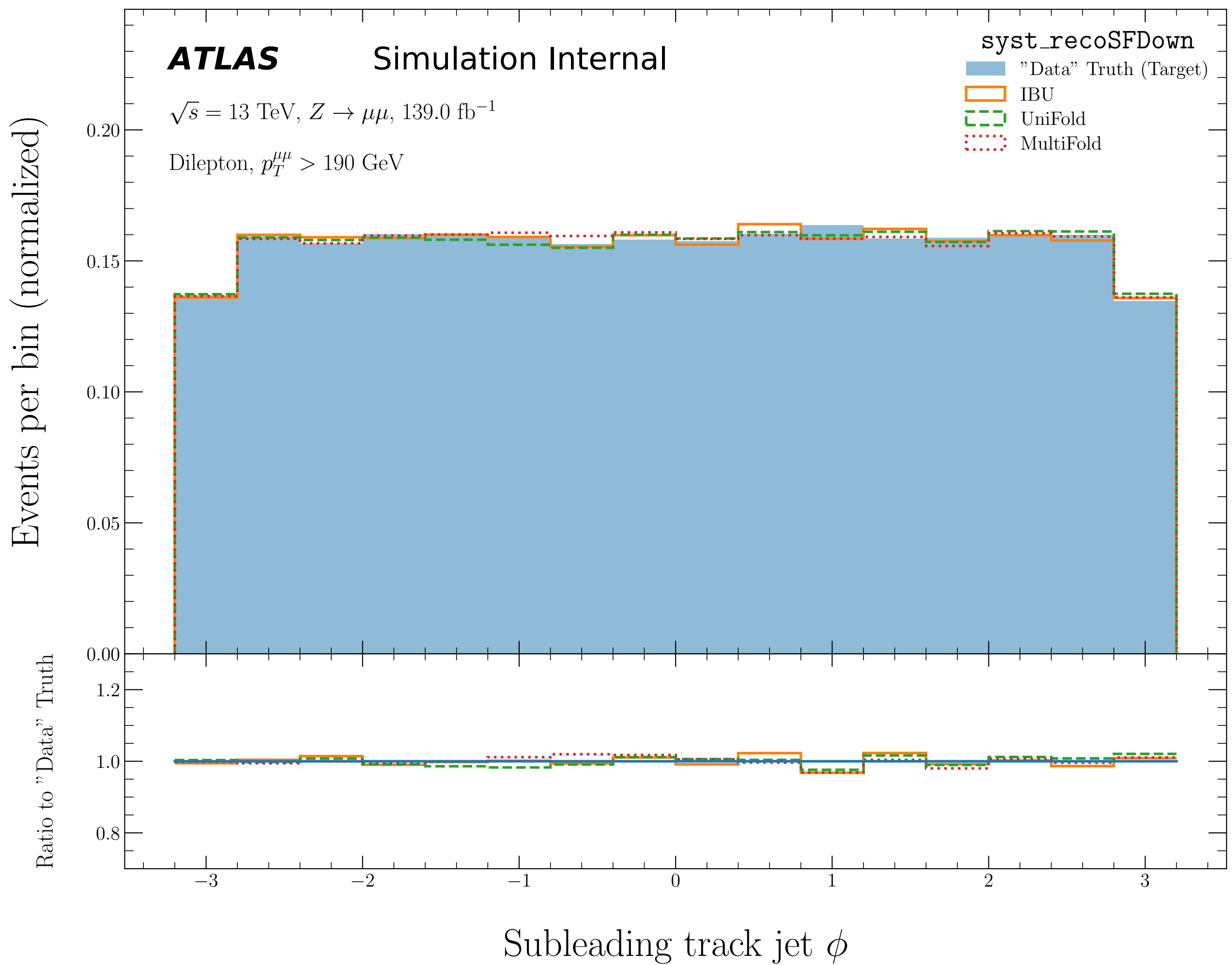


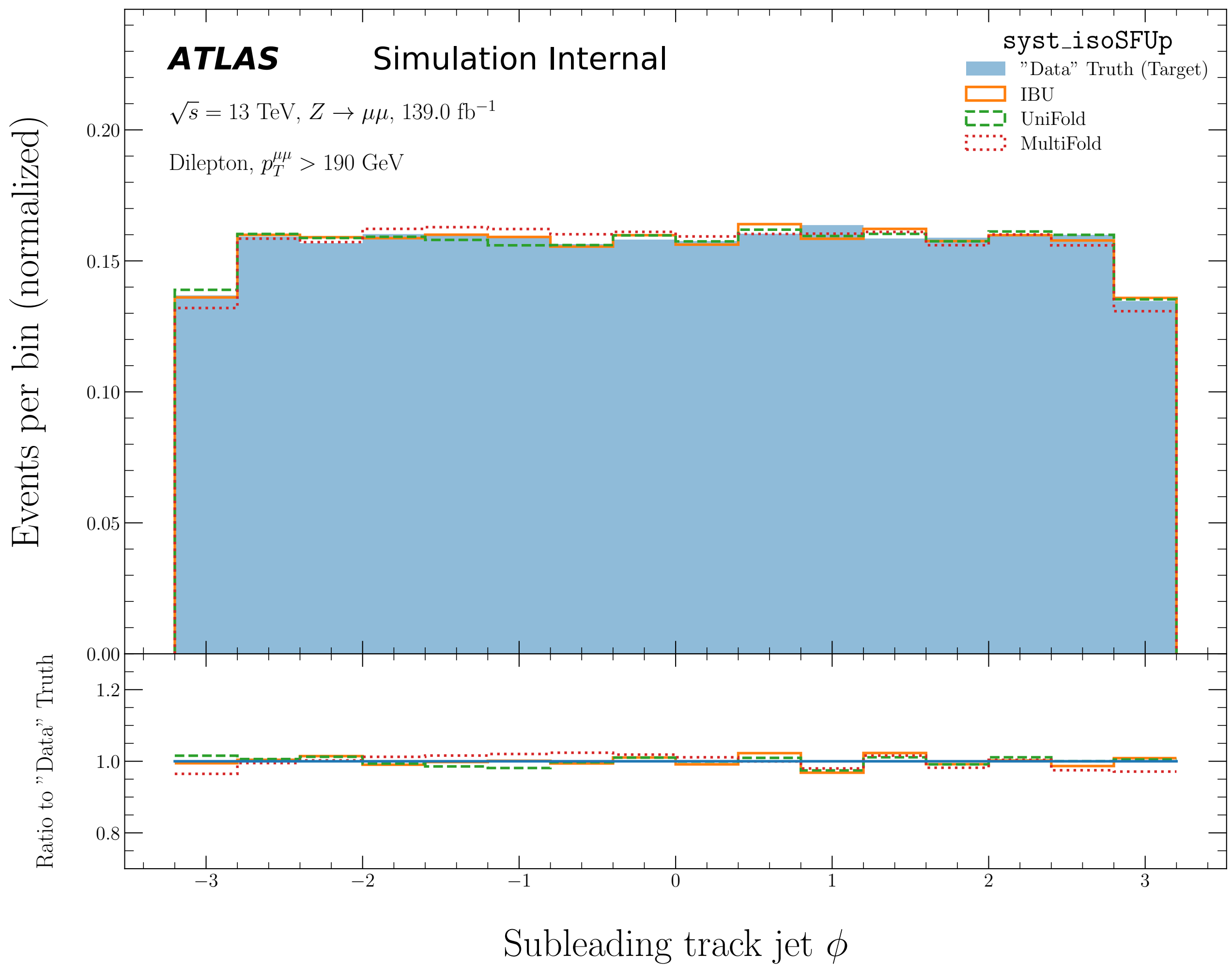


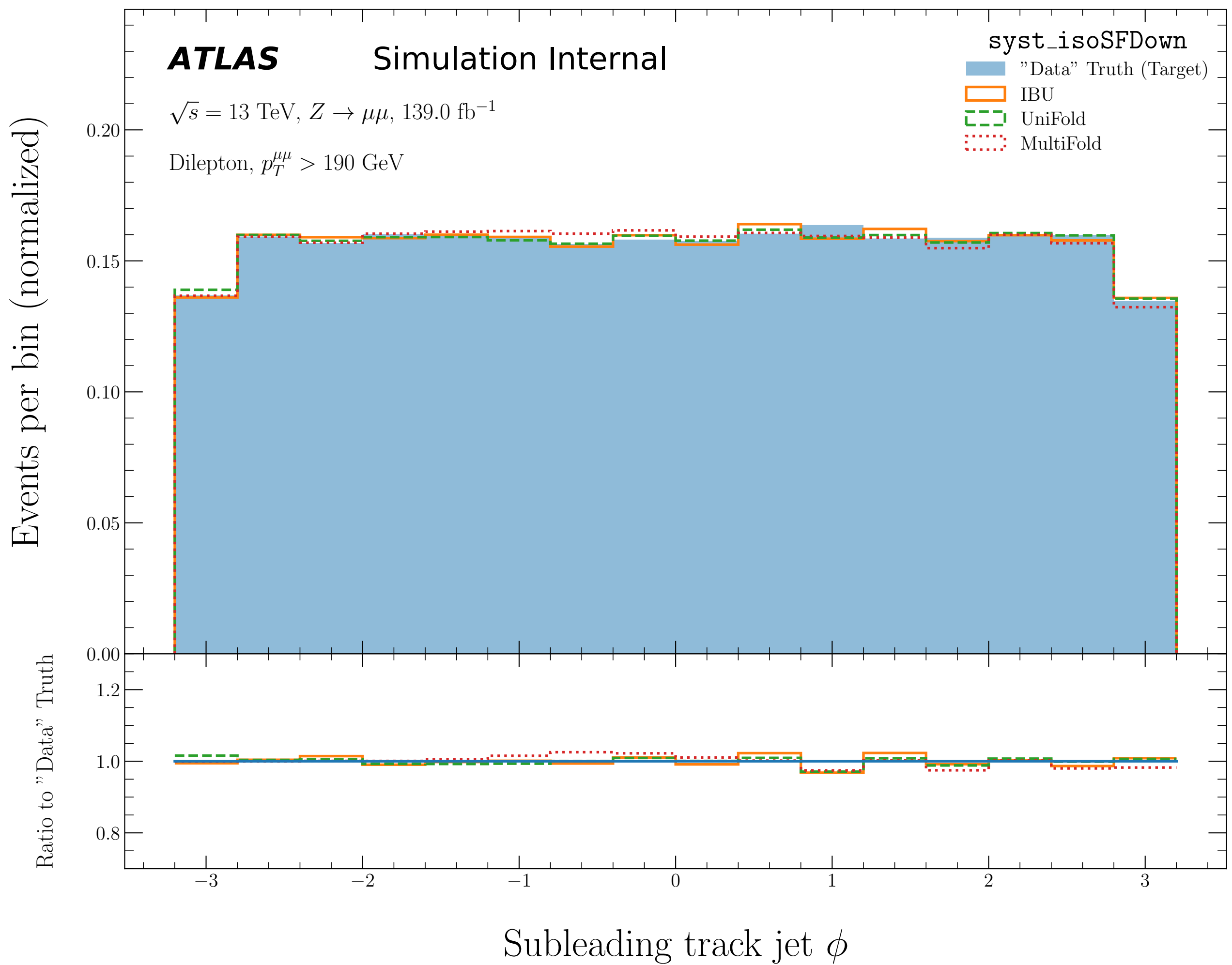




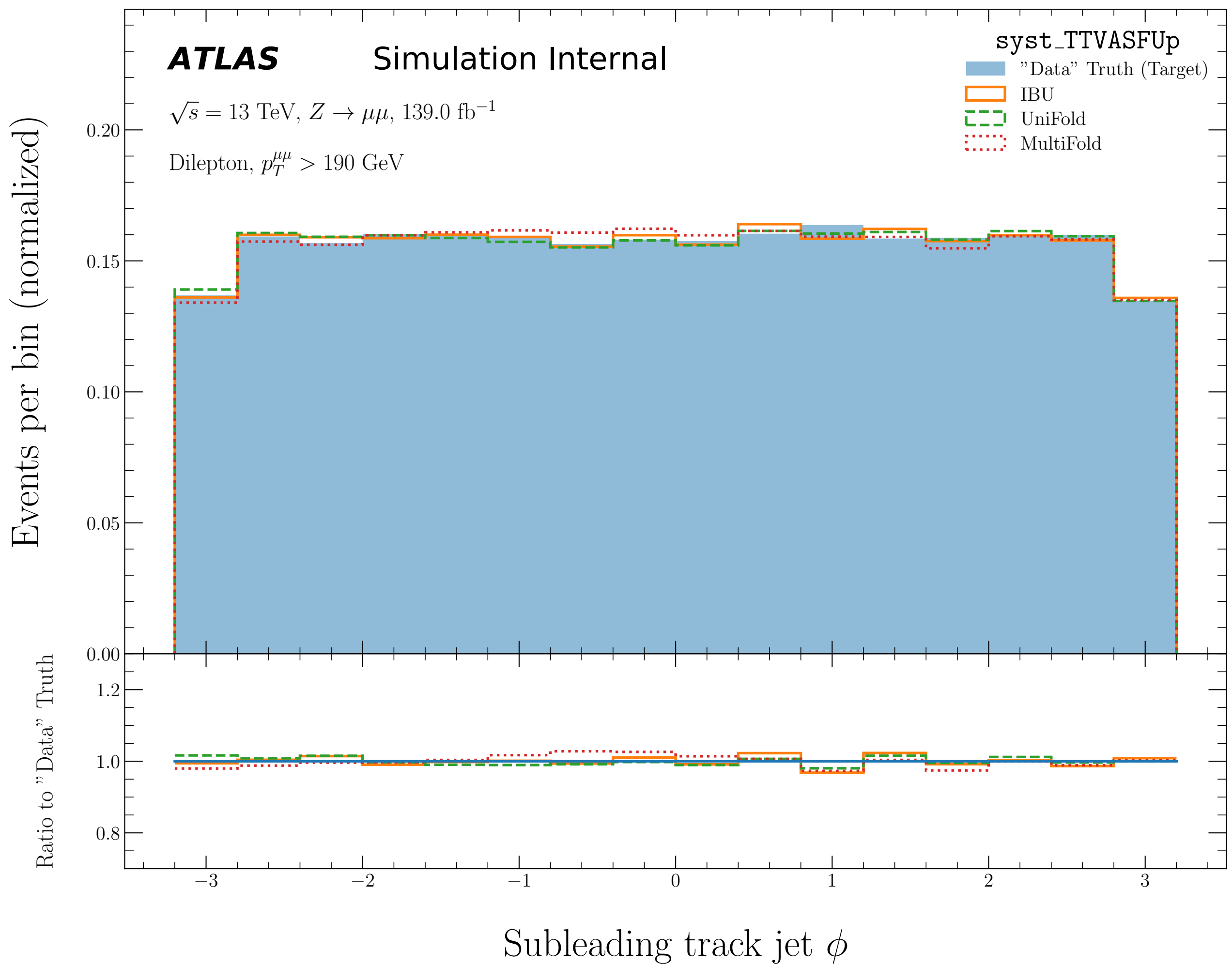


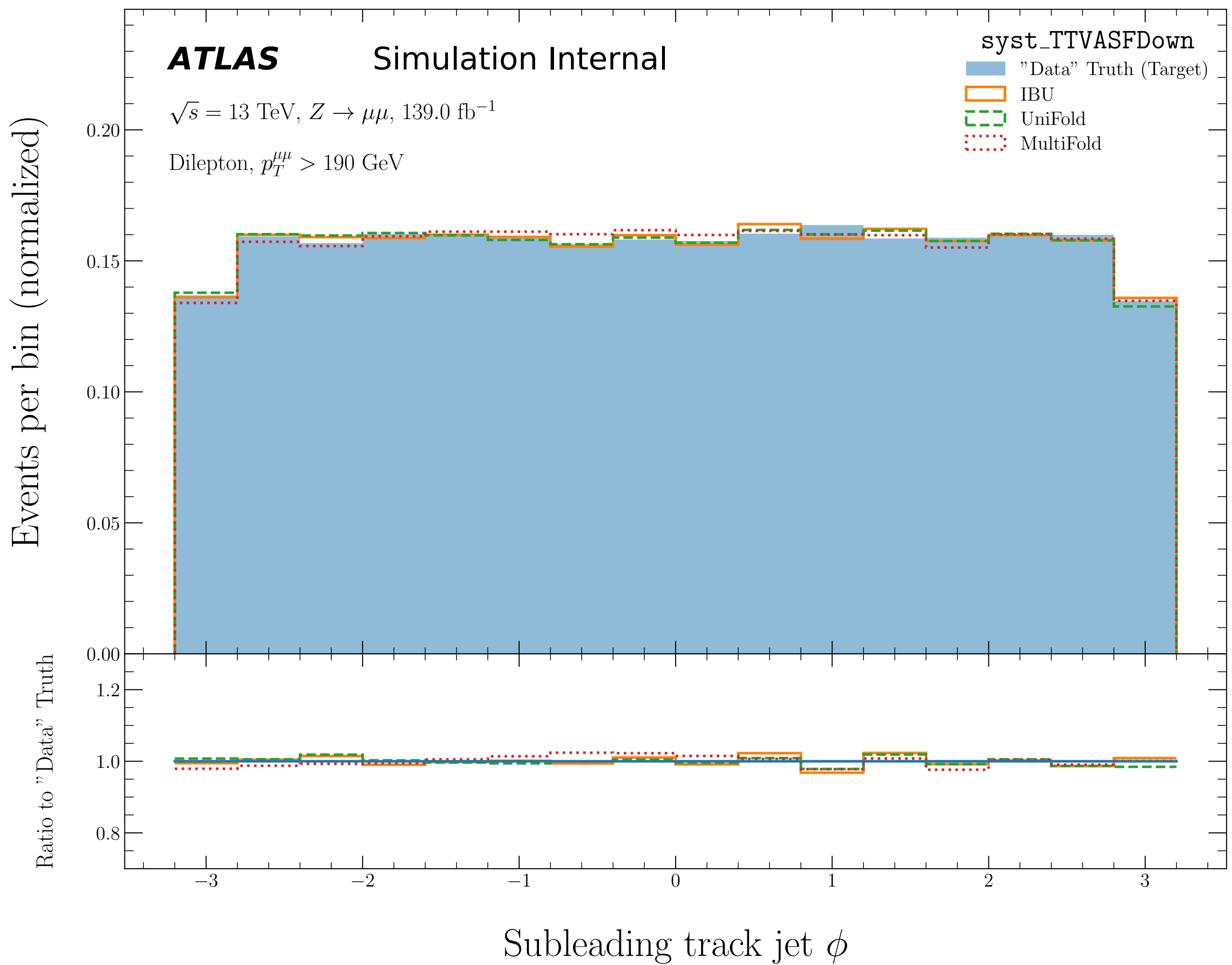


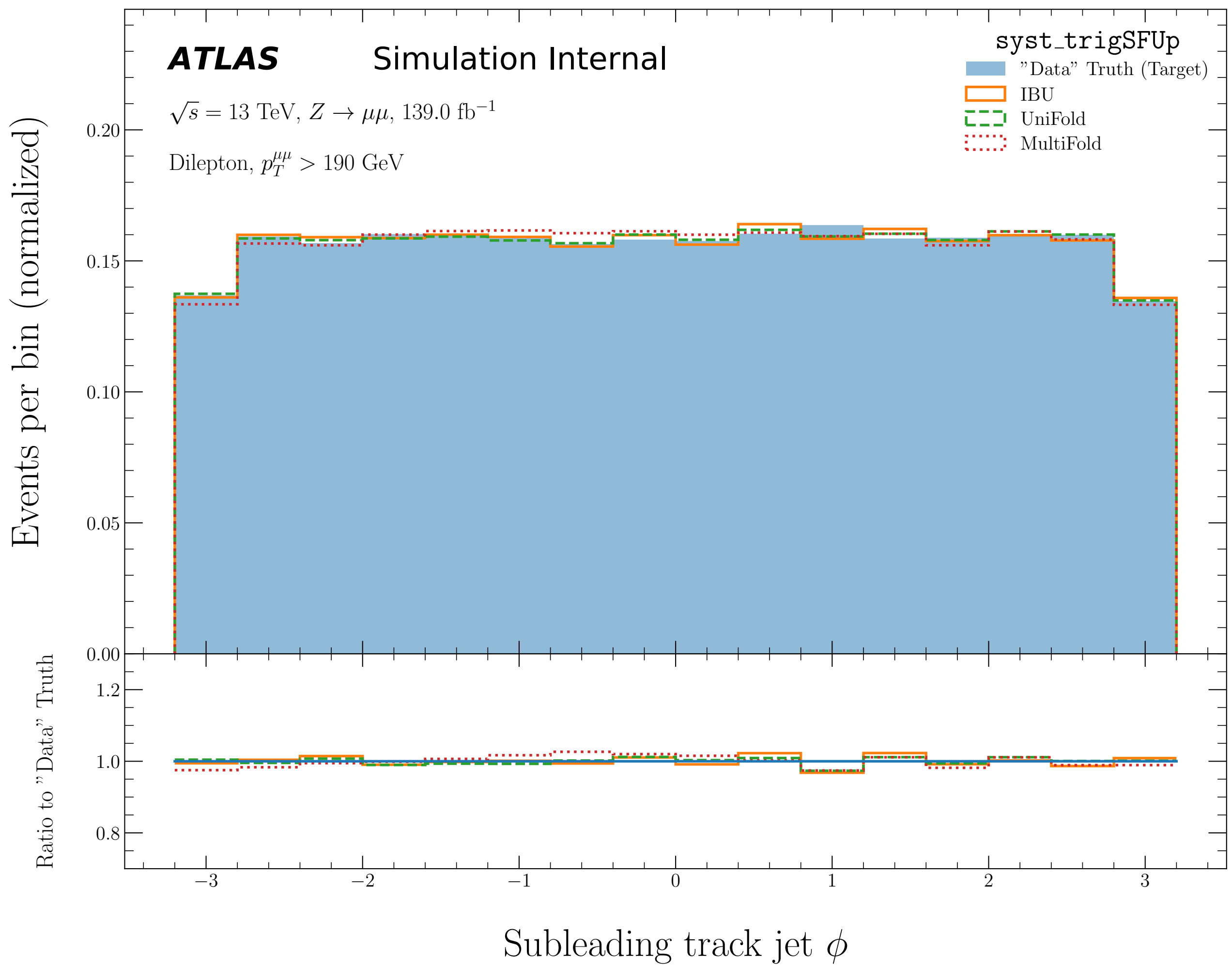


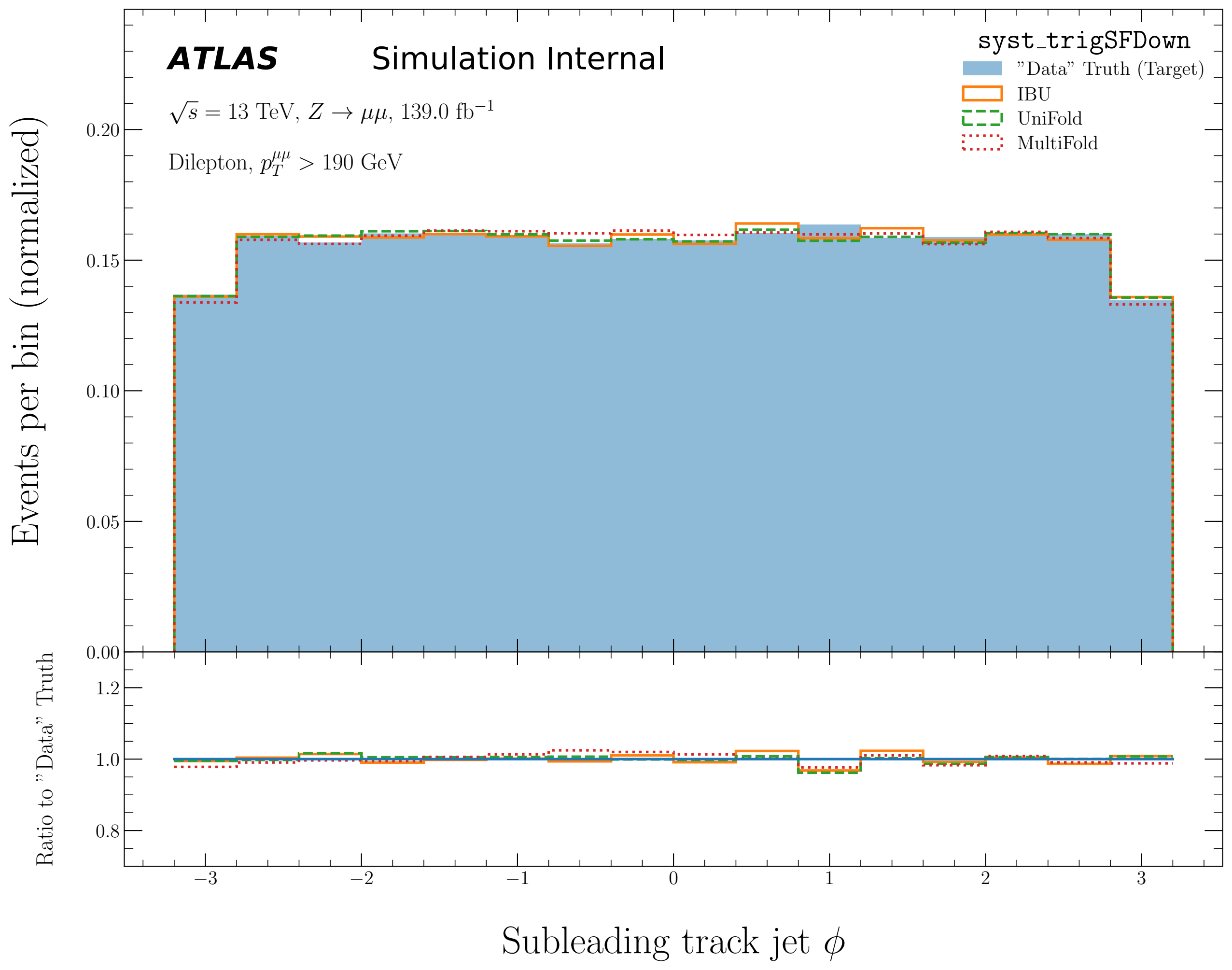


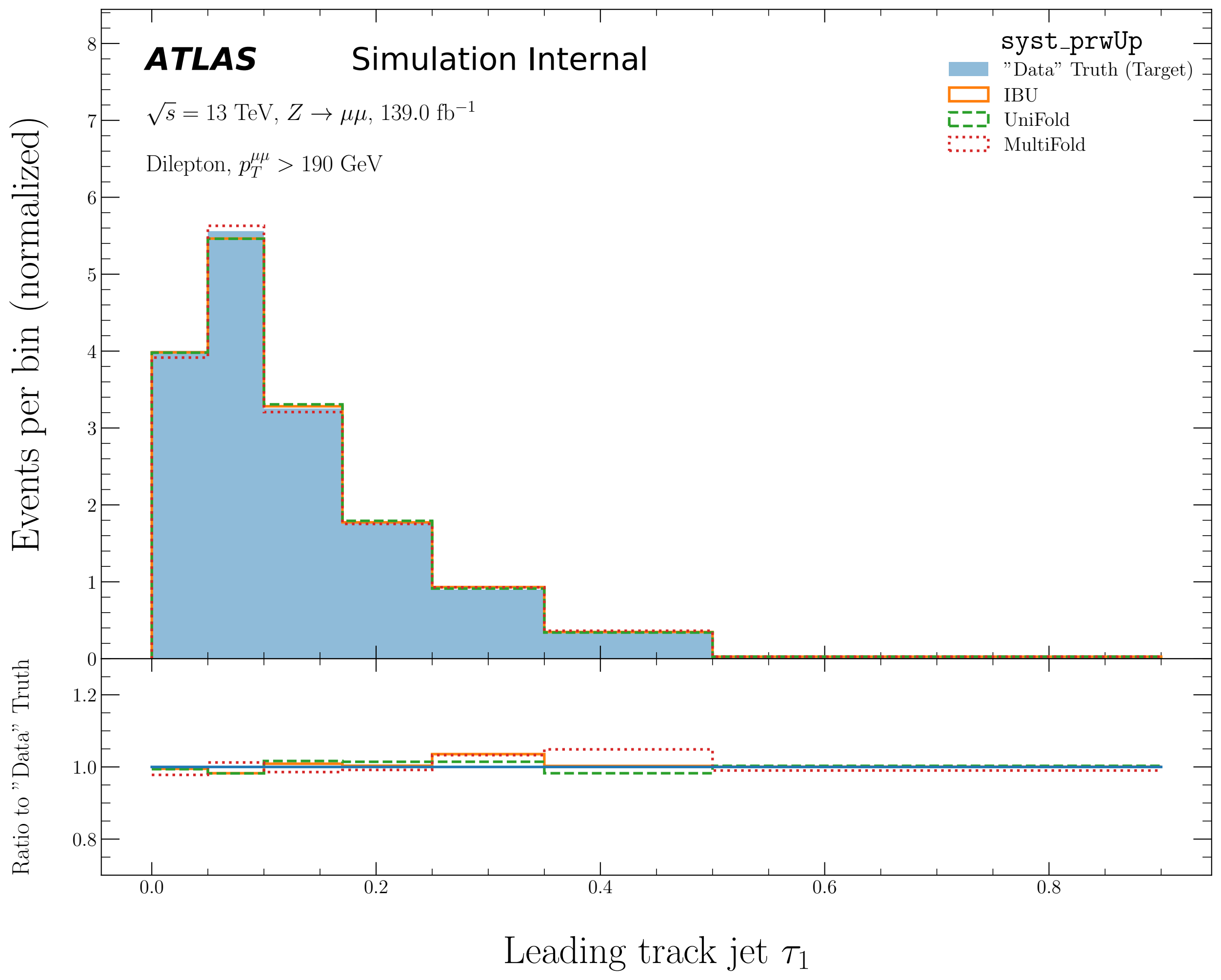


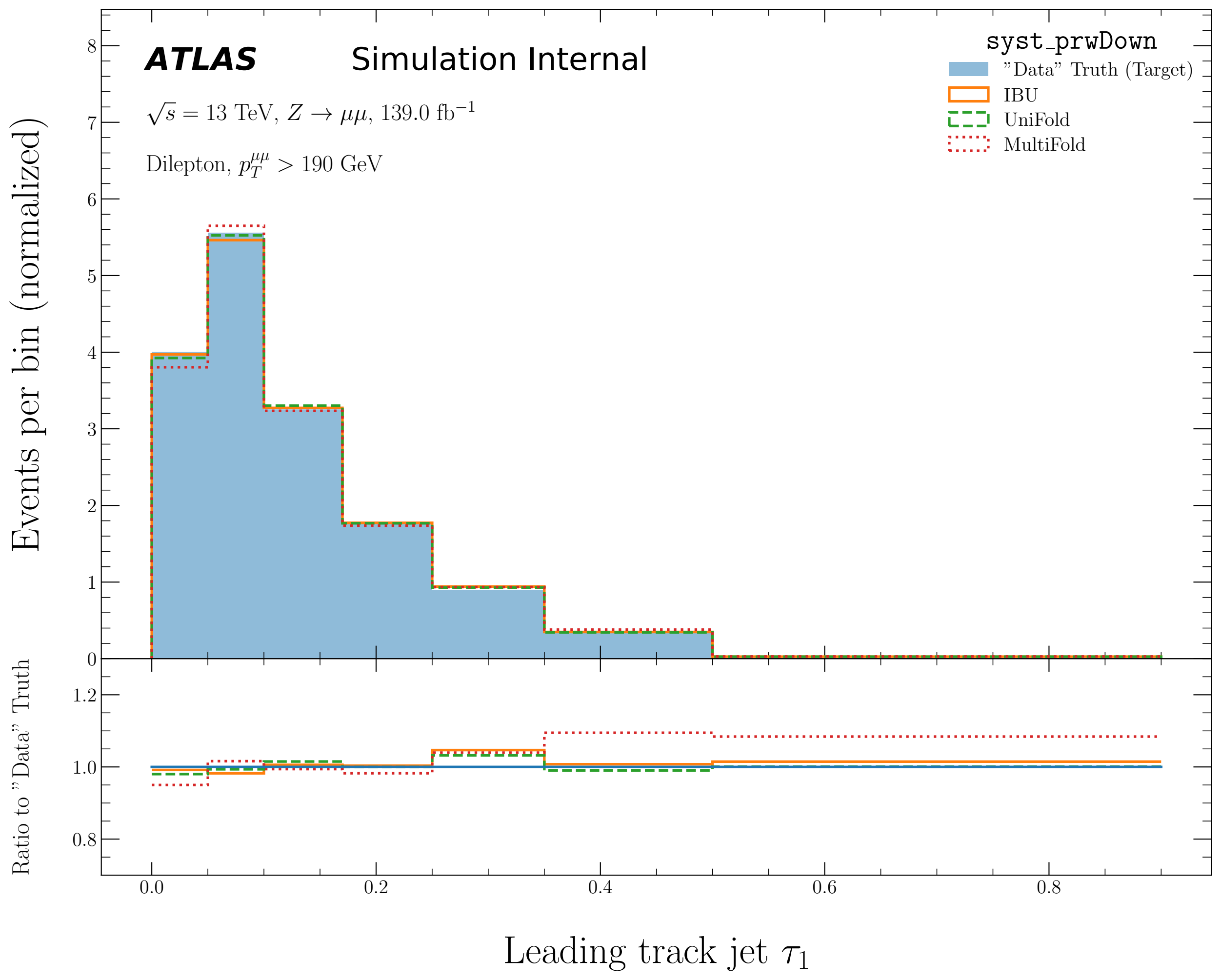


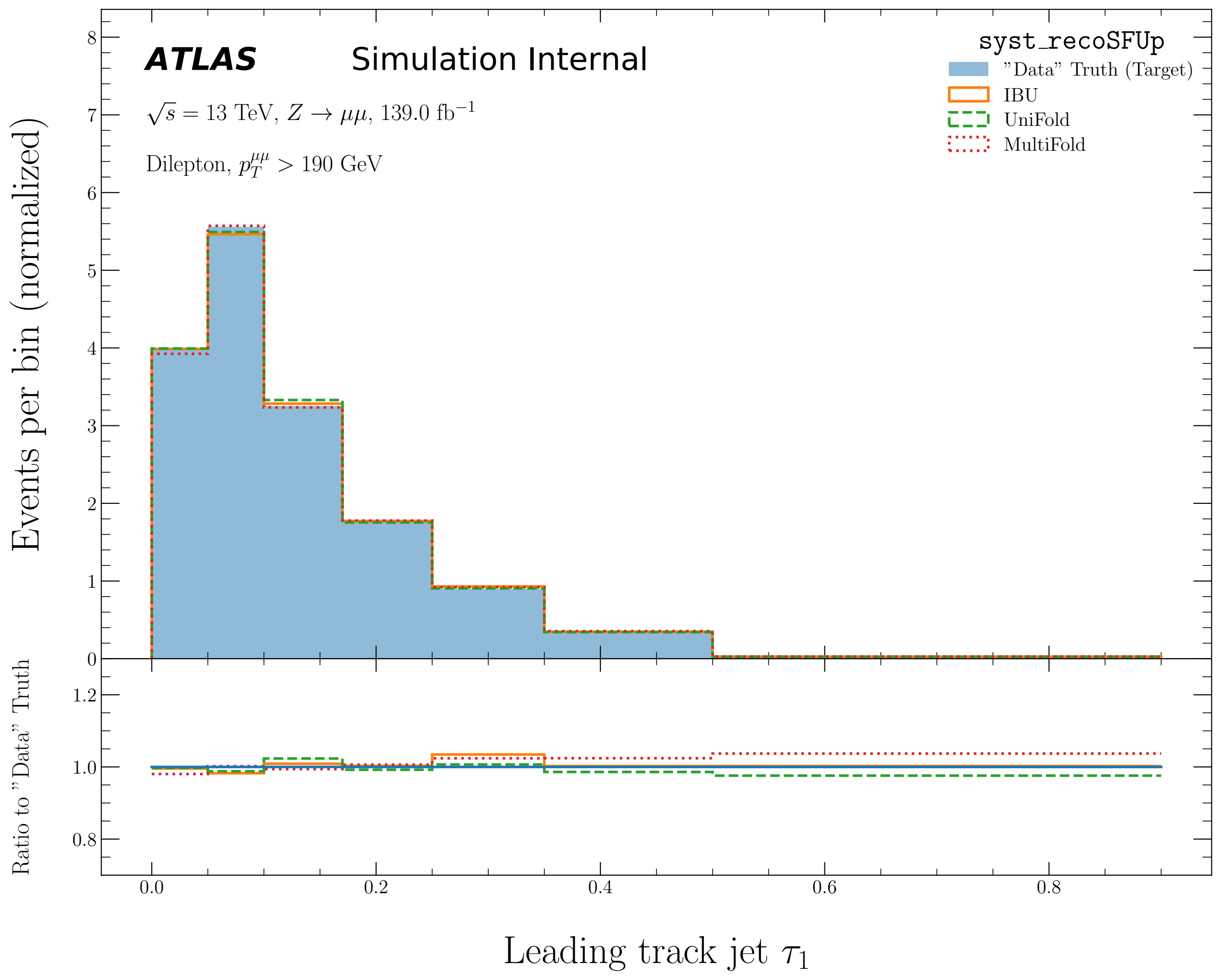


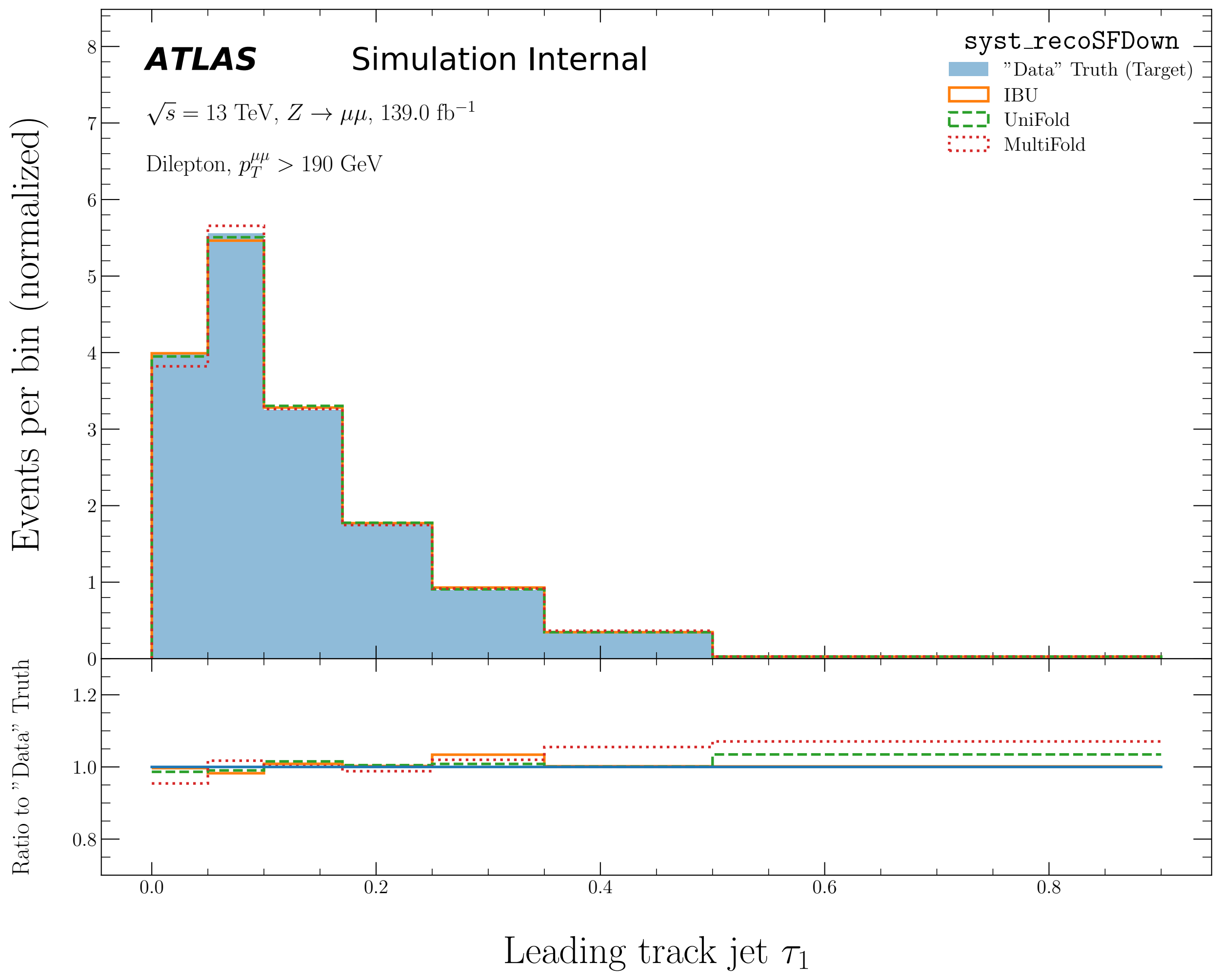




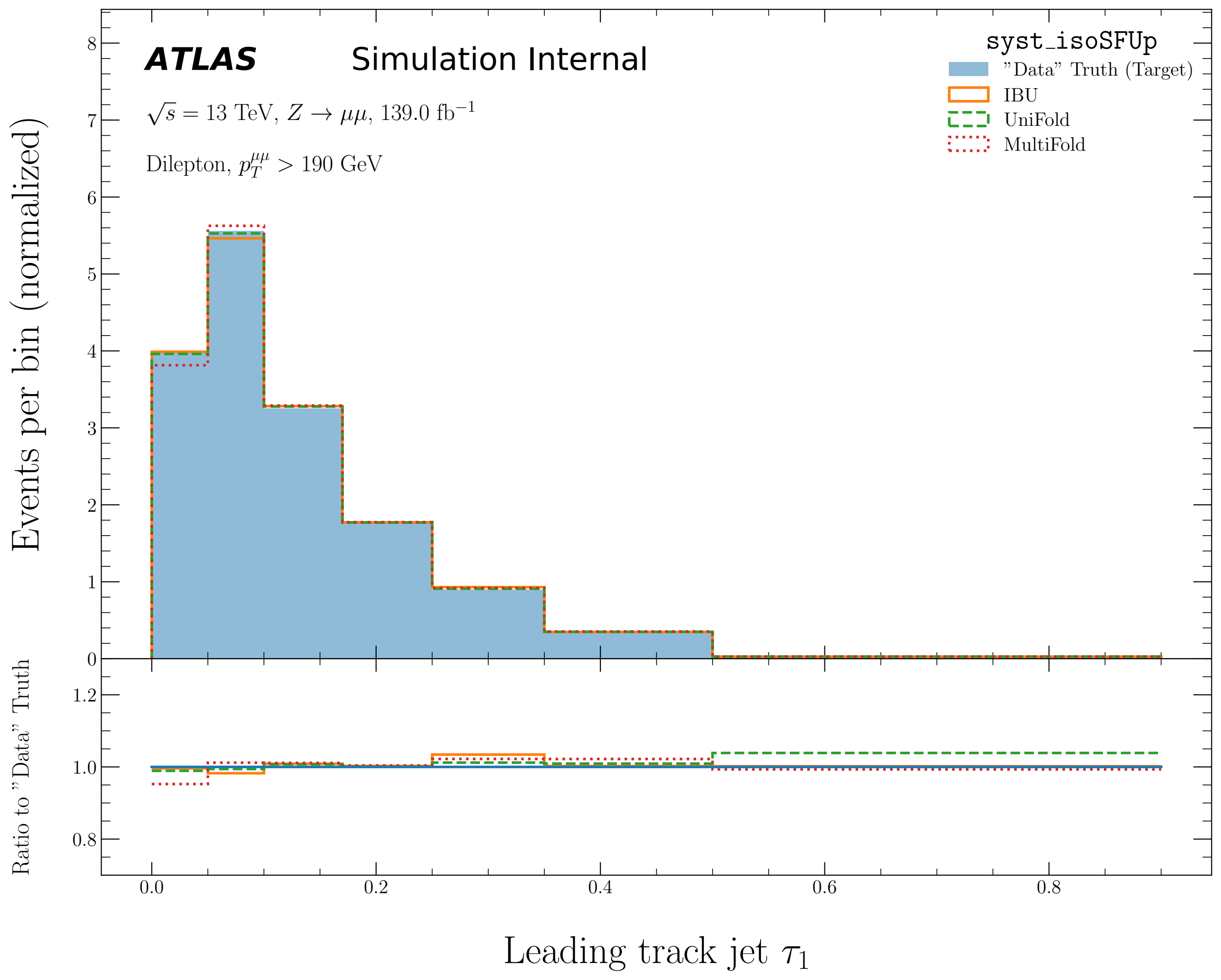


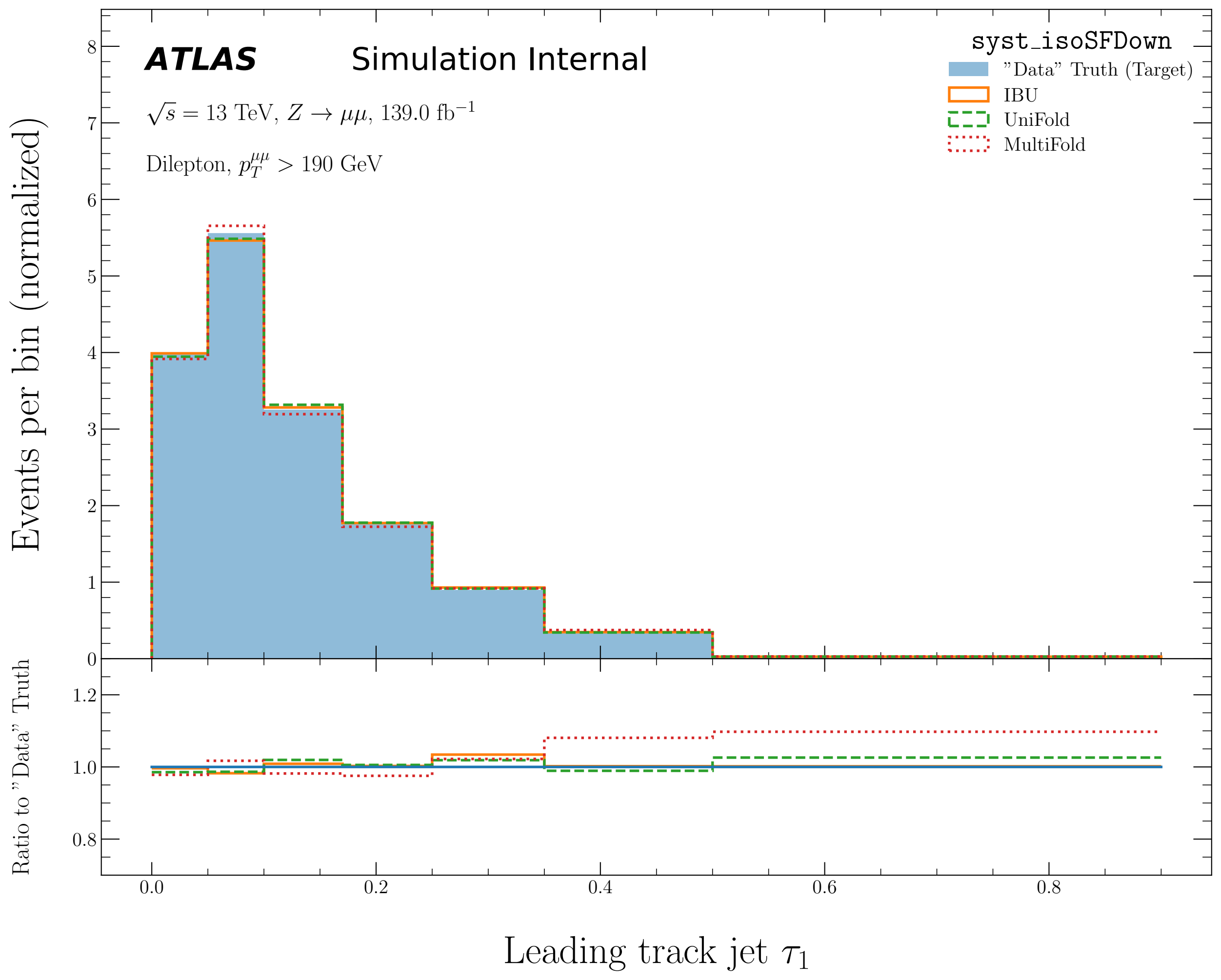


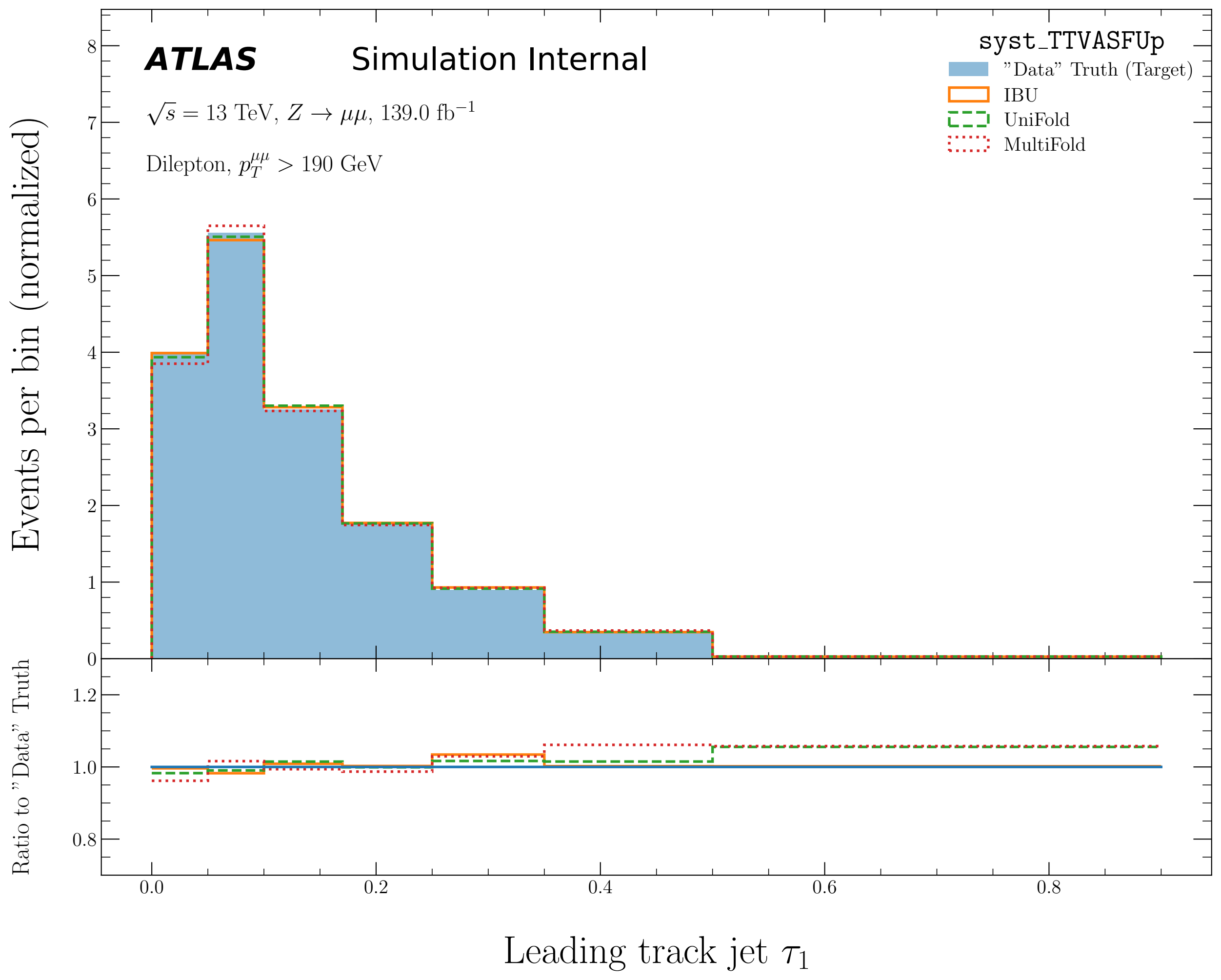


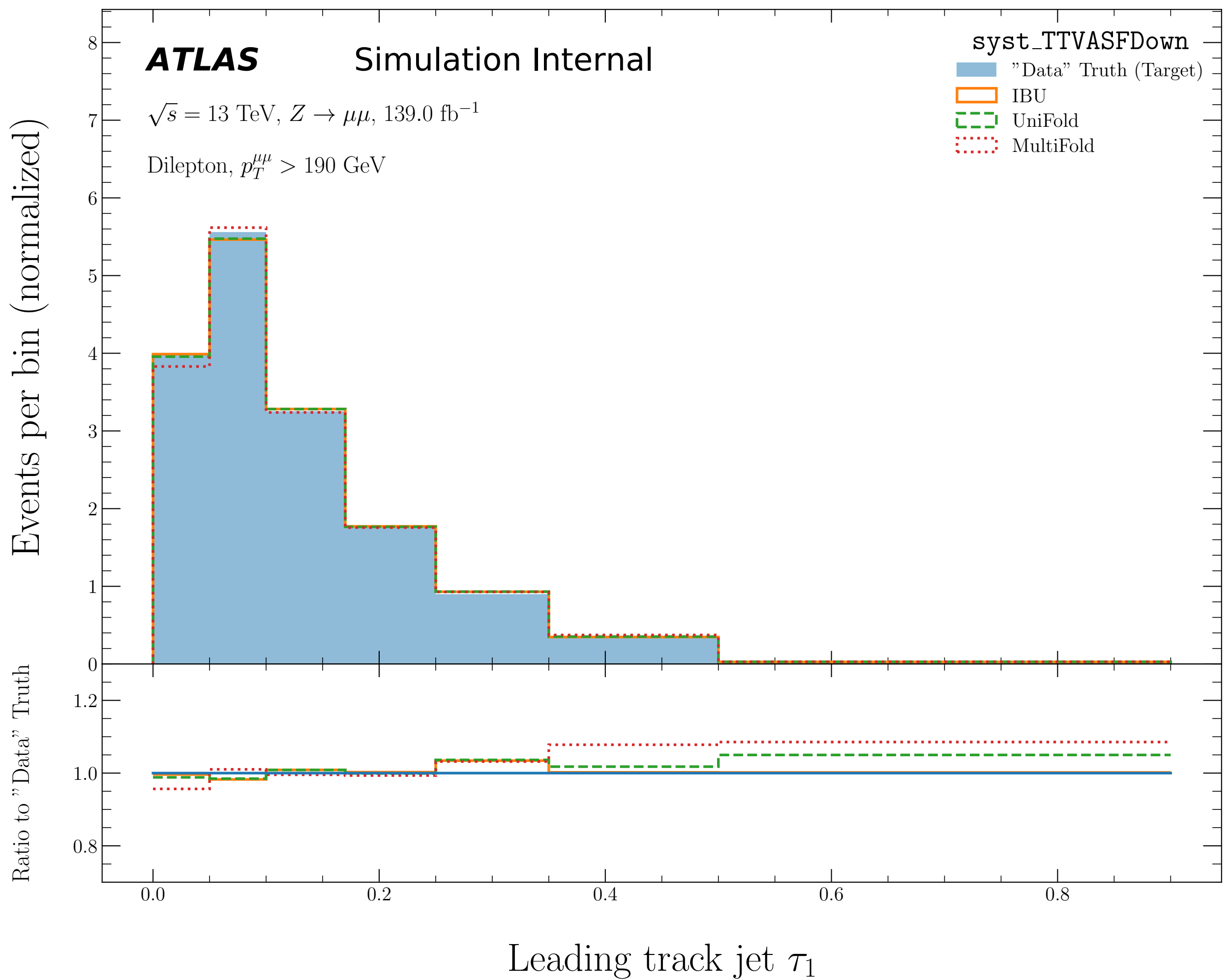


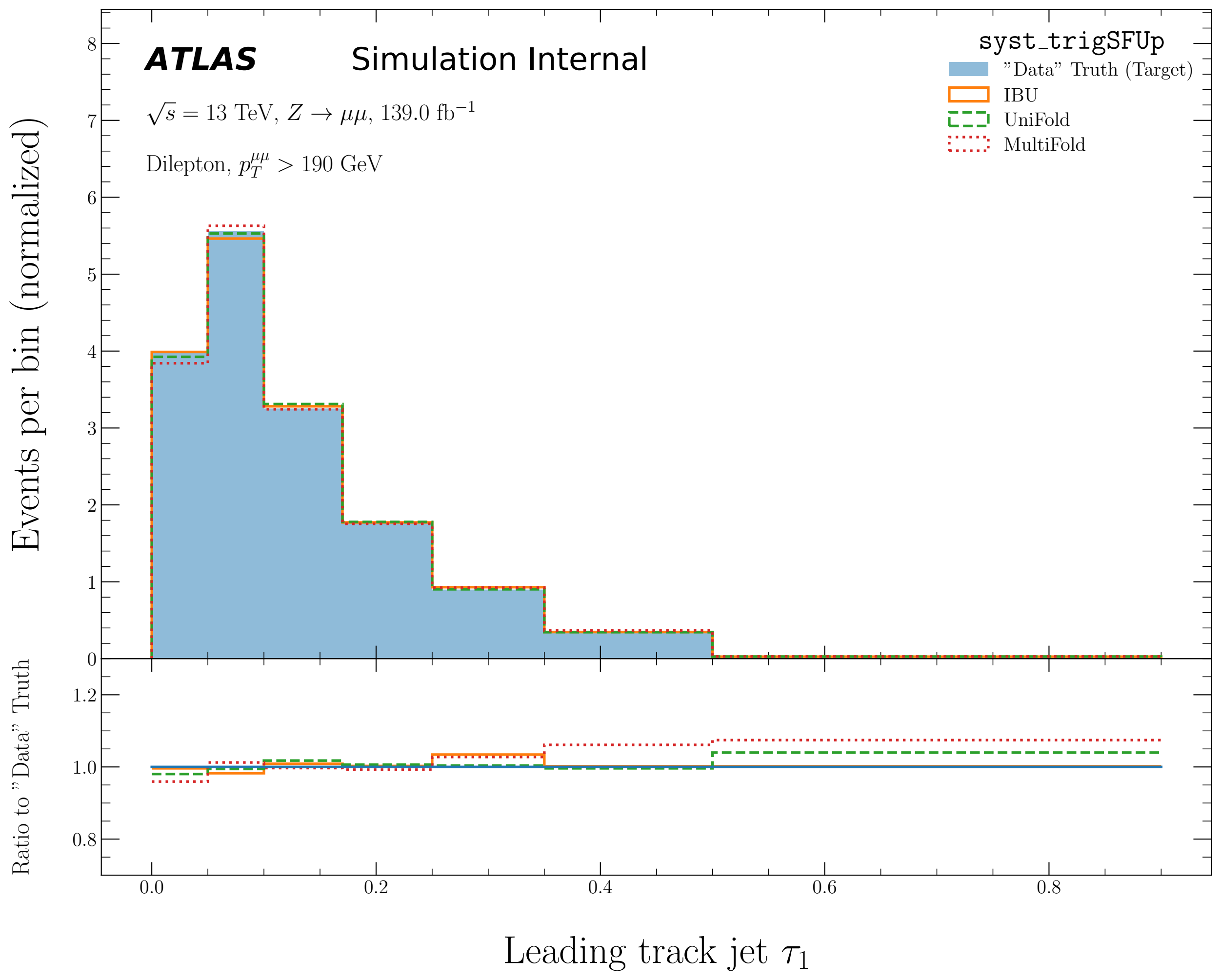


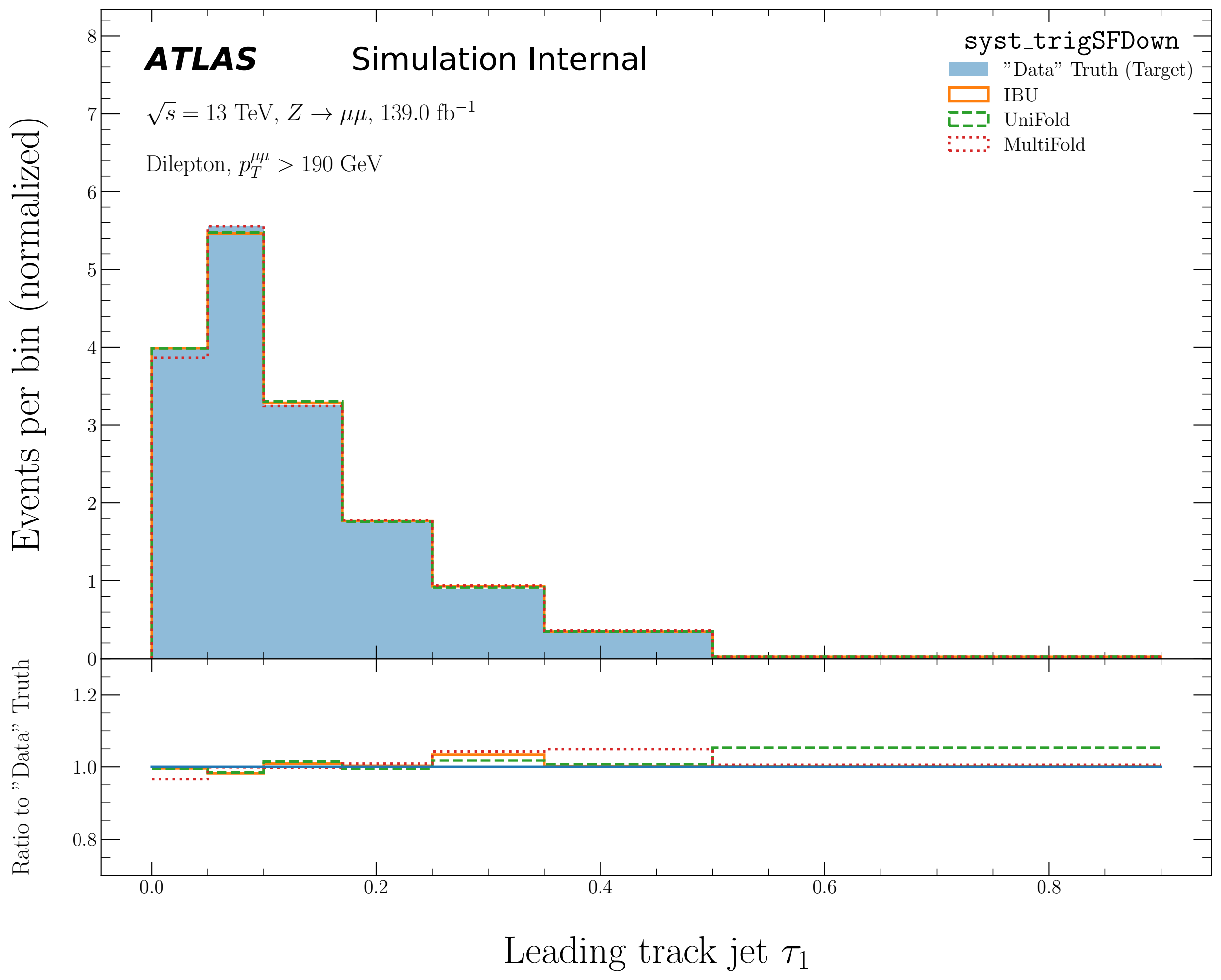


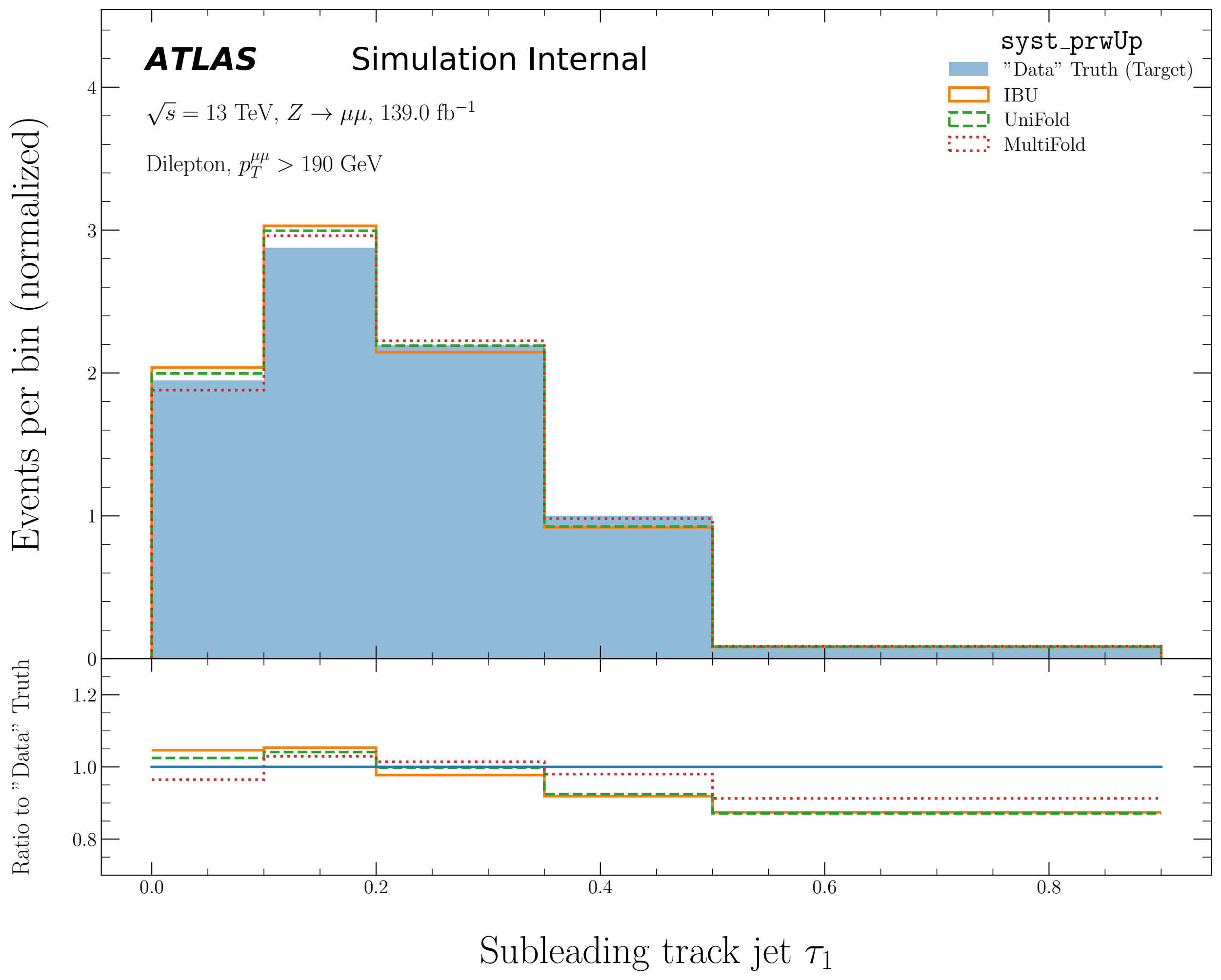


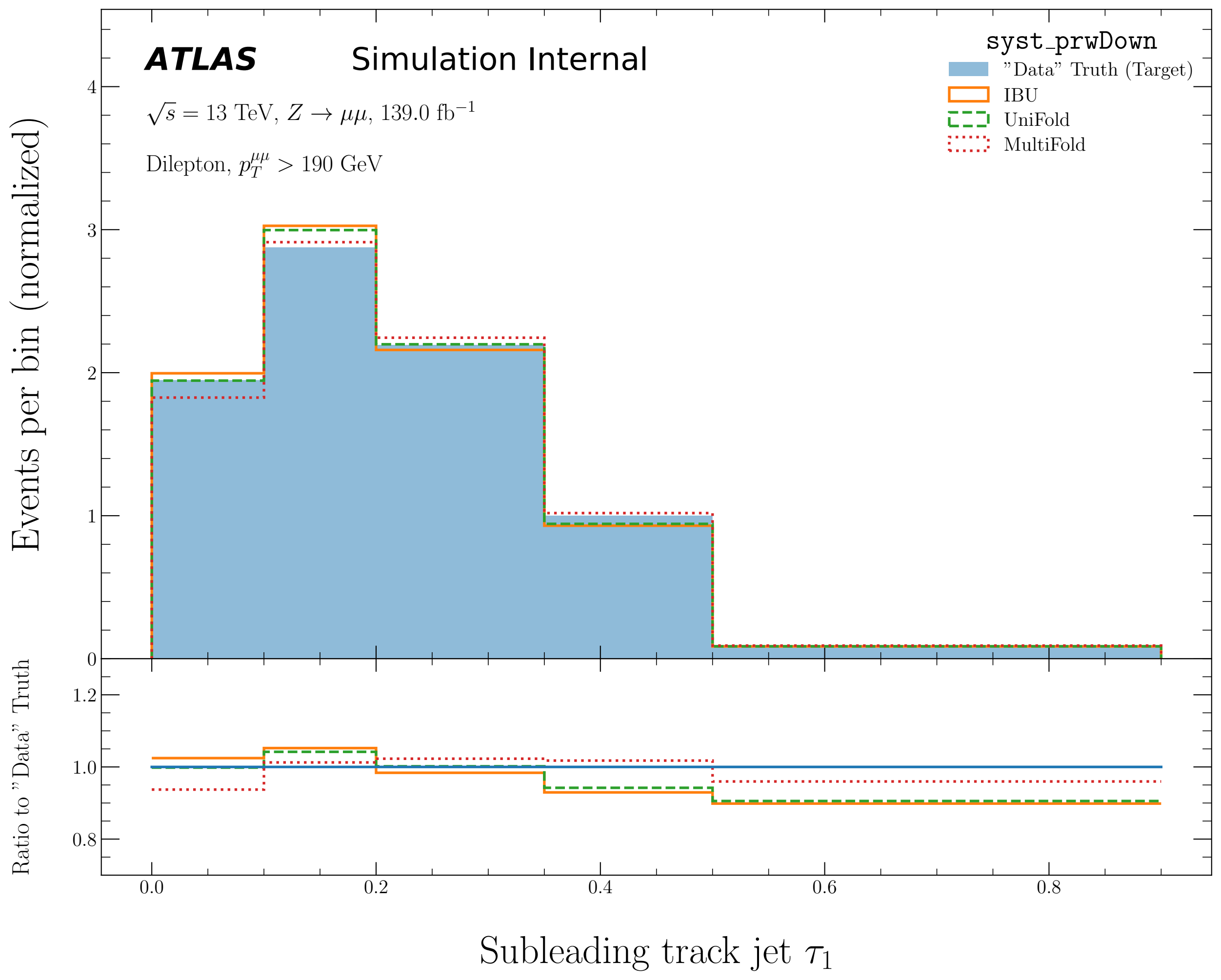




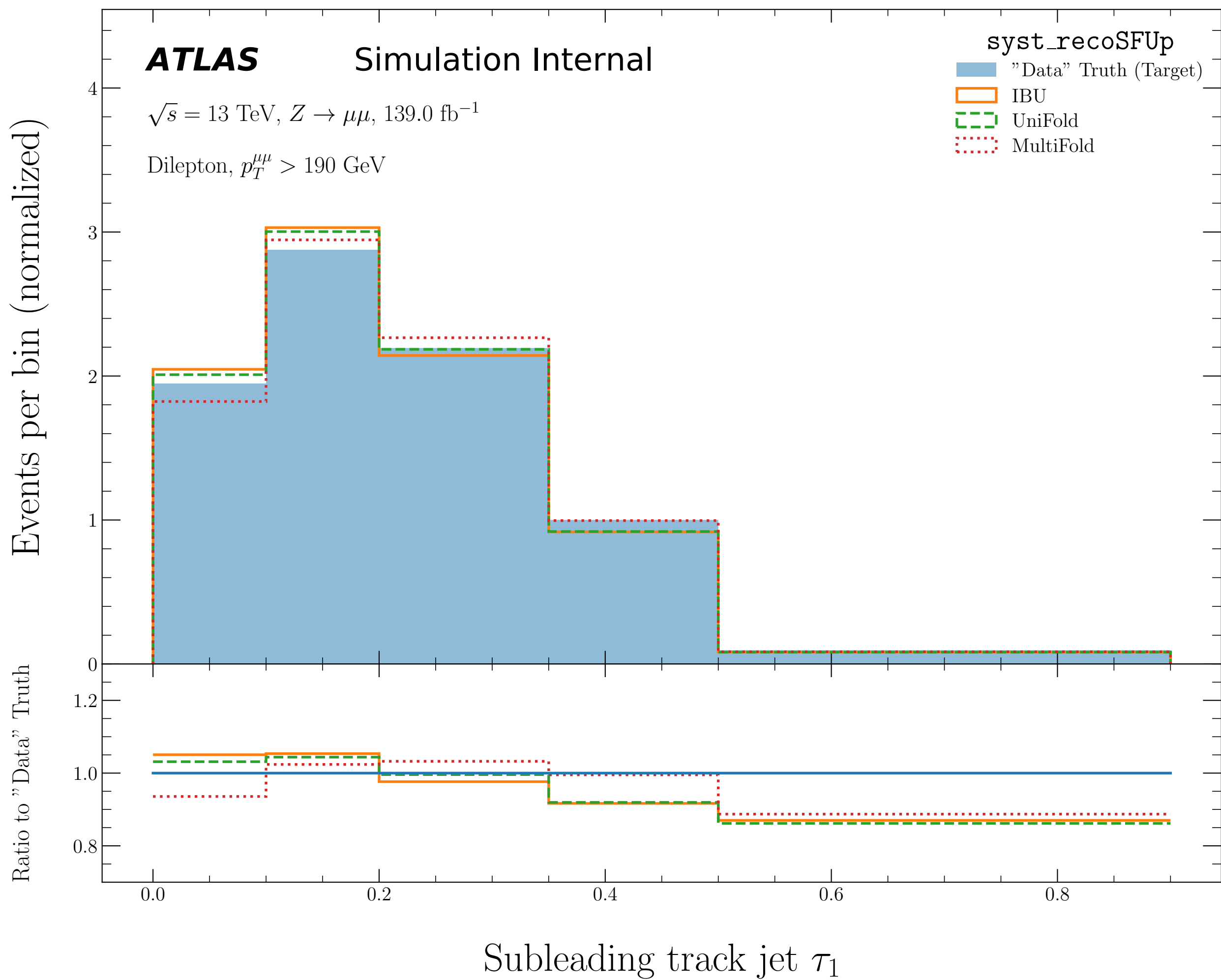


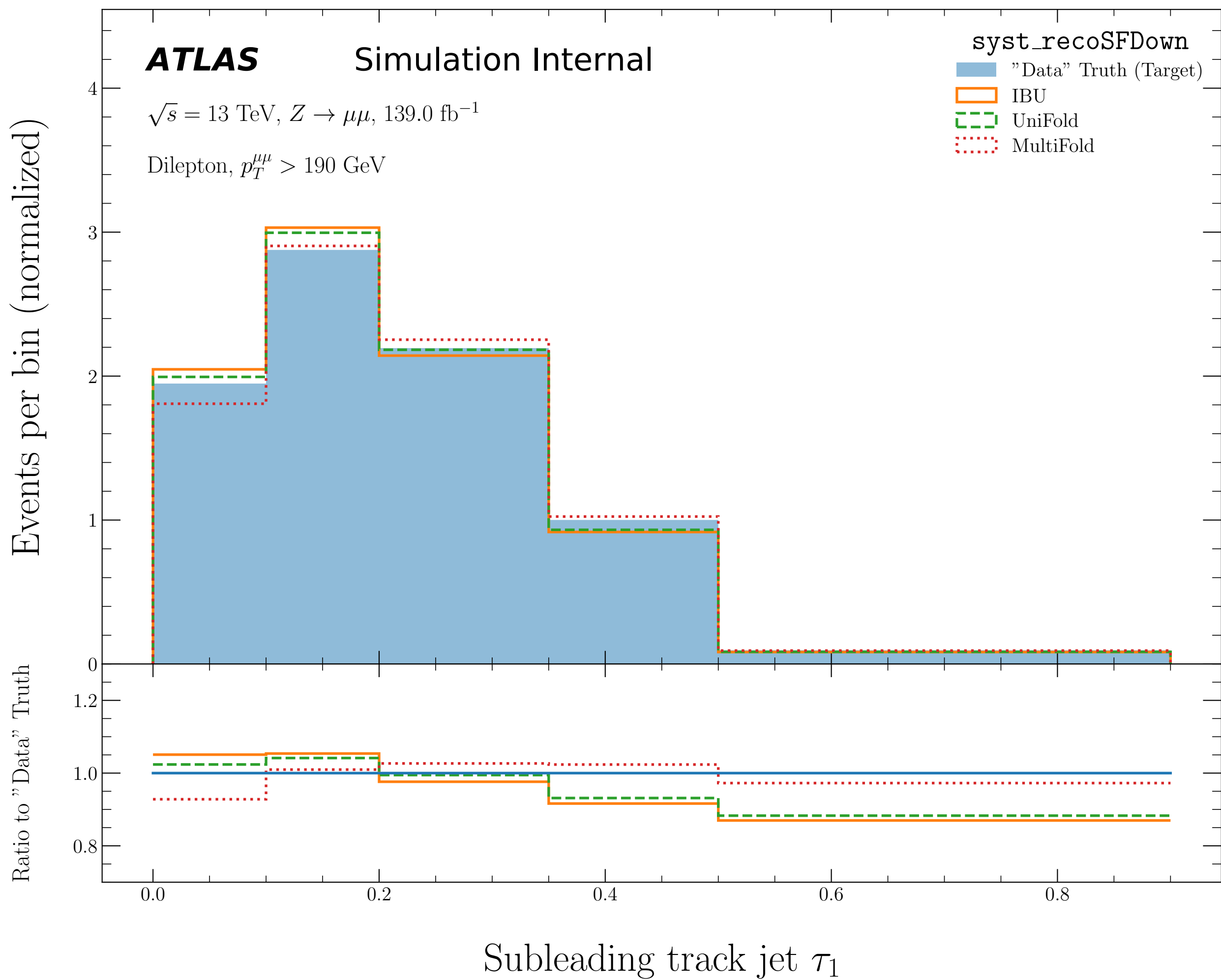


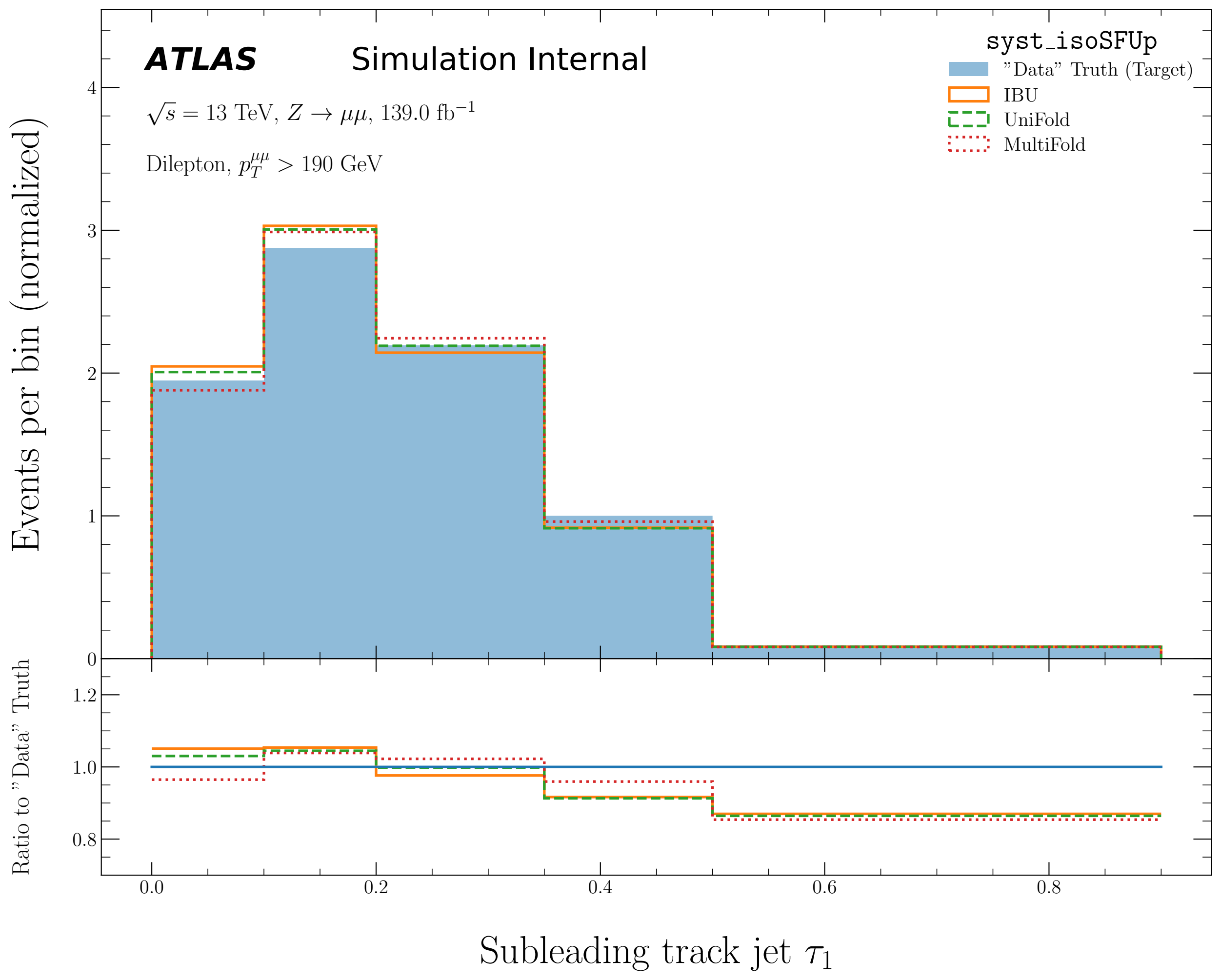


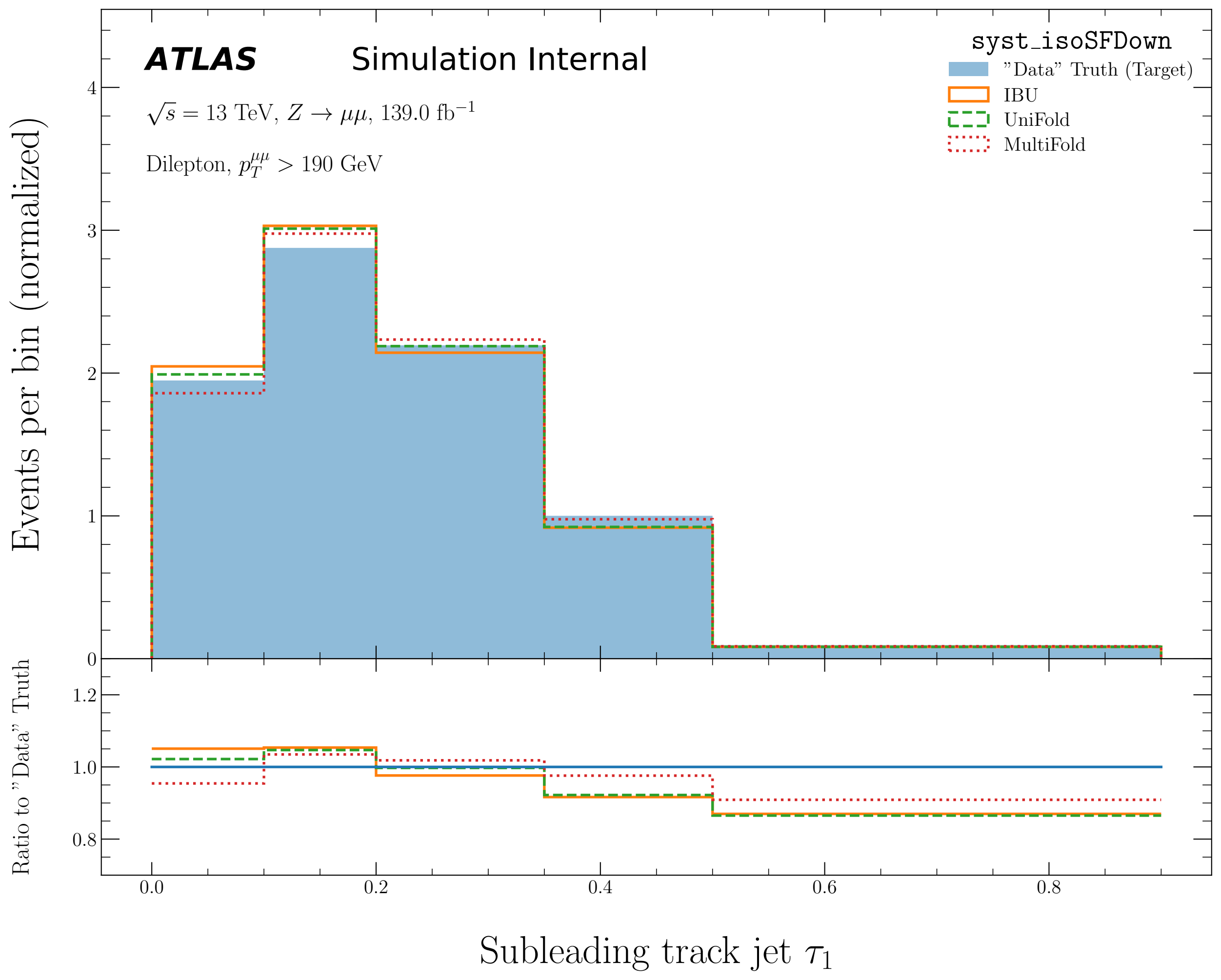


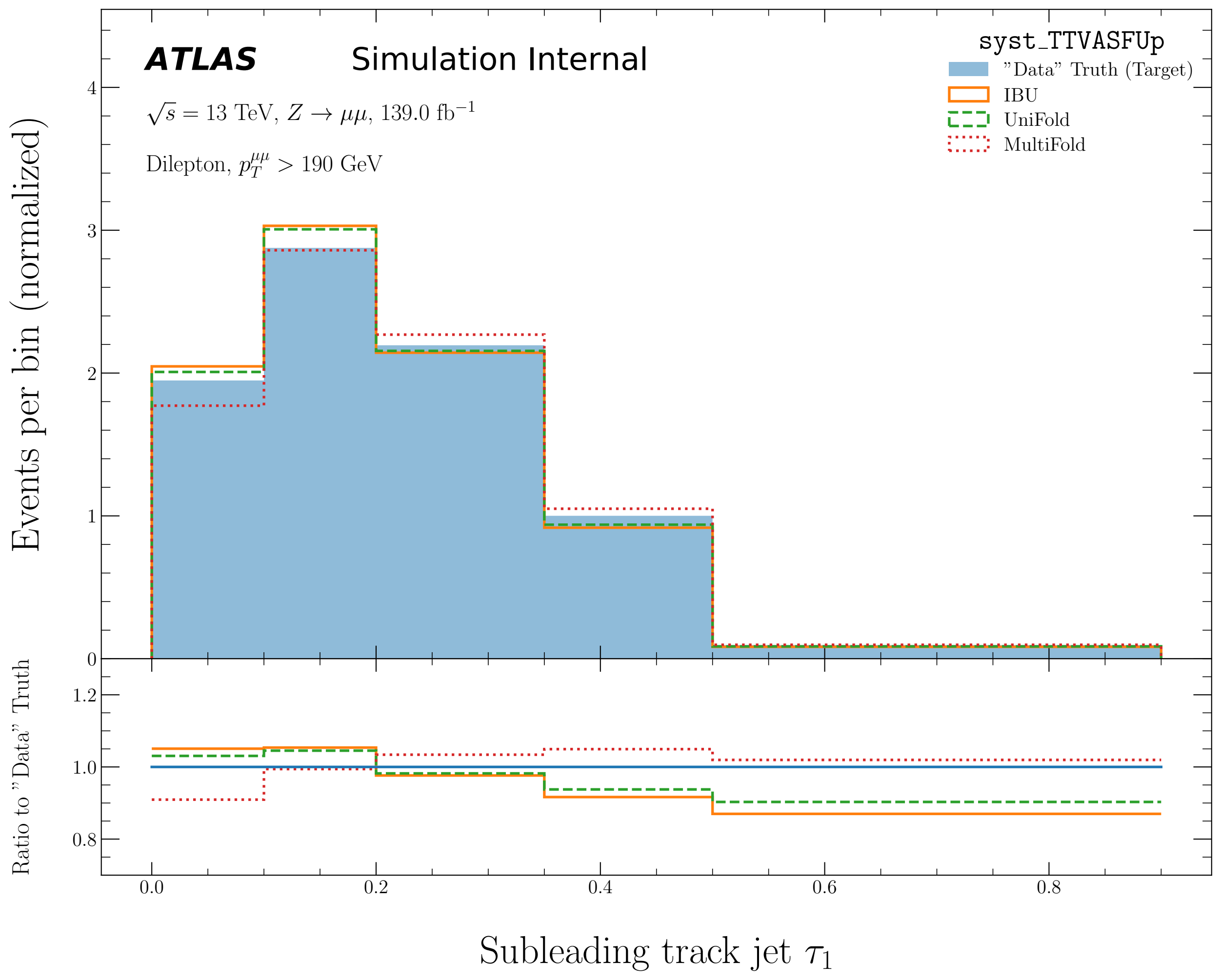


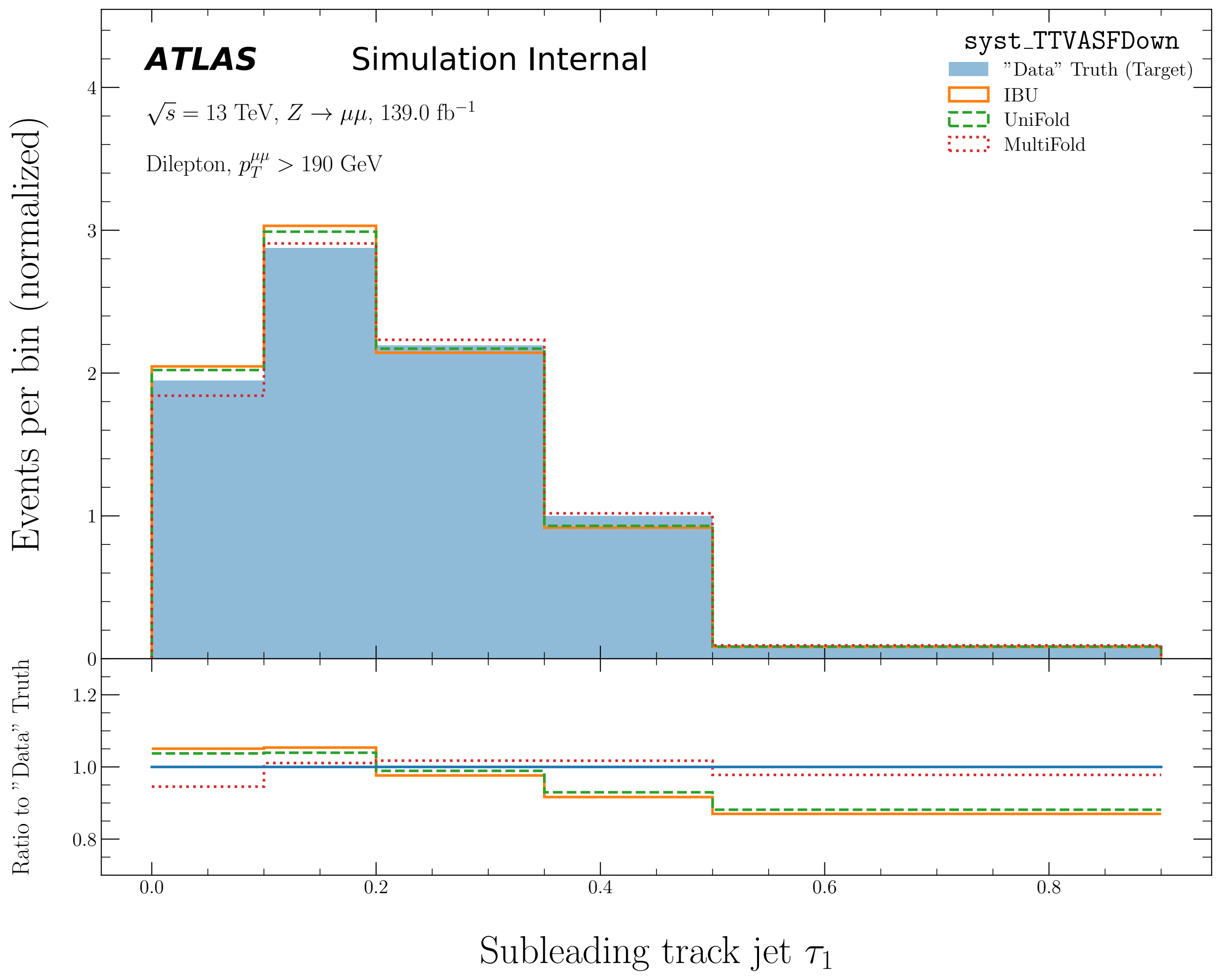


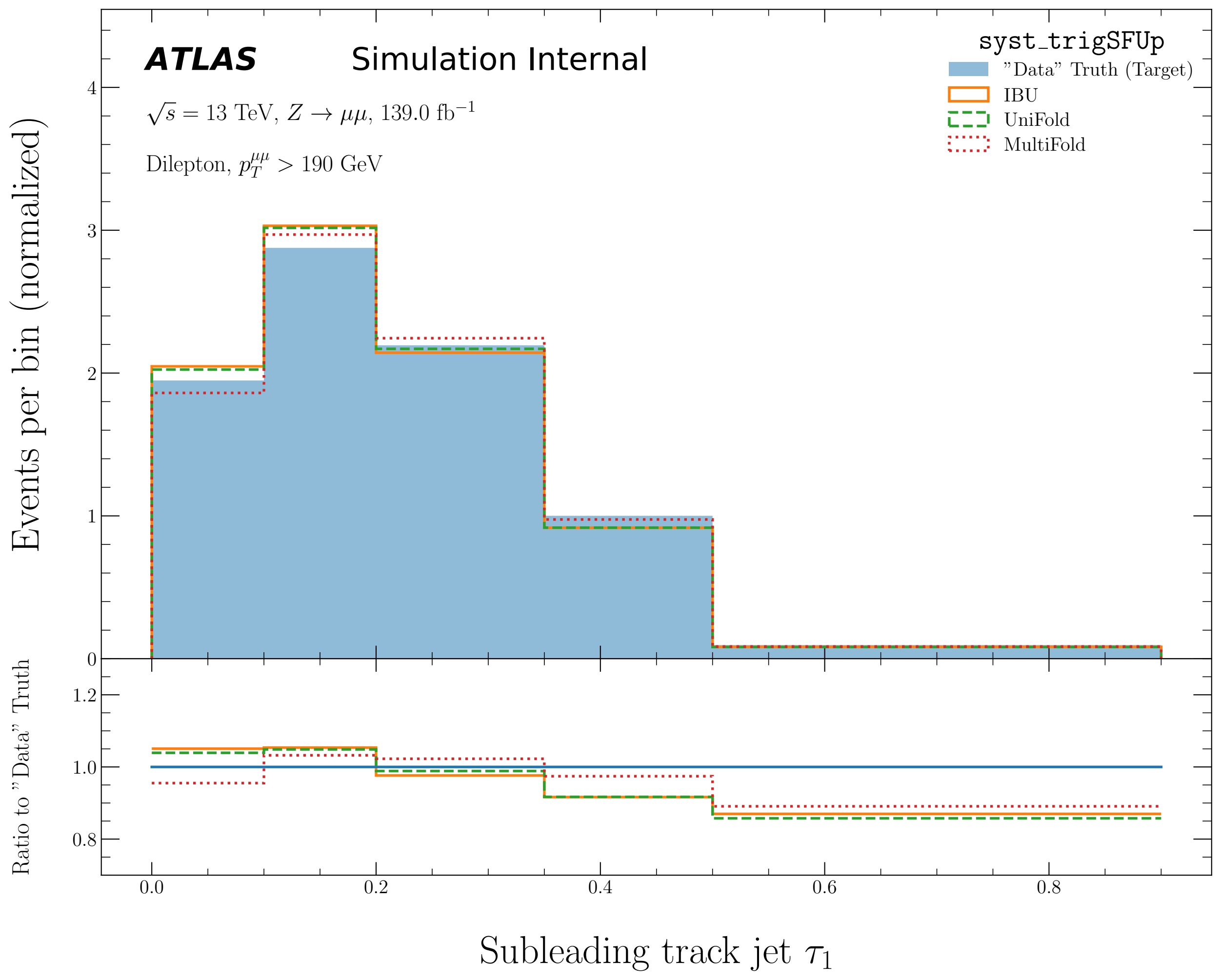


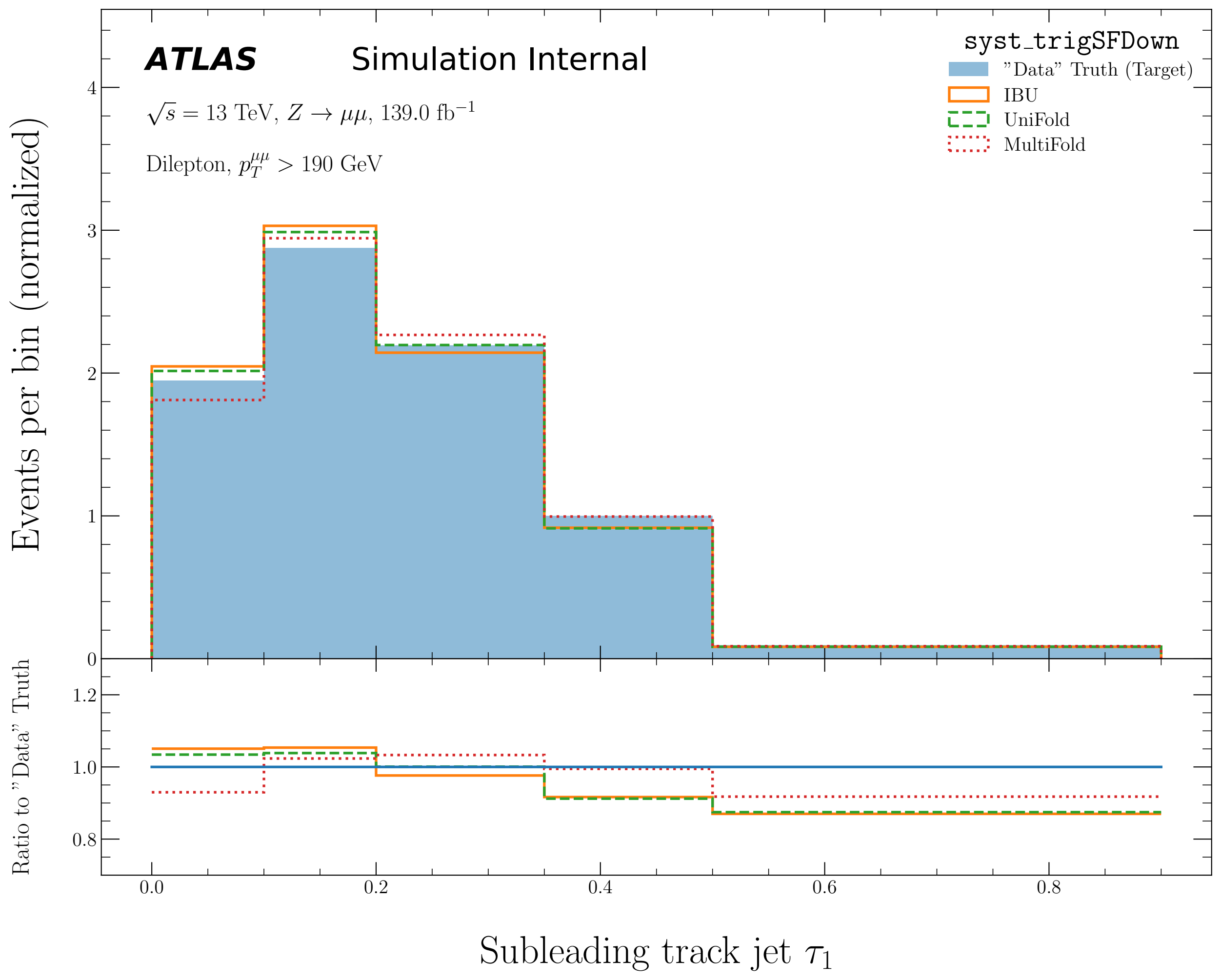




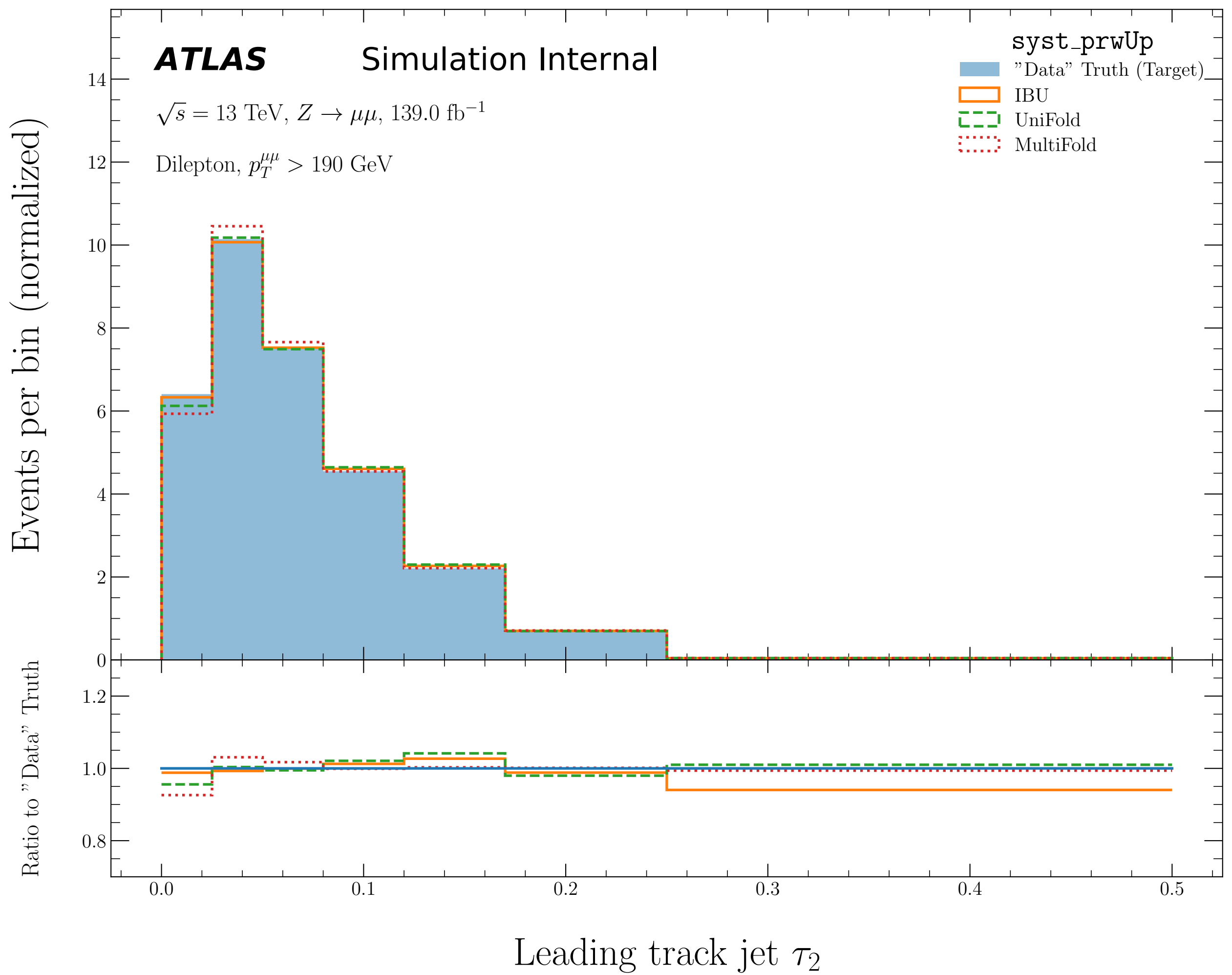


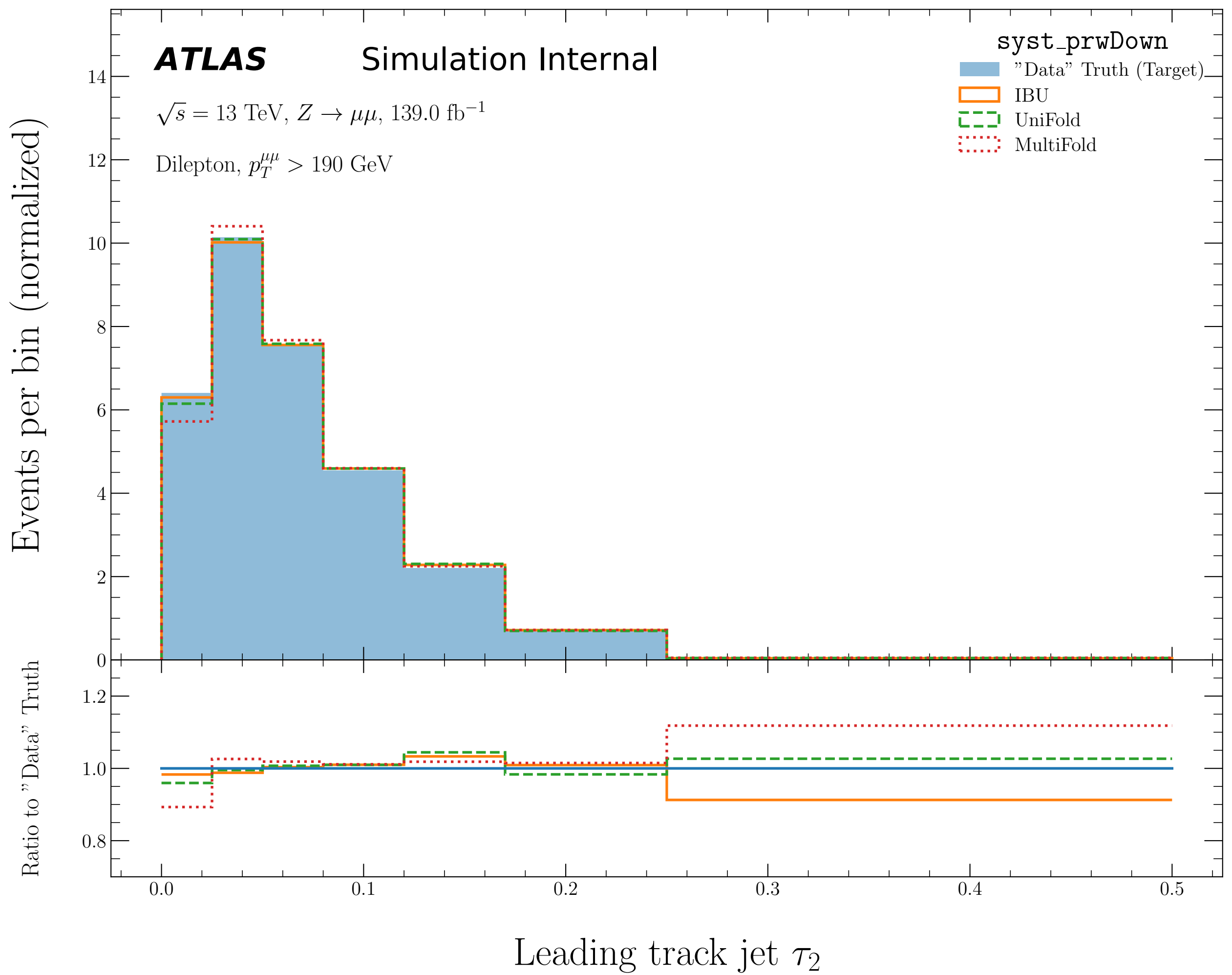


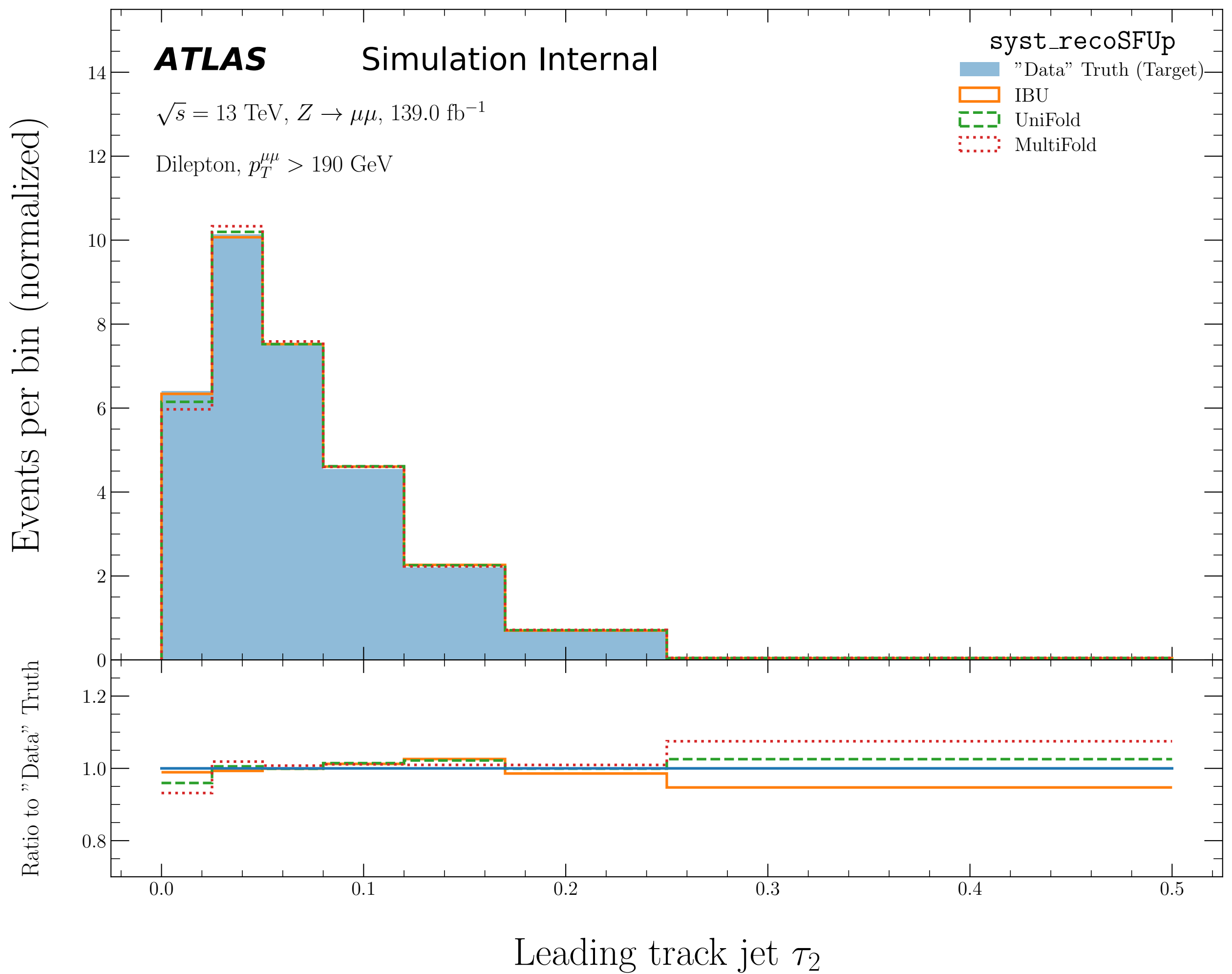


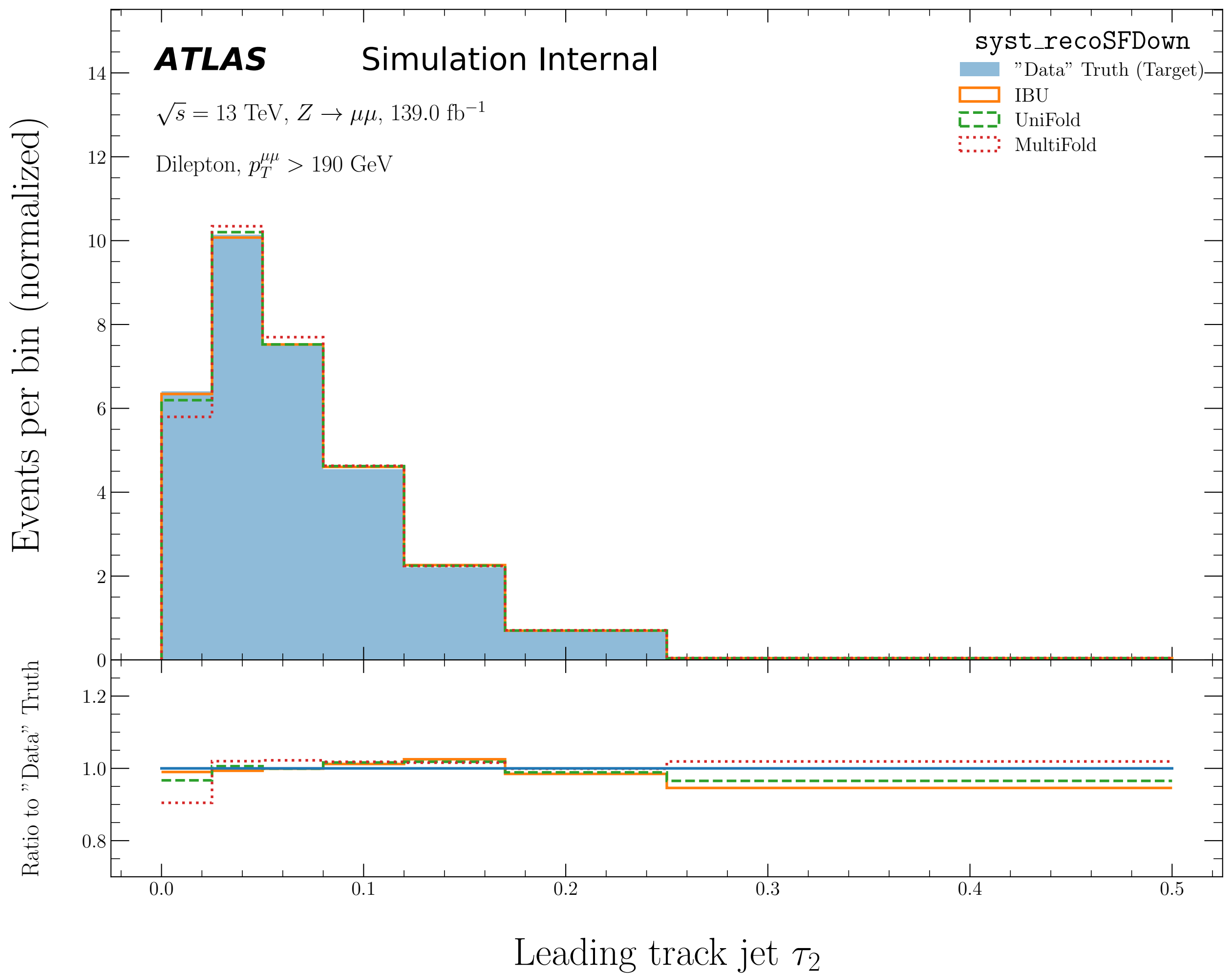


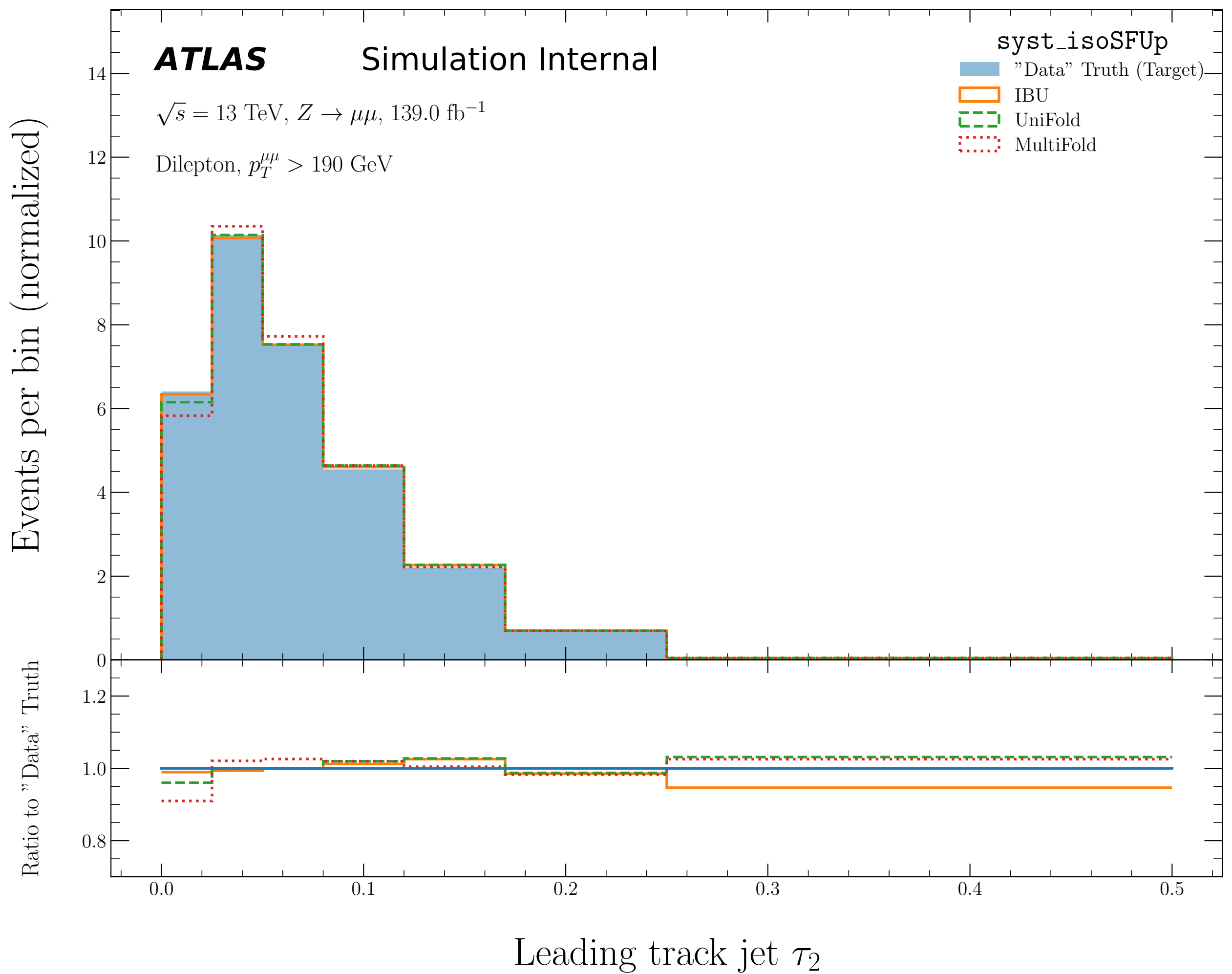


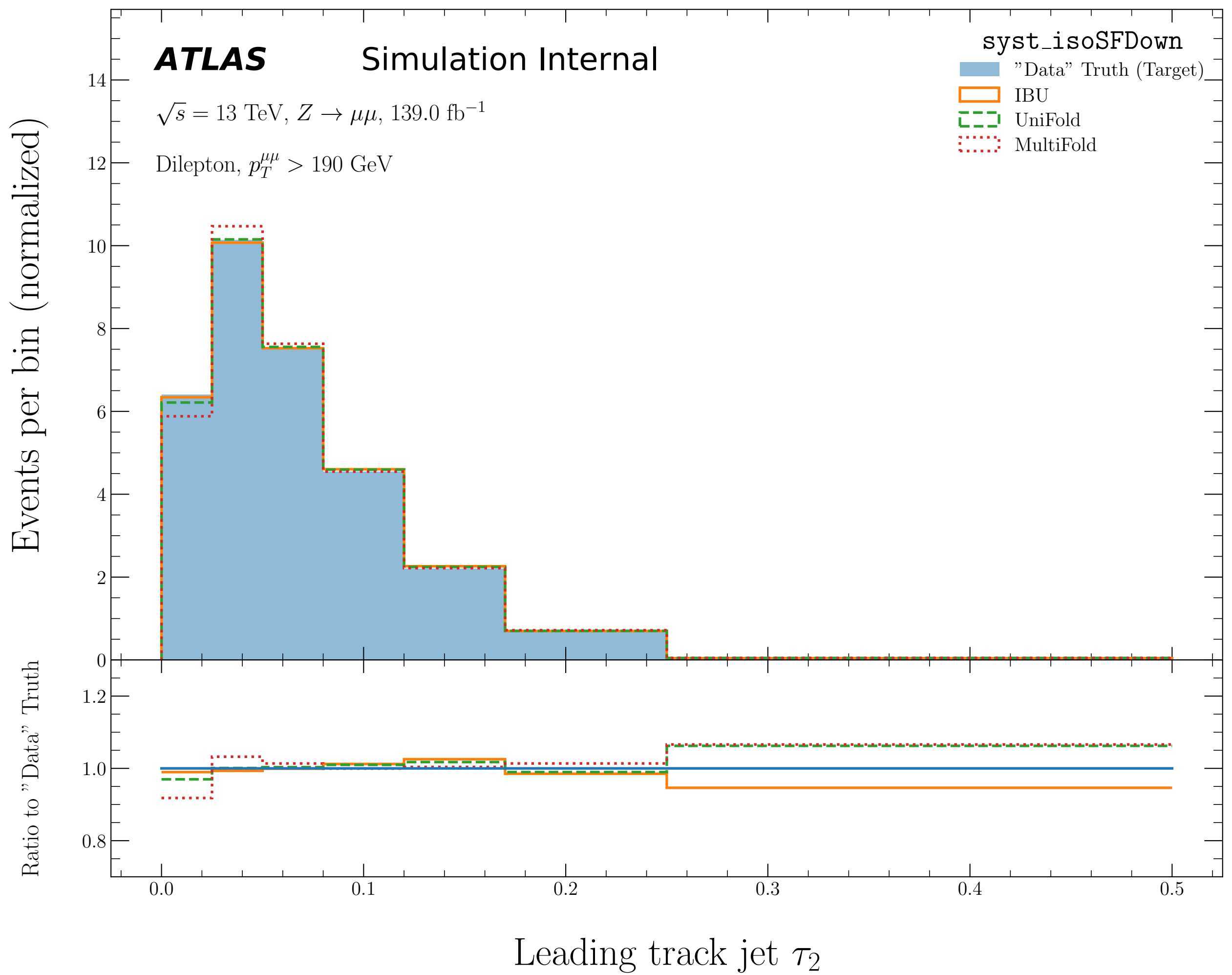


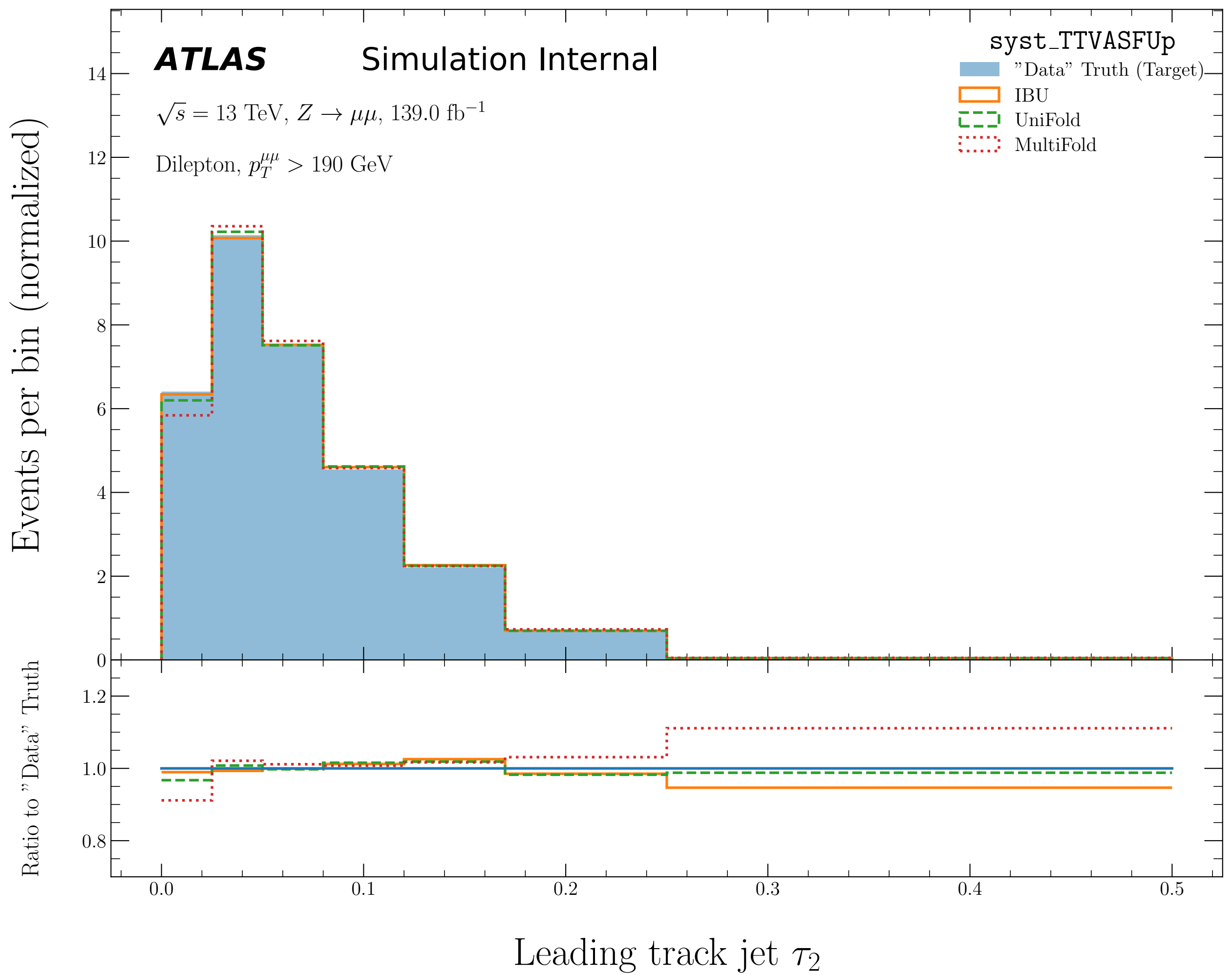


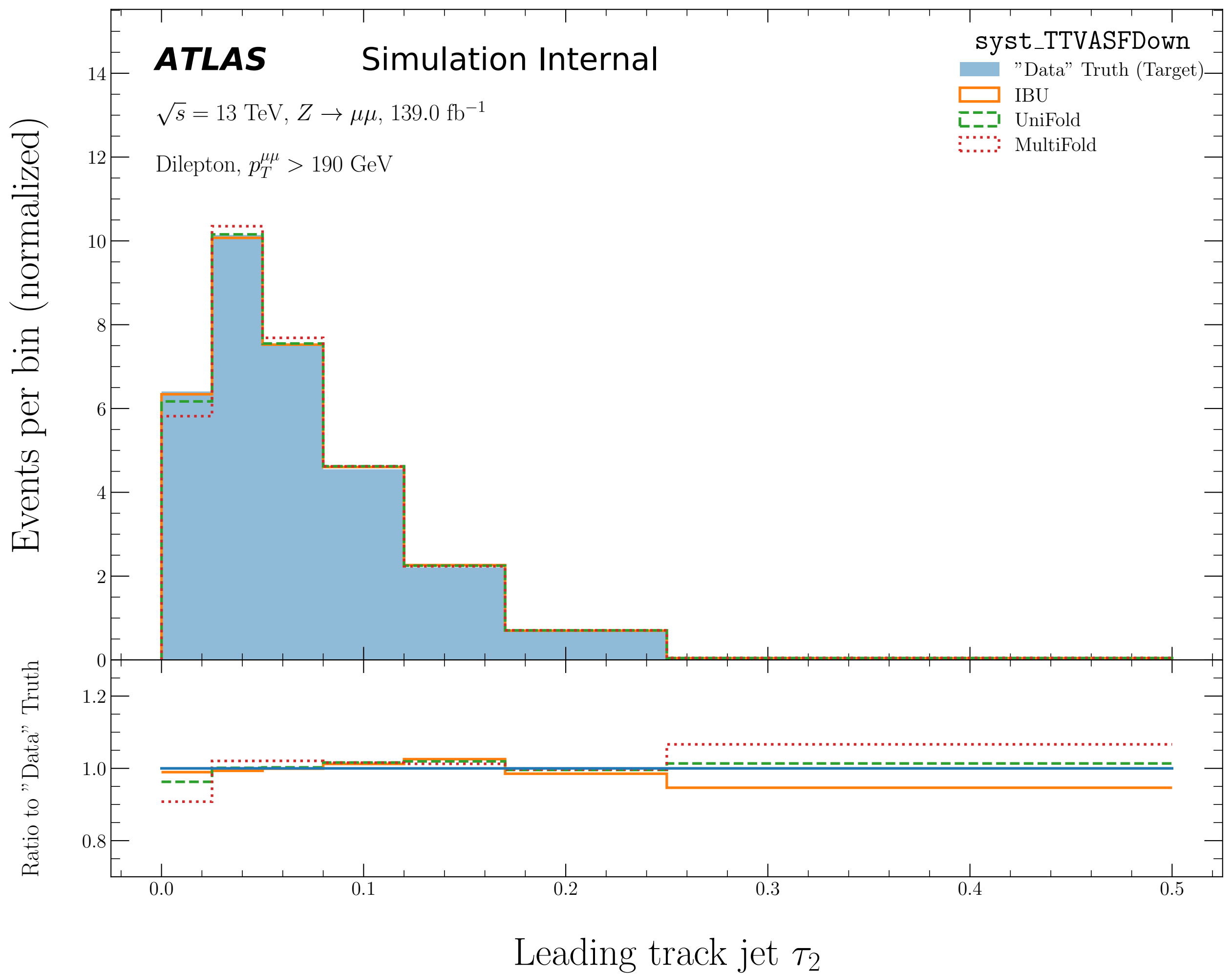




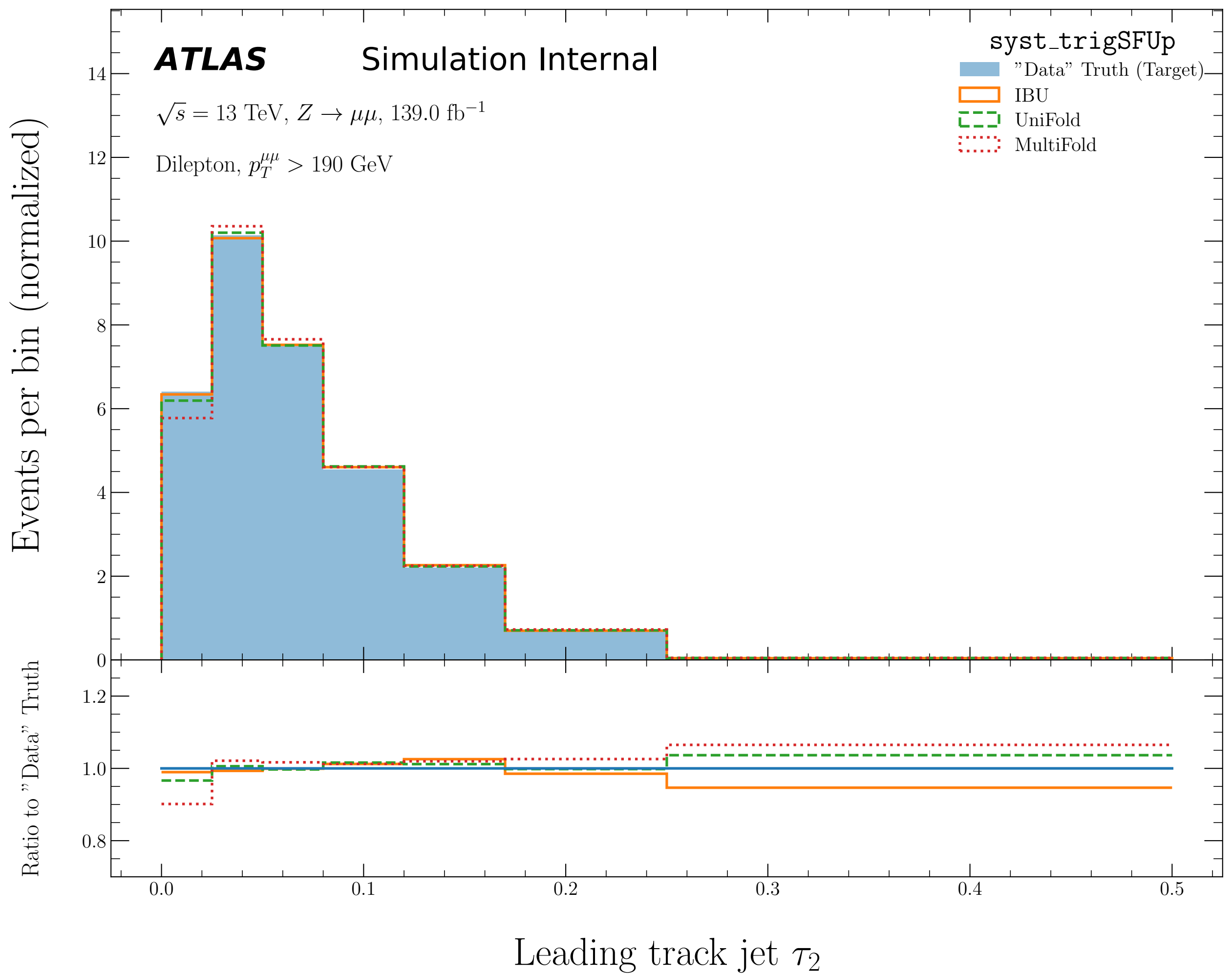


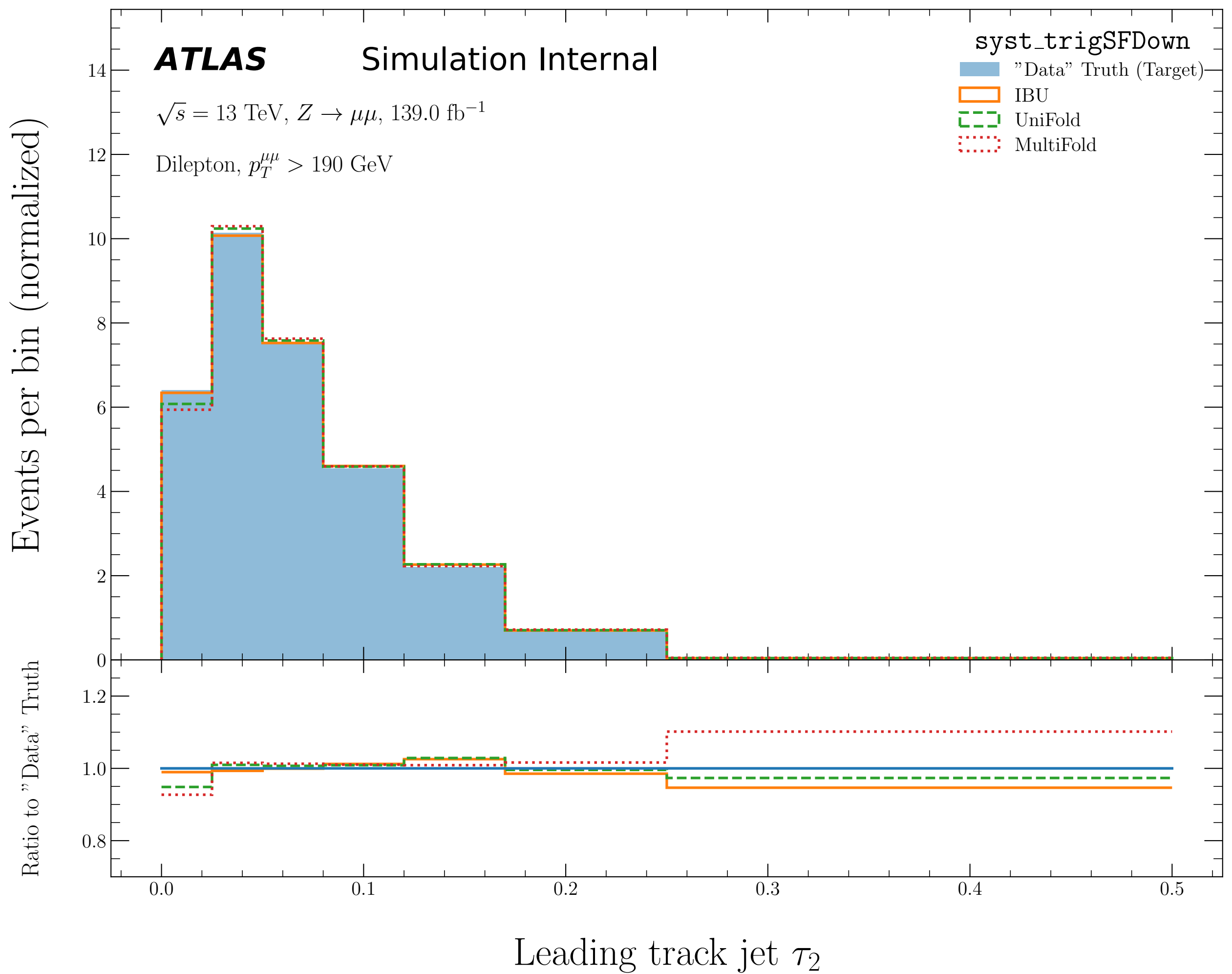


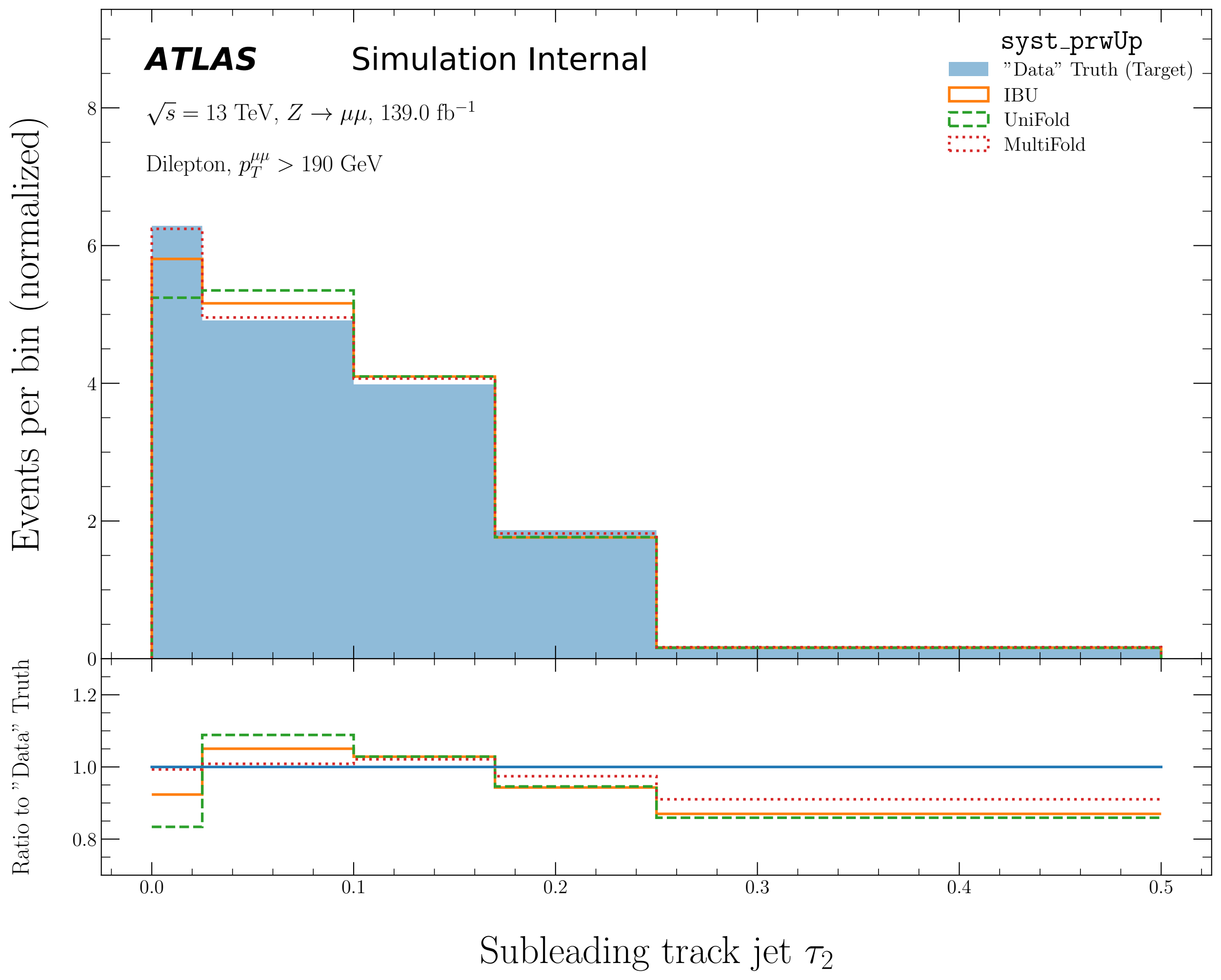


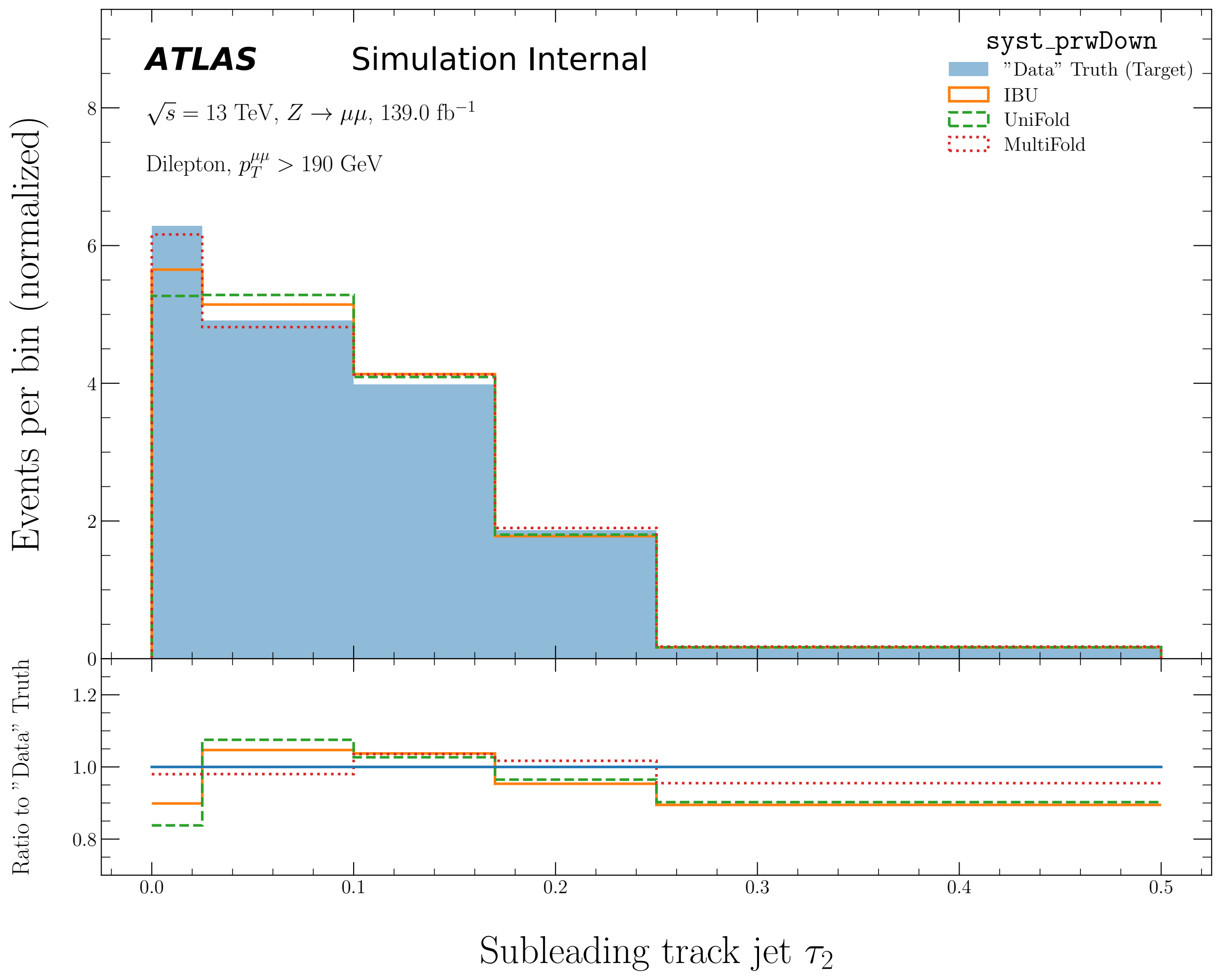


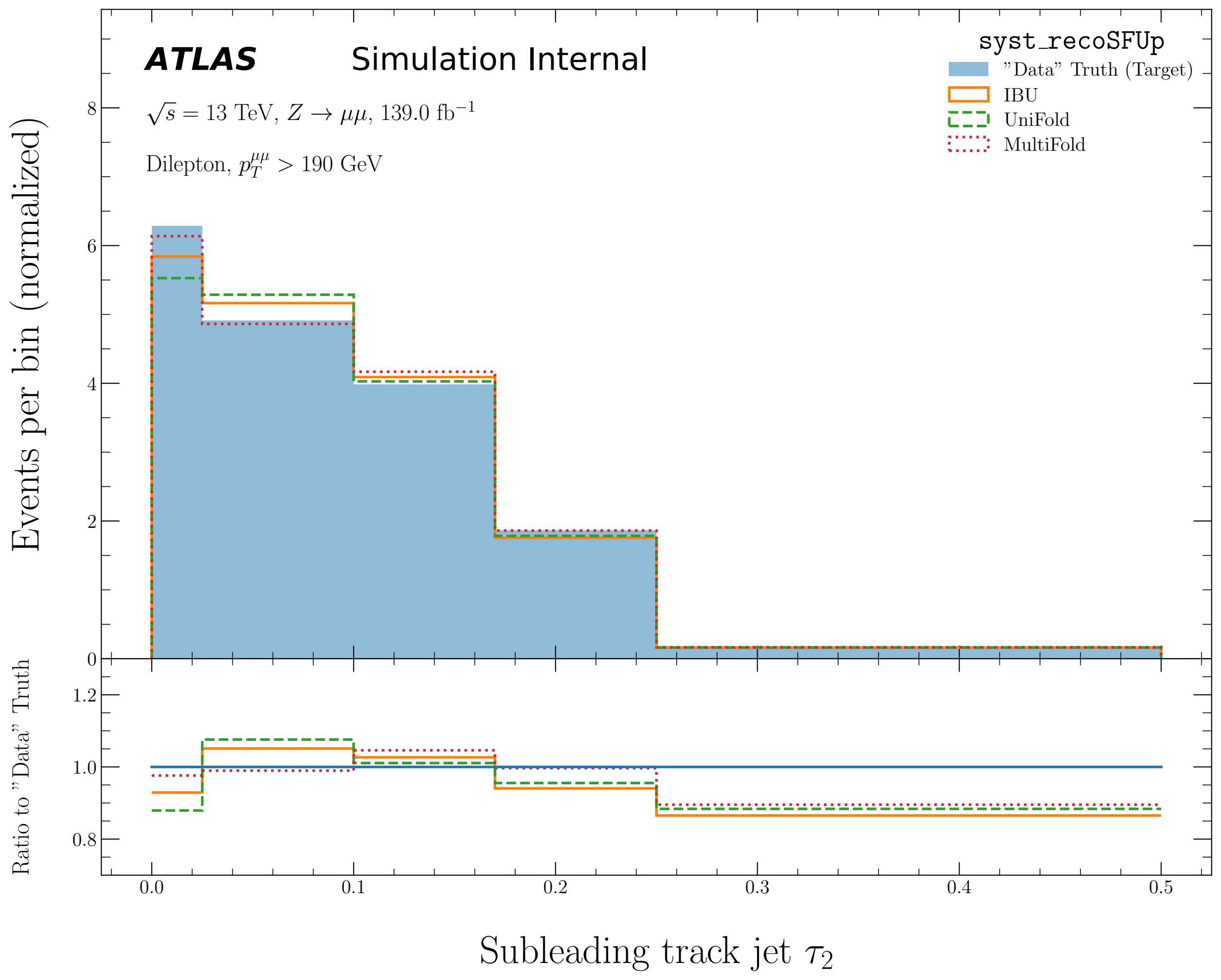


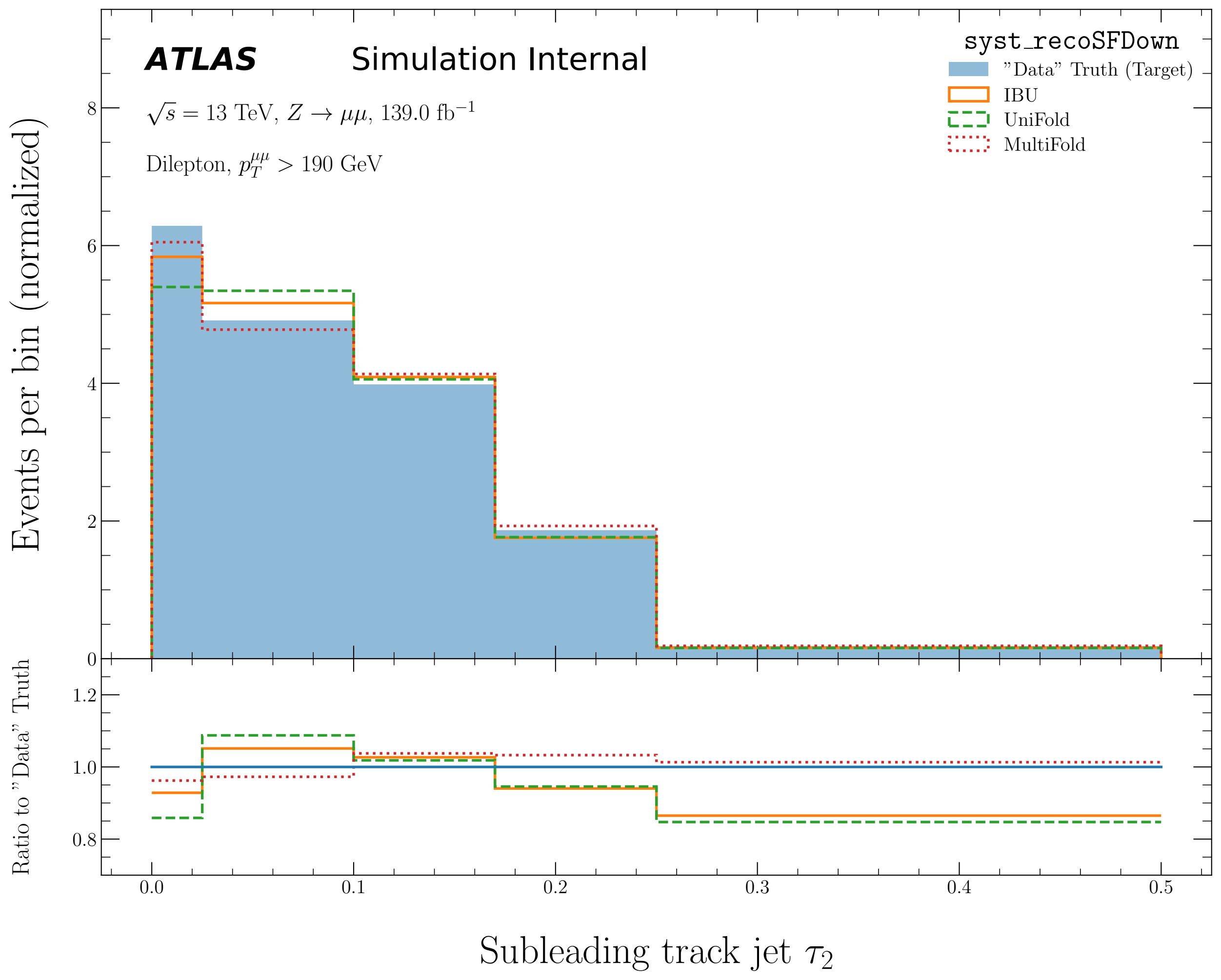


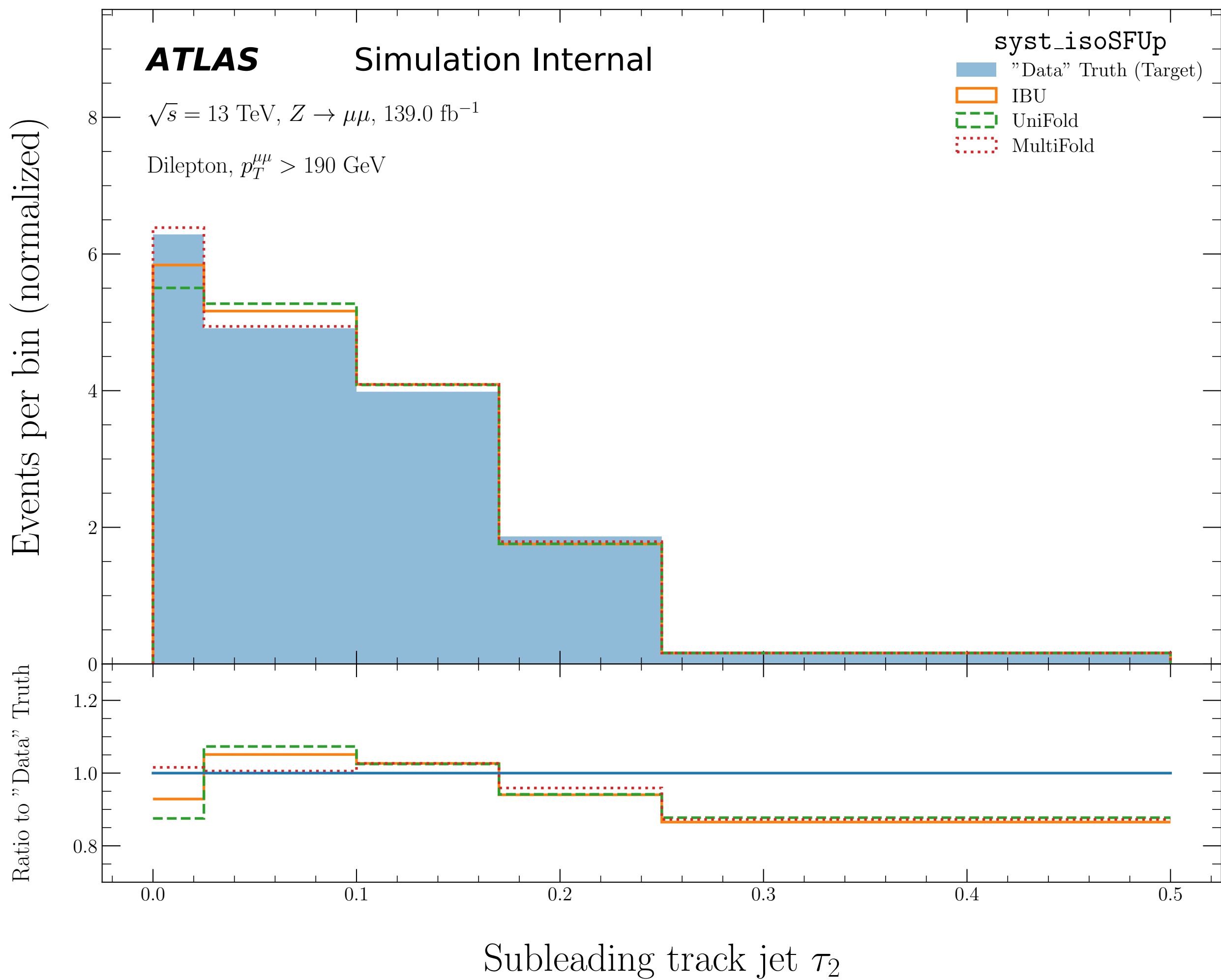


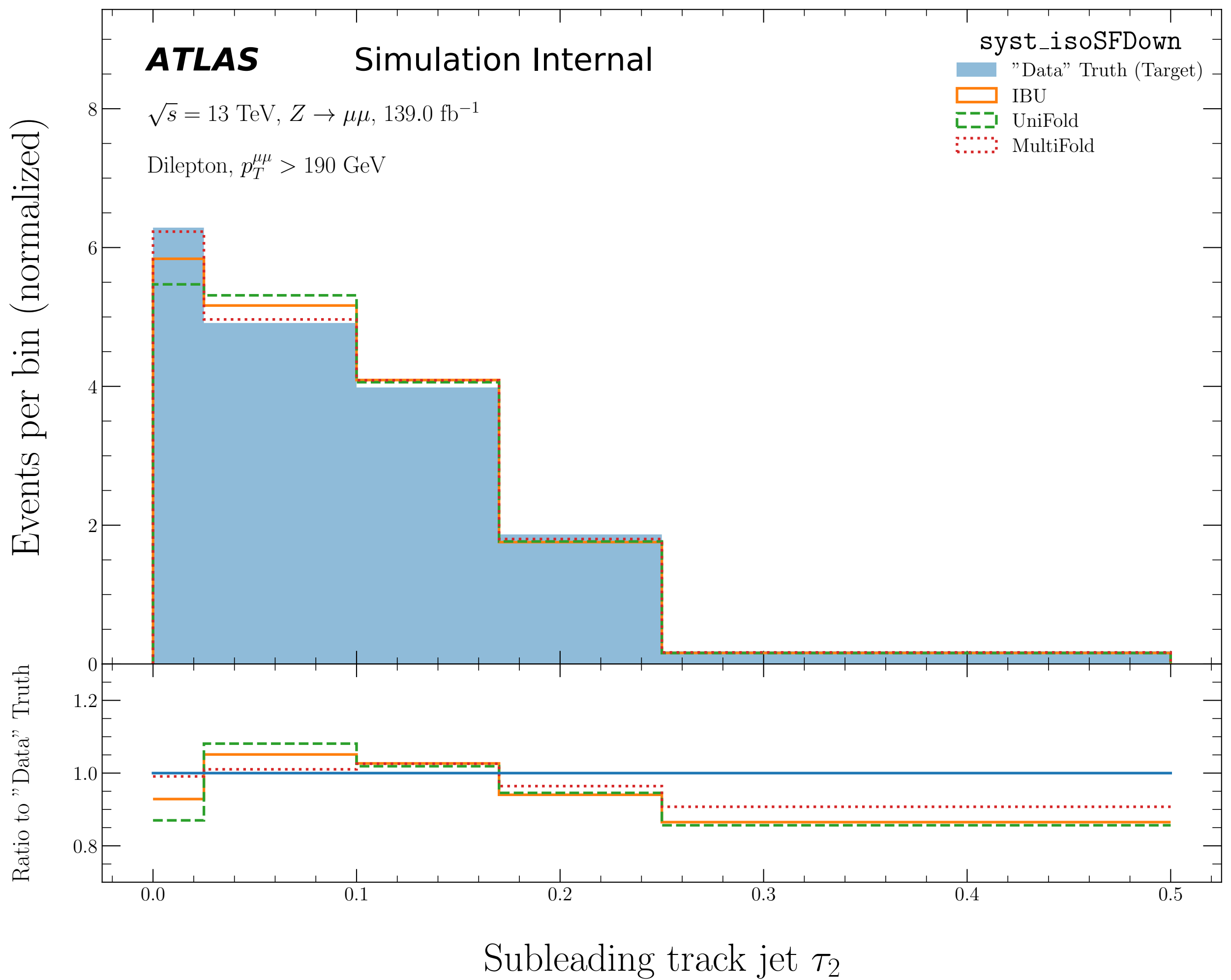




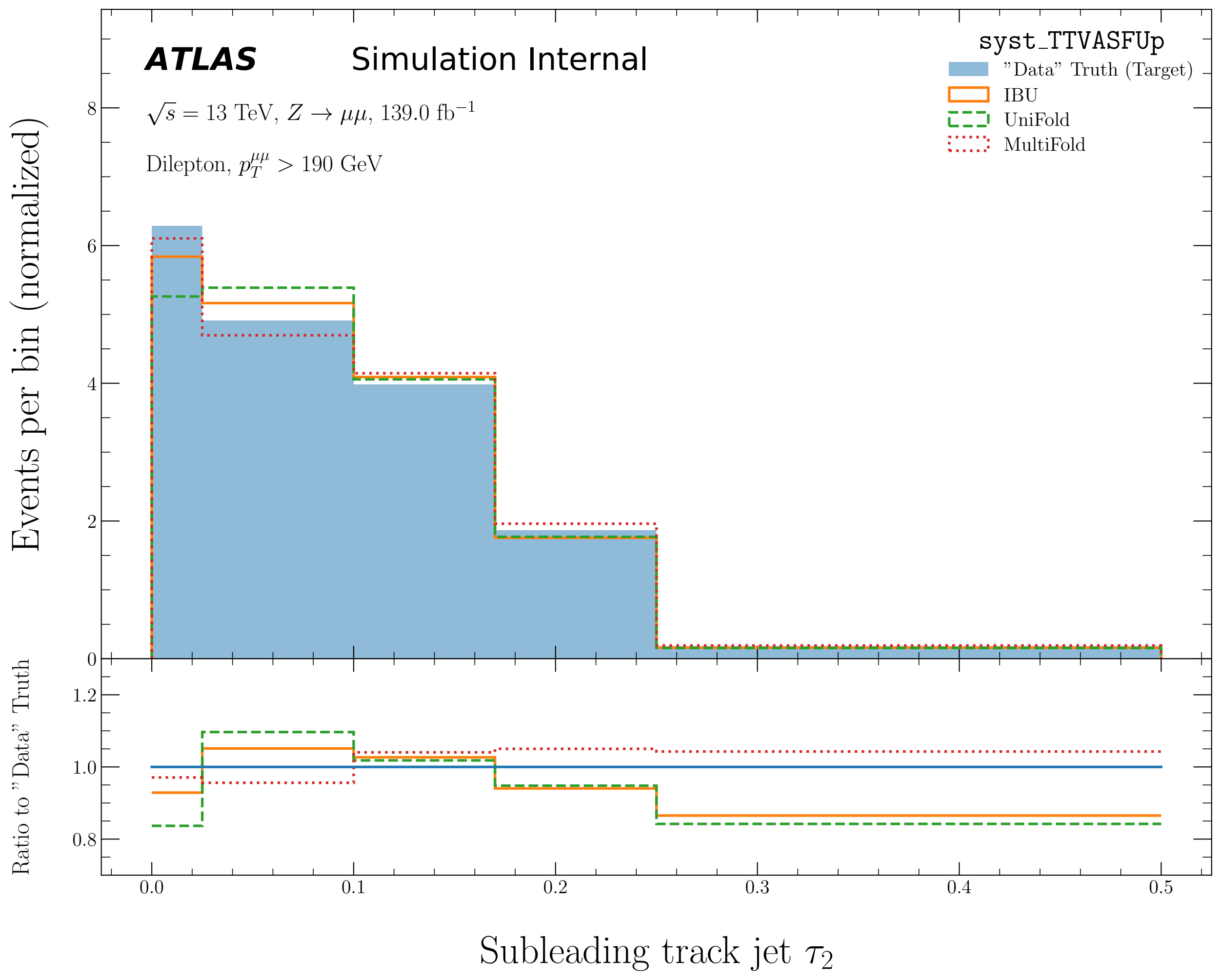


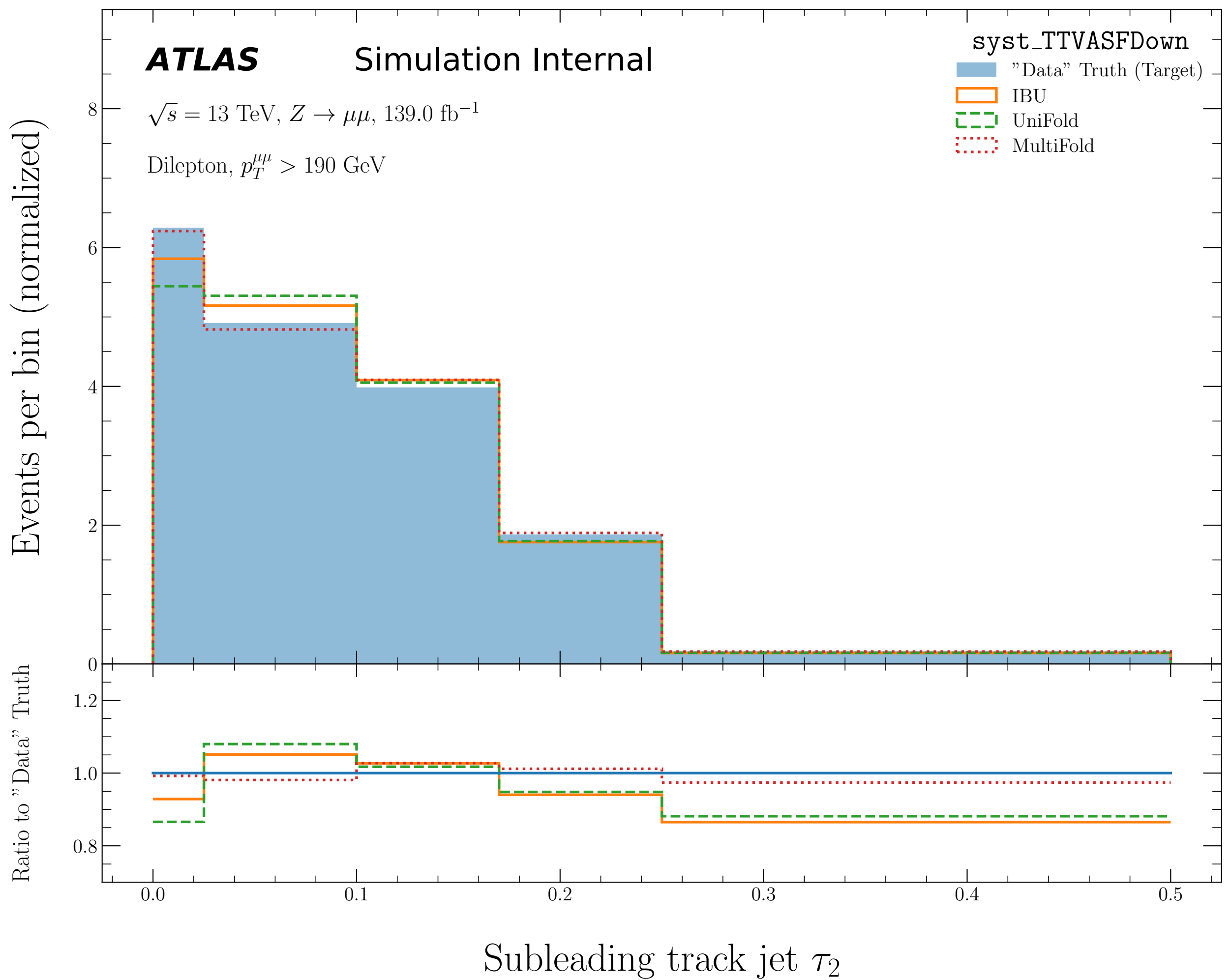


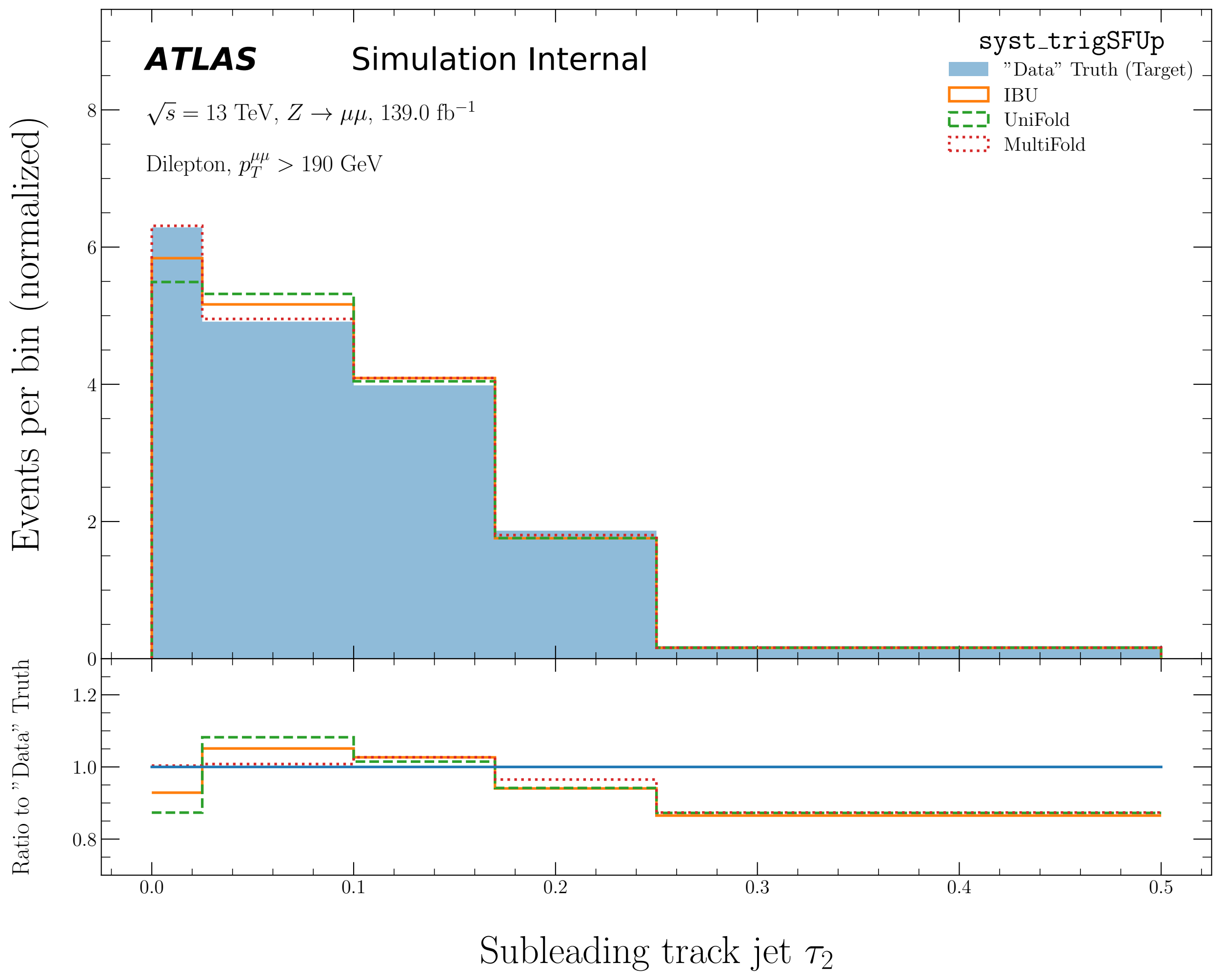


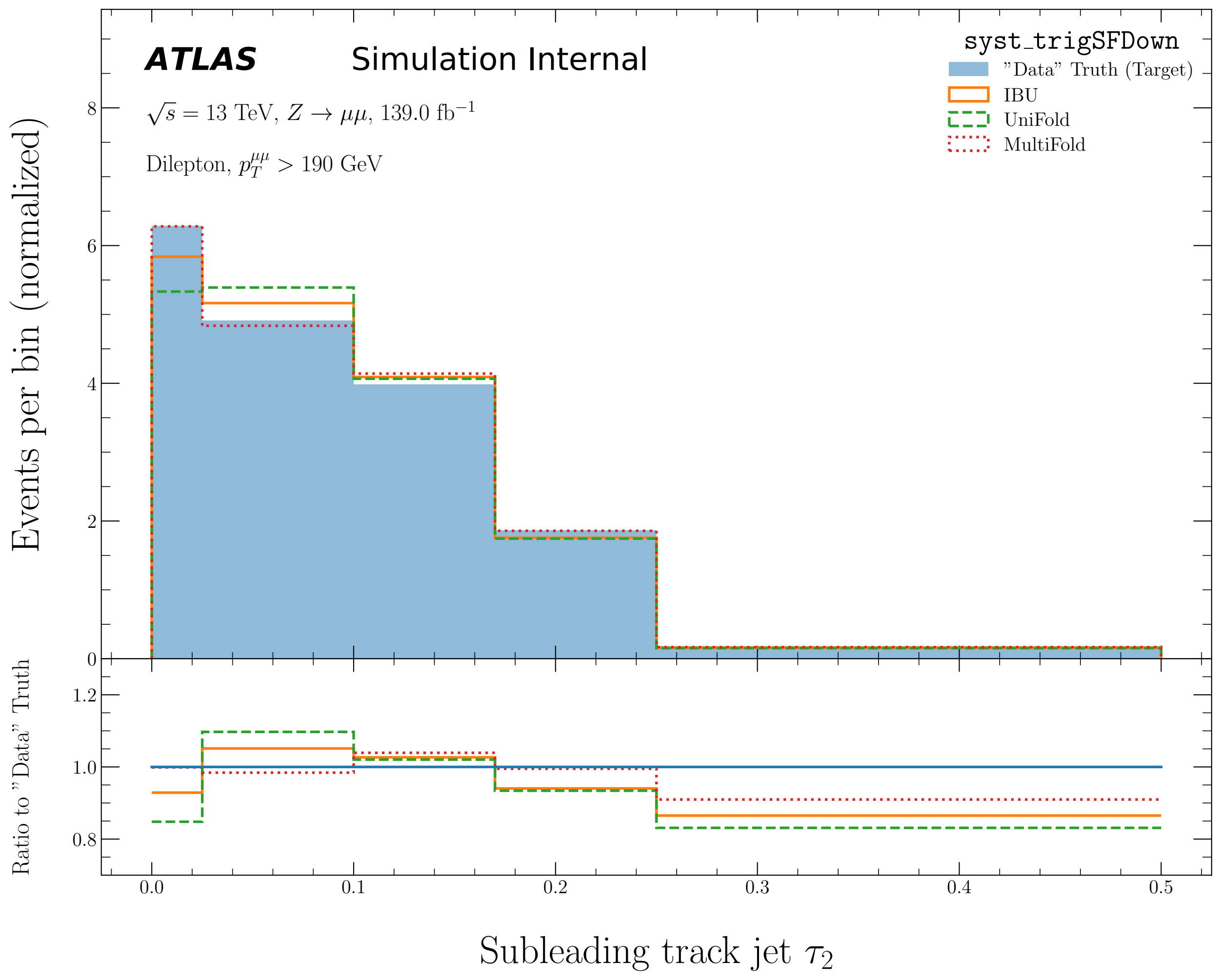


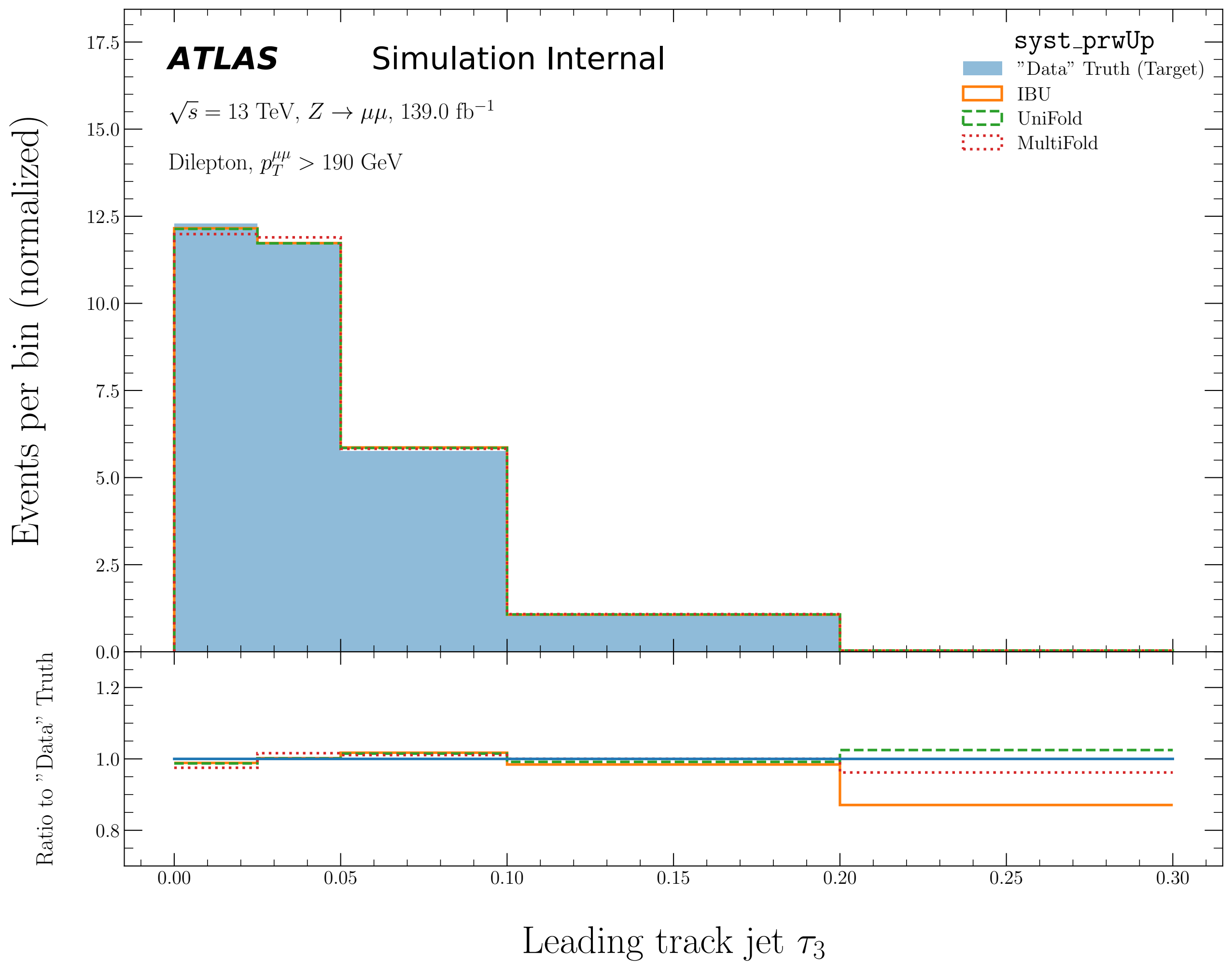


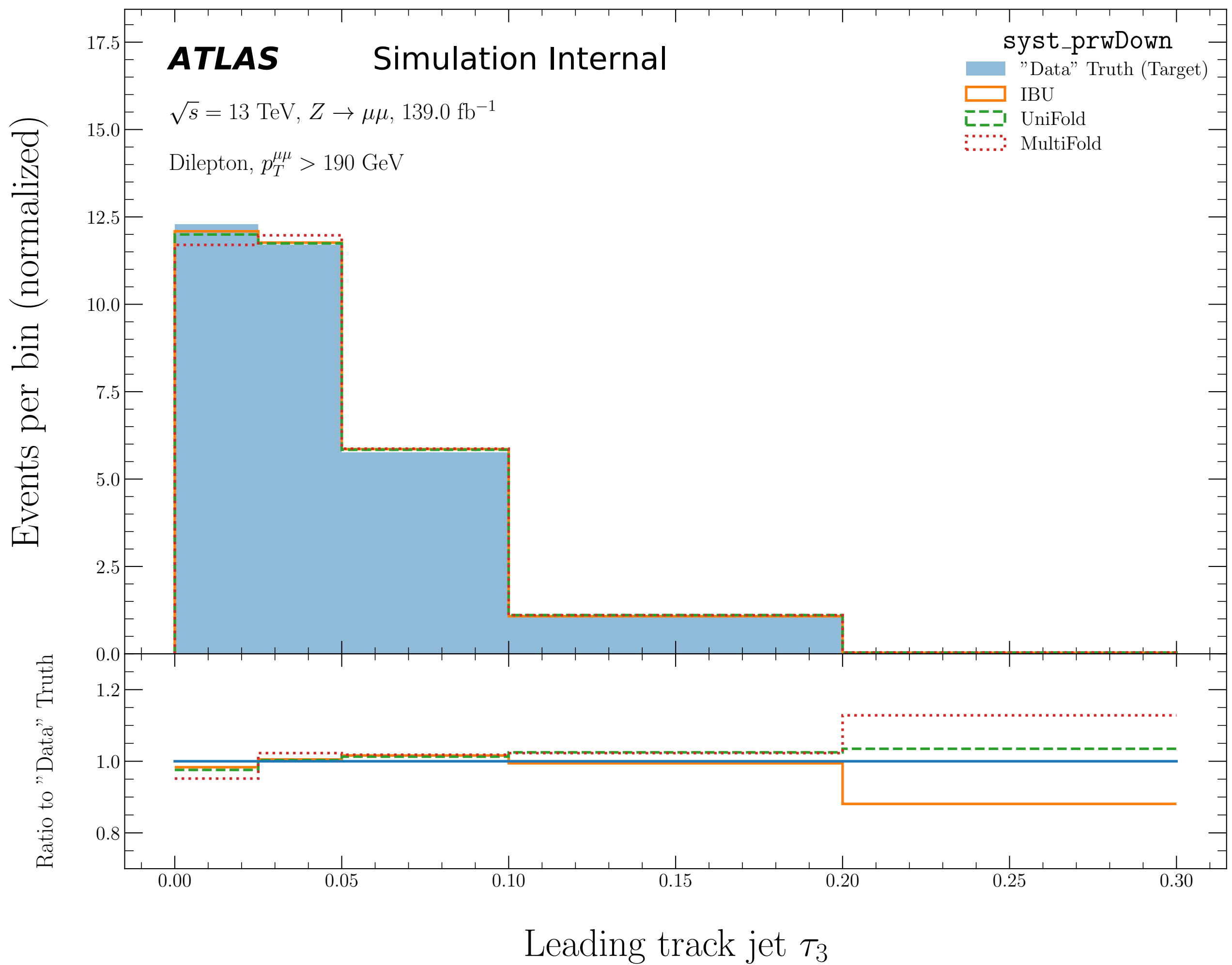


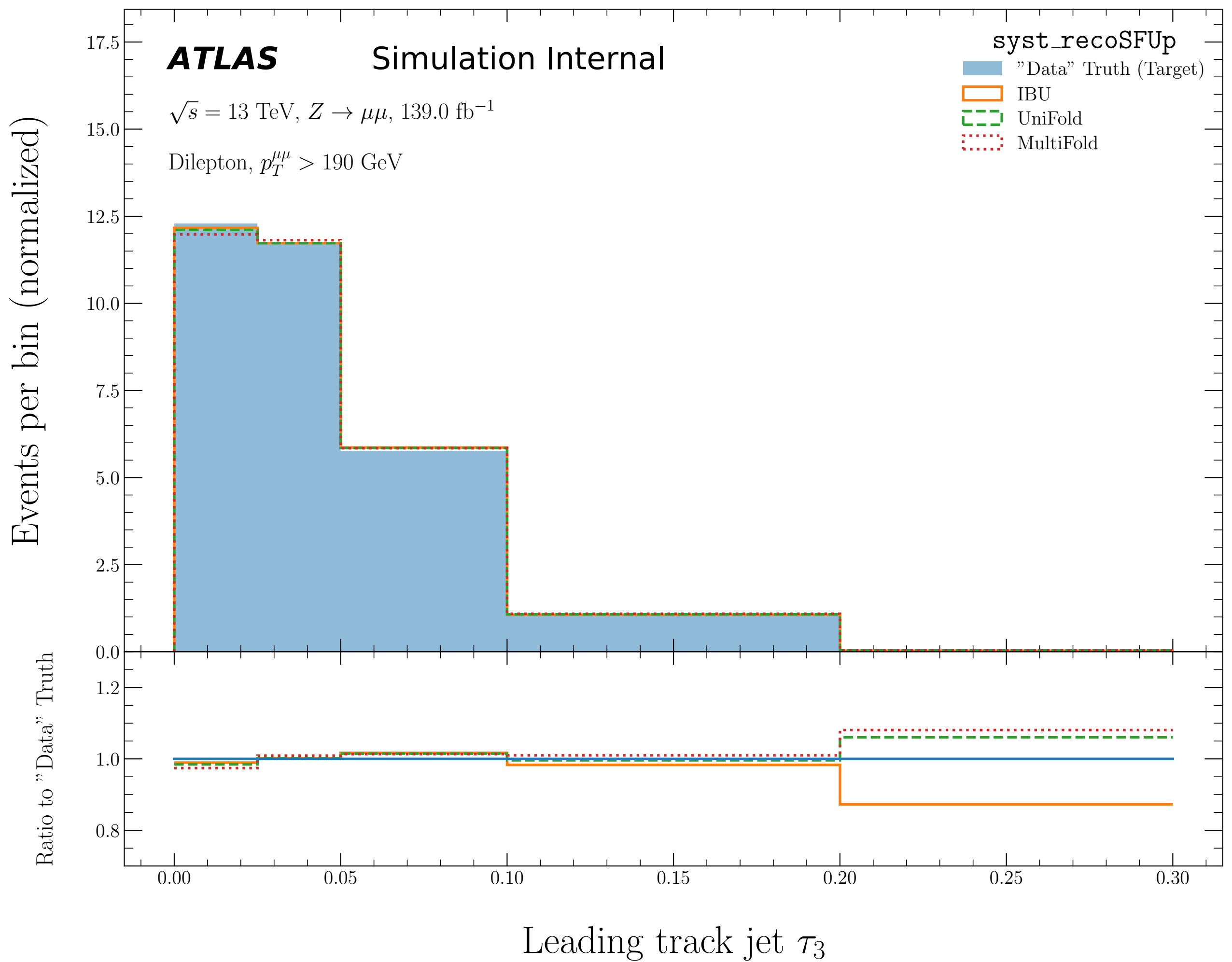


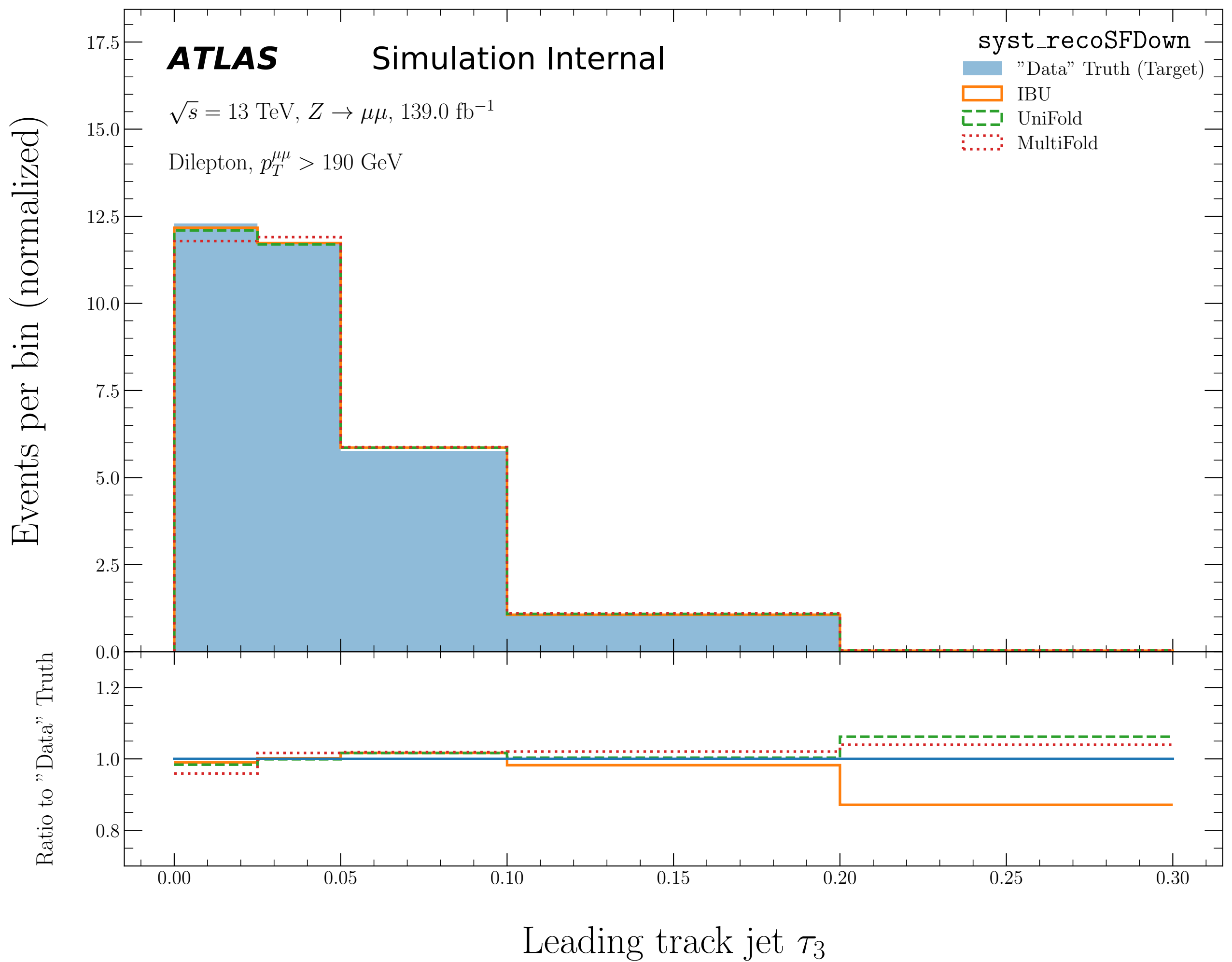




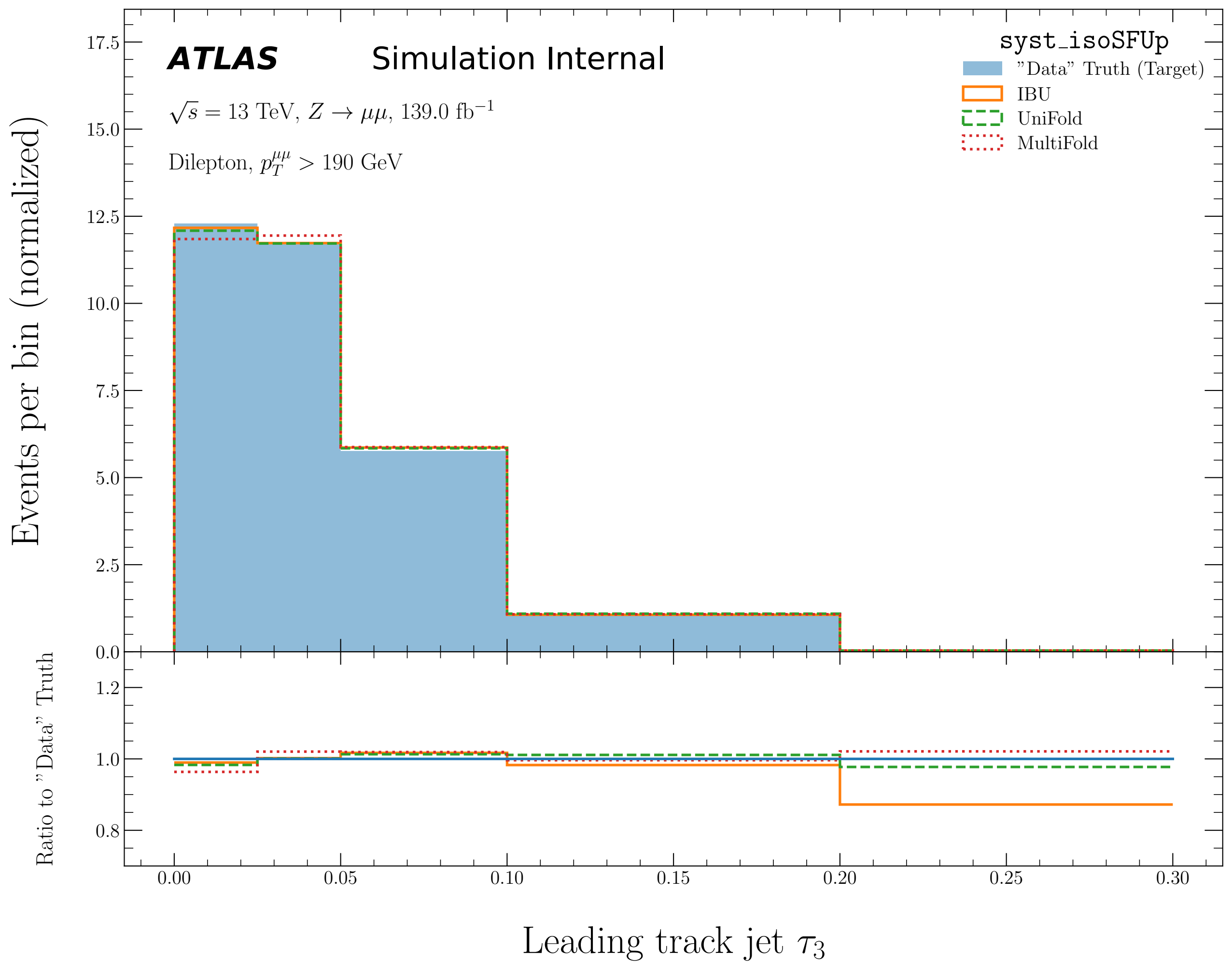


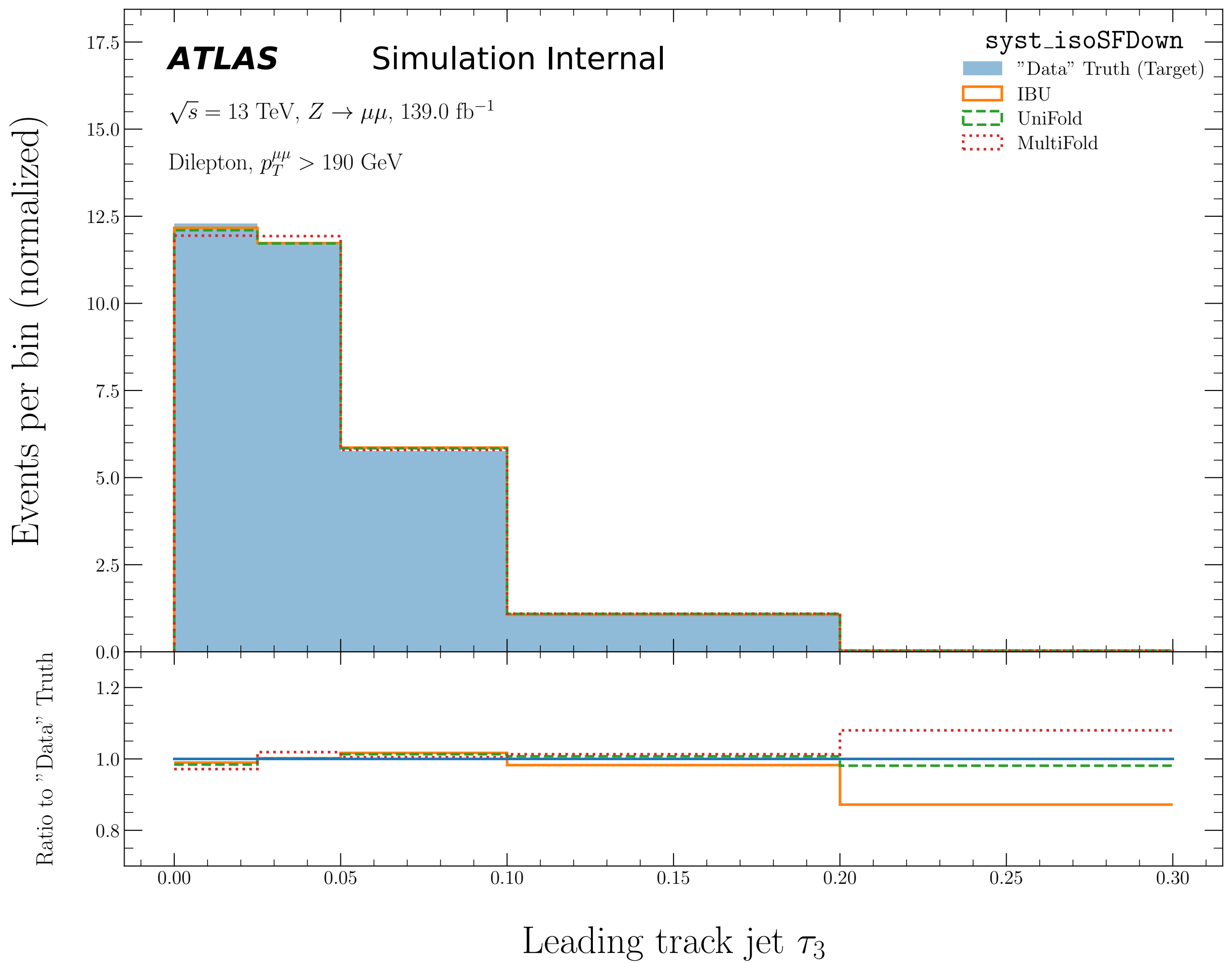


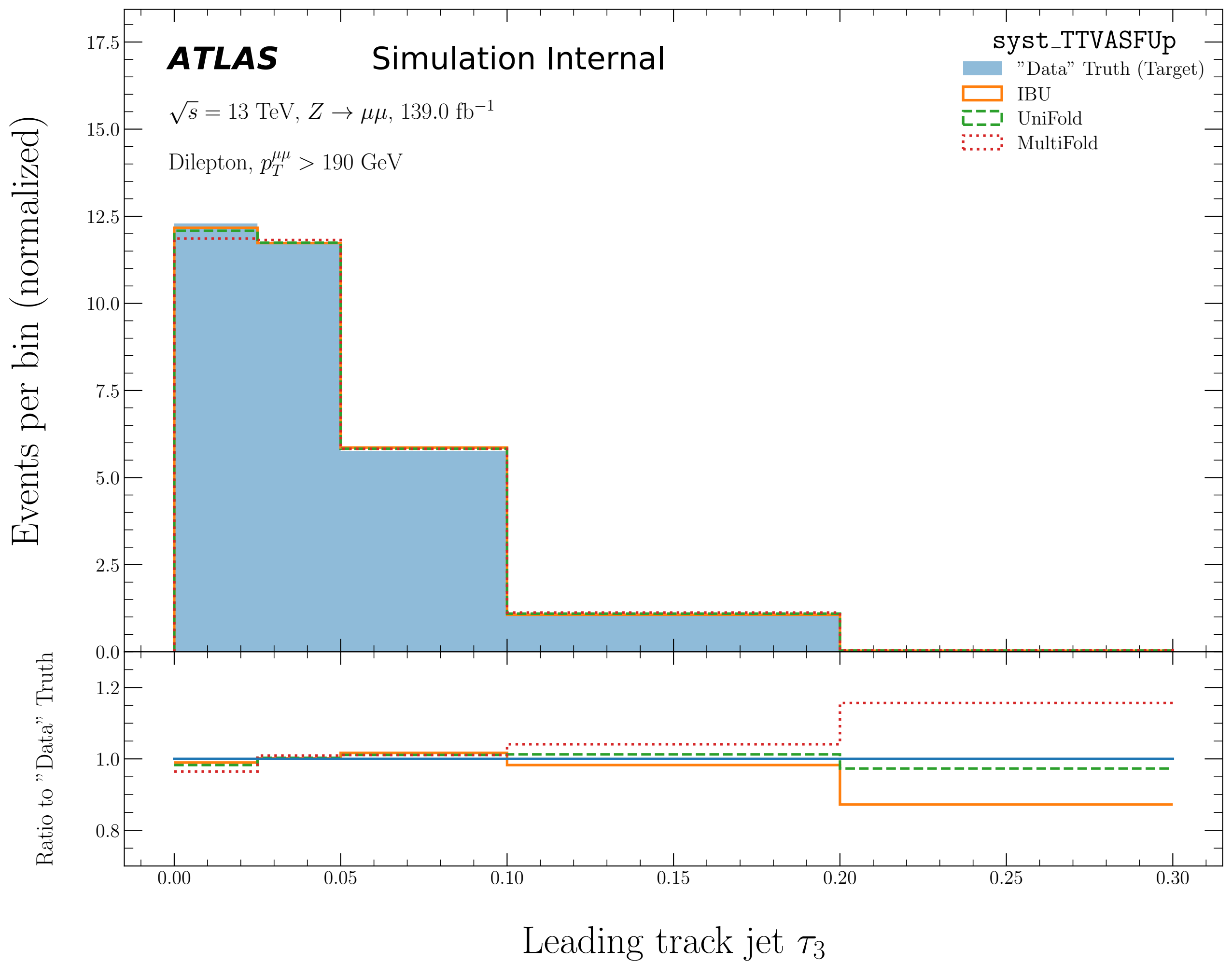


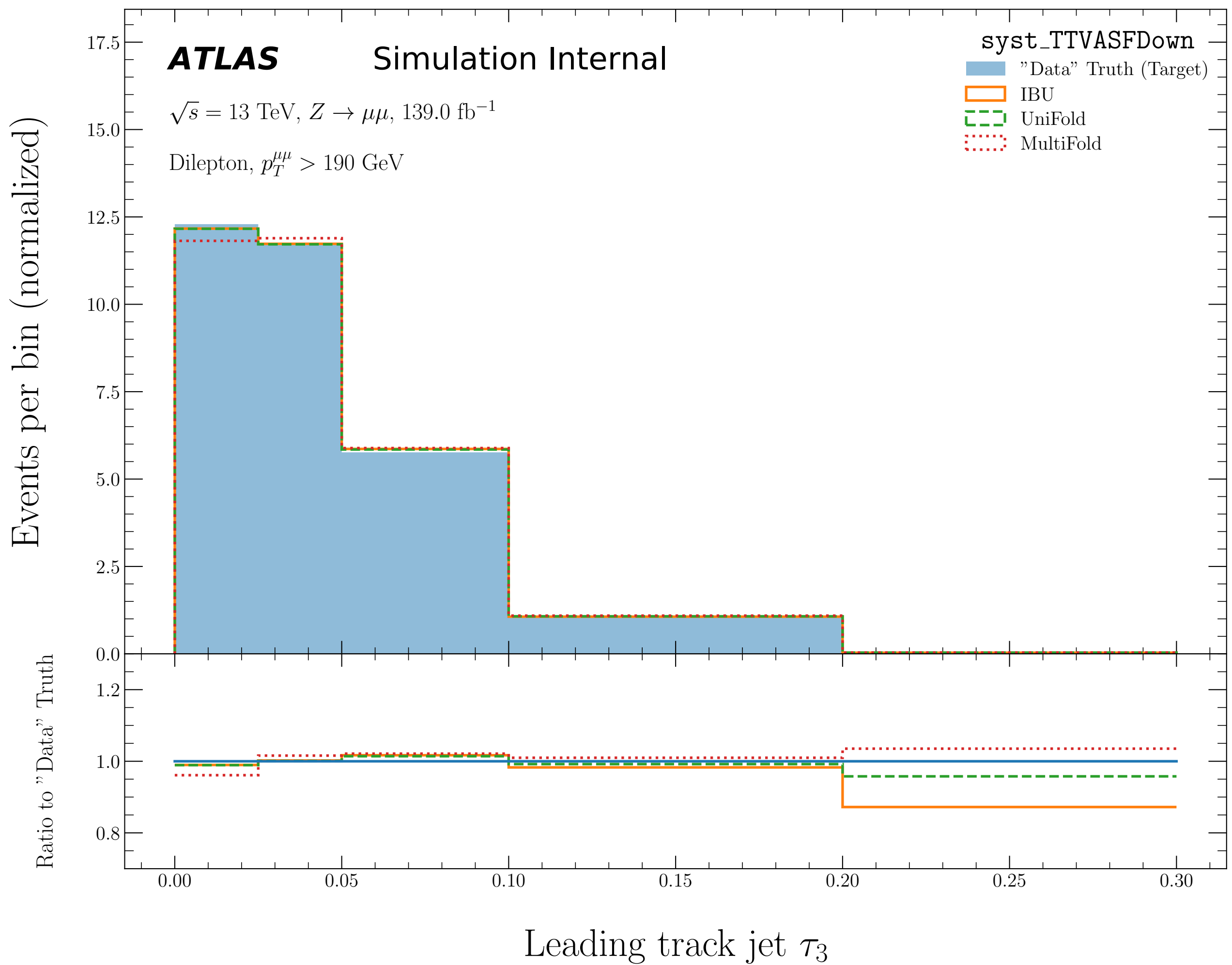


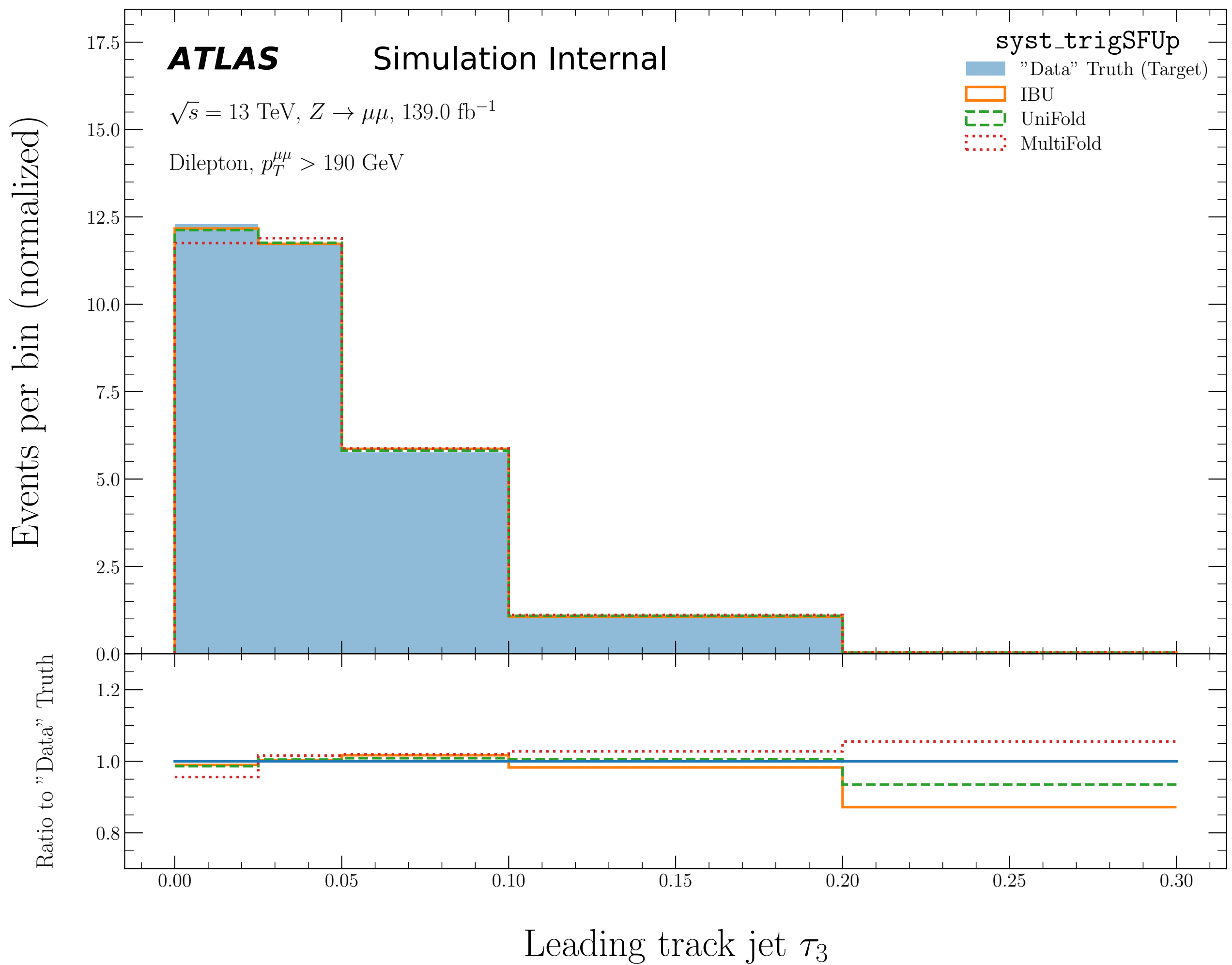


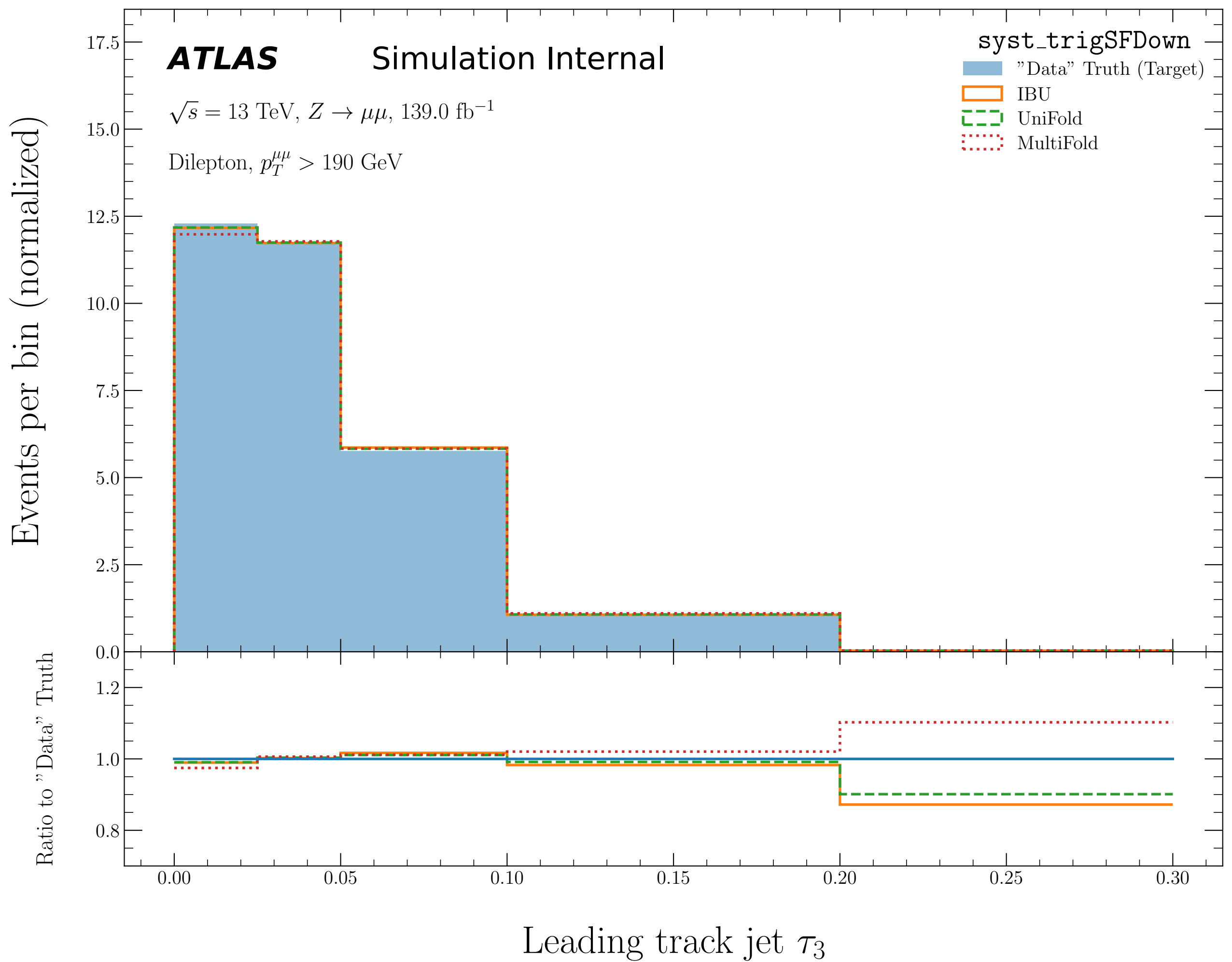


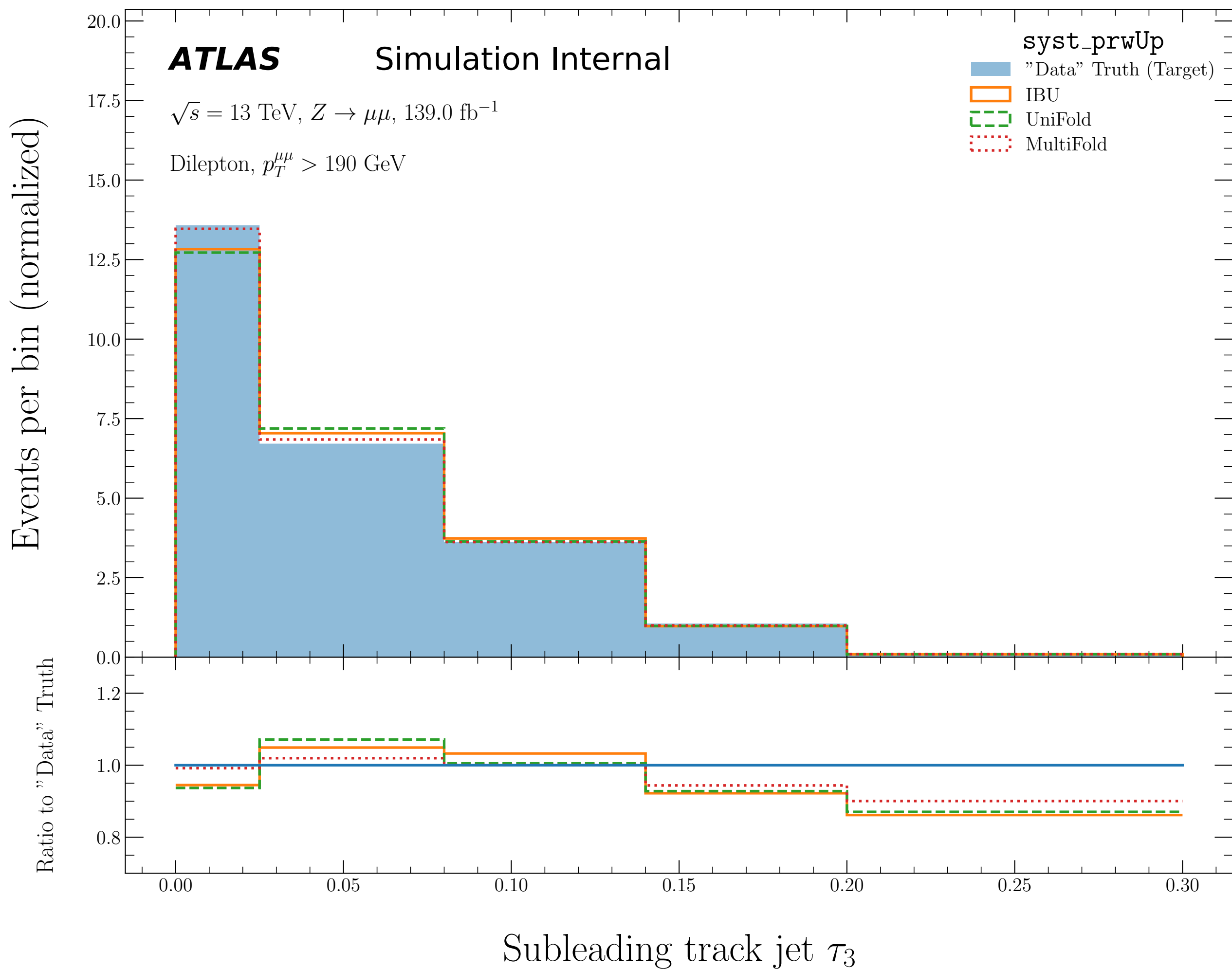


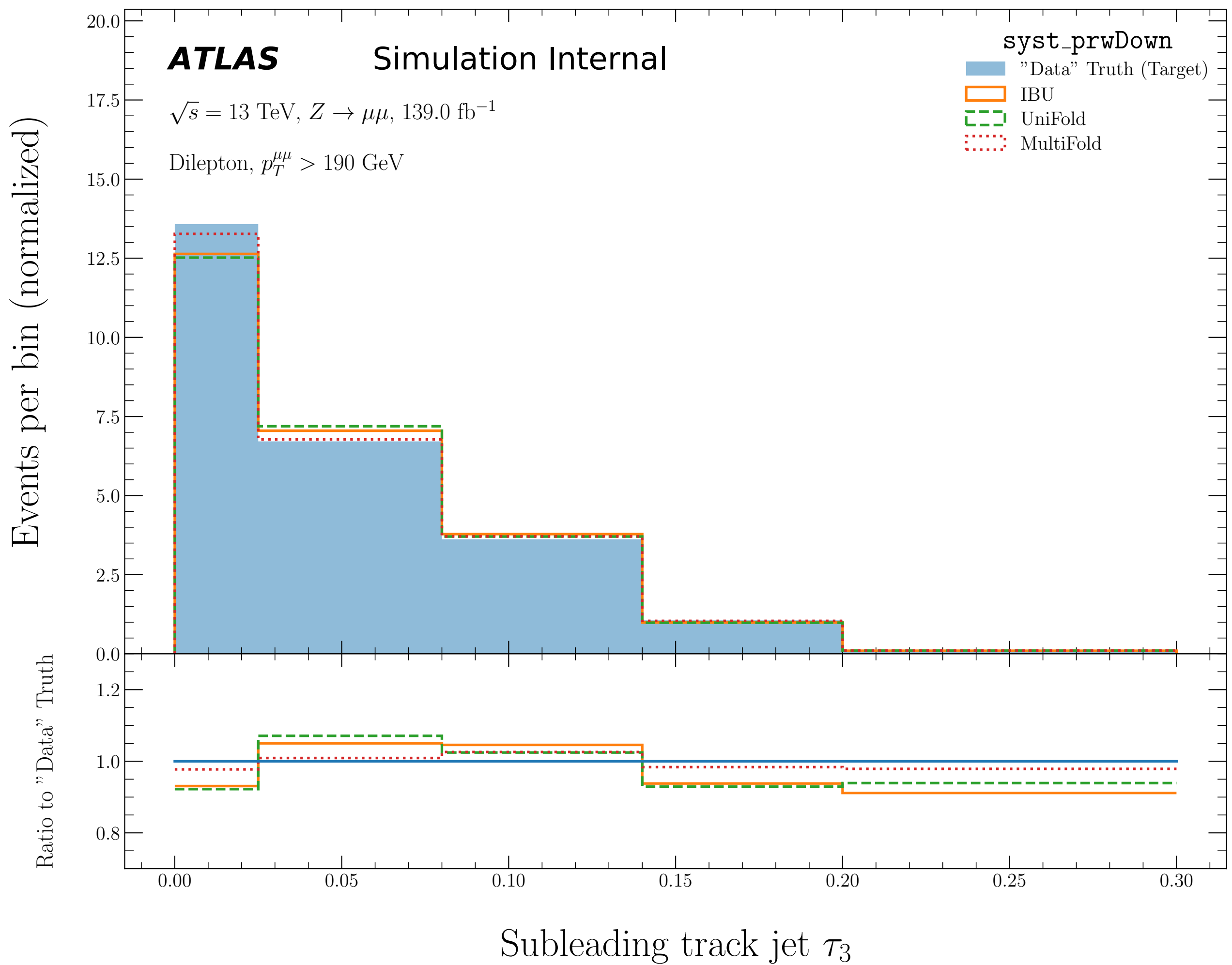




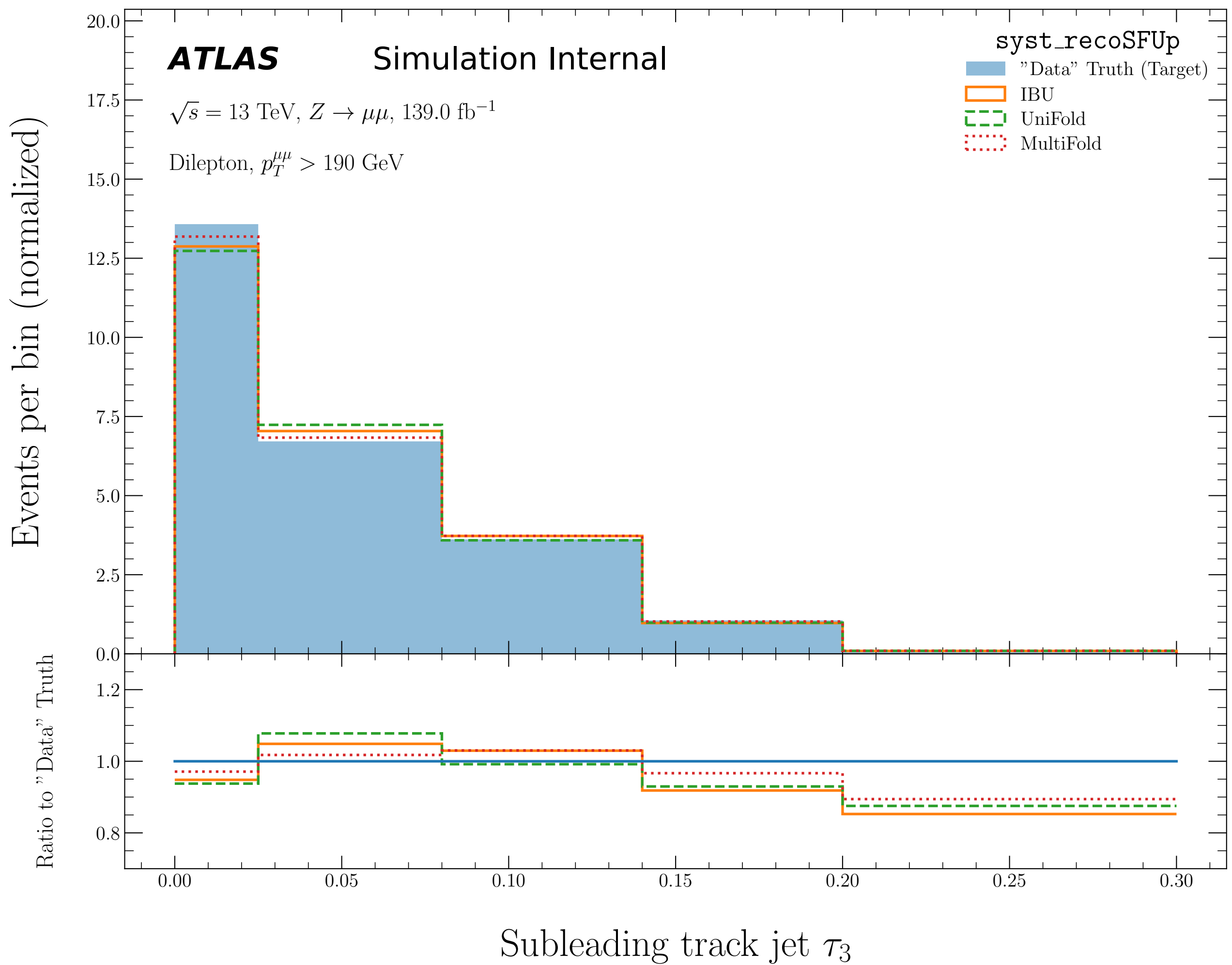


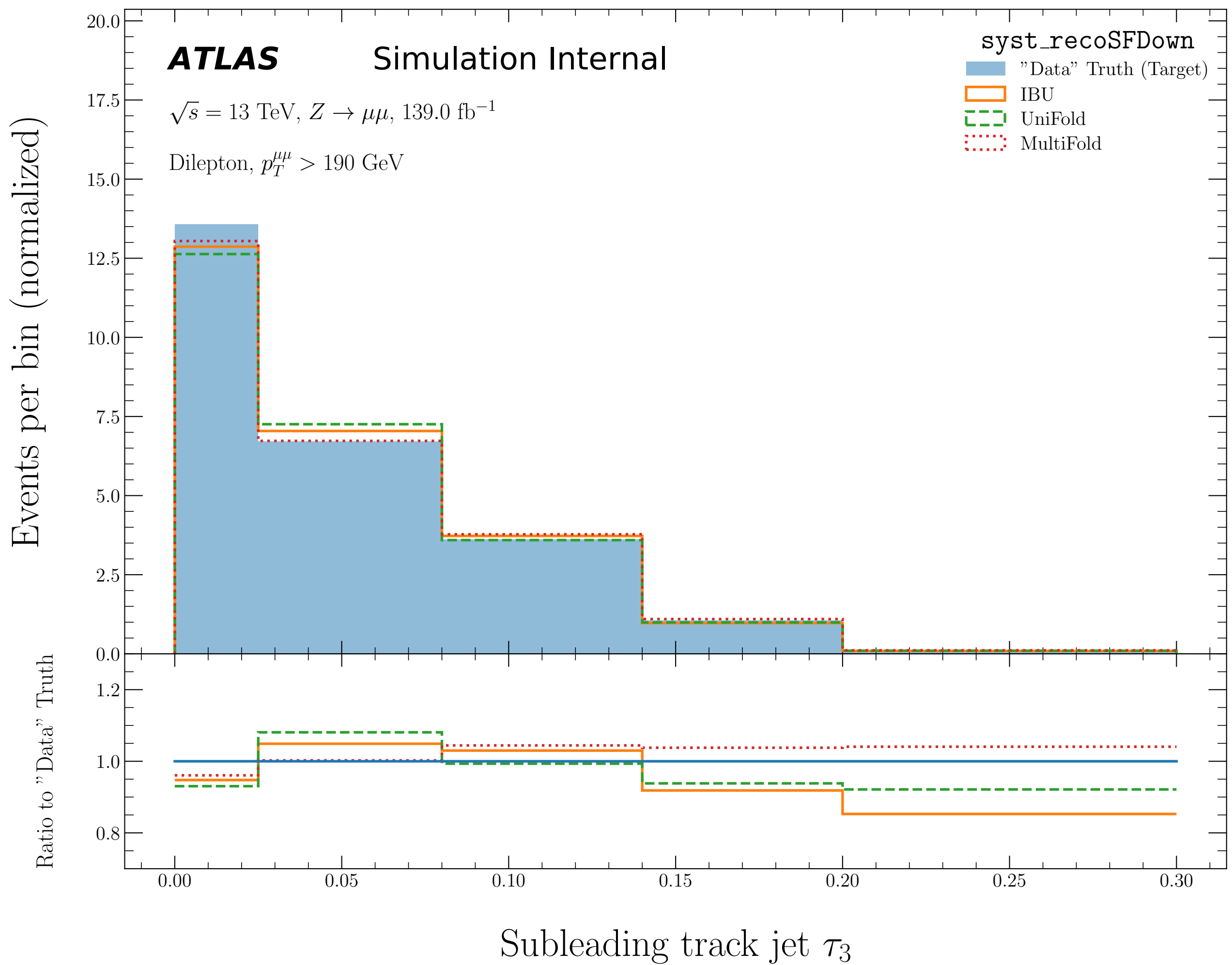


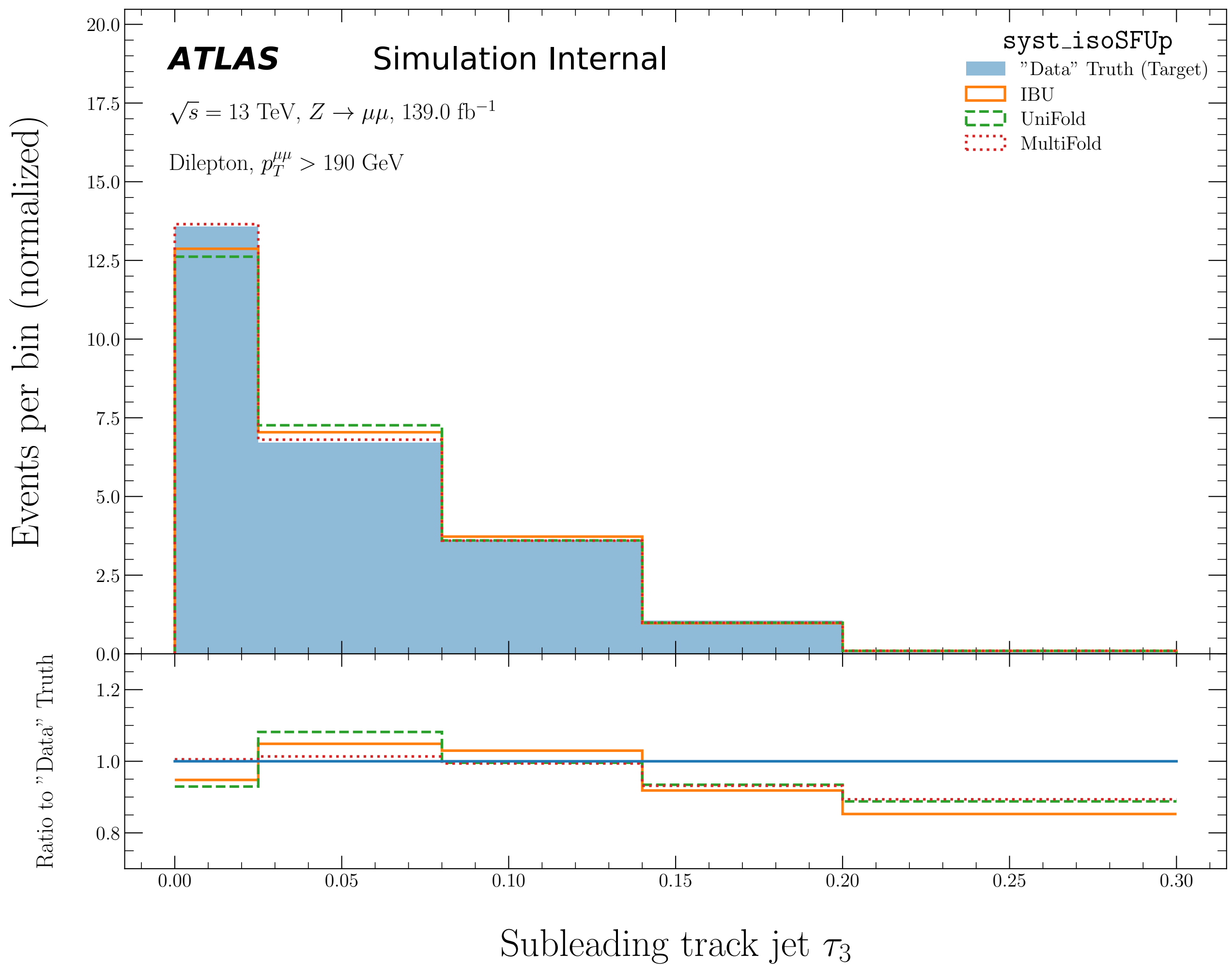


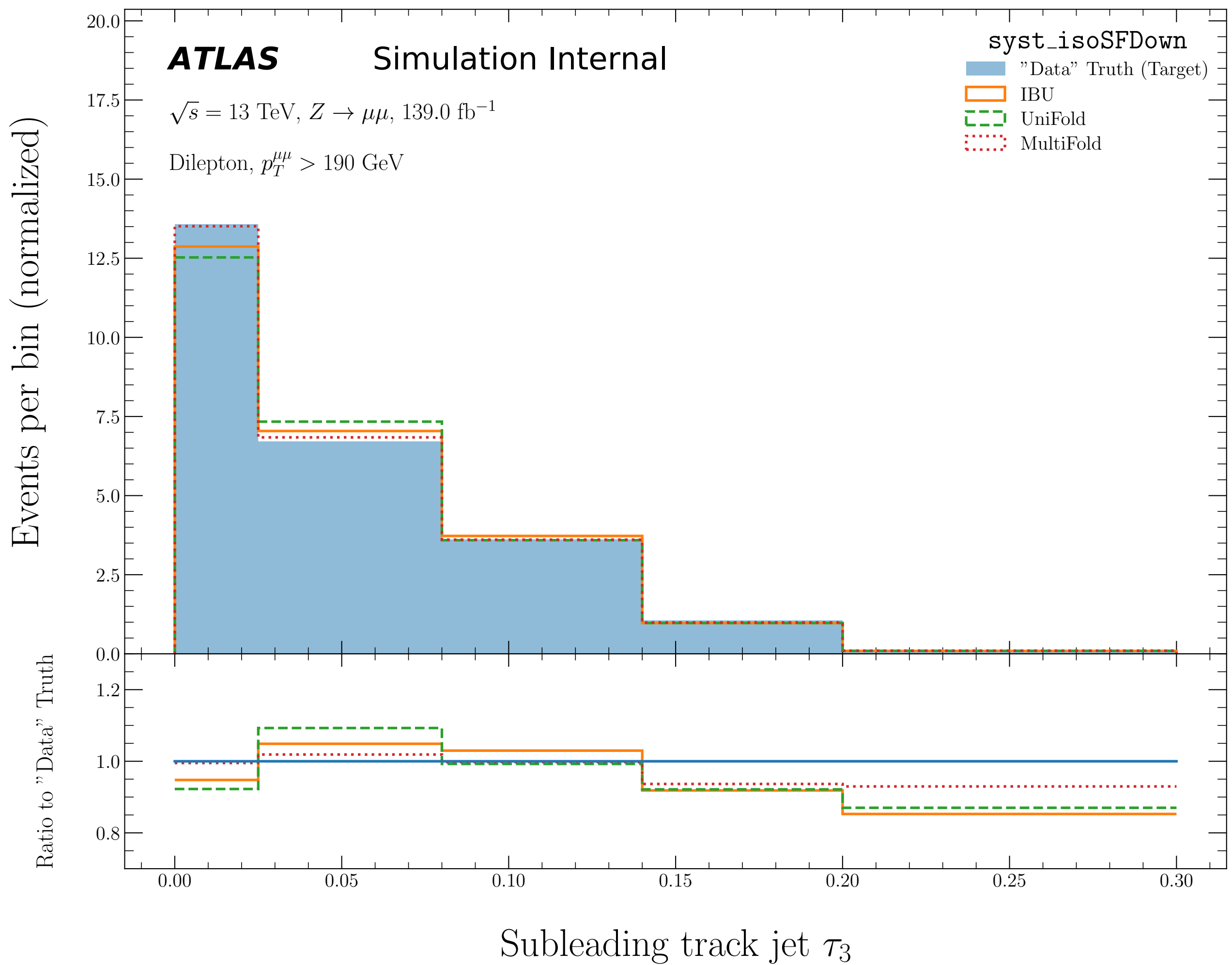


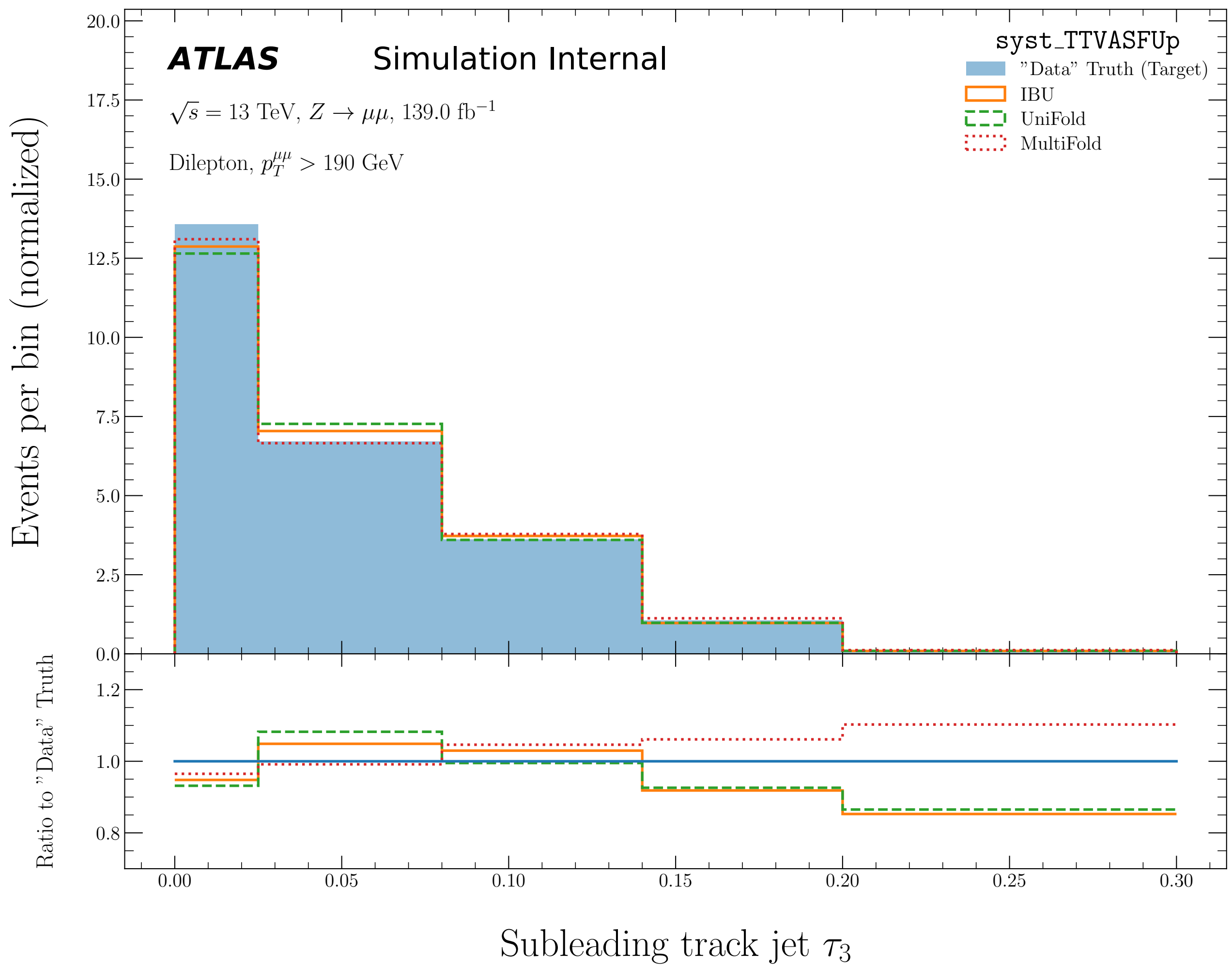


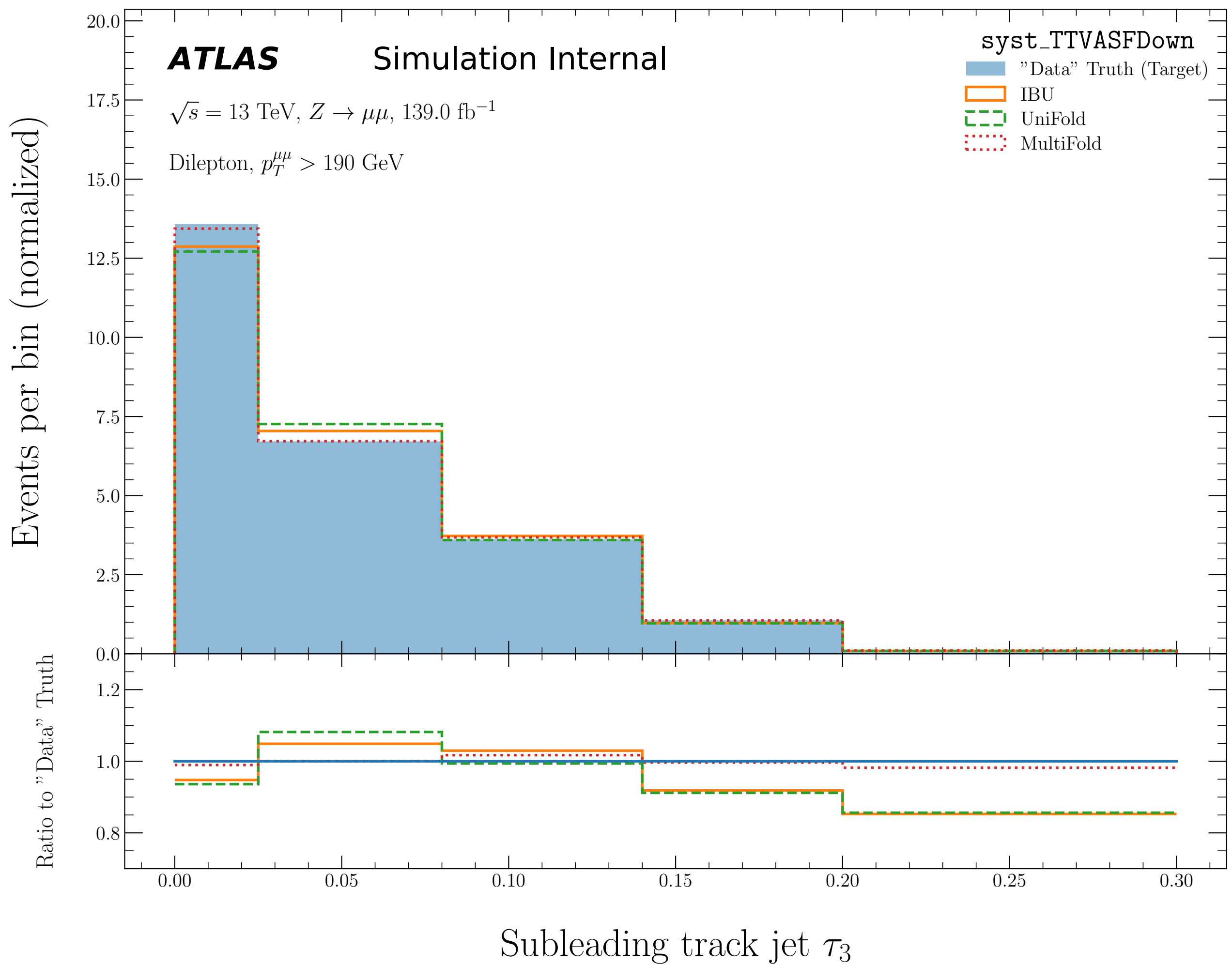


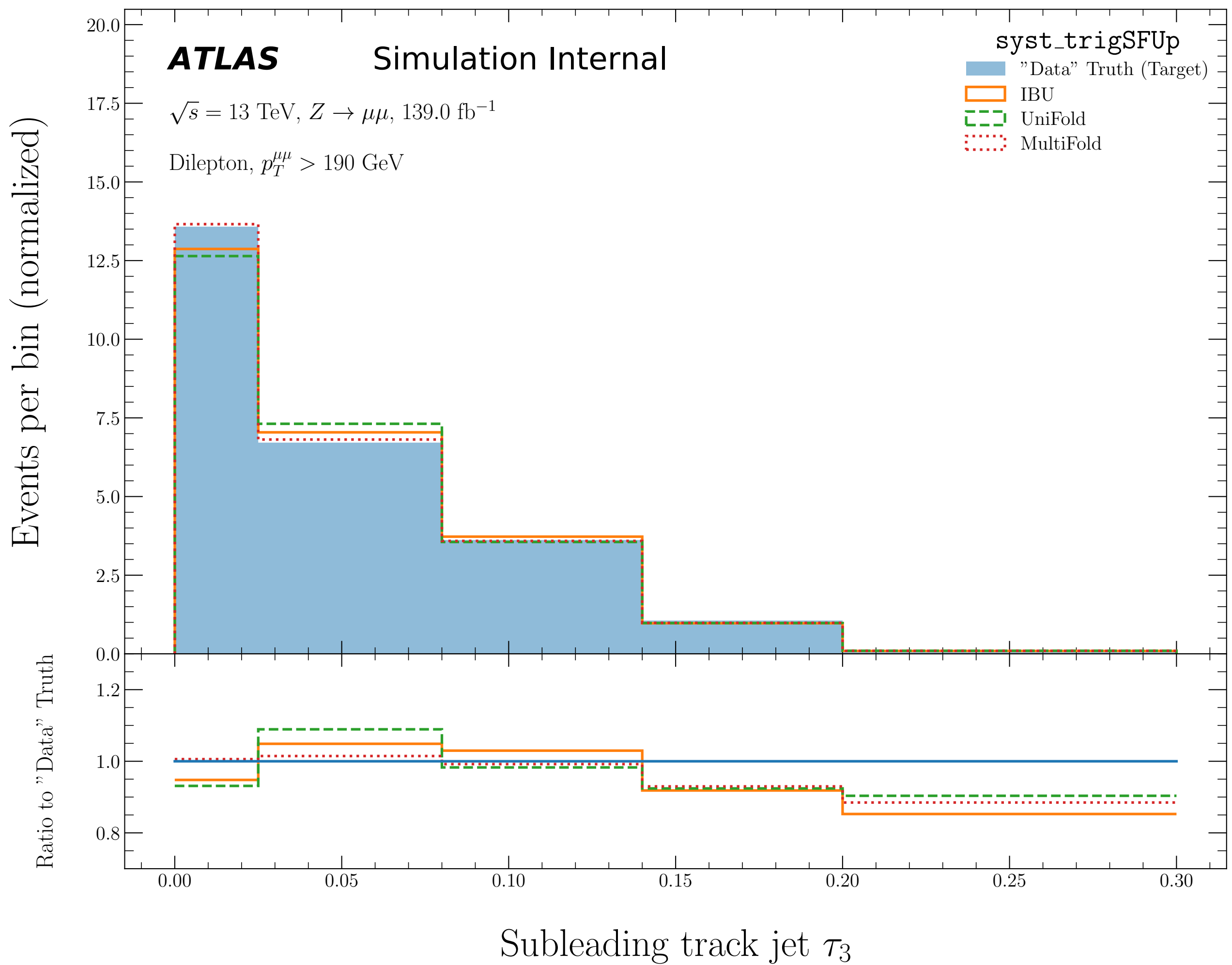


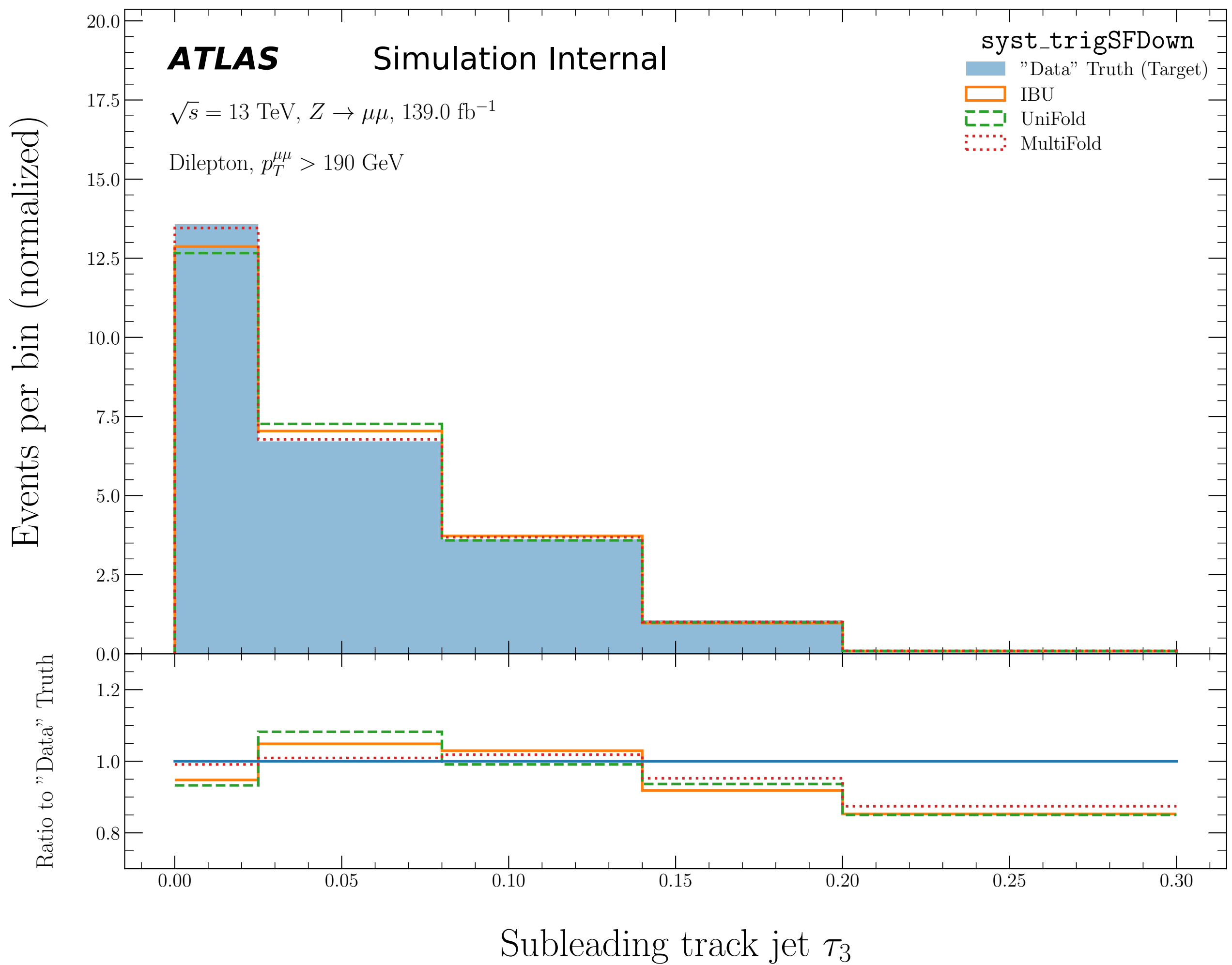




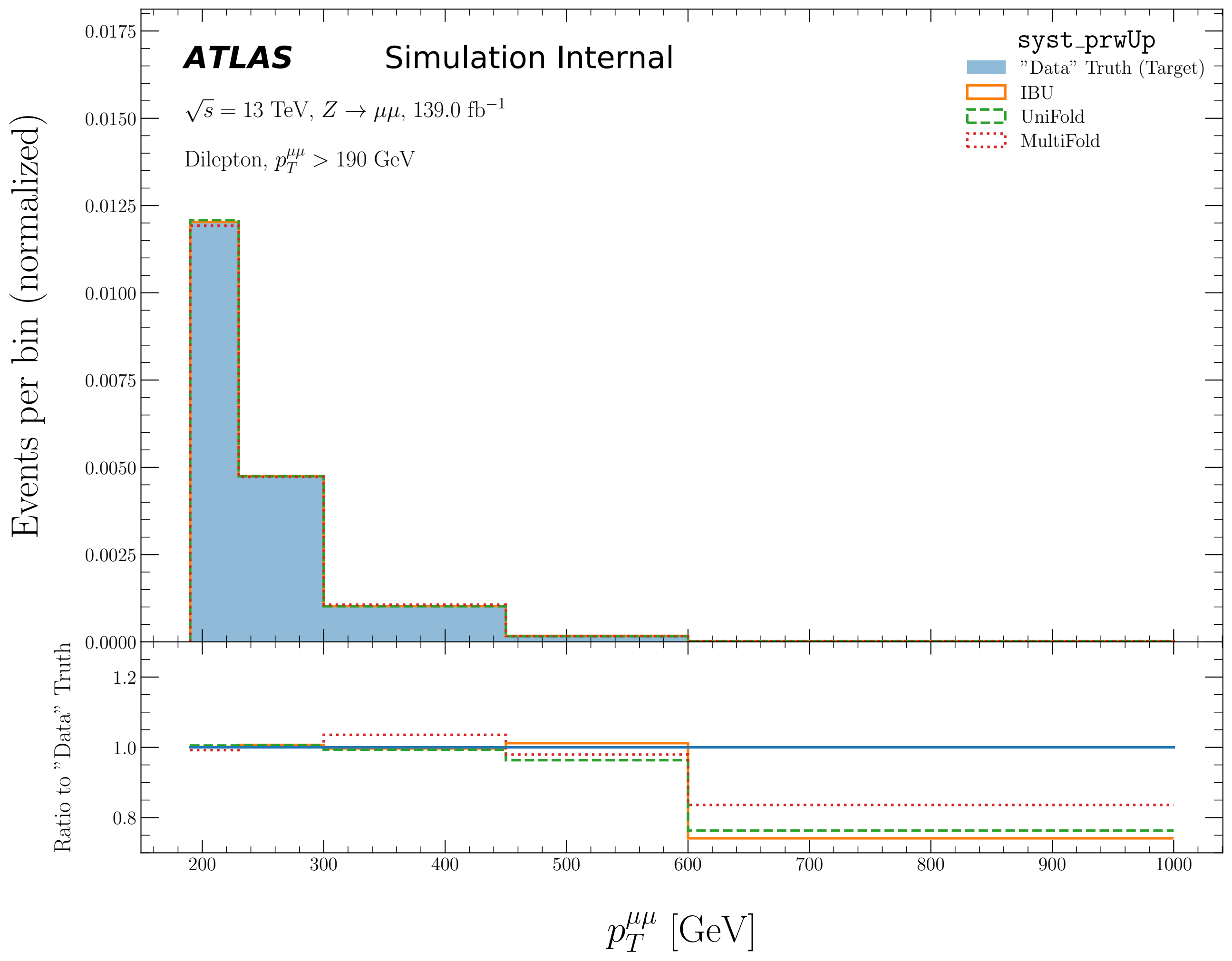


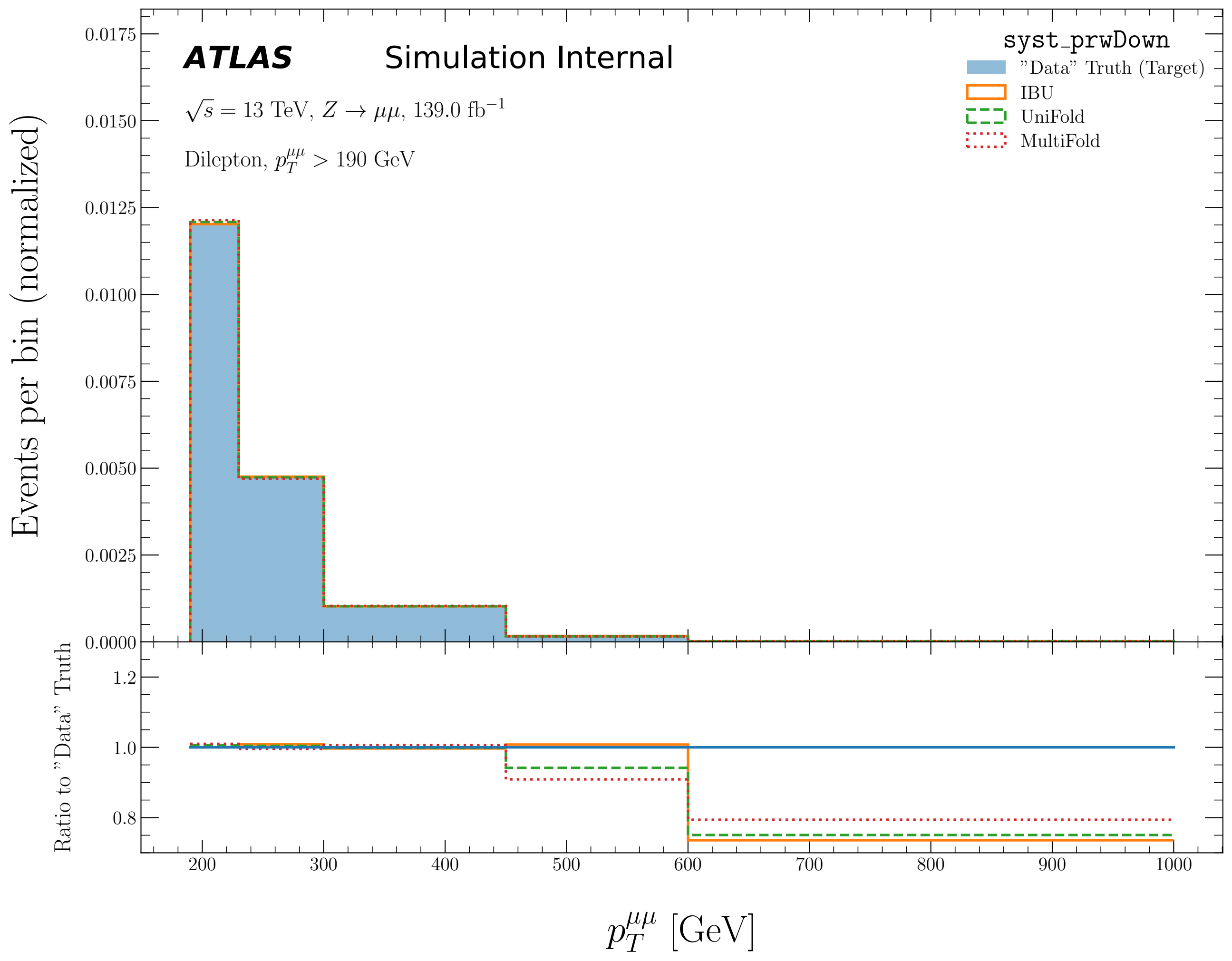


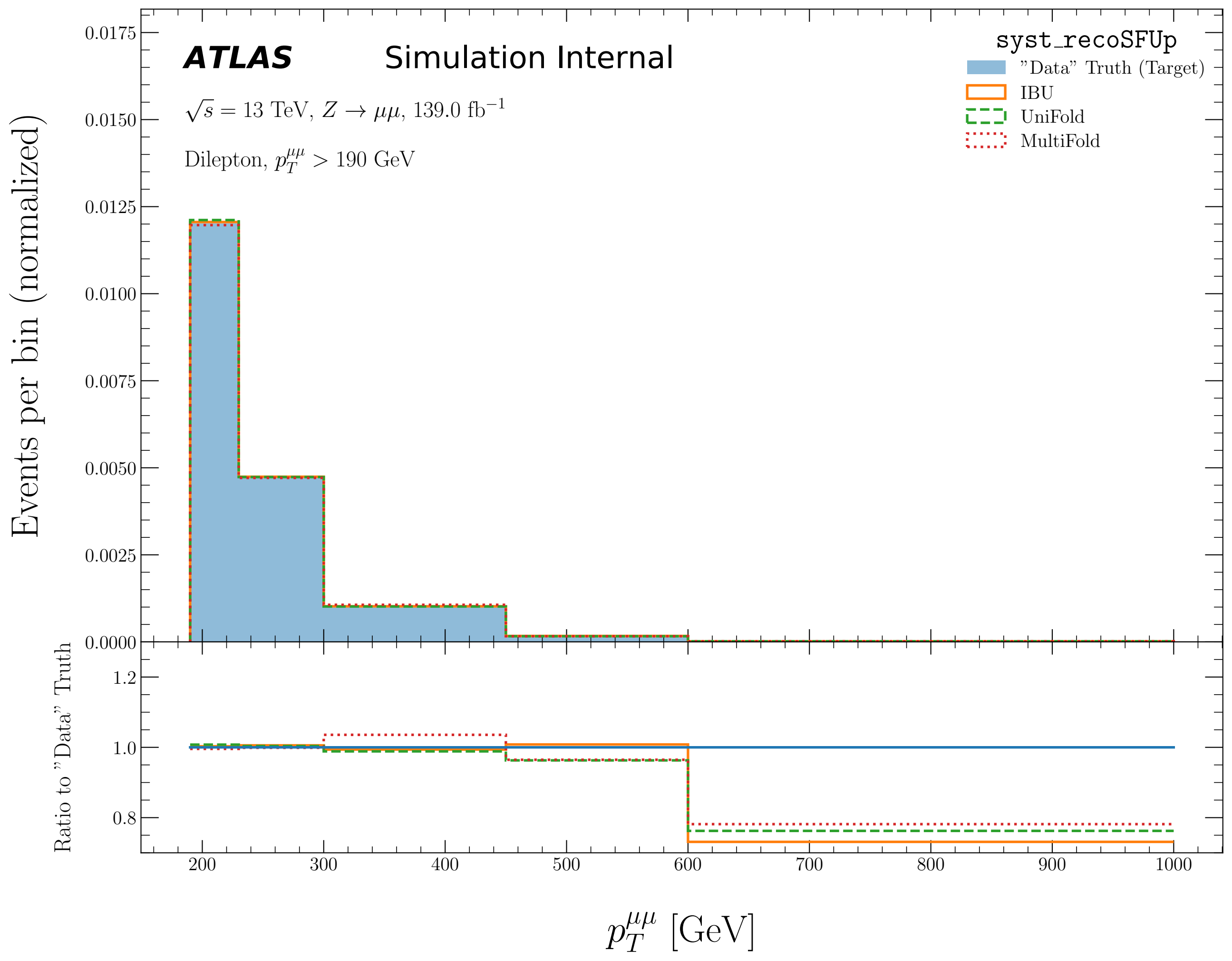


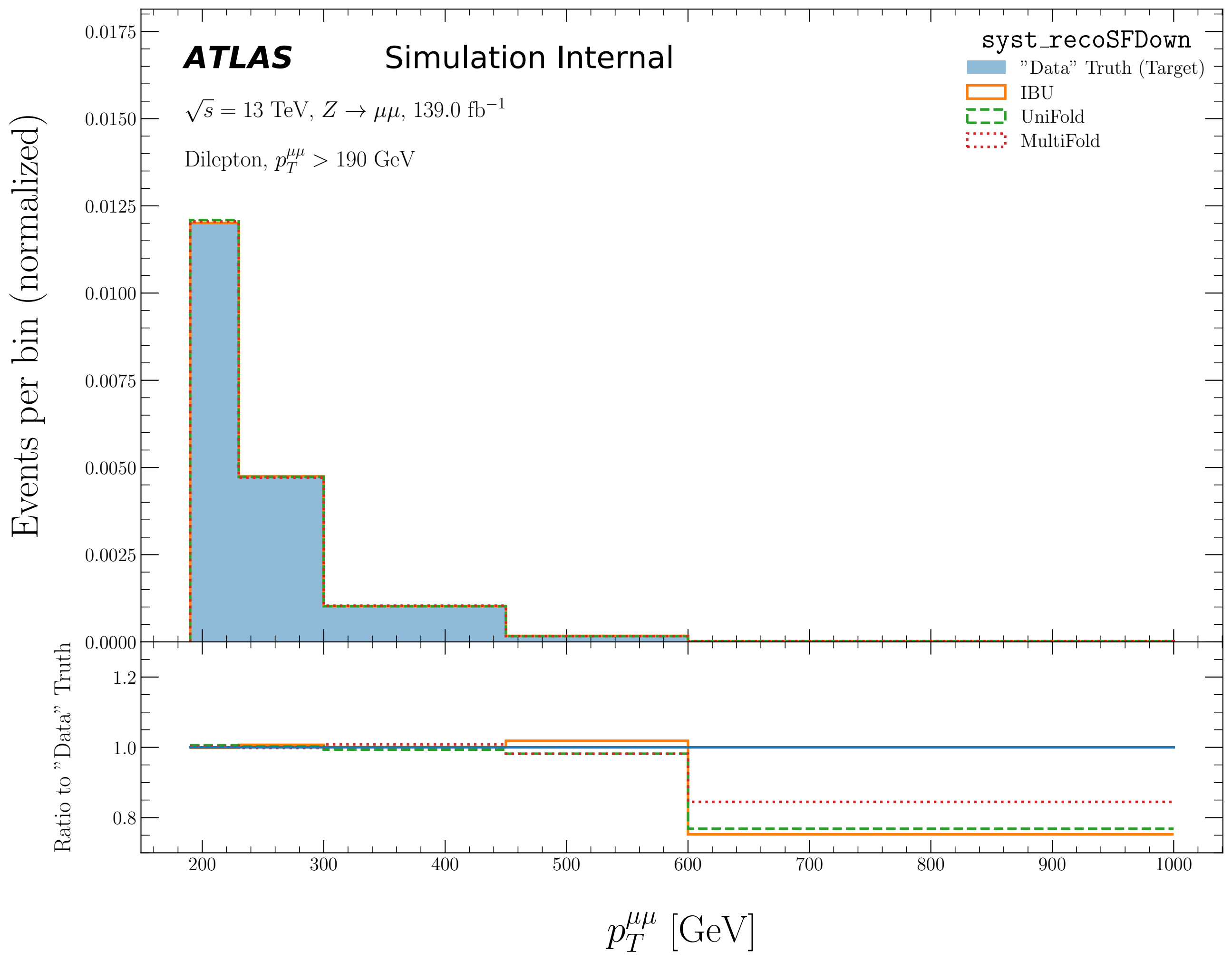


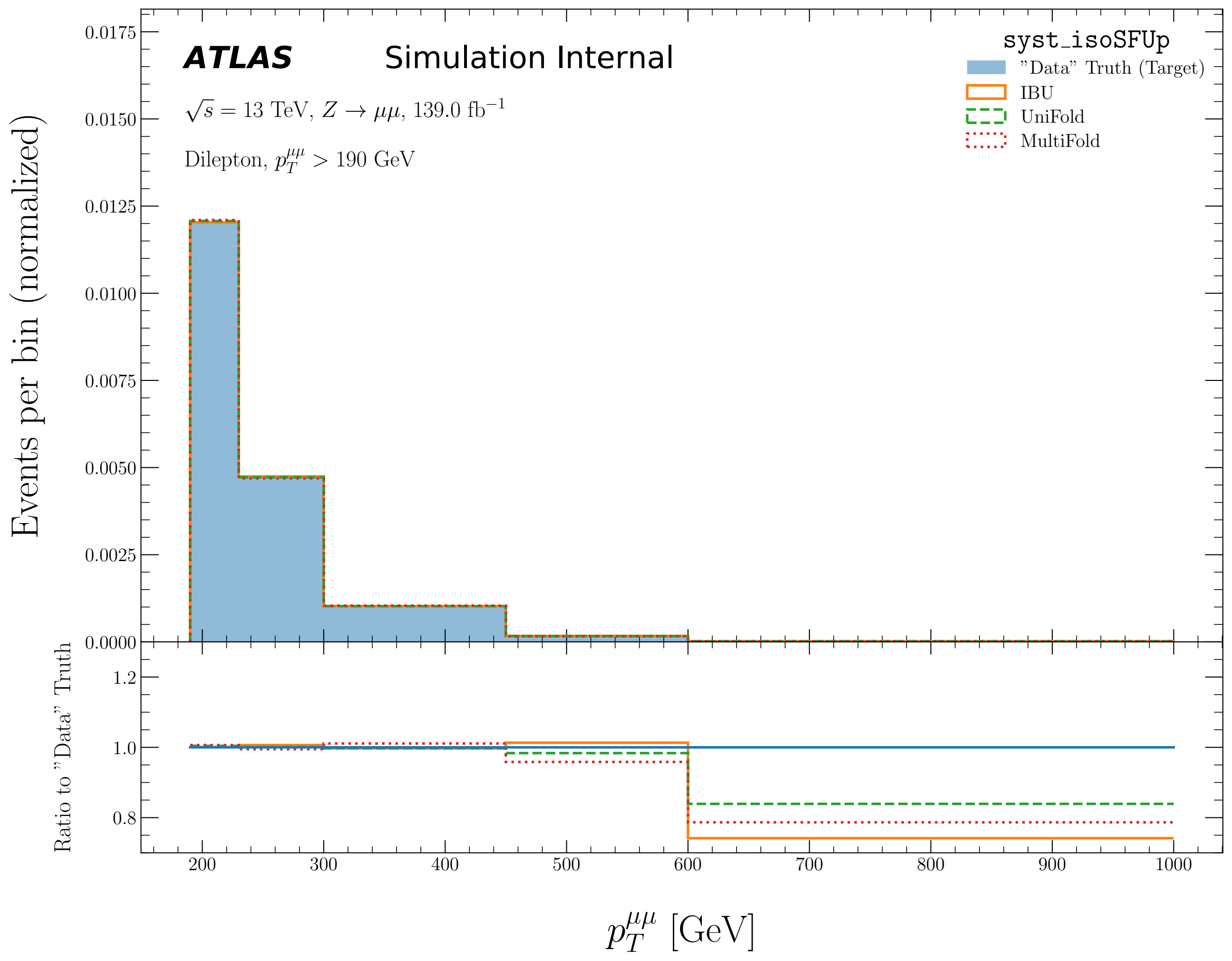


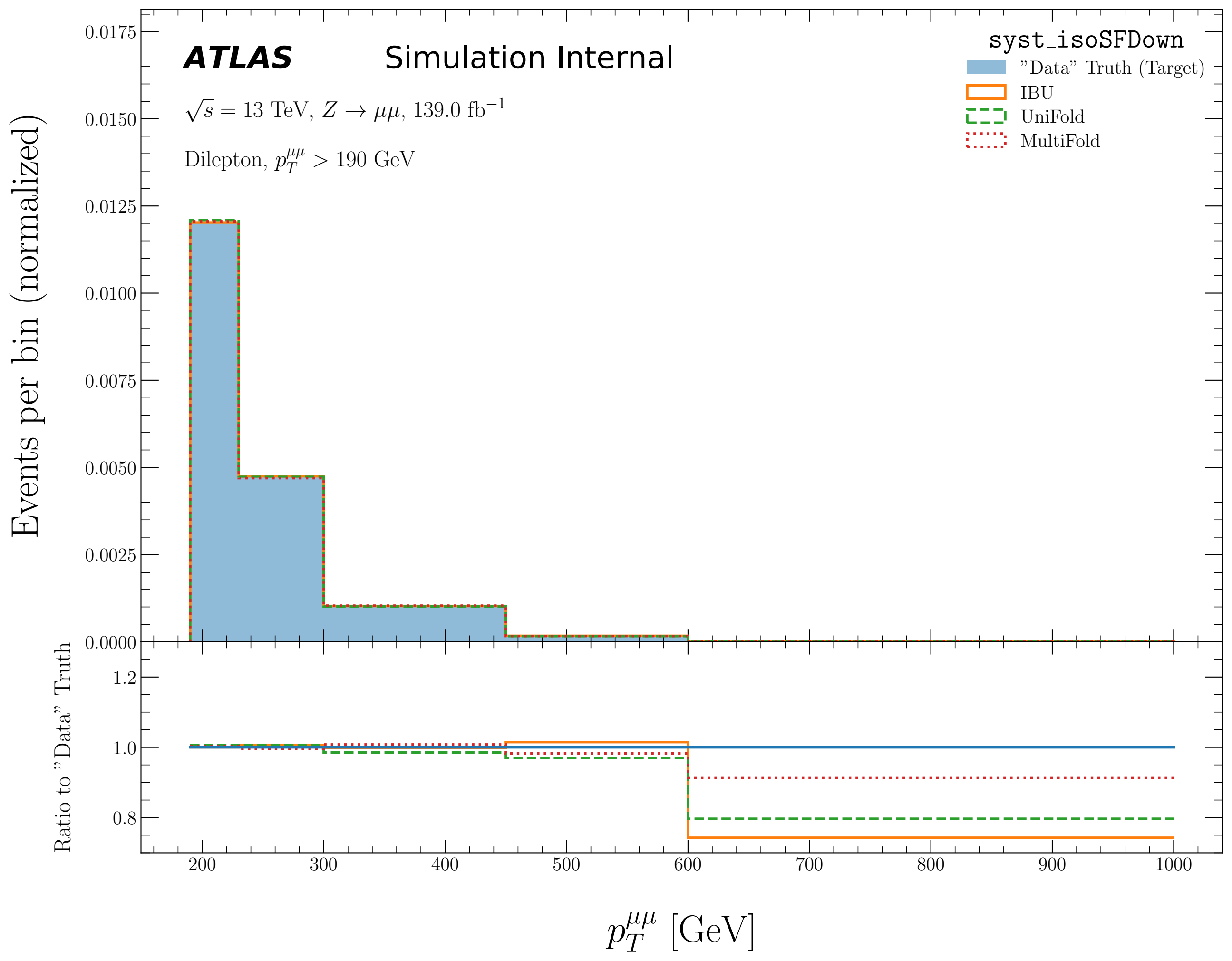


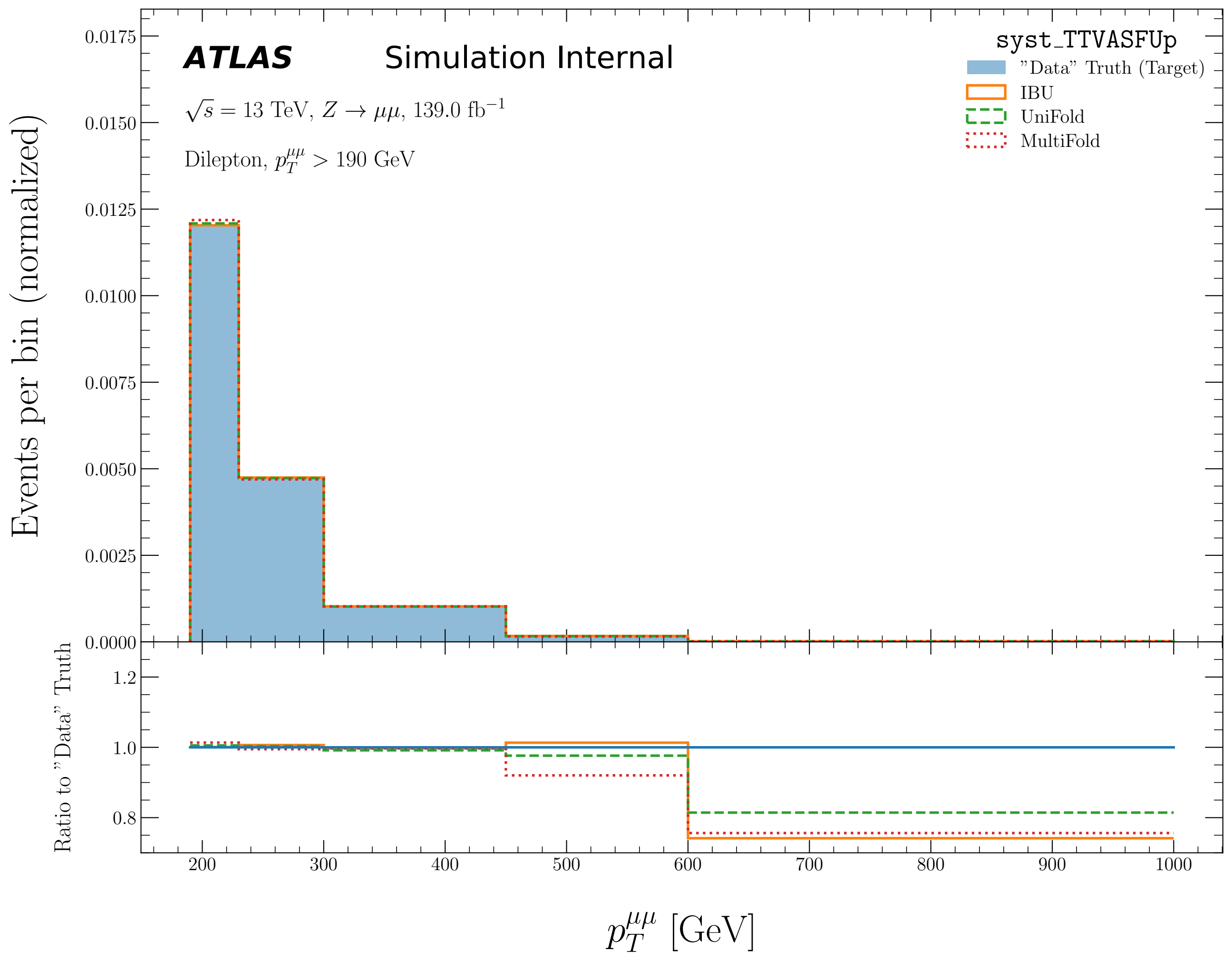


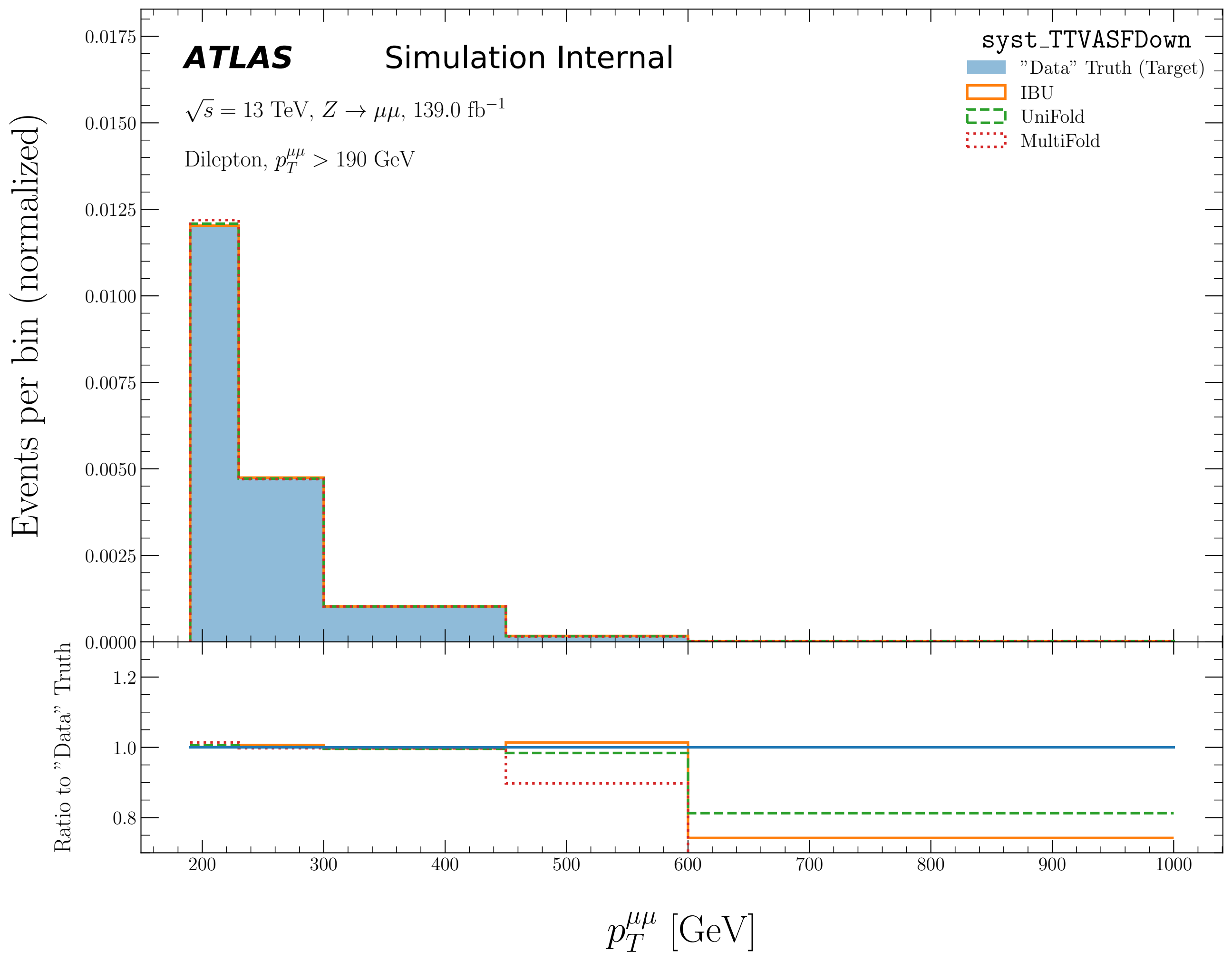




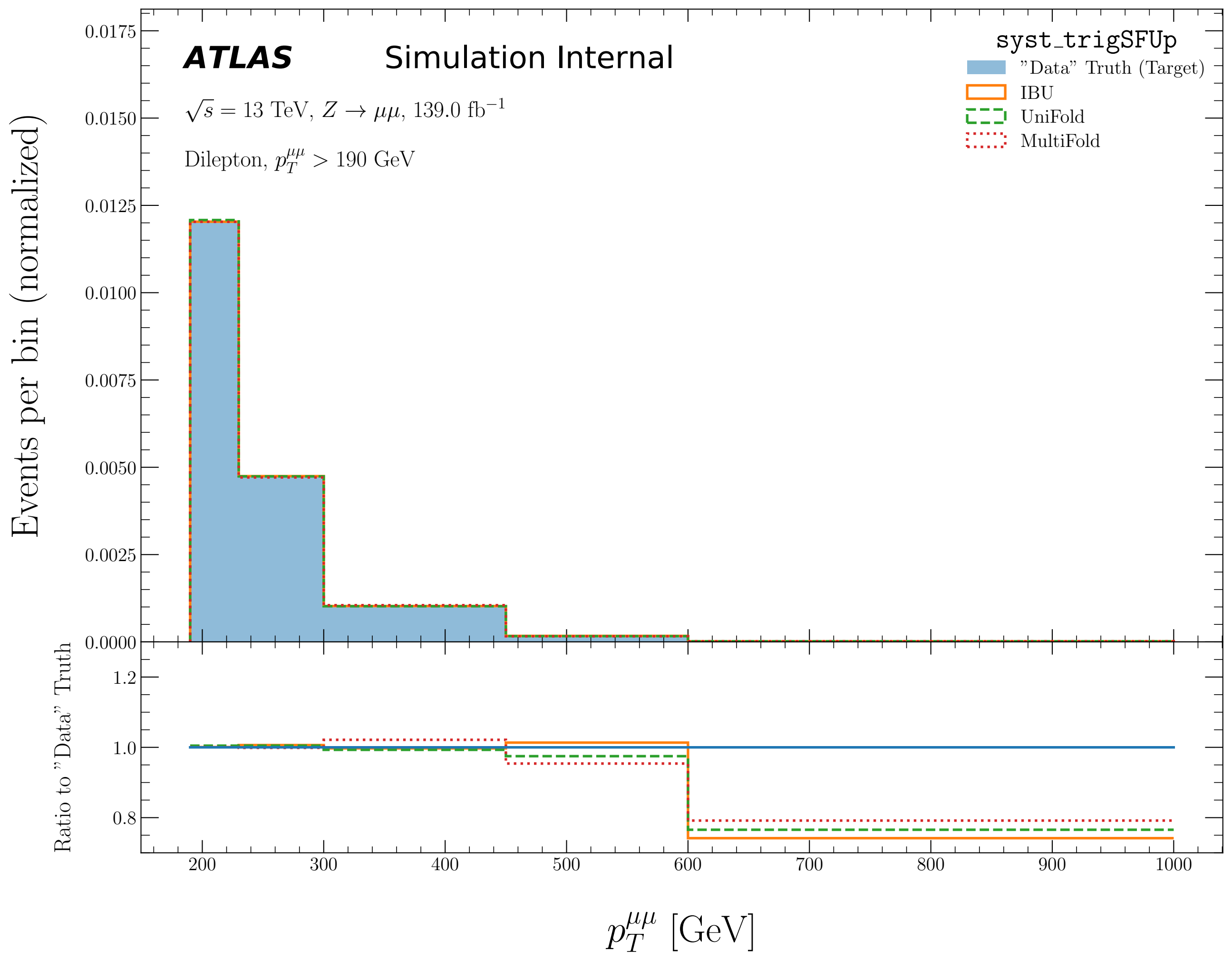


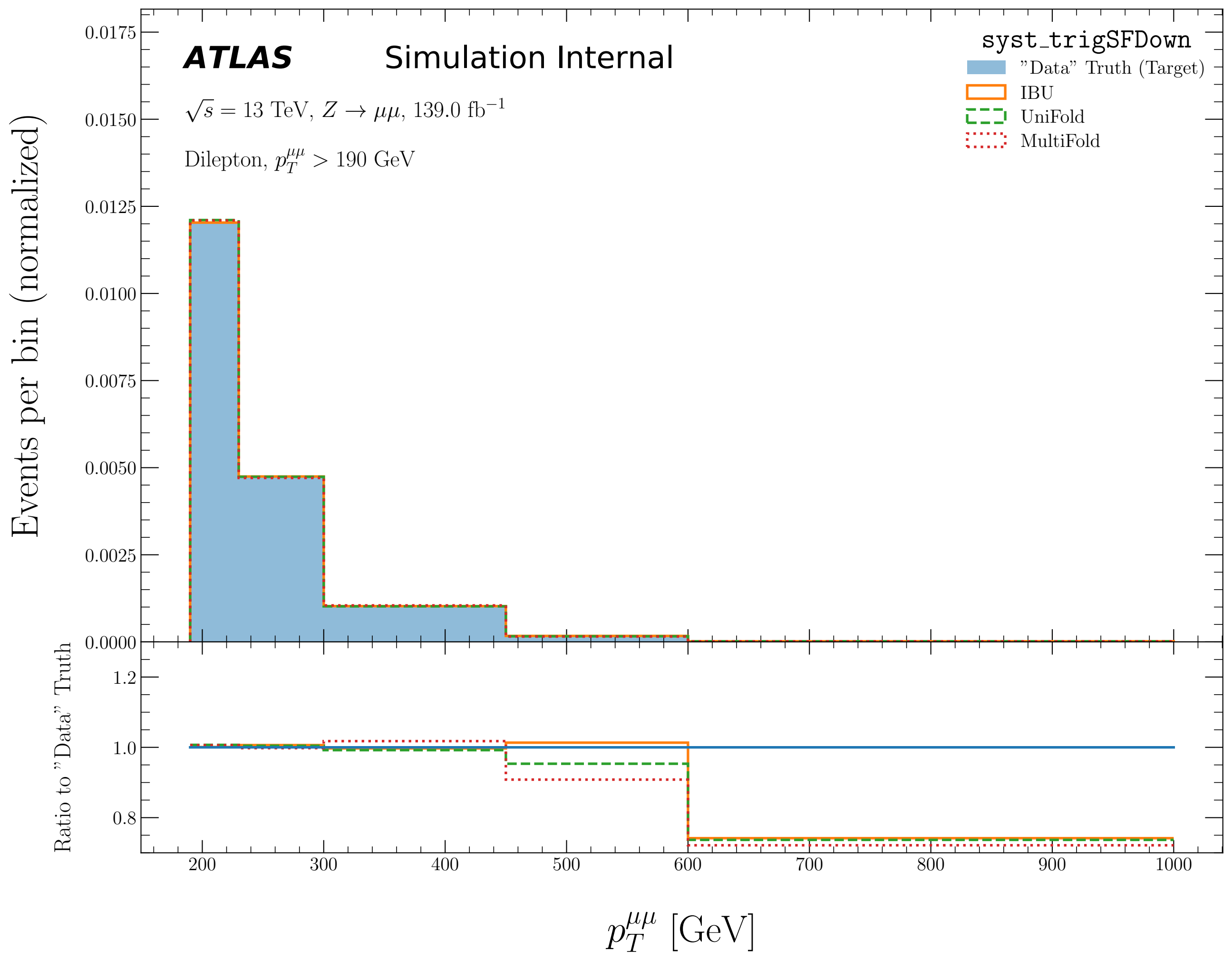


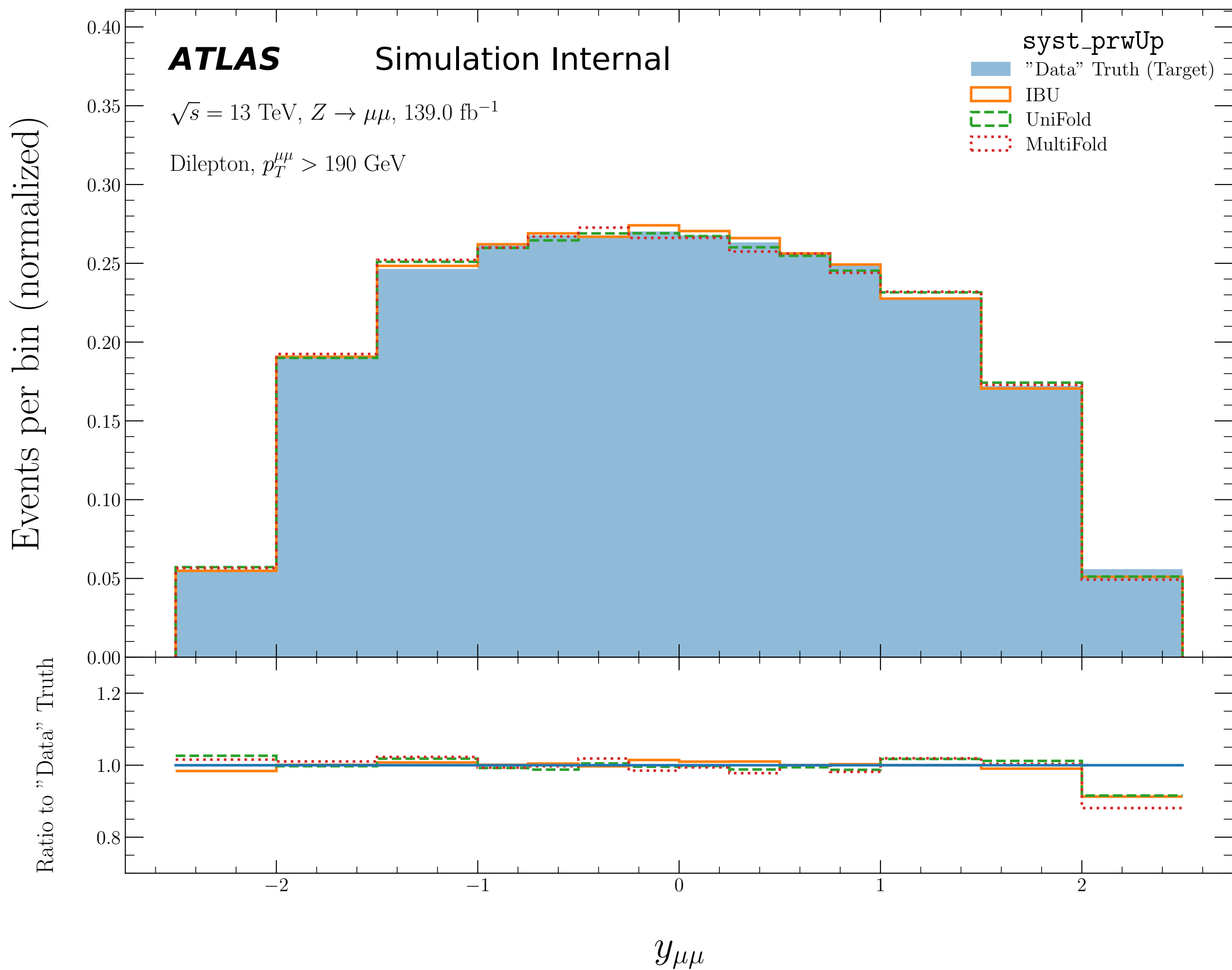












Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

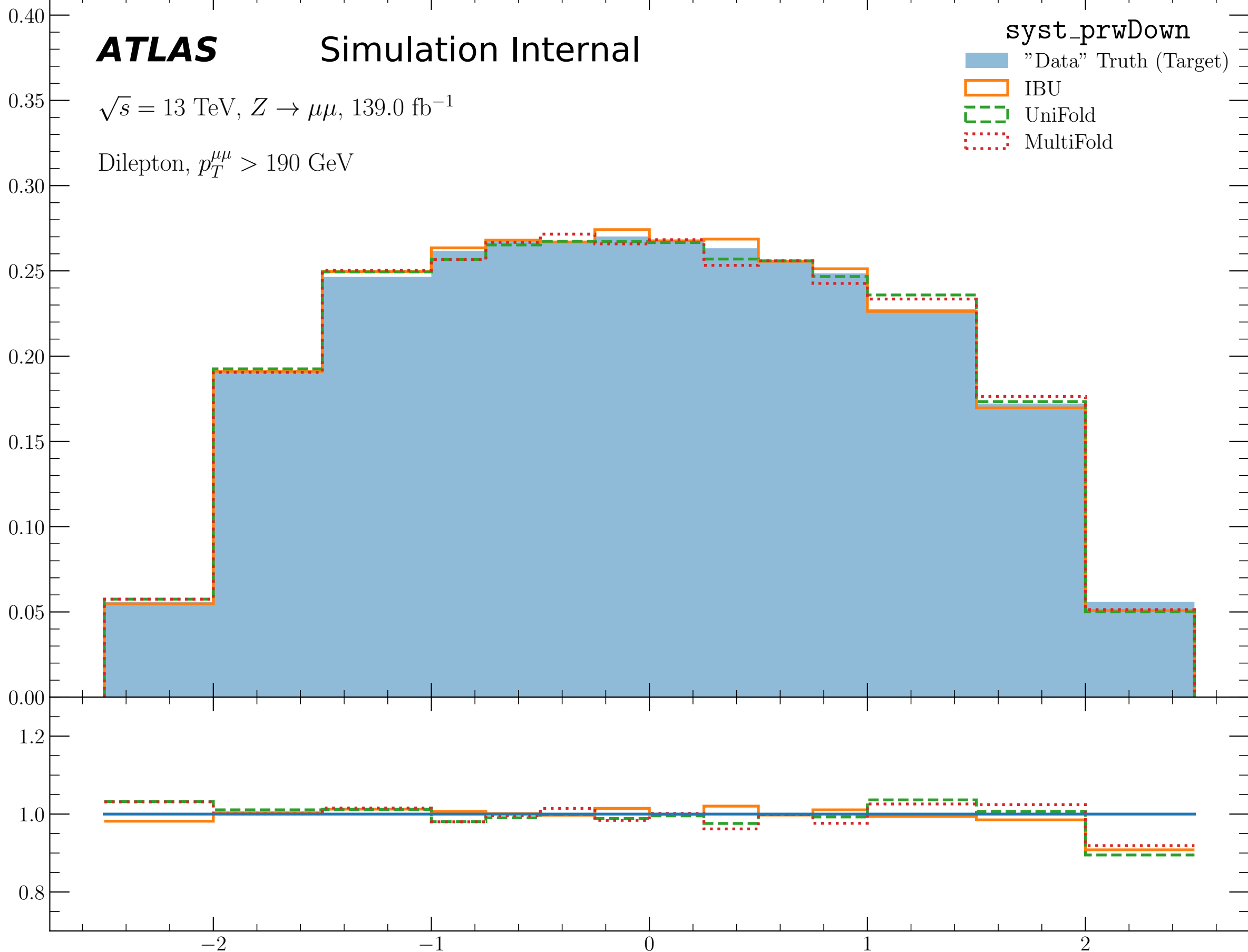
Dilepton,  $p_T^{\mu\mu} > 190 \text{ GeV}$

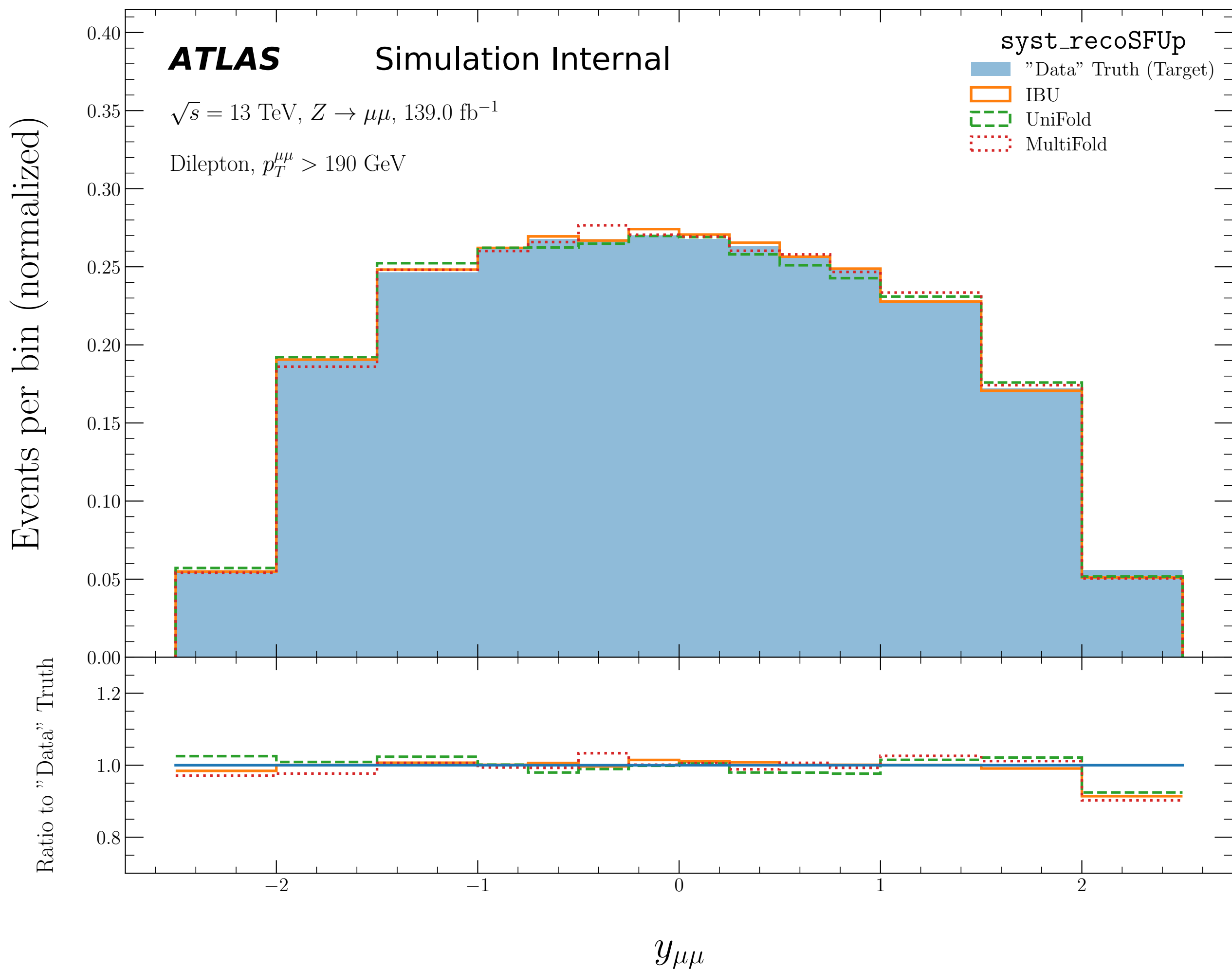
**syst\_prwDown**

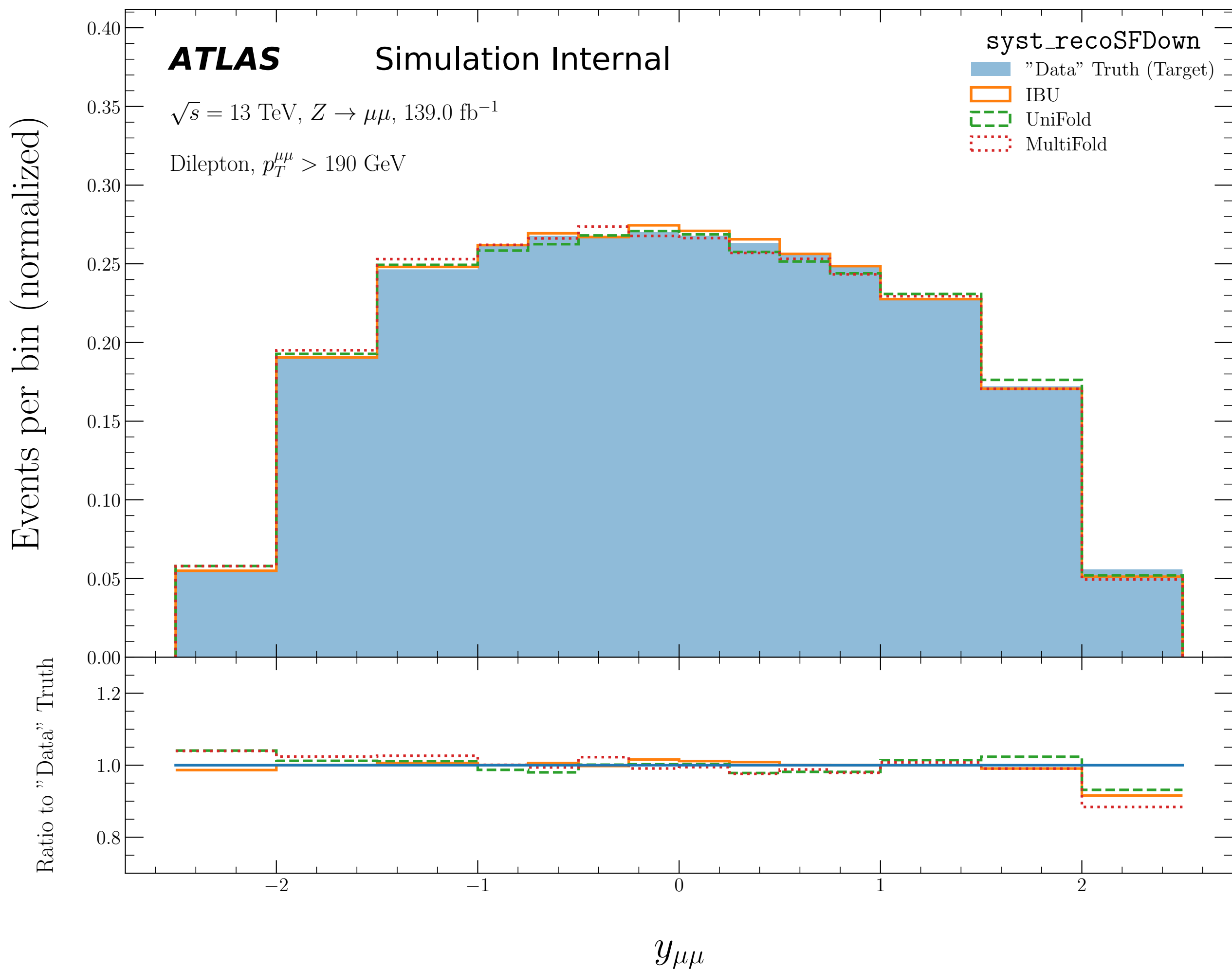
- "Data" Truth (Target)
- IBU
- UniFold
- MultiFold

Ratio to "Data" Truth

$y_{\mu\mu}$







Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

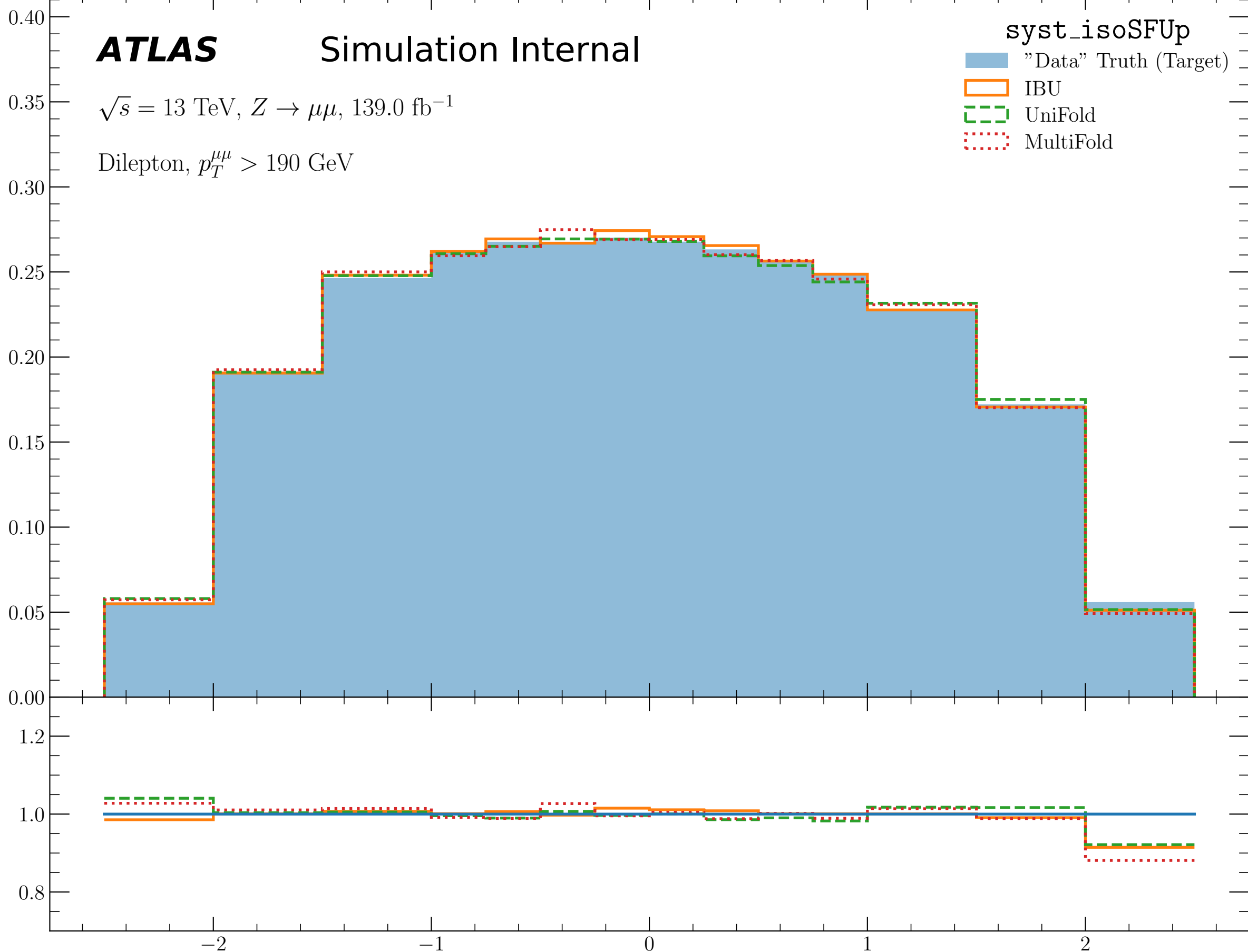
Dilepton,  $p_T^{\mu\mu} > 190 \text{ GeV}$

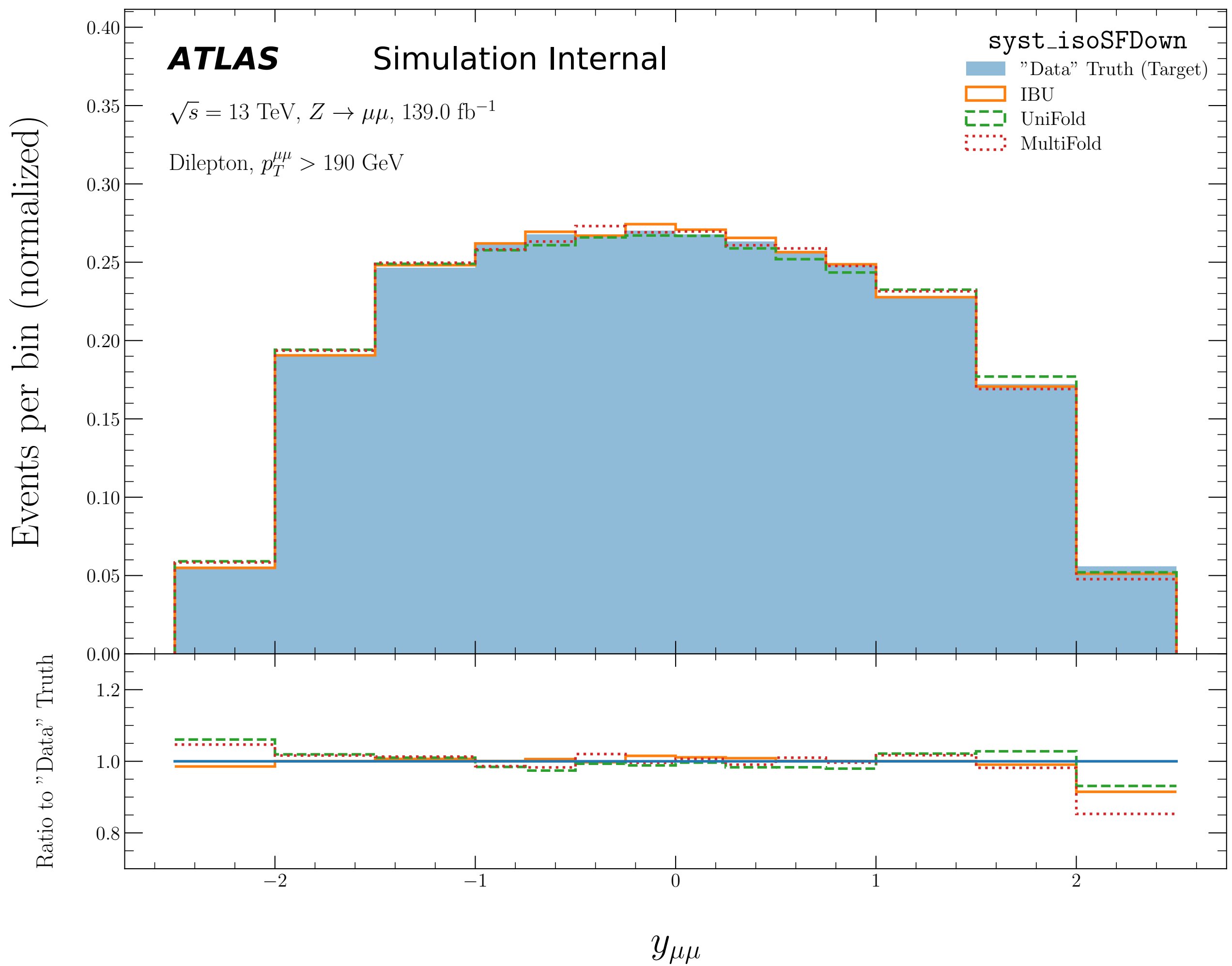
**syst\_isoSFUp**

- "Data" Truth (Target)
- IBU
- UniFold
- MultiFold

Ratio to "Data" Truth

$y_{\mu\mu}$







Events per bin (normalized)

**ATLAS**

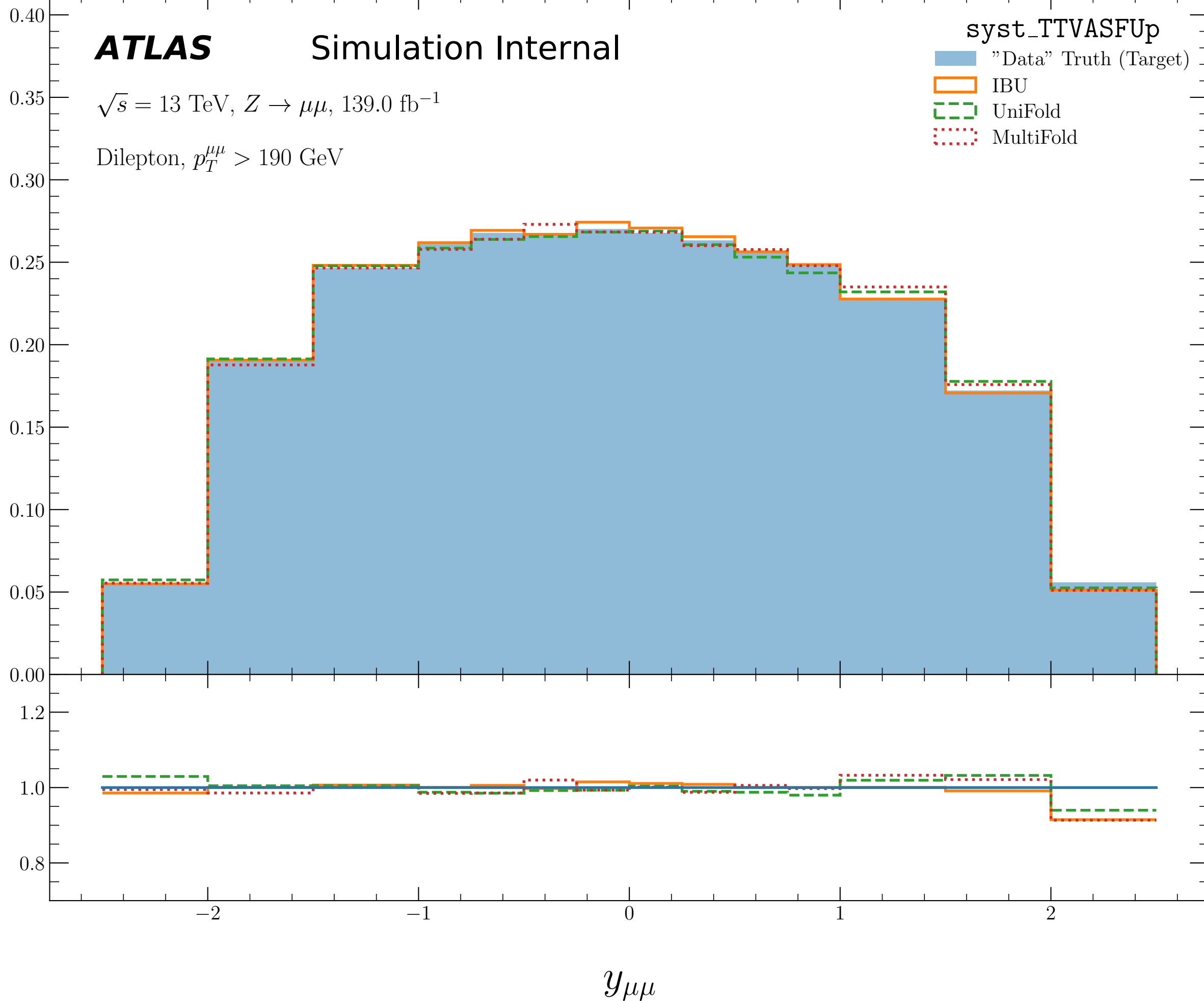
Simulation Internal

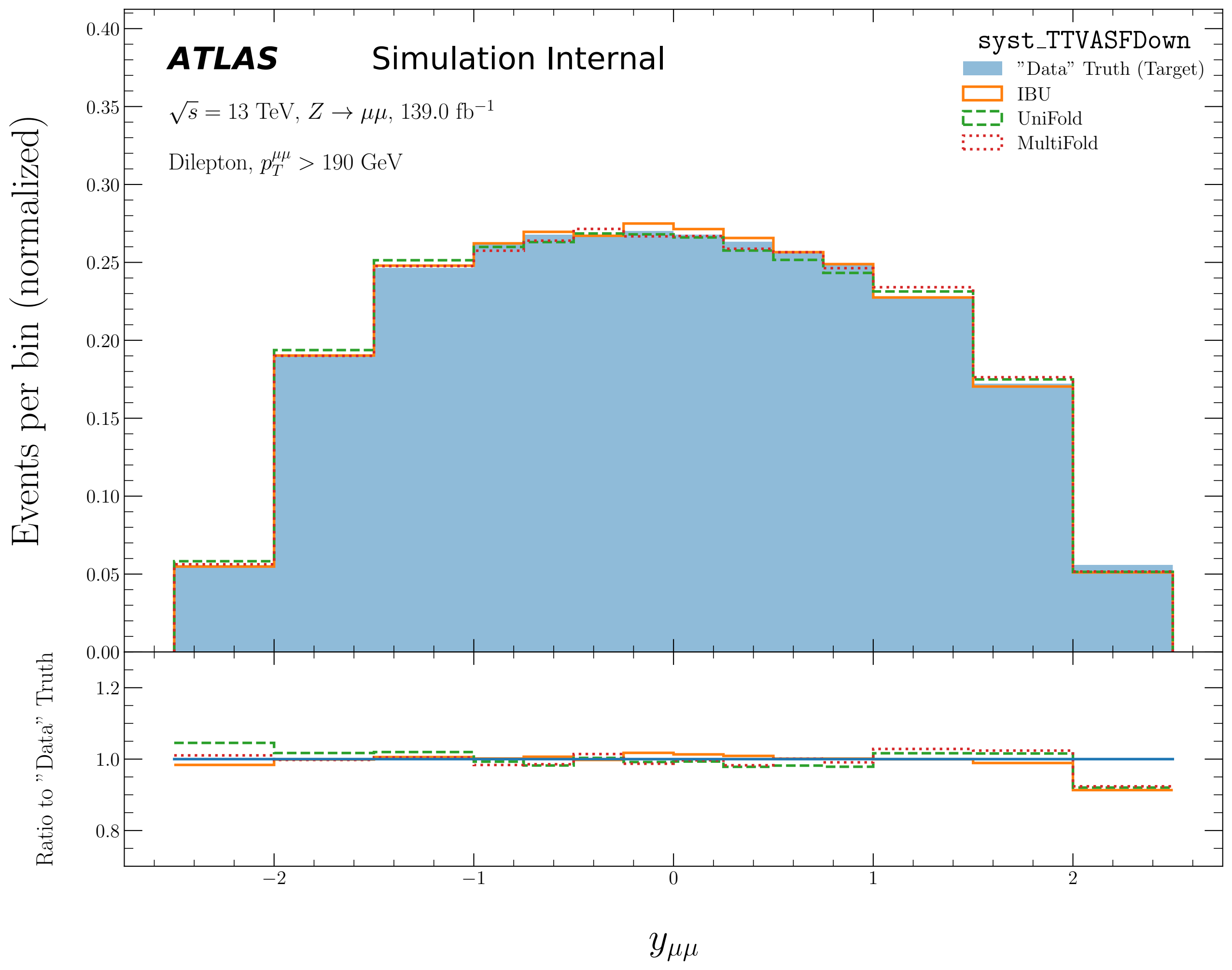
$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

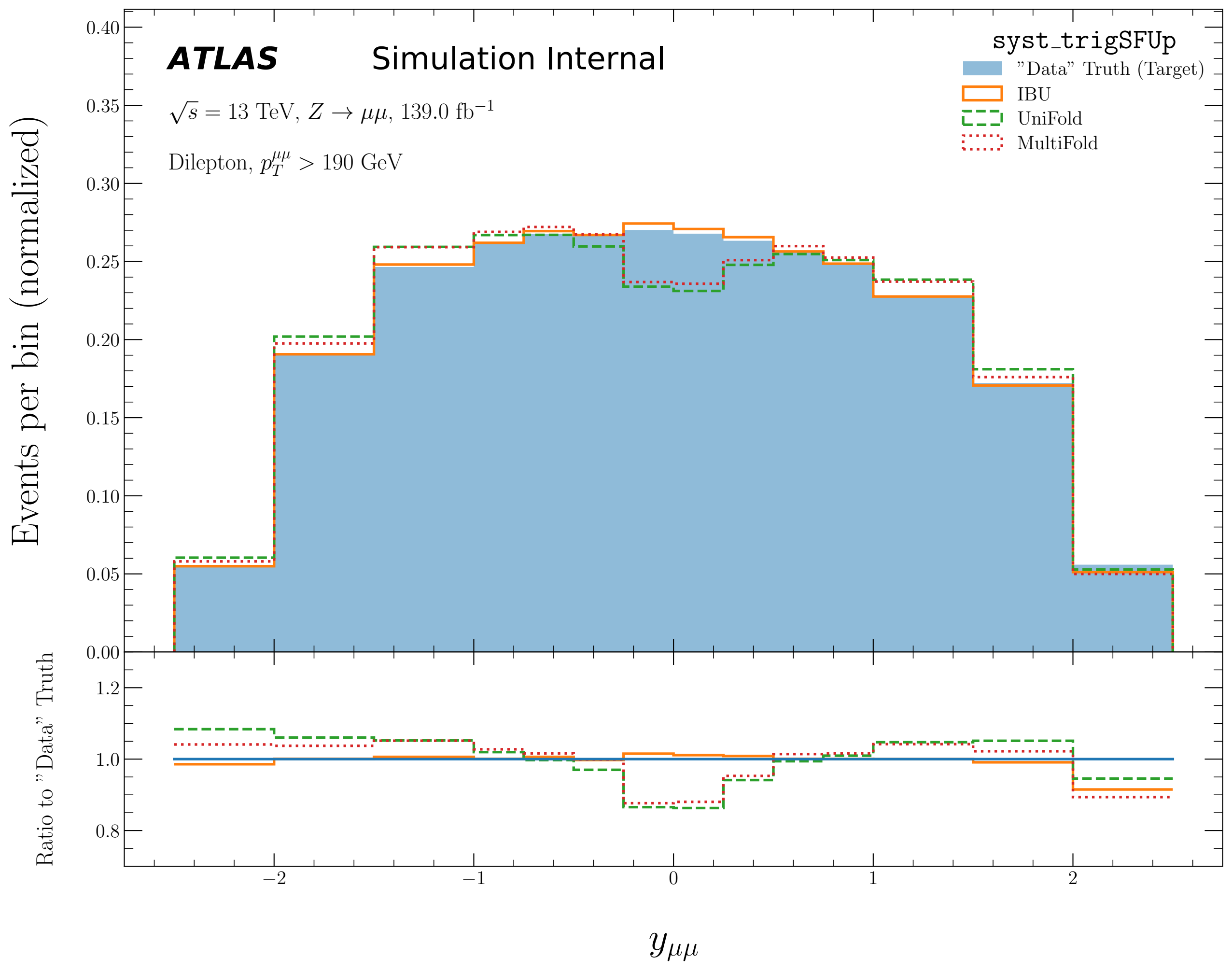
Dilepton,  $p_T^{\mu\mu} > 190 \text{ GeV}$

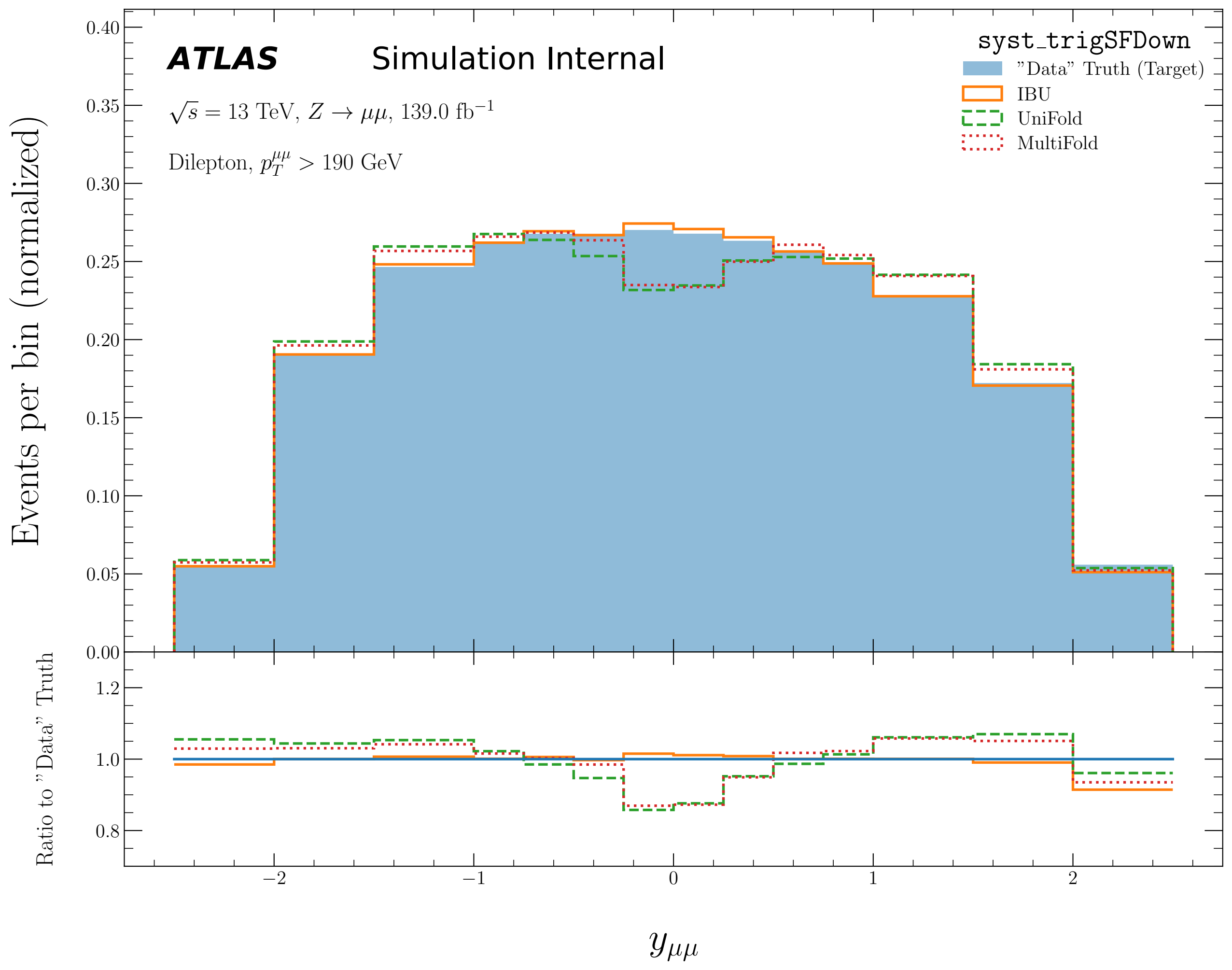
syst\_TTVASFUp

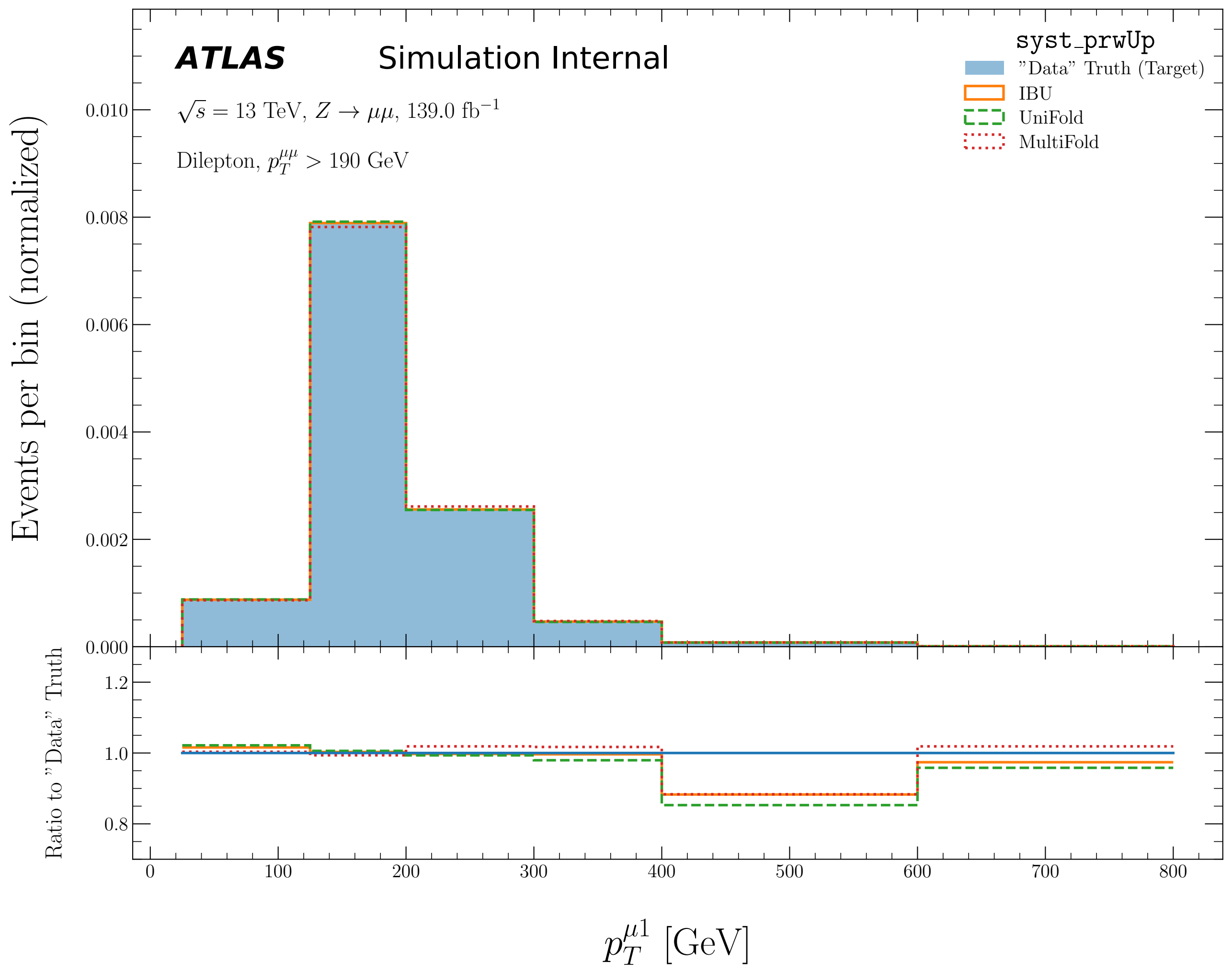
- "Data" Truth (Target)
- IBU
- UniFold
- MultiFold

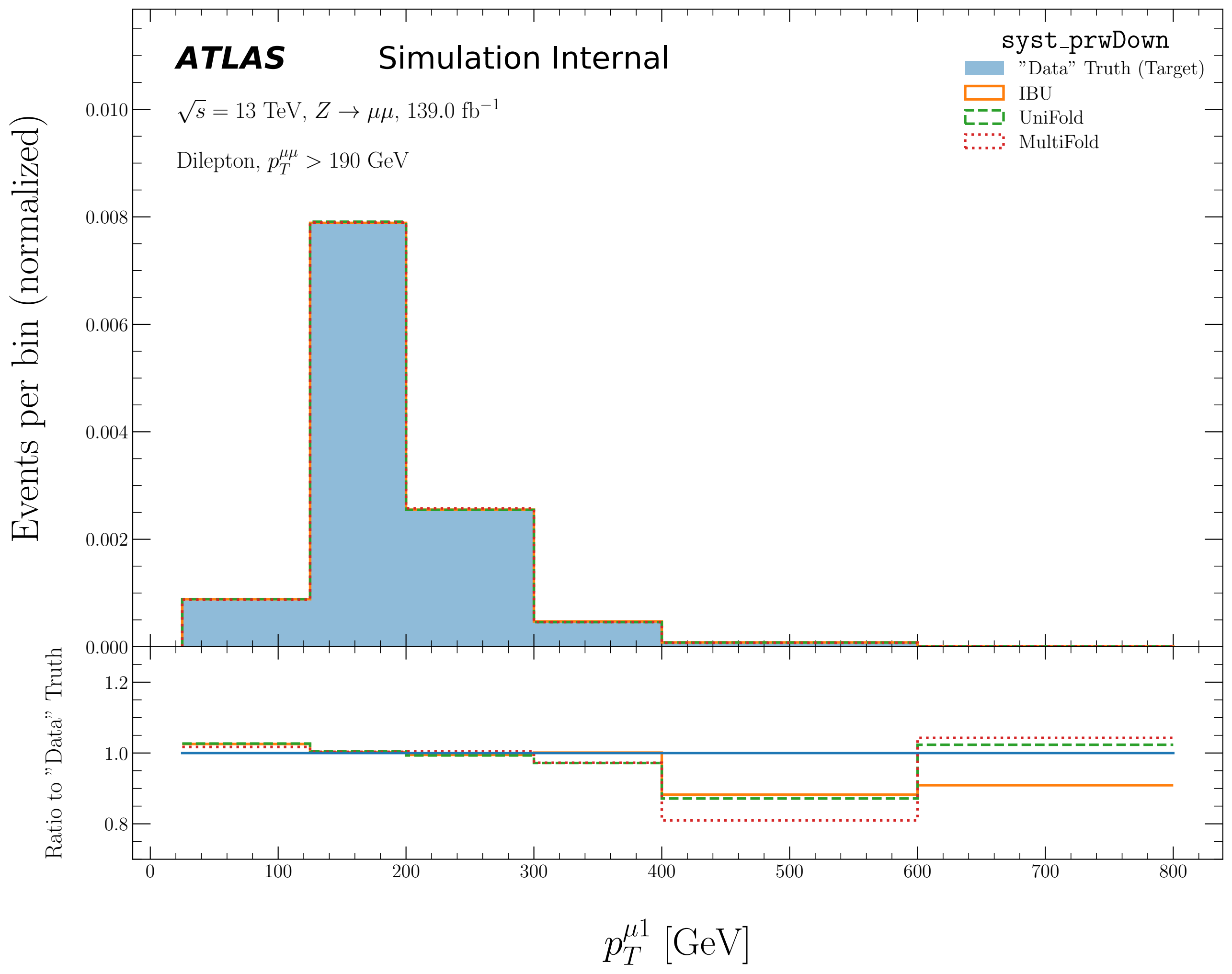


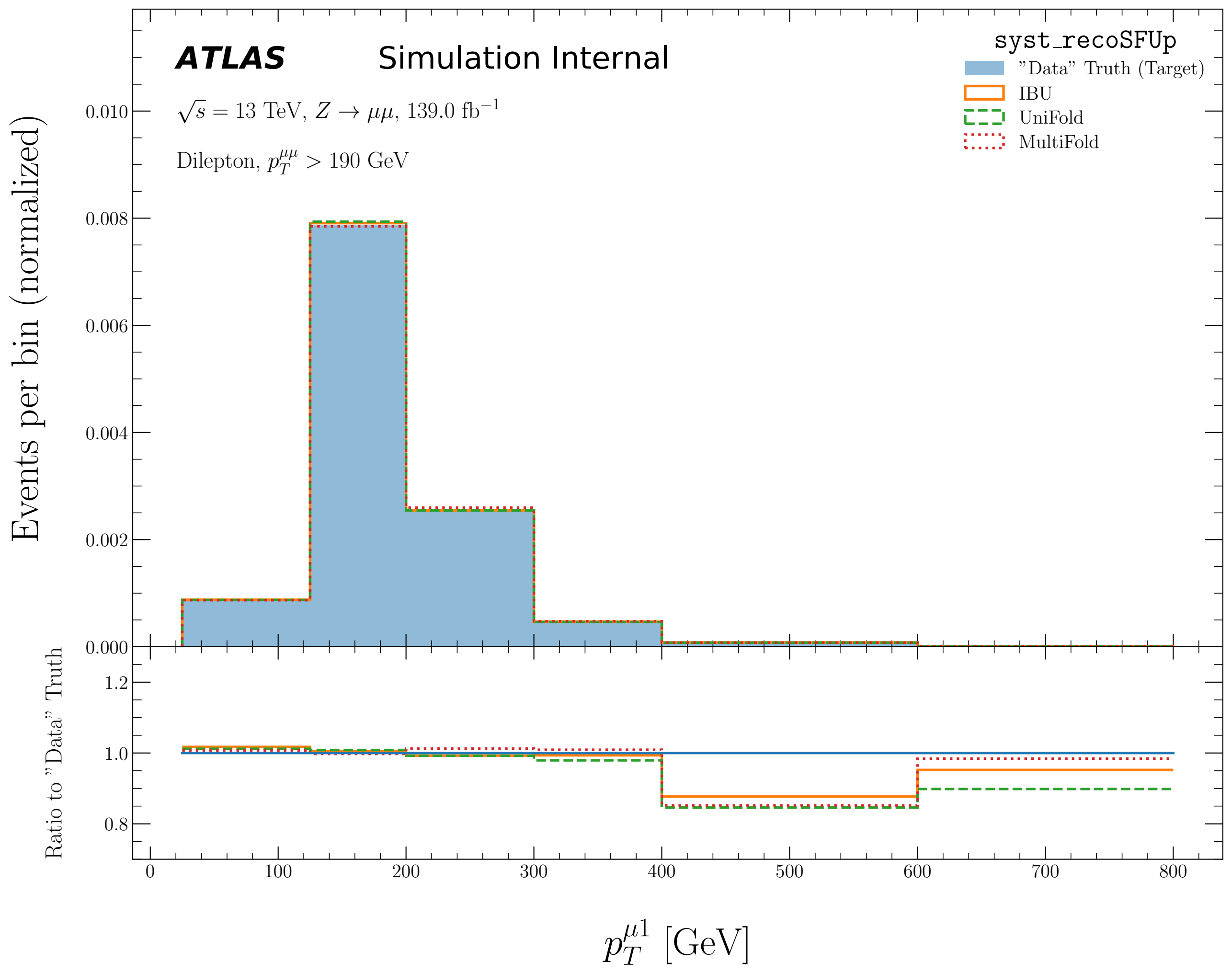


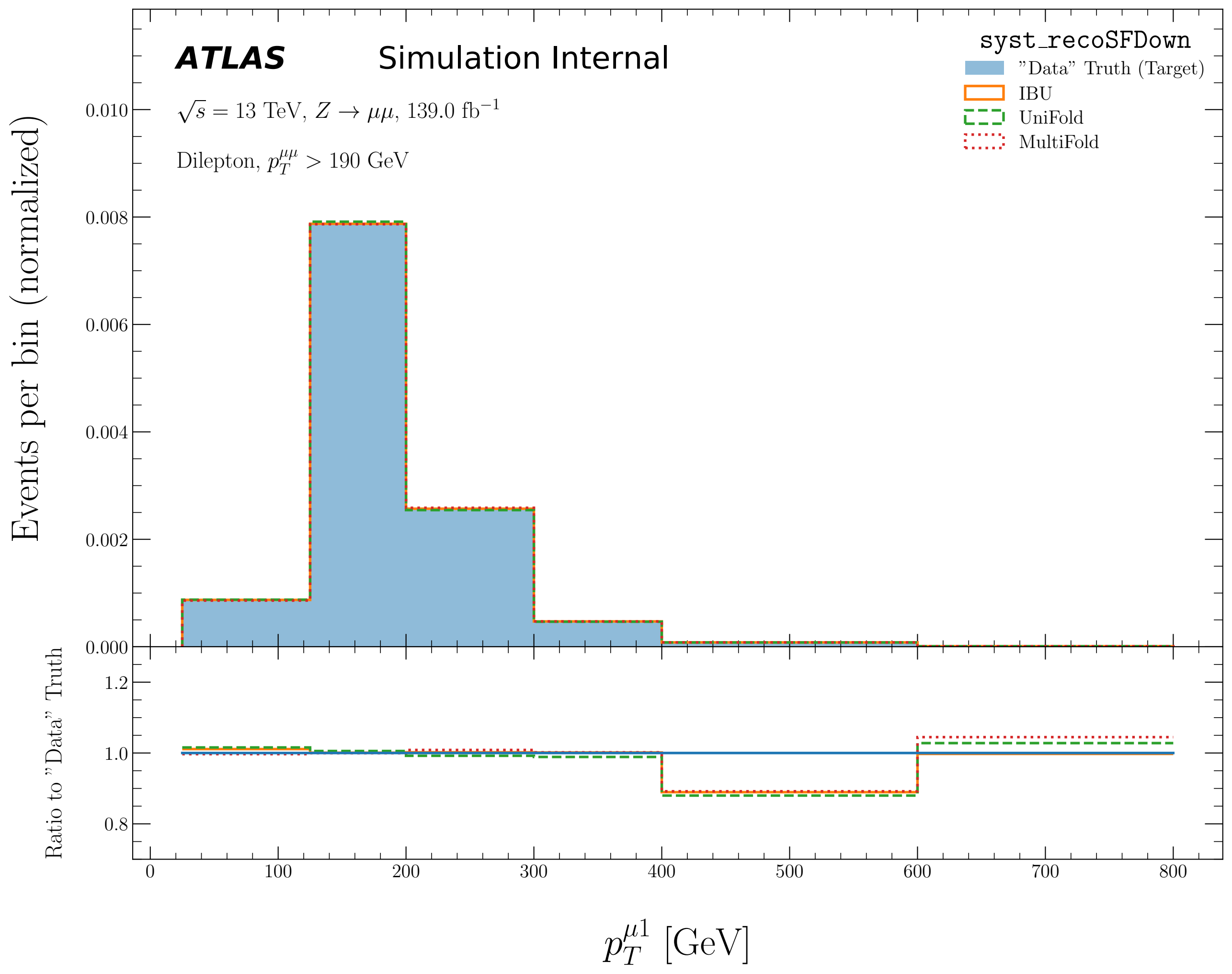




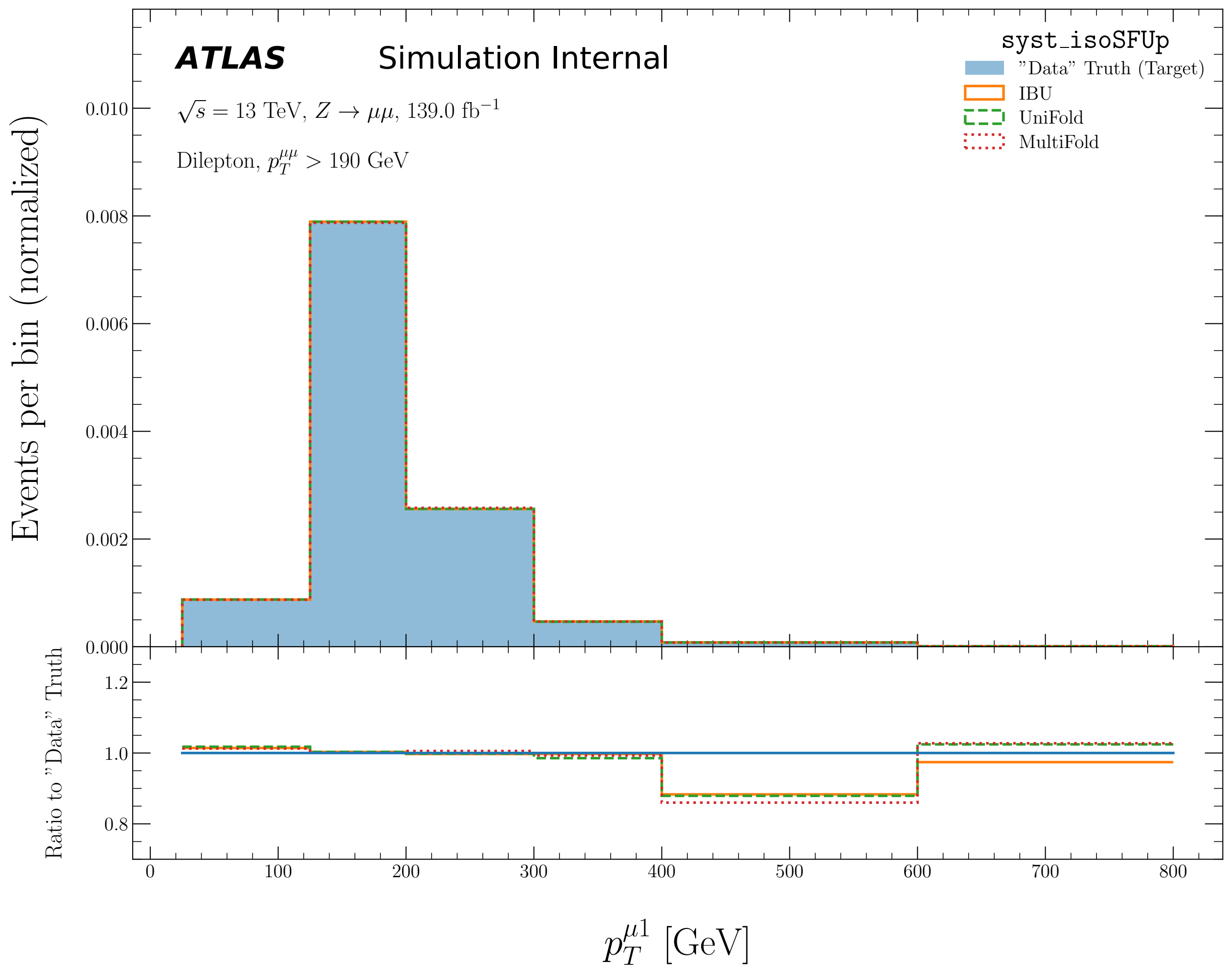


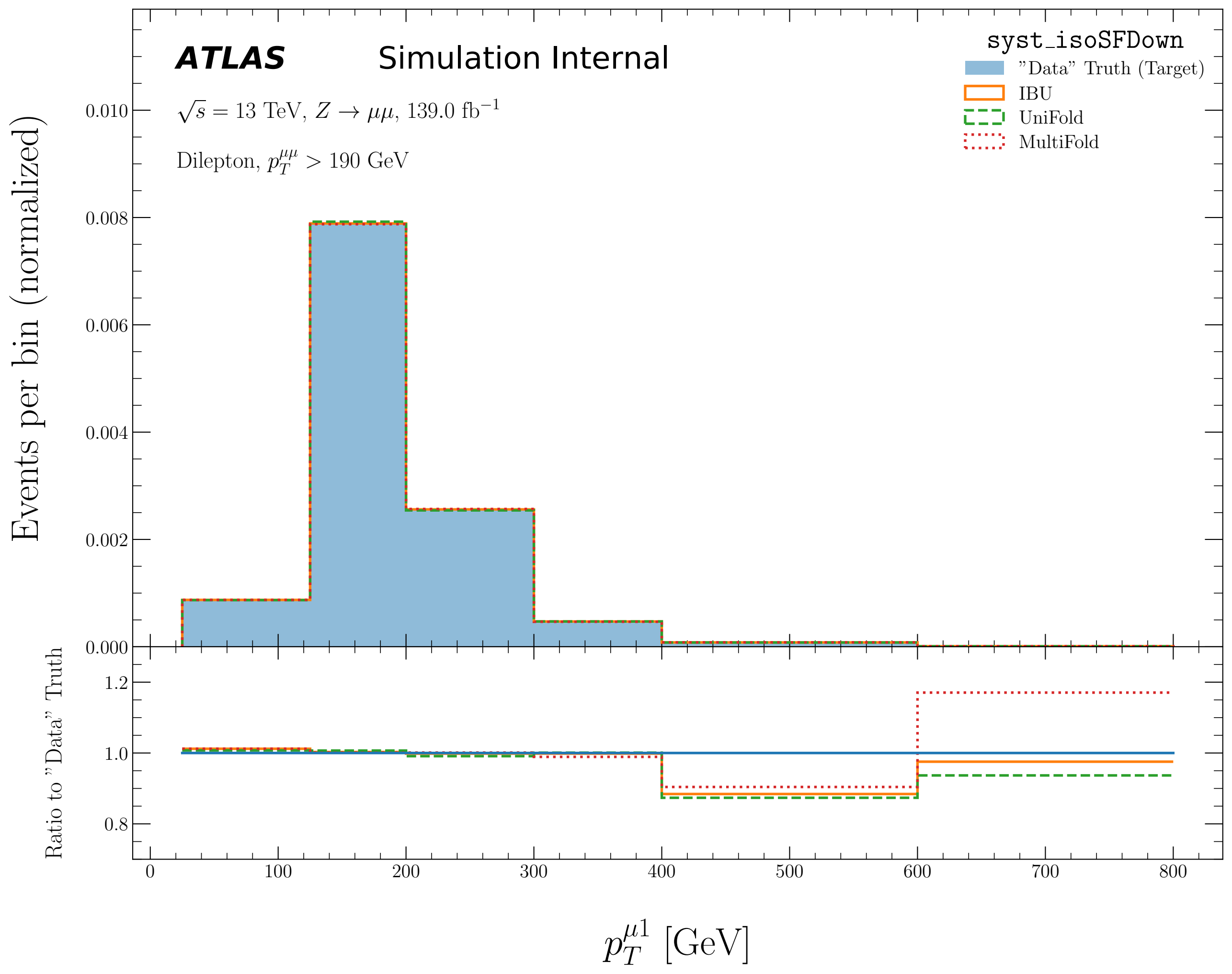


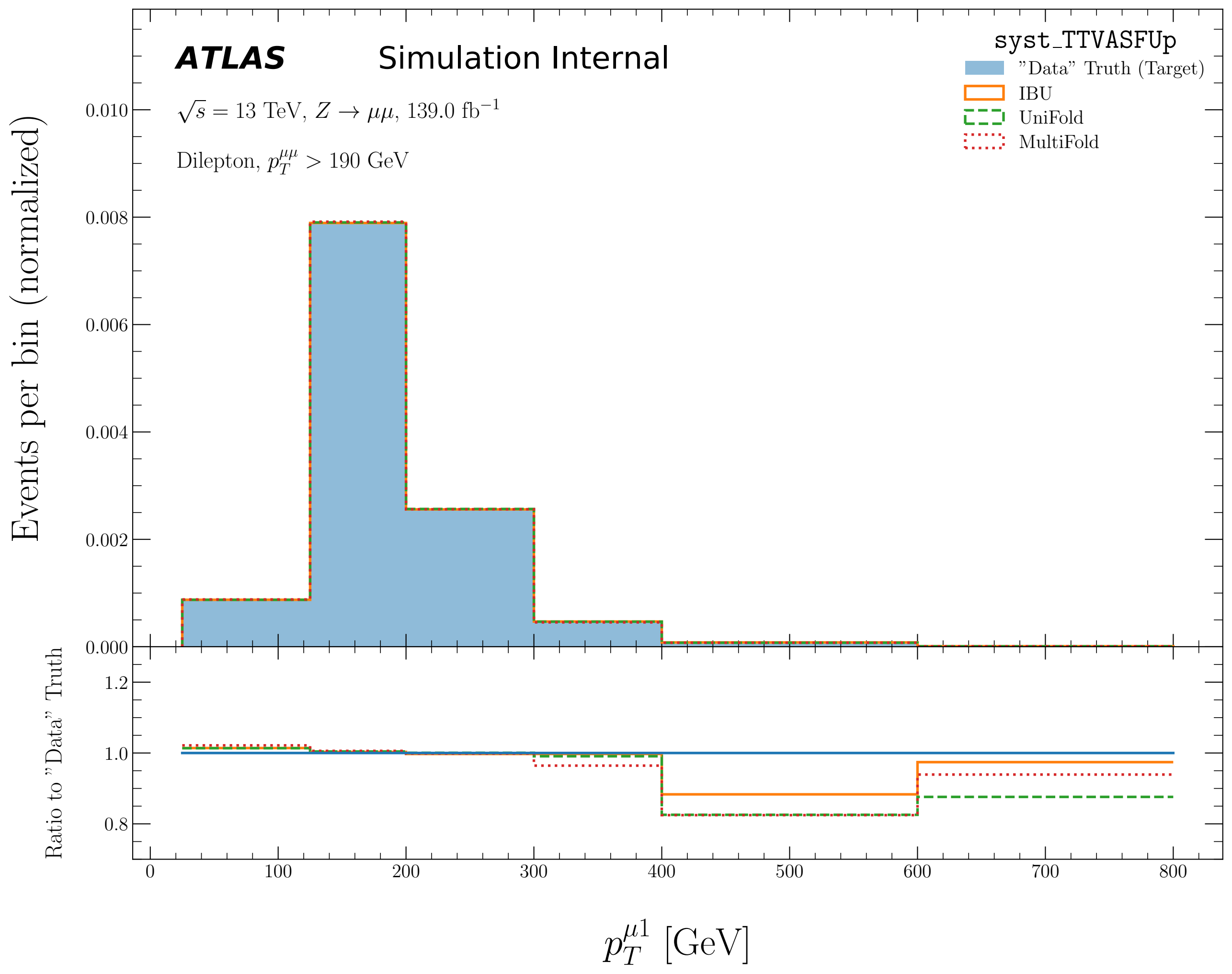


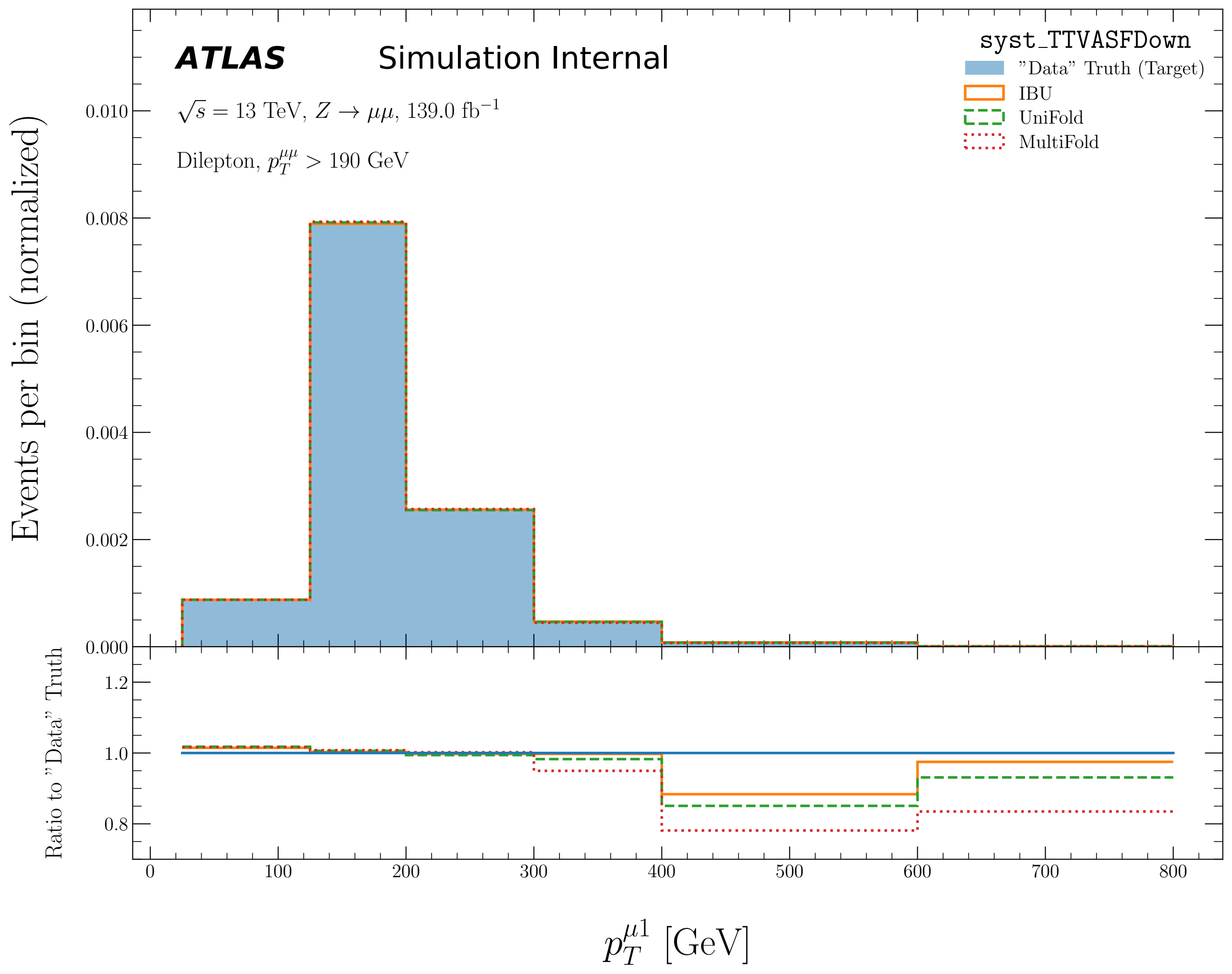


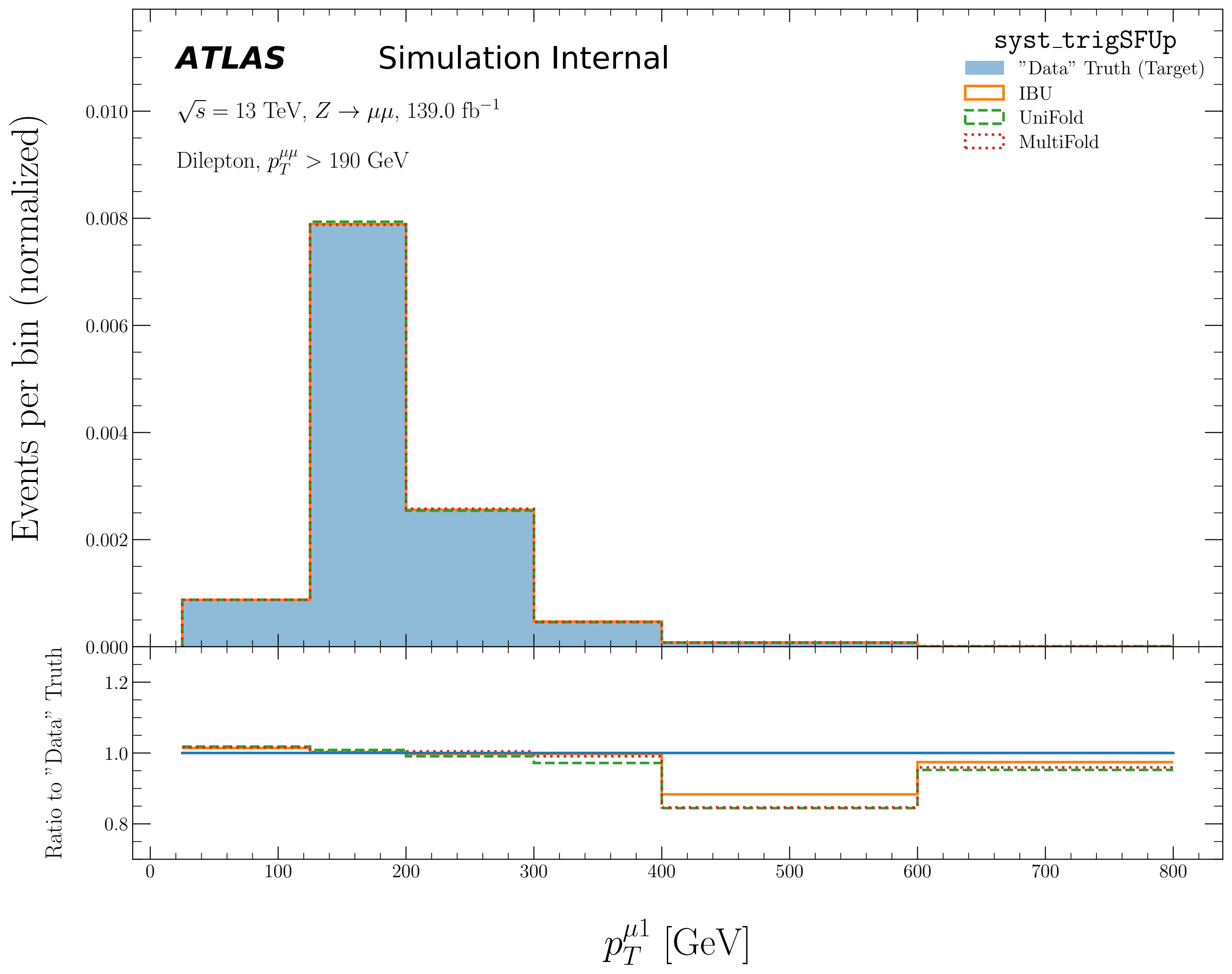


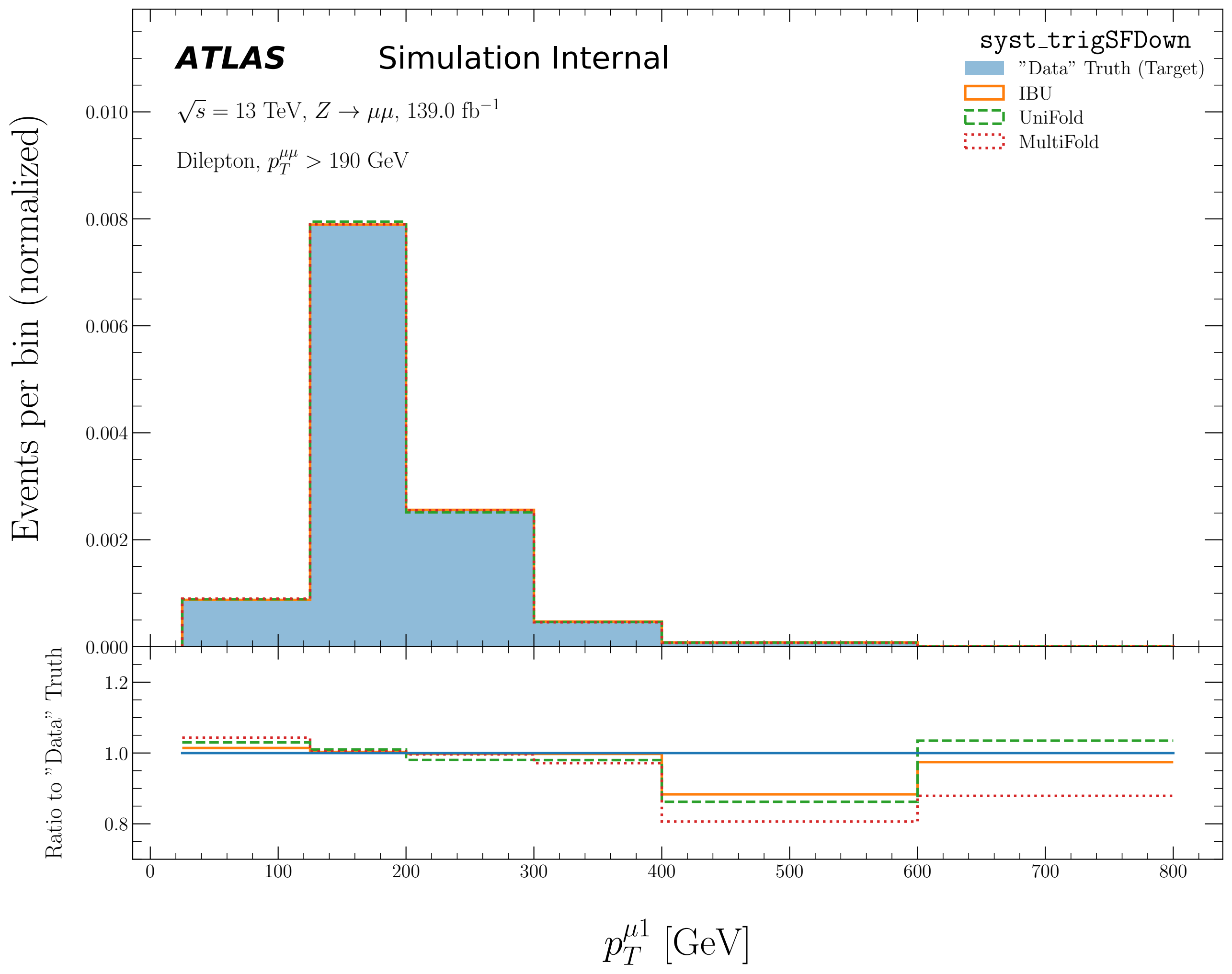


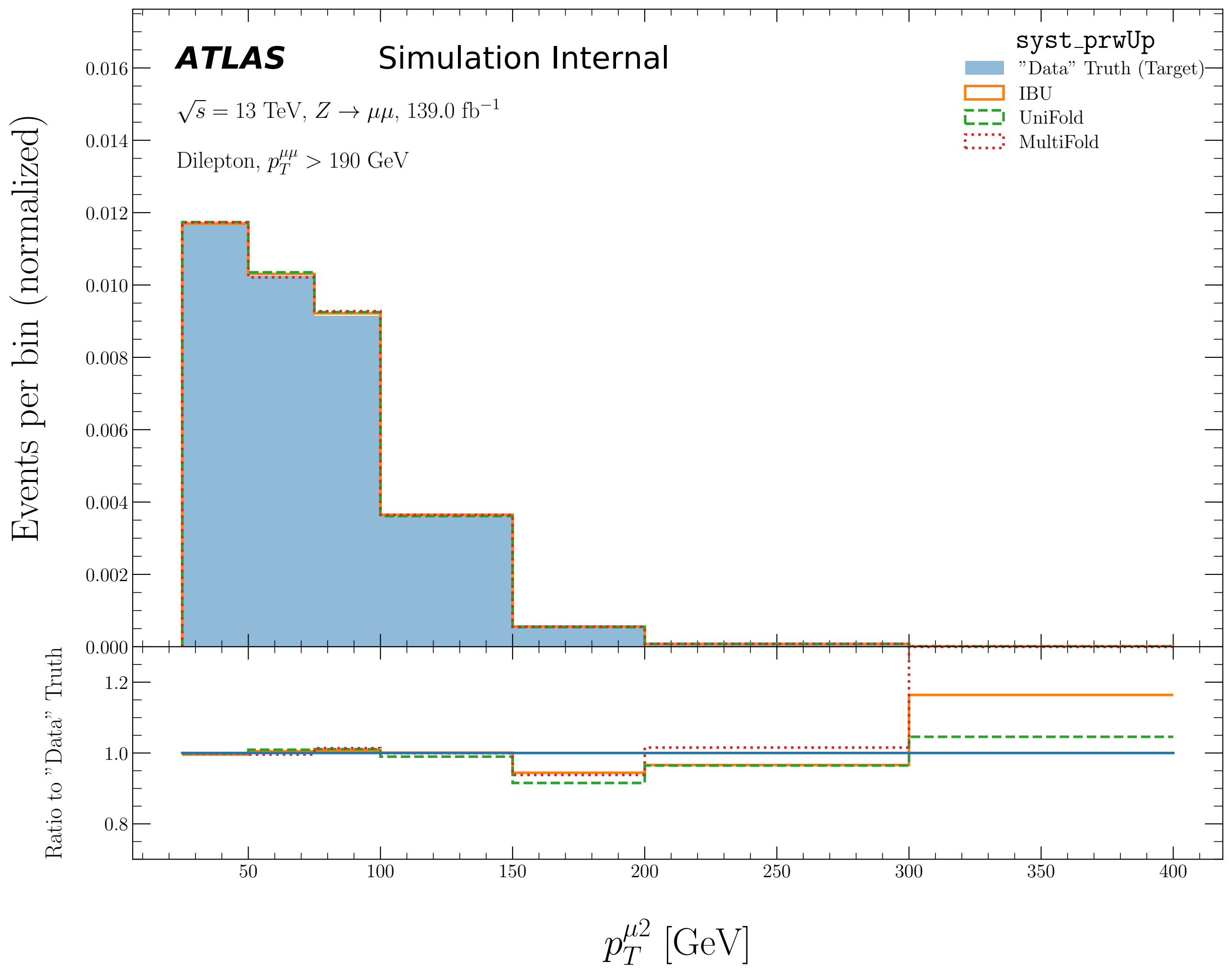


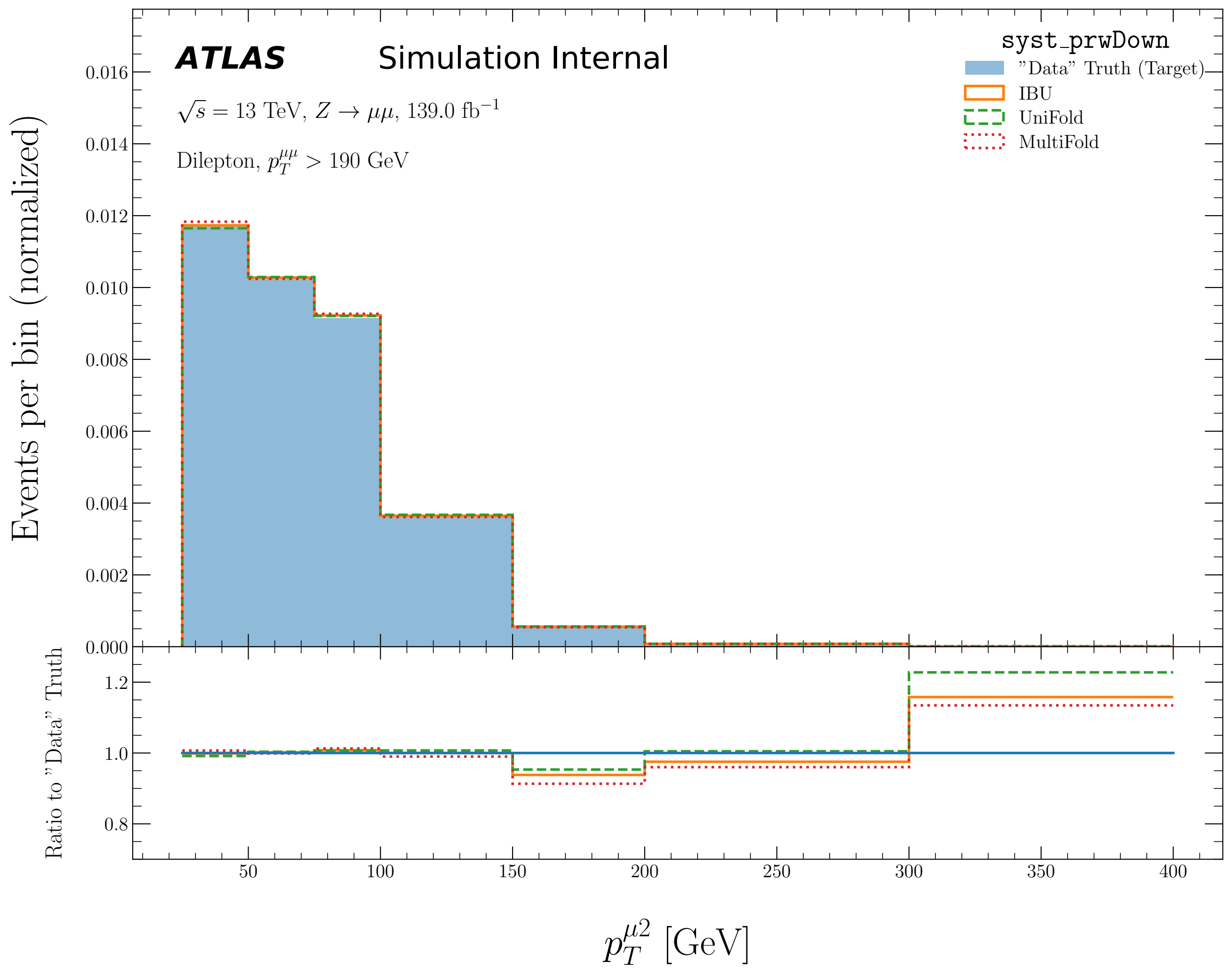




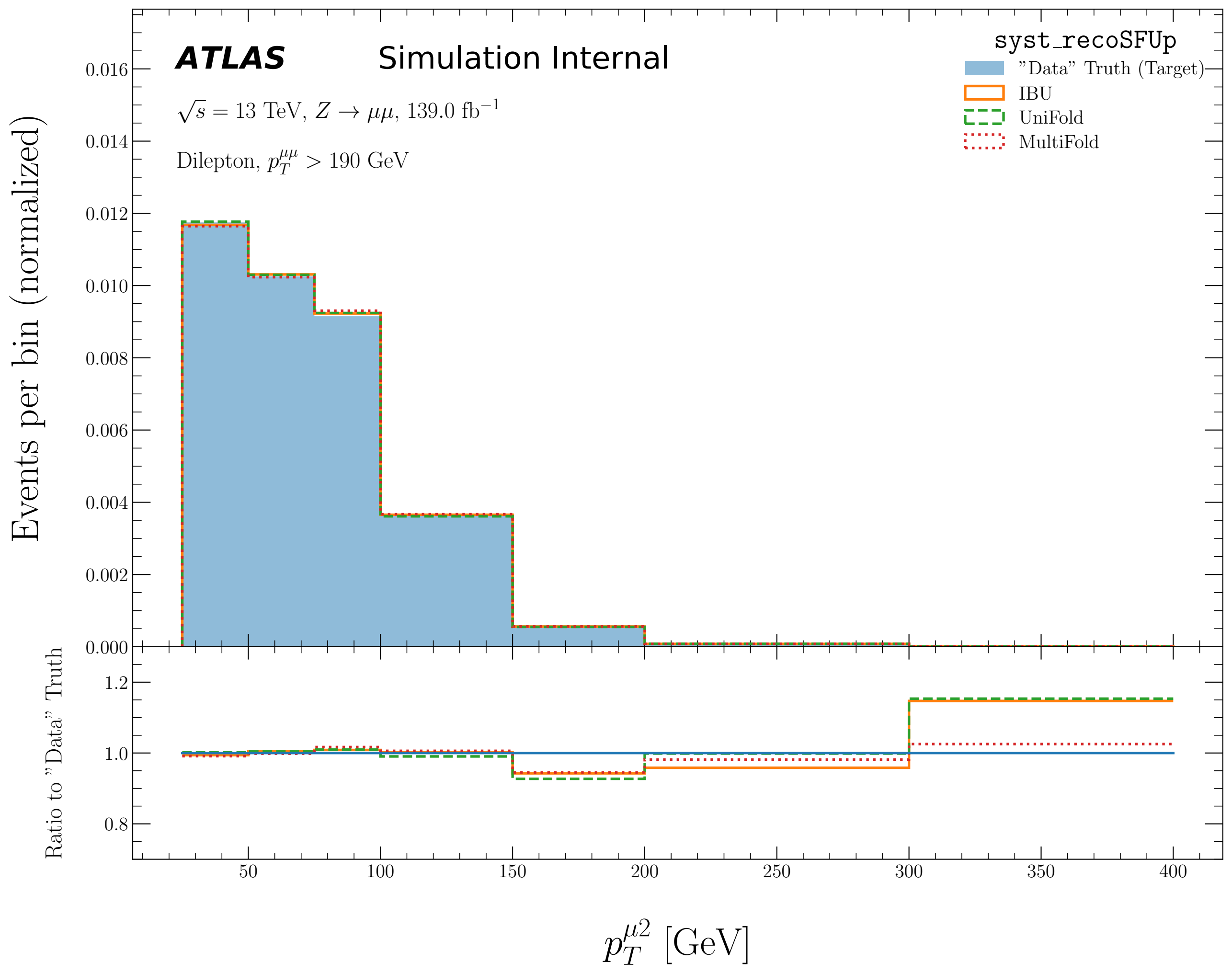


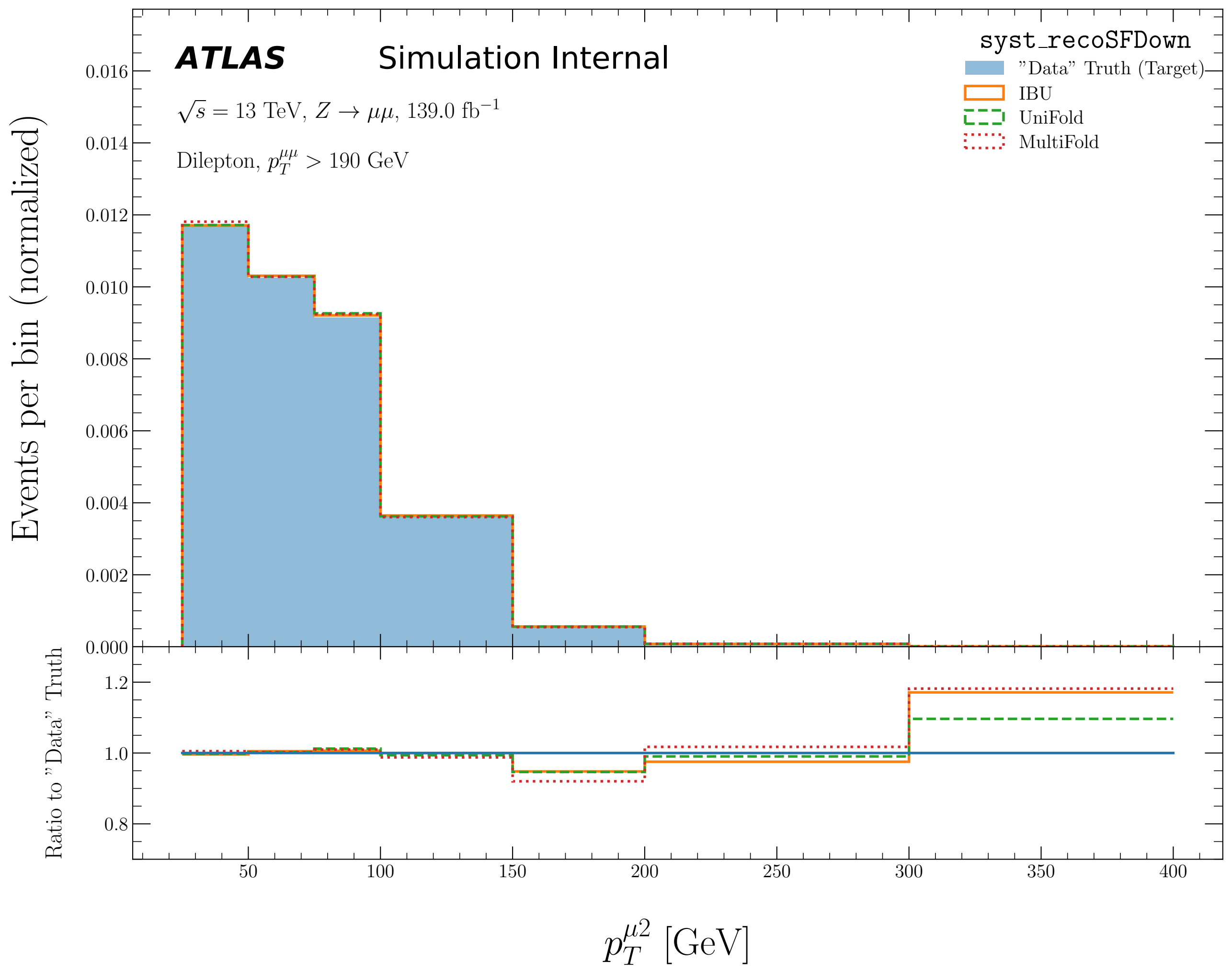


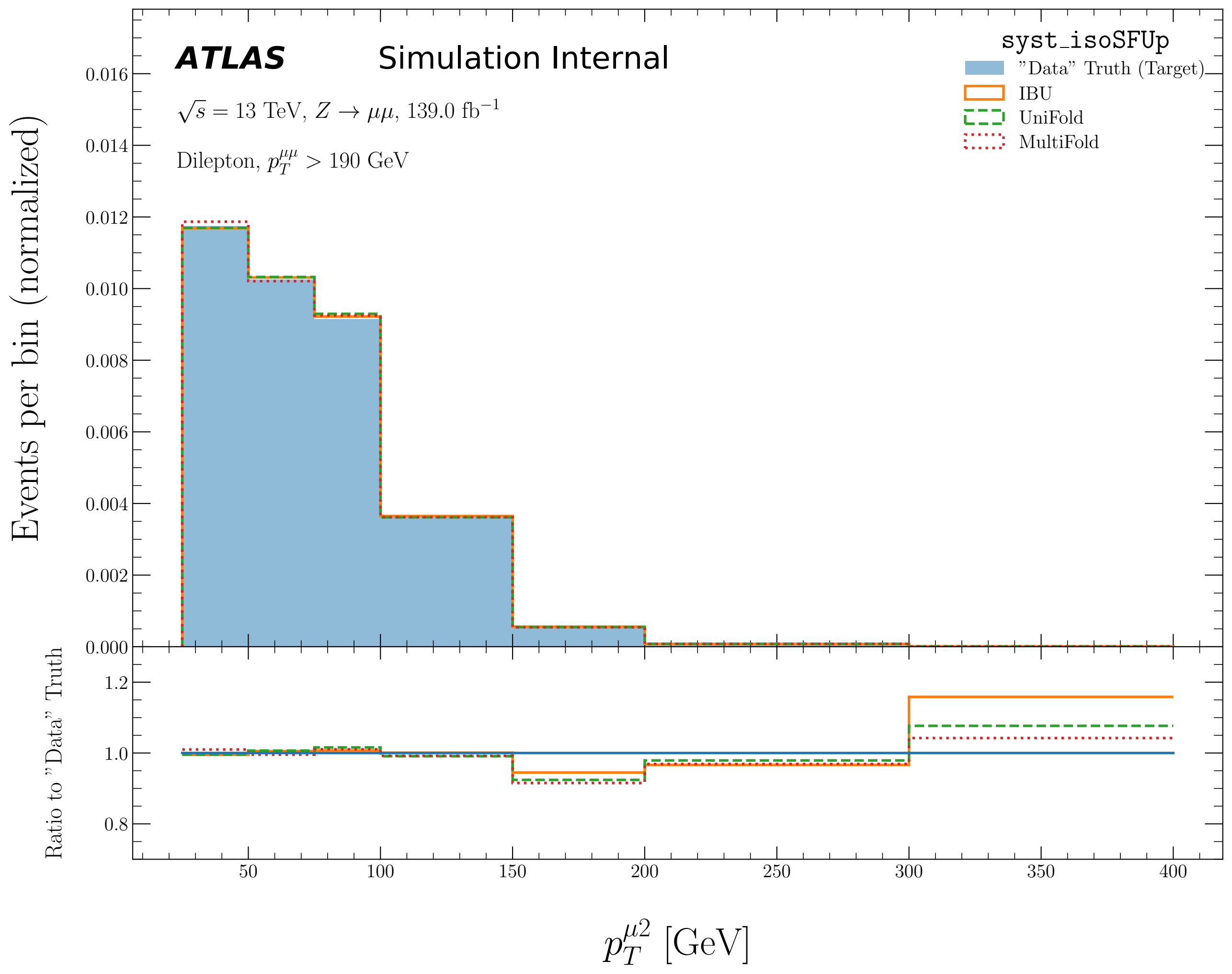


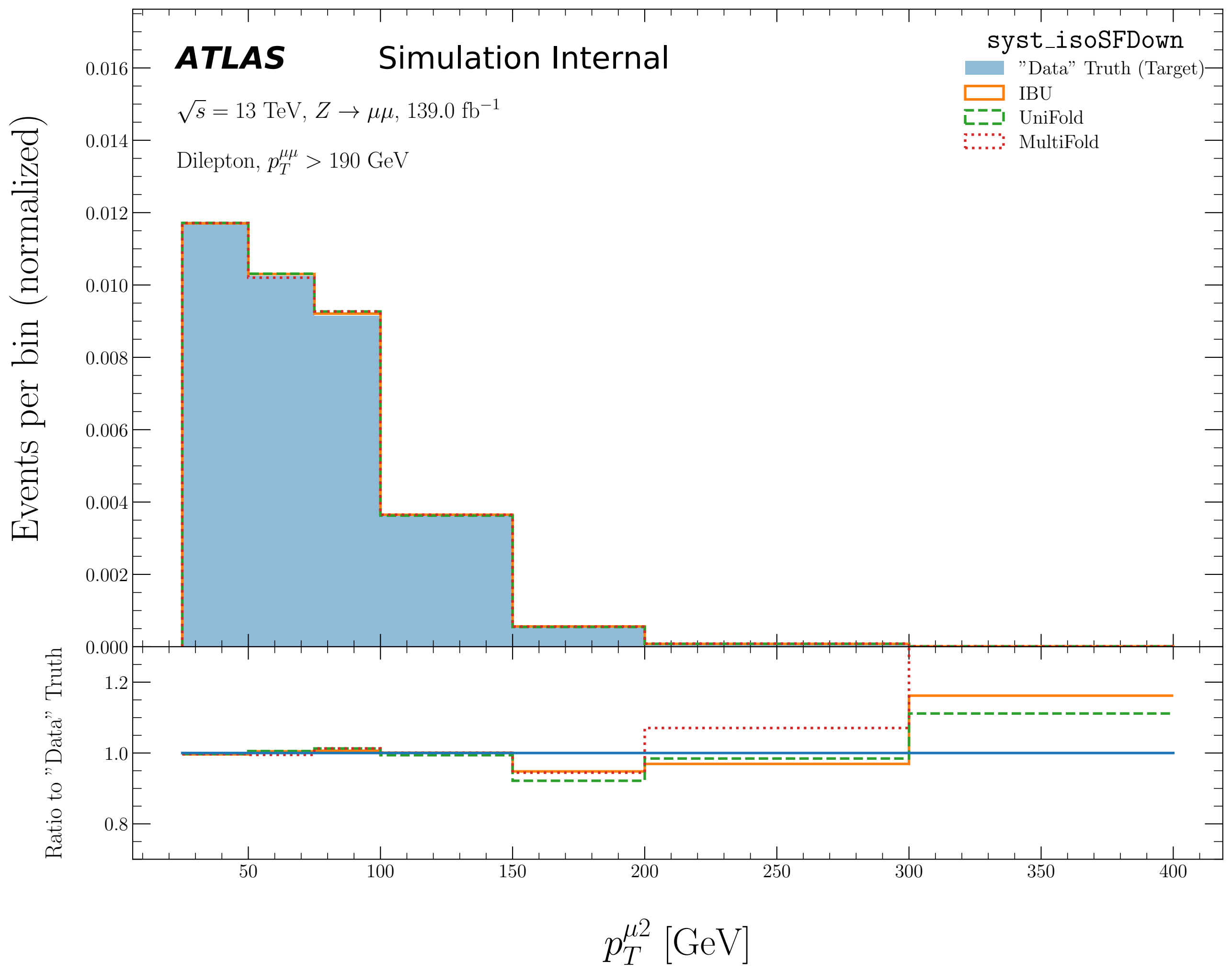


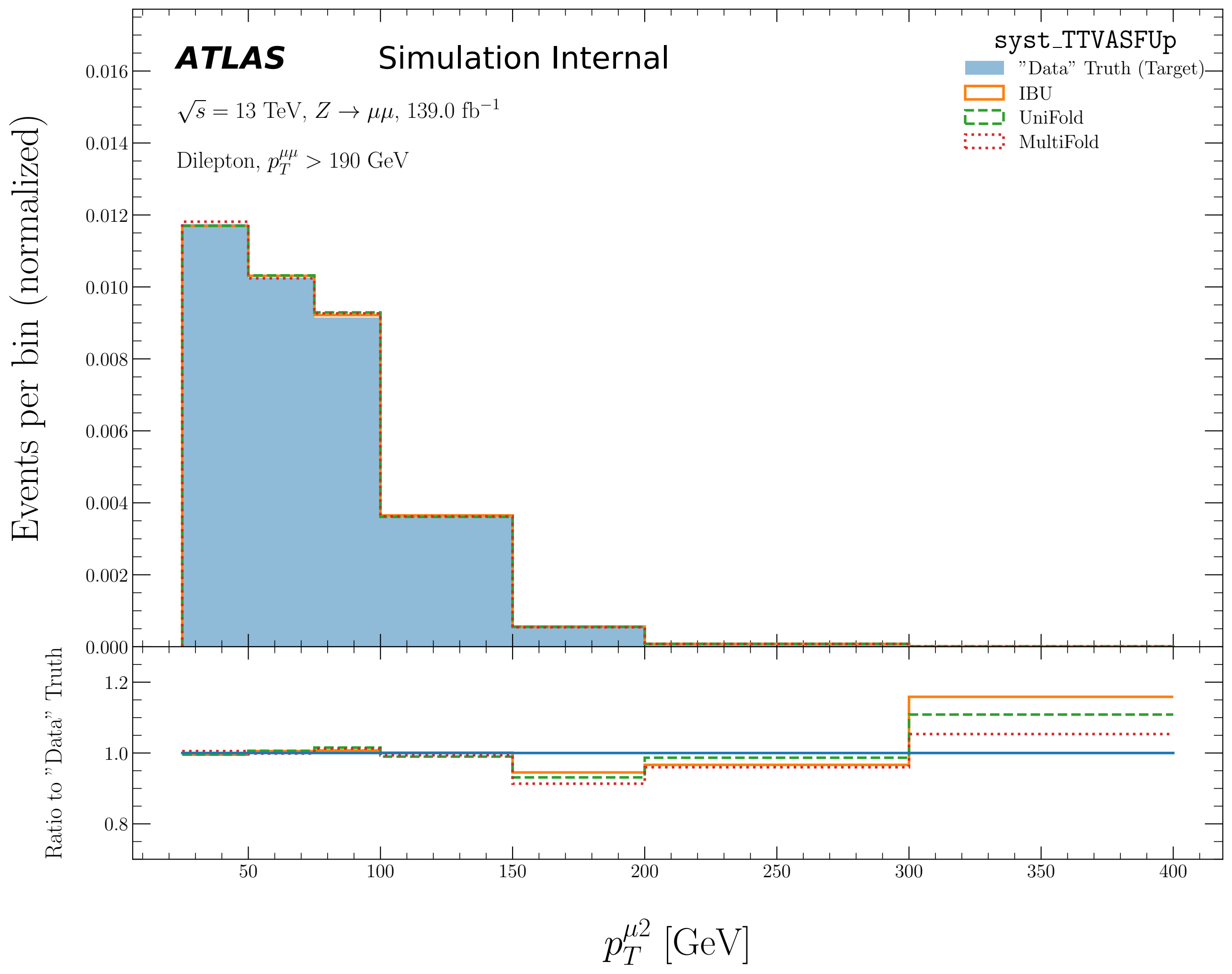


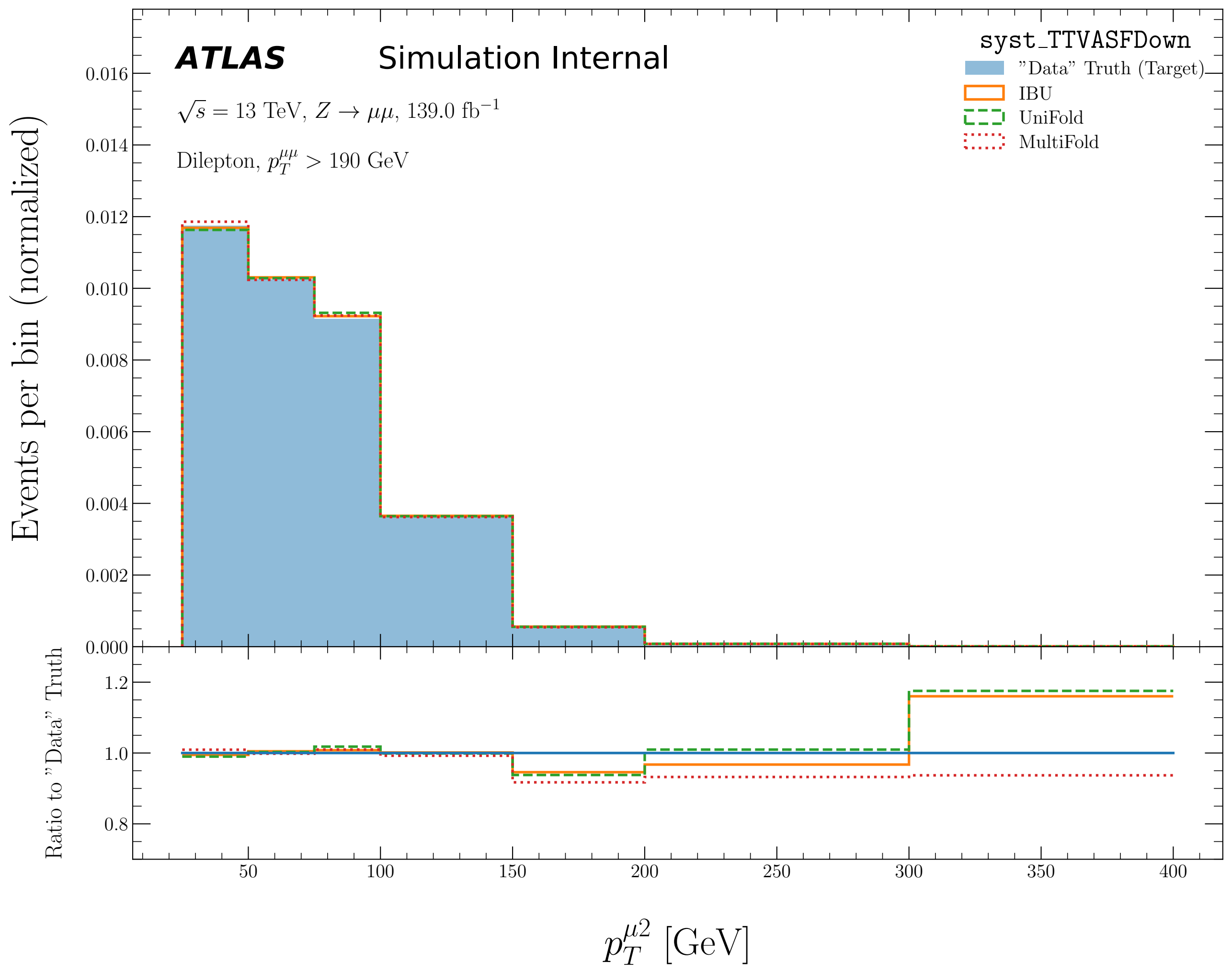


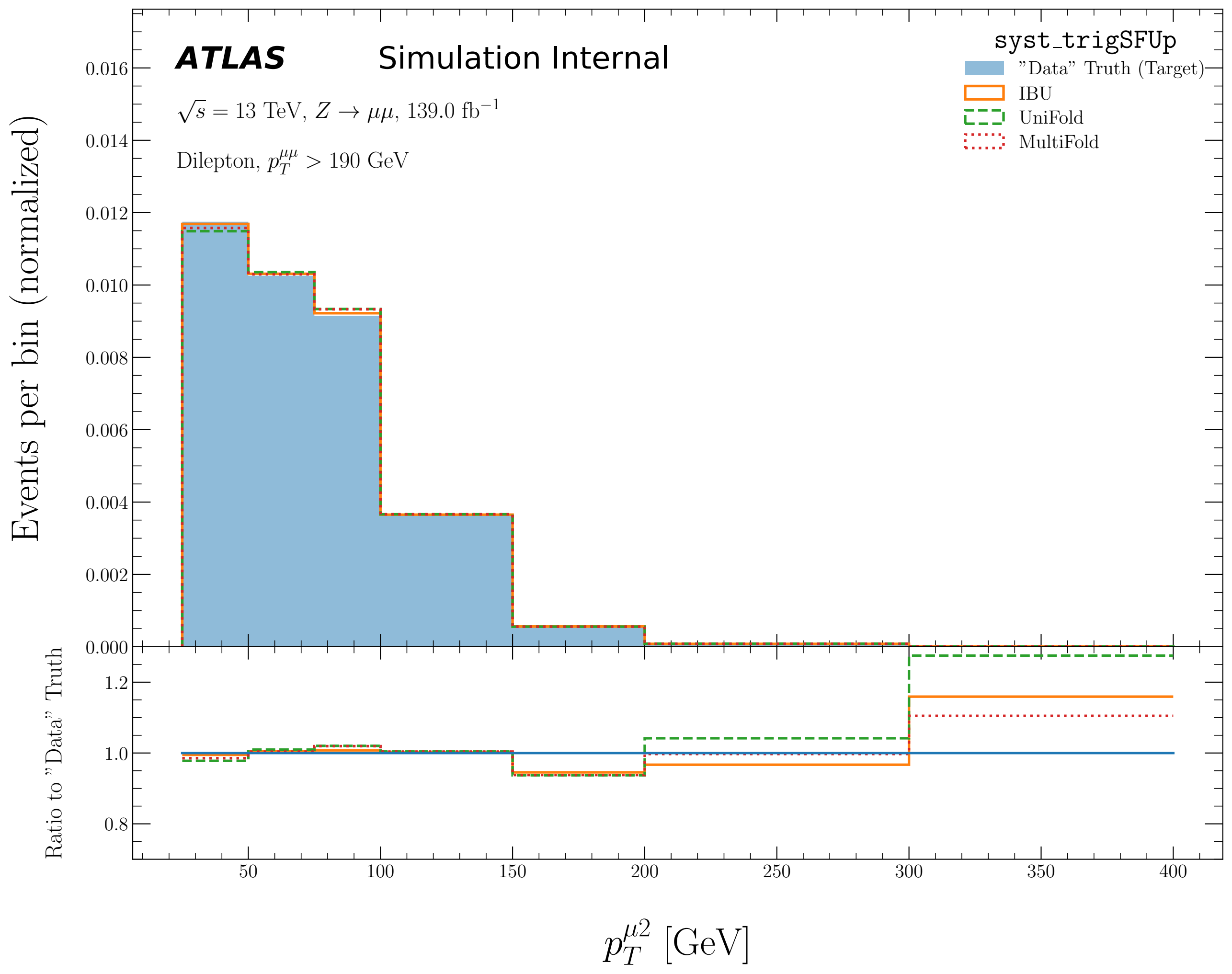


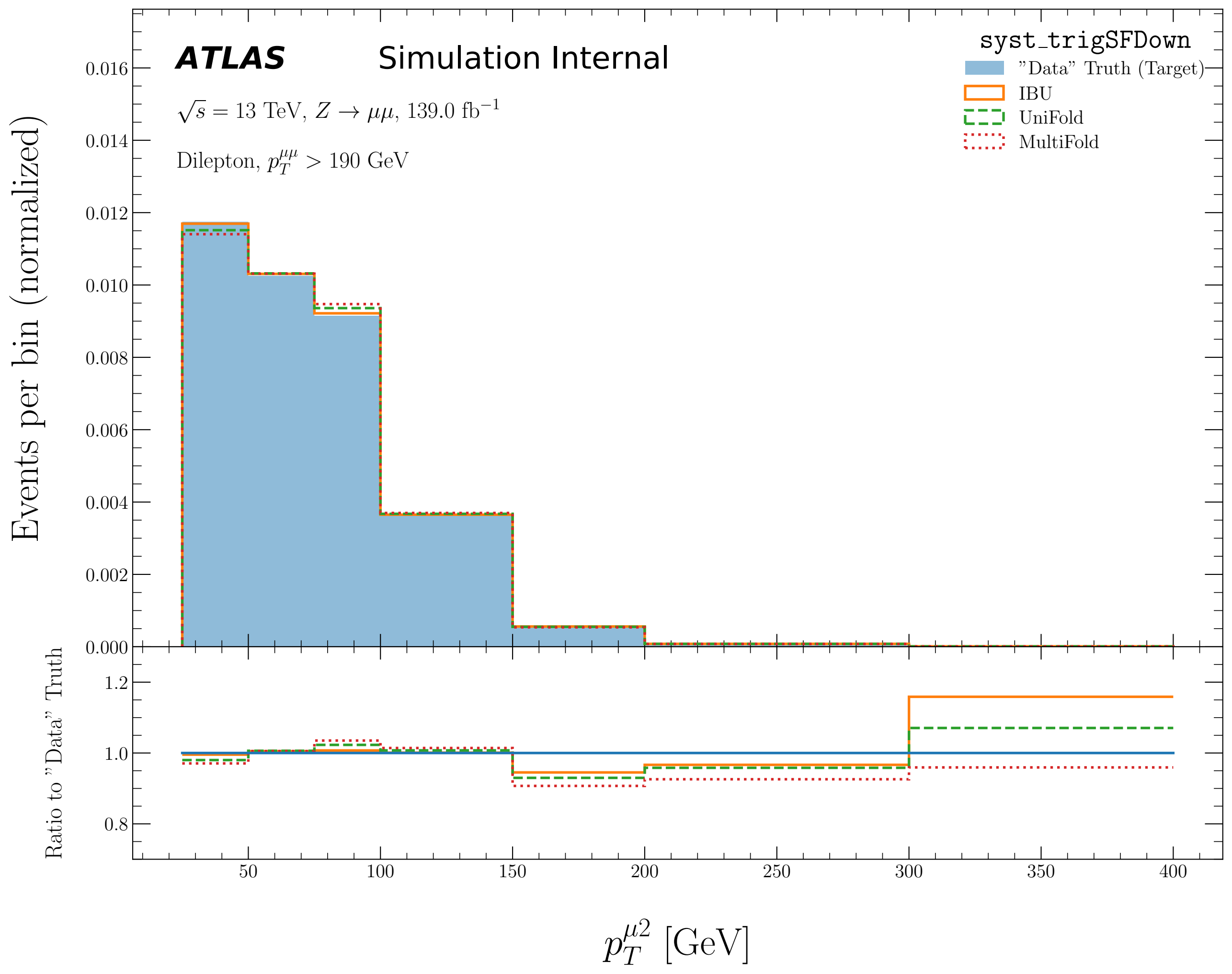




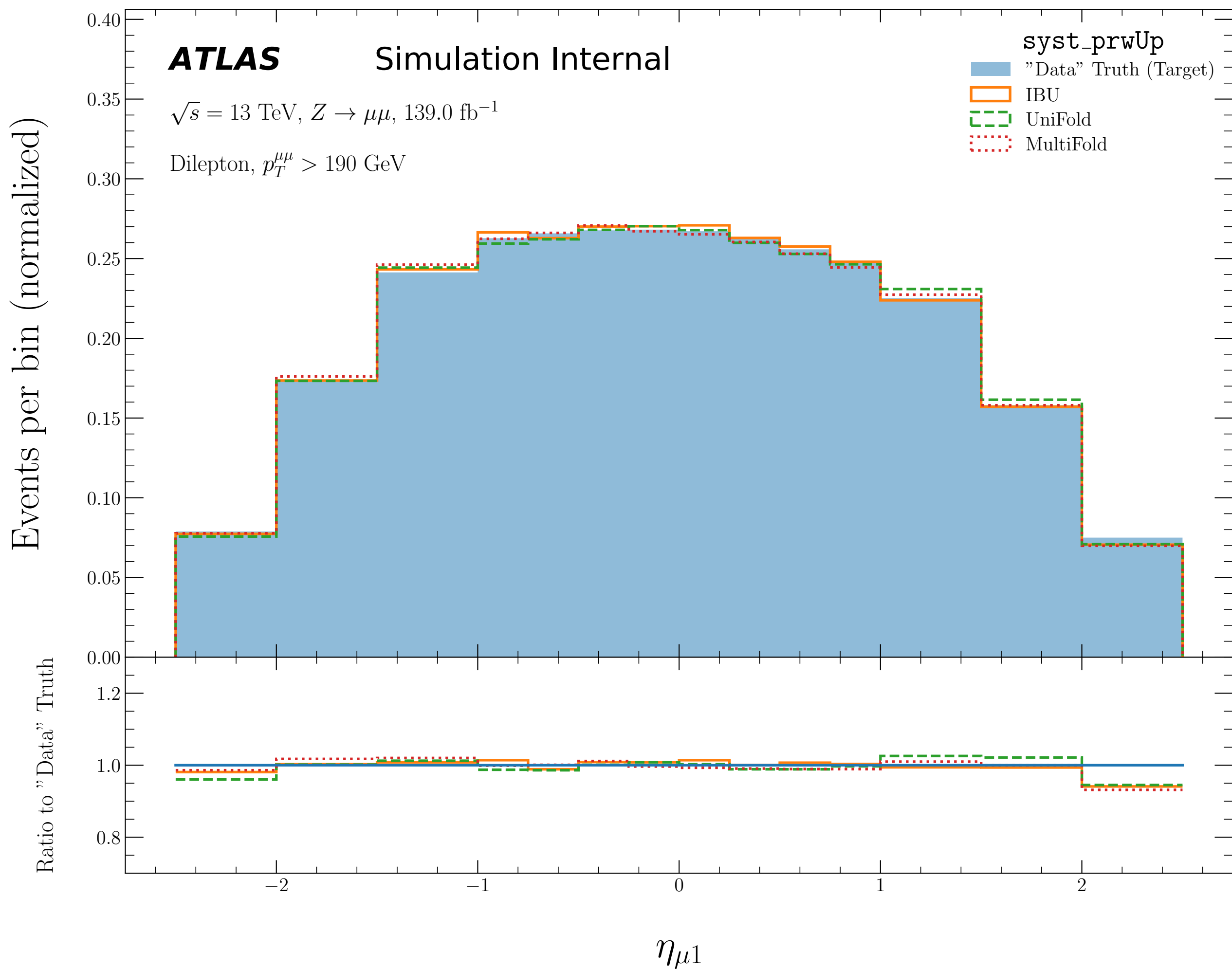


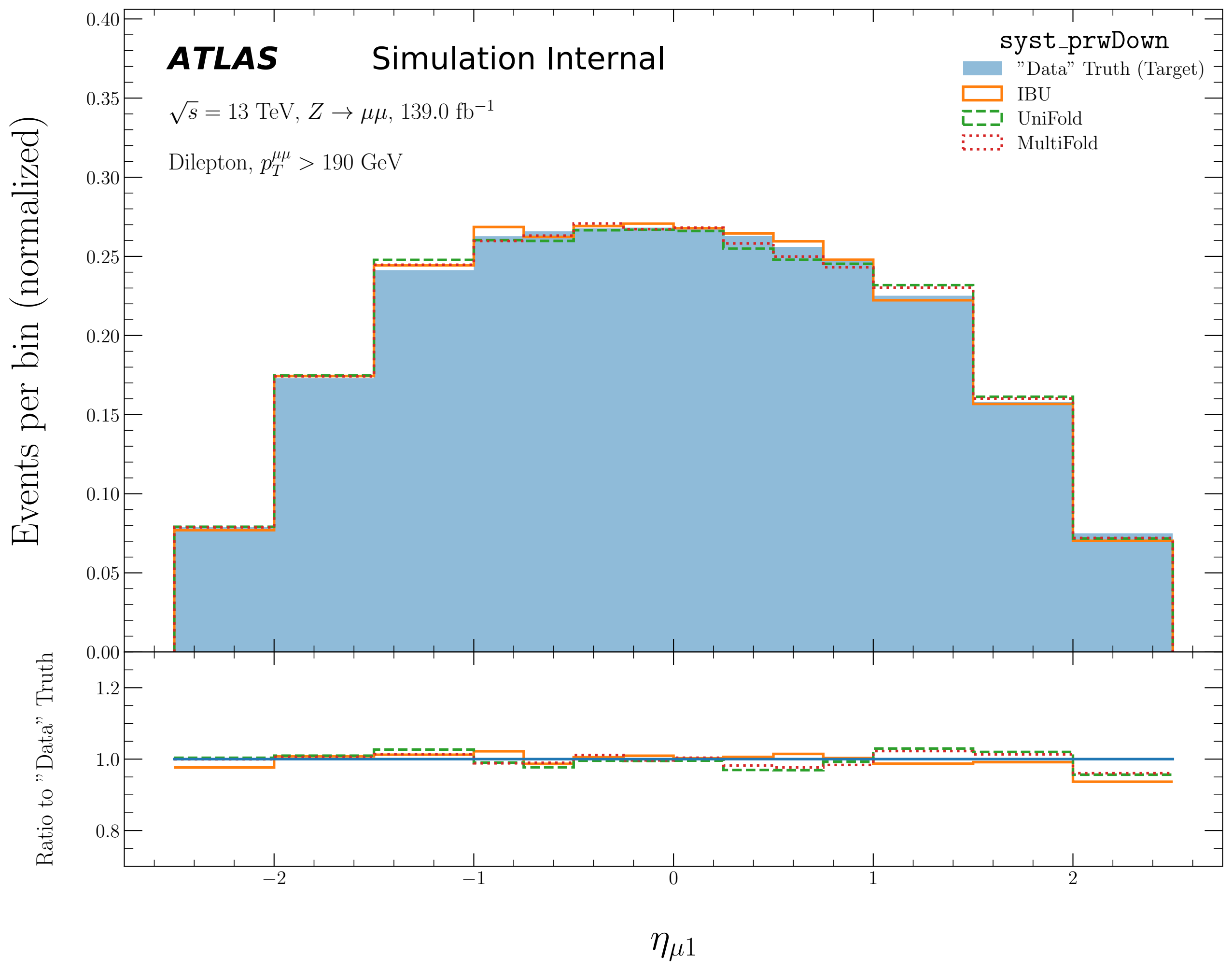


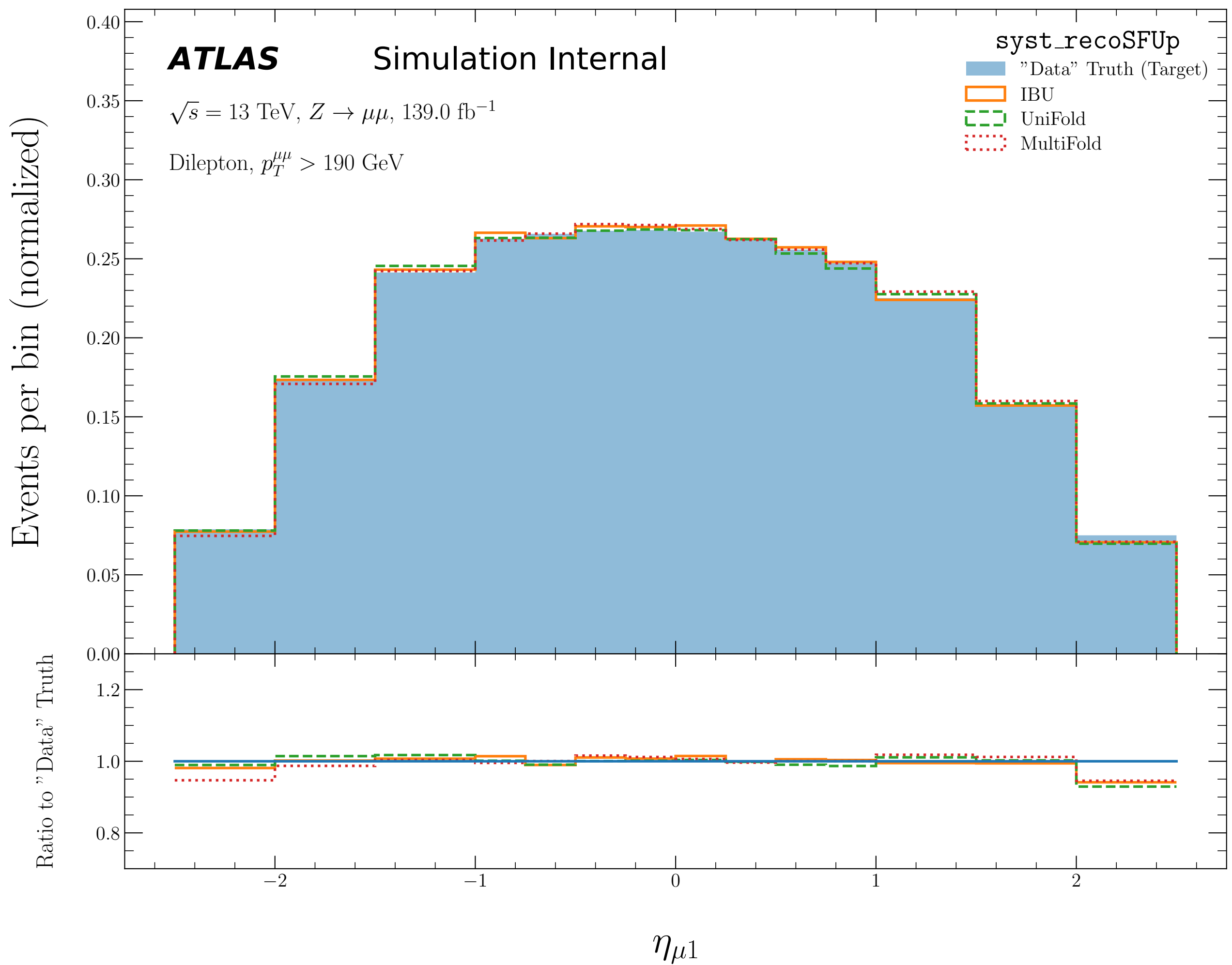


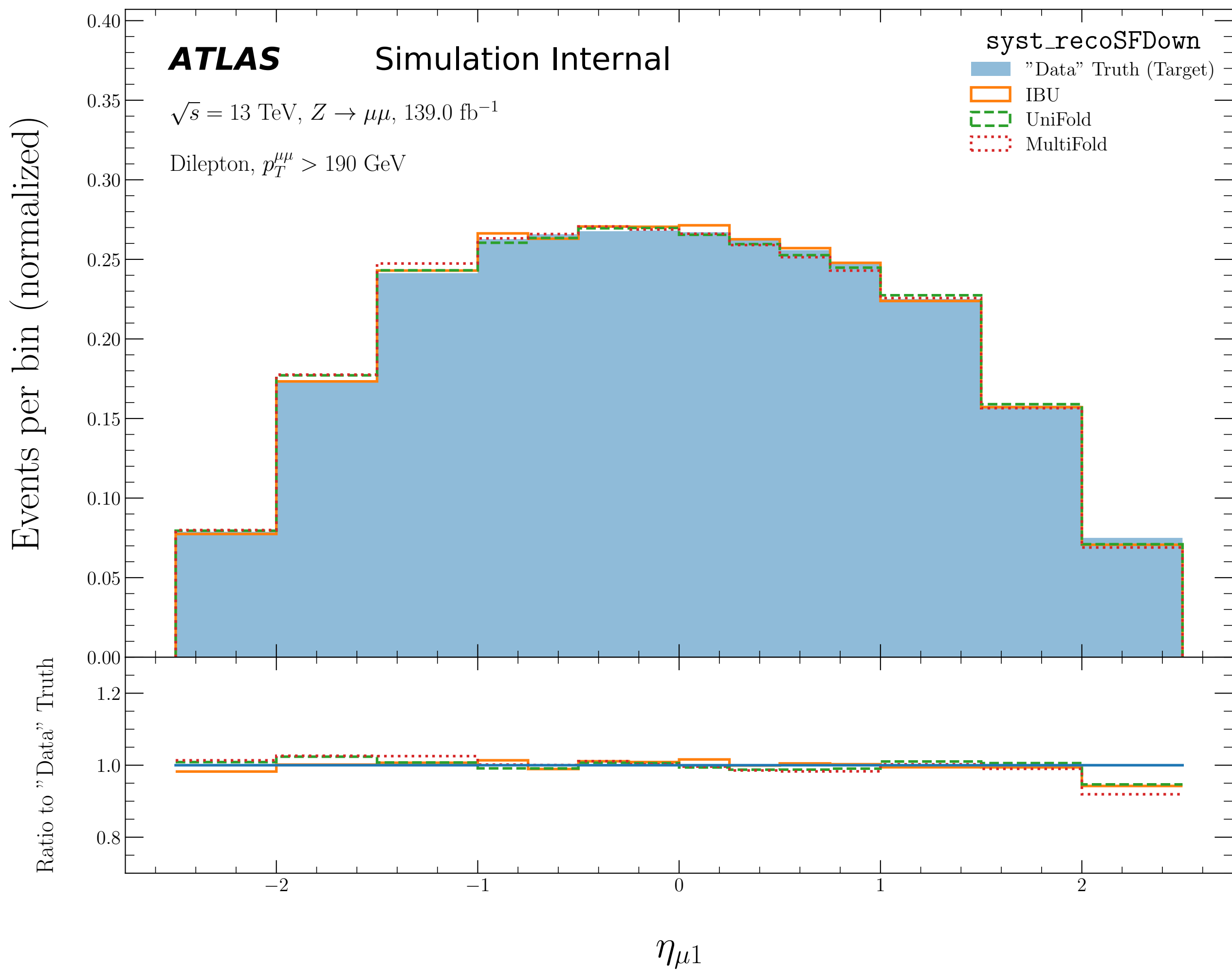


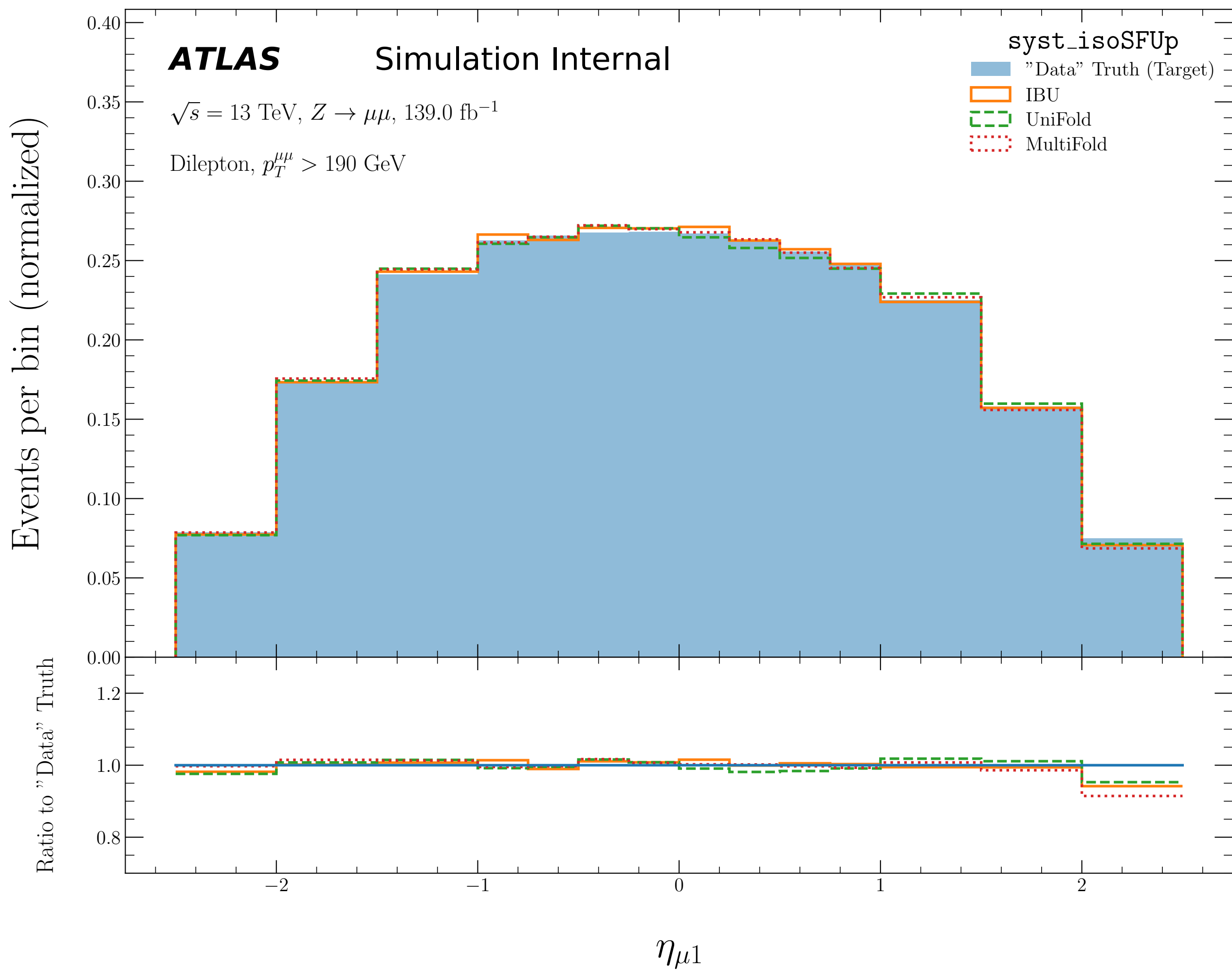


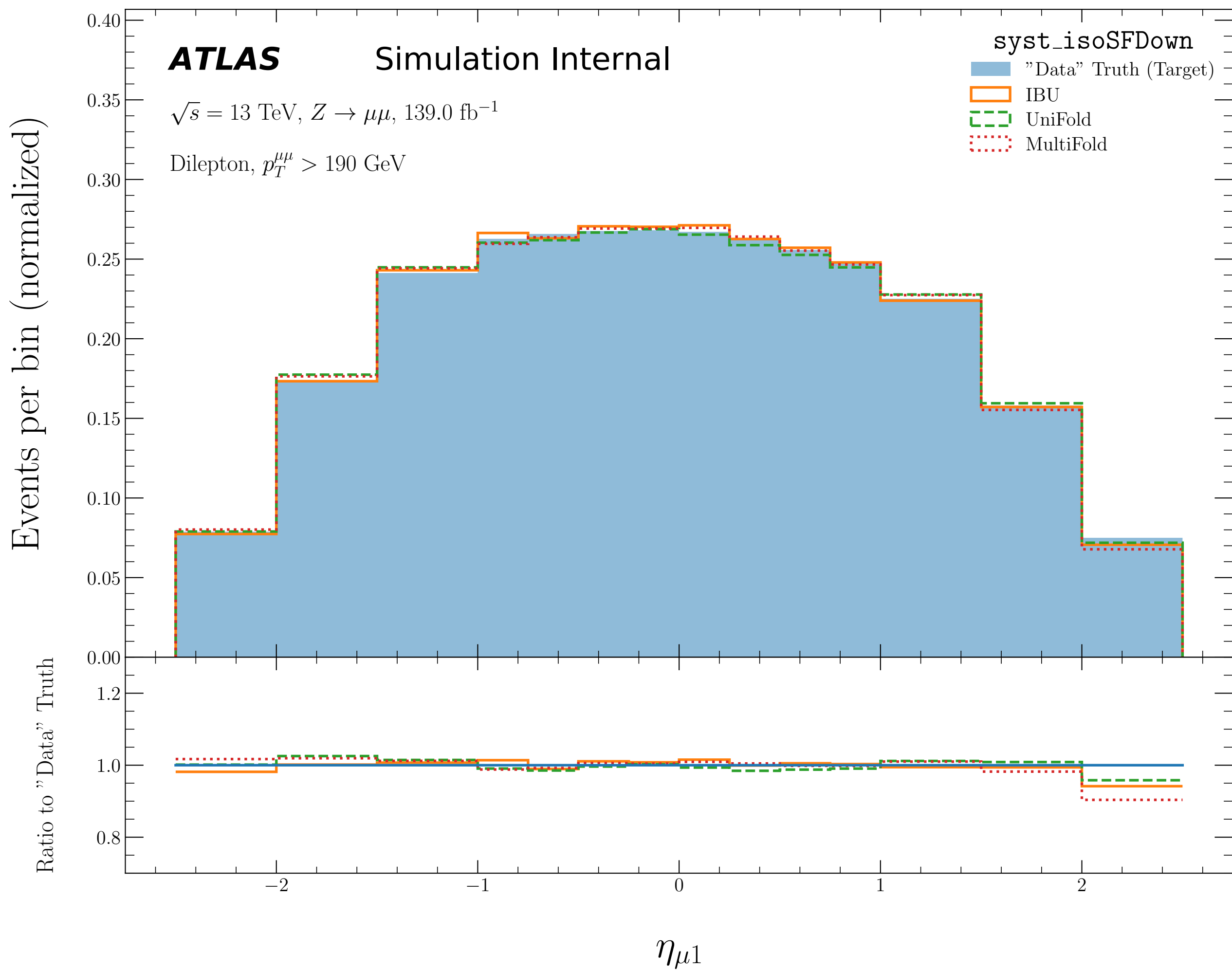


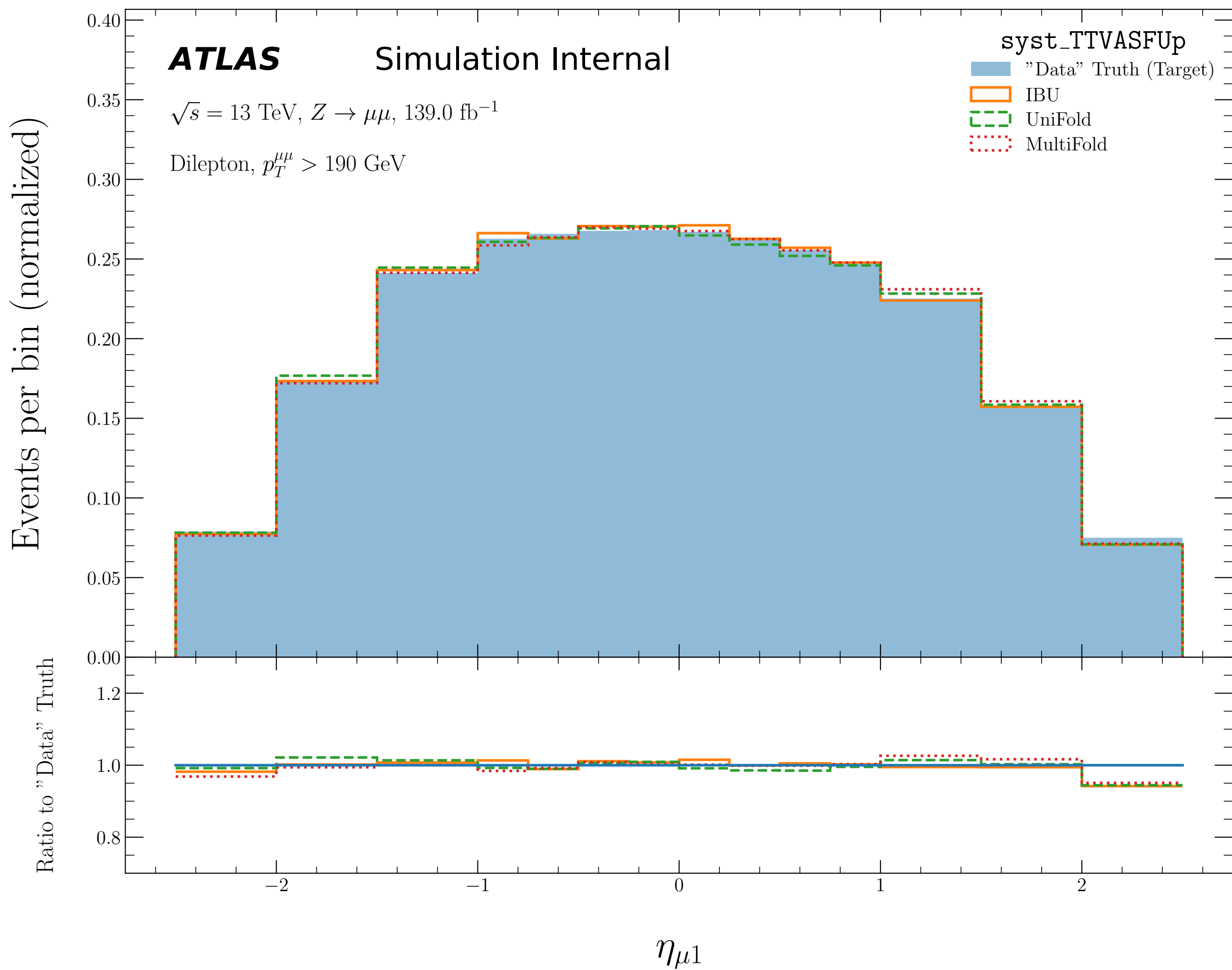


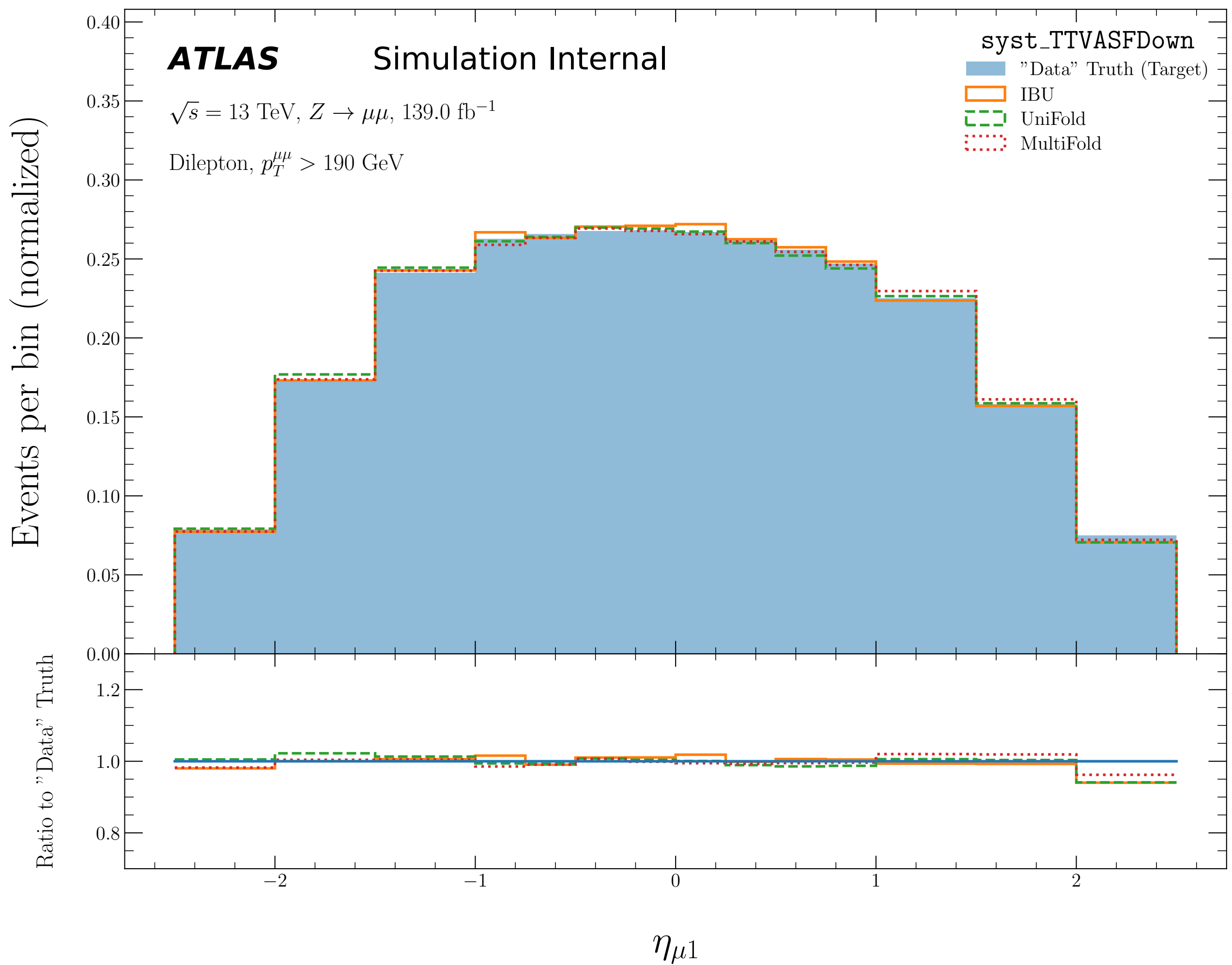




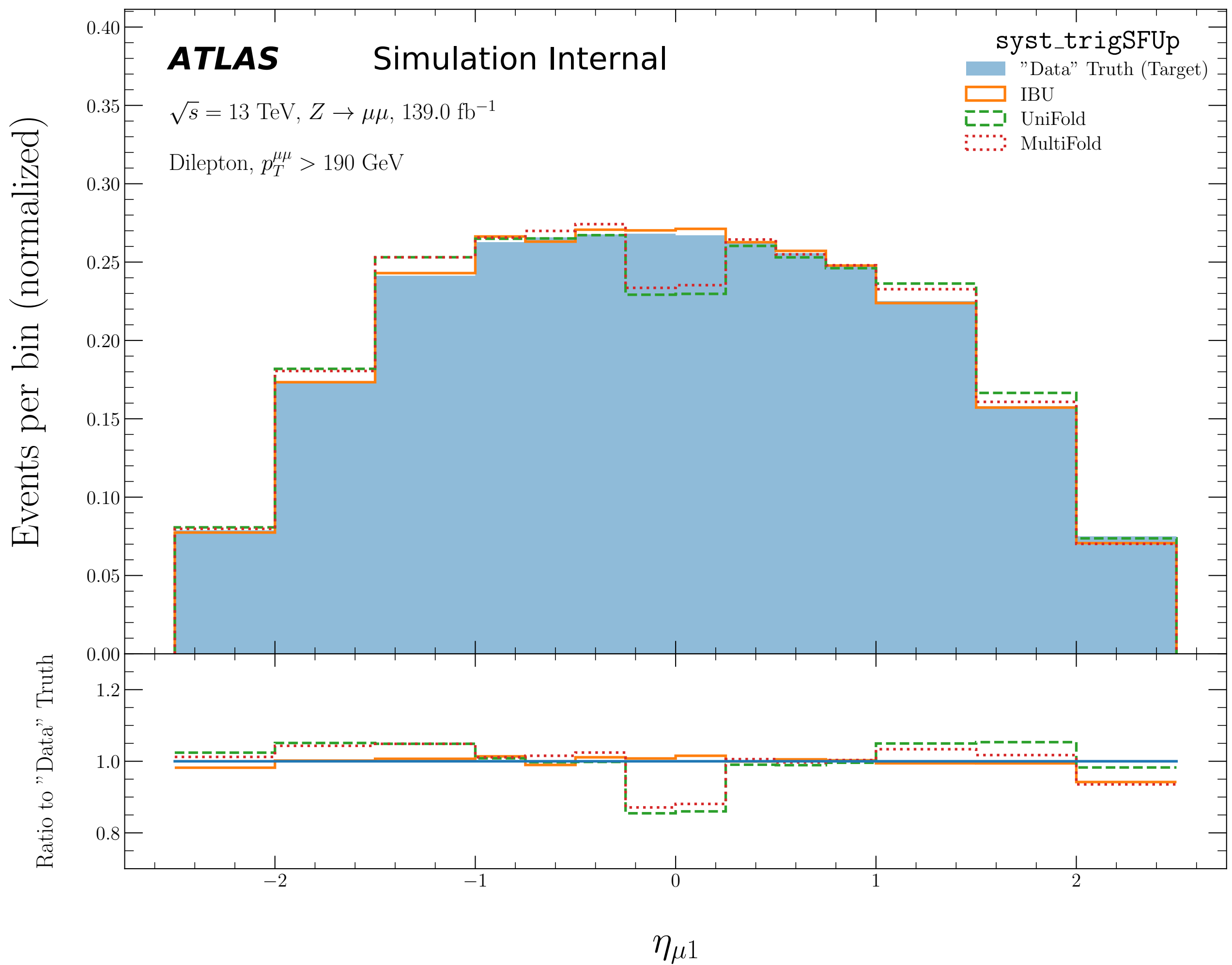


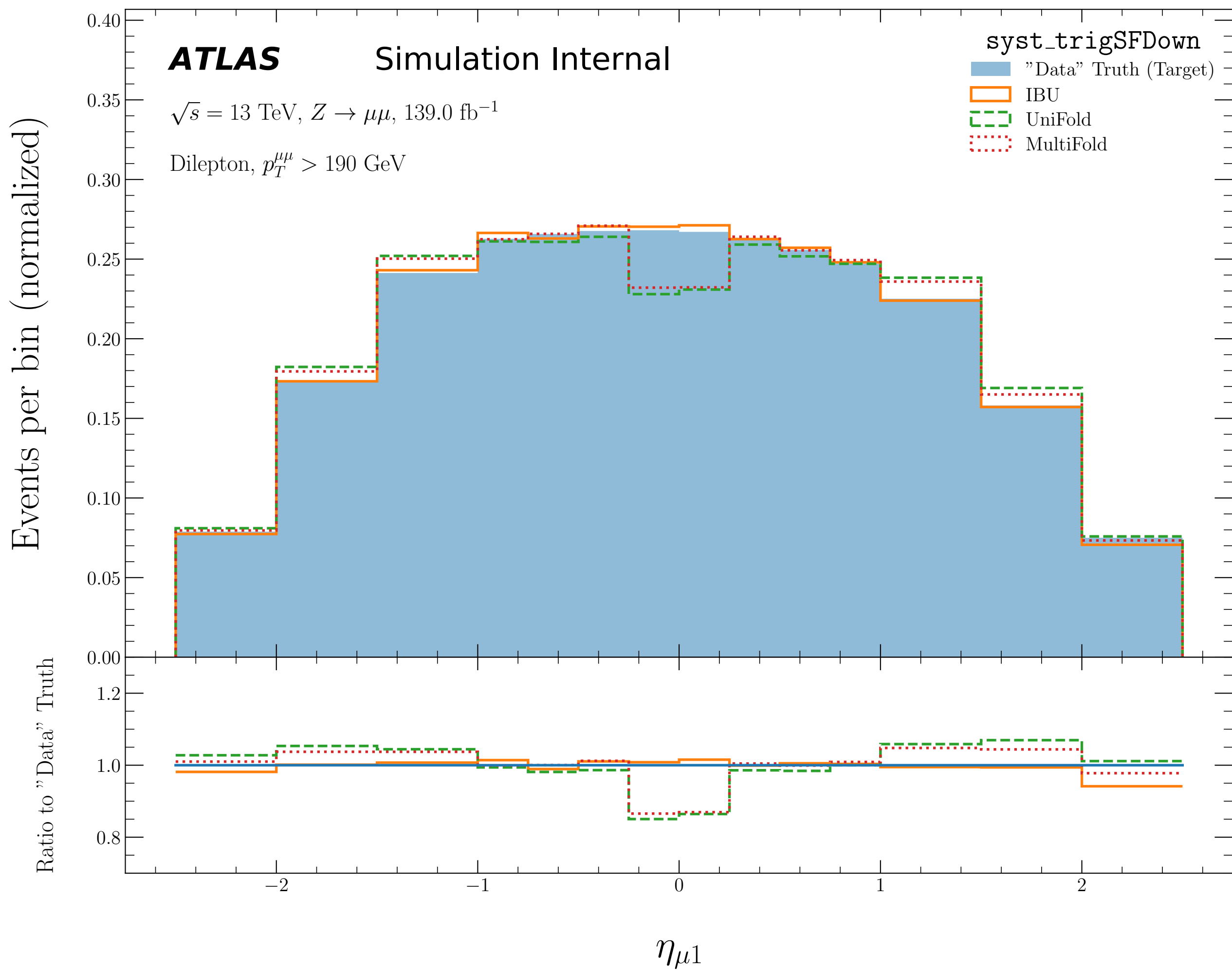


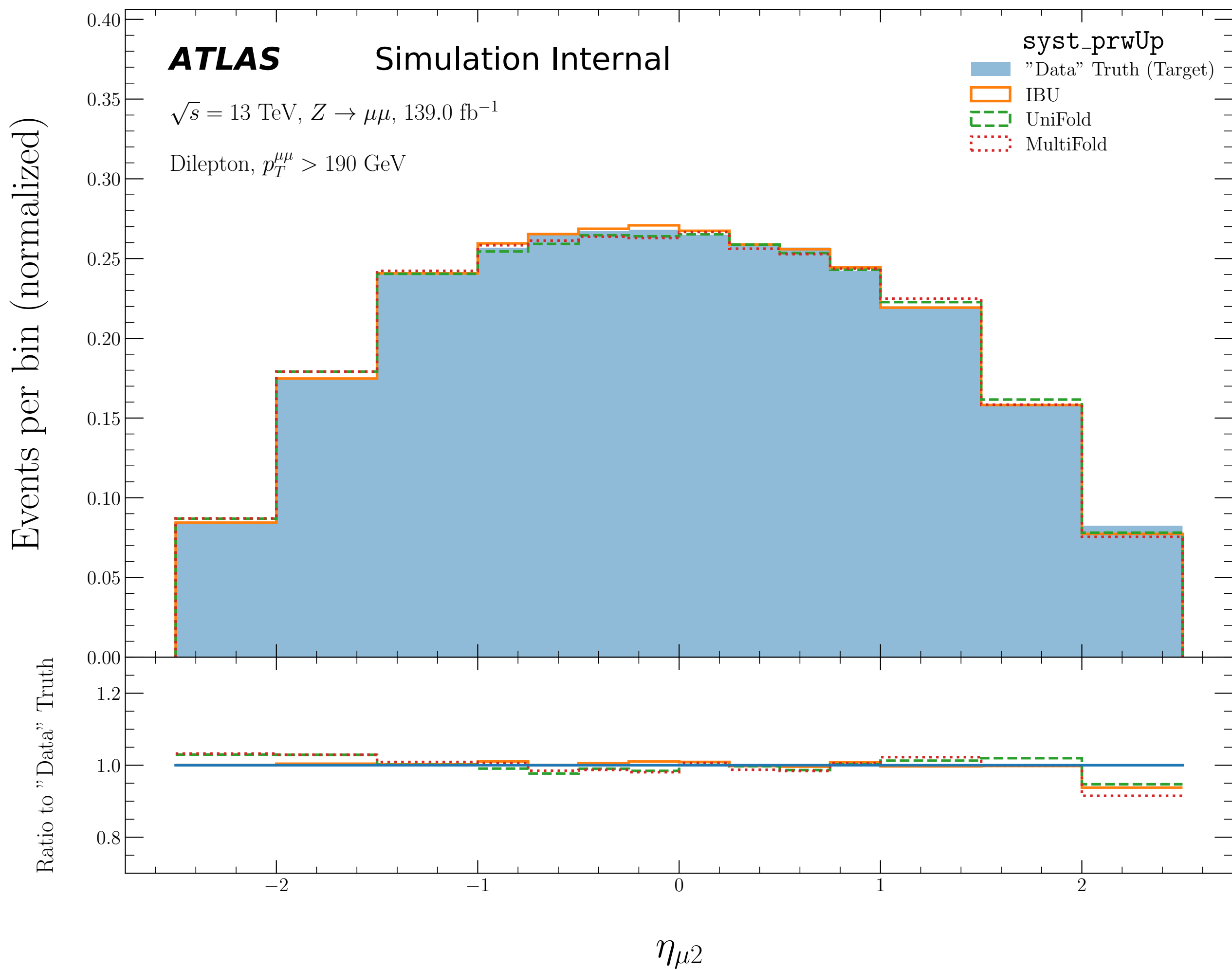


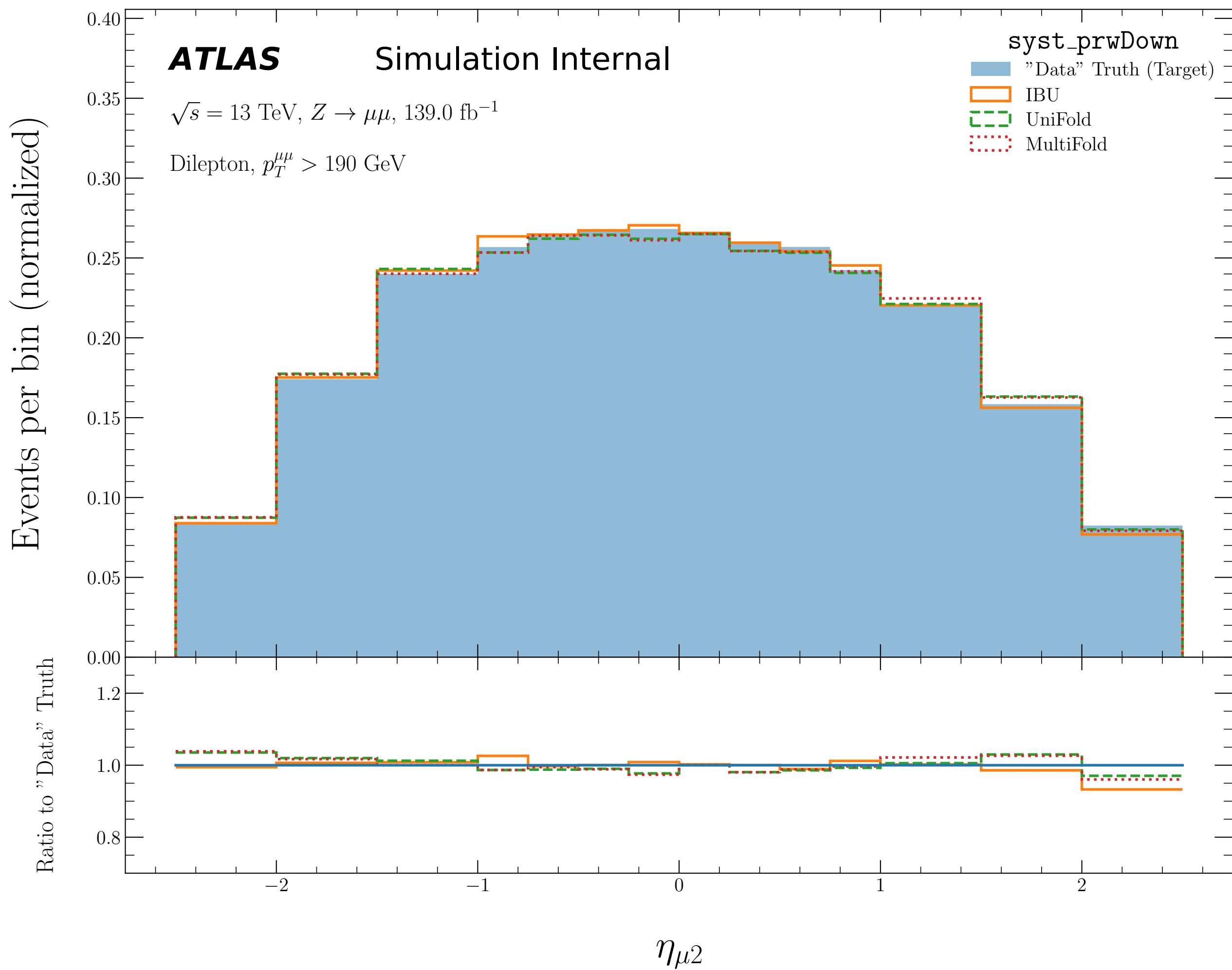


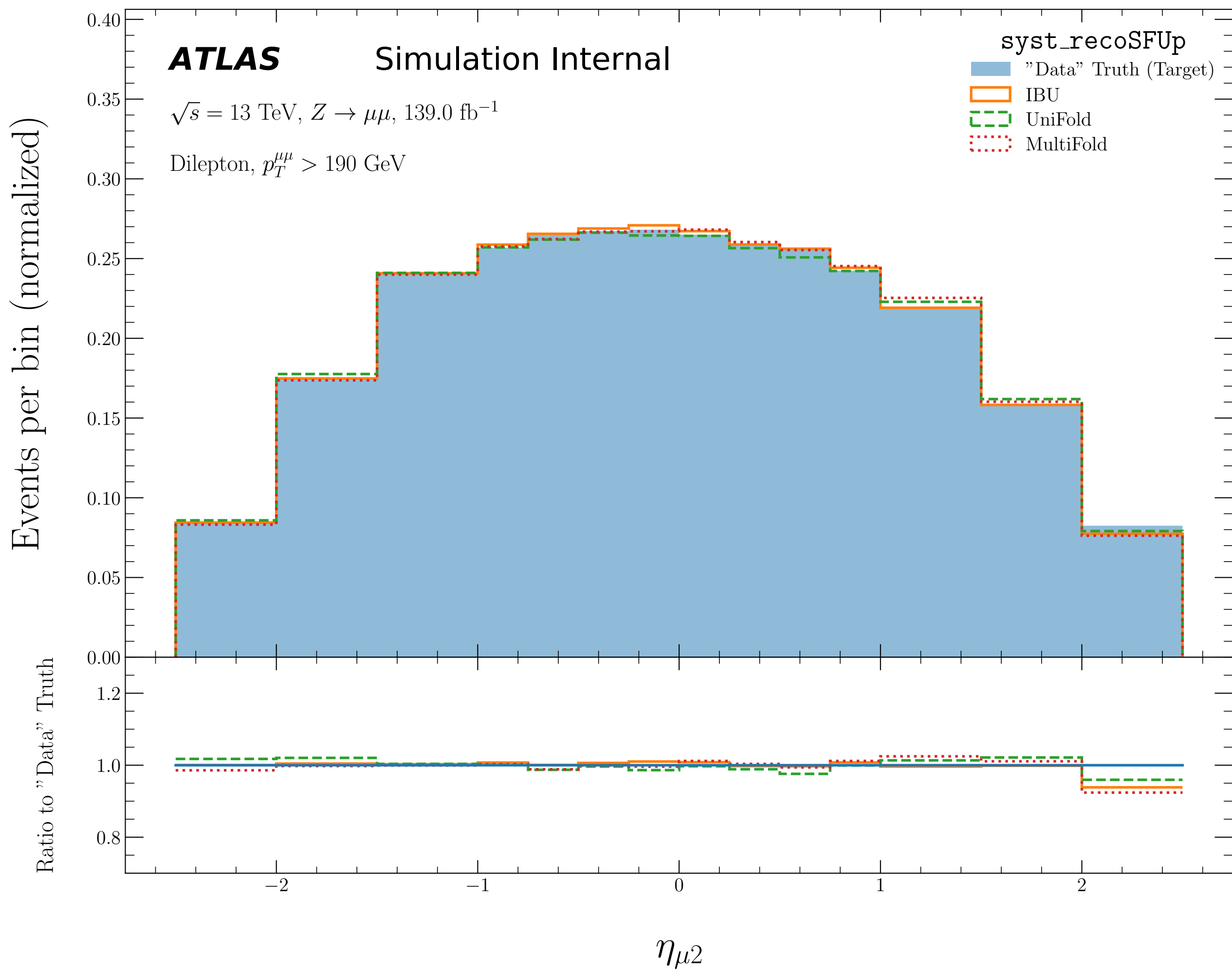


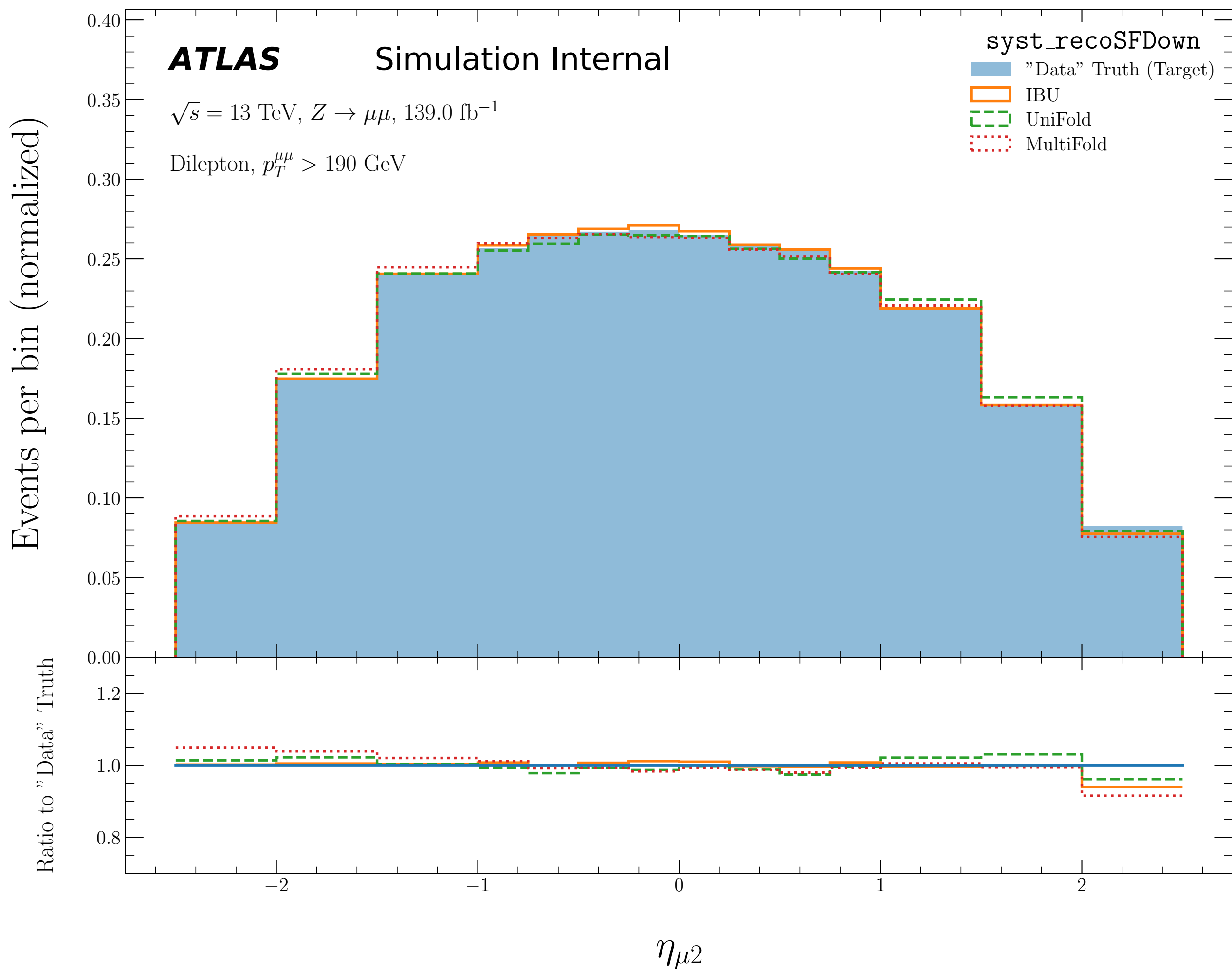


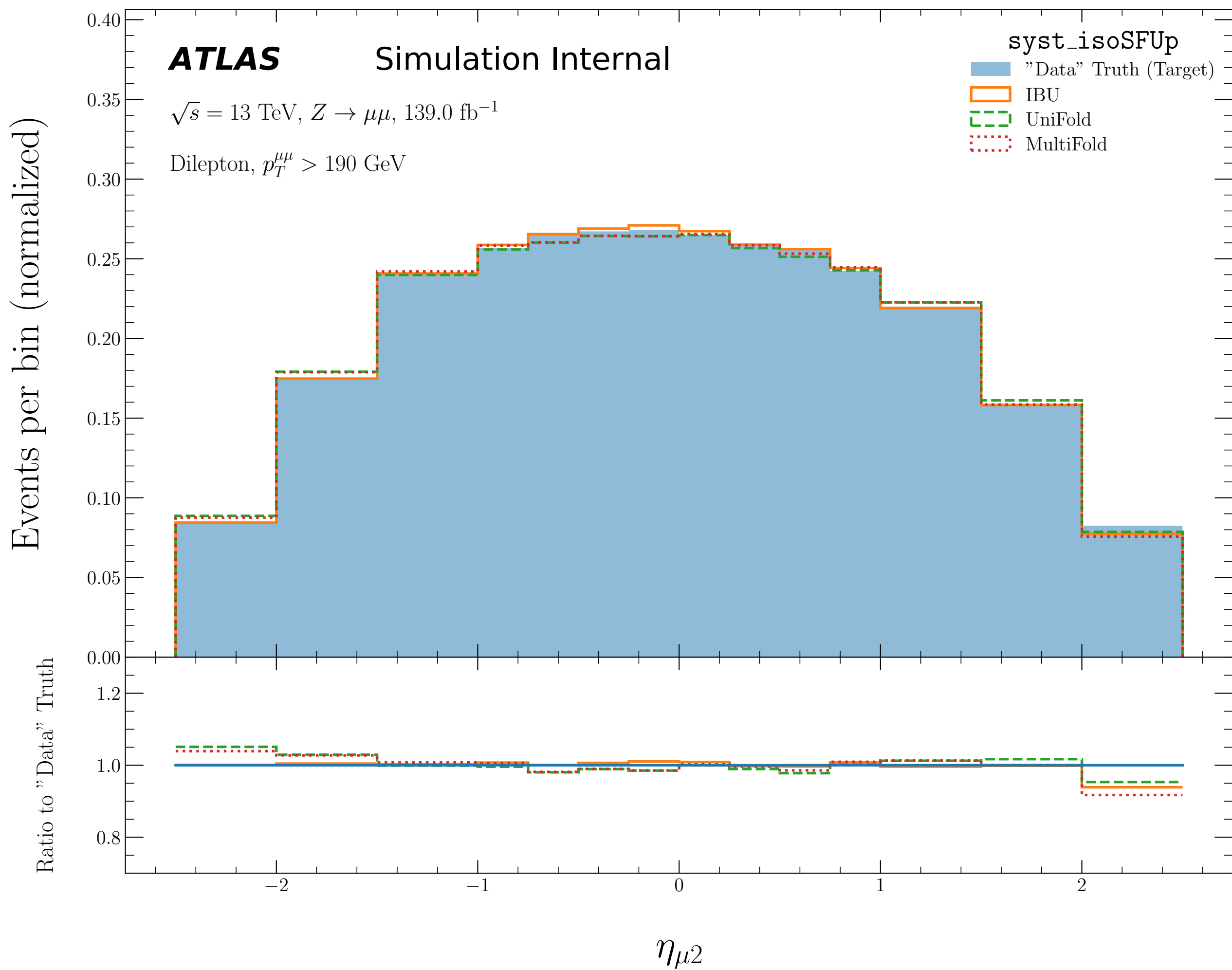


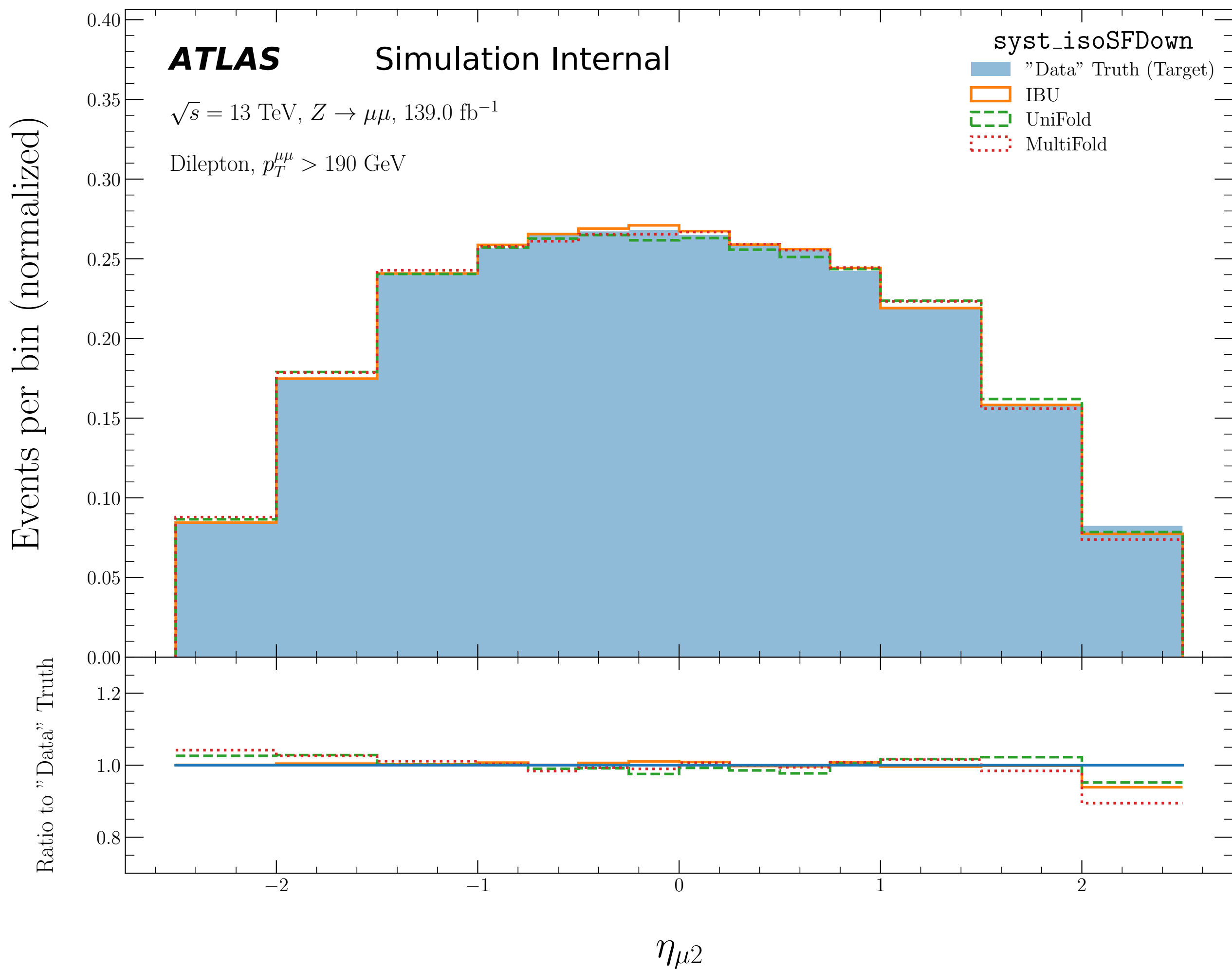




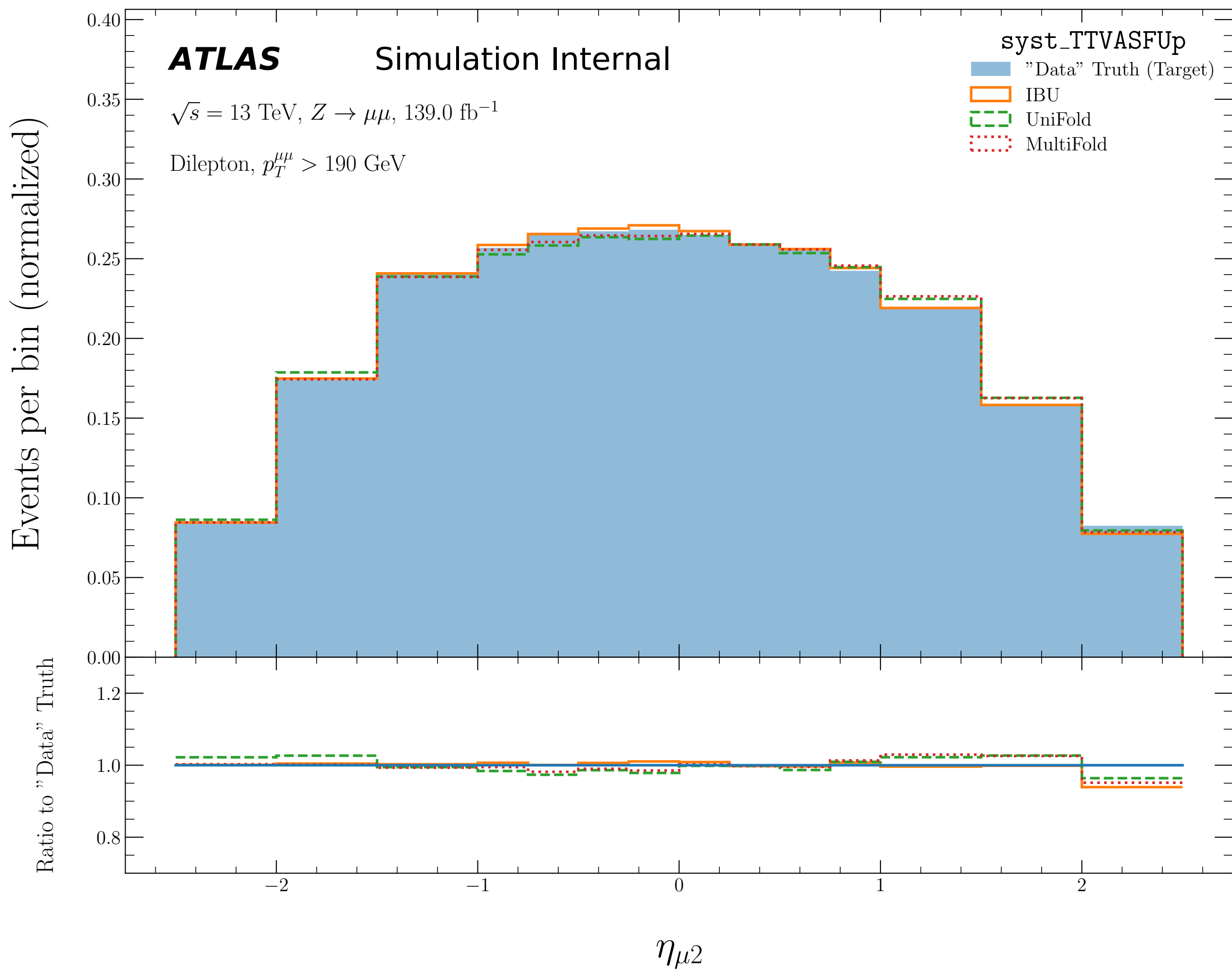


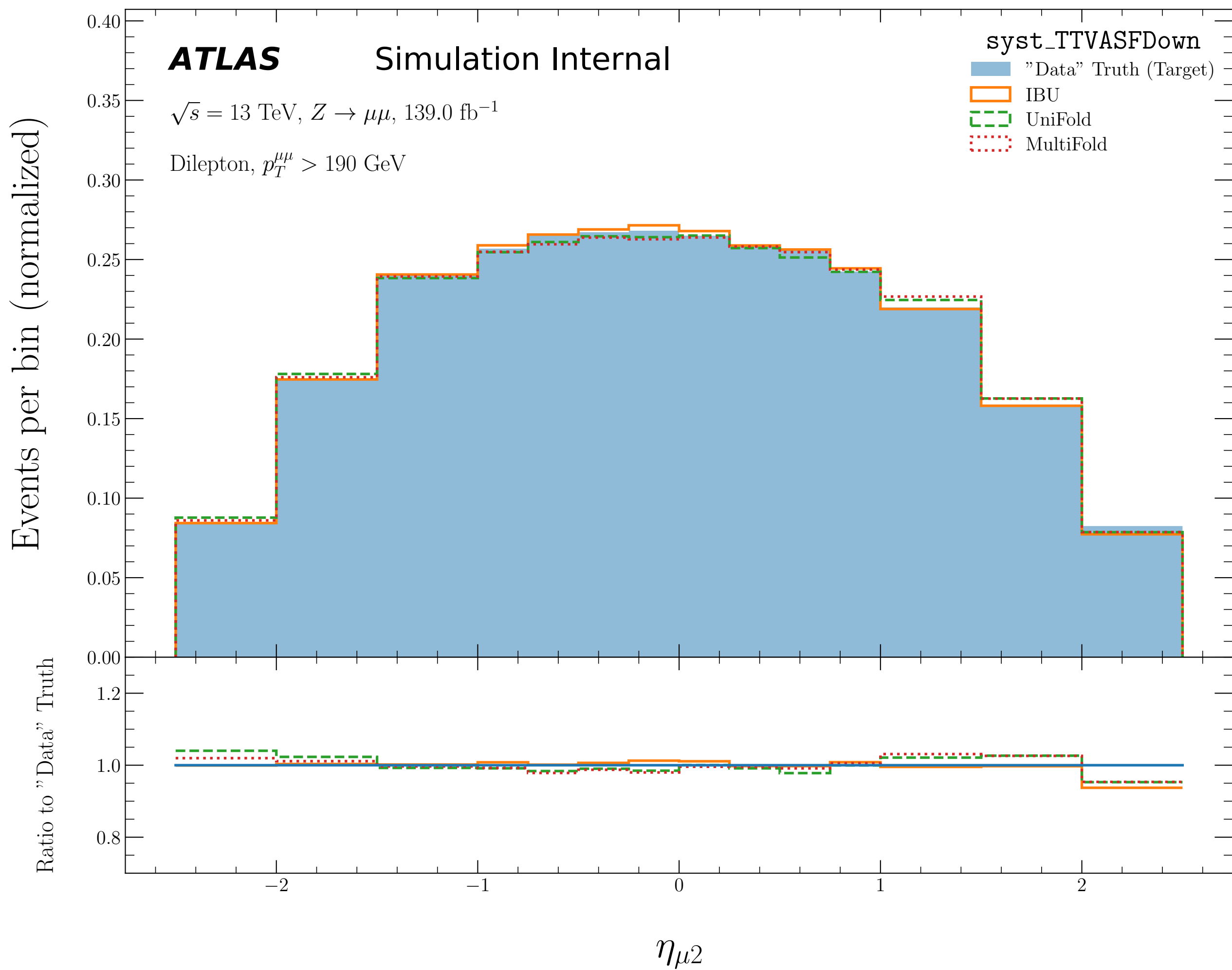


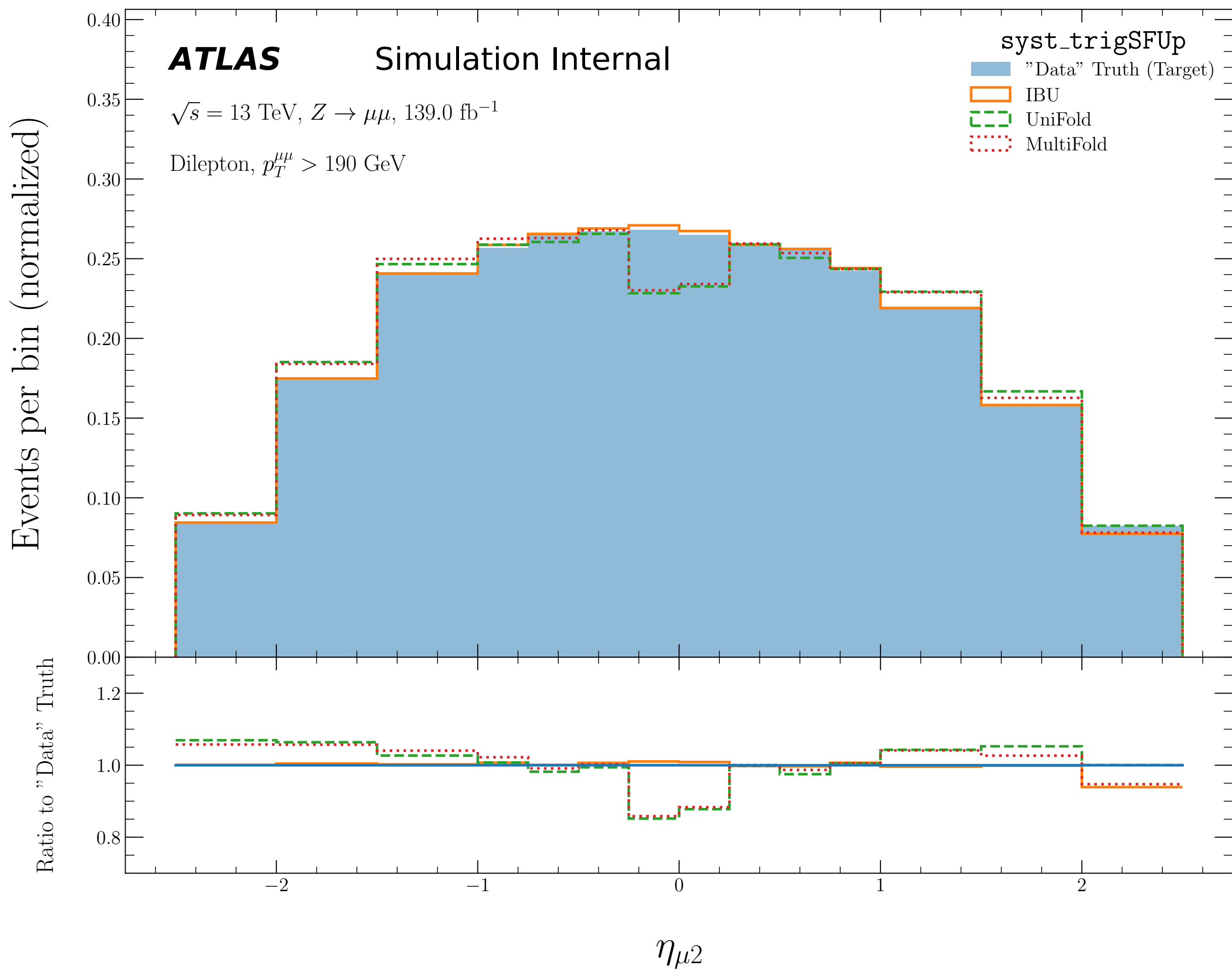


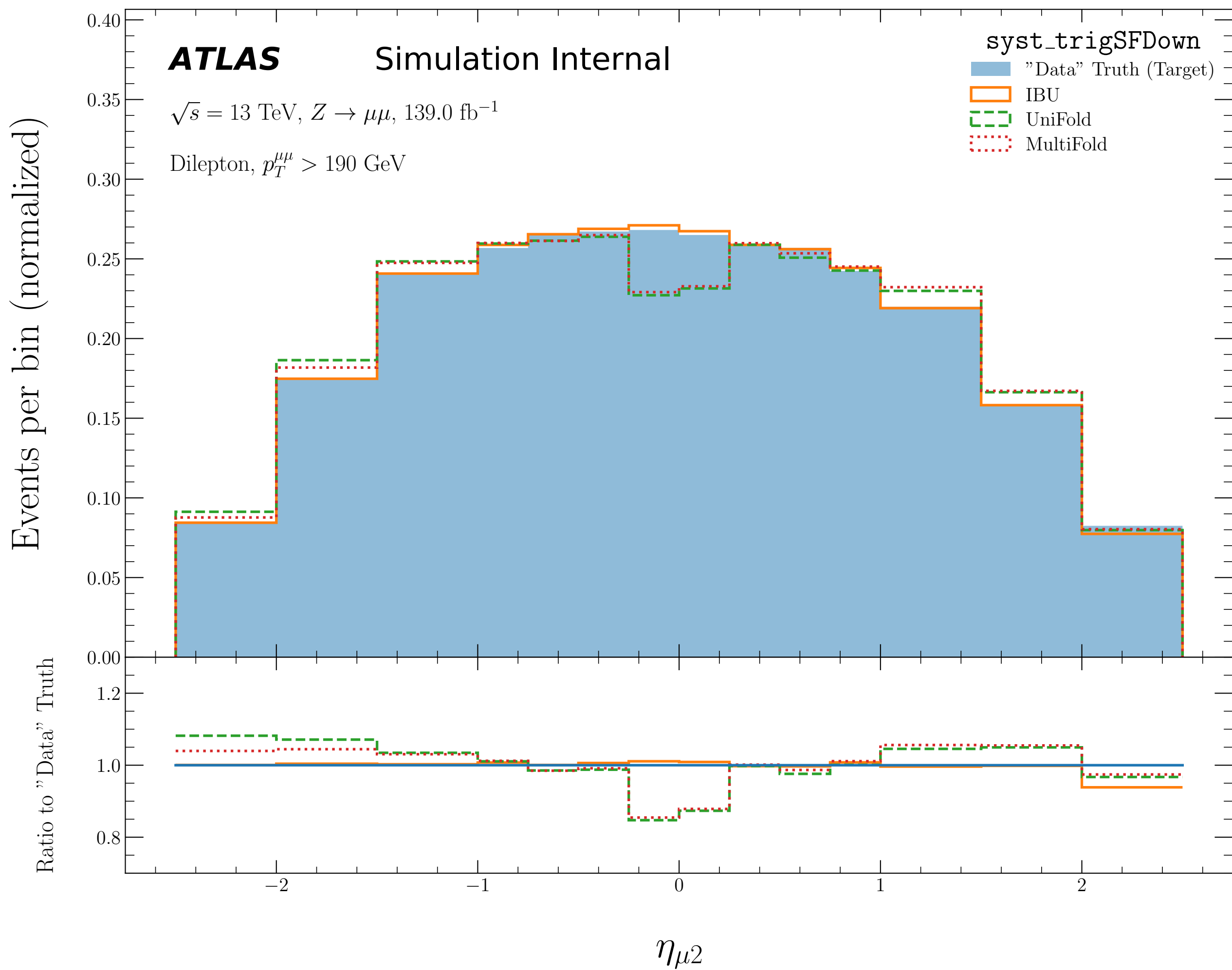












Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_prwUp

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

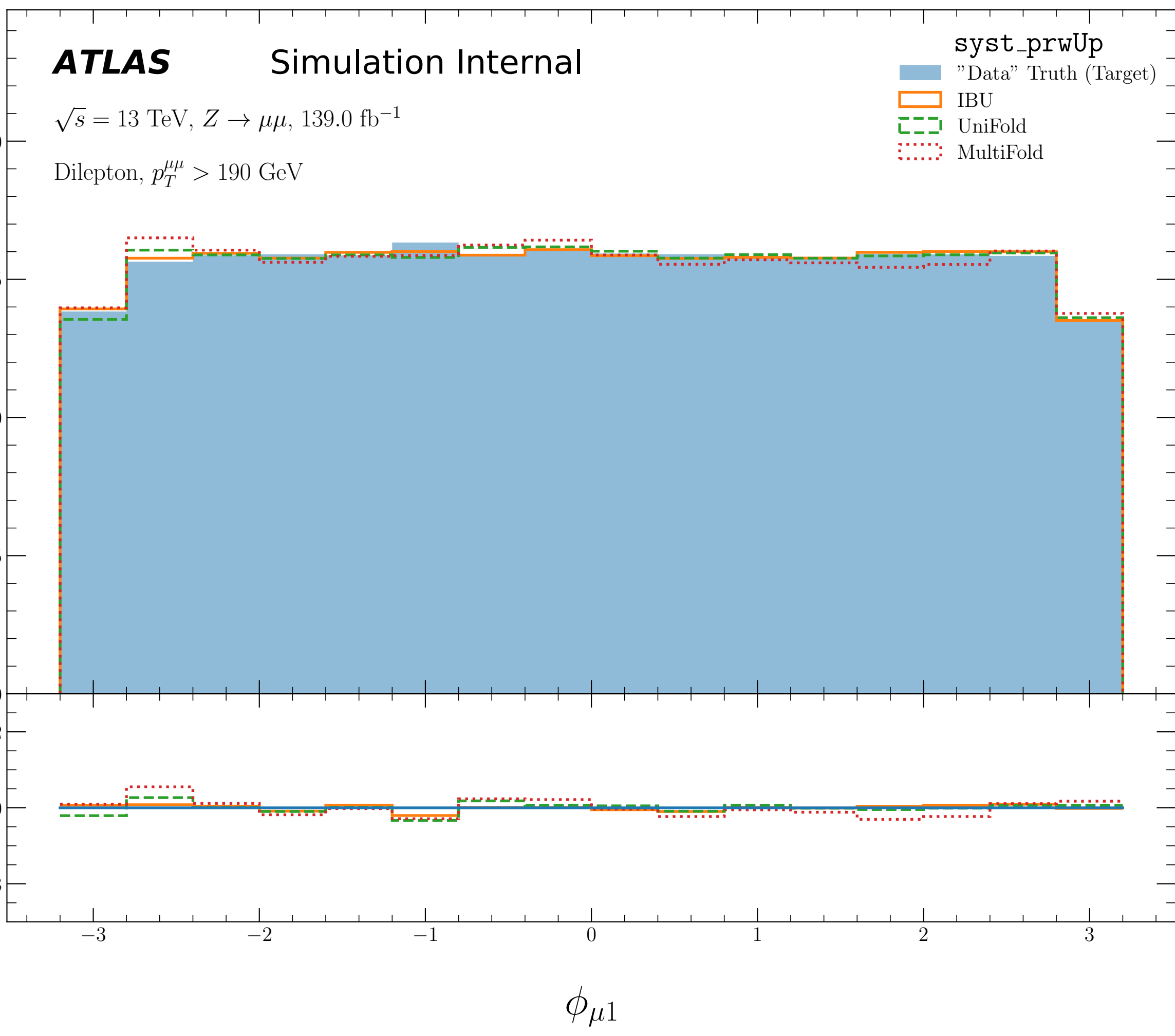
0

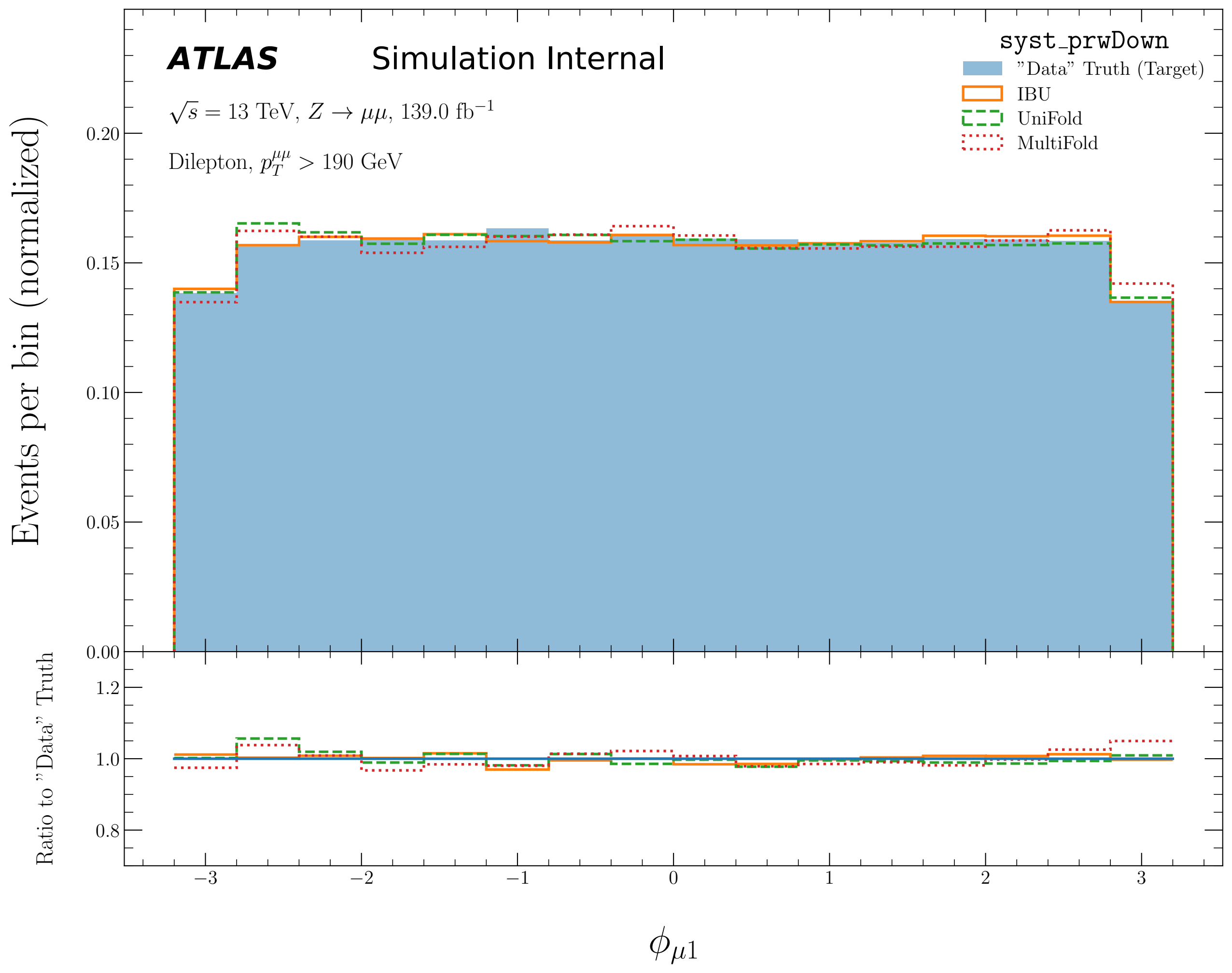
1

2

3

$\phi_{\mu 1}$





Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_recoSFUp

- "Data" Truth (Target)
- IBU
- UniFold
- MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

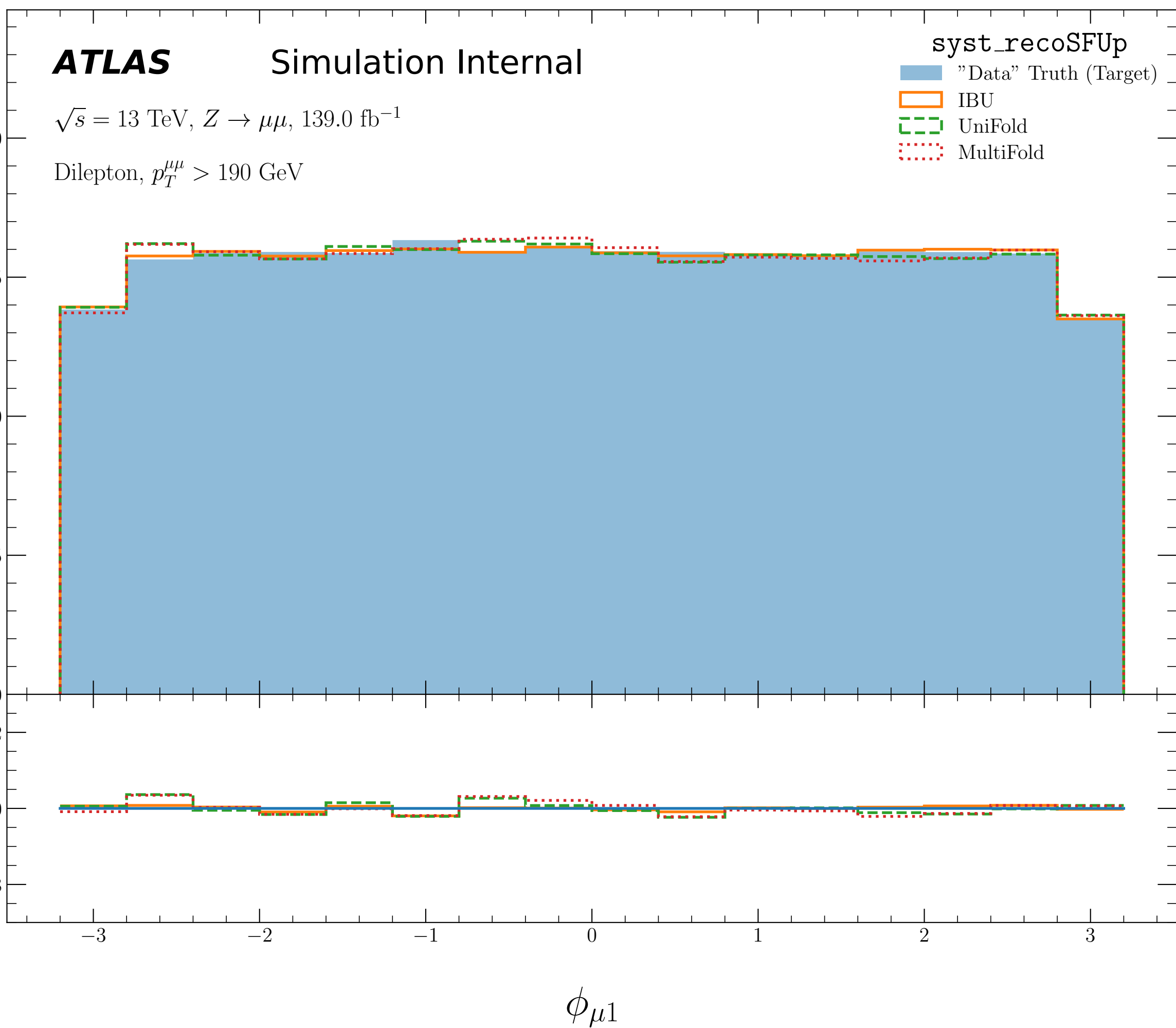
0

1

2

3

$\phi_{\mu 1}$



Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_recoSFDown

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

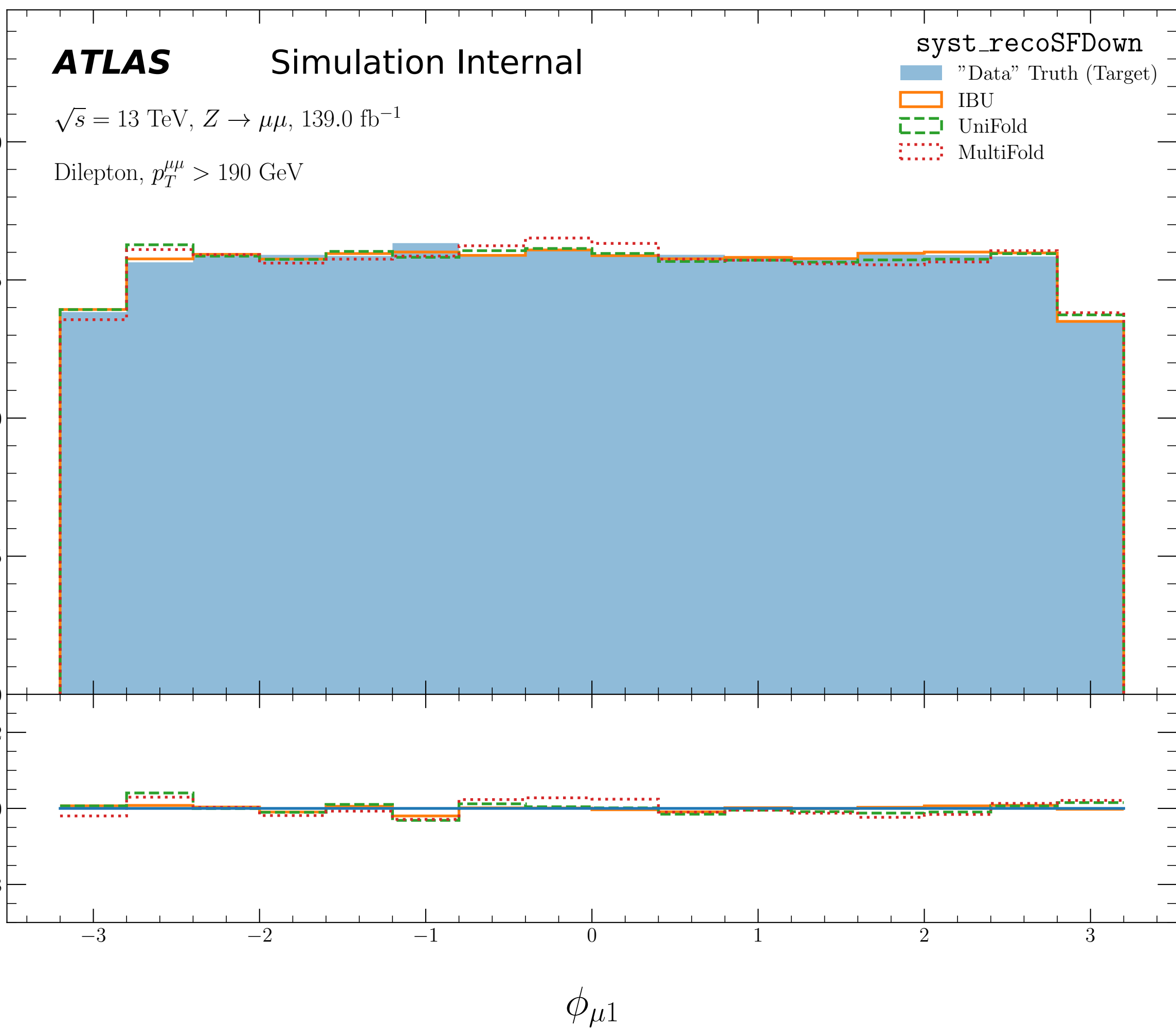
0

1

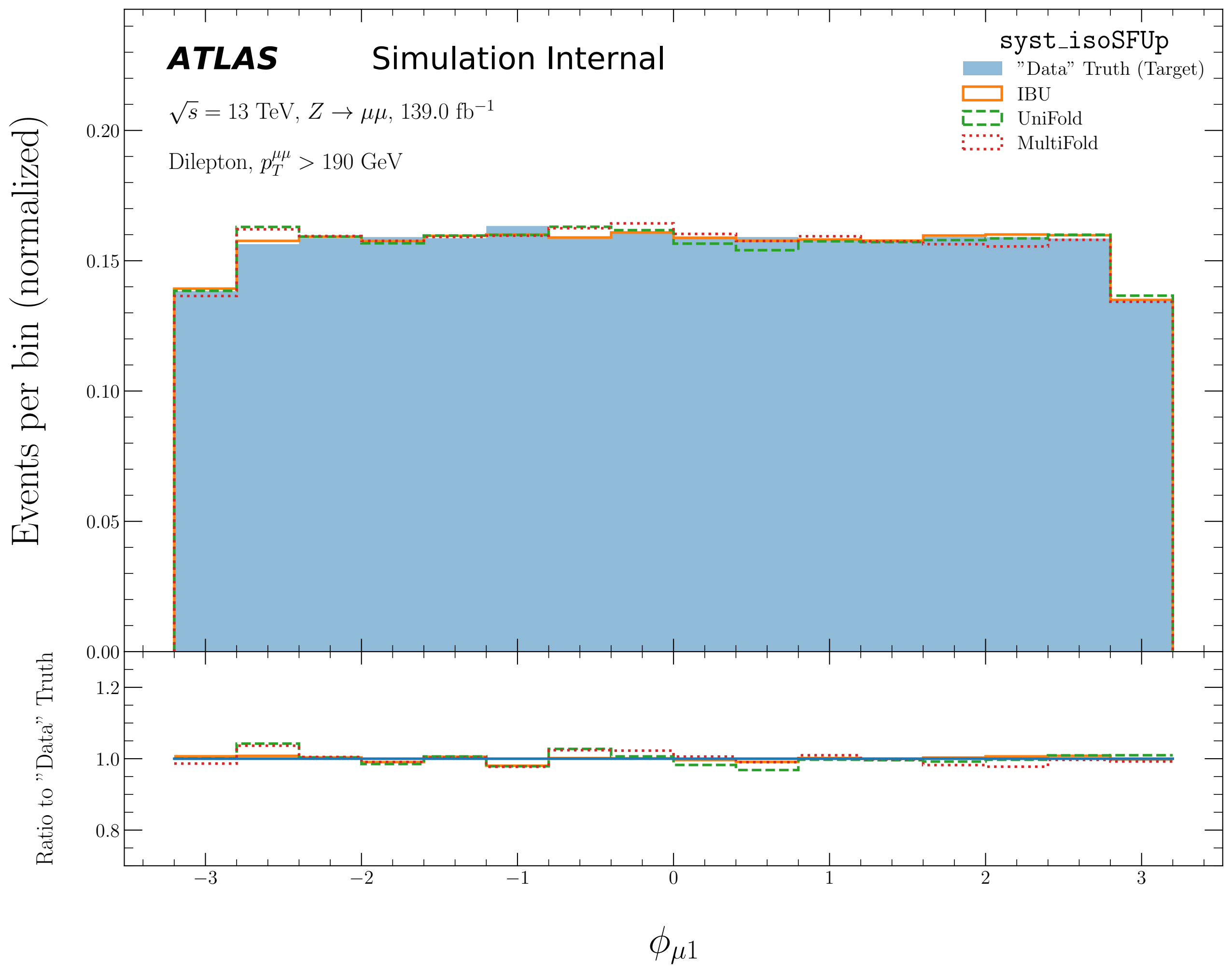
2

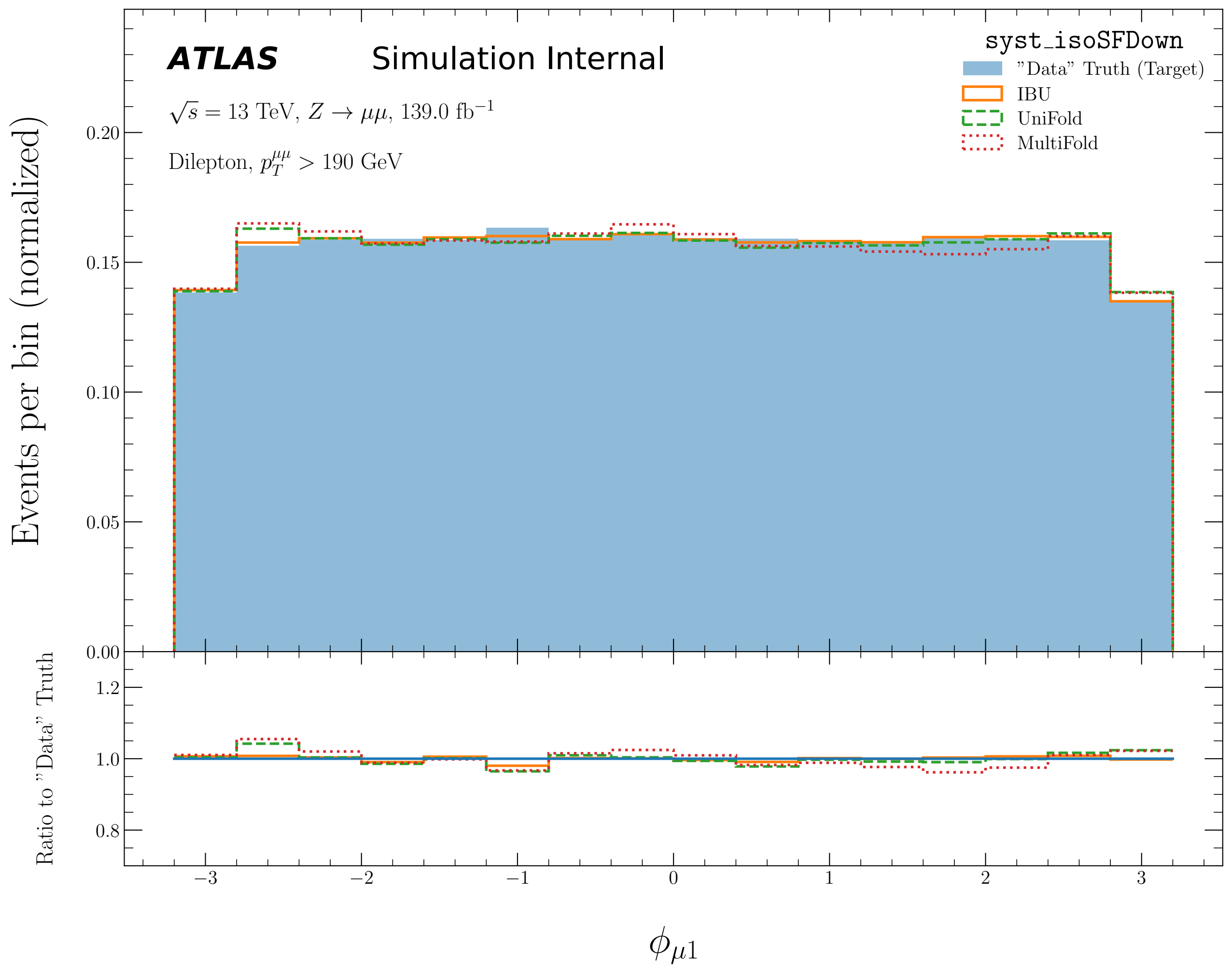
3

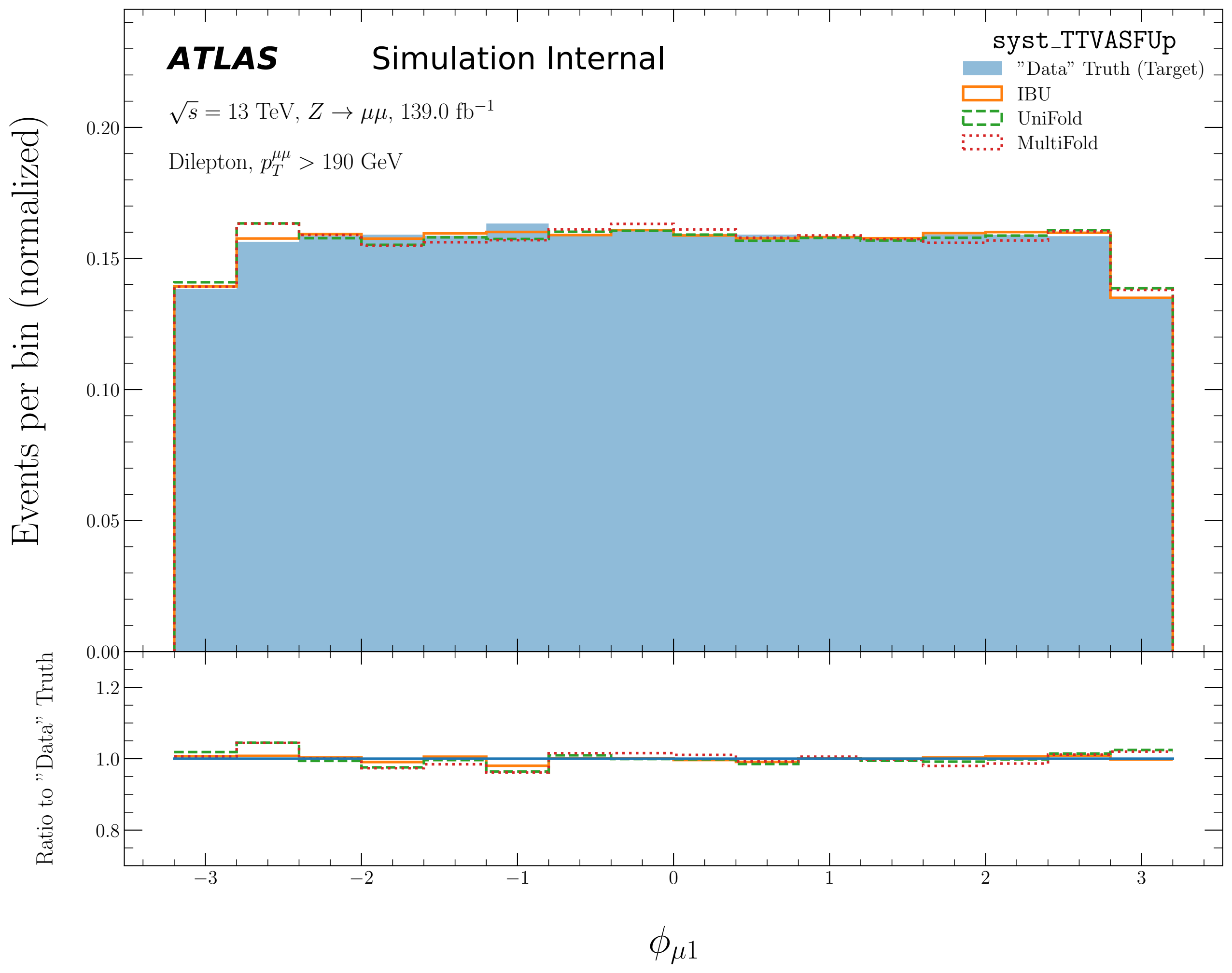
$\phi_{\mu 1}$











Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_TTVASFDown

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

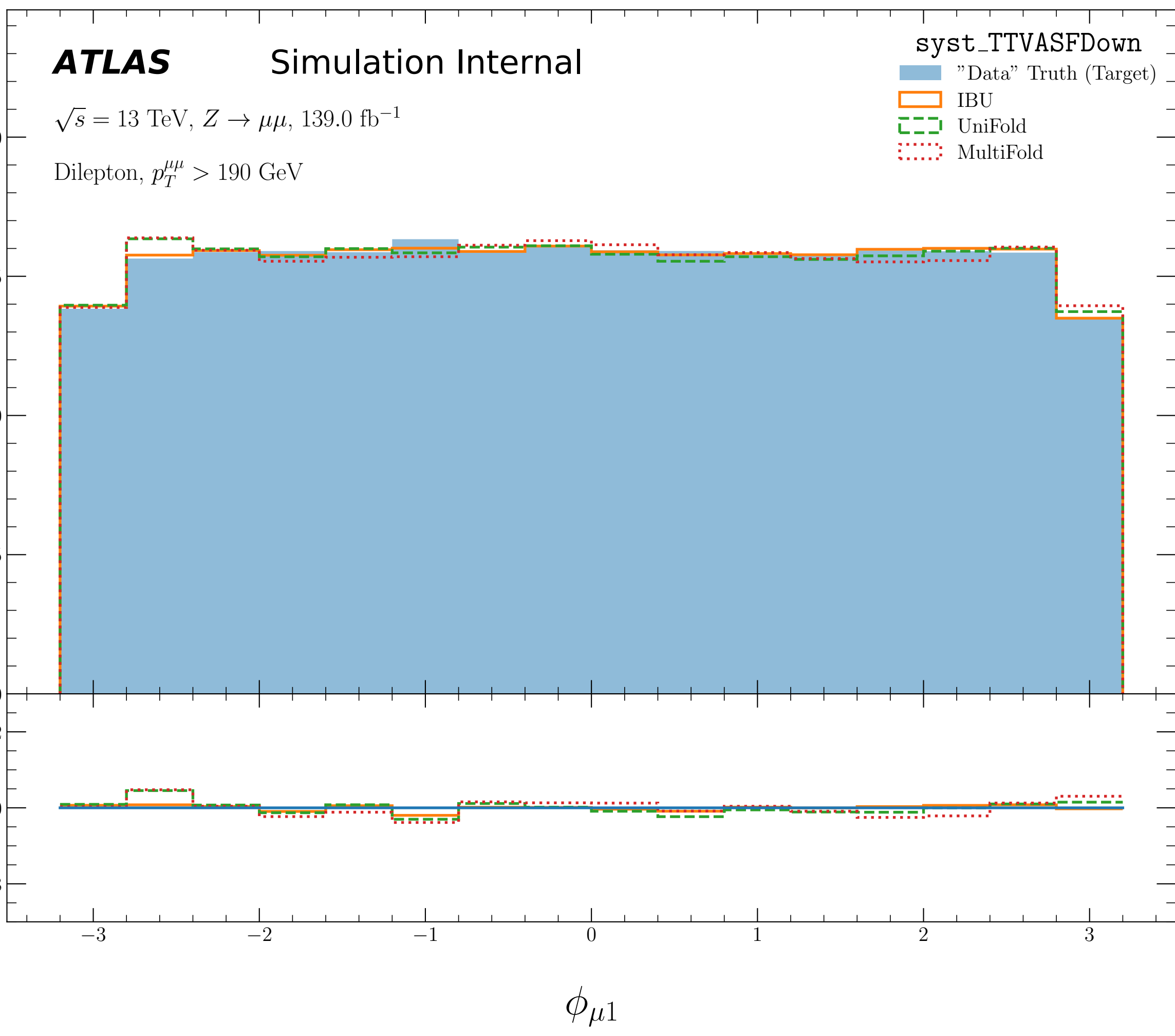
0

1

2

3

$\phi_{\mu 1}$



Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_trigSFUp

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

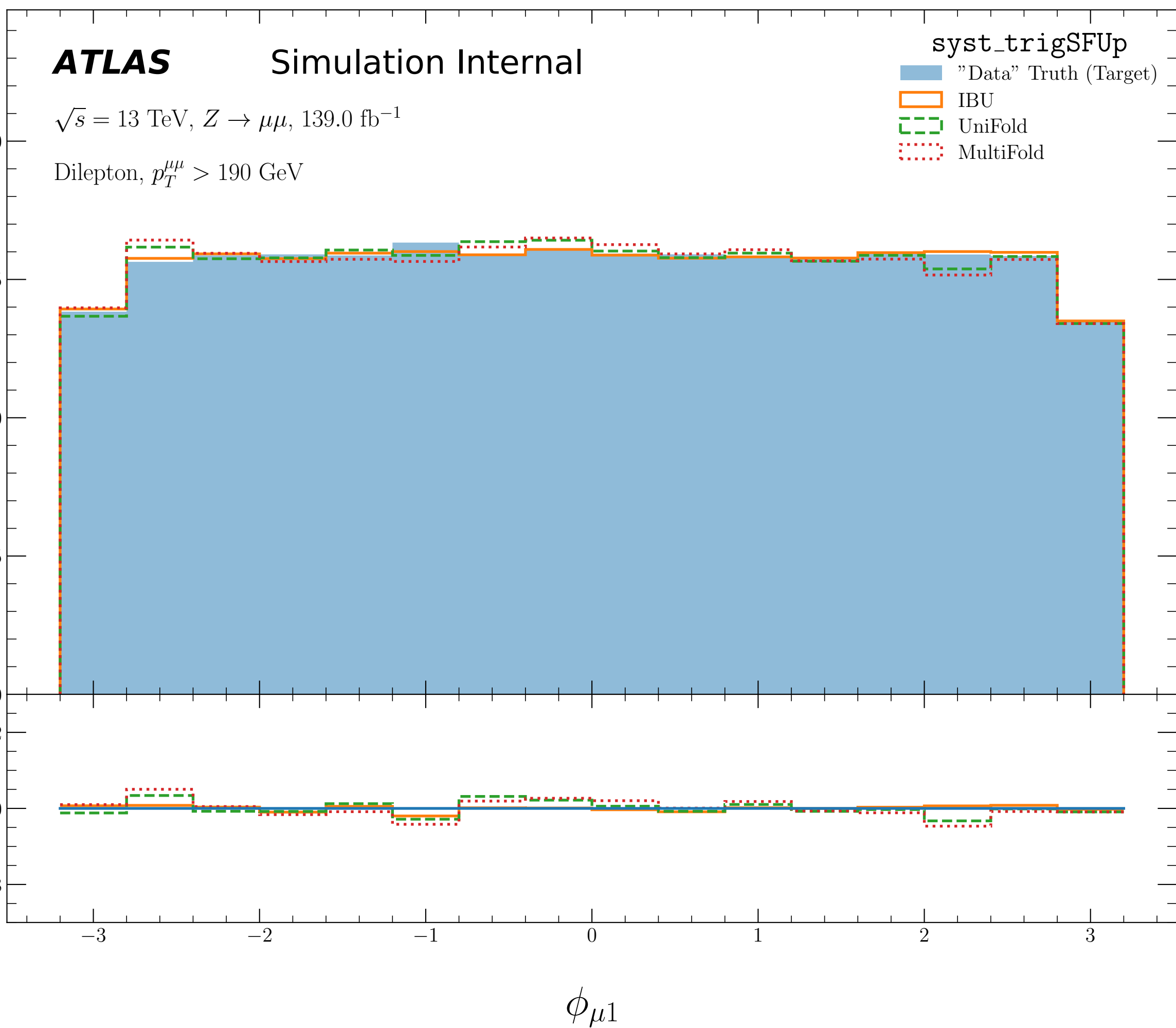
0

1

2

3

$\phi_{\mu 1}$



Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_trigSFDown

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

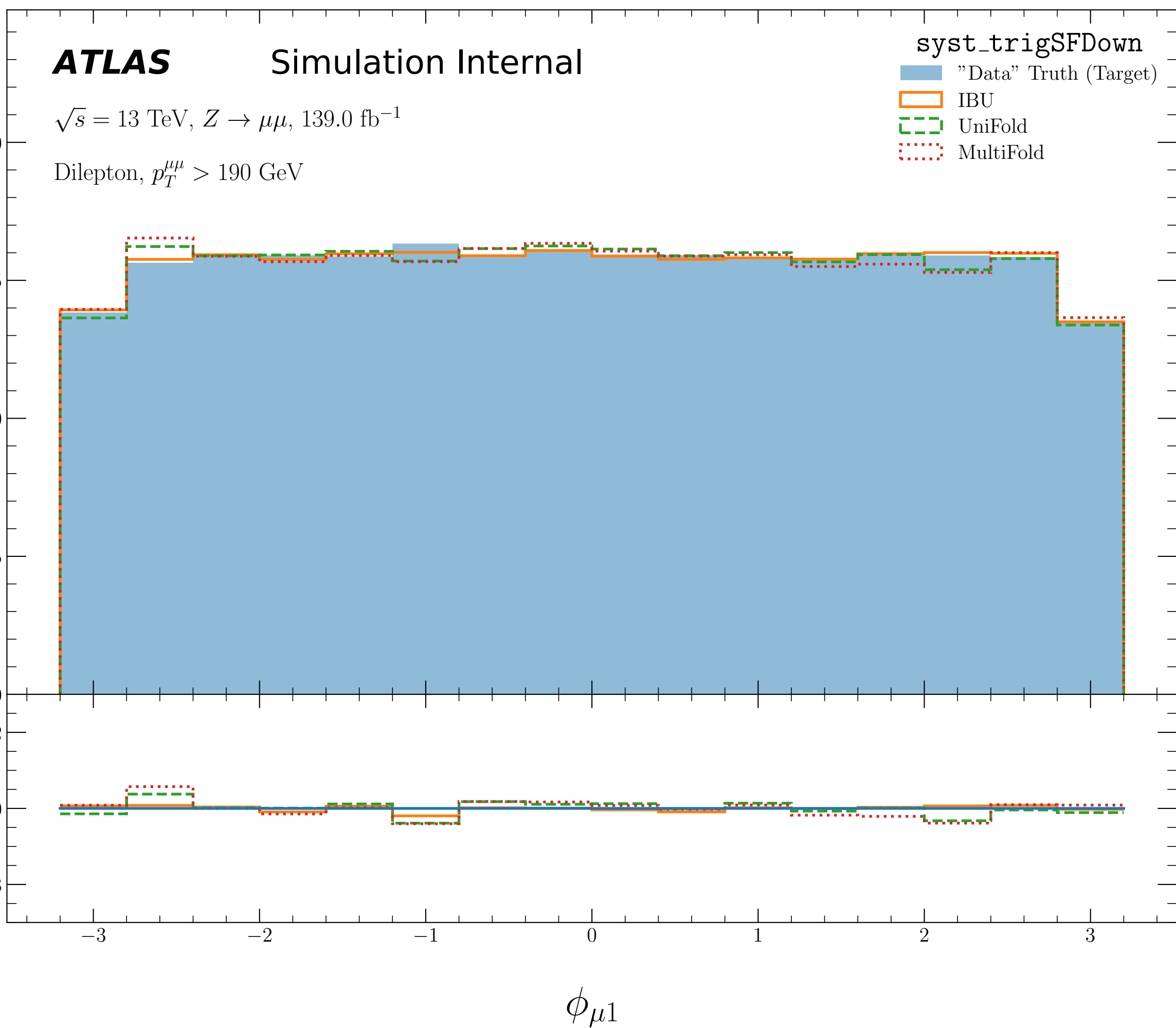
0

1

2

3

$\phi_{\mu 1}$



Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_prwUp

- "Data" Truth (Target)
- IBU
- UniFold
- MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

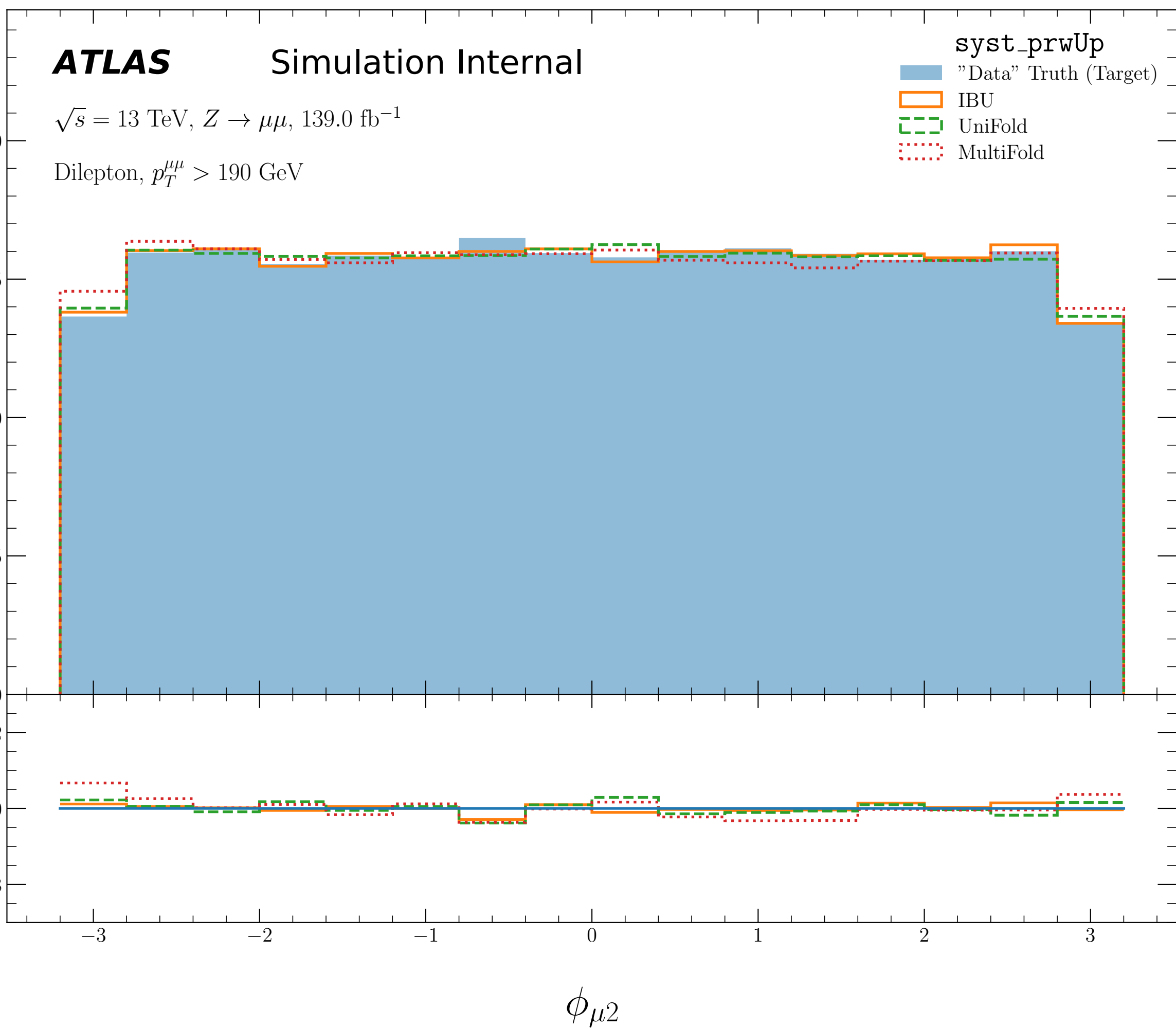
0

1

2

3

$\phi_{\mu 2}$



Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

sys\_prwDown

- "Data" Truth (Target)
- IBU
- UniFold
- MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

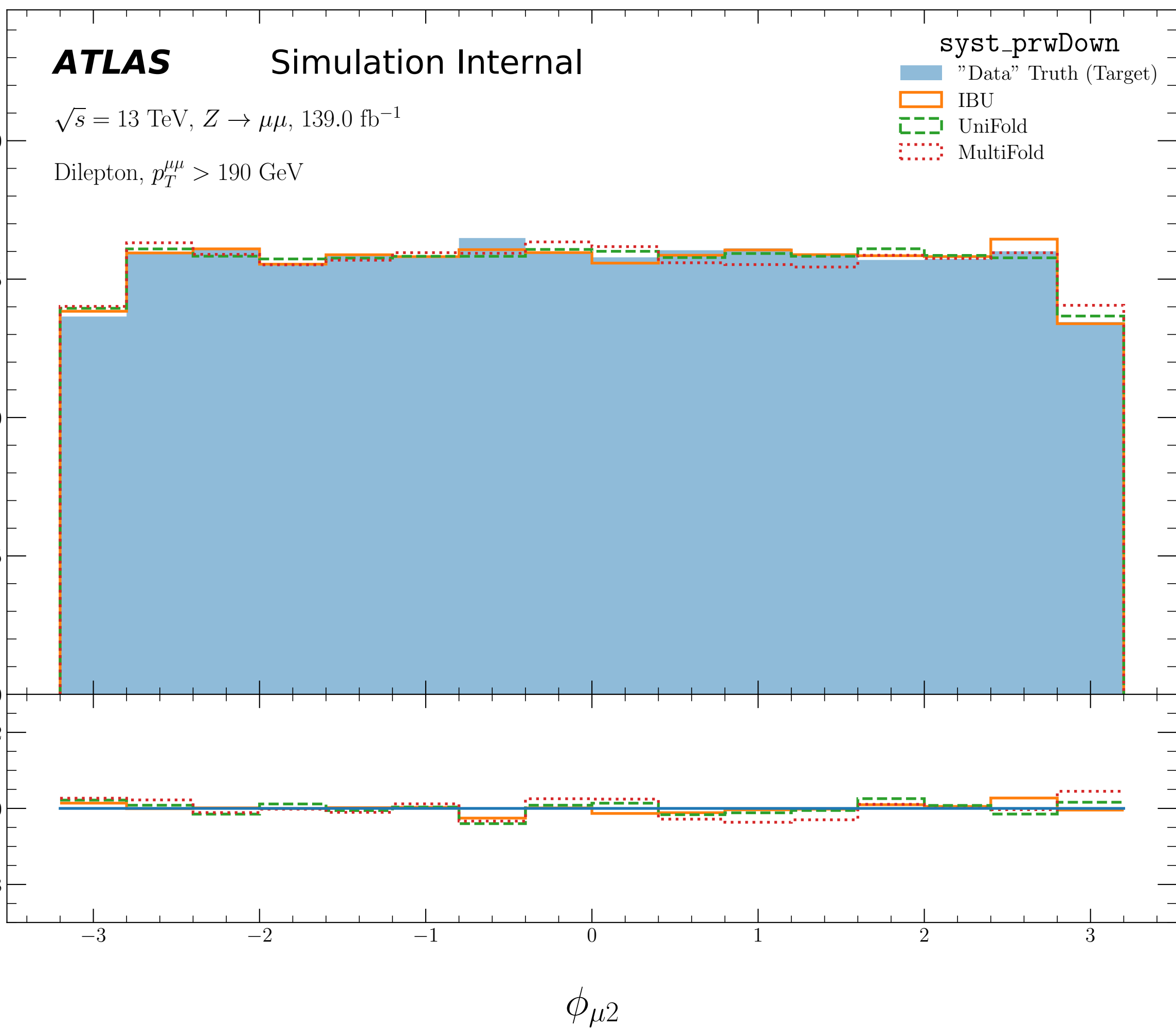
0

1

2

3

$\phi_{\mu 2}$





Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_recoSFUp

- "Data" Truth (Target)
- IBU
- UniFold
- MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

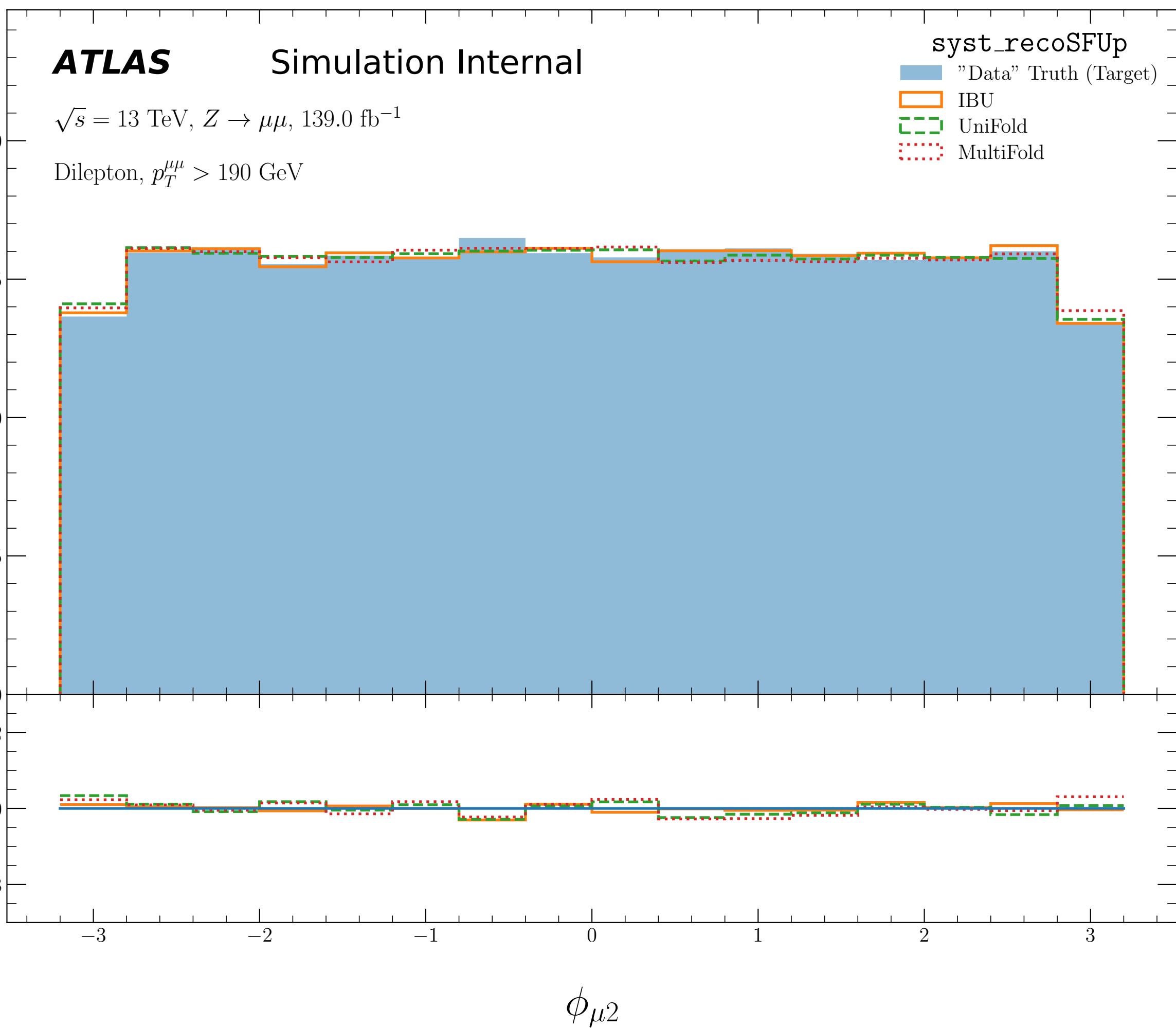
0

1

2

3

$\phi_{\mu 2}$



Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_recoSFDown

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

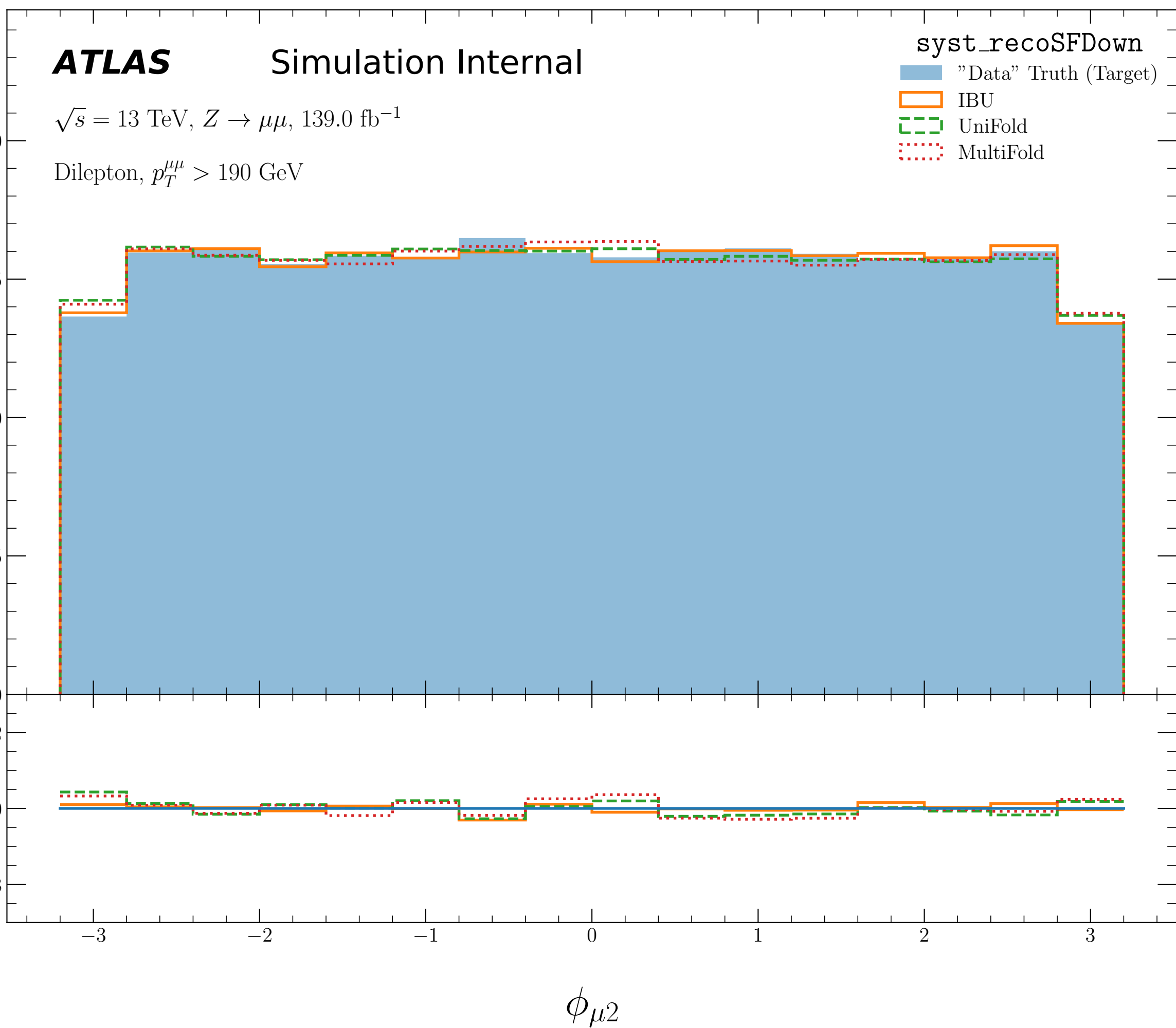
0

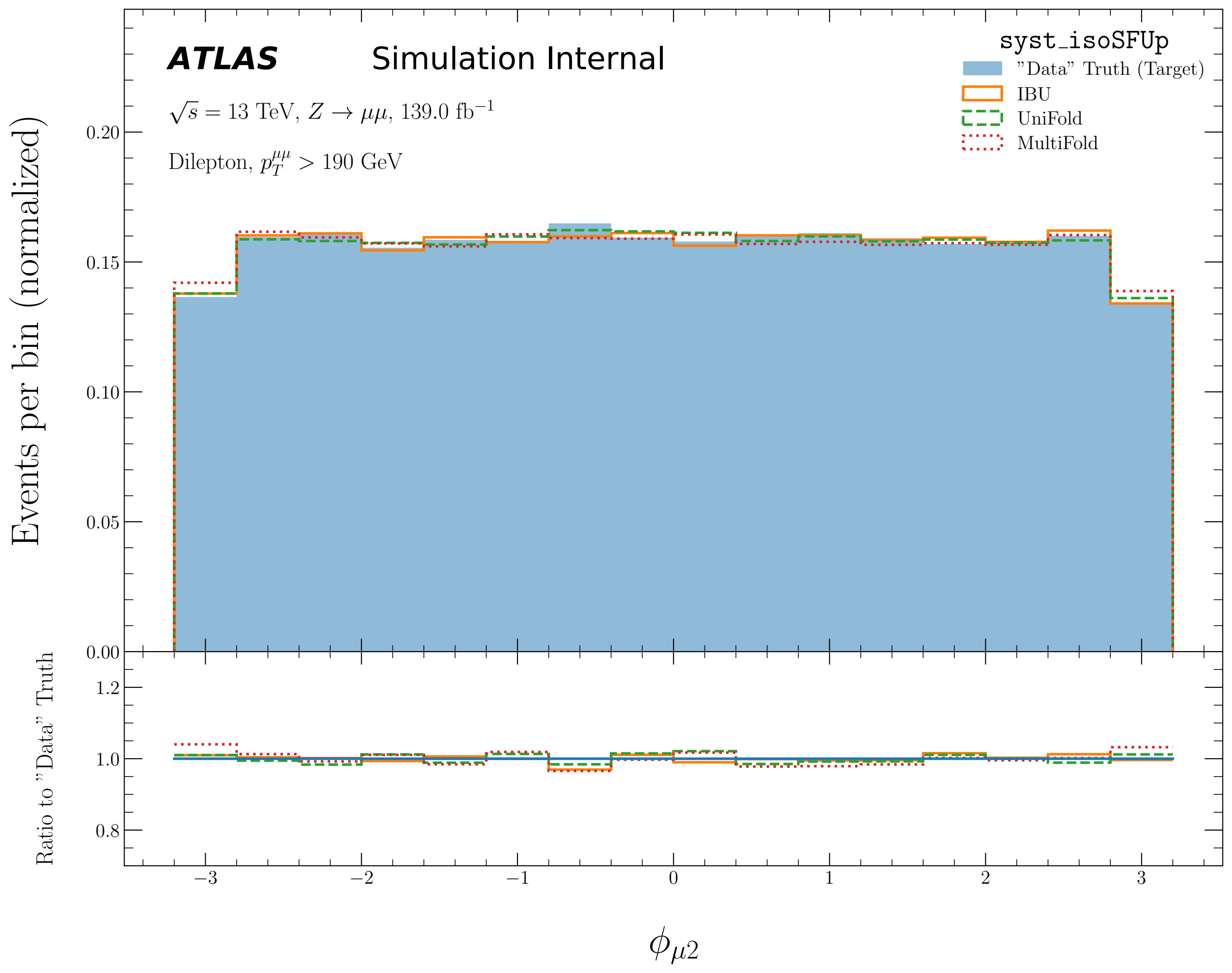
1

2

3

$\phi_{\mu 2}$





Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_isoSFDown

- "Data" Truth (Target)
- IBU
- UniFold
- MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

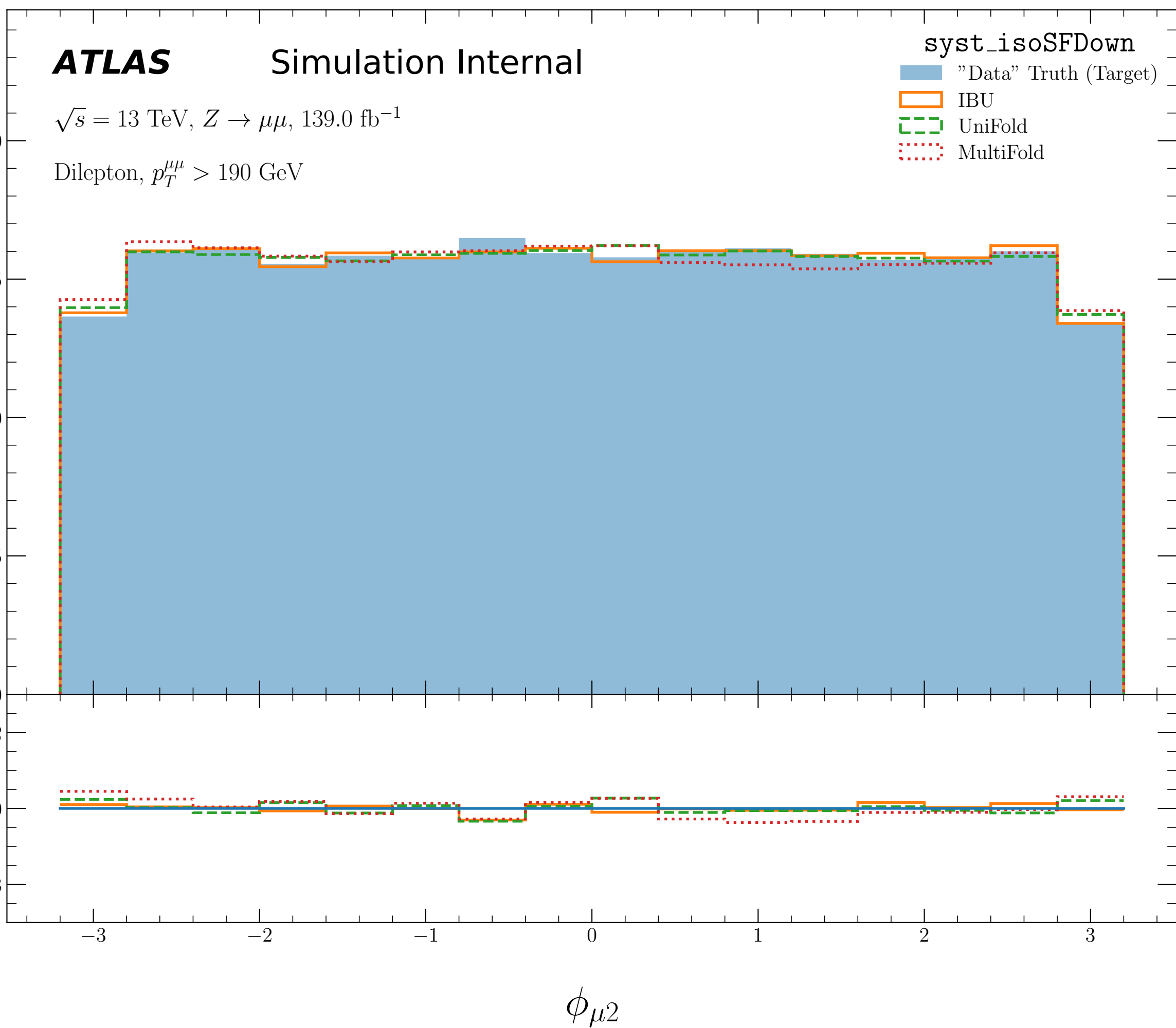
0

1

2

3

$\phi_{\mu 2}$



Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_TTVASFUp

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

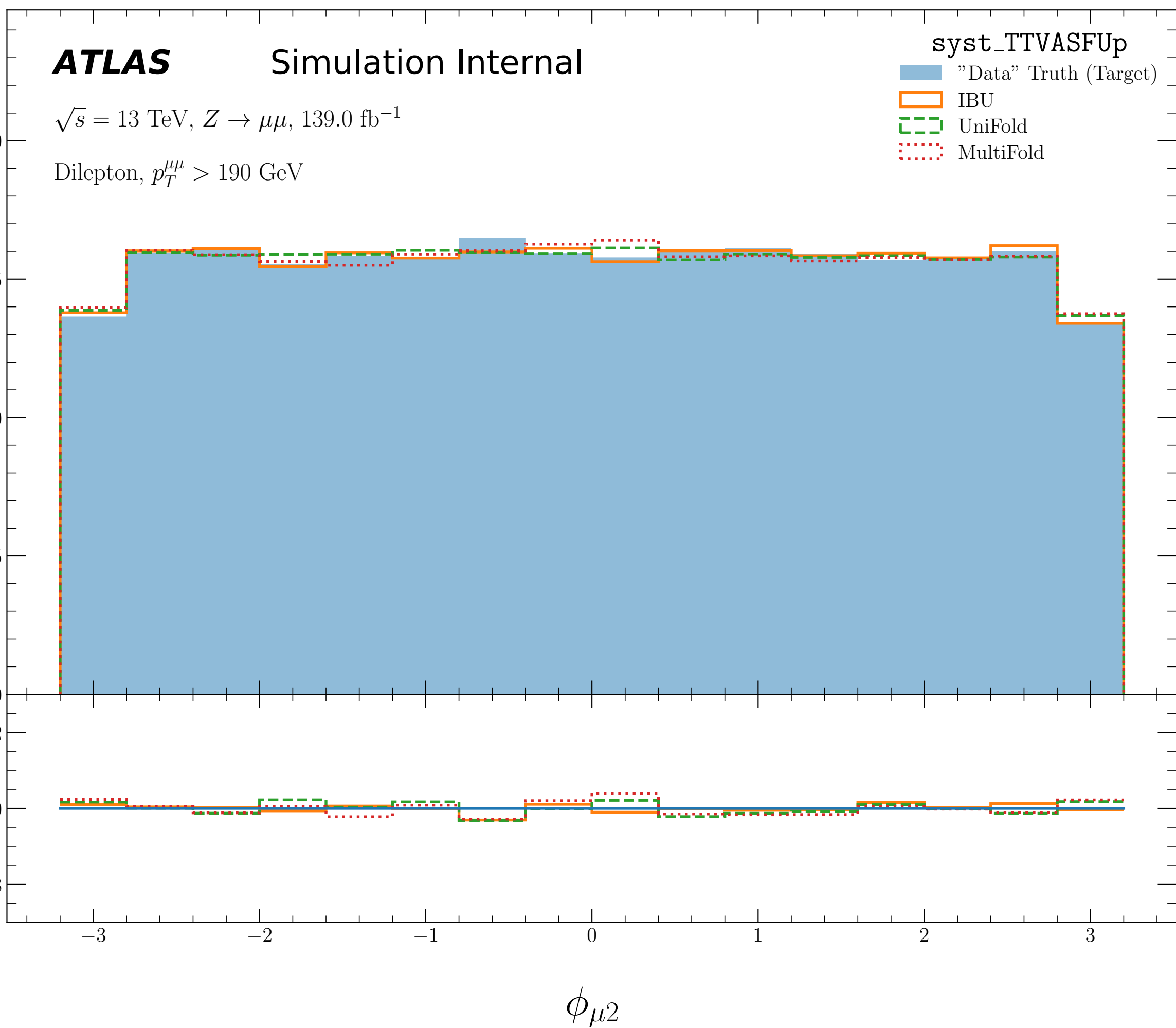
0

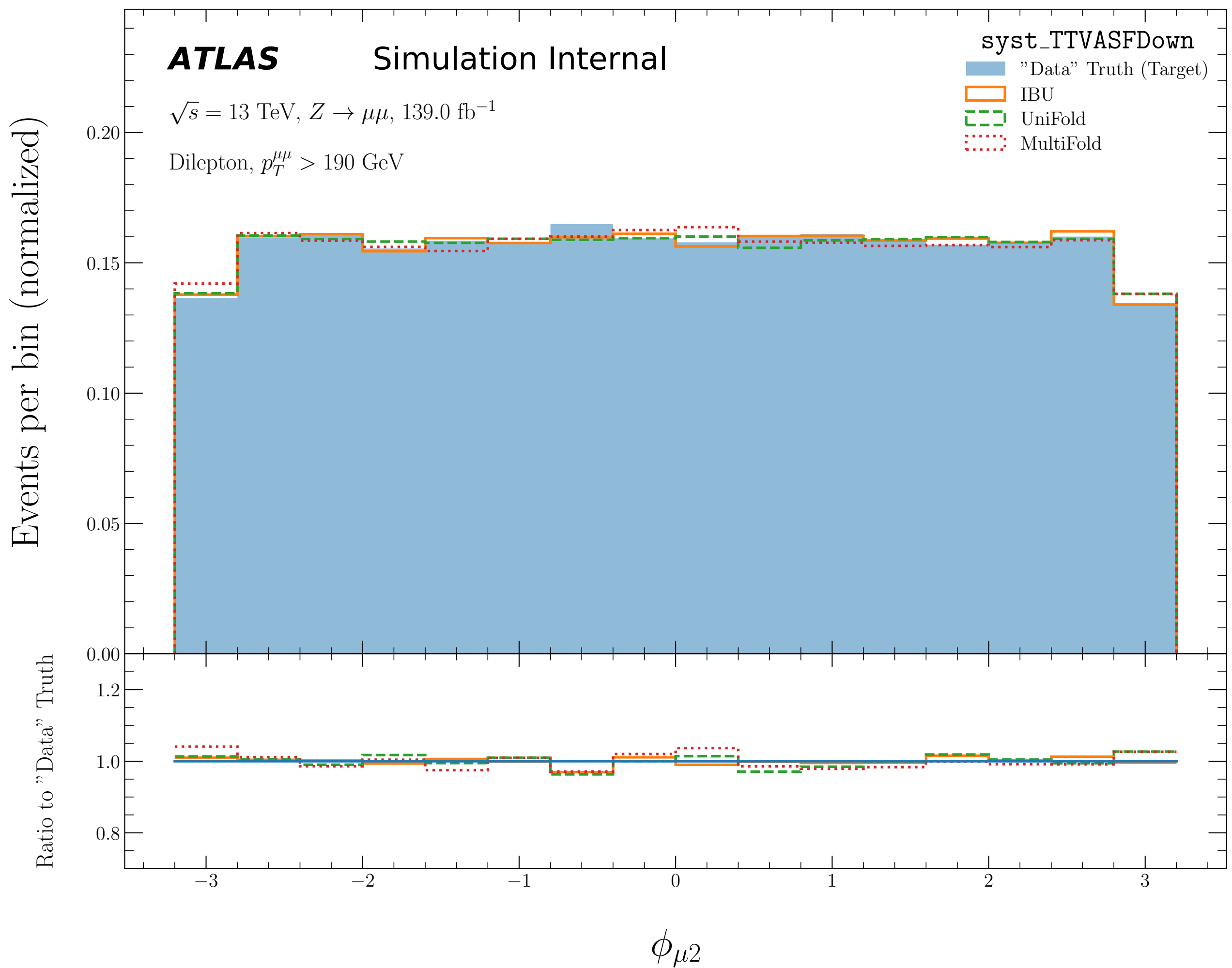
1

2

3

$\phi_{\mu 2}$





Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_trigSFUp

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

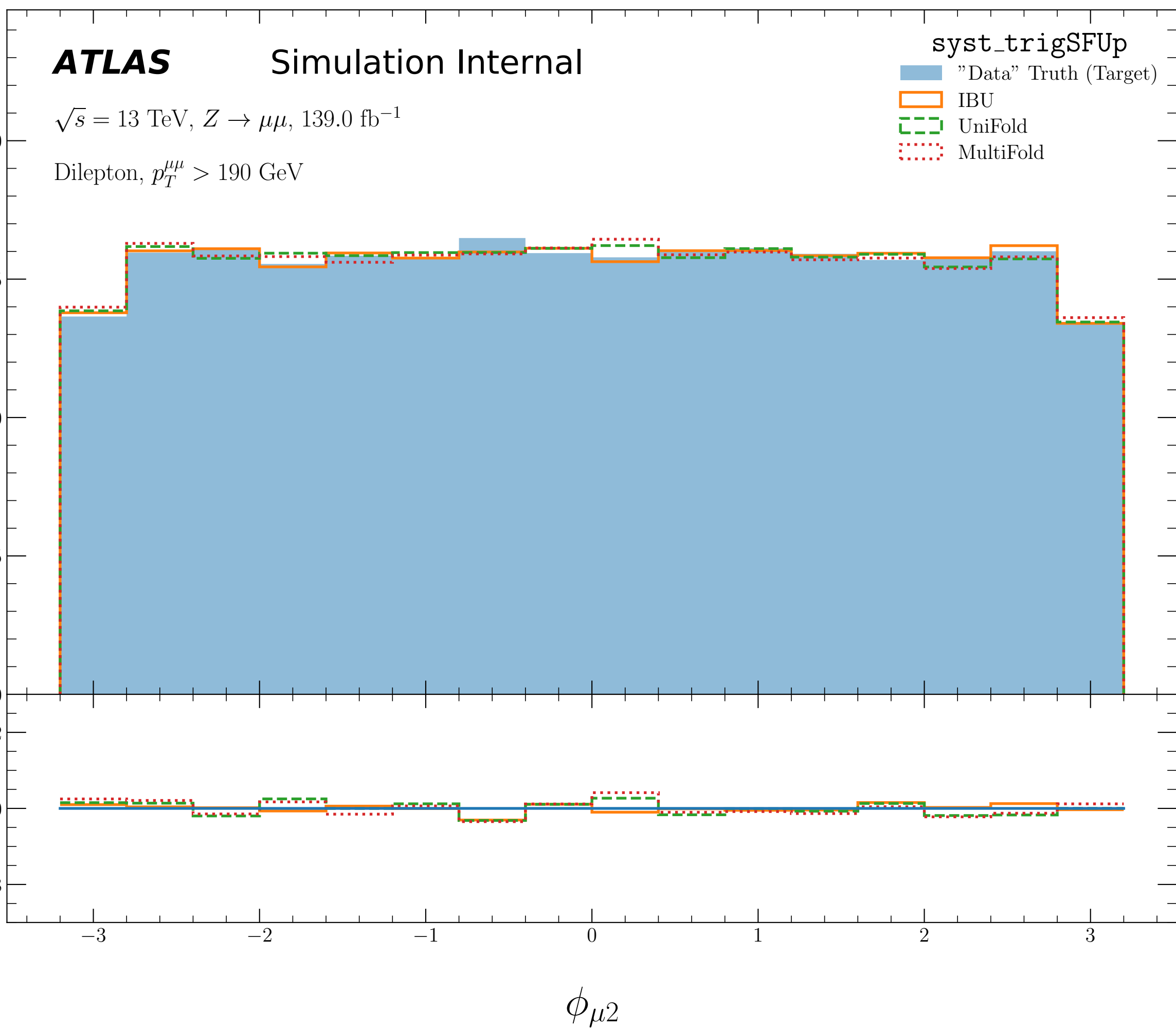
0

1

2

3

$\phi_{\mu 2}$



Events per bin (normalized)

**ATLAS**

Simulation Internal

$\sqrt{s} = 13 \text{ TeV}, Z \rightarrow \mu\mu, 139.0 \text{ fb}^{-1}$

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

syst\_trigSFDown

"Data" Truth (Target)

IBU

UniFold

MultiFold

0.20

0.15

0.10

0.05

0.00

Ratio to "Data" Truth

1.2

1.0

0.8

-3

-2

-1

0

1

2

3

$\phi_{\mu 2}$

