
Analysis Report

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Smuon

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

signal samples: MadGraph+Pythia8

simulation:Mokka

reconstruction:Marlin

Direct Smuon Quick sensitivity study

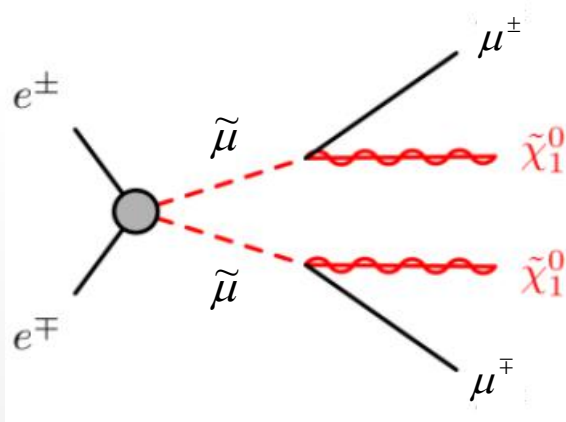
explain mu g-2 excess

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

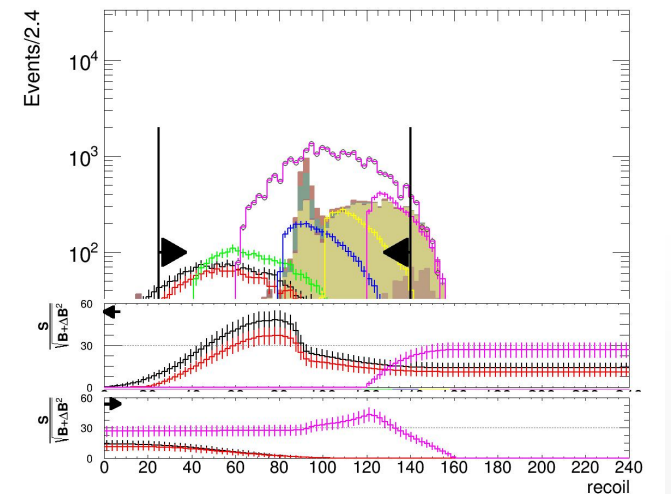
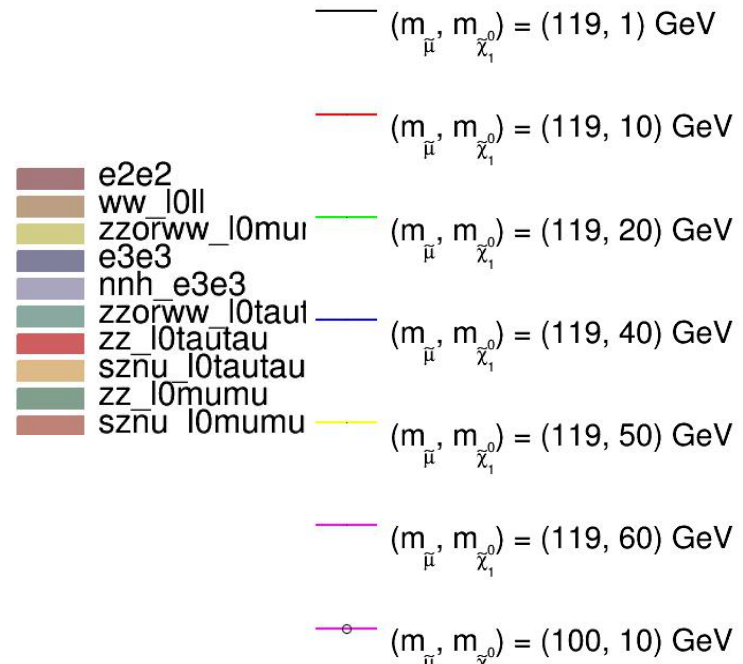
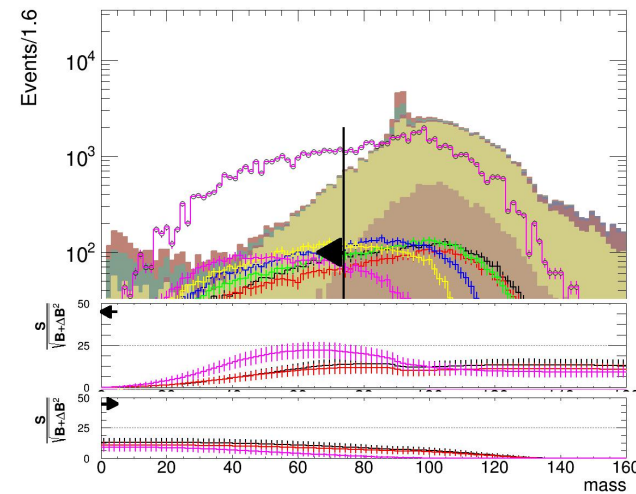
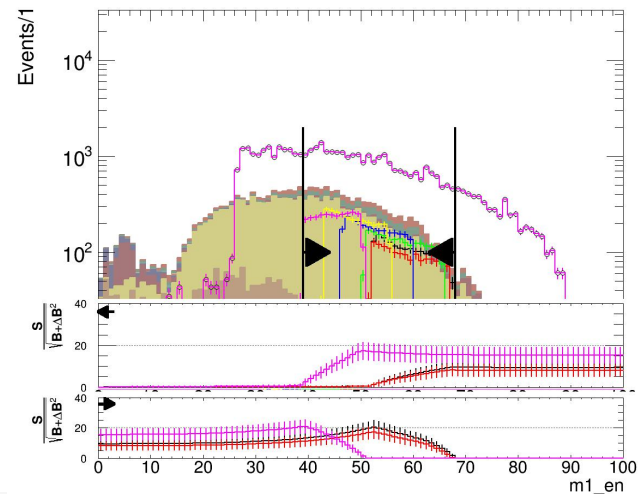
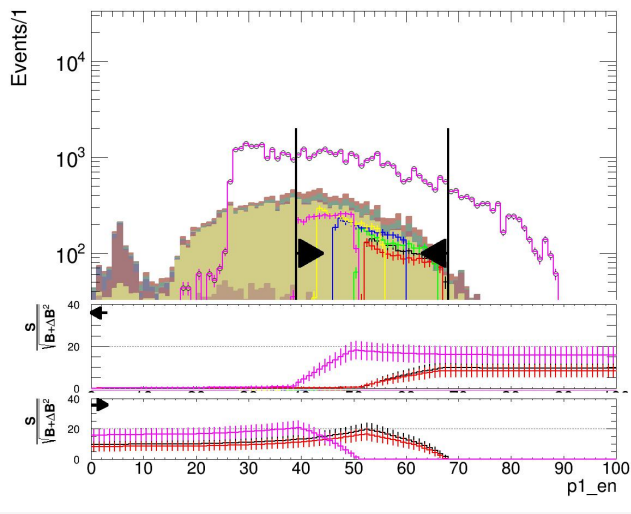
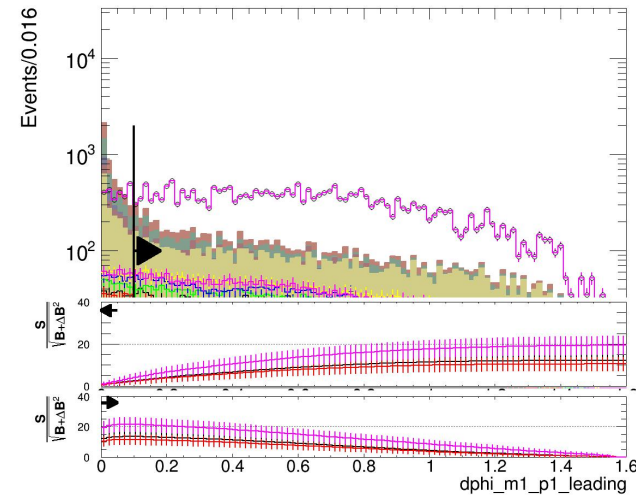
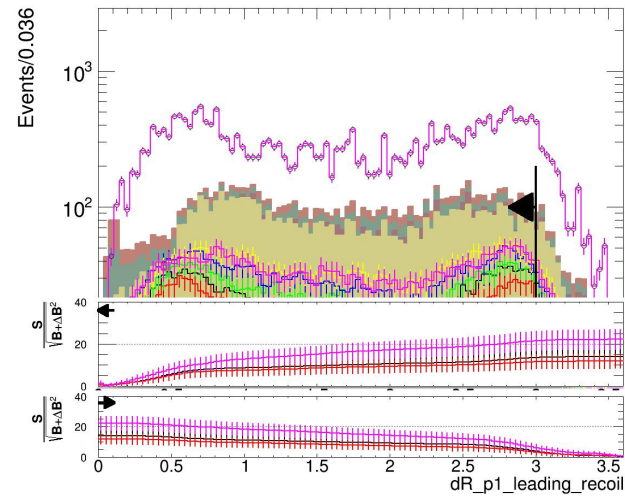
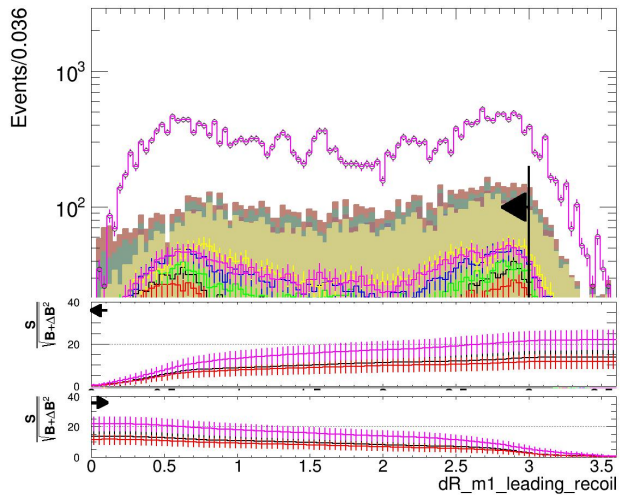
SR1	SR2	SR3
=2 OS muon		
$\Delta R(\mu, recoil) < 3$		
$\Delta\phi(\mu, \mu) > 0.1$		$\Delta\phi(\mu, \mu) > 0.2$
$39\text{GeV} < E_\mu < 68\text{GeV}$	$22\text{GeV} < E_\mu < 44\text{GeV}$	$195\text{GeV} < M_{recoil}$
$M_{\mu\mu} < 74\text{GeV}$		
$25\text{GeV} < M_{recoil} < 140\text{GeV}$	$140\text{GeV} < M_{recoil} < 195\text{GeV}$	

(100,10)
 (119,1/10/20/30/40/50/60)
 $\Delta m \geq 60$

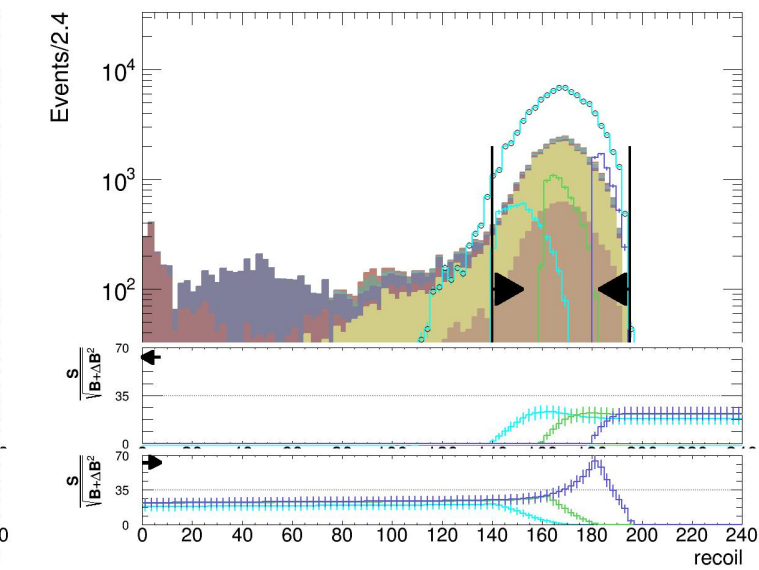
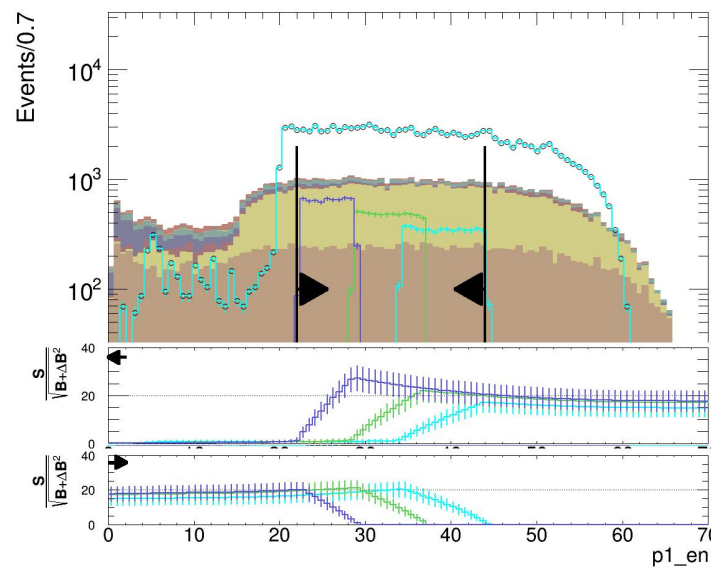
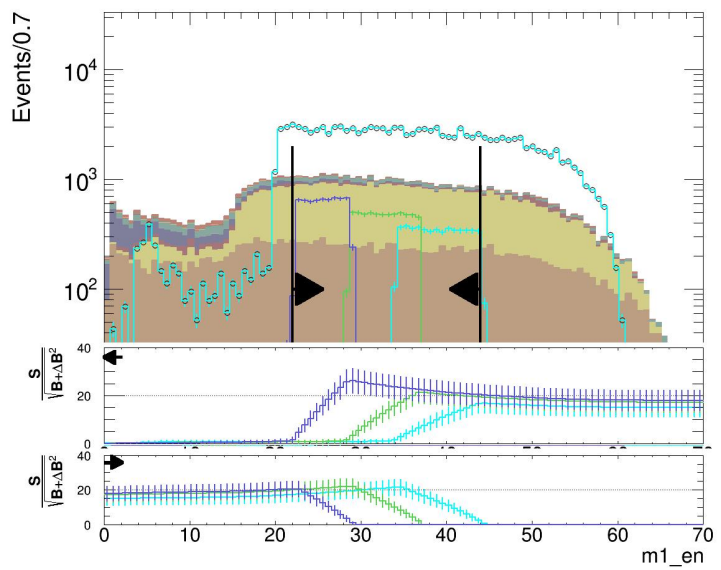
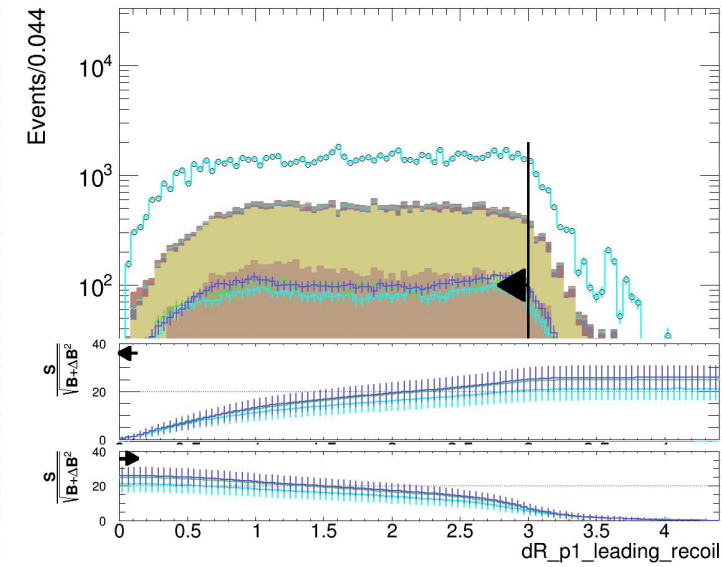
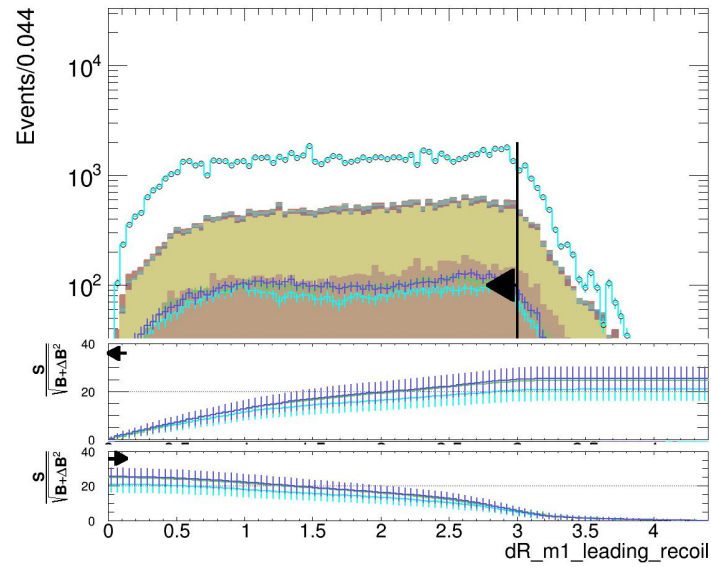
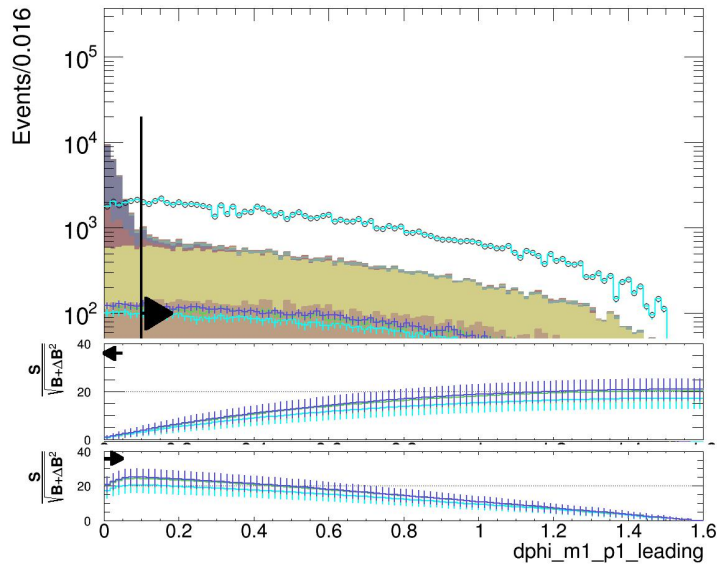
(100,50)(119,90/80/70)
 $\Delta m = 30 - 50$

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

Smuon



Smuon



- e2e2
- ww_l0ll
- zzorww_l0mumu
- e3e3
- nnh_e3e3
- zzorww_l0tautau
- zz_l0tautau
- sznu_l0tautau
- zz_l0mumu
- sznu_l0mumu

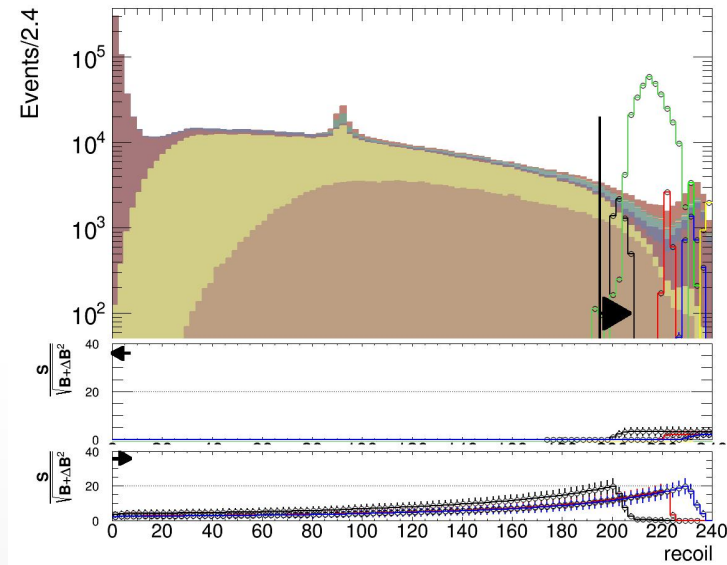
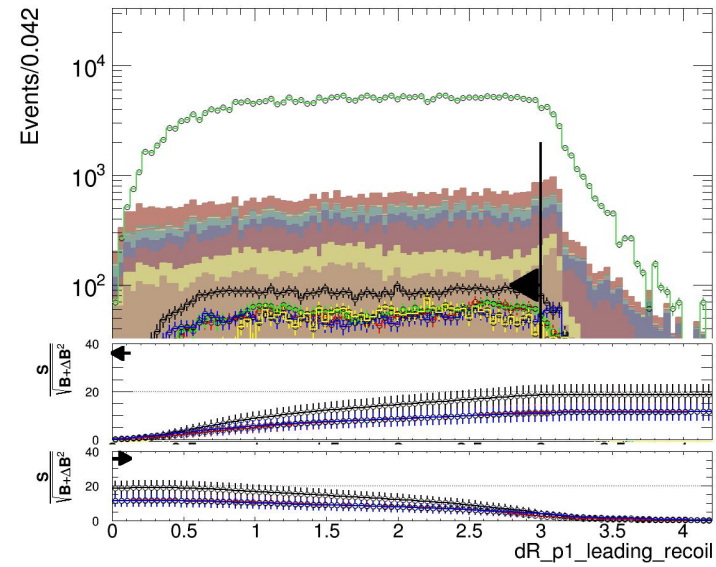
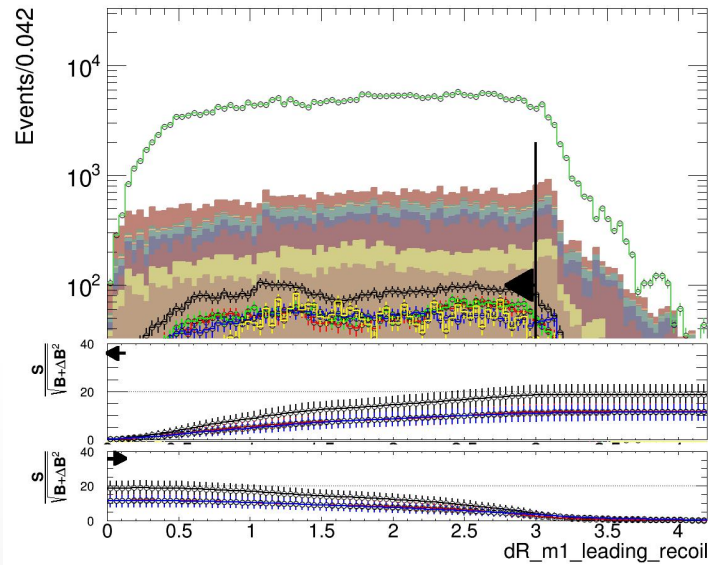
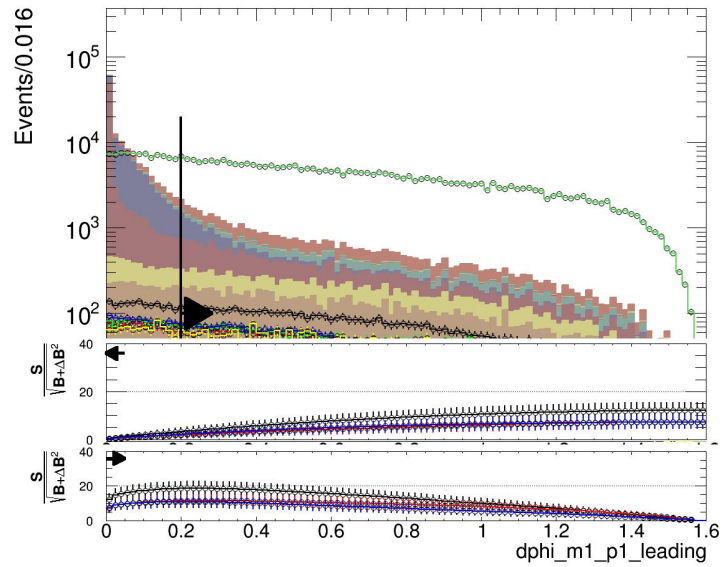
$(m_{\bar{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 70)$ GeV

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

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

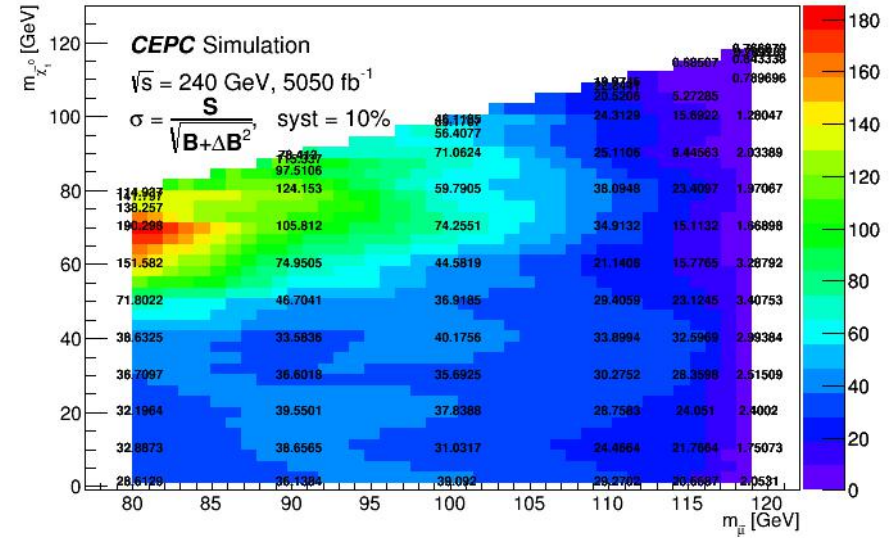
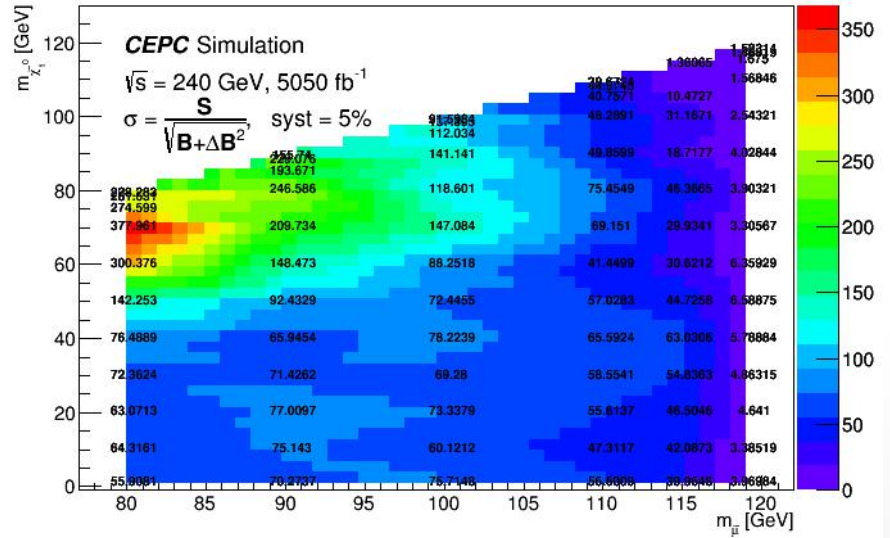
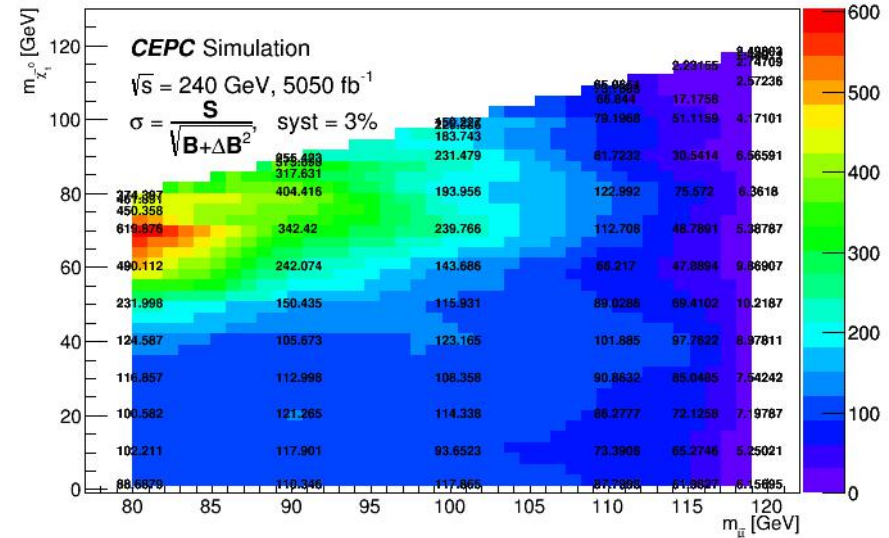
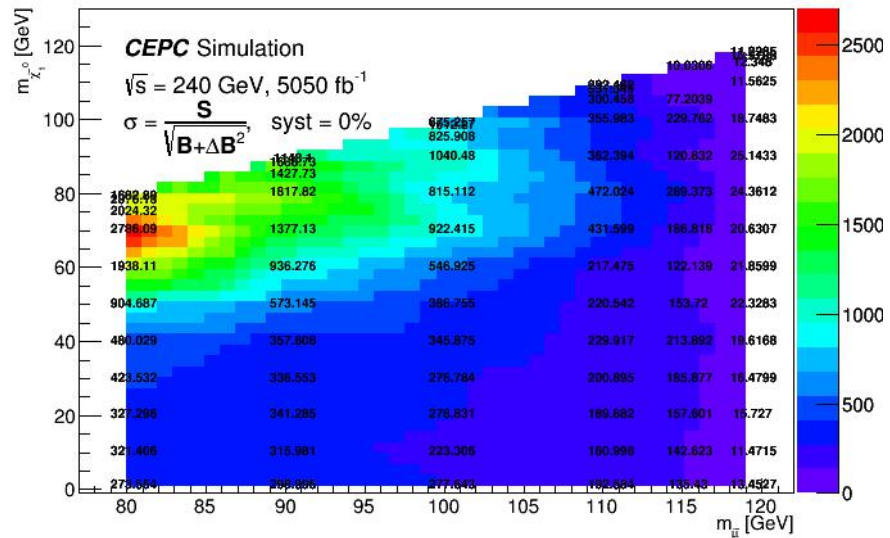
$(m_{\bar{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 50)$ GeV

Smuon



- e2e2
- ww_l0ll
- zzorww_l0mumu
- e3e3
- nnh_e3e3
- zzorww_l0tautau
- zz_l0tautau
- sznu_l0tautau
- zz_l0mumu
- sznu_l0mumu

- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 100)$ GeV
- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 110)$ GeV
- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 115)$ GeV
- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (119, 117)$ GeV
- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (115, 114)$ GeV
- $(m_{\tilde{\mu}}, m_{\tilde{\chi}_1^0}) = (100, 90)$ GeV























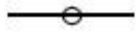






Summary

A sensitivity check for direct smuon in CEPC
Signal Region Definition for exclusion
N-1, sensitivity map

Todo:
Signal Region Definition for discovery.

Thank you.

back up

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

add (recoil<89 | |recoil>100) to SR1, other cuts are the same as P3.

