
Analysis Report

Jiarong Yuan

2020/8/26

Smuon

Circular Electron Positron Collider(CEPC): ECM=240GeV

signal samples: MadGraph+Pythia8

simulation:Mokka

reconstruction:Marlin

Direct Smuon Quick sensitivity study

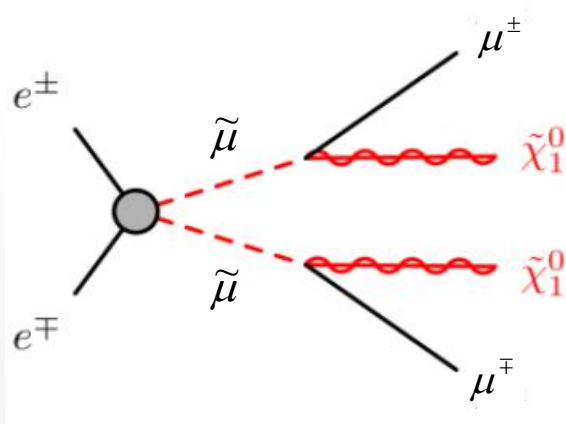
explain mu g-2 excess

Signal samples are produced,for $m_{s\mu} = 80,90,100,110,115,119\text{GeV}$, $m_{LSP} = 1,10,20,\dots,(m_{s\mu} - 10),(m_{s\mu} - 5),(m_{s\mu} - 2),(m_{s\mu} - 1)\text{GeV}$

100, 000 Events at each point.

consider backforunds with final state mumu or tautau.

normalized to 5050fb^{-1}



e3e3
nnh_e3e3
zzorww_l0tautau
zz_l0tautau
sznu_l0tautau
zzorww_l0mumu
zz_l0mumu
ww_l0ll
sznu_l0mumu
e2e2

SR1	SR2	SR3	SR4	SR5	SR6	SR7	SR8	SR9
=2 OS muon								
$\Delta R(\mu, recoil) < 3.4$								$\Delta R(\mu, recoil) < 2.9$
$\Delta\phi(\mu, \mu) > 0.1$							$\Delta\phi(\mu, \mu) > 0.35$	
$7\text{GeV} < M_{\mu\mu} < 74\text{GeV}$		$21\text{GeV} < E_{\mu} < 39\text{GeV}$	$39\text{GeV} < E_{\mu} < 42\text{GeV}$	$42\text{GeV} < E_{\mu} < 68\text{GeV}$	$20\text{GeV} < E_{\mu} < 25\text{GeV}$	$25\text{GeV} < E_{\mu} < 39\text{GeV}$	$195\text{GeV} < M_{recoil} < 220\text{GeV}$	$220\text{GeV} < M_{recoil}$
$24\text{GeV} < p_T^{\mu}$								
$25\text{GeV} < M_{recoil} < 89\text{GeV}$	$100\text{GeV} < M_{recoil} < 114\text{GeV}$	$114\text{GeV} < M_{recoil} < 160\text{GeV}$			$160\text{GeV} < M_{recoil} < 195\text{GeV}$			

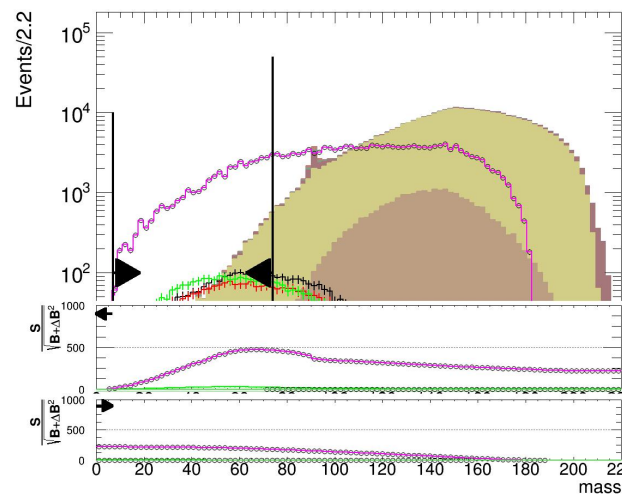
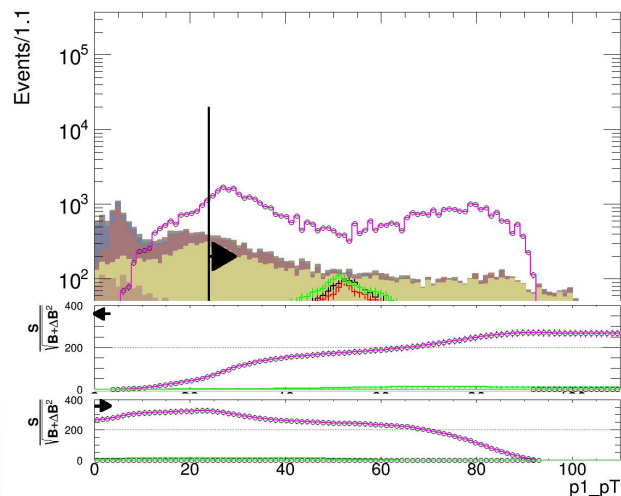
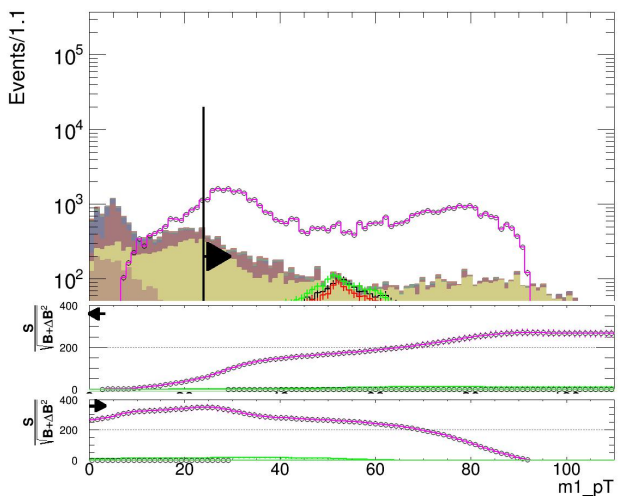
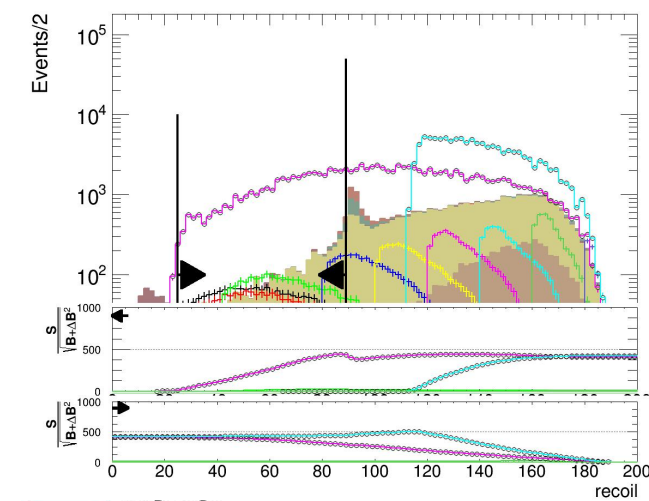
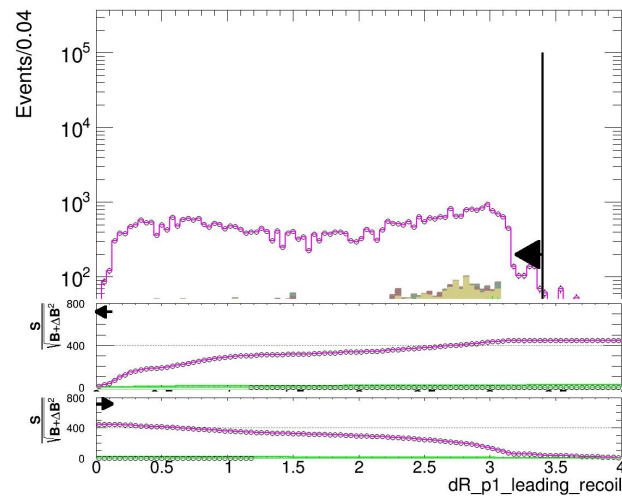
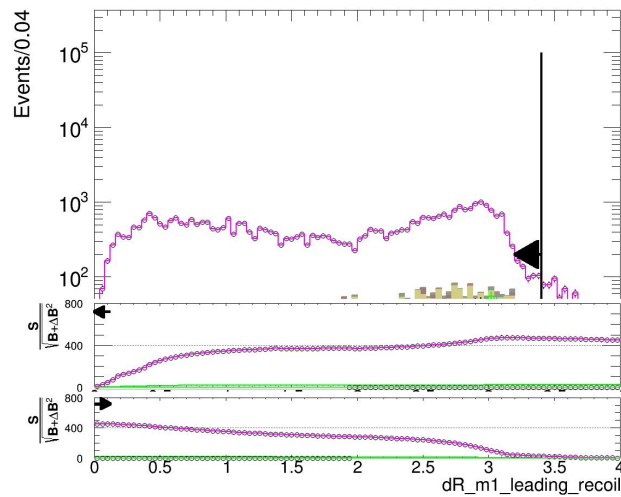
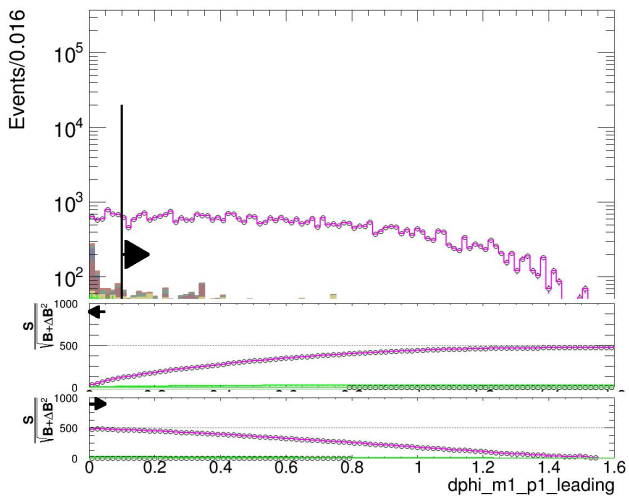
$\Delta m \geq 80$
 (100,10)
 (119,1/10/20/30/40)

$\Delta m = 50 - 70$
 (100,50)(119,70/60/50)

$\Delta m = 30 - 40$
 (100,50)(119,80/90)

$\Delta m = 10 - 20$ $\Delta m \leq 10$
 (100,90) (100,90)
 (119,100) (119,110/115
 /117)

Smuon



- e2e2
- ww_l0l1
- zzorww_l0mumu
- e3e3
- nnh_e3e3
- zzorww_l0tautau
- zz_l0tautau
- sznu_l0tautau
- zz_l0mumu
- sznu_l0mumu

$$\Delta m \geq 80$$

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 1)$ GeV

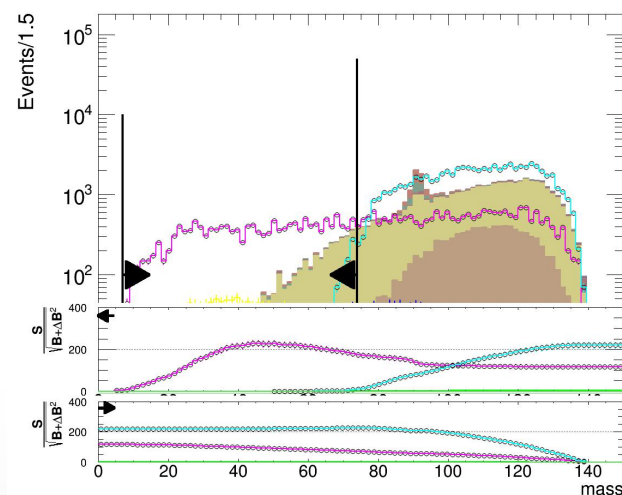
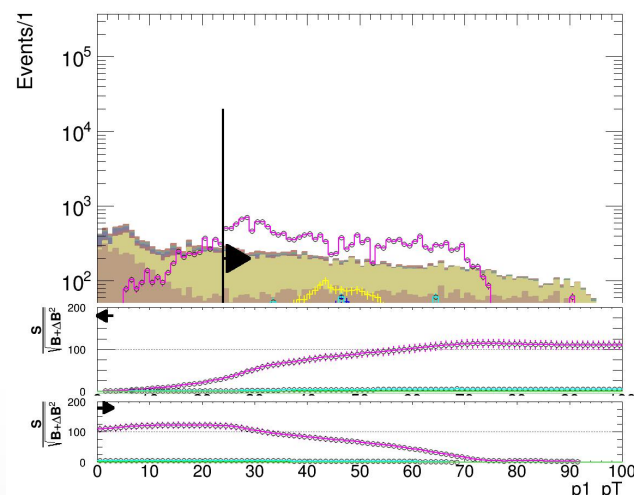
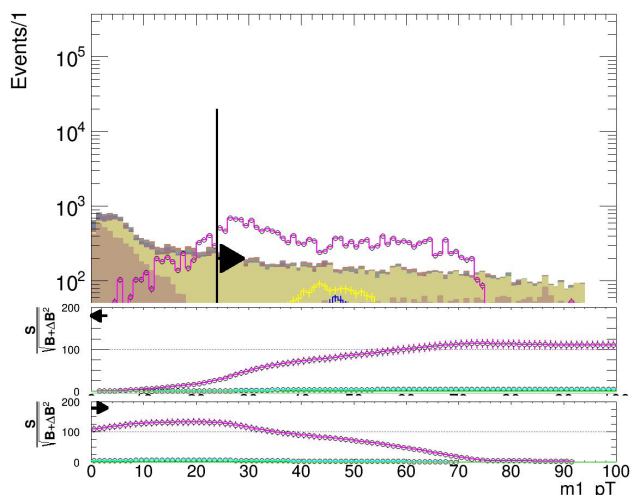
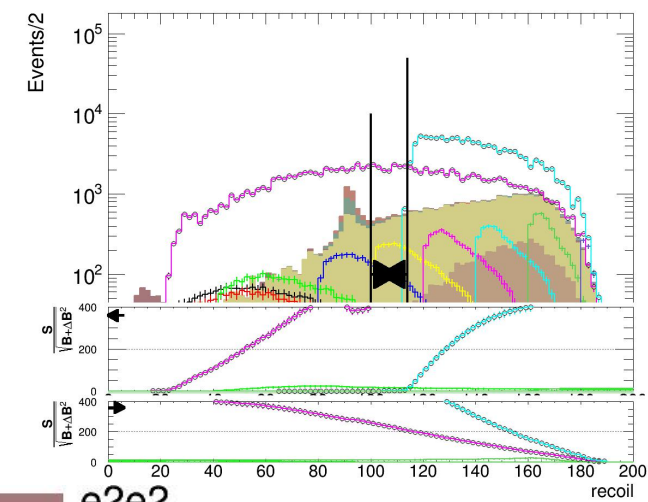
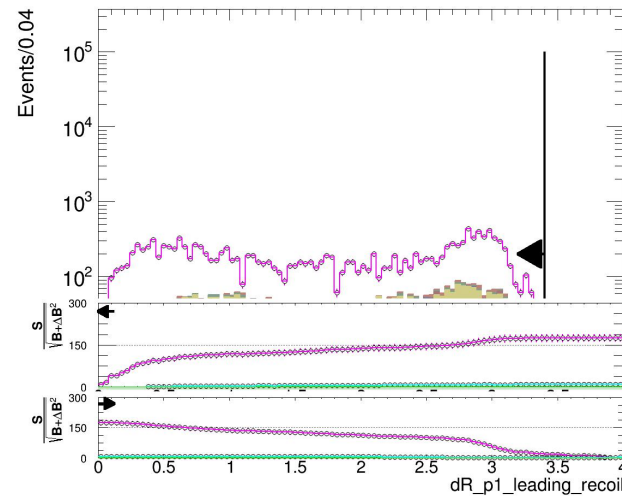
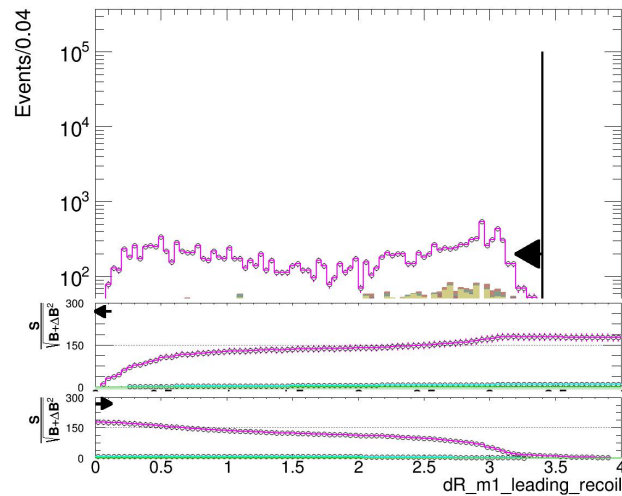
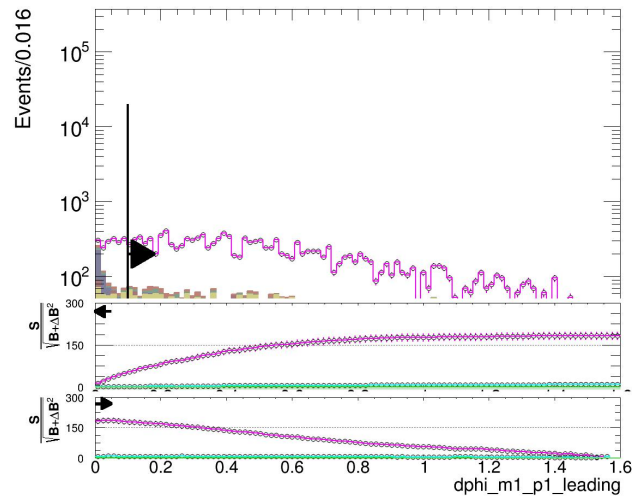
— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 10)$ GeV

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 20)$ GeV

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 40)$ GeV

—○ $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 10)$ GeV

Smuon



- e2e2
- ww l0ll
- zzorww_l0mumu
- e3e3
- nnh_e3e3
- zzorww_l0tautau
- zz_l0tautau
- sznu_l0tautau
- zz_l0mumu
- sznu_l0mumu

$\Delta m \geq 80$

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 1)$ GeV

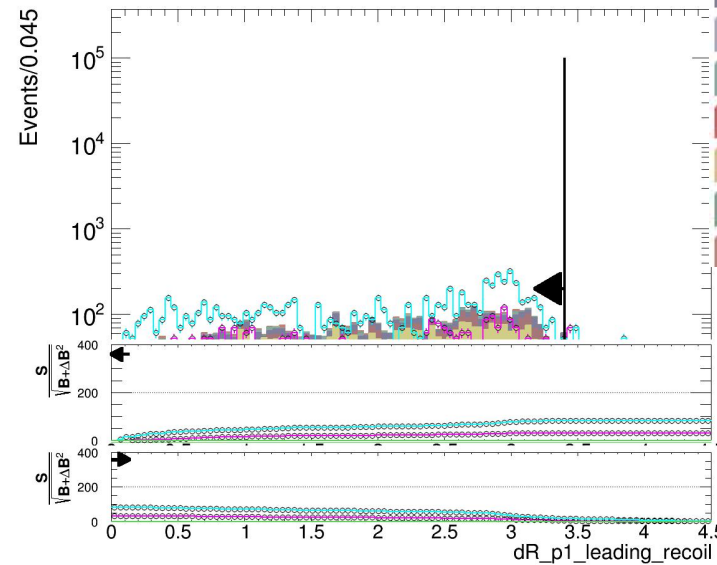
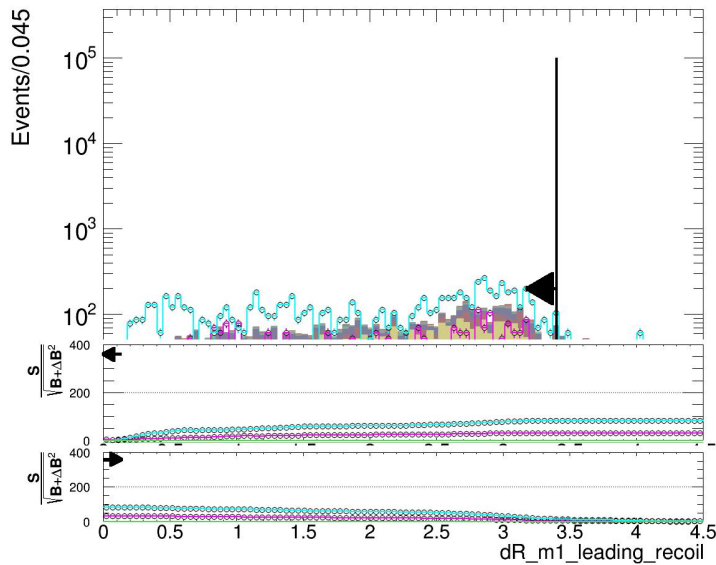
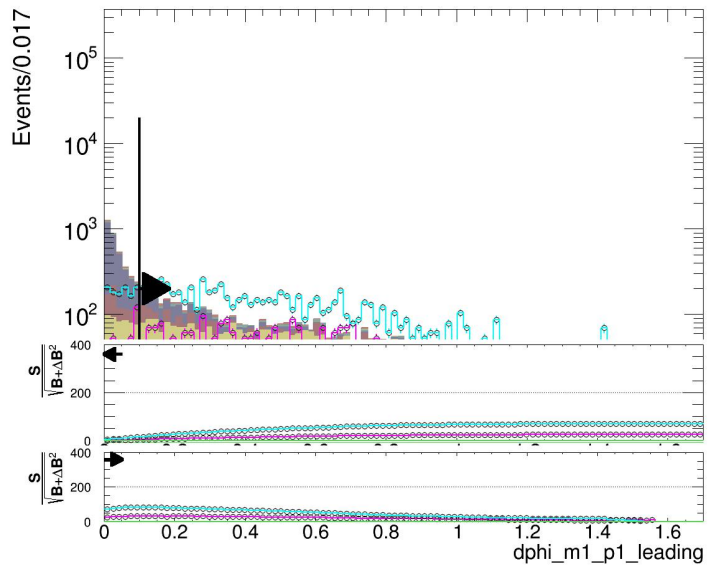
— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 10)$ GeV

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 20)$ GeV

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 40)$ GeV

—○— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 10)$ GeV

Smuon



- e2e2
- ww_l0ll
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- zzorww_l0tautau
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- zz_l0mumu
- sznu_l0mumu

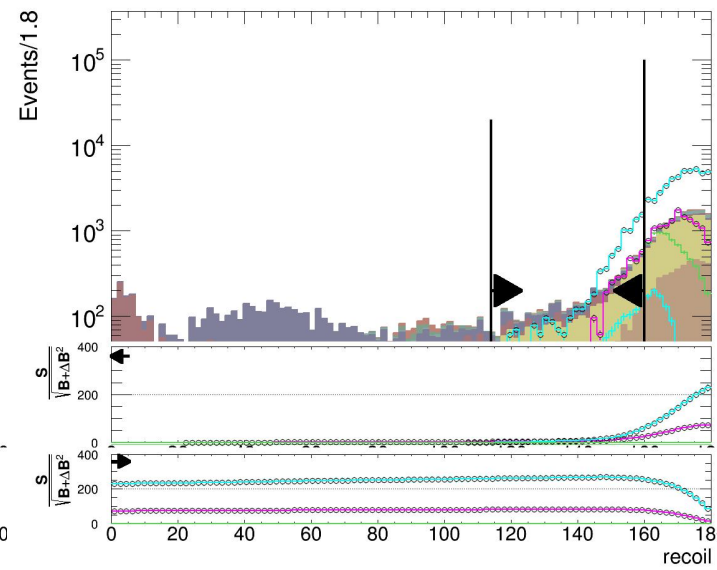
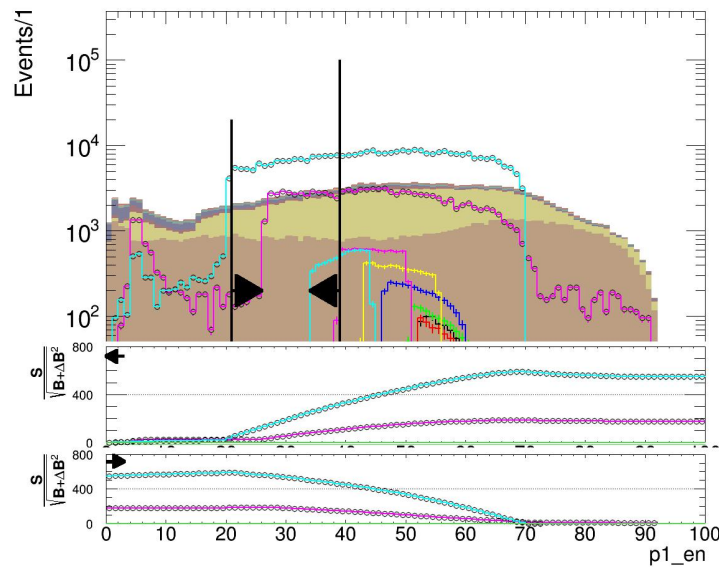
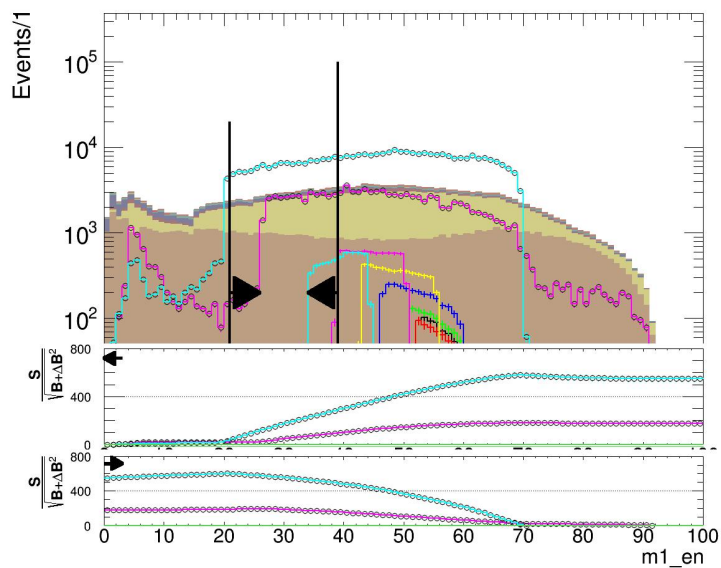
$\Delta m = 50 - 70$

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 50)$ GeV

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 60)$ GeV

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 70)$ GeV

○ $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 50)$ GeV



Smuon

- e2e2
- ww_l0l1
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- zzorww_l0tautau
- zz_l0tautau
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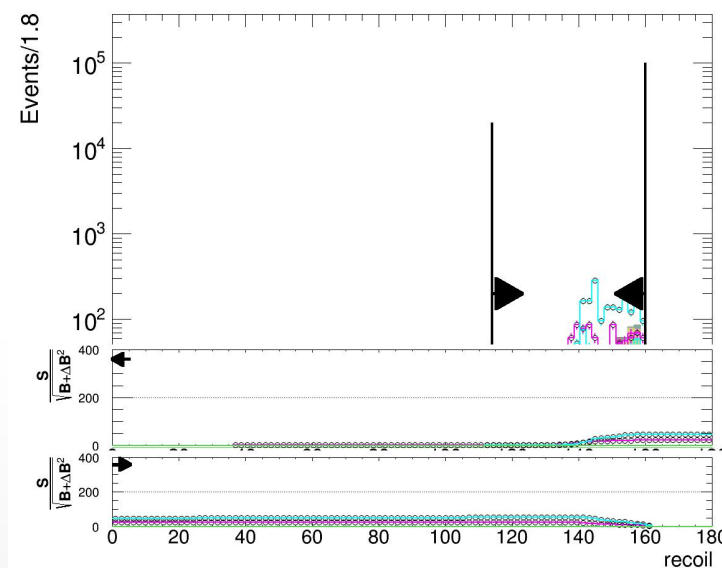
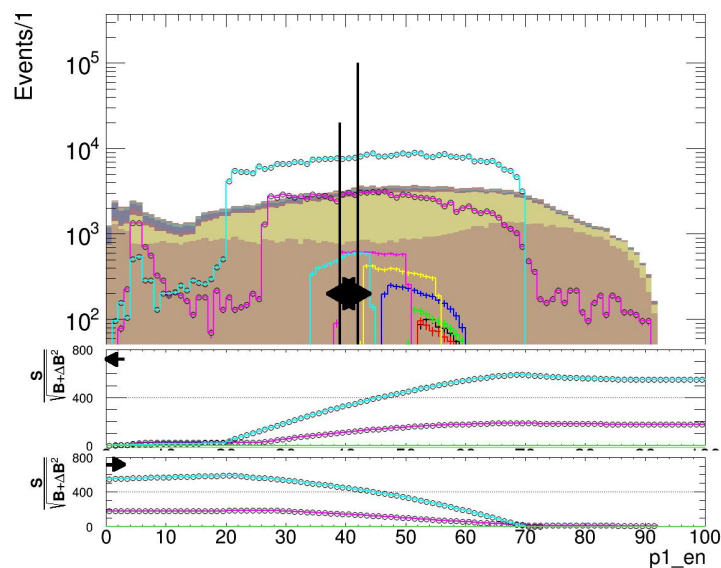
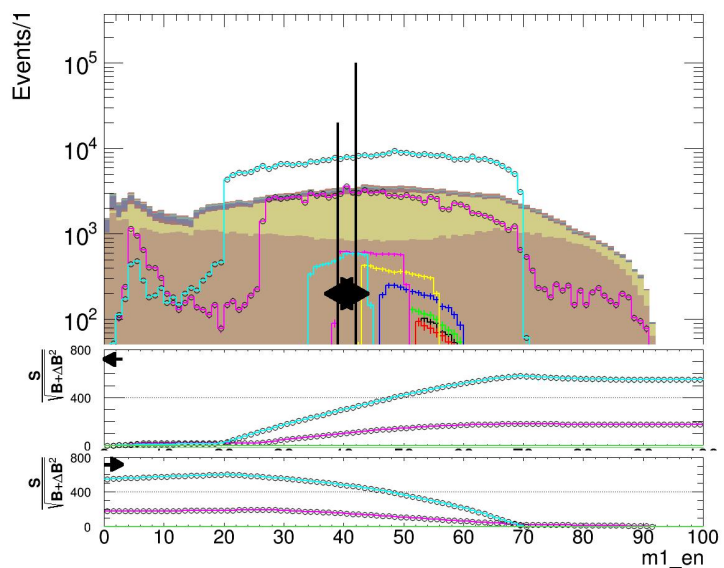
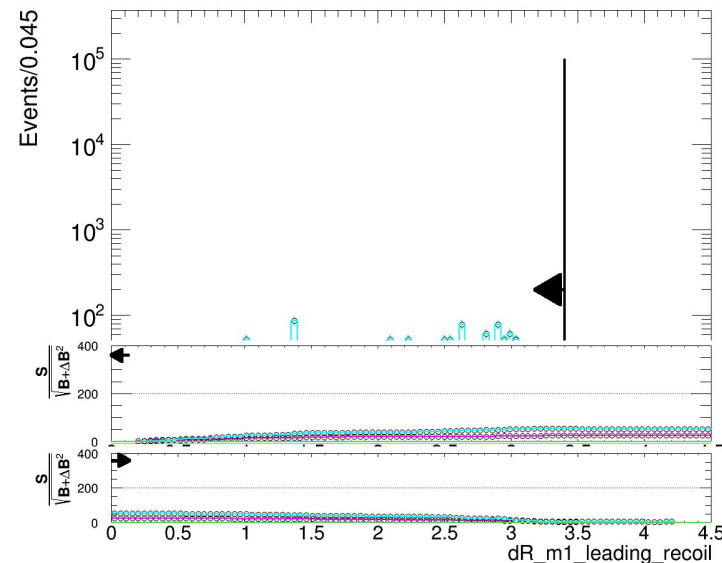
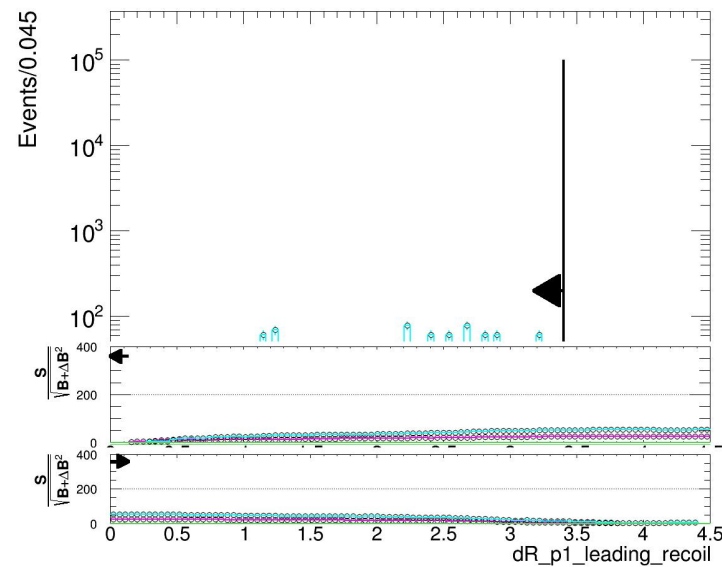
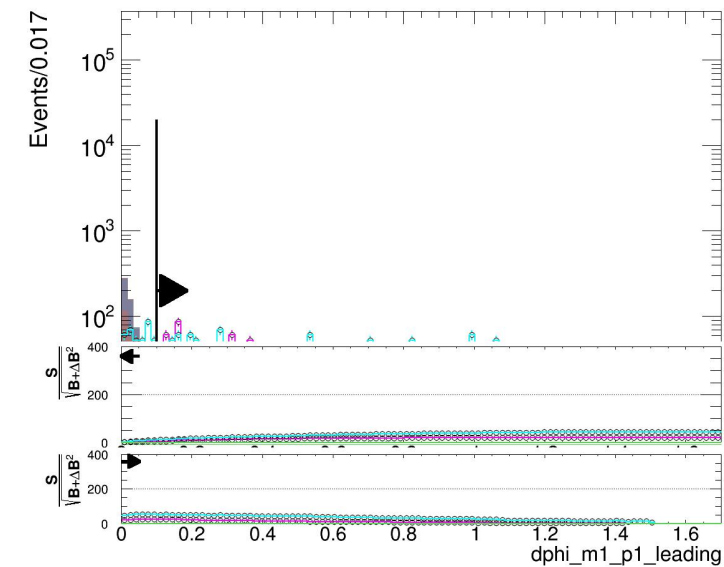
$\Delta m = 50 - 70$

$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 50)$ GeV

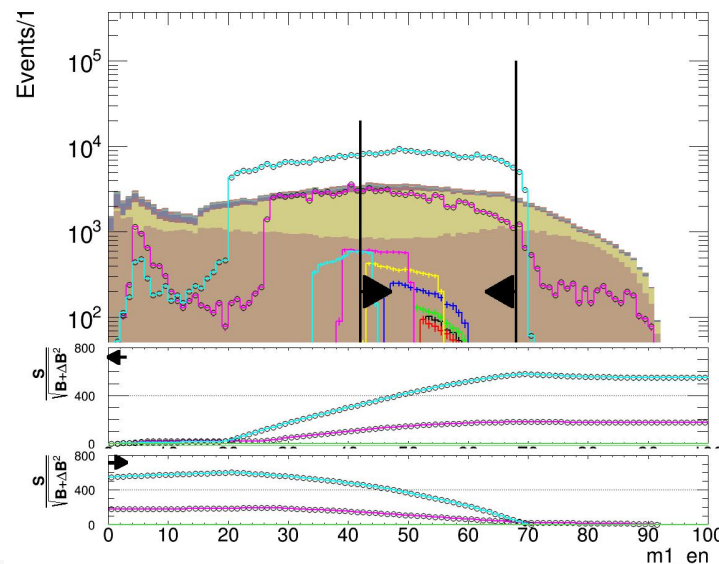
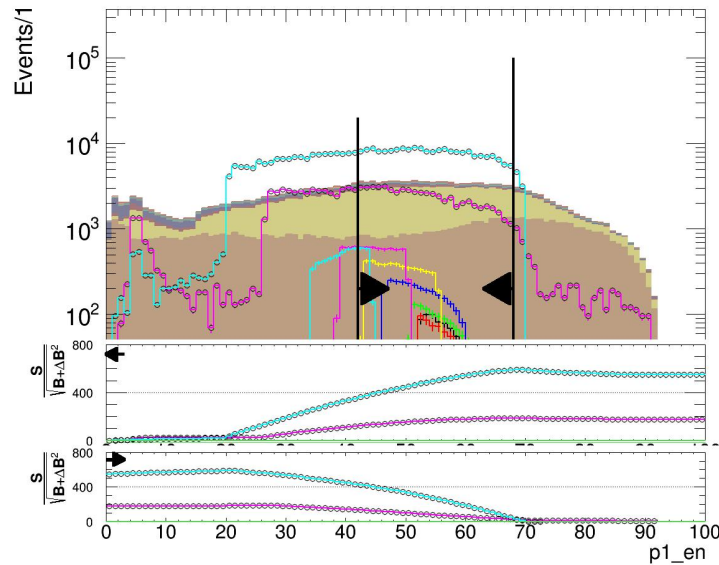
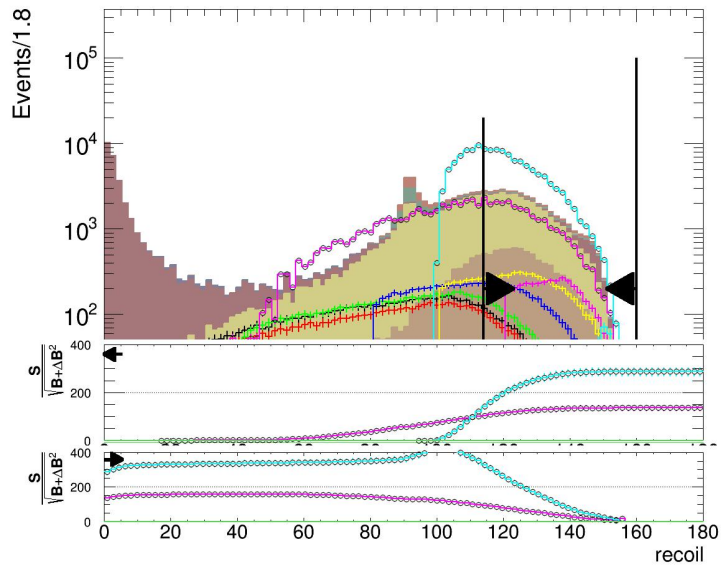
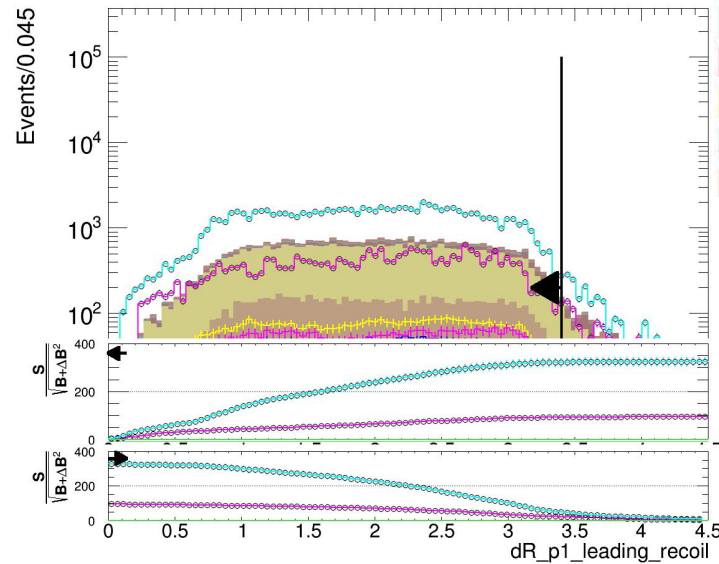
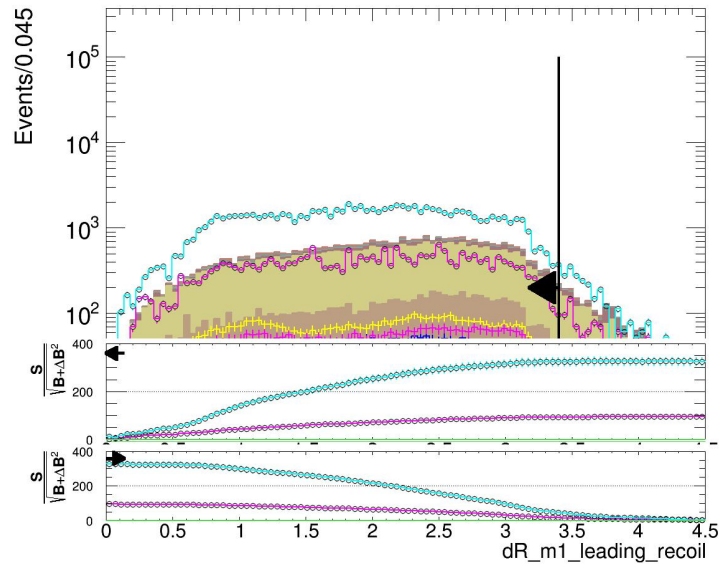
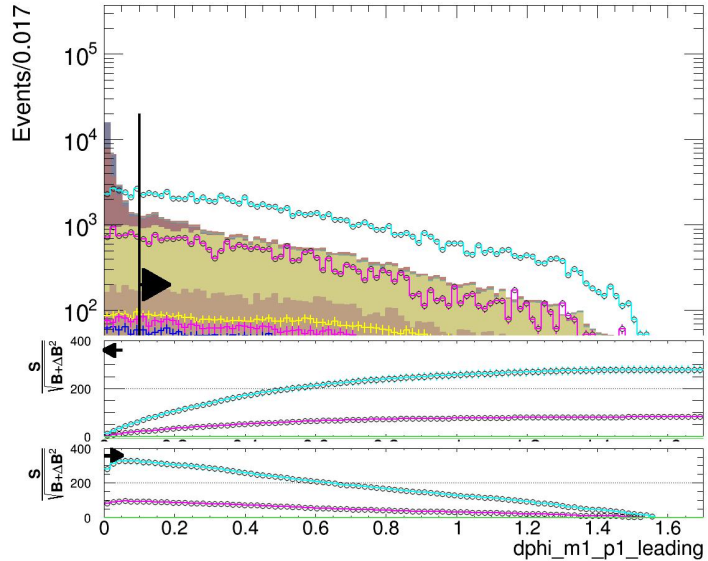
$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 60)$ GeV

$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 70)$ GeV

$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 50)$ GeV



Smuon



- e2e2
- ww_l0ll
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- zz_l0mumu
- sznū_l0mumu

$\Delta m = 50 - 70$

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 50) \text{ GeV}$

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 60) \text{ GeV}$

— $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 70) \text{ GeV}$

○ $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 50) \text{ GeV}$

Smuon

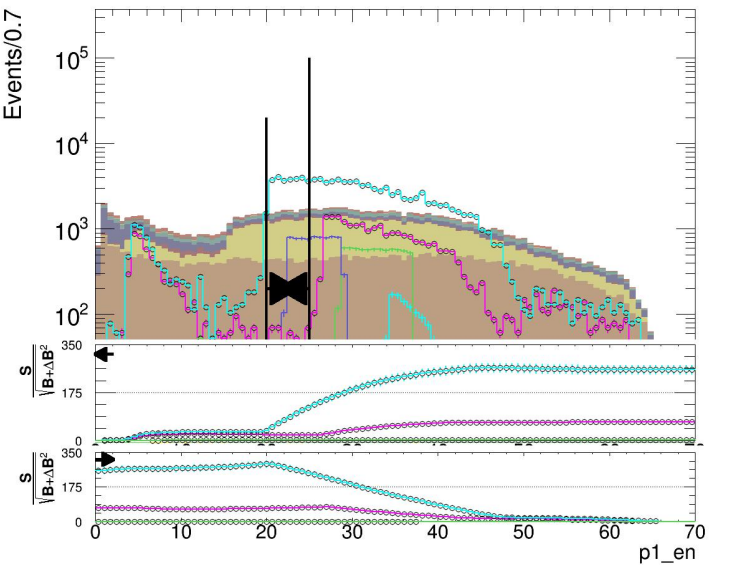
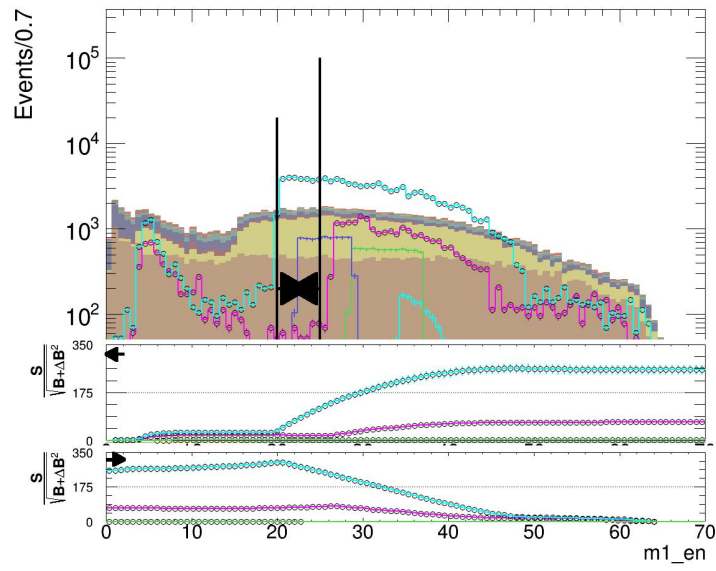
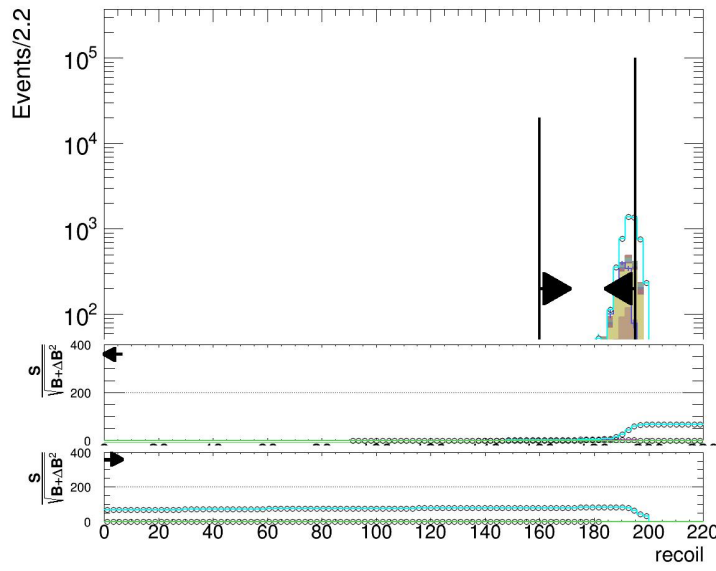
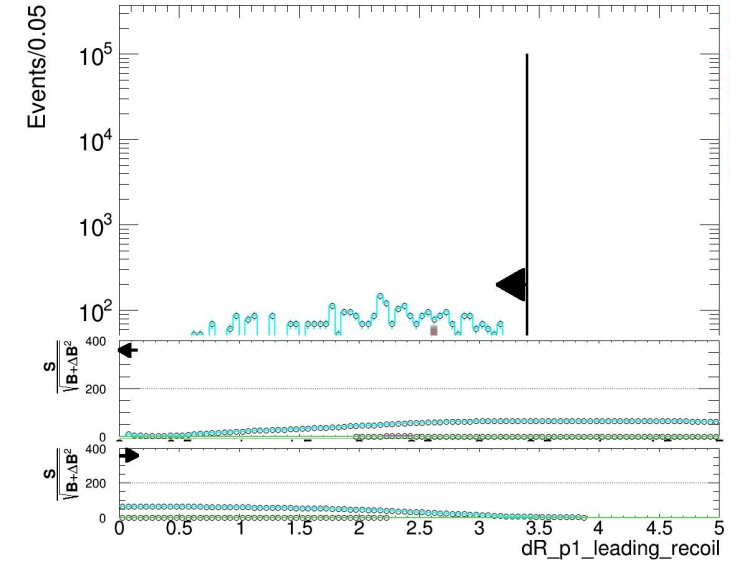
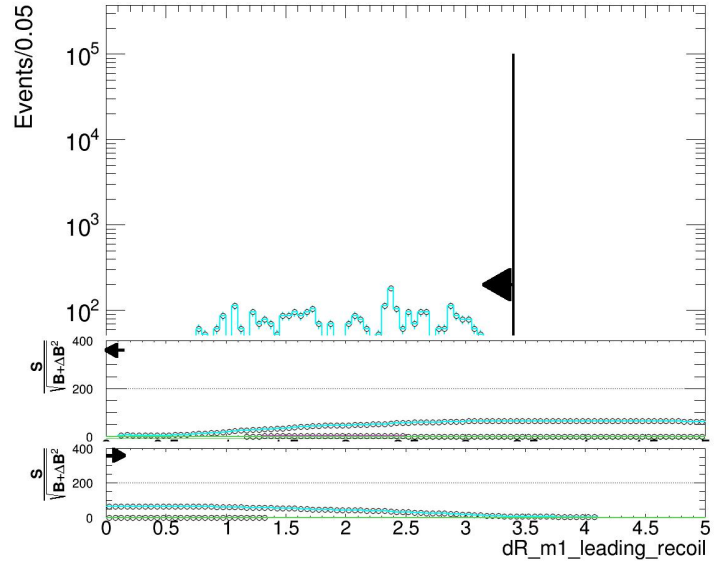
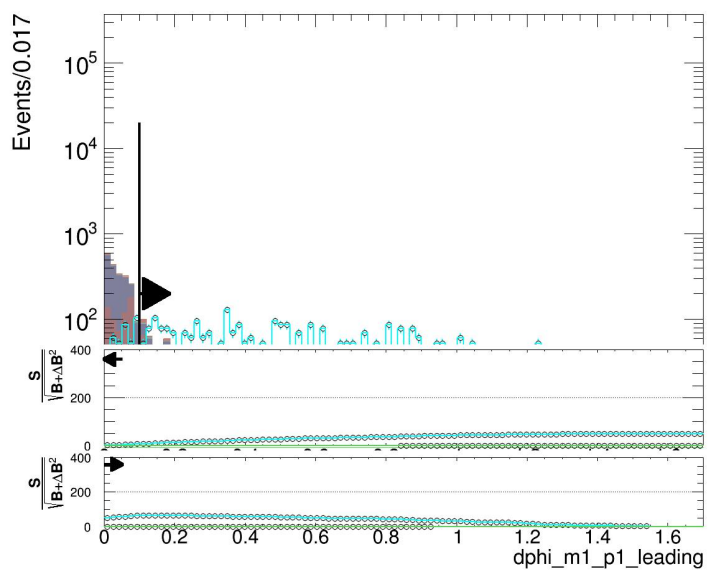
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$\Delta m = 30 - 40$

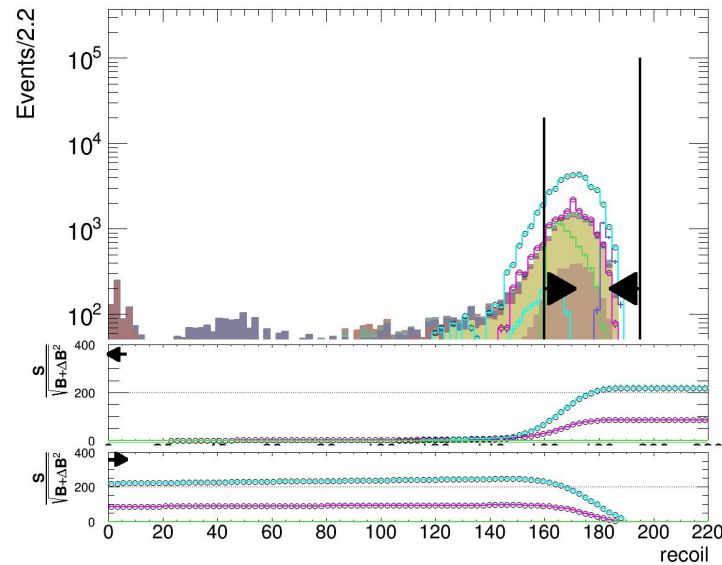
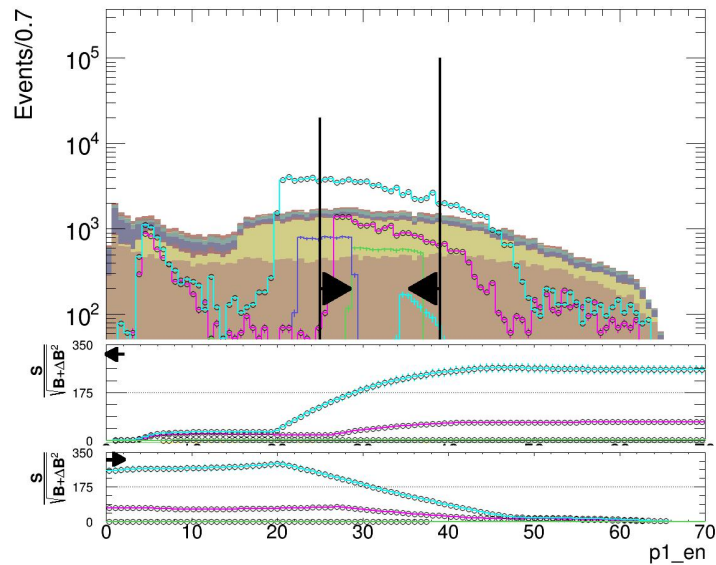
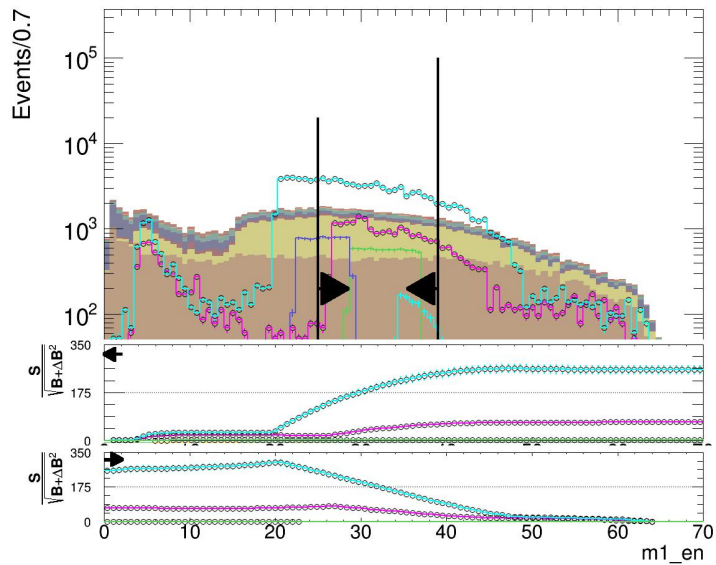
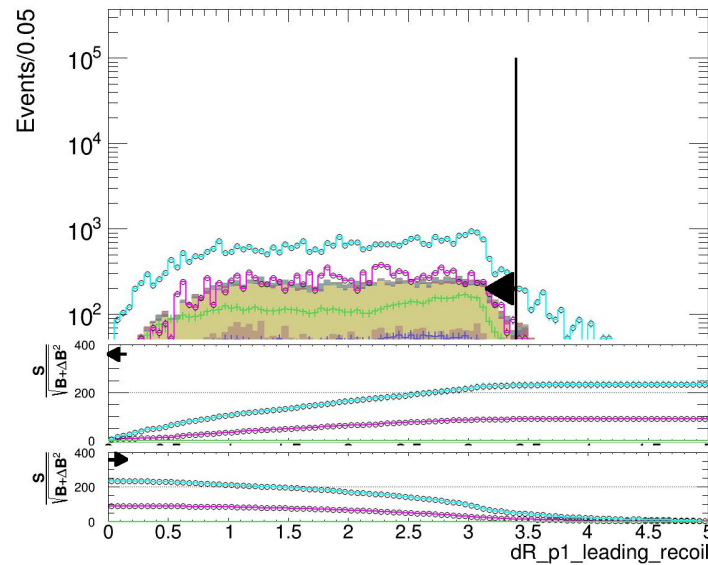
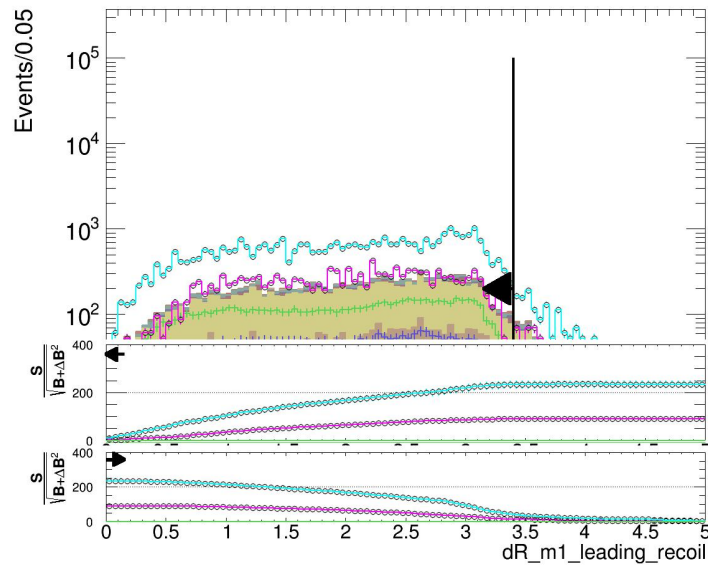
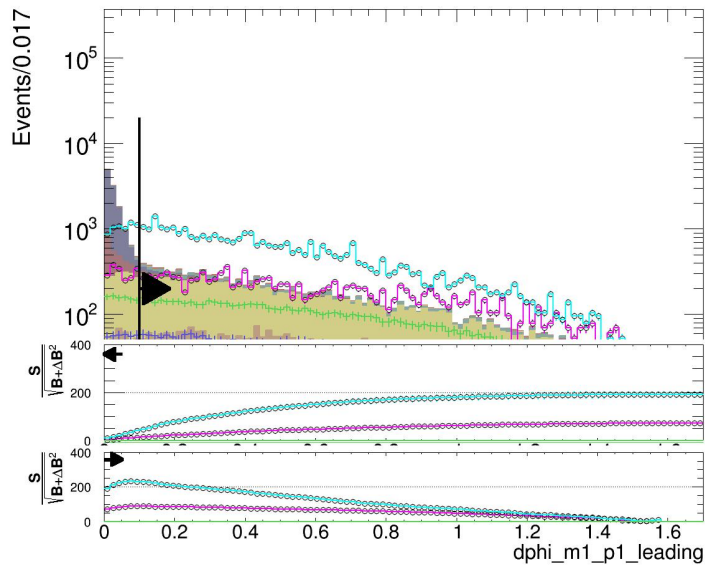
$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 80)$ GeV

$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 90)$ GeV

$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 50)$ GeV



Smuon



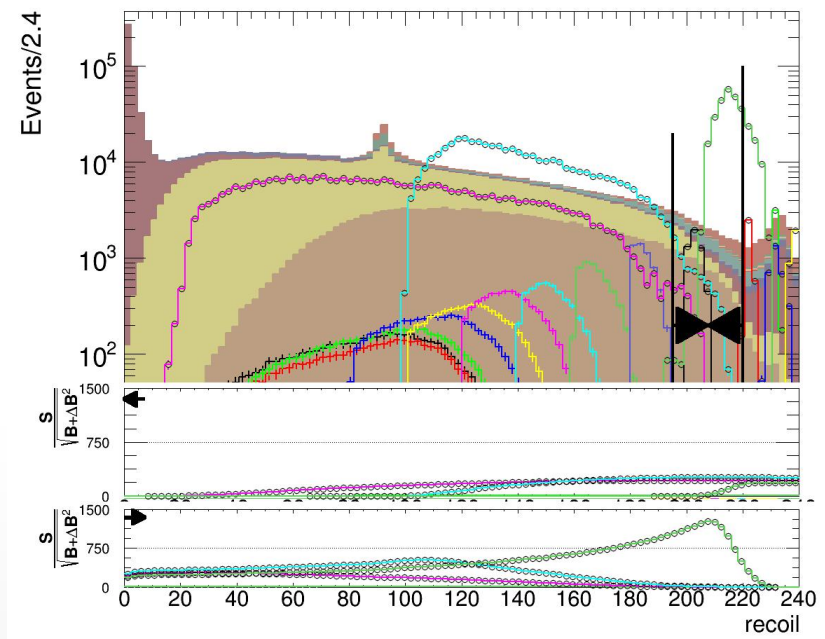
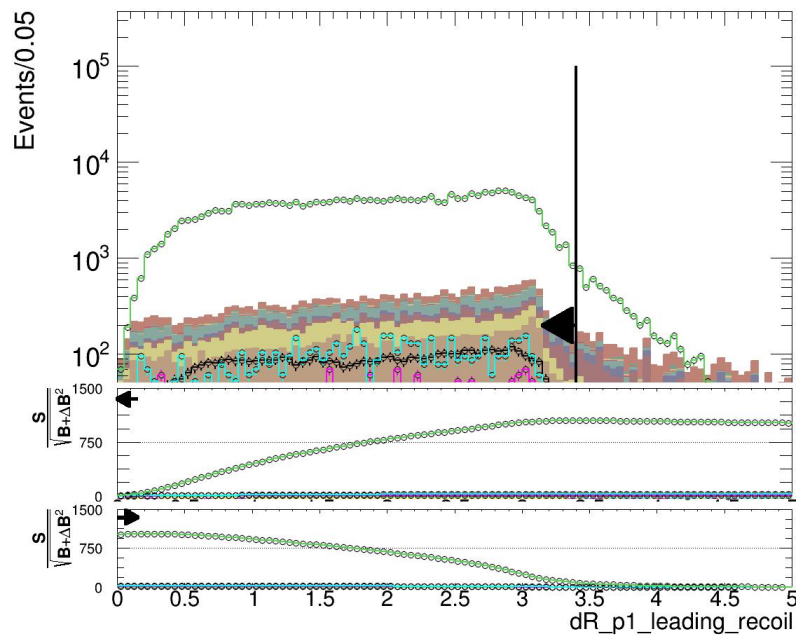
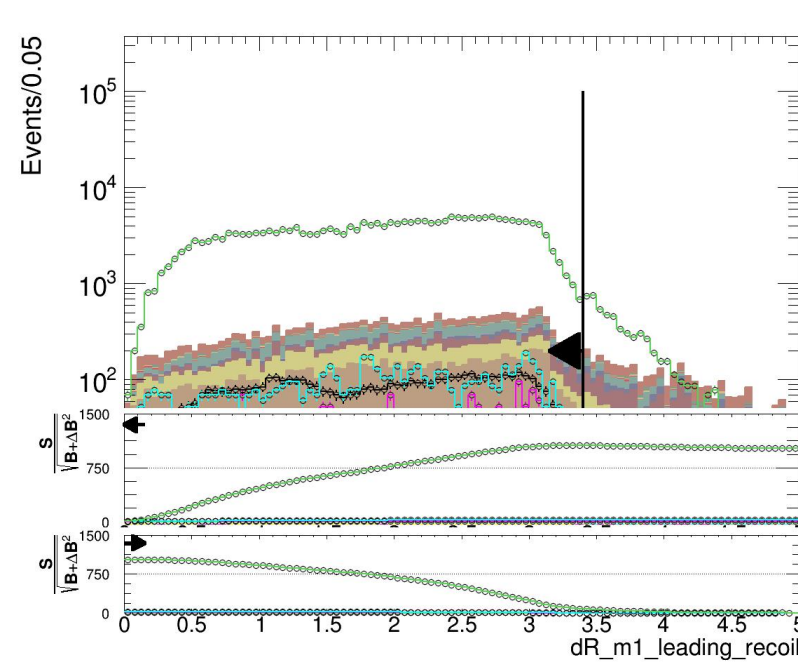
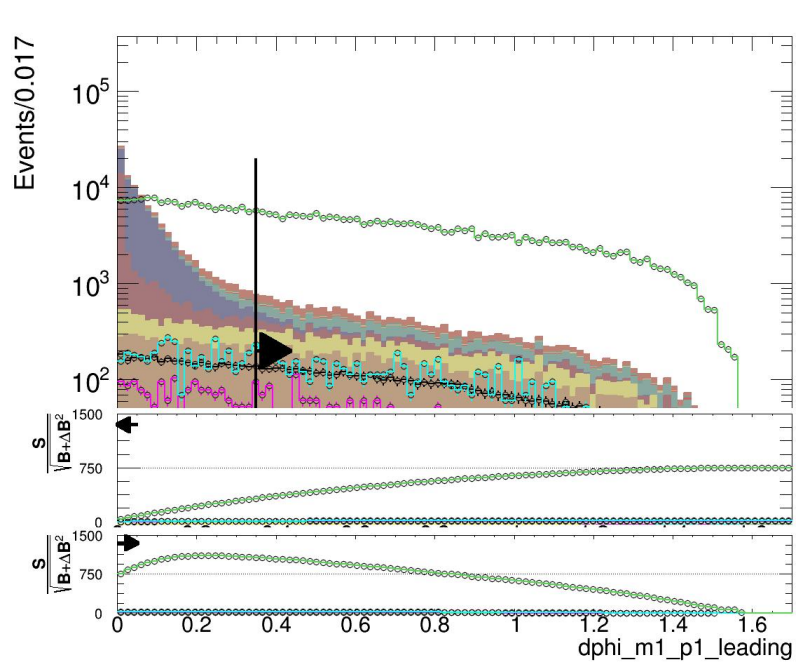
- e2e2
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- sznū_l0tautau
- zz_l0mumu
- sznū_l0mumu

$$\Delta m = 30 - 40$$

$$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 80) \text{ GeV}$$

$$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 90) \text{ GeV}$$

$$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 50) \text{ GeV}$$



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- sznu_l0tautau
- zz_l0mumu
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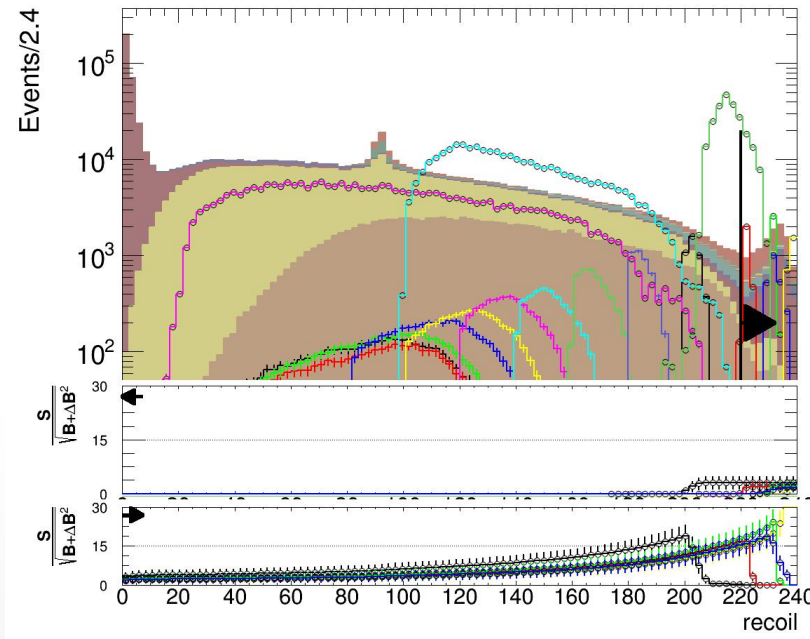
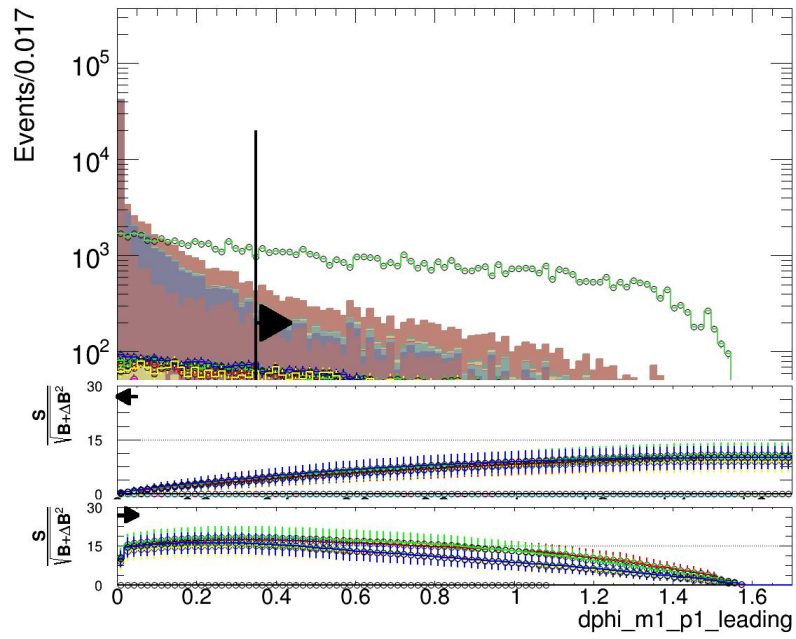
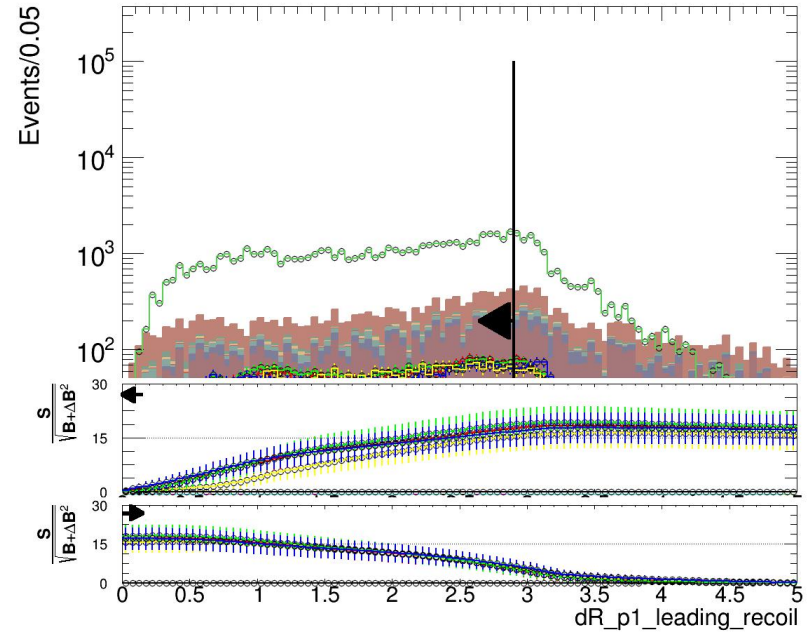
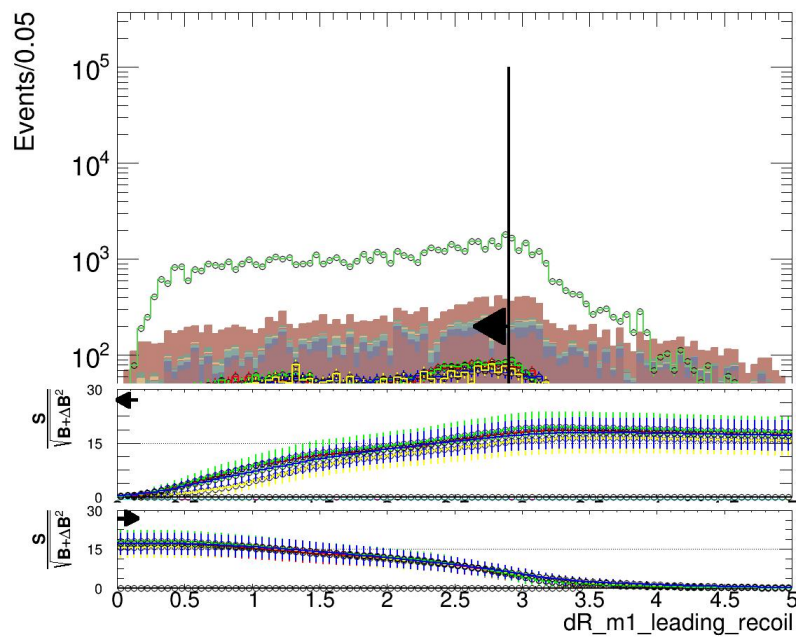
$$\Delta m = 10 - 20$$

○

$$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 100) \text{ GeV}$$

○

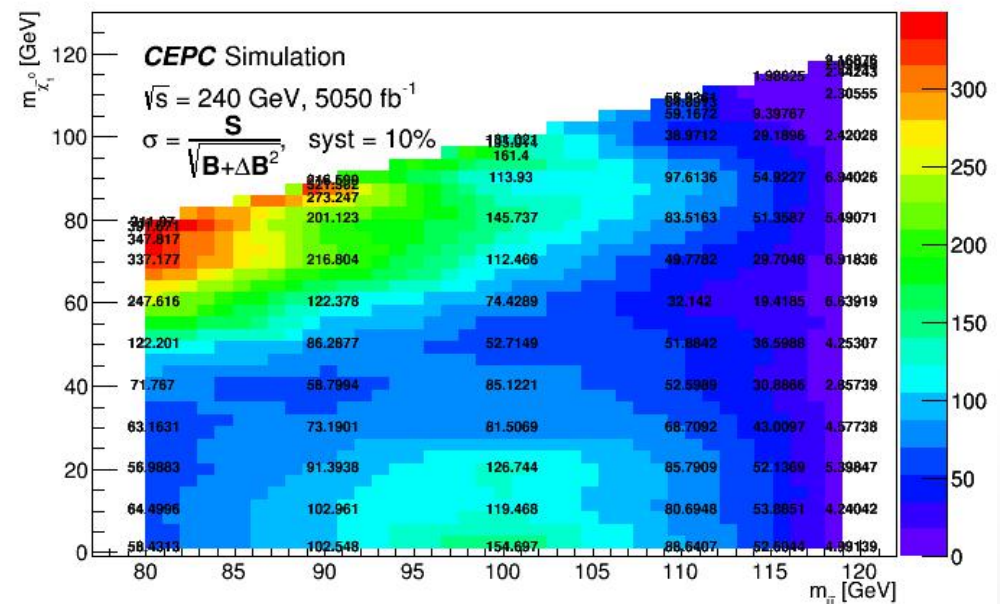
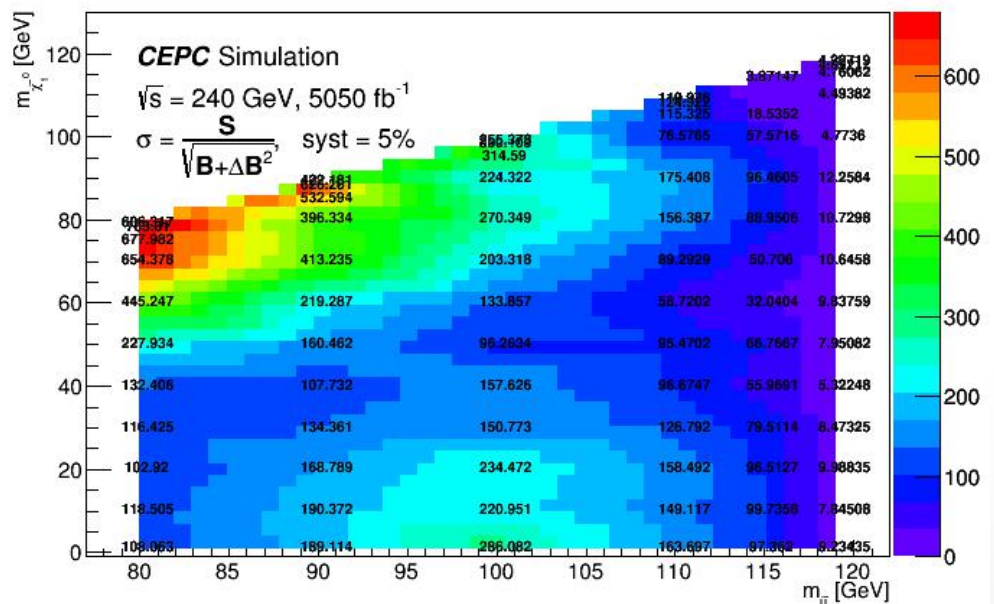
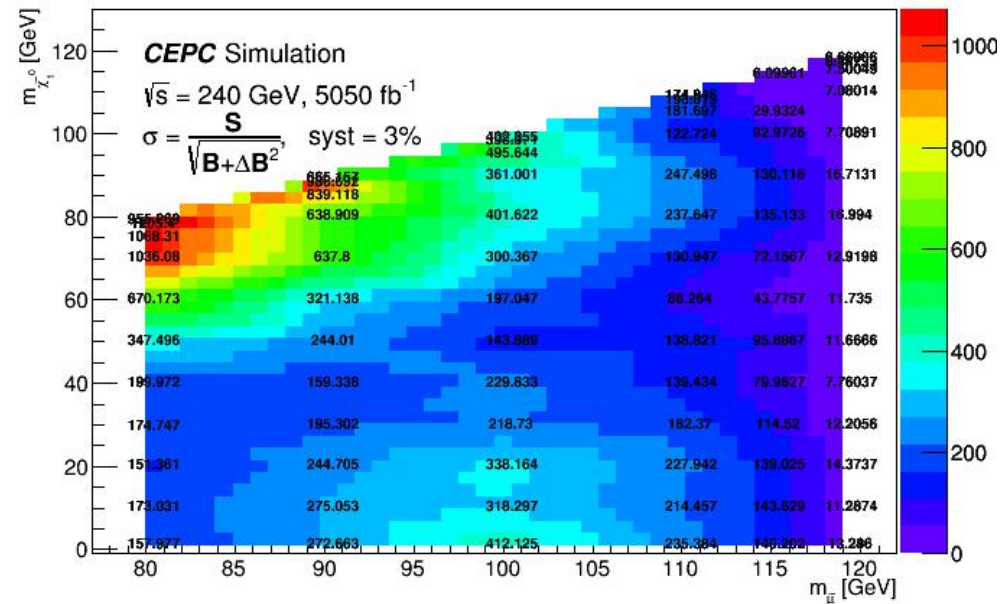
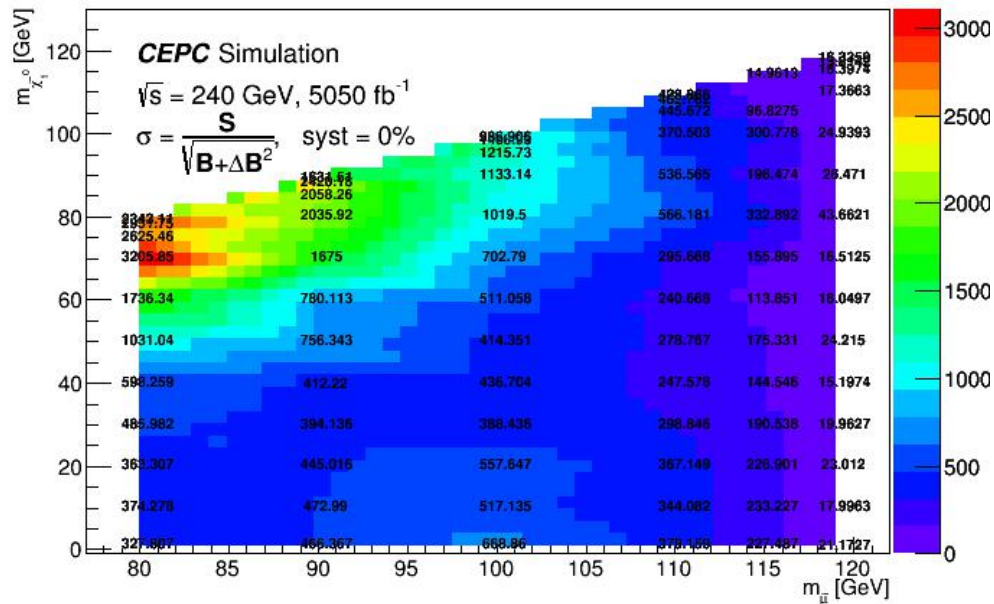
$$(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 90) \text{ GeV}$$



- e2e2
- ww_l0ll
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- zzorww_l0tautau
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- sznū_l0tautau
- zz_l0mumu
- sznū_l0mumu

$$\Delta m \leq 10$$

- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1}) = (119, 110) \text{ GeV}$
- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1}) = (119, 115) \text{ GeV}$
- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1}) = (119, 117) \text{ GeV}$
- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1}) = (100, 90) \text{ GeV}$



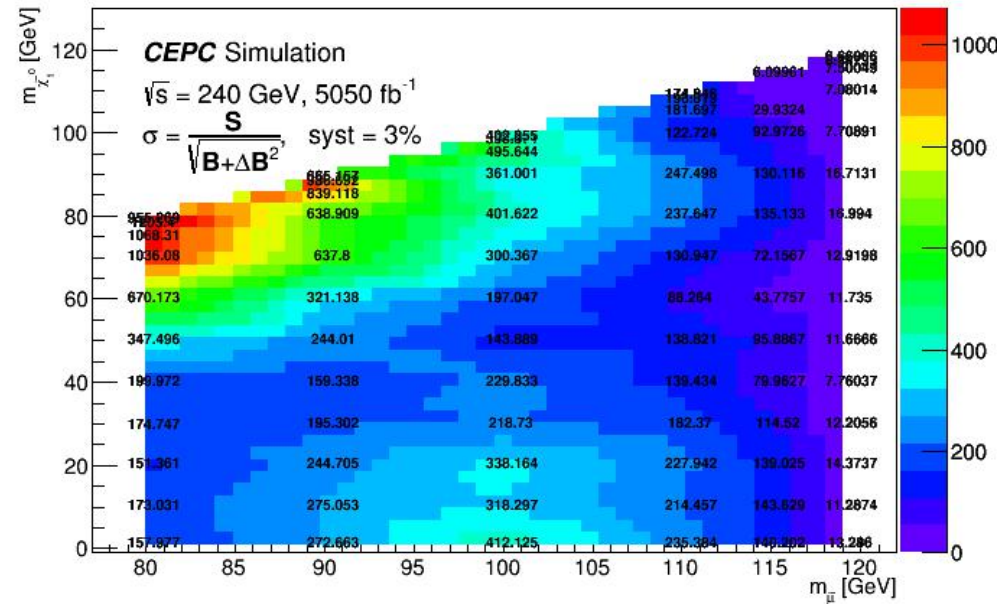
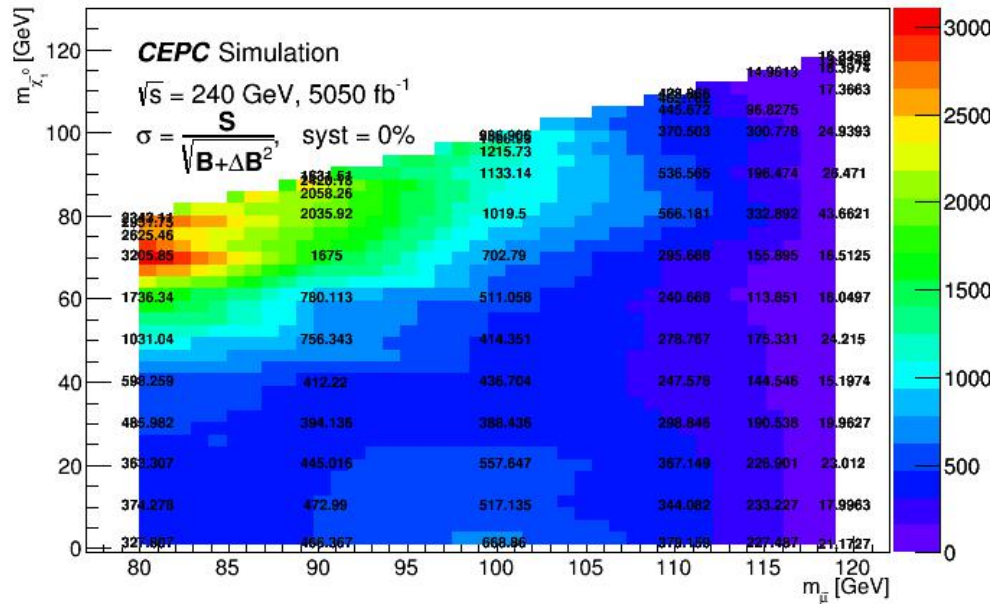
sensitivity map

Thank you.

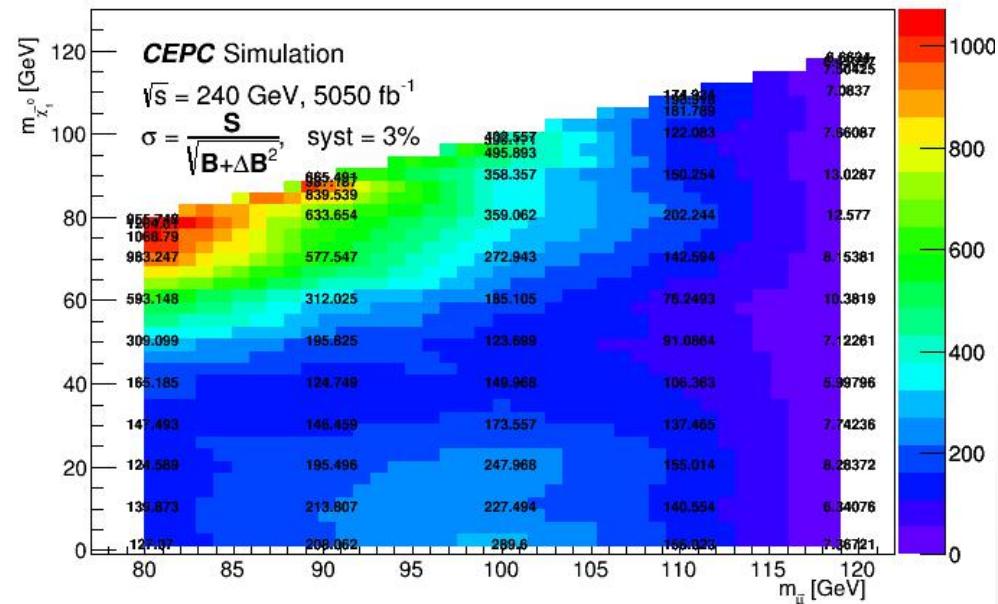
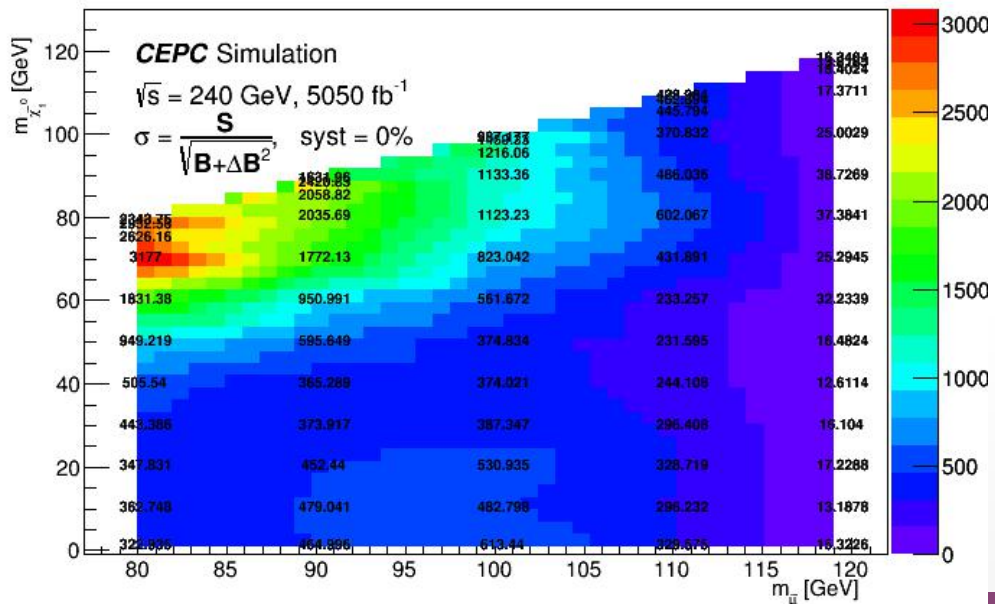
back up



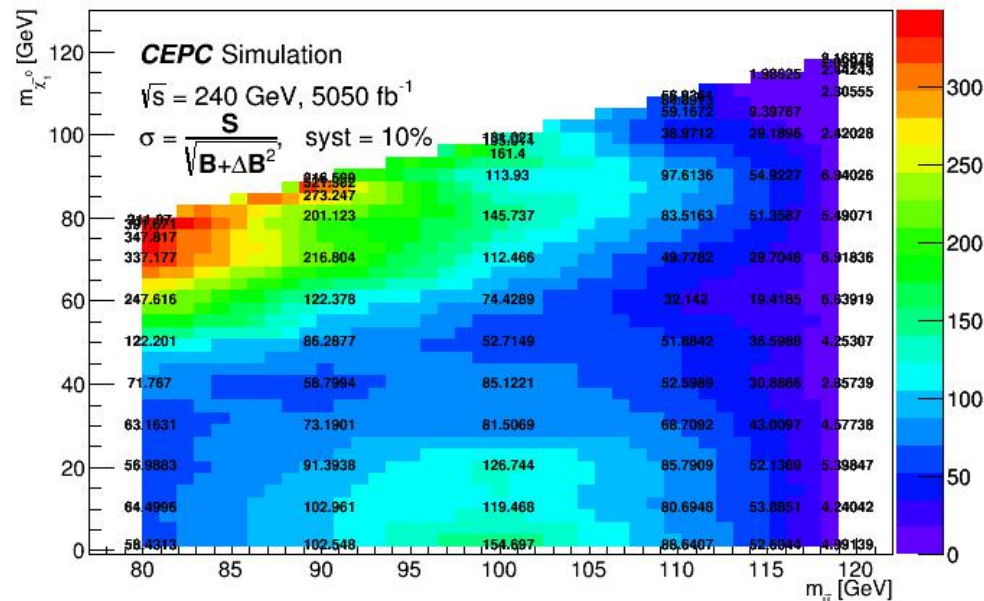
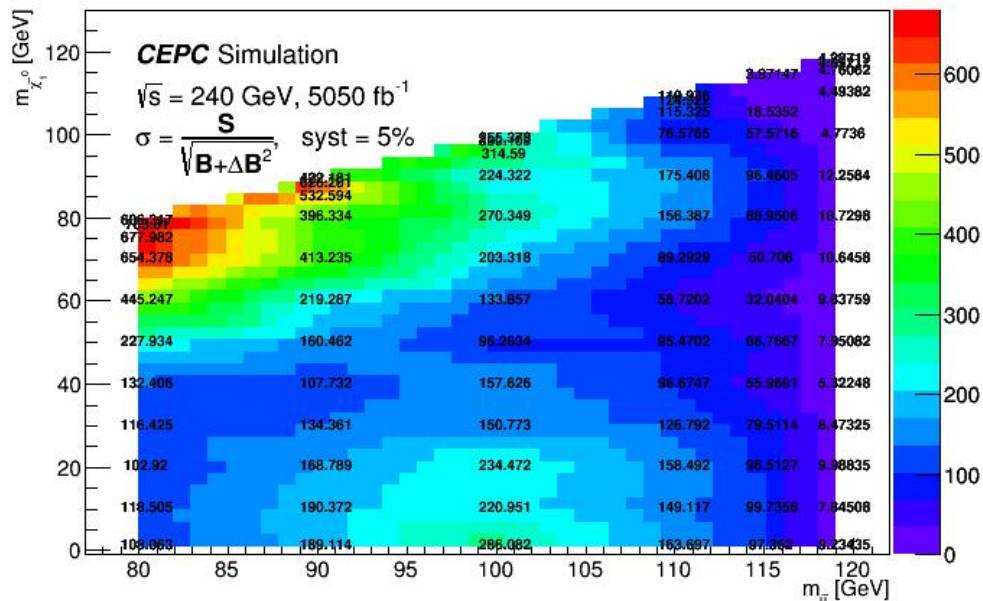
New



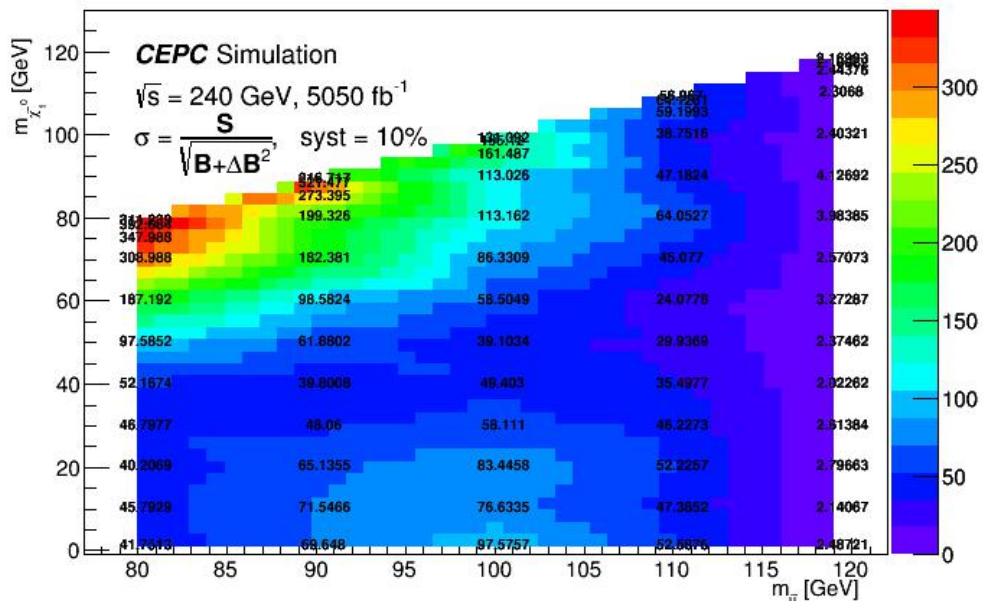
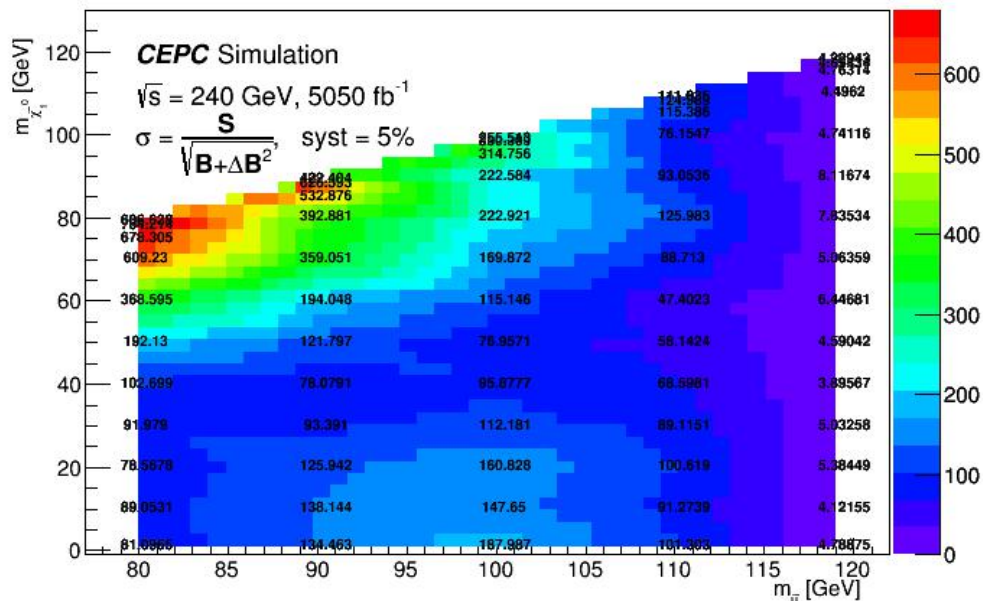
Old





















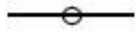








New



Old



	e2e2
	ww_l0ll
	zzorww_l0mumu
	e3e3
	nnh_e3e3
	zzorww_l0tautau
	zz_l0tautau
	sznu_l0tautau
	zz_l0mumu
	sznu_l0mumu
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 1) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 10) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 20) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 40) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 50) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 60) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 70) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 80) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 90) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 100) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 110) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 115) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (119, 117) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (115, 114) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (100, 10) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (100, 50) \text{ GeV}$
	$(m_{\tilde{\mu}}, m_{\tilde{\chi}_0}) = (100, 90) \text{ GeV}$

Smuon

SR

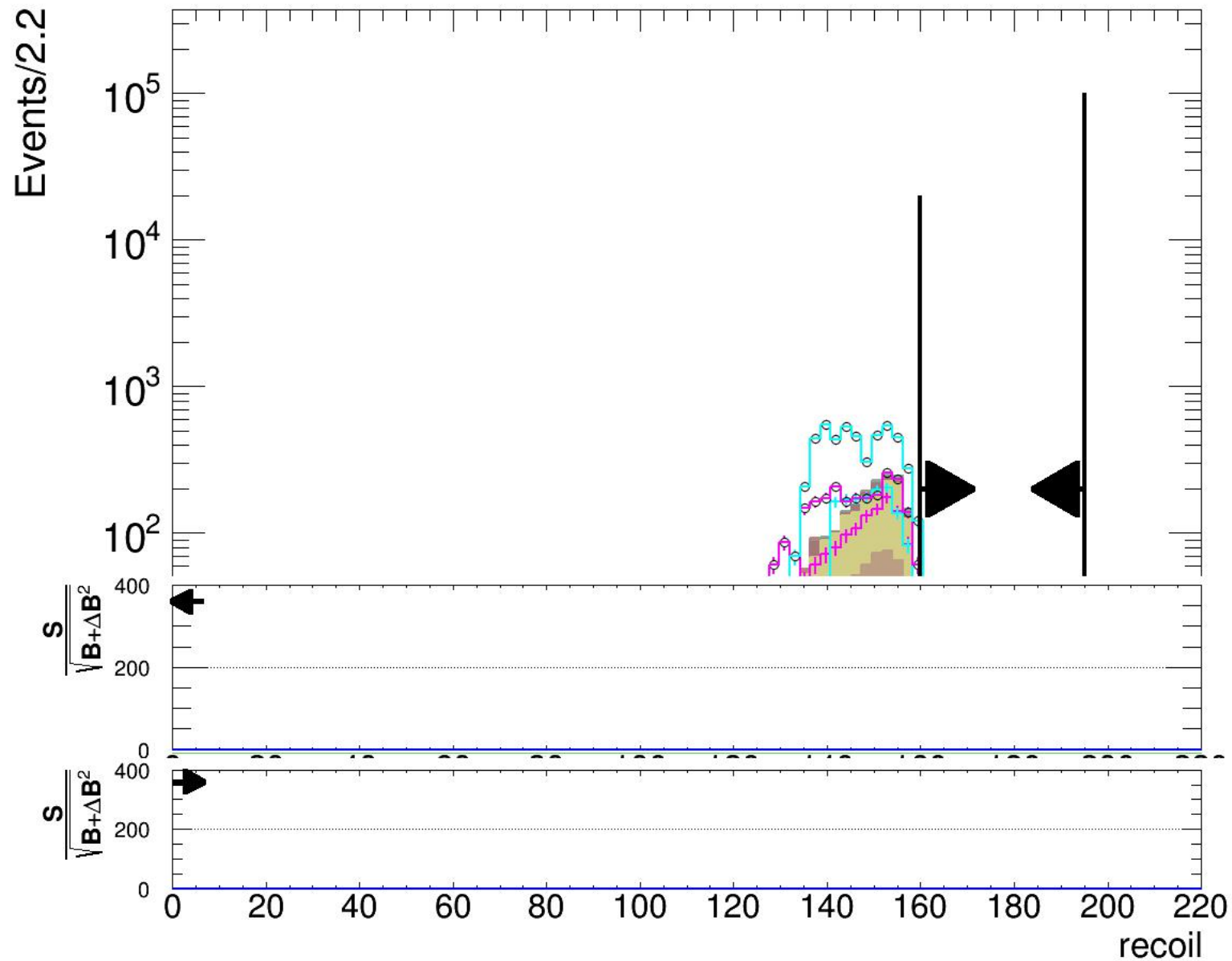
=2 OS muon

$$\Delta R(\mu, recoil) < 3.4$$

$$\Delta\phi(\mu, \mu) > 0.1$$

$$39\text{GeV} < E_\mu < 44\text{GeV}$$

$$160\text{GeV} < M_{recoil} < 195\text{GeV}$$



not use