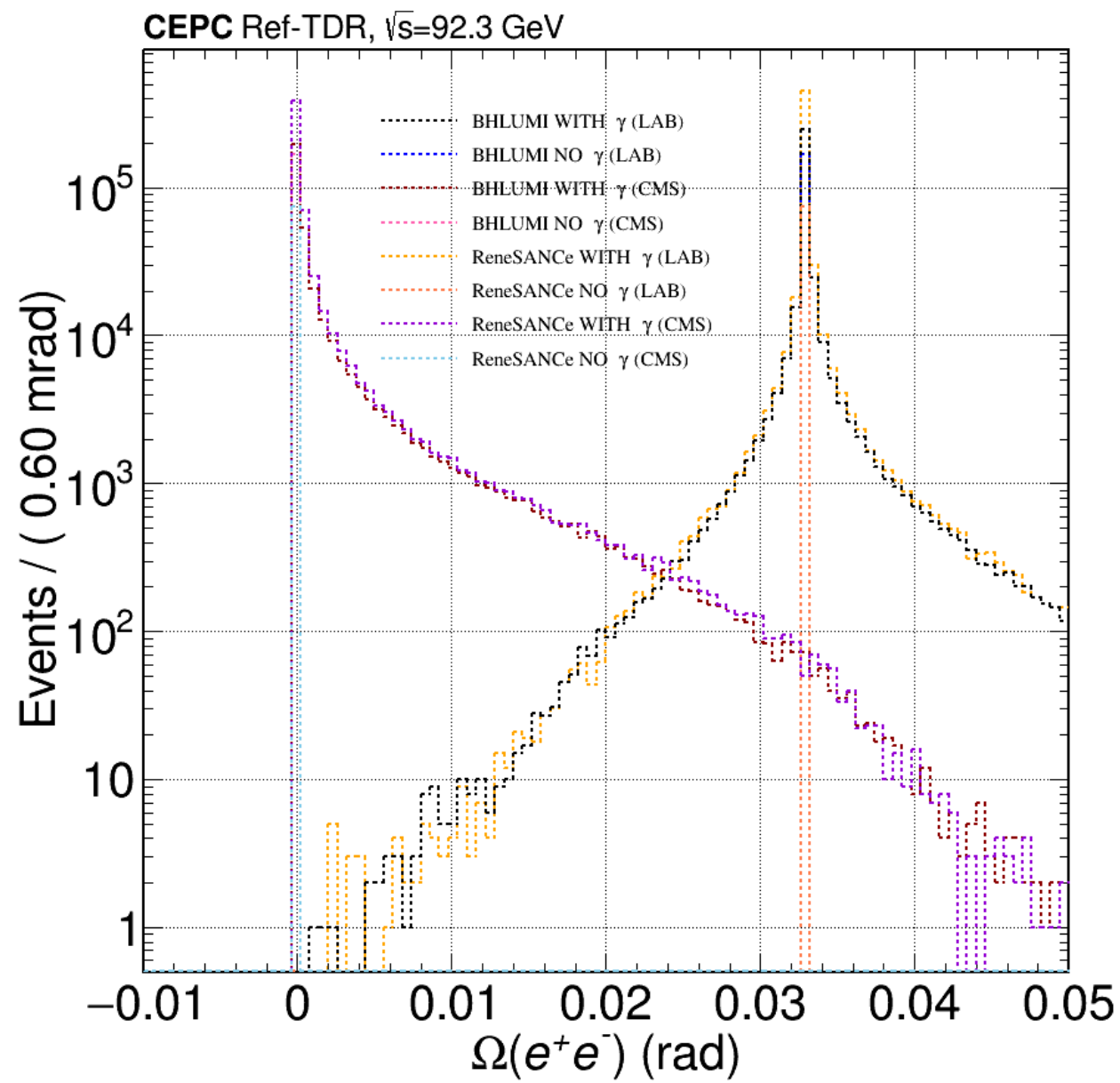


CEPC LumiCal group meeting

Jiading Gong, Renjie Ma

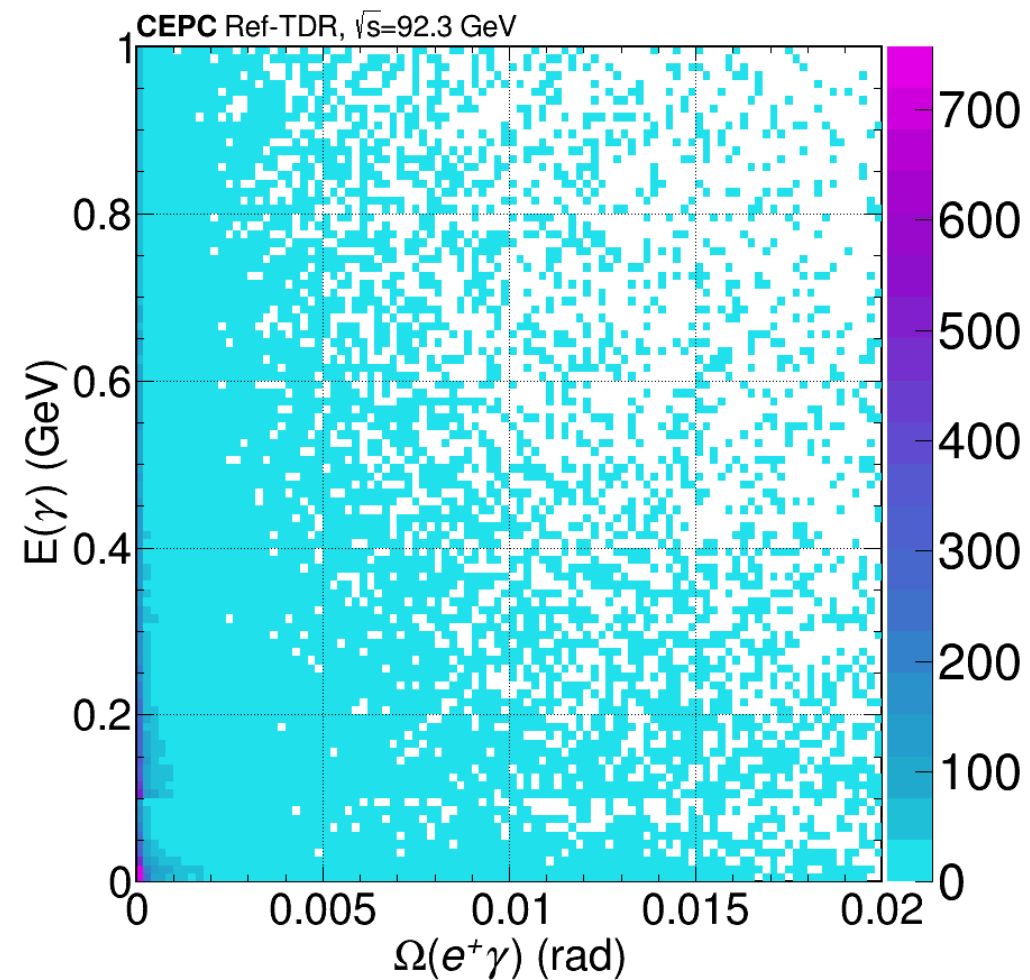
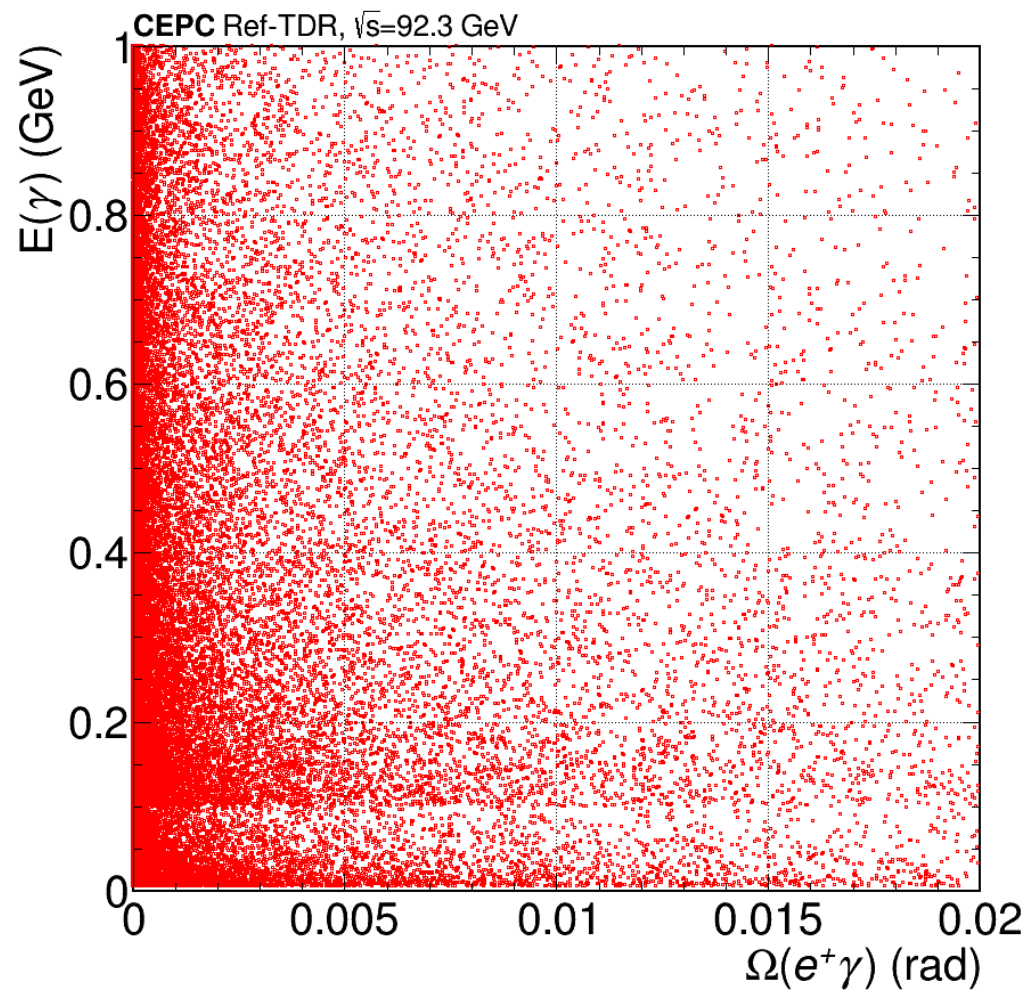
Comparison



Comparison

BHLUMI

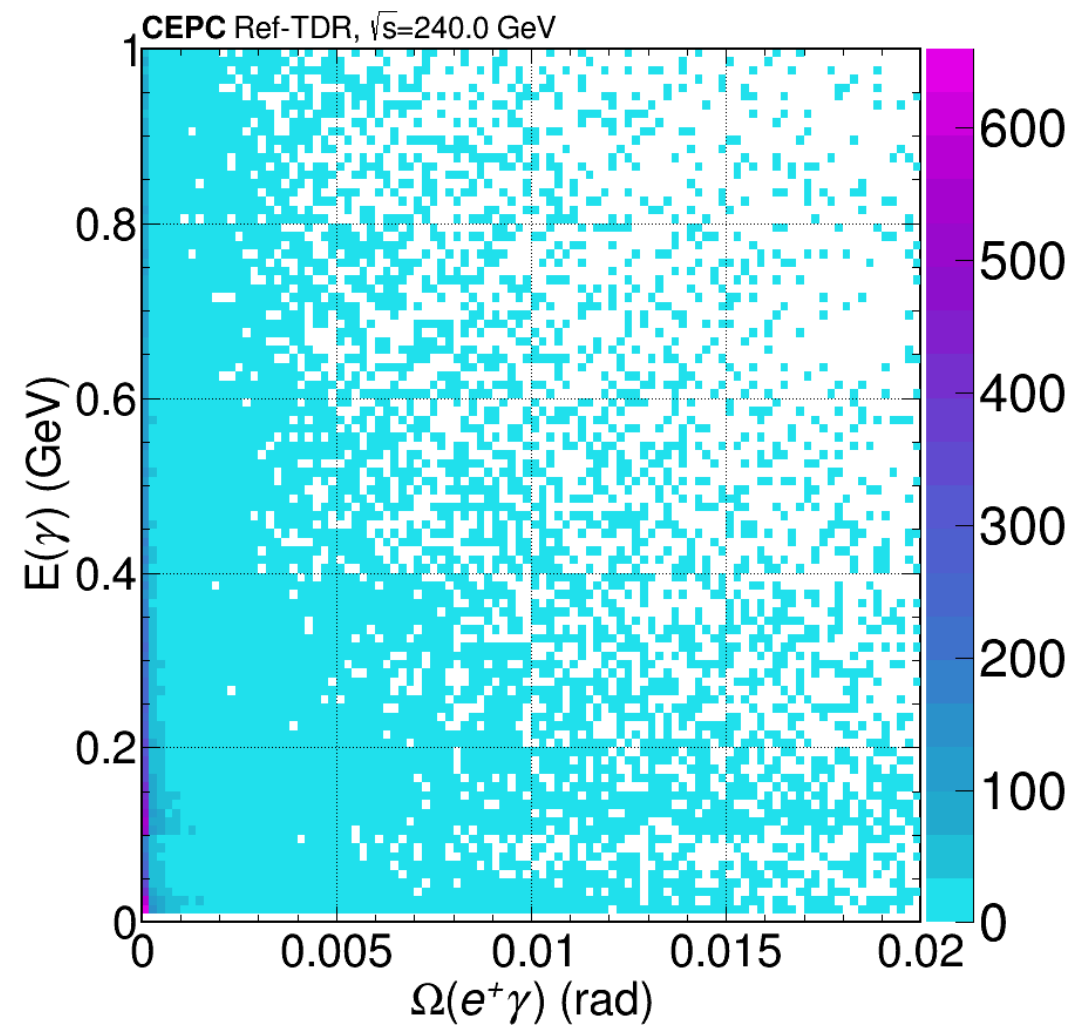
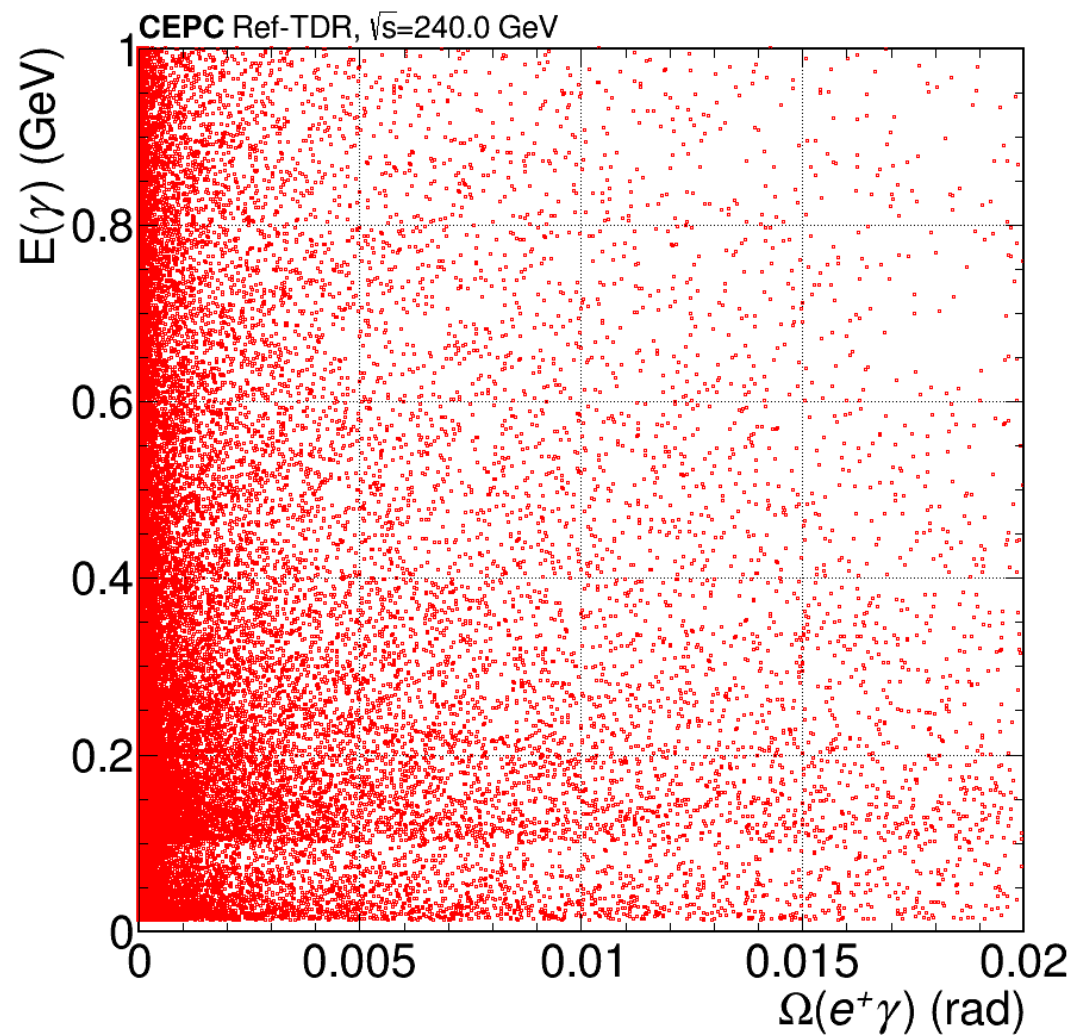
@92.3 GeV



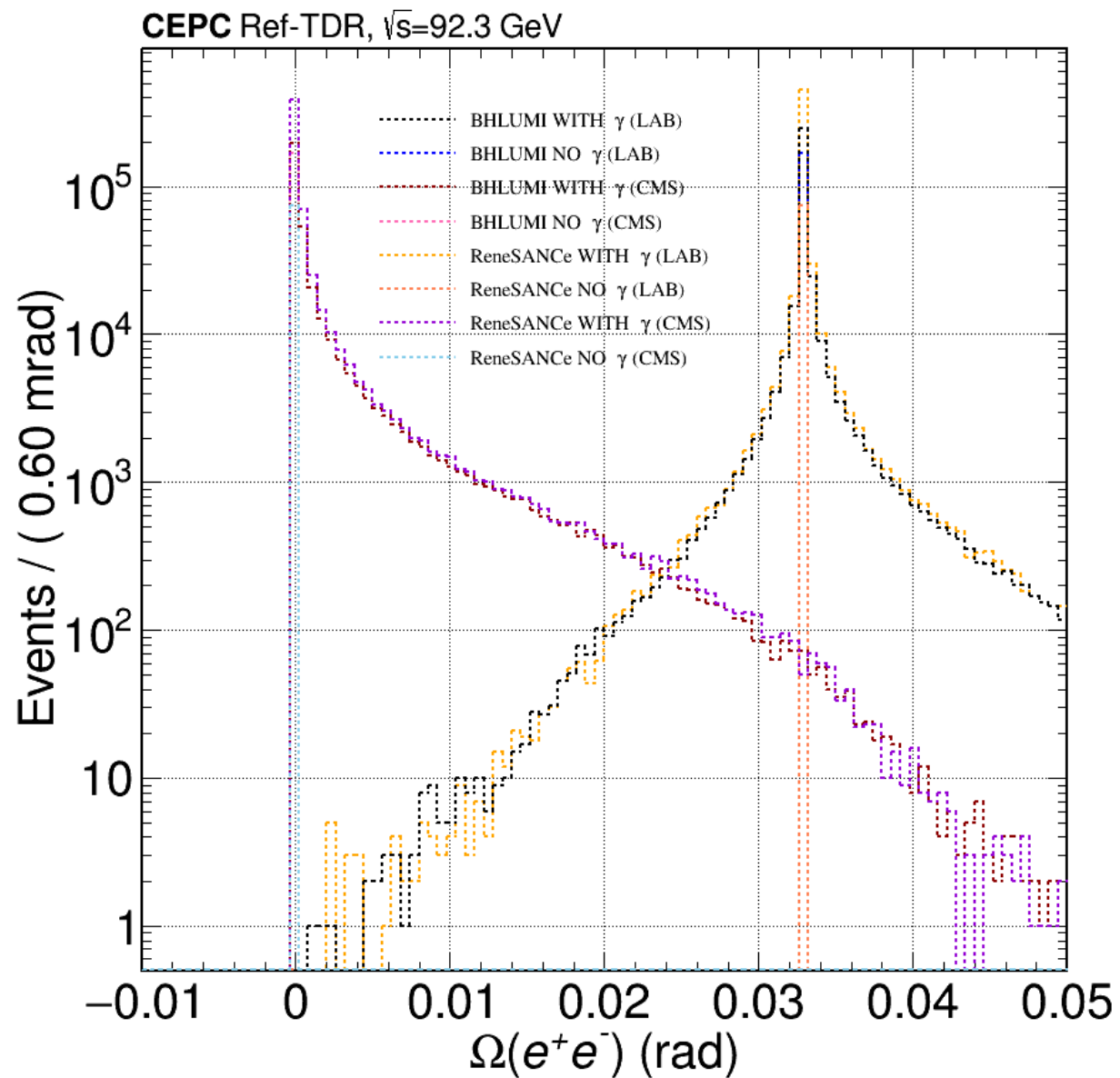
Comparison

BHLUMI

@240.0 GeV



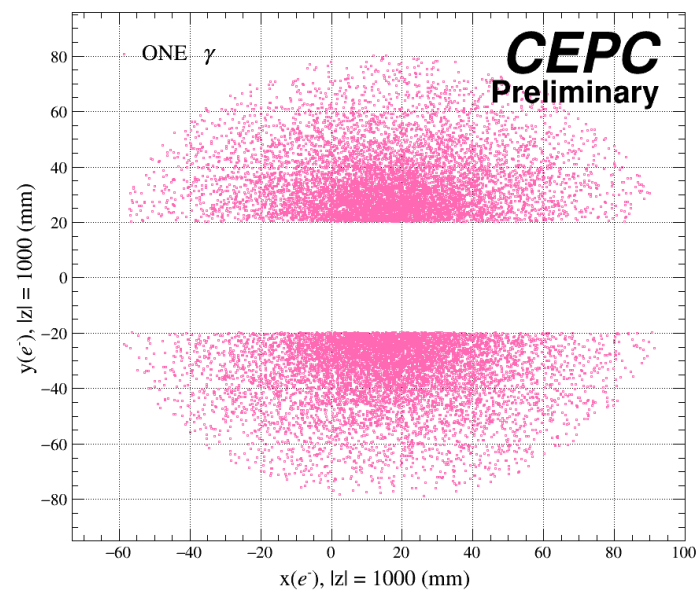
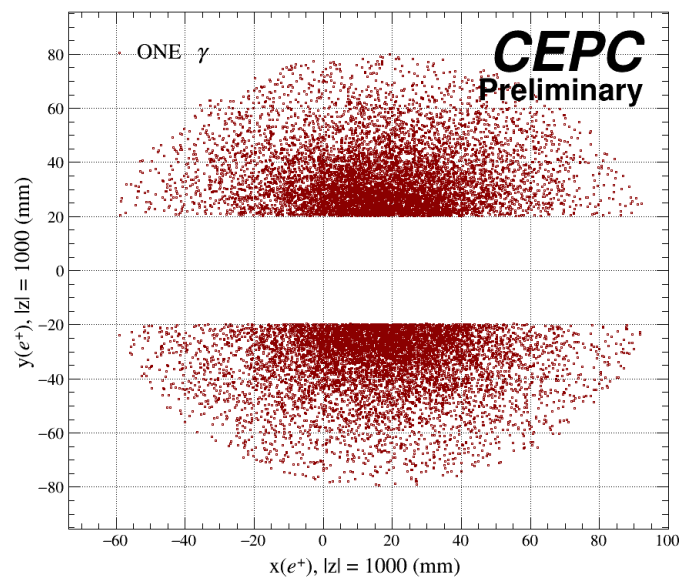
Comparison



Backup

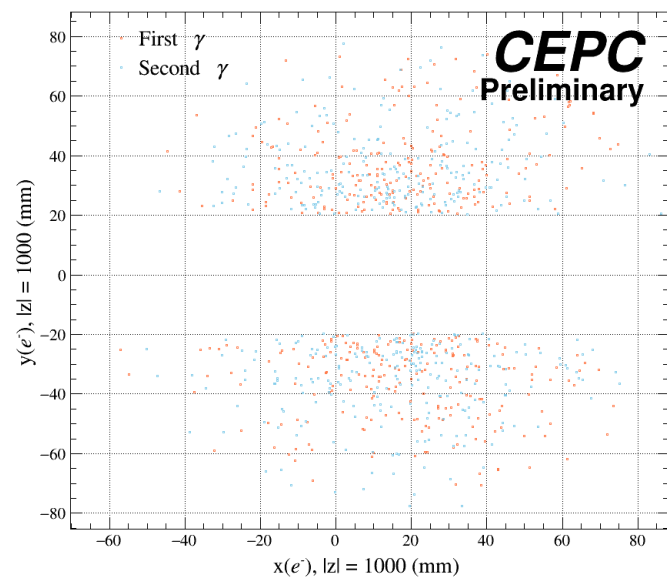
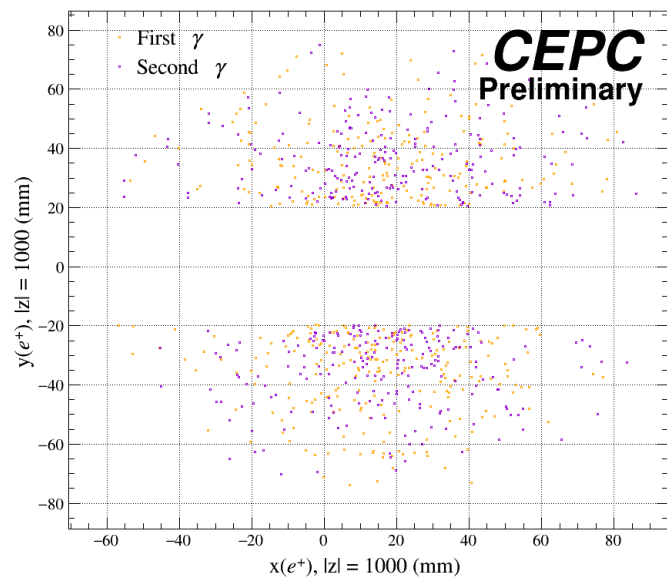
BHLUMI

@92.3 GeV



$$E_\gamma > 0.1 \text{ GeV}$$

$$\theta_{\gamma e^\pm} > 0.005 \text{ rad}$$

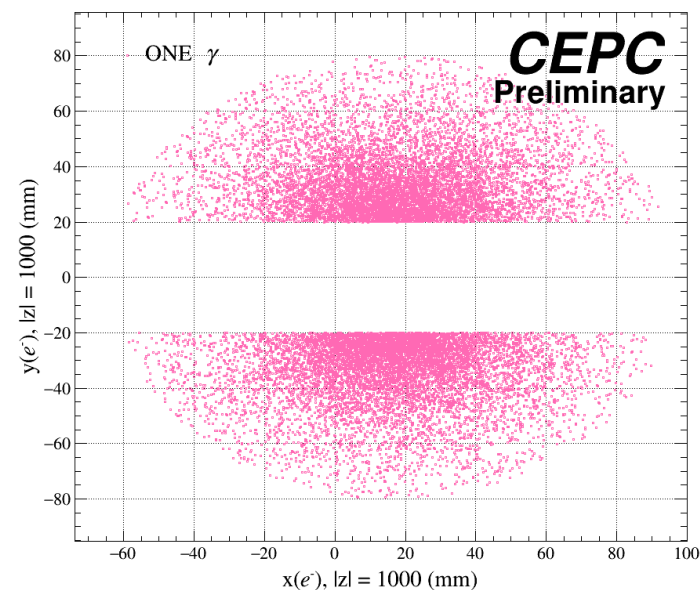
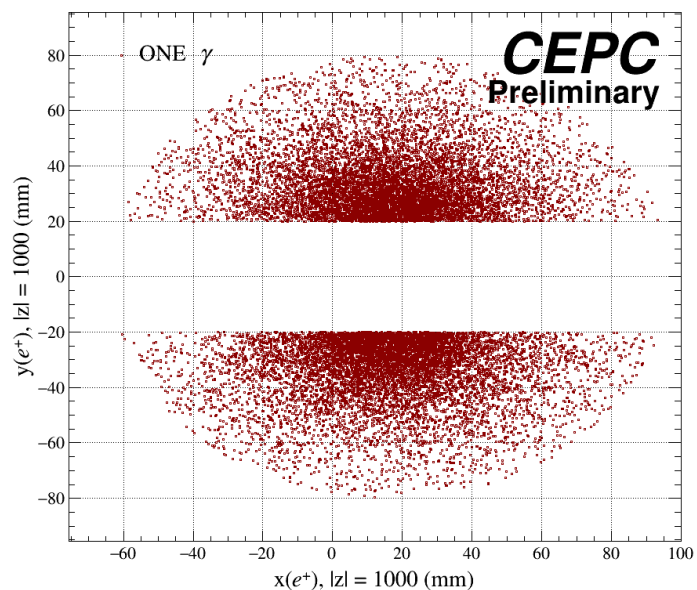


2025/7/15

Backup

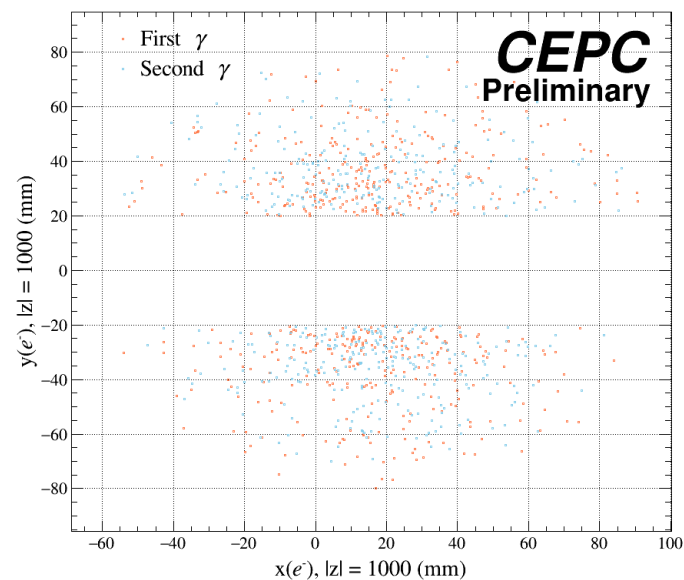
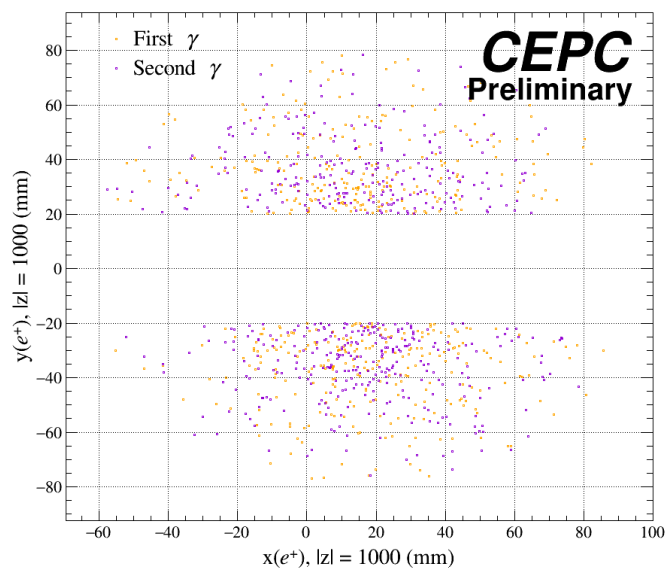
BHLUMI

@240.0 GeV



$$E_\gamma > 0.1 \text{ GeV}$$

$$\theta_{\gamma e^\pm} > 0.005 \text{ rad}$$



2025/7/15

Backup

BHLUMI

	CMS (GeV)	Both e^- and e^+ in (mm)		ONE PHOTON	TWO PHOTON	NONE
σ (nb)	92.3	$20 < r$ 287.31	.and. $ y > 20$ 131.11	7.97 (6.08%)	0.22 (0.17%)	122.91 (93.75%)
σ (nb)	240	$20 < r$ 41.49	.and. $ y > 20$ 19.56	1.35 (6.91%)	0.04 (0.20%)	18.17 (92.89%)

```

Number of points in the scatter plot (e+) (ONE) : 15595
Number of points in the scatter plot (e-) (ONE) : 15584
Number of points in the scatter plot (e+) (TWO) (FIRST) : 444
Number of points in the scatter plot (e-) (TWO) (FIEST) : 429
Number of points in the scatter plot (e+) (TWO) (SECOND) : 423
Number of points in the scatter plot (e-) (TWO) (SECOND) : 450
CMS :92.29999999999997[GeV]
The total number of events : 10000000.0000000000000000
The total cross section : 2556.516055683488958
th1 :0.0100000000000000[Rad]
th2 :0.0800000000000000[Rad]
nevent1_cut1 : 4586137.0000000000000000 (th1 < theta < th2) && s'/s > 0.5
nevent1_cut2 : 4862012.0000000000000000 e+ or e- : r1 < r && |y| < y1 && s'/s > 0.5
nevent1_cut3 : 1135362.0000000000000000 (e-: r2 < r && |y| < y1) && cut2
nevent1_cut4 : 536663.0000000000000000 (e-: r2 < r && |y| < y1 && |y| > y2) && cut2
nevent1_cut5 : 1088625.0000000000000000 (e+: r2 < r && |y| < y1) && cut3
nevent1_cut6 : 512839.0000000000000000 (e+: r2 < r && |y| < y1 && |y| > y2) && cut4
nevent1_cut7 : 31179.0000000000000000 ONE photon can be observed.
nevent1_cut8 : 873.0000000000000000 TWO photons can be observed.
nevent1_cut9 : 480787.0000000000000000 NO photon can be observed.
Cross Section 1 : 1172.453287406410936[nb]
Cross Section 2 : 1242.981174092579067[nb]
Cross Section 3 : 290.257118201291746[nb]
Cross Section 4 : 137.198757599126822[nb]
Cross Section 5 : 278.308729111843832[nb]
Cross Section 6 : 131.108113748066472[nb]
Cross Section 7 : 7.970961410015549[nb]
Cross Section 8 : 0.223183851661169[nb]
Cross Section 9 : 122.913968486389763[nb]
Beam Lab : (16.501497538082106, 0.000000000000000, 1000.000000000000000)

```

```

Number of points in the scatter plot (e+) (ONE) : 17691
Number of points in the scatter plot (e-) (ONE) : 17642
Number of points in the scatter plot (e+) (TWO) (FIRST) : 493
Number of points in the scatter plot (e-) (TWO) (FIEST) : 534
Number of points in the scatter plot (e+) (TWO) (SECOND) : 529
Number of points in the scatter plot (e-) (TWO) (SECOND) : 498
CMS :240.00000000000000000000[GeV]
The total number of events : 10000000.0000000000000000
The total cross section : 382.577777244586741
th1 :0.0100000000000000[Rad]
th2 :0.0800000000000000[Rad]
nevent1_cut1 : 4556688.0000000000000000 (th1 < theta < th2) && s'/s > 0.5
nevent1_cut2 : 4864364.0000000000000000 e+ or e- : r1 < r && |y| < y1 && s'/s > 0.5
nevent1_cut3 : 1136388.0000000000000000 (e-: r2 < r && |y| < y1) && cut2
nevent1_cut4 : 537859.0000000000000000 (e-: r2 < r && |y| < y1 && |y| > y2) && cut2
nevent1_cut5 : 1084565.0000000000000000 (e+: r2 < r && |y| < y1) && cut3
nevent1_cut6 : 511207.0000000000000000 (e+: r2 < r && |y| < y1 && |y| > y2) && cut4
nevent1_cut7 : 35333.0000000000000000 ONE photon can be observed.
nevent1_cut8 : 1027.0000000000000000 TWO photons can be observed.
nevent1_cut9 : 474847.0000000000000000 NO photon can be observed.
Cross Section 1 : 174.328756663708134[nb]
Cross Section 2 : 186.099756682858697[nb]
Cross Section 3 : 43.475679512742140[nb]
Cross Section 4 : 20.577290069099618[nb]
Cross Section 5 : 41.493046697727522[nb]
Cross Section 6 : 19.557643777187344[nb]
Cross Section 7 : 1.351762060338298[nb]
Cross Section 8 : 0.039290737723019[nb]
Cross Section 9 : 18.166590979126028[nb]
Beam Lab : (16.501497538082106, 0.000000000000000, 1000.000000000000000)

```

Backup

@92.3 GeV

	CMS generated Th1, Th2 (mRad)	e^- .or. e^+ to pipe centers (mm)	Single e^- in (mm) (mm)		Both e^- .and. e^+ in (mm) (mm)	
σ (nb)	10 to 80 1172.45	$10 < r, y < 80$ 1217.45	$r > 20$ 217.20	.and. $ y > 20$ 137.46	$r > 20$ 140.74	.and. $ y > 20$ 131.21
σ (nb)	10 to 80 1172.45	$10 < r, y < 80$ 1217.45	$r > 25$ 133.42	.and. $ y > 25$ 82.20	$r > 25$ 85.89	.and. $ y > 25$ 78.08
σ (nb)	10 to 120 1181.94	$10 < r, y < 120$ 1226.98	$r > 25$ 144.59	.and. $ y > 25$ 91.34	$r > 25$ 96.94	.and. $ y > 25$ 87.18

	CMS generated Th1, Th2(mrad)	e^- .or. e^+ to pipe centers (mm)	Single e^- in (mm)		Both e^- .and. e^+ in (mm)	
σ (nb)	10 to 80 1172.45	$10 < r, y < 80$ 1242.98	$20 < r$ 290.26	.and. $ y > 20$ 137.20	$20 < r$ 287.31	.and. $ y > 20$ 131.11
σ (nb)	10 to 80 1172.45	$10 < r, y < 80$ 1242.98	$25 < r$ 178.70	.and. $ y > 25$ 81.98	$25 < r$ 170.73	.and. $ y > 25$ 77.99
σ (nb)	10 to 120 1181.94	$10 < r, y < 120$ 1252.38	$25 < r$ 189.81	.and. $ y > 25$ 91.13	$25 < r$ 181.88	.and. $ y > 25$ 87.05

Backup

@91 GeV (BHLUMI)

	CMS generated Th1, Th2(mrad)	$e^- . or . e^+$ to pipe centers (mm)	Single e^- in (mm)		Both $e^- . and e^+$ in (mm)	
σ (nb)	10 to 80 1206.67	$10 < r, y < 80$ 1279.09	$20 < r$ 299.21	$. and . y > 20$ 141.52	$20 < r$ 286.90	$. and . y > 20$ 135.25
σ (nb)	10 to 80 1206.67	$10 < r, y < 80$ 1279.09	$25 < r$ 184.40	$. and . y > 25$ 84.64	$25 < r$ 176.19	$. and . y > 25$ 80.52
σ (nb)	10 to 120 1216.68	$10 < r, y < 120$ 1288.97	$25 < r$ 195.90	$. and . y > 25$ 94.14	$25 < r$ 187.75	$. and . y > 25$ 89.95

```

CMS :91.00000000000000[GeV]
The total number of events : 10000000.000000000000000
The total cross section : 2631.190389271412641
th1 :0.0100000000000000[Rad]
th2 :0.1200000000000000[Rad]
nevent1_cut1 : 4624080.0000000000000000 (th1 < theta < th2) && s'/s > 0.5
nevent1_cut2 : 4916897.0000000000000000 e+ or e- : r1 < r && |y| < y1 && s'/s > 0.5
nevent1_cut3 : 761785.0000000000000000 (e-: r2 < r && |y| < y1) && cut2
nevent1_cut4 : 372047.0000000000000000 (e-: r2 < r && |y| < y1 && |y| > y2) && cut2
nevent1_cut5 : 729973.0000000000000000 (e+: r2 < r && |y| < y1) && cut3
nevent1_cut6 : 355946.0000000000000000 (e+: r2 < r && |y| < y1 && |y| > y2) && cut4
Cross Section 1 : 1216.683485522215278[nb]
Cross Section 2 : 1293.729213143744118[nb]
Cross Section 3 : 200.440137069112296[nb]
Cross Section 4 : 97.892649075726126[nb]
Cross Section 5 : 192.069794202762097[nb]
Cross Section 6 : 93.656169429960215[nb]
Beam_Lab : (16.501497538082106, 0.000000000000000, 1000.000000000000000)

```

```

Xcru, AWT, DWT, Xcru*AWT= 2631.1903892714126 5.3
NevTot = 10000000
Theta Th1,Th2 (mRad)= 1.0000000000000000E-002 0.12000
NevTot Sum WtMod SumAllWt = 10000000.000000000
NthBARE1(th=Th1,Th2) SthBARE1Wt = 4846681.000000000
NevBARE1 1-sp/s lt .5 SevBARE1Wt = 4624080.000000000
NthBARE1(th=Th1,Th2) = 4846681
NevBARE1 1-sp/s lt .5= 4624080
NrjBARE1 1-sp/s nlt.5= 222601
Xcru*NevBare1/NevTot = 1216.683485522155

```

Backup

@240 GeV (BHLUMI)

	CMS generated Th1, Th2(mrad)	$e^- . or . e^+$ to pipe centers (mm)	Single e^- in (mm)		Both $e^- . and e^+$ in (mm)	
σ (nb)	10 to 80 174.33	$10 < r, y < 80$ 186.10	$20 < r$ 43.48	$. and . y > 20$ 20.58	$20 < r$ 41.49	$. and . y > 20$ 19.56
σ (nb)	10 to 80 174.33	$10 < r, y < 80$ 186.10	$25 < r$ 26.81	$. and . y > 25$ 12.31	$25 < r$ 25.50	$. and . y > 25$ 11.65
σ (nb)	10 to 120 175.99	$10 < r, y < 120$ 187.75	$25 < r$ 28.51	$. and . y > 25$ 13.72	$25 < r$ 27.21	$. and . y > 25$ 13.03

```

CMS :240.00000000000000[GeV]
The total number of events : 10000000.000000000000000
The total cross section : 382.577777244586741
th1 :0.0100000000000000[Rad]
th2 :0.0800000000000000[Rad]
nevent1_cut1 : 4556688.000000000000000 (th1 < theta < th2) && s'/s > 0.5
nevent1_cut2 : 4904724.000000000000000 e+ or e- : r1 < r && |y| < y1 && s'/s > 0.5
nevent1_cut3 : 1174783.000000000000000 (e-: r2 < r && |y| < y1) && cut2
nevent1_cut4 : 568041.000000000000000 (e-: r2 < r && |y| < y1 && |y| > y2) && cut2
nevent1_cut5 : 1121047.000000000000000 (e+: r2 < r && |y| < y1) && cut3
nevent1_cut6 : 539053.000000000000000 (e+: r2 < r && |y| < y1 && |y| > y2) && cut4
Cross Section 1 : 174.32875666370813[nb]
Cross Section 2 : 187.643840591817849[nb]
Cross Section 3 : 44.944586888472735[nb]
Cross Section 4 : 21.731986316379231[nb]
Cross Section 5 : 42.888766944671225[nb]
Cross Section 6 : 20.622969855702625[nb]
Beam Lab : (16.501497538082106, 0.000000000000000, 1000.000000000000000)

```

```

Xcru, AWT, DWT, Xcru*AWT= 382.57777724458674 5.
NevTot = 10000000
Theta Th1,Th2 (mRad)= 1.0000000000000000E-002 8.000
NevTot Sum WtMod SumAllWt = 10000000.000000000
NthBARE1(th=Th1,Th2) SthBARE1Wt = 4794737.000000000
NevBARE1 1-sp/s lt .5 SevBARE1Wt = 4556688.000000000
NthBARE1(th=Th1,Th2) = 4794737
NevBARE1 1-sp/s lt .5= 4556688
NrjBARE1 1-sp/s nlt.5= 238049
Xcru*NevBare1/NevTot = 174.32875666370813

```

Backup

@92.3 GeV

th1 = 0.01,
th2 = 0.08 or 0.12,
thmin = 0.7* th1,
thmax = 2*th2

	CMS generated Th1, Th2(mrad)	$e^- . or . e^+$ to pipe centers (mm)	Single e^- in (mm)		Both $e^- . and e^+$ in (mm)	
σ (nb)	10 to 80 1172.45	$10 < r, y < 80$ 1242.98	$20 < r$ 290.26	. and. $ y > 20$ 137.20	$20 < r$ 287.31	. and. $ y > 20$ 131.11
σ (nb)	10 to 80 1172.45	$10 < r, y < 80$ 1242.98	$25 < r$ 178.70	. and. $ y > 25$ 81.98	$25 < r$ 170.73	. and. $ y > 25$ 77.99
σ (nb)	10 to 120 1181.94	$10 < r, y < 120$ 1252.38	$25 < r$ 189.81	. and. $ y > 25$ 91.13	$25 < r$ 181.88	. and. $ y > 25$ 87.05

th1 = 0.007,
thmin = th1,
thmax = PI / 2

ReneSANCe	CMS generated Th1, Th2(mrad)	$e^- . or . e^+$ to pipe centers (mm)	Single e^- in (mm)		Both $e^- . and e^+$ in (mm)	
σ (nb)	10 to 80 1223.68	$10 < r, y < 80$ 1333.88	$20 < r$ 351.78	. and. $ y > 20$ 172.22	$20 < r$ 330.31	. and. $ y > 20$ 156.61
σ (nb)	10 to 80 1223.68	$10 < r, y < 80$ 1333.88	$25 < r$ 225.85	. and. $ y > 25$ 106.96	$25 < r$ 211.31	. and. $ y > 25$ 96.64
σ (nb)	10 to 120 1240.96	$10 < r, y < 120$ 1351.72	$25 < r$ 242.87	. and. $ y > 25$ 121.11	$25 < r$ 228.46	. and. $ y > 25$ 110.69

Backup

@92.3 GeV

th1 = 0.007,
th2 = $\text{PI} / 2$,
thmin = th1,
thmax = th2

BHLUMI	CMS generated Th1, Th2(mrad)	$e^- . or . e^+$ to pipe centers (mm)	Single e^- in (mm)		Both $e^- . and e^+$ in (mm)	
σ (nb)	10 to 80 1171.55	$10 < r, y < 80$ 1241.93	$20 < r$ 290.17	. and. $ y > 20$ 137.32	$20 < r$ 278.17	. and. $ y > 20$ 131.13
σ (nb)	10 to 80 1171.55	$10 < r, y < 80$ 1241.93	$25 < r$ 178.69	. and. $ y > 25$ 81.96	$25 < r$ 170.75	. and. $ y > 25$ 77.92
σ (nb)	10 to 120 1182.88	$10 < r, y < 120$ 1253.27	$25 < r$ 190.01	. and. $ y > 25$ 91.26	$25 < r$ 182.06	. and. $ y > 25$ 87.12

ReneSANCe	CMS generated Th1, Th2(mrad)	$e^- . or . e^+$ to pipe centers (mm)	Single e^- in (mm)		Both $e^- . and e^+$ in (mm)	
σ (nb)	10 to 80 1223.68	$10 < r, y < 80$ 1333.88	$20 < r$ 351.78	. and. $ y > 20$ 172.22	$20 < r$ 330.31	. and. $ y > 20$ 156.61
σ (nb)	10 to 80 1223.68	$10 < r, y < 80$ 1333.88	$25 < r$ 225.85	. and. $ y > 25$ 106.96	$25 < r$ 211.31	. and. $ y > 25$ 96.64
σ (nb)	10 to 120 1240.96	$10 < r, y < 120$ 1351.72	$25 < r$ 242.87	. and. $ y > 25$ 121.11	$25 < r$ 228.46	. and. $ y > 25$ 110.69

th1 = 0.007,
thmin = th1,
thmax = $\text{PI} / 2$

Backup

BHLUMI

@92.3 GeV

@240 GeV

Both
 e^- and e^+ in
 (mm)
 $20 < r < 80$
 and $|y| > 20$

@91 GeV

