PROMPT PHOTONS IN DIFFRACTIVE PHOTOPRODUCTION
(status report)

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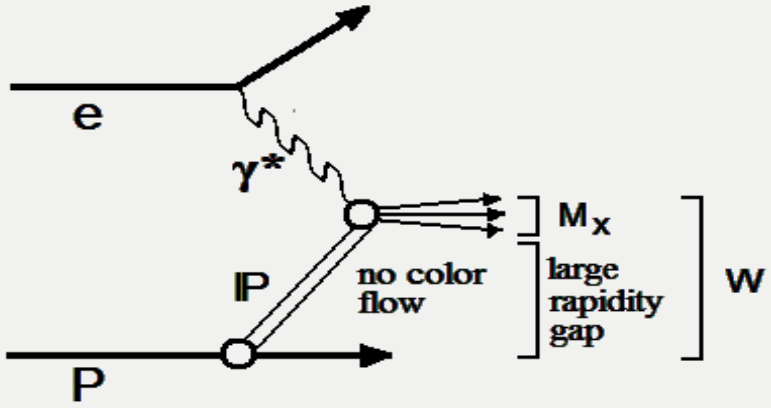
Goals

- Apply the reweighting procedure for direct Rapgap MC using Z_{IP} variable.
- Evaluate for HERA2 the differential cross sections of diffractive photoproduction as functions of:
  - ✓ photon transverse energy
  - ✓ photon pseudorapidity
  - ✓ jet transverse energy
  - ✓ jet pseudorapidity
  - ✓ M_X, X_γ, X_{IP}, Z_{IP}, $\delta\eta$, $\delta\varphi$

Objectives and procedures

Our physics objective is to select diffractively produced prompt photons in photoproduction. These events can be explained if the scattered proton escapes through the beam pipe while emitting a colorless object (pomeron), which scatters with the electron. Therefore such events are characterized by low momentum transfer from proton to the pomeron and a large rapidity gap between the hadrons systems Mx and the proton. In other words we are trying to identify a subset of prompt photon events with low Xp and η_{max}.



Our ***general method*** to distinguish the signal from hadronic background is based on MC fit of the dZ distribution (dZ - *energy weighted mean width of the electromagnetic cluster in Z direction*). This fit allows us statistically separate prompt photon left peak (signal) from π^0 decay right peak (background).

$$dZ = \frac{\sum_i E_i \left| Z_{cluster} - Z_i \right|}{w_{cell} \sum_i E_i}$$

Data samples and event selection

- ***Data***: 9899e, 9900p, 0405e, 06e, 0607p (Mini Ntuples v08b), 91.18 pb^{-1}, 374 pb^{-1}
- ***MC signal***: (Rapgap 3.202 v08b, diffractive php) direct + resolved
- ***MC background***: (Rapgap 3.202 v08b, Pythia 6.2 v08b giant dijet) direct+resolved

True level selection

Event selection

$0.2 < y < 0.7$

$Q^2 < 1\ GeV^2$

Prompt photon selection

Fmck_prt[]=29

$-0.7 < \eta < 0.9$

$5 < Et < 15$ GeV

Eparticle / Ejet > 0.9

Hadronic jet selection

$4 < Et\ jet < 35$ GeV

$-1.5 < \eta\ jet < 1.8$

Diffractive event selection

$\eta_{max} < 2.5$ for Eparticle > 0.4 GeV

$Xp < 0.03$

Detector level selection

Event selection

Trigger HPP16 on

$|Zvtx| < 40$ cm

$|BCAL\ time| < 10$ ns

$Cal\_pt < 10$

$0.2 < Yjb < 0.7$

No SINISTRA electron with prob > 0.9 and $Yel < 0.7$

Hadronic jet selection

$4 < Et\ jet < 35$ GeV

$-1.5 < \eta\ jet < 1.8$

Prompt photon selection

Tufo[][0]=31

$-0.7 < \eta < 0.9$

$5 < Et < 15$ GeV

Ezufo / Ejet > 0.9

Zufoeemc / Zufoecal > 0.9

track isolation in cone 0.2

Diffractive event selection

$\eta_{max} < 2.5$ for Ezufo>0.4 GeV

$Xp < 0.03$

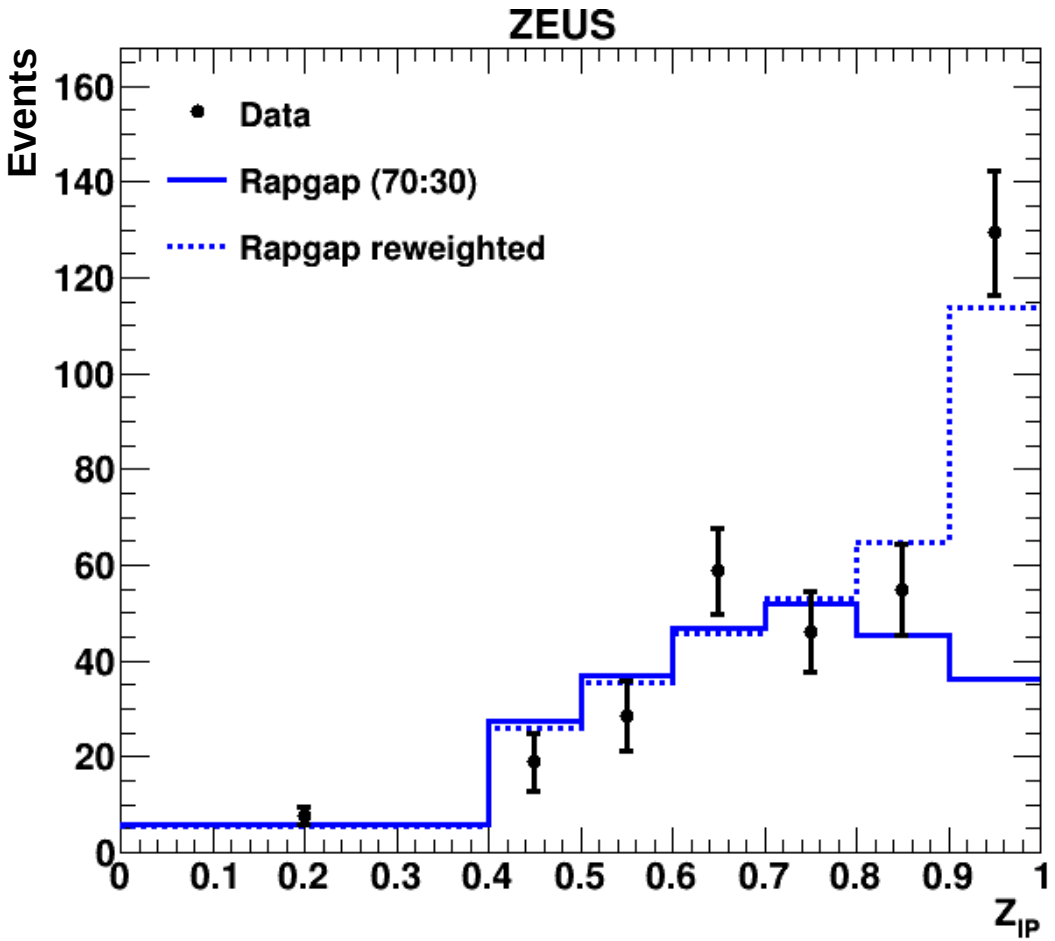
$E_{FPC} < 1$ GeV (in HERAI case)

HERAII, the comparison of Z_{IP} data signal distribution to MC Rapgap signal, γ+jet selection

η_{max}+ X_P cuts

data – fitted photons, MC is normalized to data

The reweighting is applied only to direct Rapgap on hadron level



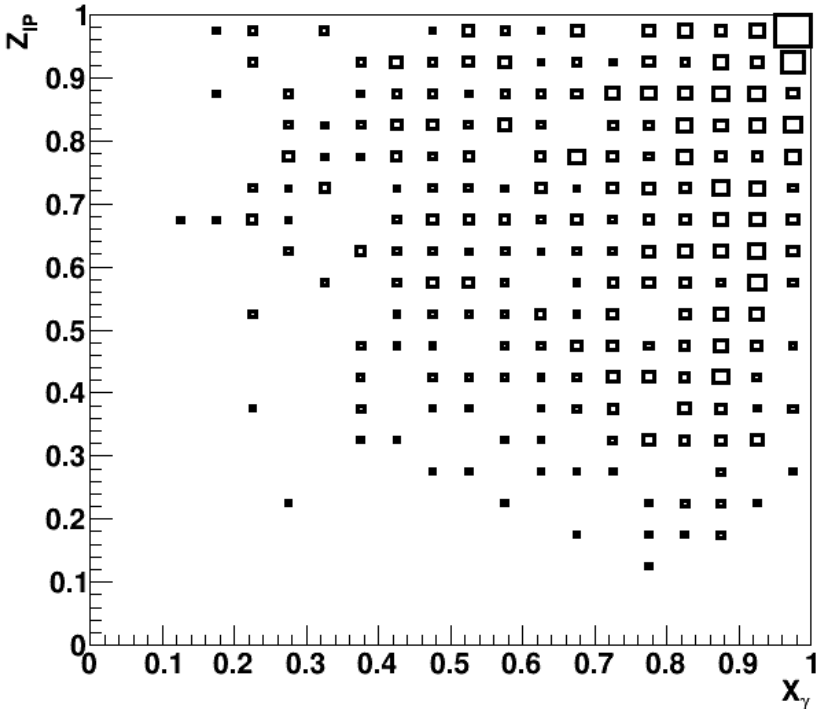
Reweighting formula:

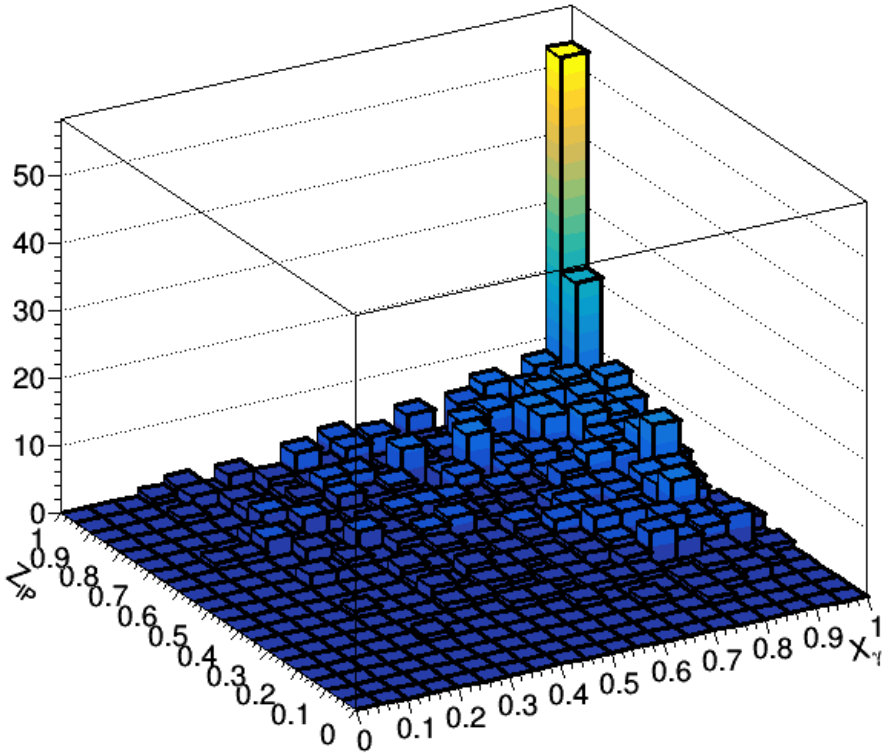
$$w = \begin{cases} 7, & Z_{IP} > 0.9 \\ 1, & Z_{IP} \leq 0.9 \end{cases}$$

Rapgap requires reweighting

HERAII, 2D-distribution of X_γ and Z_{IP} data variables, γ+jet selection

η_{max}+ X_P cuts





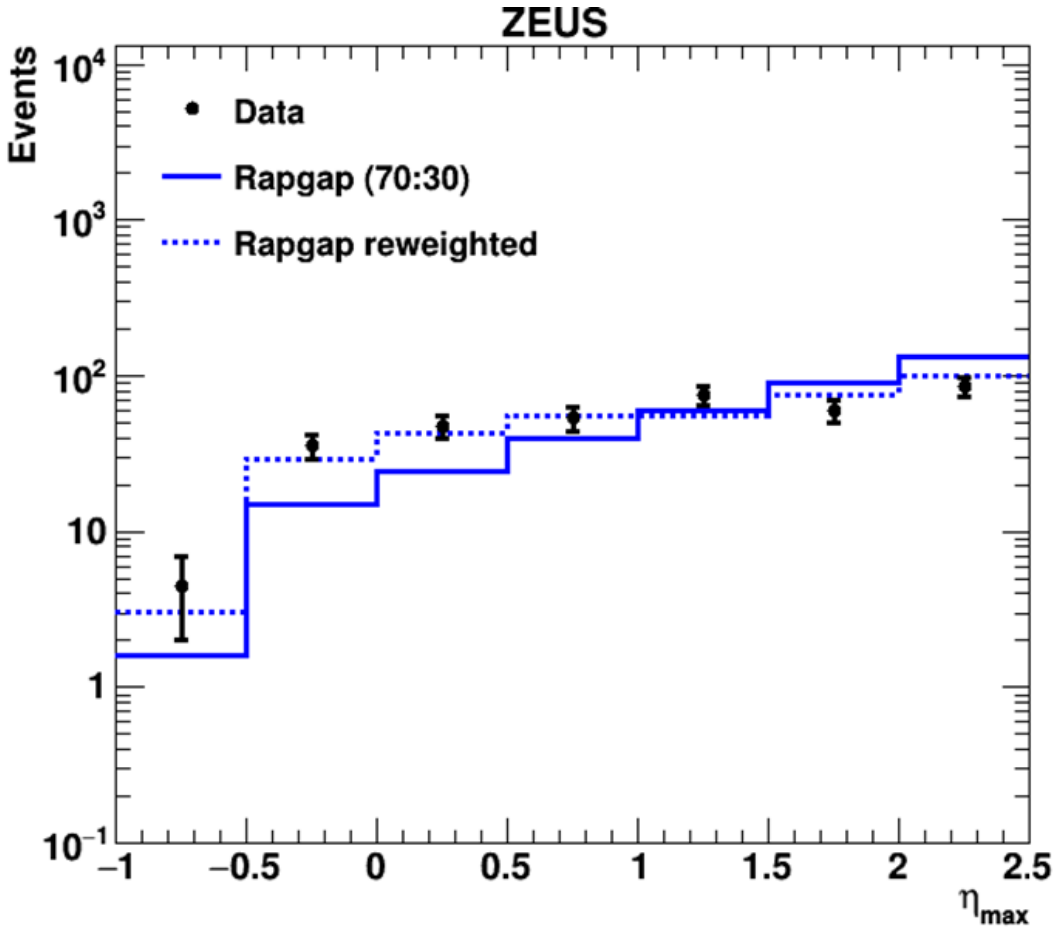
High Z_{IP} corresponds to high X_γ

HERAII, the comparison of η_{max} data signal distribution to MC Rapgap signal, γ+jet selection

η_{max}+ X_P cuts

data – fitted photons, MC is normalized to data

The reweighting is applied only to direct Rapgap on hadron level



Z_{IP} reweighting gives a good description of η_{max}

On all following slides:

- **Left plot** - Cross sections without normalization to HERAI.
- **Right plot** - Cross sections normalized to HERAI total cross section. More precisely: cross sections are multiplied by factor HERAI_tot/HERAII_tot, where:
  HERAI_tot - HERAI total cross section
  HERAII_tot - HERAII total cross section
- **Errors**:
  thick - statistical
  thin - statistical + systematics + normalization error

The origins of systematics errors:

1) variation of the photon energy by ±2%
2) variation of the jet energy by ±2%
3) variation of the top and bottom limits in dZ fit: bottom 0.6, top 1.0 (central is 0.8)
4) variation of the direct/resolved signal fraction by ±14% (0.7 ± 0.1)
5) possible presence of non-diffractive background –10%

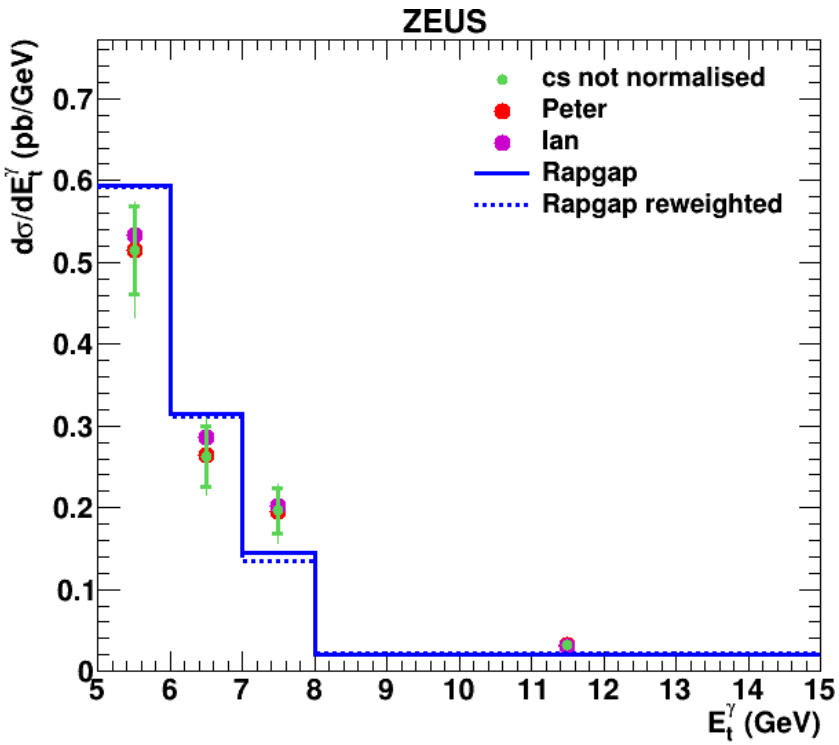
MC Rapgap direct/resolved fraction is 70:30%

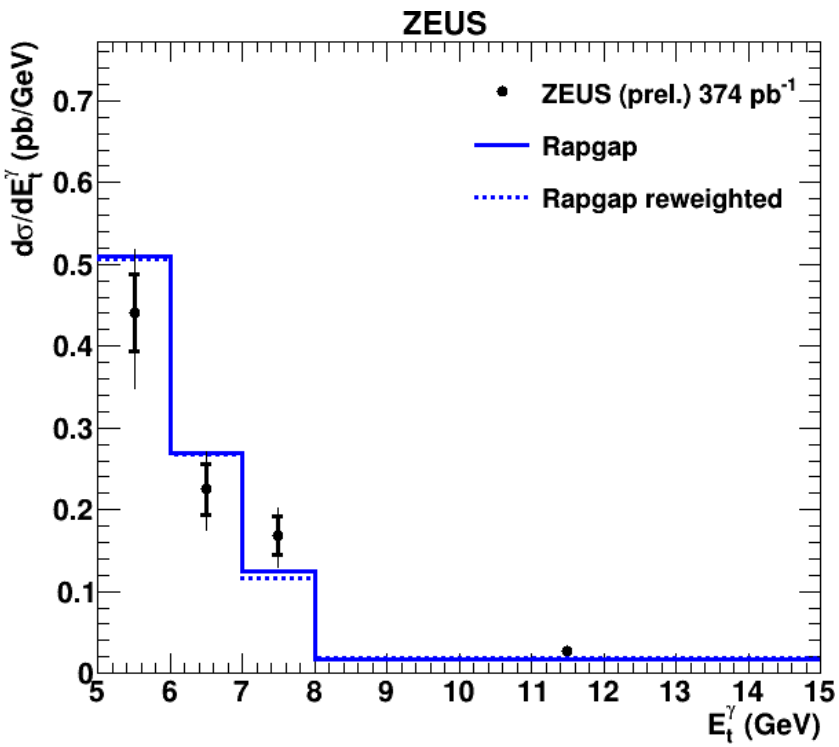
The total cross sections values (pb)

HERAI		HERAII	
γ+jet	inclusive	γ+jet	inclusive
1.026 ± 0.139	1.195 ± 0.143	1.197 ± 0.078	1.290 ± 0.079

HERAII differential cross sections for photon E_t, γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
magenta – cross sections calculated by Ian Skillicorn
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section





	5 ÷ 6 GeV	6 ÷ 7 GeV	7 ÷ 8 GeV	8 ÷ 15 GeV
cr sec, pb	0.441±0.047	0.225±0.031	0.168±0.024	0.028±0.004
	0.515±0.055	0.262±0.037	0.196±0.028	0.032±0.004
1/acceptance	1.234±0.026	1.177±0.032	1.036±0.038	1.103±0.030

HERAII differential cross sections for photon η , γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
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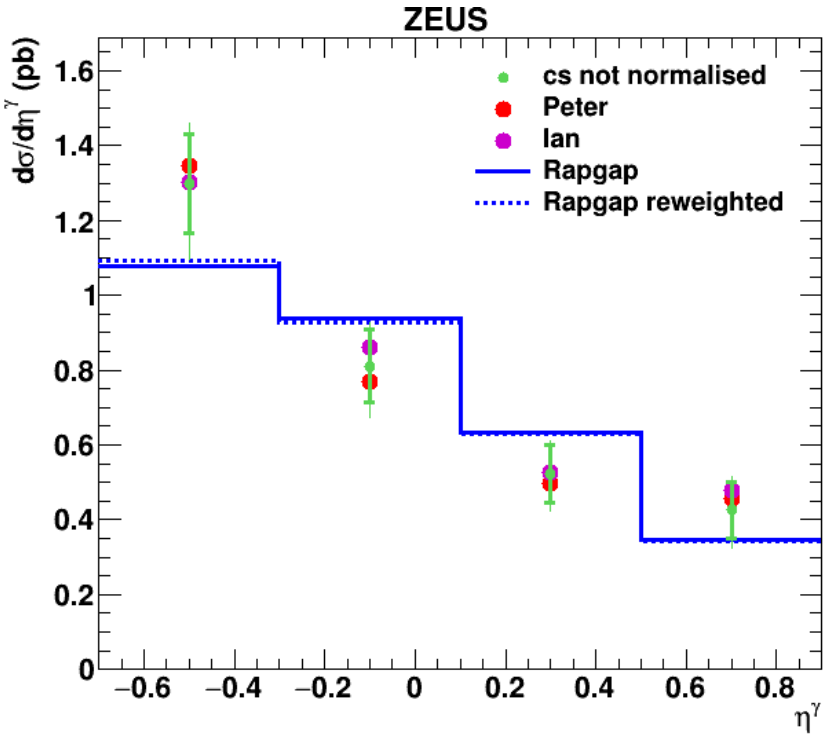
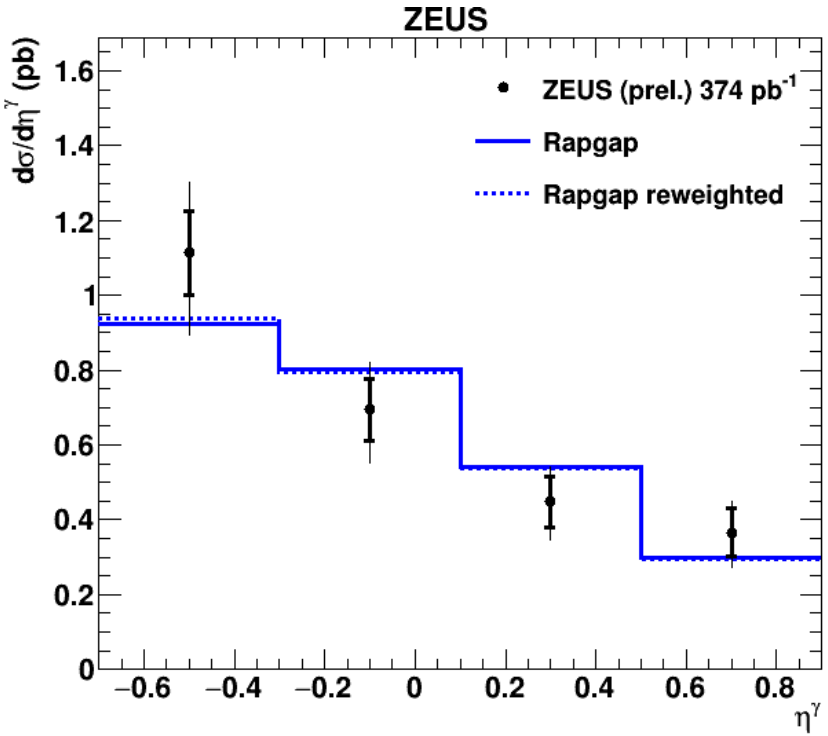
magenta – cross sections calculated by Ian Skillicorn
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section

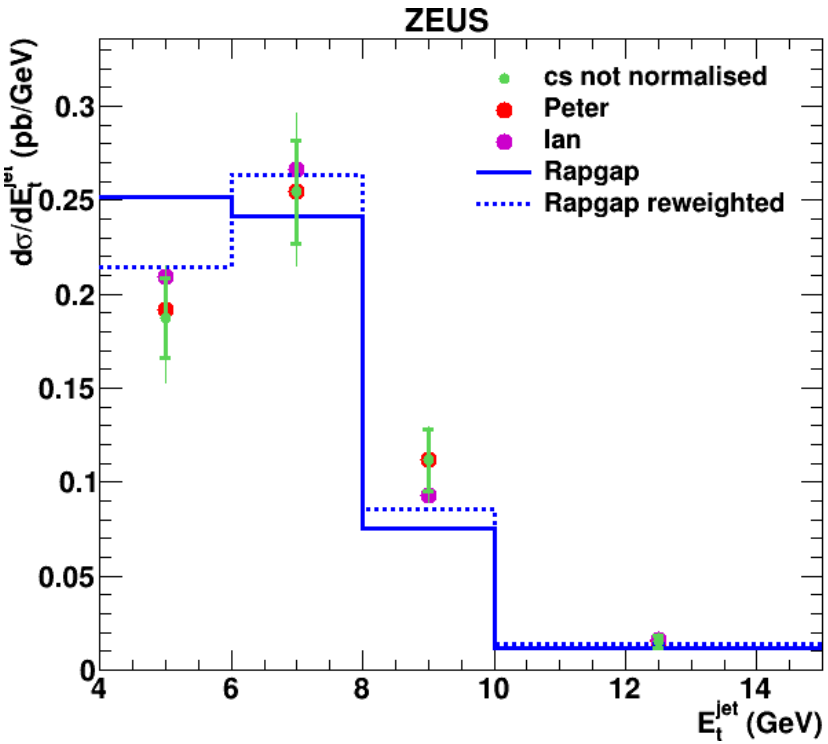


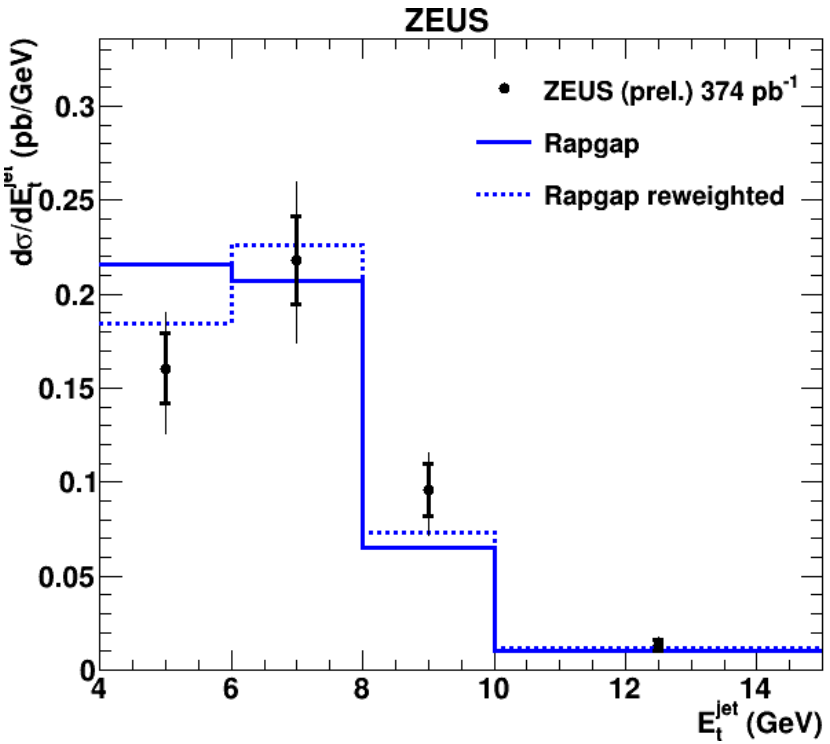


	-0.7 ÷ -0.3	-0.3 ÷ -0.1	-0.1 ÷ 0.5	0.5 ÷ 0.9
cr sec, pb	1.113±0.112	0.695±0.083	0.448±0.067	0.365±0.064
	1.298±0.131	0.811±0.097	0.523±0.078	0.426±0.075
1/acceptance	1.268±0.026	1.122±0.023	1.131±0.028	1.128±0.037

HERAII differential cross sections for jet E_t, γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
magenta – cross sections calculated by Ian Skillicorn
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section





	4 ÷ 6 GeV	6 ÷ 8 GeV	8 ÷ 10 GeV	10 ÷ 15 GeV
cr sec, pb	0.161±0.018	0.218±0.023	0.096±0.014	0.013±0.003
	0.187±0.021	0.254±0.027	0.112±0.016	0.015±0.003
1/acceptance	1.019±0.024	1.449±0.032	1.102±0.038	0.905±0.043

HERAII differential cross sections for jet η , γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
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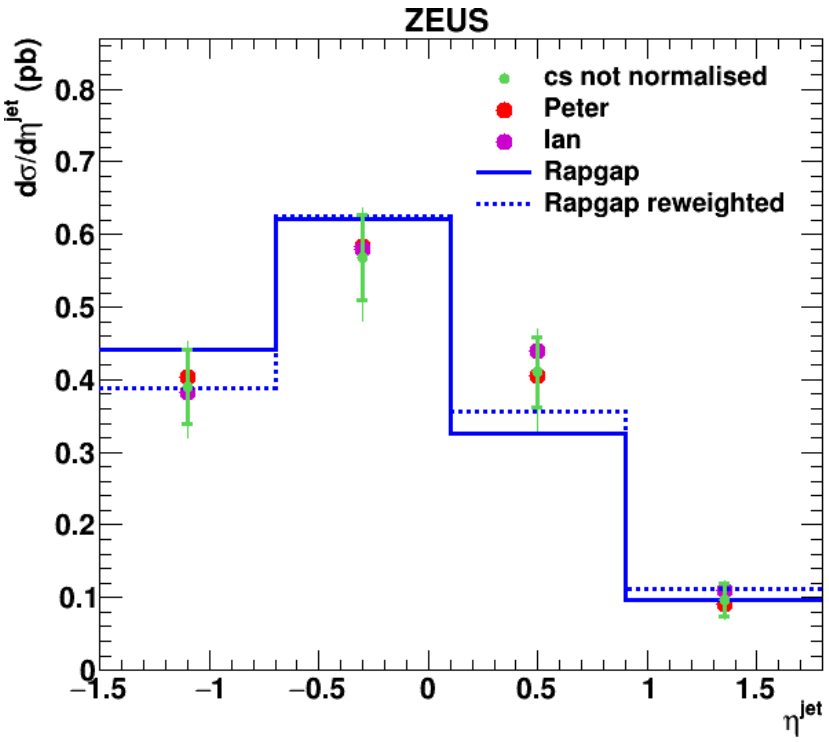
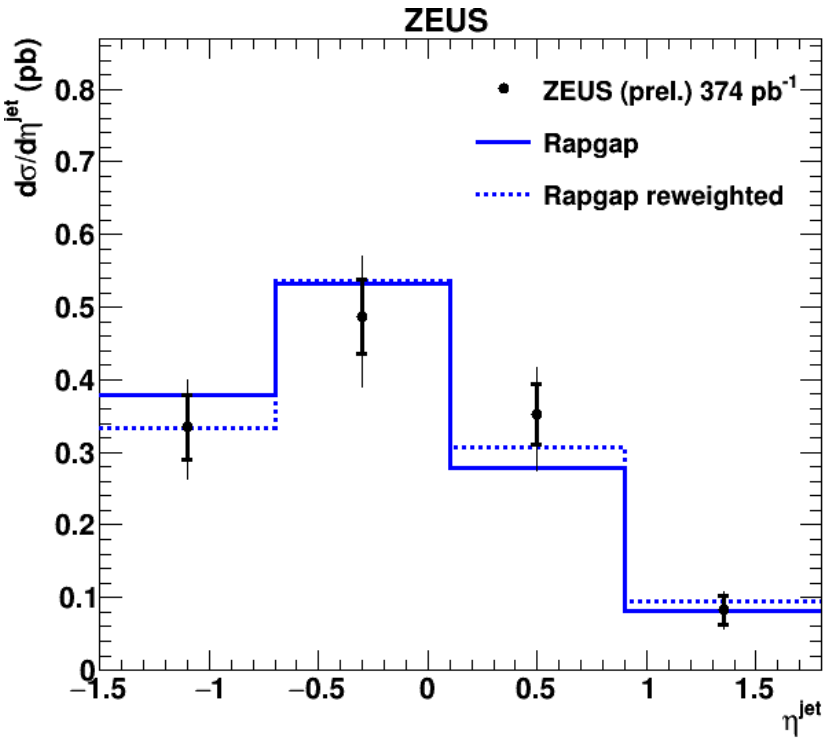
magenta – cross sections calculated by Ian Skillicorn
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section

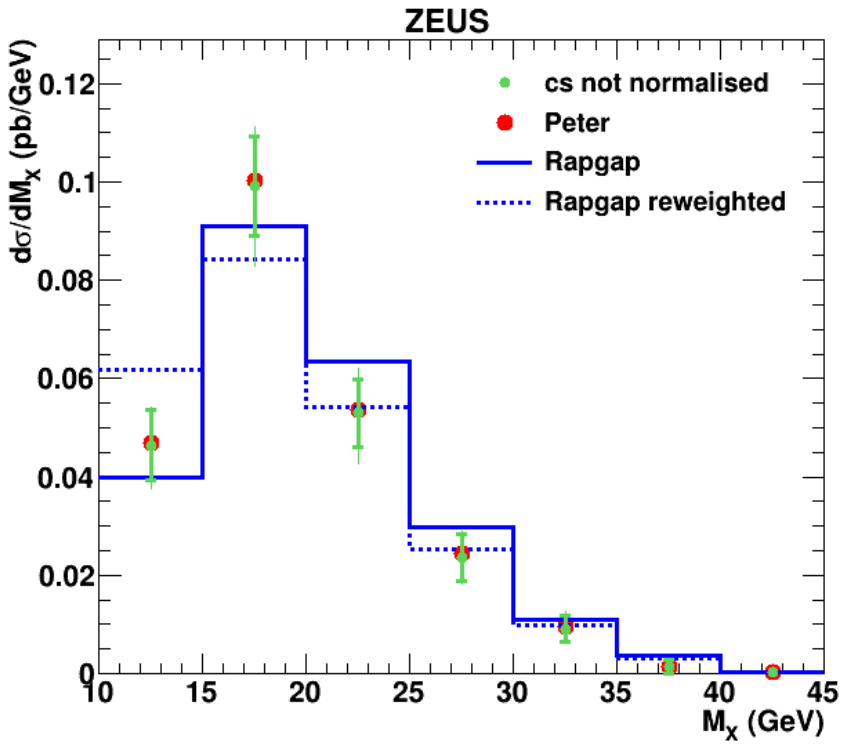


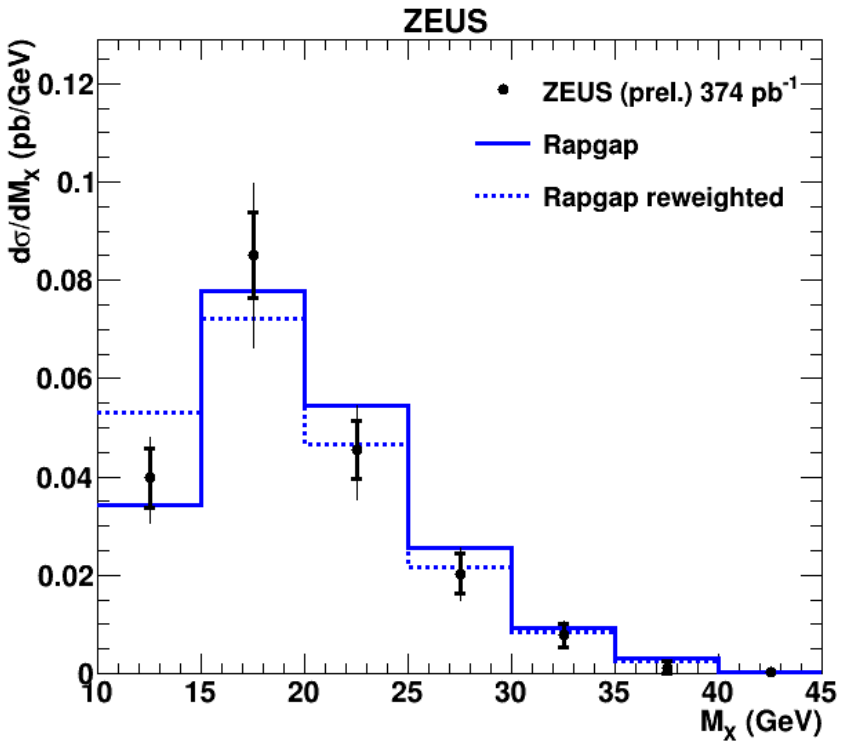


	-1.5 ÷ -0.7	-0.7 ÷ 0.1	0.1 ÷ 0.9	0.9 ÷ 1.8
cr sec, pb	0.335±0.044	0.487±0.050	0.352±0.042	0.083±0.020
	0.390±0.052	0.568±0.059	0.410±0.049	0.097±0.023
1/acceptance	1.338±0.030	1.217±0.022	1.049±0.026	0.917±0.039

HERAII differential cross sections for photon M_X, γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section

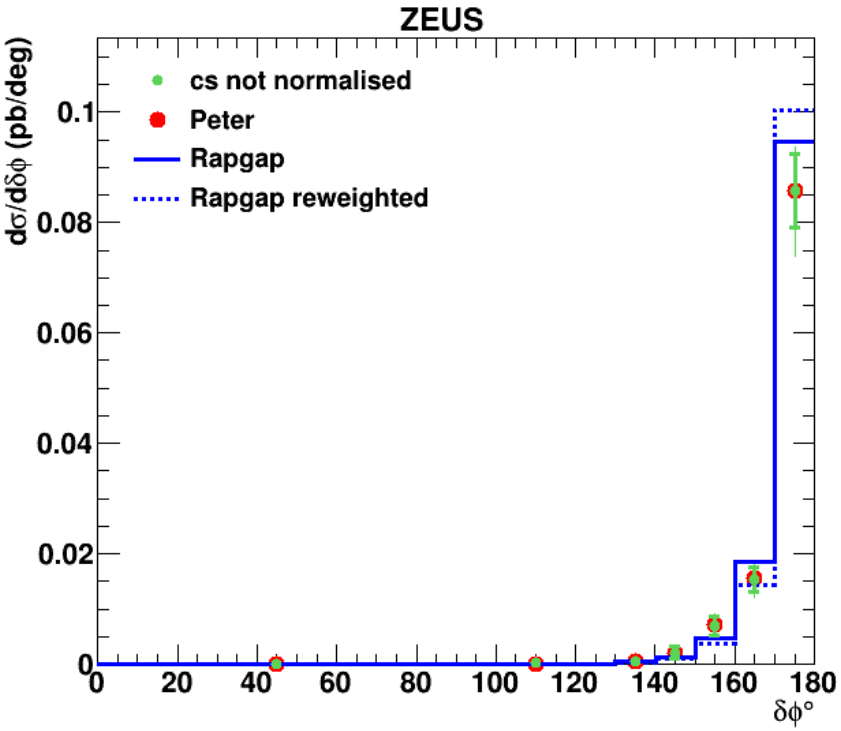


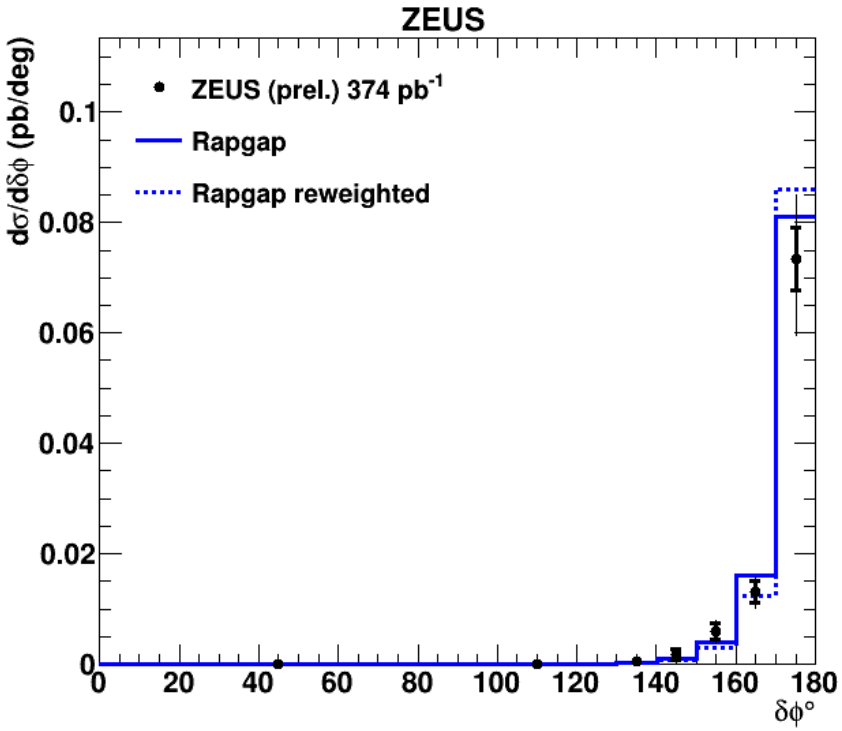


	10 ÷ 15 GeV	15 ÷ 20 GeV	20 ÷ 25 GeV	25 ÷ 30 GeV	30 ÷ 35 GeV	35 ÷ 40 GeV	40 ÷ 45 GeV
cr sec, pb	0.040±0.006	0.085±0.009	0.045±0.006	0.020±0.004	0.008±0.002	0.001±0.001	0.000±0.000
	0.046±0.007	0.099±0.010	0.053±0.007	0.024±0.005	0.009±0.003	0.001±0.001	0.000±0.000
1/acceptance	1.517±0.040	1.234±0.025	1.014±0.026	0.921±0.039	0.845±0.060	0.830±0.118	0.452±0.194

HERAII differential cross sections for angle between photon and jet δϕ , γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section

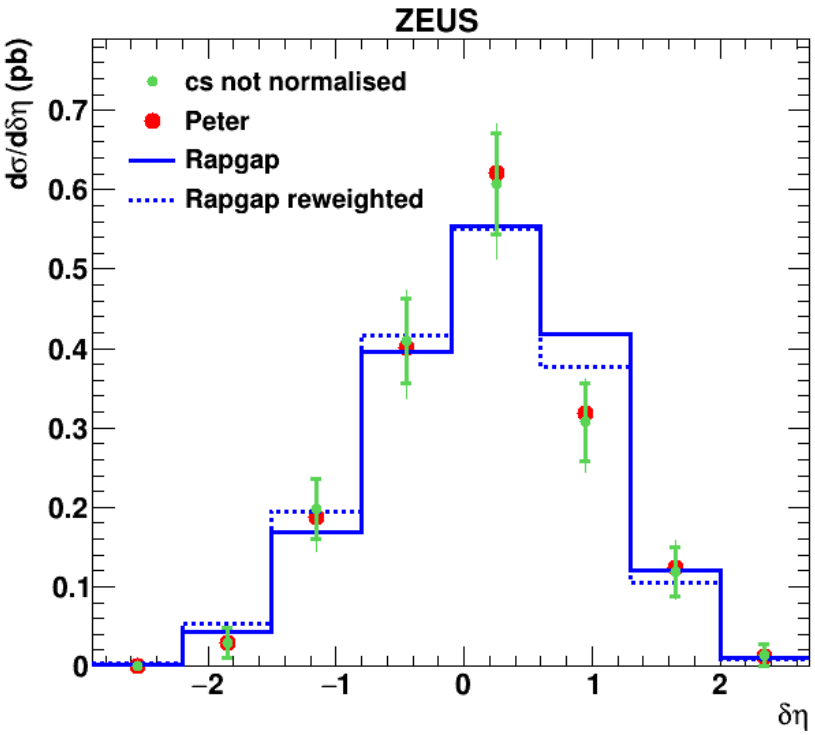


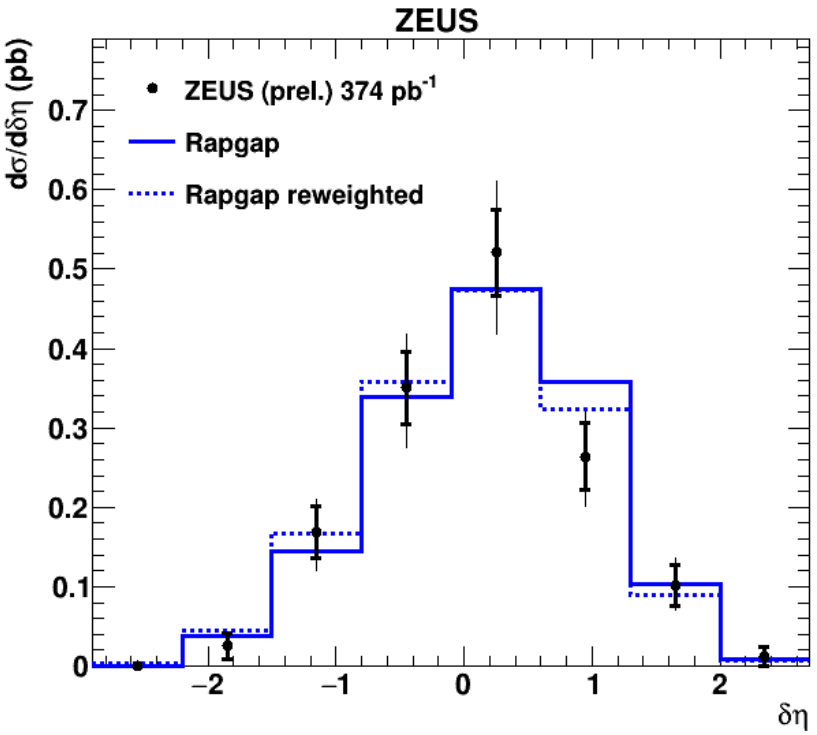


	0 ÷ 90	90 ÷ 130	130 ÷ 140	140 ÷ 150	150 ÷ 160	160 ÷ 170	170 ÷ 180
cr sec, pb	0.000±0.000	0.000±0.000	0.000±0.001	0.002±0.001	0.006±0.001	0.013±0.002	0.073±0.006
	0.000±0.000	0.000±0.000	0.001±0.001	0.002±0.001	0.007±0.002	0.015±0.002	0.086±0.007
1/acceptance	0.000±0.000	0.391±0.130	0.706±0.195	0.774±0.134	0.828±0.069	0.730±0.028	1.309±0.019

HERAII differential cross sections for angle between photon and jet δη , γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section

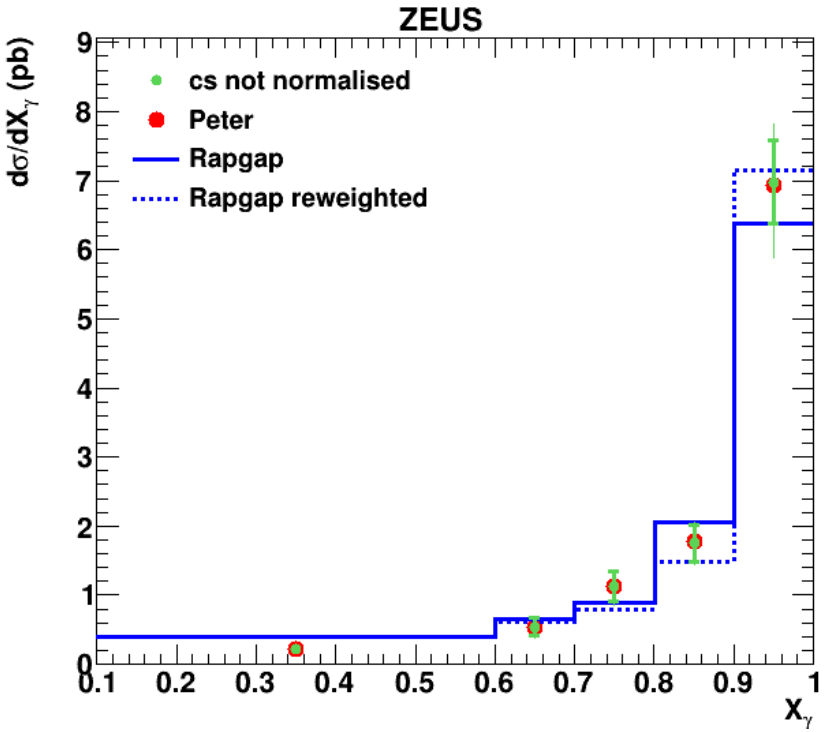


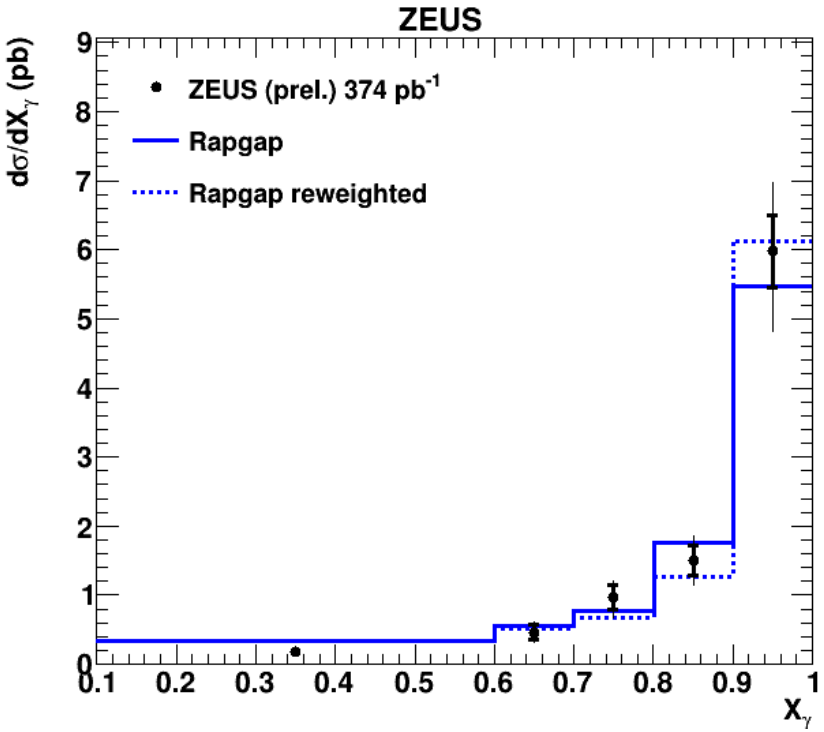


	-2.9 ÷ -2.2	-2.2 ÷ -1.5	-1.5 ÷ -0.8	-0.8 ÷ -0.1	-0.1 ÷ 0.6	0.6 ÷ 1.3	1.3 ÷ 2	2 ÷ 2.7
cr sec, pb	0.000±0.001	0.026±0.016	0.169±0.033	0.351±0.046	0.521±0.054	0.264±0.042	0.102±0.026	0.013±0.012
	0.000±0.002	0.030±0.019	0.197±0.038	0.409±0.053	0.608±0.064	0.308±0.049	0.119±0.030	0.015±0.014
1/acceptance	0.689±0.148	1.073±0.076	1.026±0.038	1.130±0.028	1.215±0.026	1.233±0.029	1.319±0.058	1.231±0.188

HERAII differential cross sections for X_γ, γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section





	0.1 ÷ 0.6	0.6 ÷ 0.7	0.7 ÷ 0.8	0.8 ÷ 0.9	0.9 ÷ 1
cr sec, pb	0.184±0.044	0.466±0.114	0.965±0.182	1.500±0.222	5.979±0.518
	0.214±0.051	0.543±0.133	1.126±0.213	1.750±0.259	6.975±0.604
1/acceptance	0.910±0.036	0.666±0.049	0.810±0.049	0.830±0.029	1.521±0.024

HERAII differential cross sections for X_{IP}, γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
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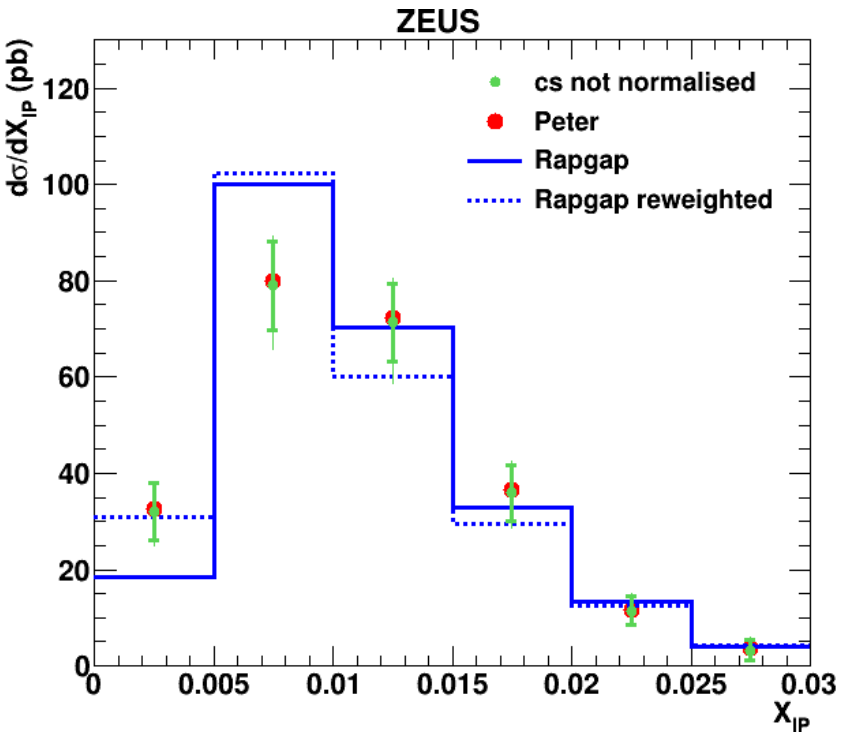
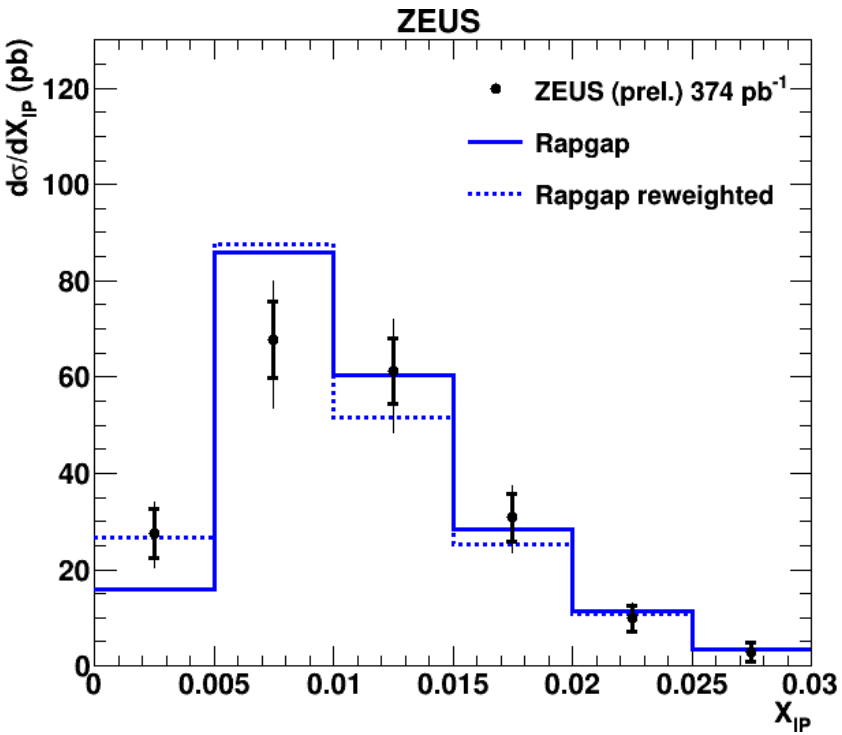
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section





	0 ÷ 0.005	0.005 ÷ 0.01	0.01 ÷ 0.015	0.015 ÷ 0.02	0.02 ÷ 0.025	0.025 ÷ 0.03
cr sec, pb	27.452±5.143	67.711±7.900	61.175±6.896	30.840±4.965	9.824±2.589	2.809±1.869
	32.025±5.999	78.990±9.216	71.365±8.045	35.978±5.793	11.461±3.020	3.277±2.181
1/acceptance	1.568±0.058	1.278±0.023	1.048±0.025	1.038±0.038	0.842±0.050	0.804±0.083

HERAII differential cross sections for Z_{IP}, γ+jet selection

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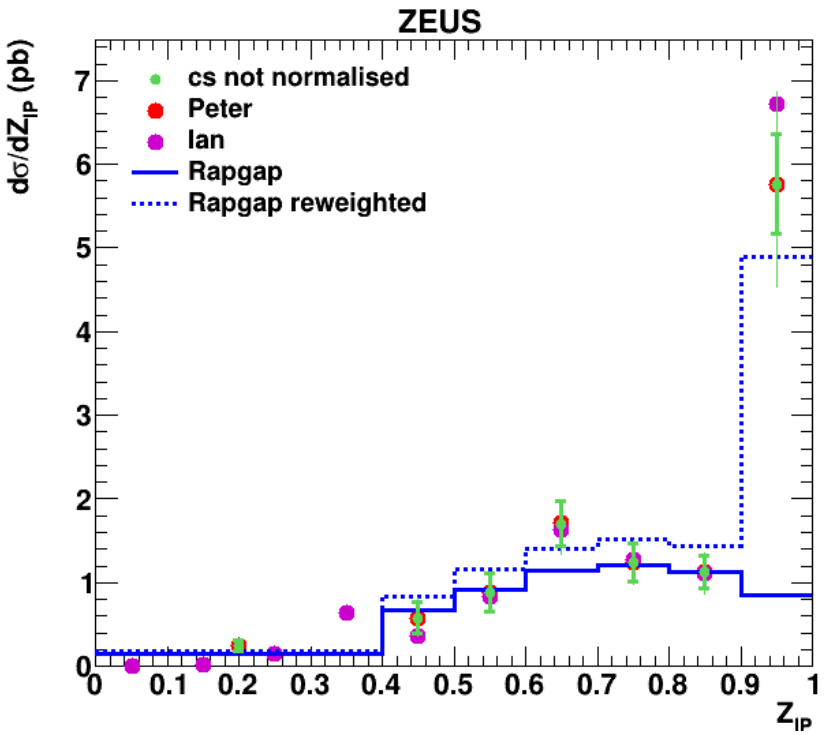
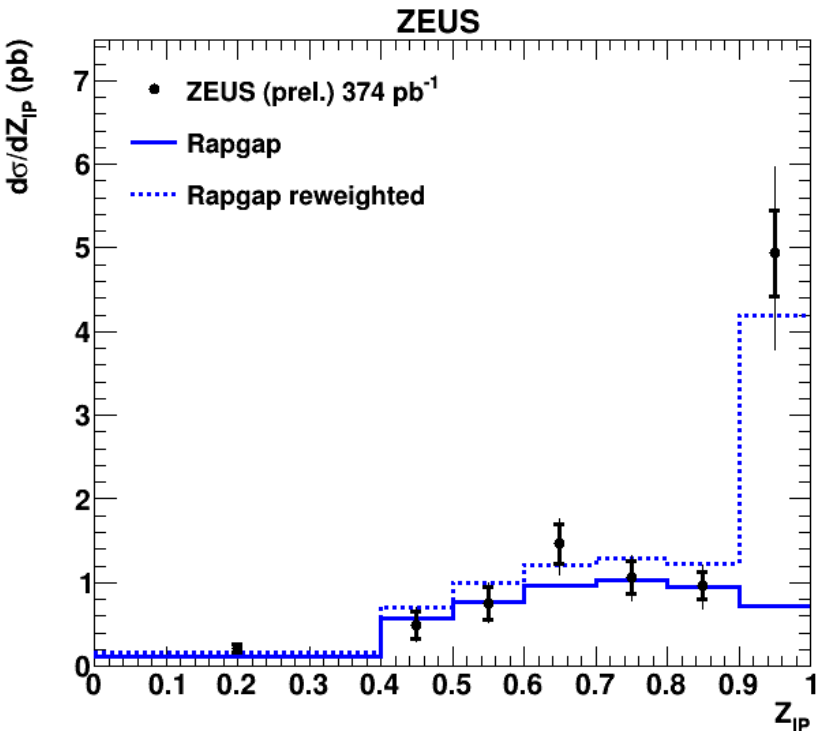
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
magenta – cross sections calculated by Ian Skillicorn
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section
standard Rapgap is normalized to cross section in 0-0.9 Z_{IP} range





	0.0 ÷ 0.4	0.4 ÷ 0.5	0.5 ÷ 0.6	0.6 ÷ 0.7	0.7 ÷ 0.8	0.8 ÷ 0.9	0.9 ÷ 1.0
cr sec, pb	0.210±0.051	0.492±0.161	0.752±0.196	1.461±0.233	1.059±0.195	0.964±0.169	4.937±0.510
	0.245±0.059	0.574±0.188	0.878±0.229	1.705±0.272	1.236±0.227	1.124±0.197	5.760±0.595
1/acceptance	1.164±0.065	1.096±0.061	1.111±0.052	1.046±0.043	0.967±0.036	0.739±0.029	1.607±0.037

Inclusive selection

HERAII differential cross sections for photon E_t, inclusive selection

black – cross sections normalized to HERA1 total cross section
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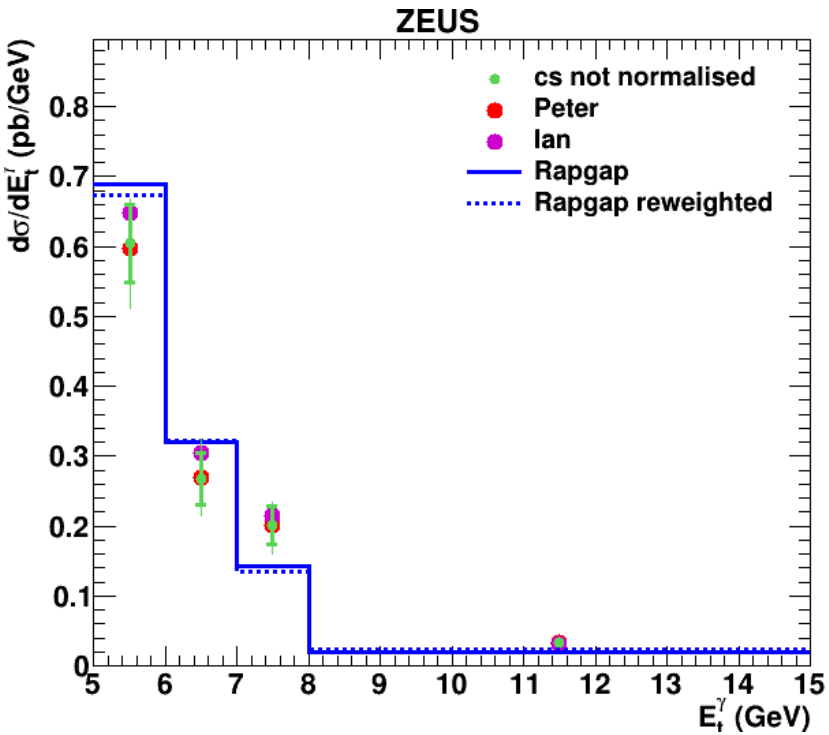
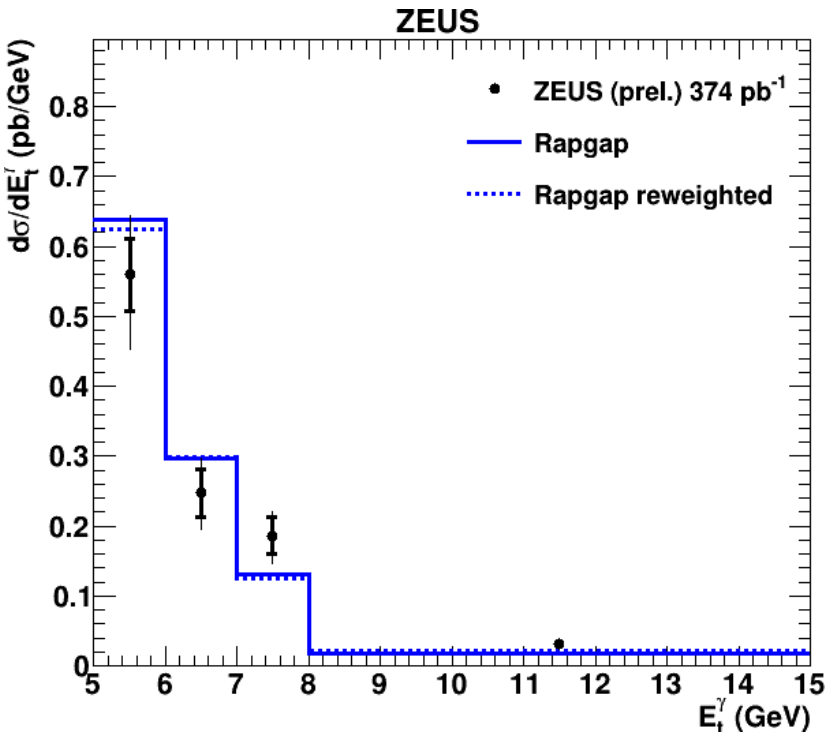
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section





	5 ÷ 6 GeV	6 ÷ 7 GeV	7 ÷ 8 GeV	8 ÷ 15 GeV
cr sec, pb	0.560±0.051	0.248±0.034	0.186±0.026	0.031±0.004
	0.604±0.055	0.267±0.037	0.201±0.028	0.034±0.005
1/acceptance	1.072±0.021	1.115±0.029	1.012±0.036	1.104±0.030

HERAII differential cross sections for photon η , inclusive selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
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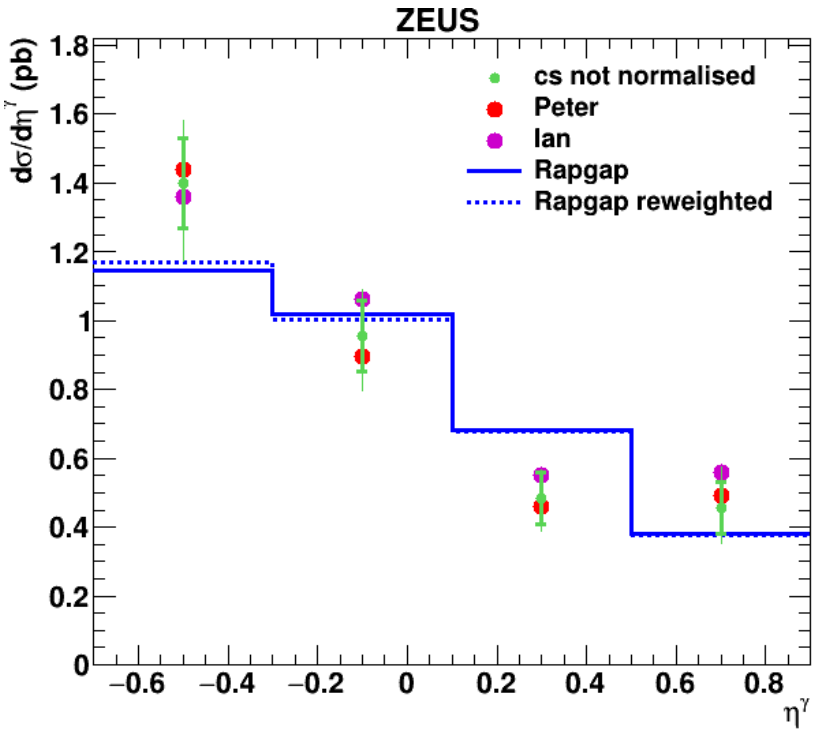
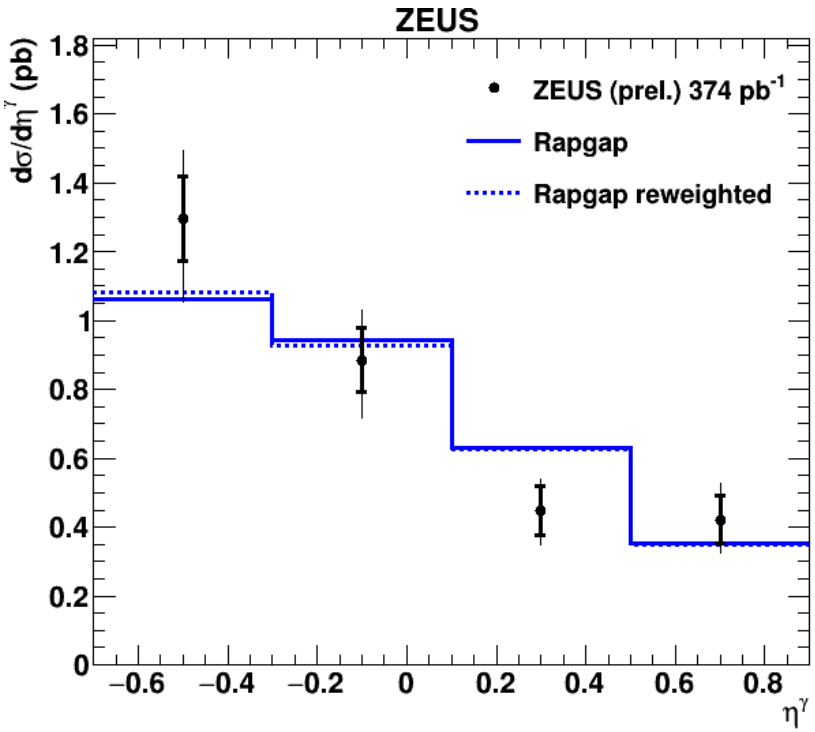
magenta – cross sections calculated by Ian Skillicorn
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section

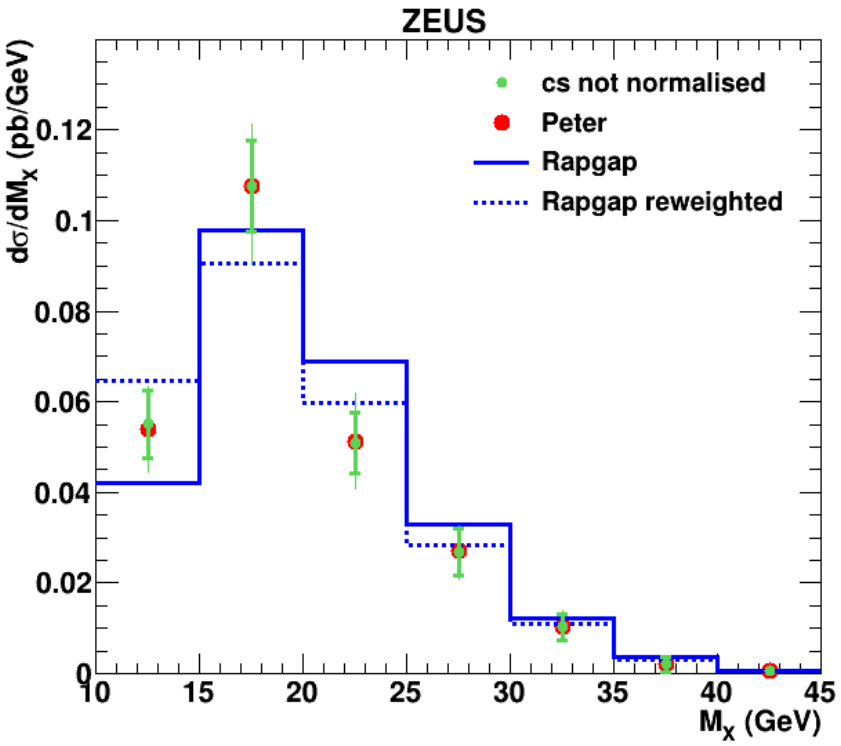


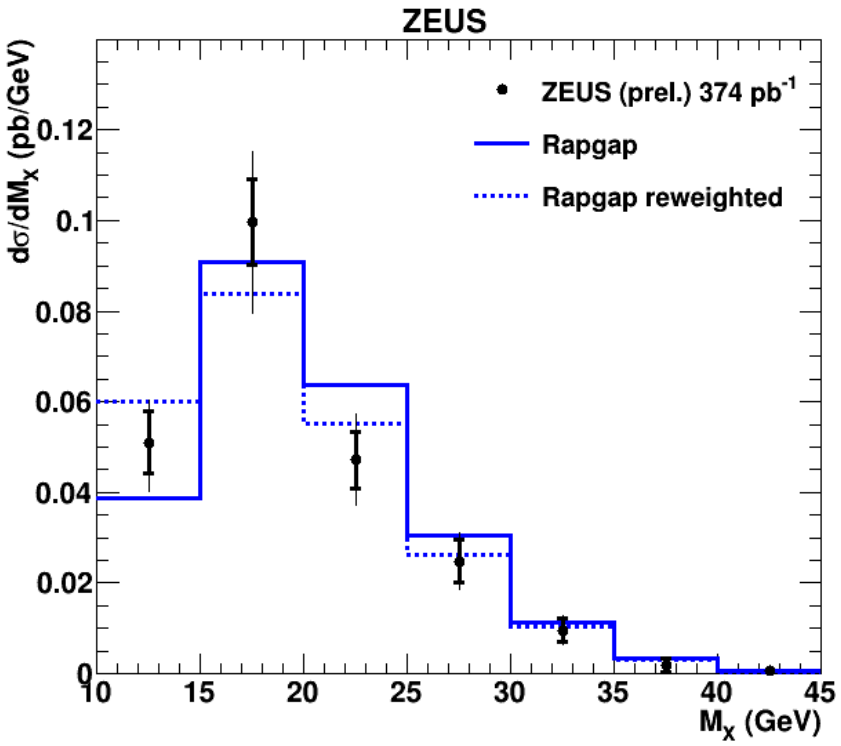


	-0.7 ÷ -0.3	-0.3 ÷ -0.1	-0.1 ÷ 0.5	0.5 ÷ 0.9
cr sec, pb	1.296±0.122	0.886±0.095	0.448±0.070	0.422±0.069
	1.399±0.131	0.956±0.102	0.484±0.075	0.455±0.074
1/acceptance	1.136±0.022	1.049±0.021	1.038±0.025	1.074±0.033

HERAII differential cross sections for photon M_X, inclusive selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section

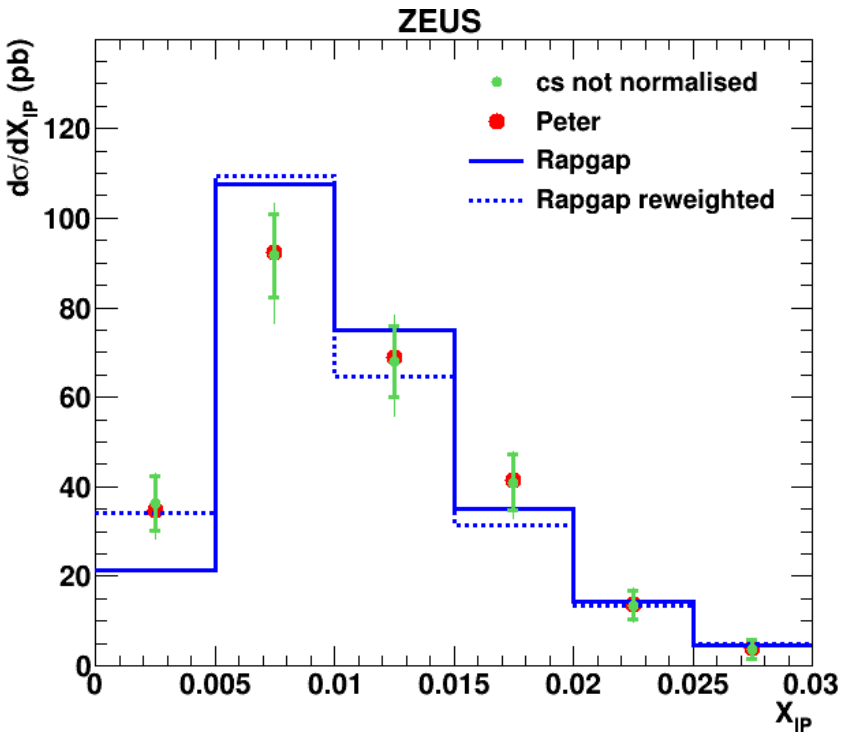


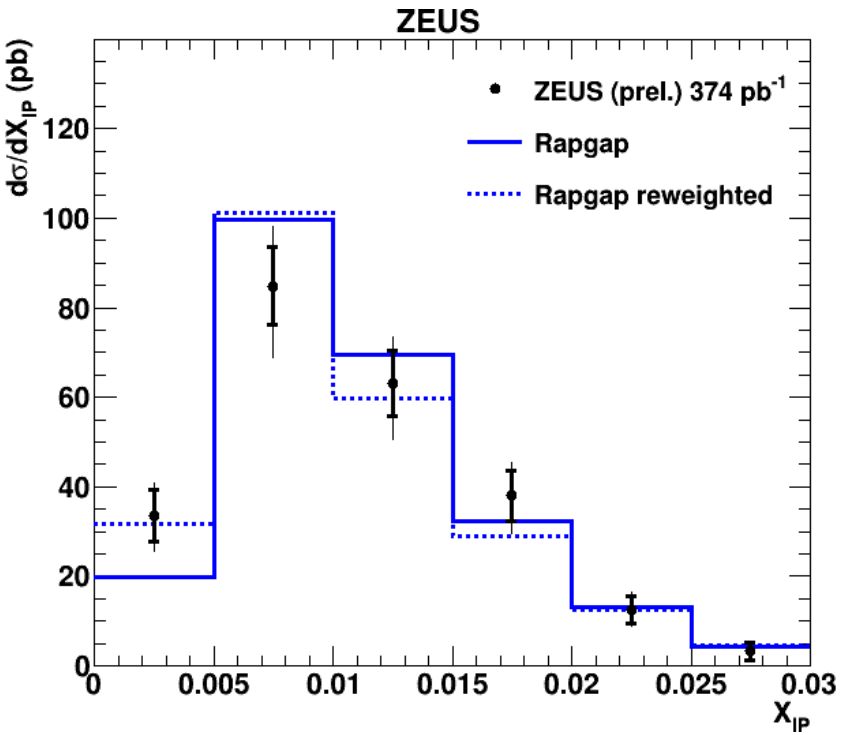


	10 ÷ 15 GeV	15 ÷ 20 GeV	20 ÷ 25 GeV	25 ÷ 30 GeV	30 ÷ 35 GeV	35 ÷ 40 GeV	40 ÷ 45 GeV
cr sec, pb	0.051±0.007	0.100±0.009	0.047±0.006	0.025±0.005	0.009±0.003	0.002±0.002	0.000±0.001
	0.055±0.007	0.108±0.010	0.051±0.007	0.027±0.005	0.010±0.003	0.002±0.002	0.001±0.001
1/acceptance	1.323±0.031	1.123±0.022	0.959±0.023	0.894±0.035	0.835±0.056	0.773±0.104	0.660±0.233

HERAII differential cross sections for X_{IP}, inclusive selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
blue – Rapgap (70:30) prediction normalized to HERAII (left) / HERAI (right) total cross section





	0 ÷ 0.005	0.005 ÷ 0.01	0.01 ÷ 0.015	0.015 ÷ 0.02	0.02 ÷ 0.025	0.025 ÷ 0.03
cr sec, pb	33.609±5.754	84.868±8.677	62.979±7.301	37.962±5.708	12.558±3.064	3.314±1.988
	36.286±6.213	91.627±9.369	67.995±7.882	40.985±6.163	13.559±3.308	3.578±2.146
1/acceptance	1.303±0.039	1.150±0.020	0.994±0.024	0.987±0.034	0.842±0.047	0.773±0.073

Conclusions

- We have presented a final set of cross sections for diffractive photoproduction of prompt photons in the region defined by kinematic cuts and cuts on η_{max} and X_{IP}.
- Rapgap gives a good description of all variables with the exception of Z_{IP} and η_{max}.
- The Z_{IP} distribution shows a peak for $Z_{IP} > 0.9$ that is not predicted by Rapgap.
- The high Z_{IP} events are associated with high X_{γ} and low η_{max}.
- When the direct Rapgap is weighted by a factor 7 for $Z_{IP} > 0.9$, the weighted Rapgap describes all variables well.
- We have evidence for a hitherto unobserved direct process at high Z_{IP} that is not modeled in Rapgap with the H1 2006B version of the pomeron PDF.

Future plans

- make final group presentation and paper

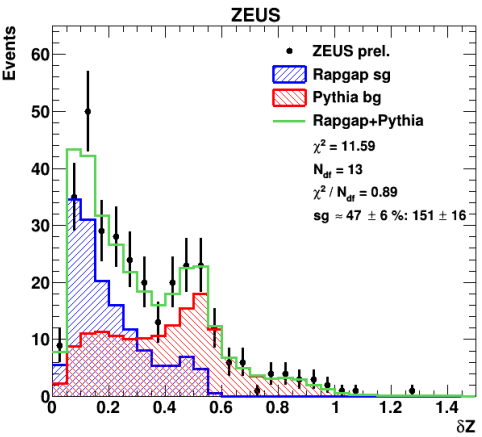
Thanks for help and support to Peter Bussey, Ian Skillicorn, David Saxon

Backup

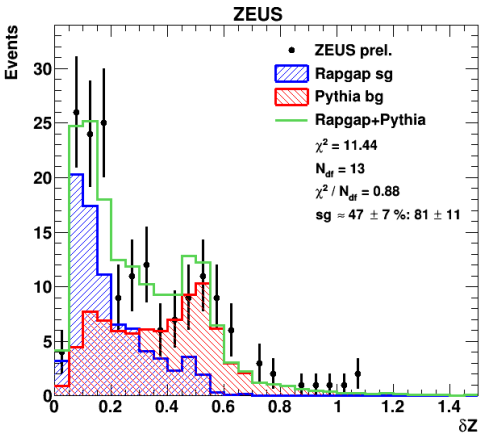
The dZ fit procedures for photon E_T cross section evaluation

γ+jet selection

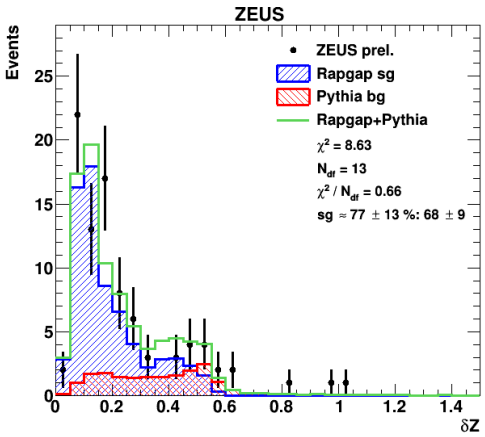
5 ÷ 6



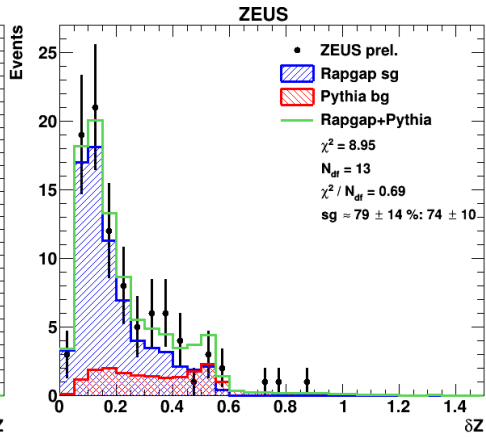
6 ÷ 7



7 ÷ 8



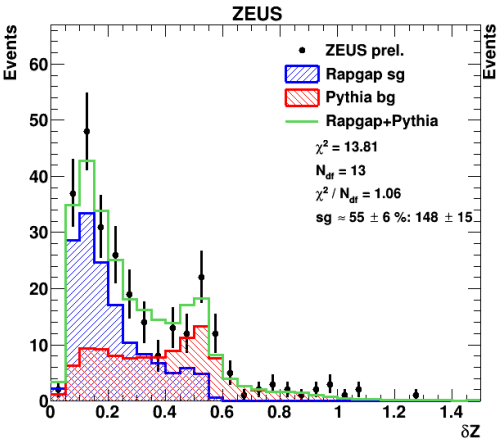
8 ÷ 15



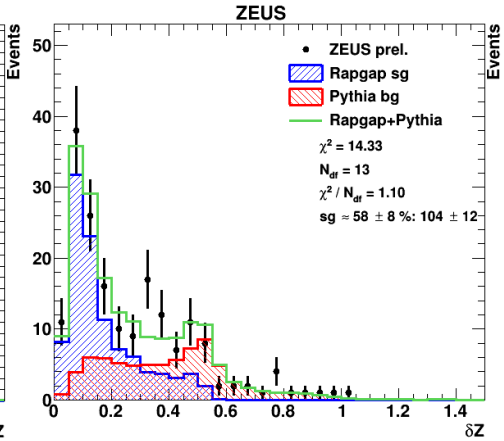
The dZ fit procedures for photon η cross section evaluation

γ+jet selection

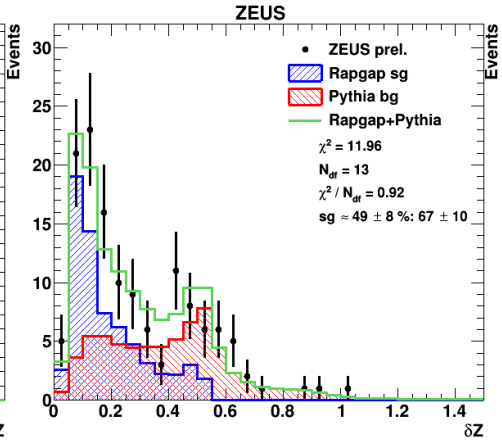
-0.7 ÷ -0.3



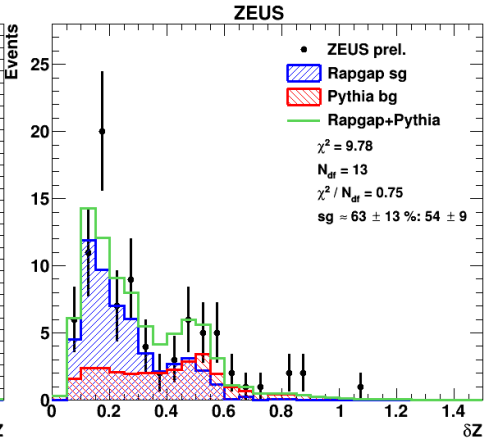
-0.3 ÷ -0.1



-0.1 ÷ 0.5



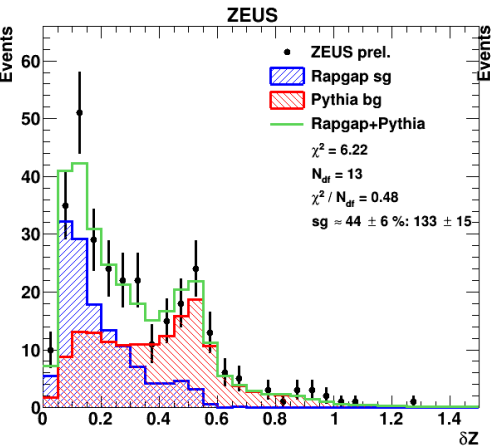
0.5 ÷ 0.9



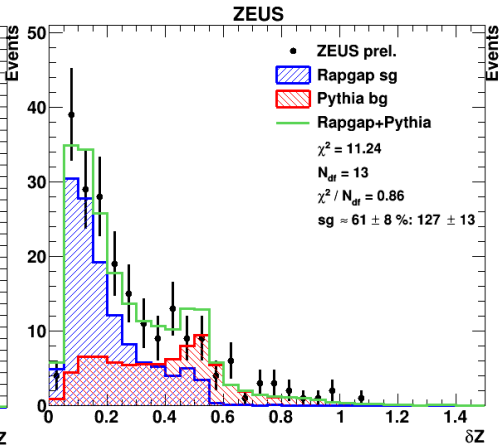
The dZ fit procedures for jet E_T cross section evaluation

γ+jet selection

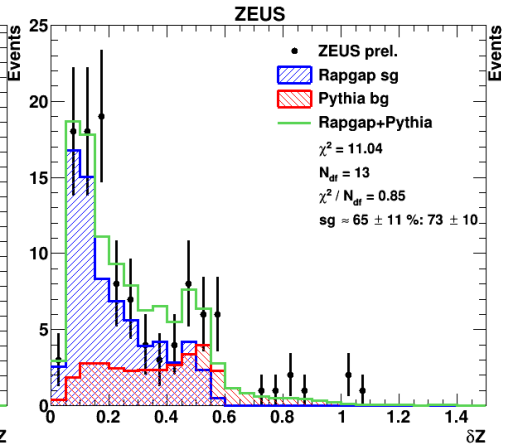
4 ÷ 6



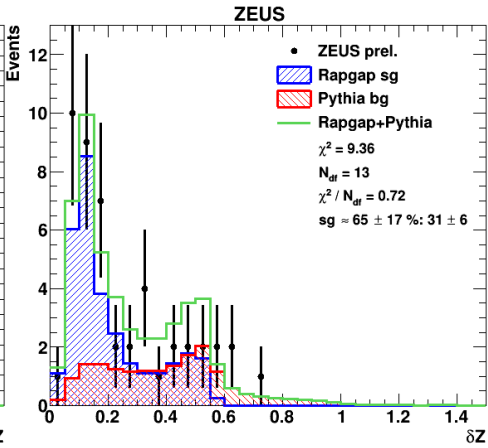
6 ÷ 8



8 ÷ 10



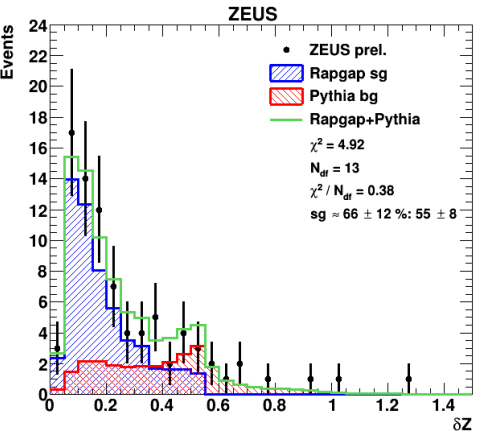
10 ÷ 15



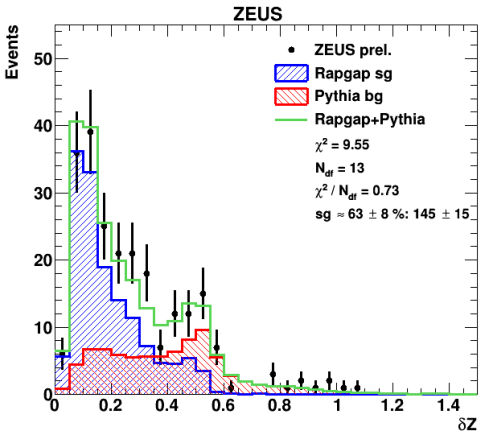
The dZ fit procedures for M_X cross section evaluation

γ+jet selection

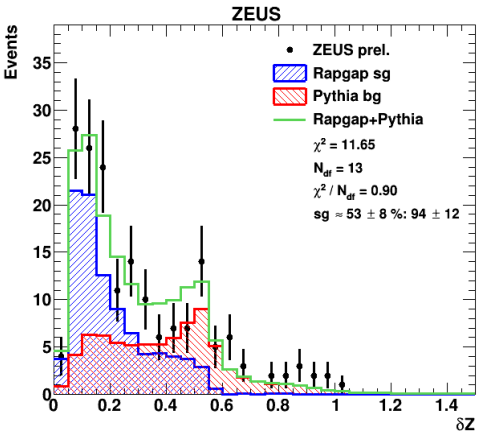
10 ÷ 15



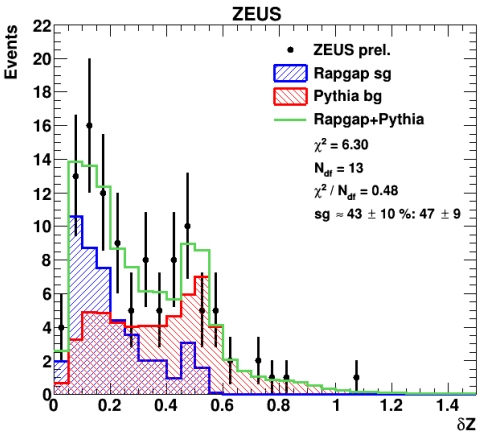
15 ÷ 20



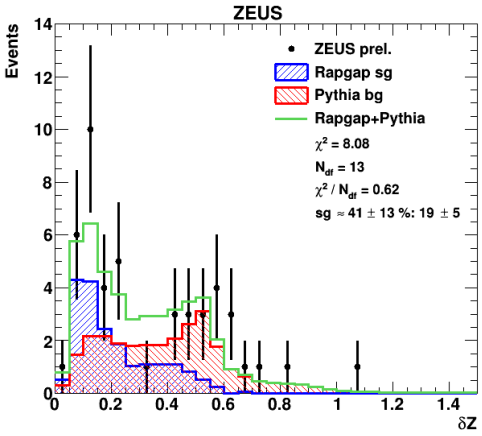
20 ÷ 25



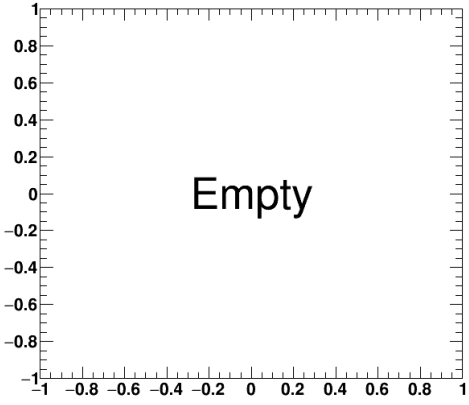
25 ÷ 30



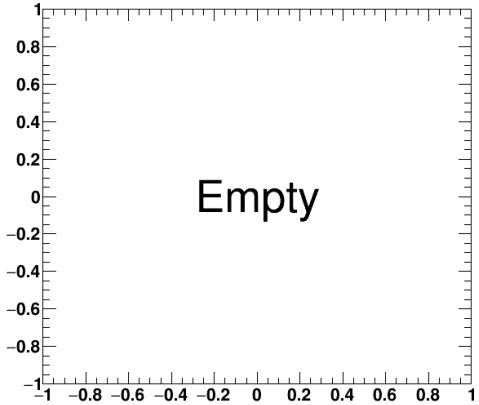
30 ÷ 35



35 ÷ 40



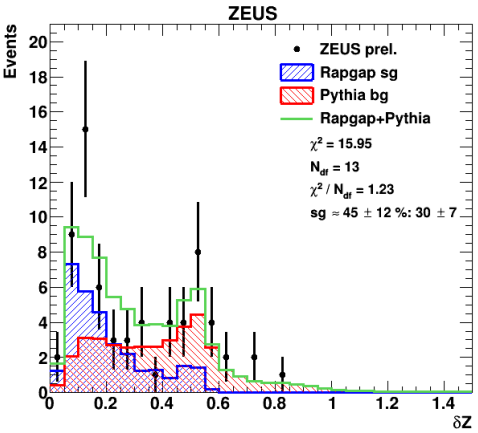
40 ÷ 45



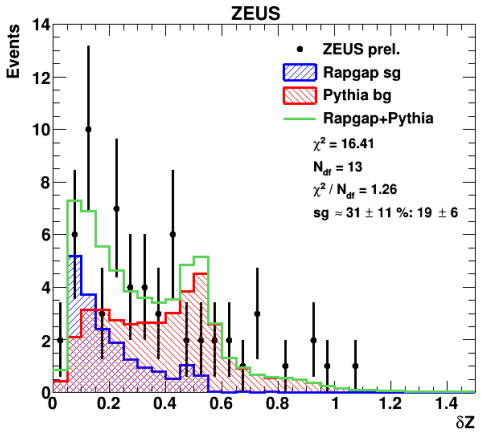
The dZ fit procedures for Z_{IP} cross section evaluation

γ+jet selection

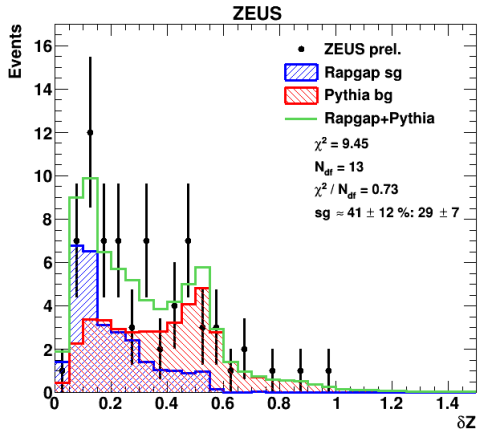
0 ÷ 0.4



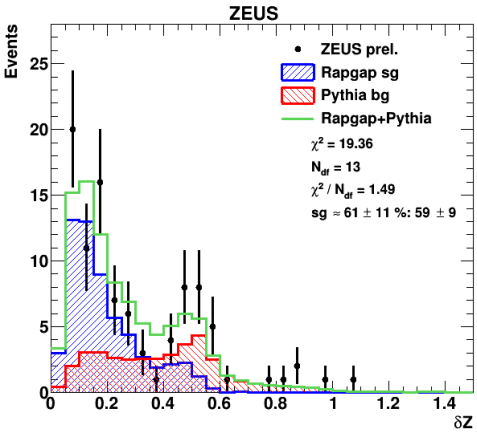
0.4 ÷ 0.5



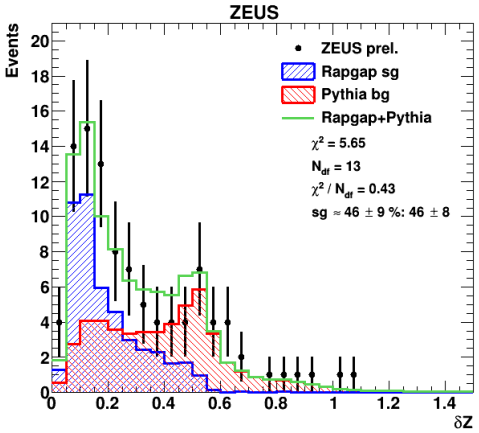
0.5 ÷ 0.6



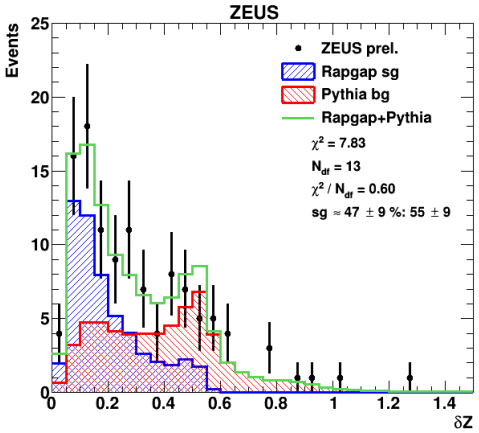
0.6 ÷ 0.7



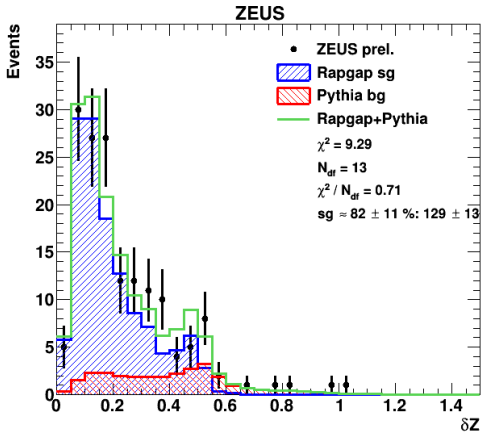
0.7 ÷ 0.8



0.8 ÷ 0.9



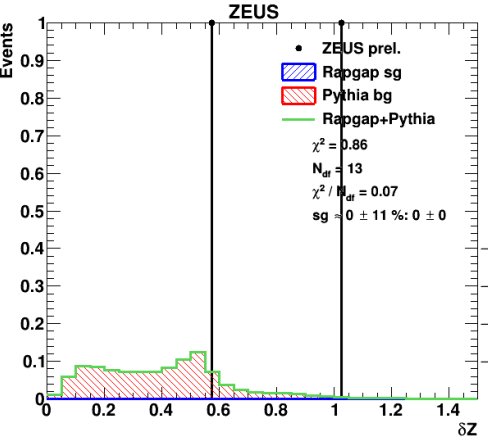
0.9 ÷ 1



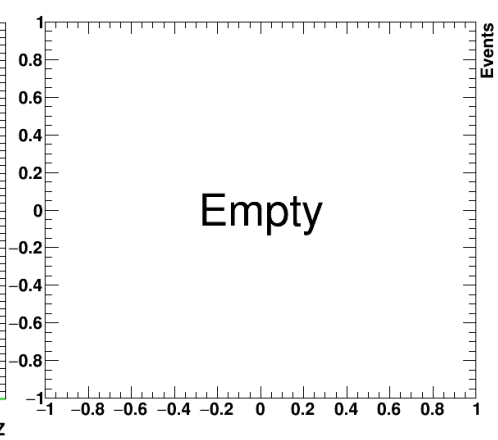
The dZ fit procedures for δϕ cross section evaluation

γ+jet selection

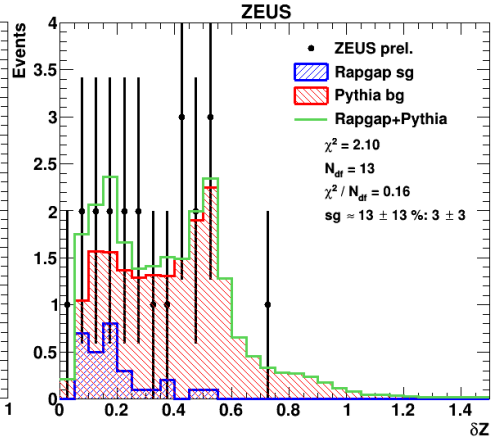
0 ÷ 90



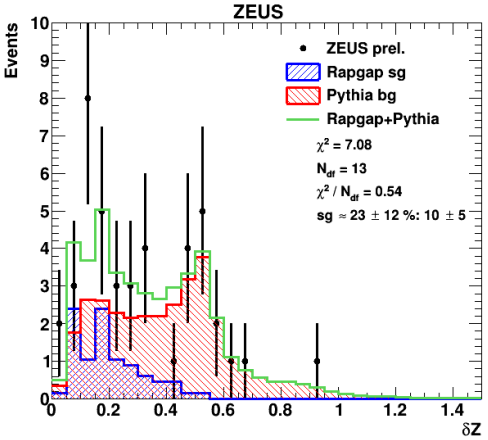
90 ÷ 130



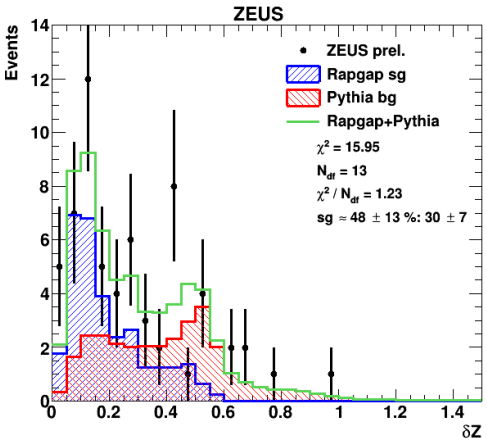
130 ÷ 140



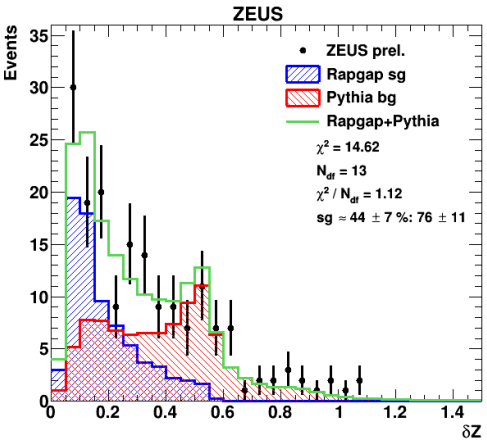
140 ÷ 150



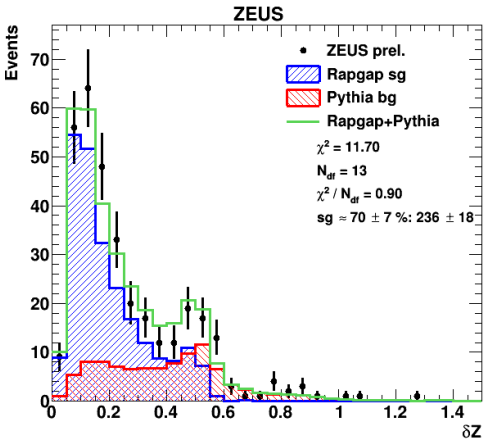
150 ÷ 160



160 ÷ 170



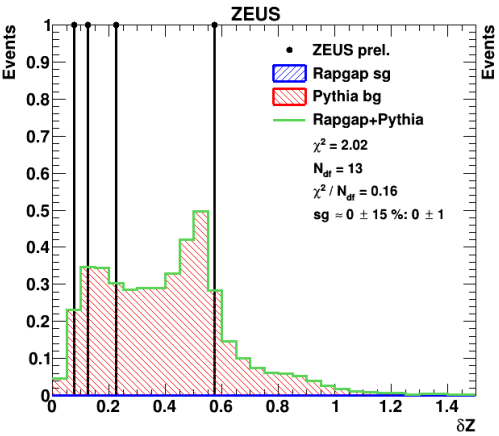
170 ÷ 180



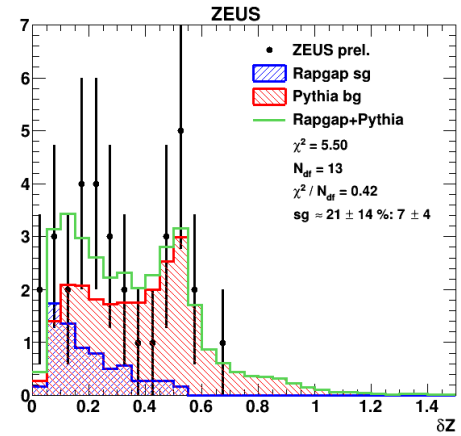
The dZ fit procedures for δη cross section evaluation

γ+jet selection

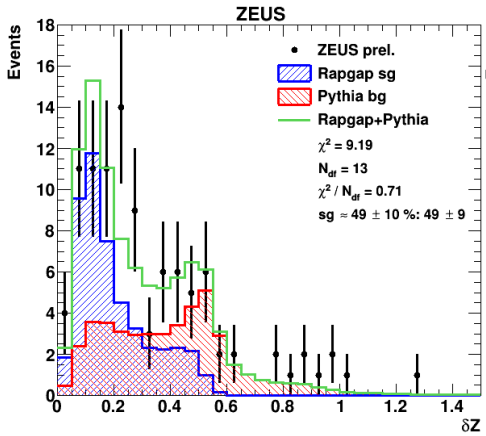
-2.9 ÷ -2.2



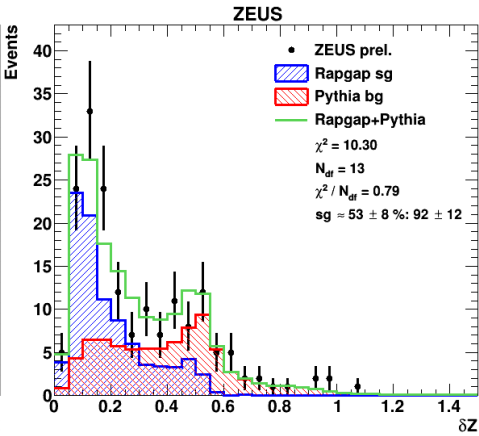
-2.2 ÷ -1.5



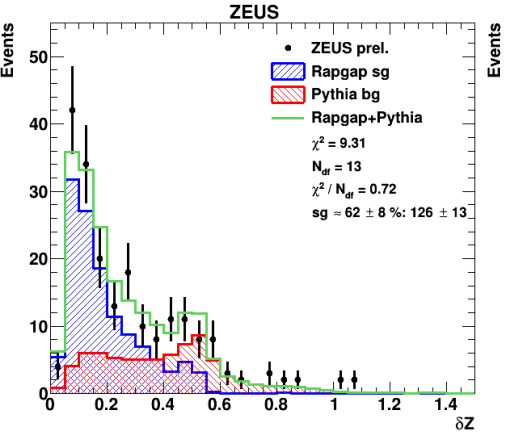
-1.5 ÷ -0.8



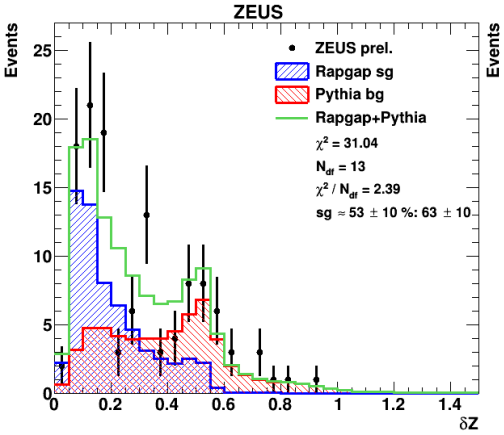
-0.8 ÷ -0.1



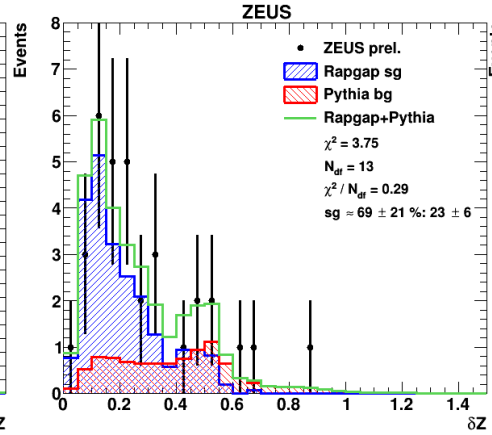
-0.1 ÷ 0.6



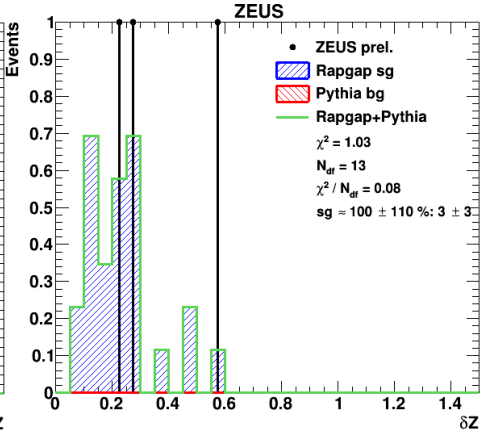
0.6 ÷ 1.3



1.3 ÷ 2



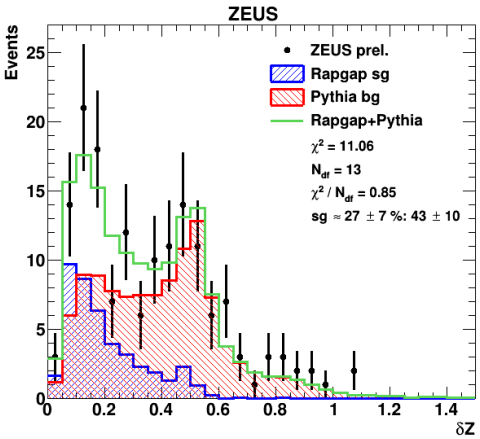
2 ÷ 2.7



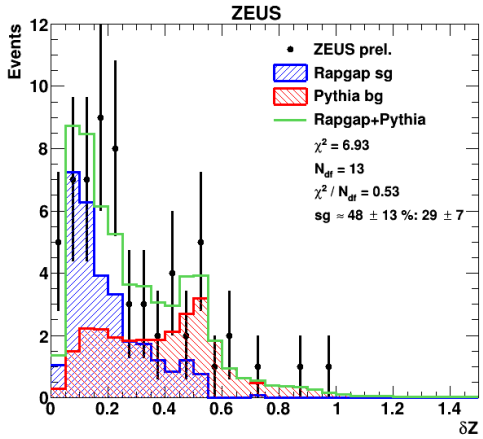
The dZ fit procedures for X_γ cross section evaluation

γ+jet selection

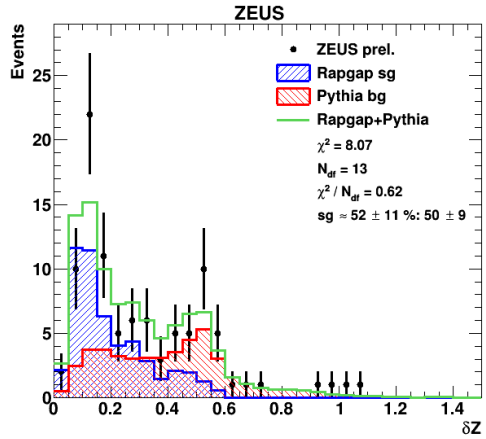
0.1 ÷ 0.6



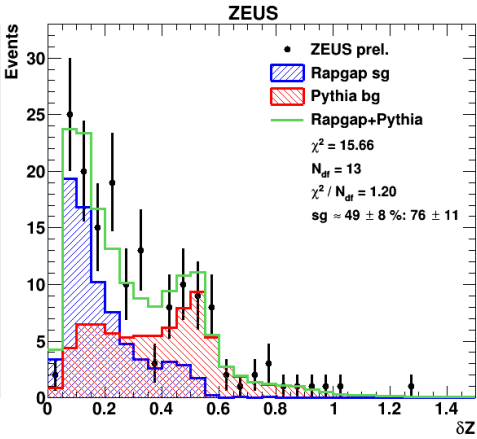
0.6 ÷ 0.7



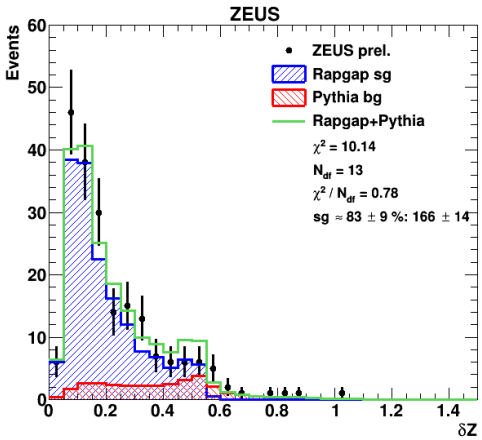
0.7 ÷ 0.8



0.8 ÷ 0.9



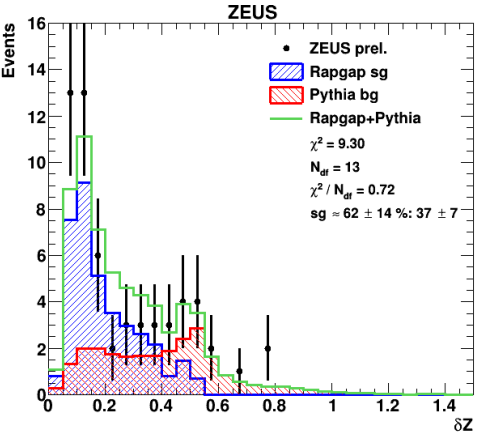
0.9 ÷ 1



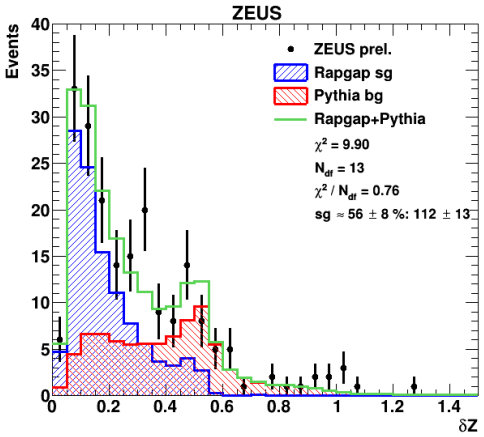
The dZ fit procedures for X_{IP} cross section evaluation

γ+jet selection

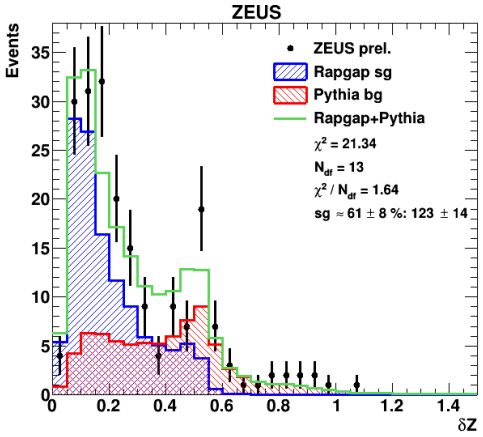
0 ÷ 0.005



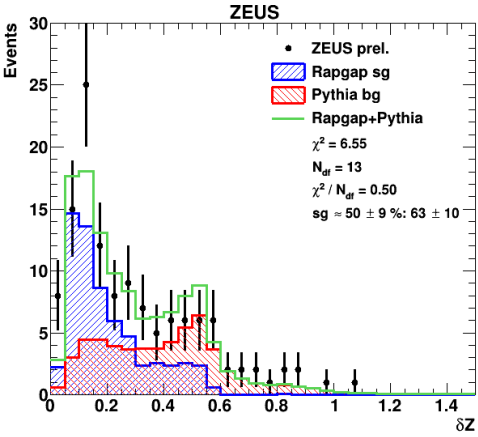
0.005 ÷ 0.01



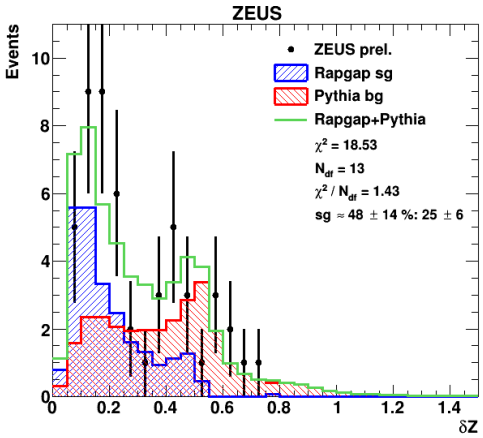
0.01 ÷ 0.015



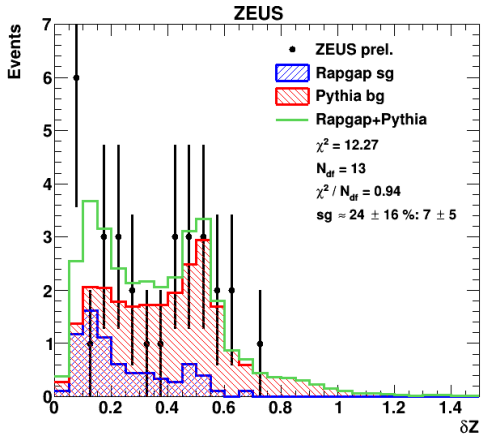
0.015 ÷ 0.02



0.02 ÷ 0.025



0.025 ÷ 0.03

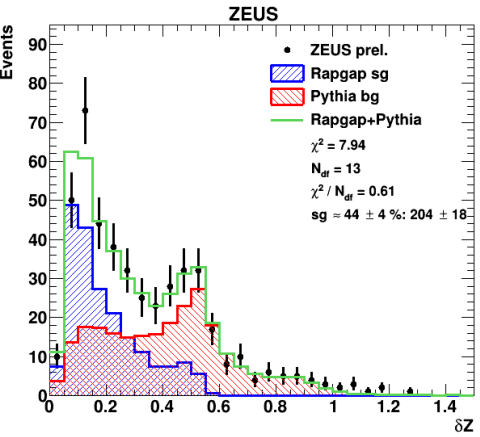


inclusive

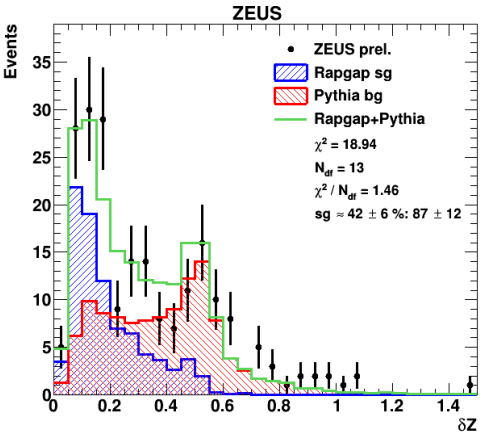
The dZ fit procedures for photon E_T cross section evaluation

inclusive selection

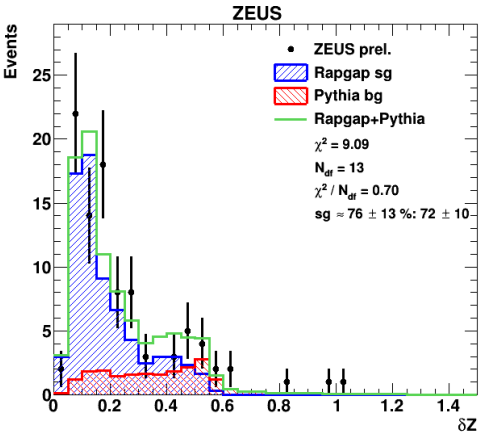
5 ÷ 6



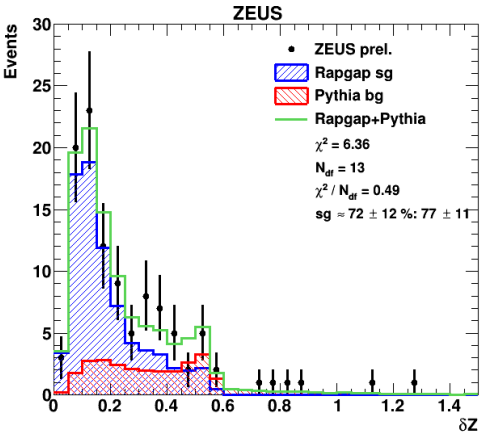
6 ÷ 7



7 ÷ 8



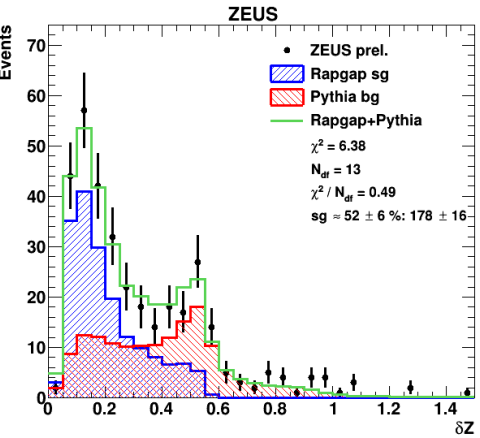
8 ÷ 15



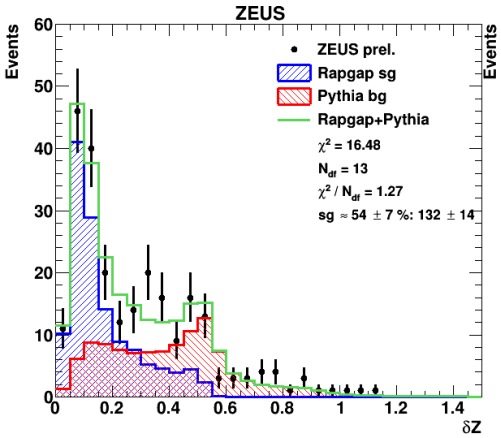
The dZ fit procedures for photon η cross section evaluation

inclusive selection

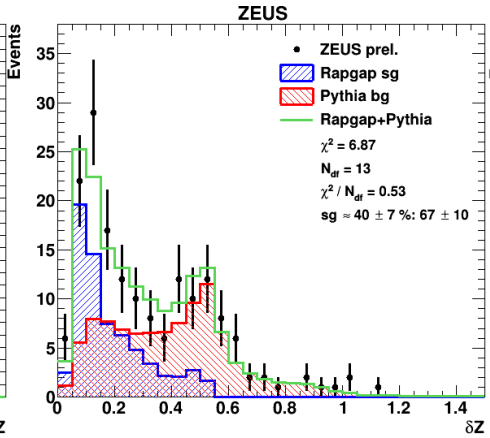
-0.7 ÷ -0.3



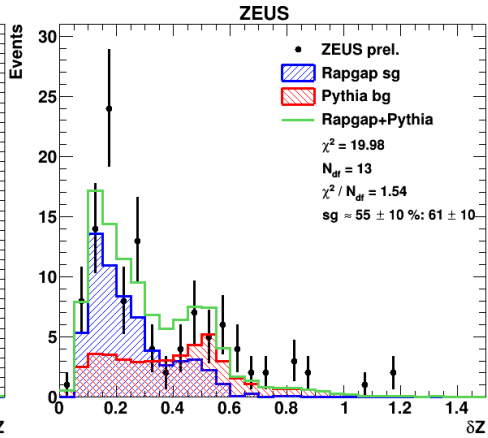
-0.3 ÷ -0.1



-0.1 ÷ 0.5



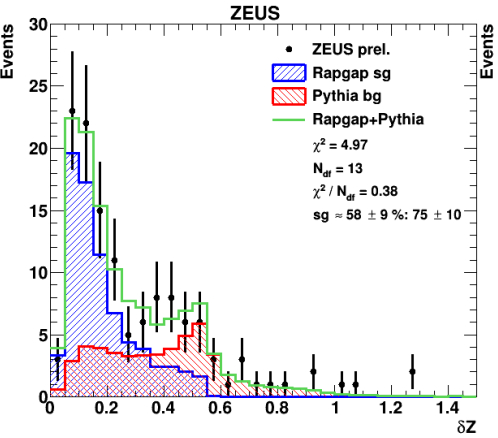
0.5 ÷ 0.9



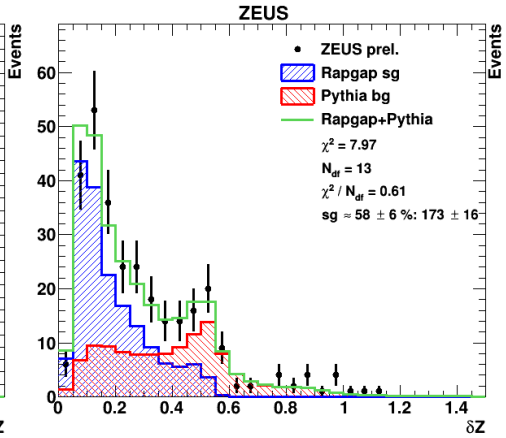
The dZ fit procedures for M_X cross section evaluation

inclusive selection

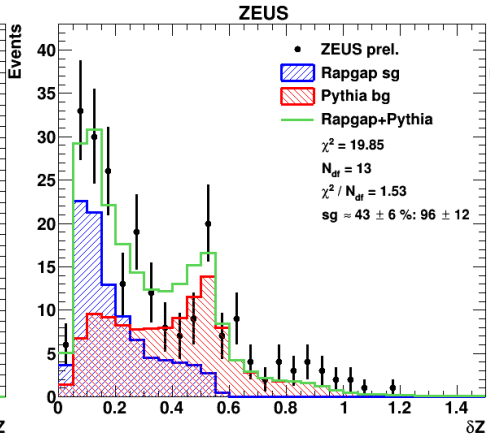
10 ÷ 15



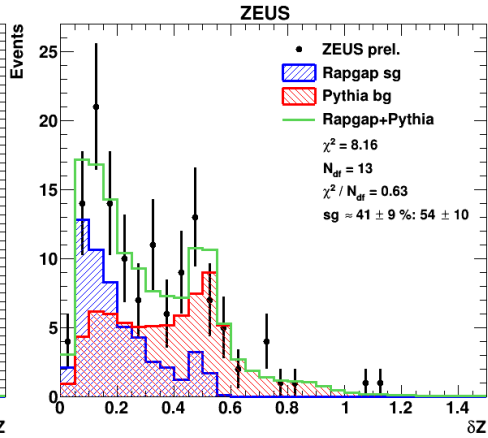
15 ÷ 20



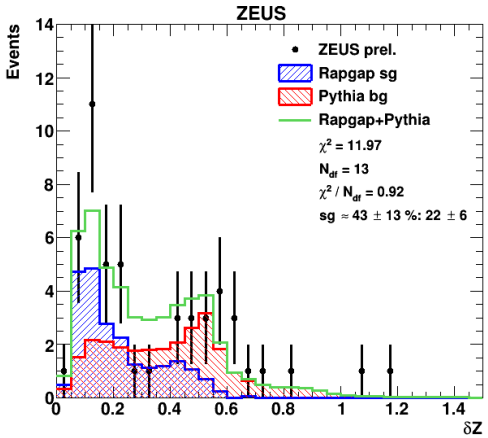
20 ÷ 25



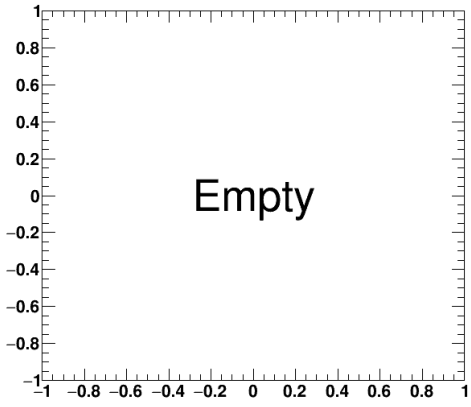
25 ÷ 30



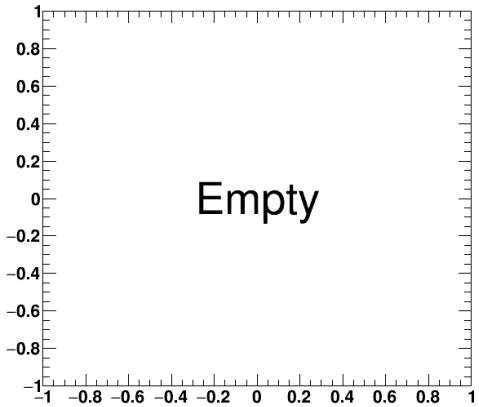
30 ÷ 35



35 ÷ 40



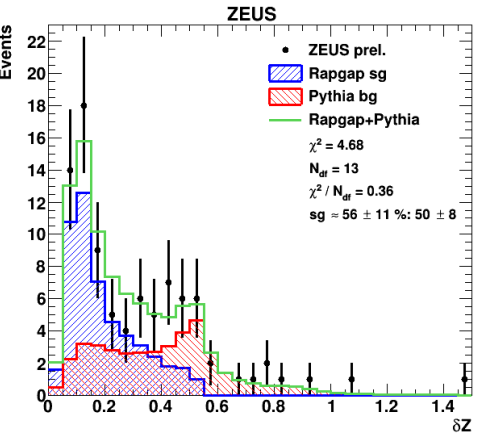
40 ÷ 45



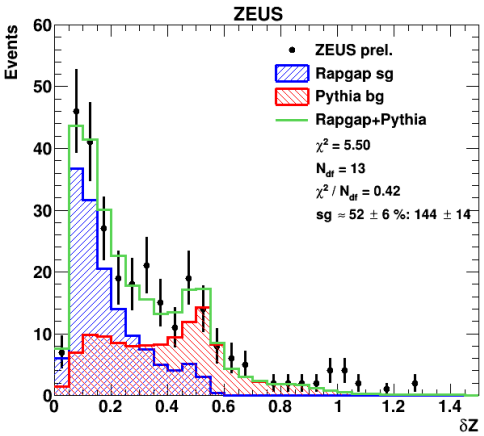
The dZ fit procedures for X_{IP} cross section evaluation

inclusive selection

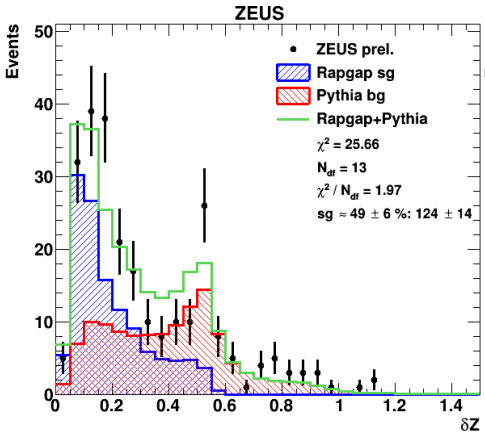
0 ÷ 0.005



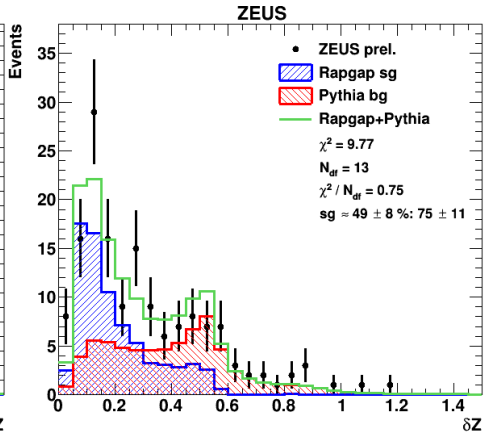
0.005 ÷ 0.01



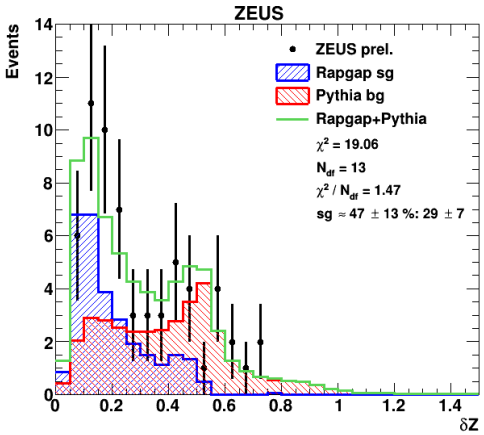
0.01 ÷ 0.015



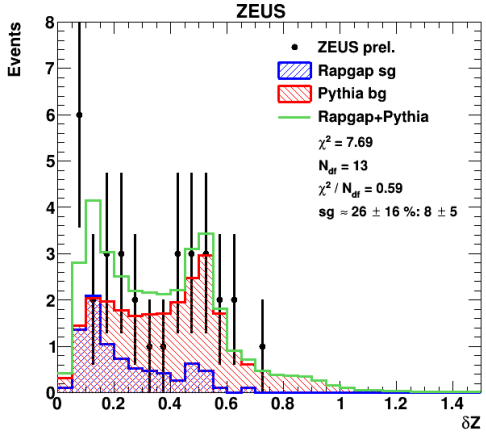
0.015 ÷ 0.02



0.02 ÷ 0.025

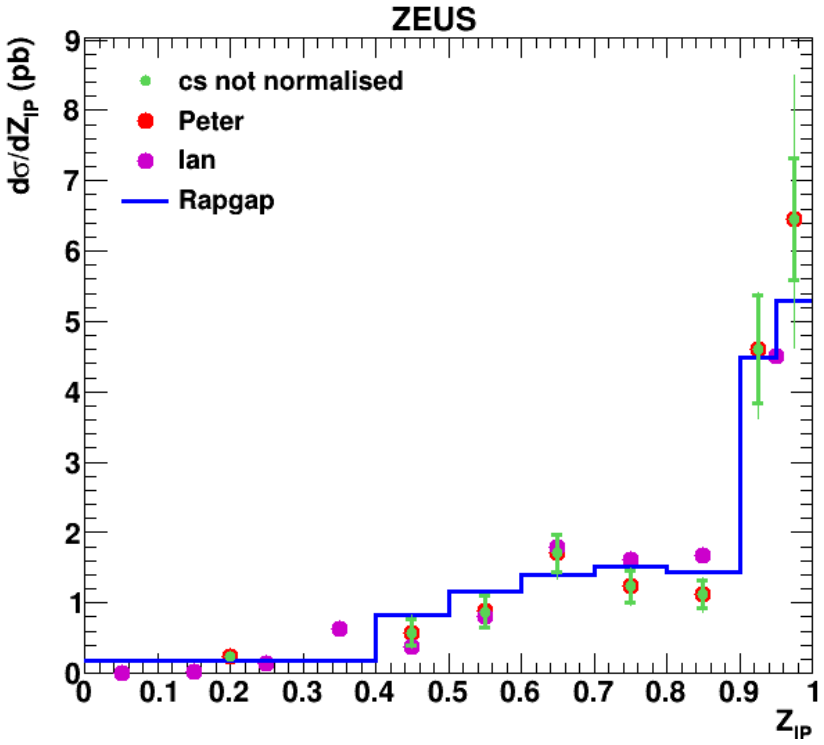


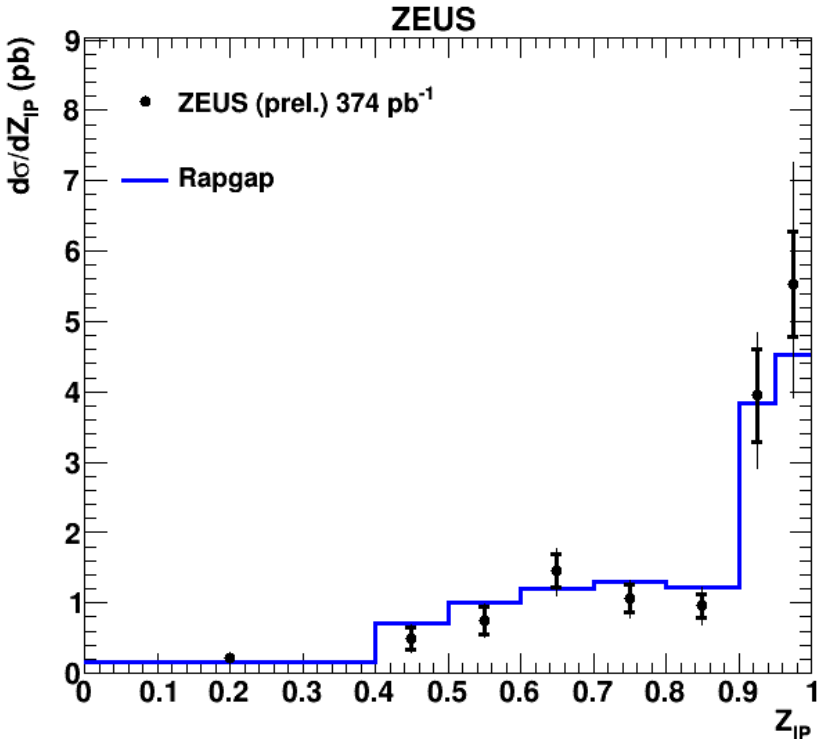
0.025 ÷ 0.03



HERAII differential cross sections for Z_{IP}, γ+jet selection

black – cross sections normalized to HERA1 total cross section
green – cross sections not normalized
red – cross sections calculated by Peter Bussey
magenta – cross sections calculated by Ian Skillicorn
blue – Rapgap prediction normalized to HERAII (left) / HERAI (right) total cross section



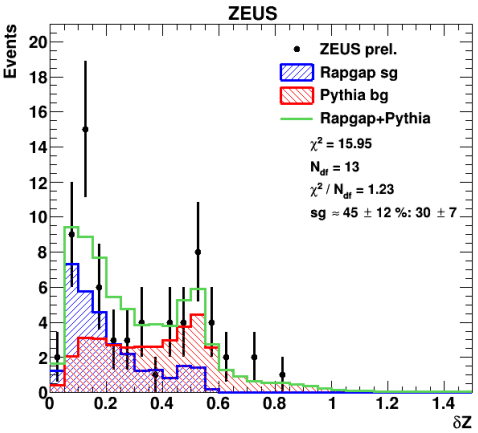


	0.0 ÷ 0.4	0.4 ÷ 0.5	0.5 ÷ 0.6	0.6 ÷ 0.7	0.7 ÷ 0.8	0.8 ÷ 0.9	0.9 ÷ 0.95	0.95 ÷ 1.0
cr sec, pb	0.210±0.051	0.492±0.161	0.752±0.196	1.461±0.233	1.059±0.195	0.964±0.169	3.951±0.655	5.531±0.739
	0.245±0.059	0.574±0.188	0.878±0.229	1.705±0.272	1.236±0.227	1.124±0.197	4.610±0.764	6.453±0.862
1/acceptance	1.164±0.065	1.096±0.061	1.111±0.052	1.046±0.043	0.967±0.036	0.739±0.029	1.694±0.062	1.541±0.046

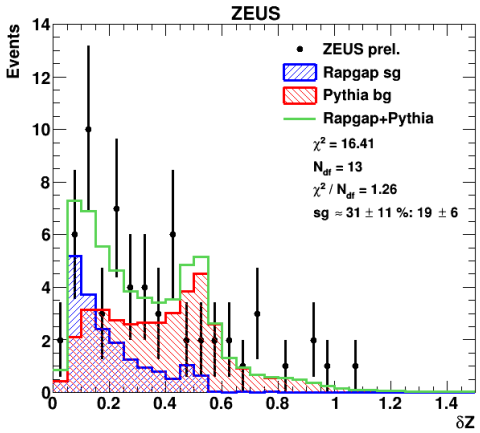
The dZ fit procedures for Z_{IP} cross section evaluation

γ+jet selection

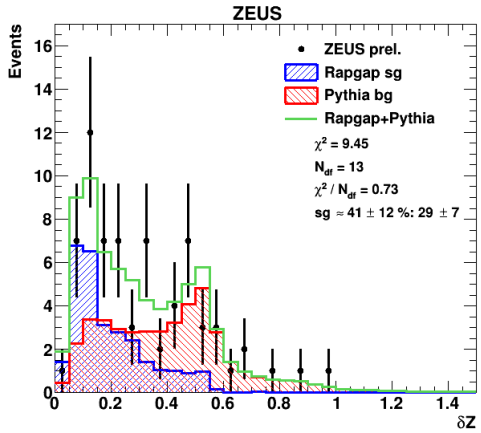
0 ÷ 0.4



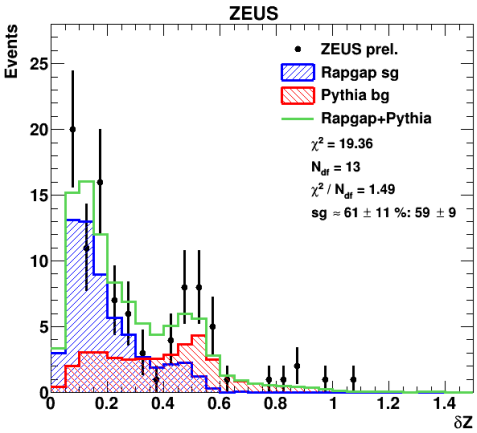
0.4 ÷ 0.5



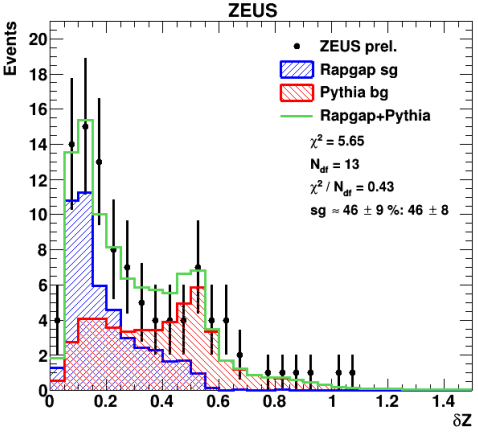
0.5 ÷ 0.6



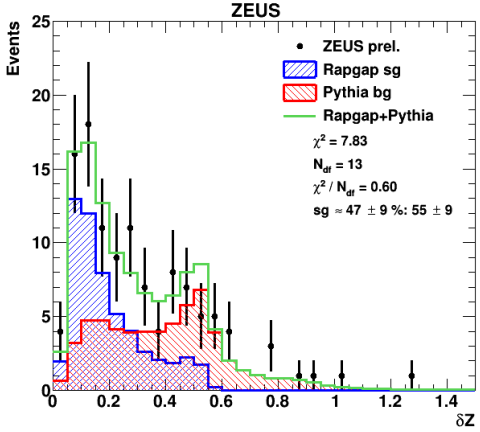
0.6 ÷ 0.7



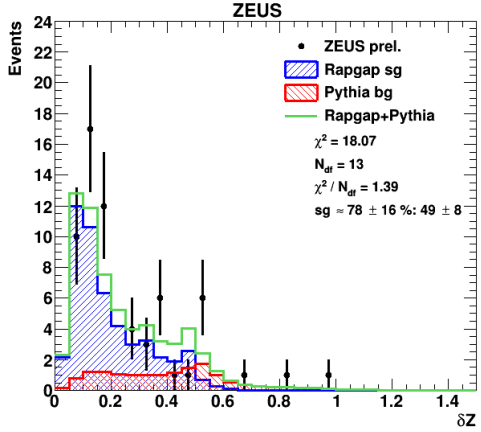
0.7 ÷ 0.8



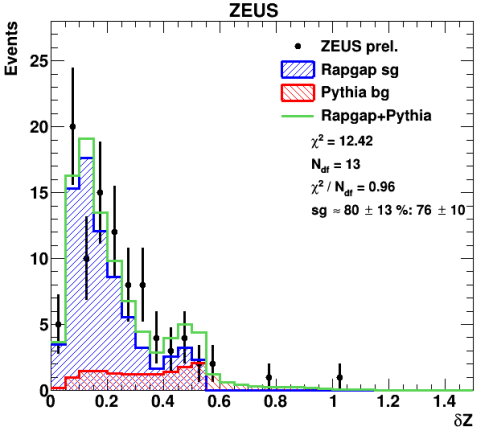
0.8 ÷ 0.9



0.9 ÷ 0.95



0.95 ÷ 1

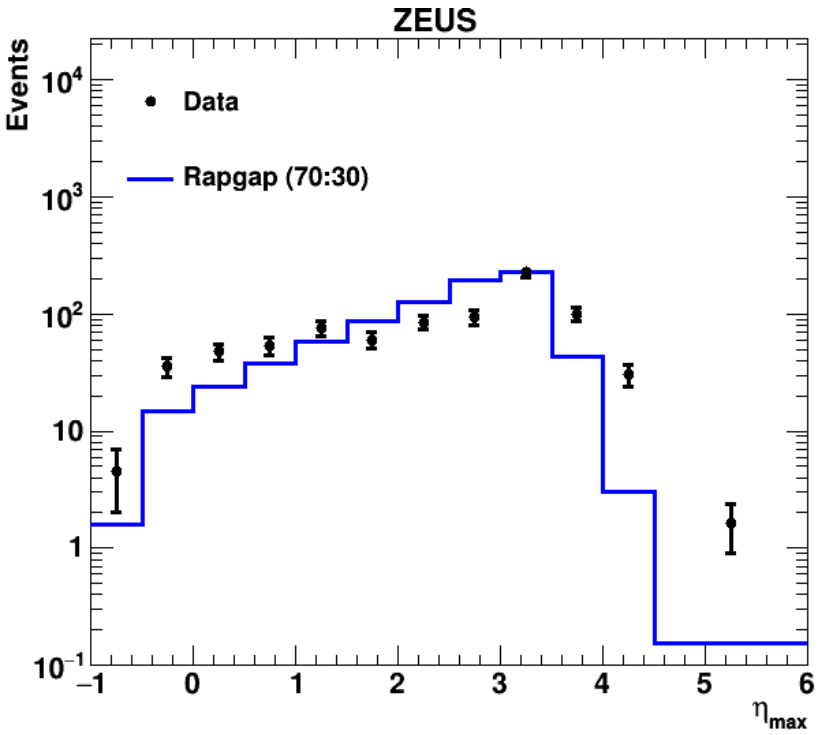


HERAII, the comparison of η_{max} data signal distribution to MC Rapgap signal, γ+jet selection

X_P cut

data – fitted photons, MC is normalized to data

Rapgap is not-weighted



Rapgap direct is weighted