

# Slepton and higgsino pair production @ CEPC

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汇报时间：2020.08.14

# Slepton @ CEPC

- $e^+ e^- \rightarrow \tilde{e}_L^+ \tilde{e}_L^-$
- $e^+ e^- \rightarrow \tilde{e}_R^+ \tilde{e}_R^-$
- $e^+ e^- \rightarrow \tilde{\mu}_L^+ \tilde{\mu}_L^-$
- $e^+ e^- \rightarrow \tilde{\mu}_R^+ \tilde{\mu}_R^-$
- $e^+ e^- \rightarrow \tilde{\tau}_{1(L)}^+ \tilde{\tau}_{1(L)}^-$
- $e^+ e^- \rightarrow \tilde{\tau}_{1(R)}^+ \tilde{\tau}_{1(R)}^-$

## 1. SUSYHIT

(产生质量谱)

$m_{\tilde{L}}$ : 90 - 120 GeV

$\tan\beta$ : 2 - 60

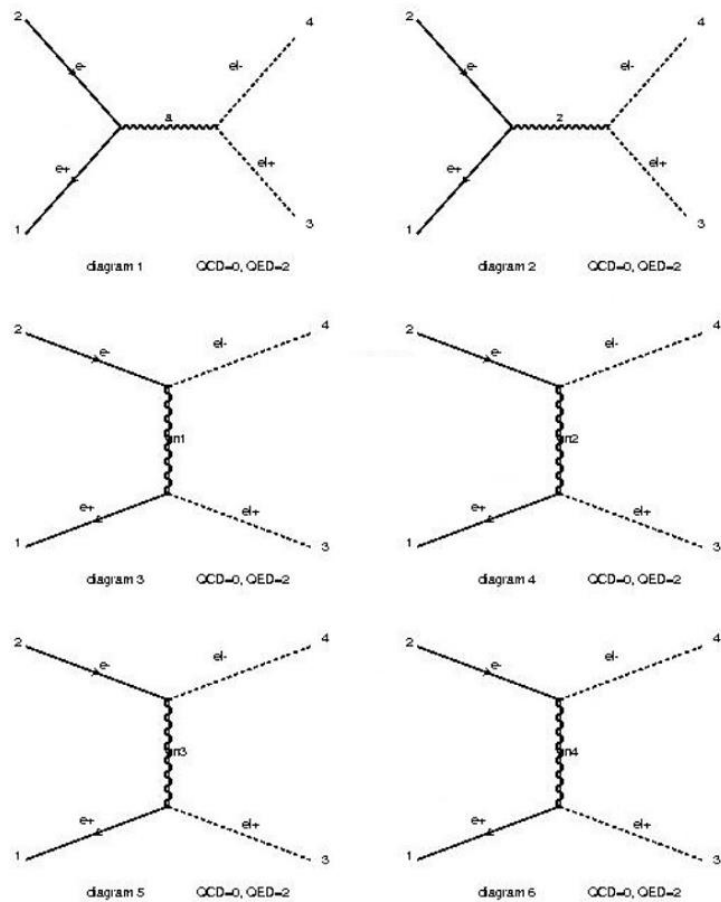
$A$ : 0

others: 2 TeV

## 2. MadGraph5\_aMC@NLO

(产生信号事例, 得到散射截面)

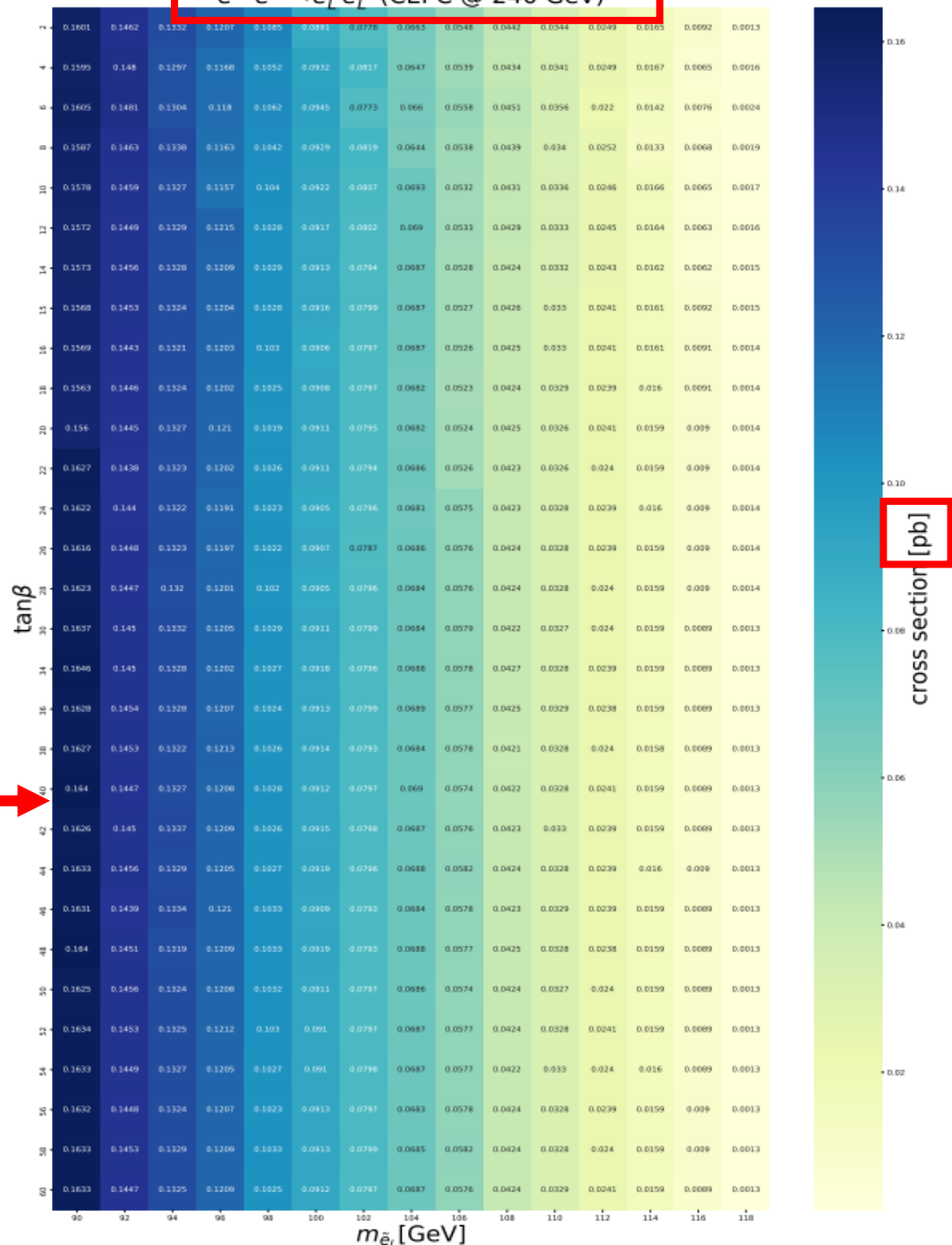
$$e^+ e^- \rightarrow \tilde{e}_L^+ \tilde{e}_L^-$$



$$\mathcal{L} = 3000 fb^{-1}$$

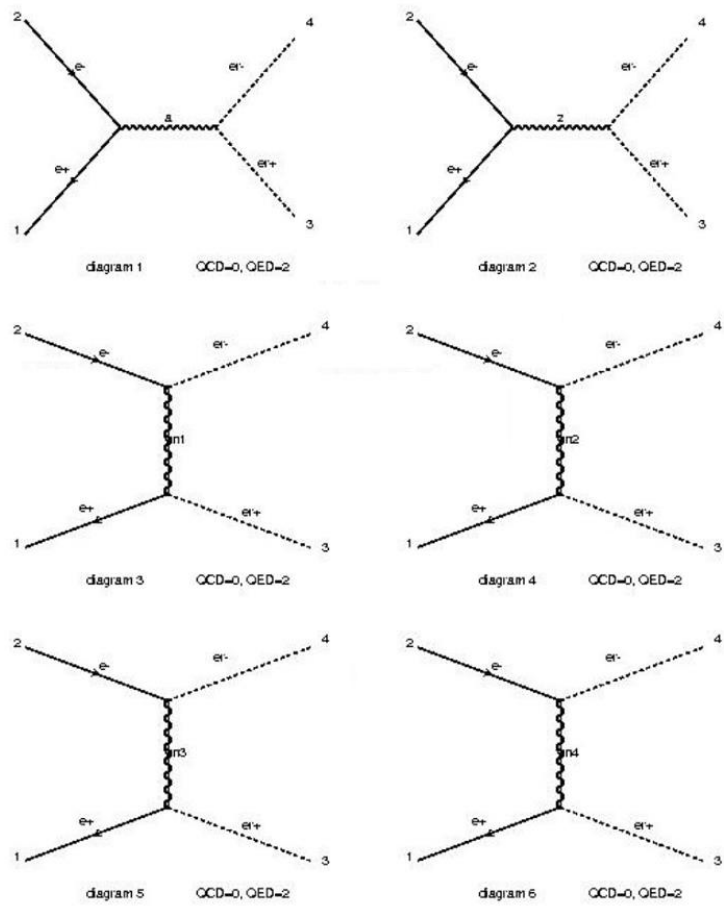
$$N_{max} = \sigma_{max} * \mathcal{L} = 4.92e5$$

$e^+ e^- \rightarrow \tilde{e}_L^+ \tilde{e}_L^-$  (CEPC @ 240 GeV)



$$e^+ e^- \rightarrow \tilde{e}_R^+ \tilde{e}_R^-$$

$e^+ e^- \rightarrow \tilde{e}_R^+ \tilde{e}_R^-$  (CEPC @ 240 GeV)

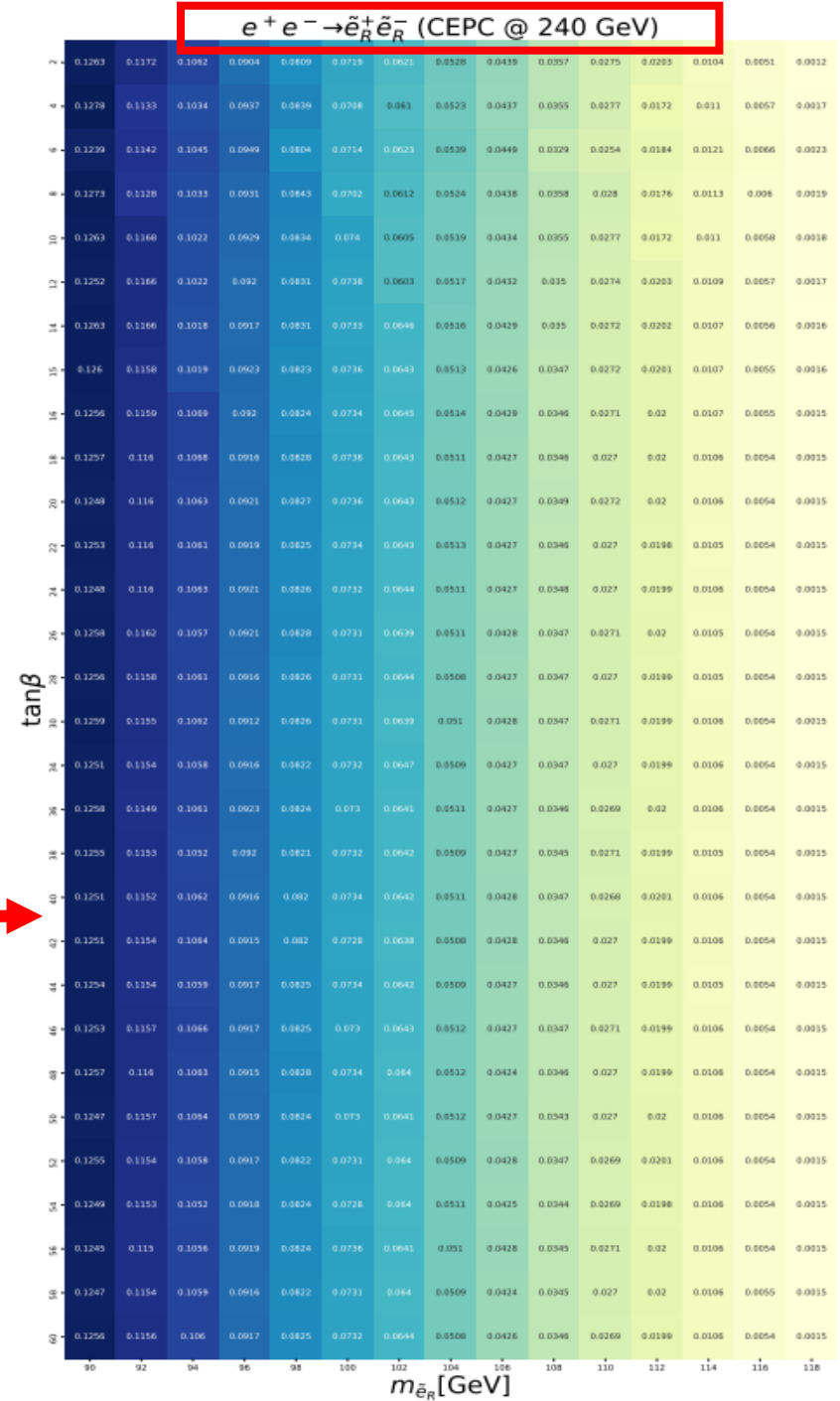


$$\mathcal{L} = 3000 fb^{-1}$$

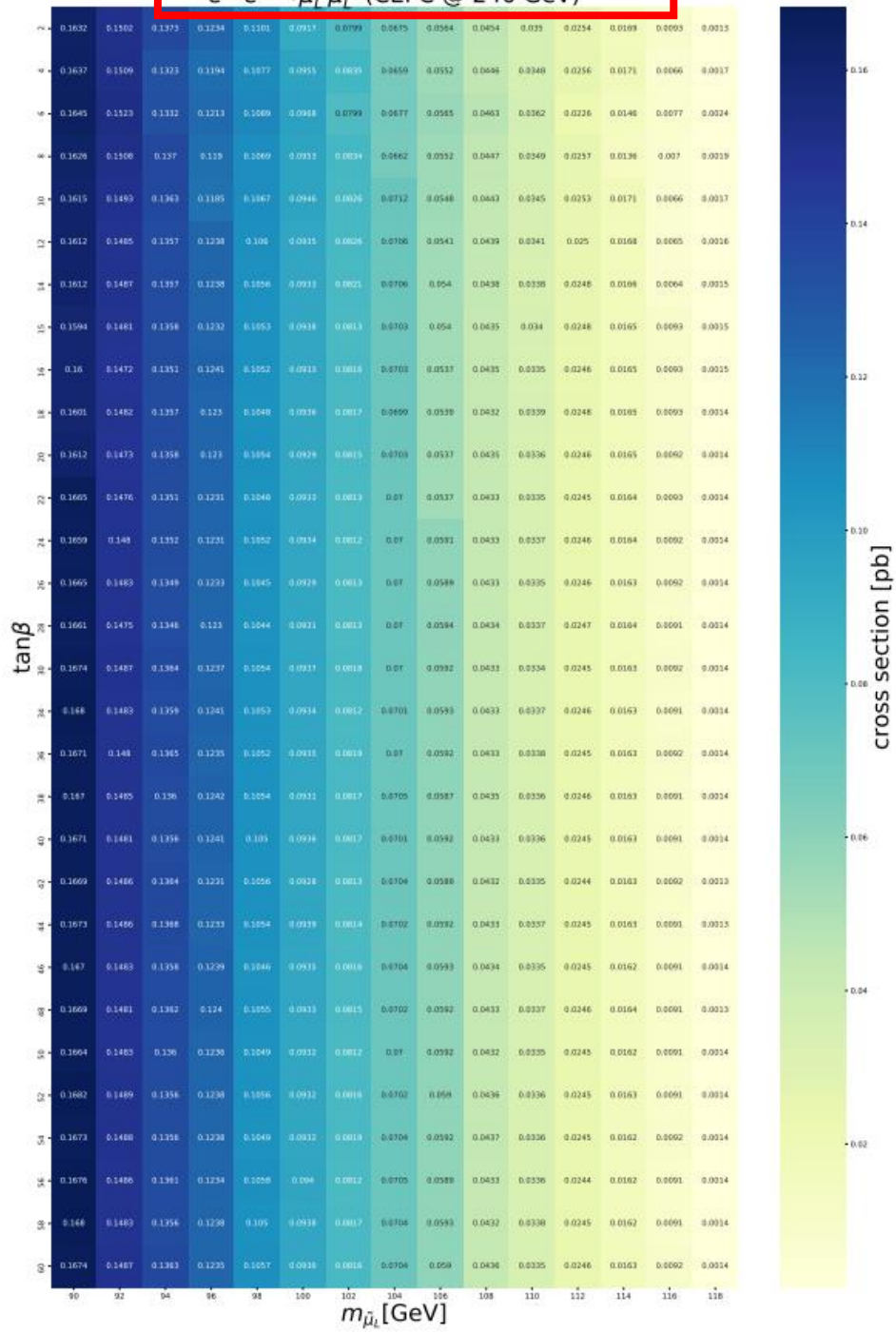
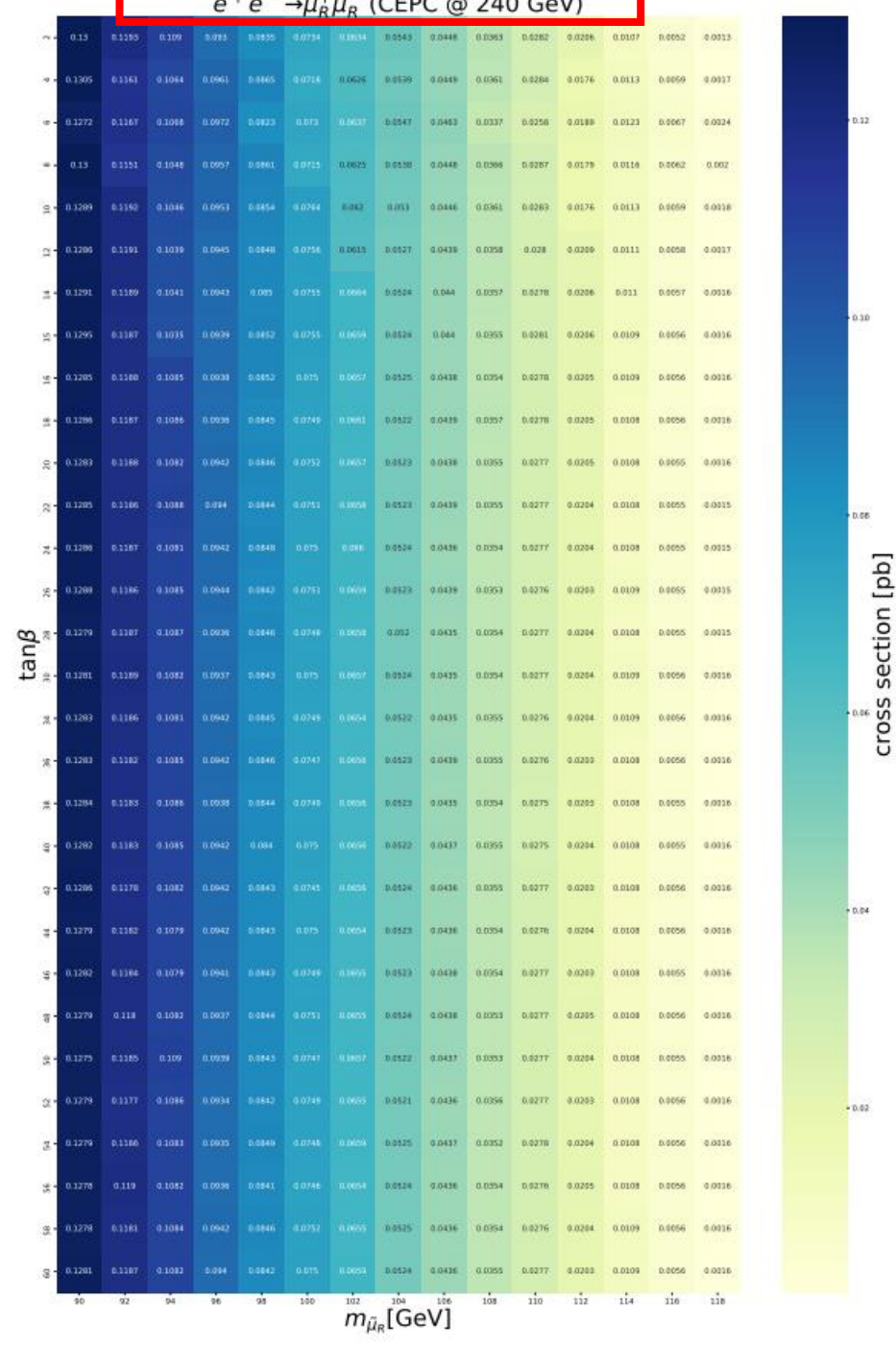
$$N_{max} = \sigma_{max} * \mathcal{L} = 3.78e5$$

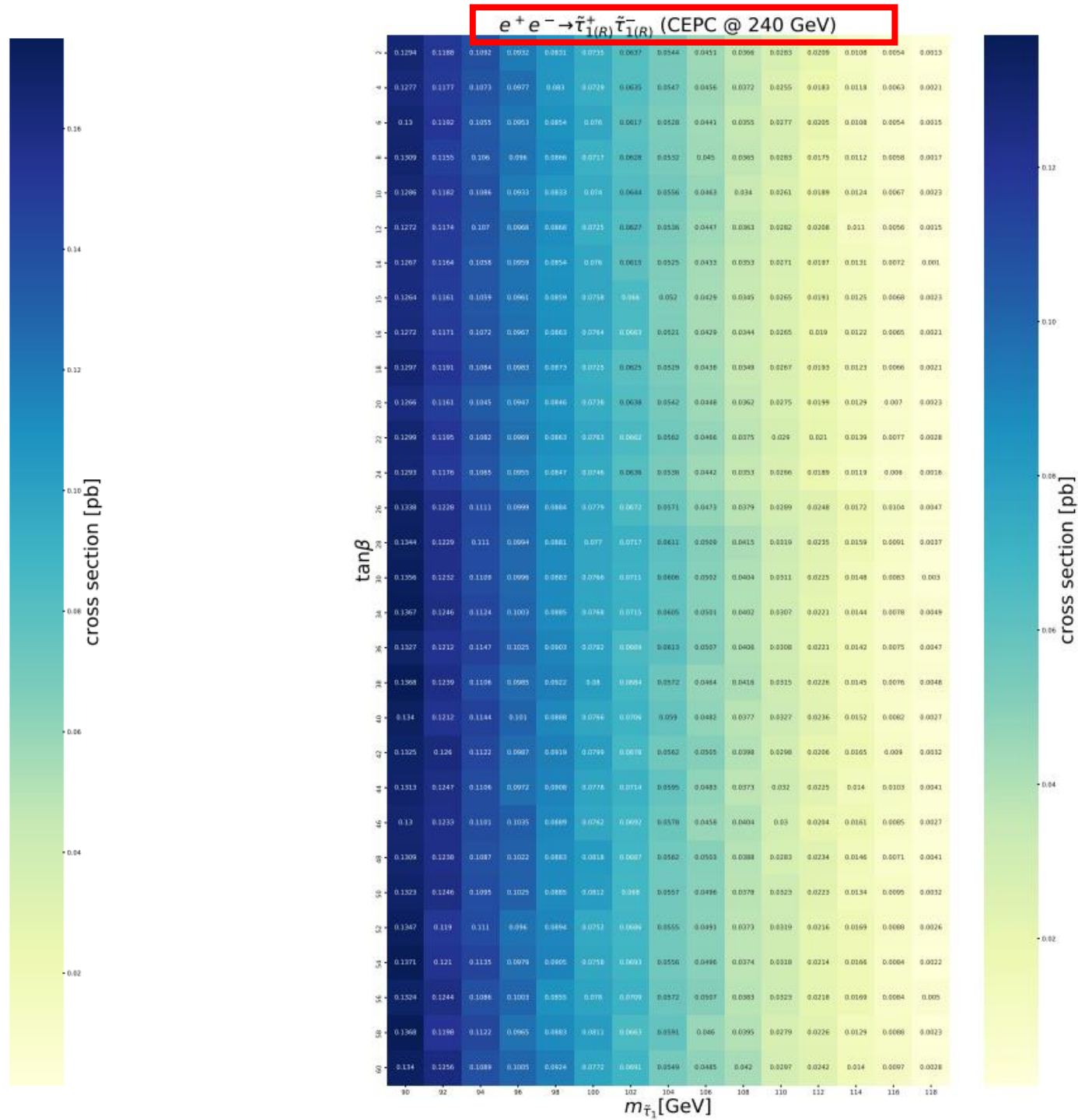
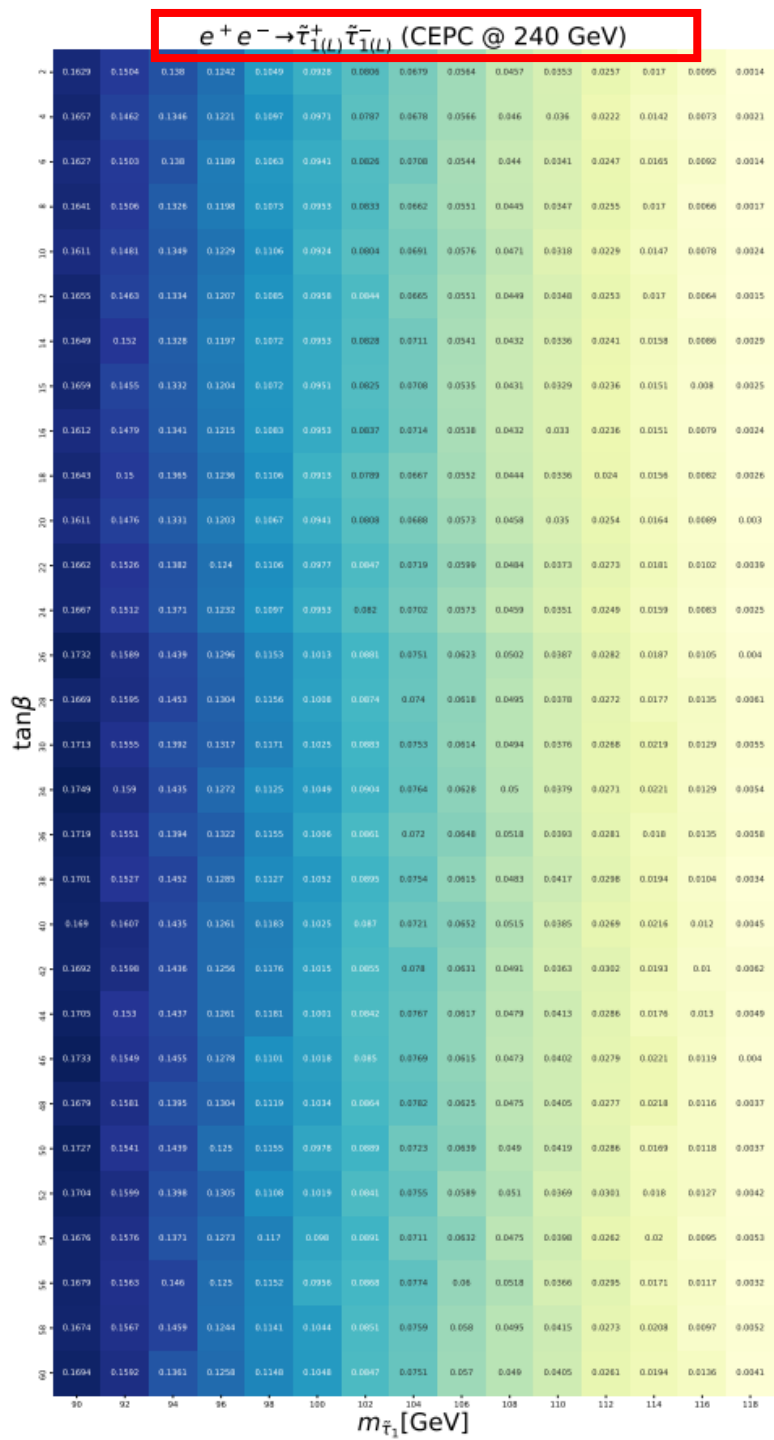
0.126

$\tan\beta$



cross section [pb]

$e^+e^- \rightarrow \tilde{\mu}_L^+ \tilde{\mu}_L^-$  (CEPC @ 240 GeV) $e^+e^- \rightarrow \tilde{\mu}_R^+ \tilde{\mu}_R^-$  (CEPC @ 240 GeV)



# Higgsino @ CEPC

- $e^+ e^- \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_1^0$
- $e^+ e^- \rightarrow \tilde{\chi}_2^0 \tilde{\chi}_2^0$
- $e^+ e^- \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_2^0$
- $e^+ e^- \rightarrow \tilde{\chi}_1^+ \tilde{\chi}_1^-$

## 1. SUSYHIT

$$M_{1,2} \gg \mu$$

$$\mu: 90 - 120 \text{ GeV}$$

$$\tan\beta: 2 - 60$$

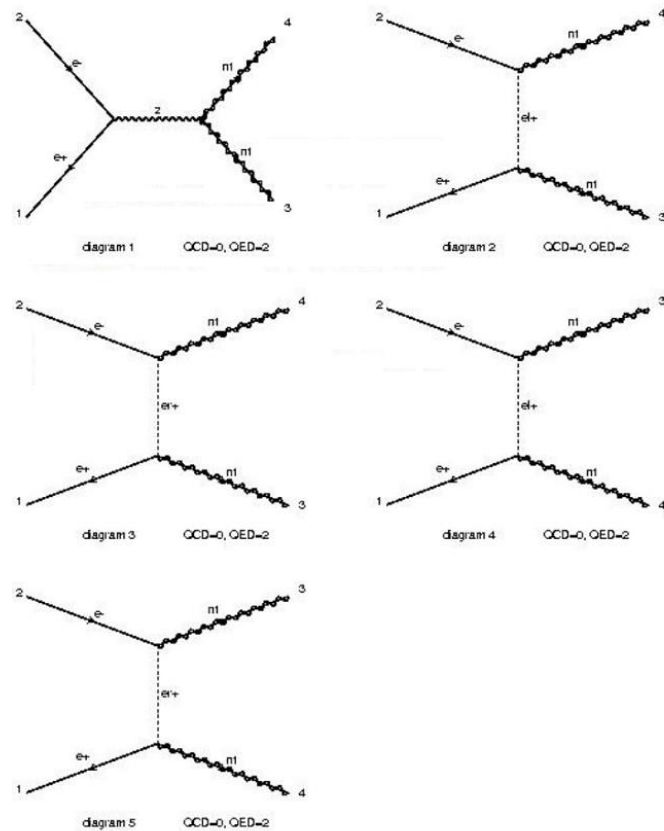
$$M_{\tilde{L}_{1,2}}: 100 \text{ GeV}$$

$$A: 0$$

$$\text{others: } 2 \text{ TeV}$$

## 2. MadGraph5\_aMC@NLO

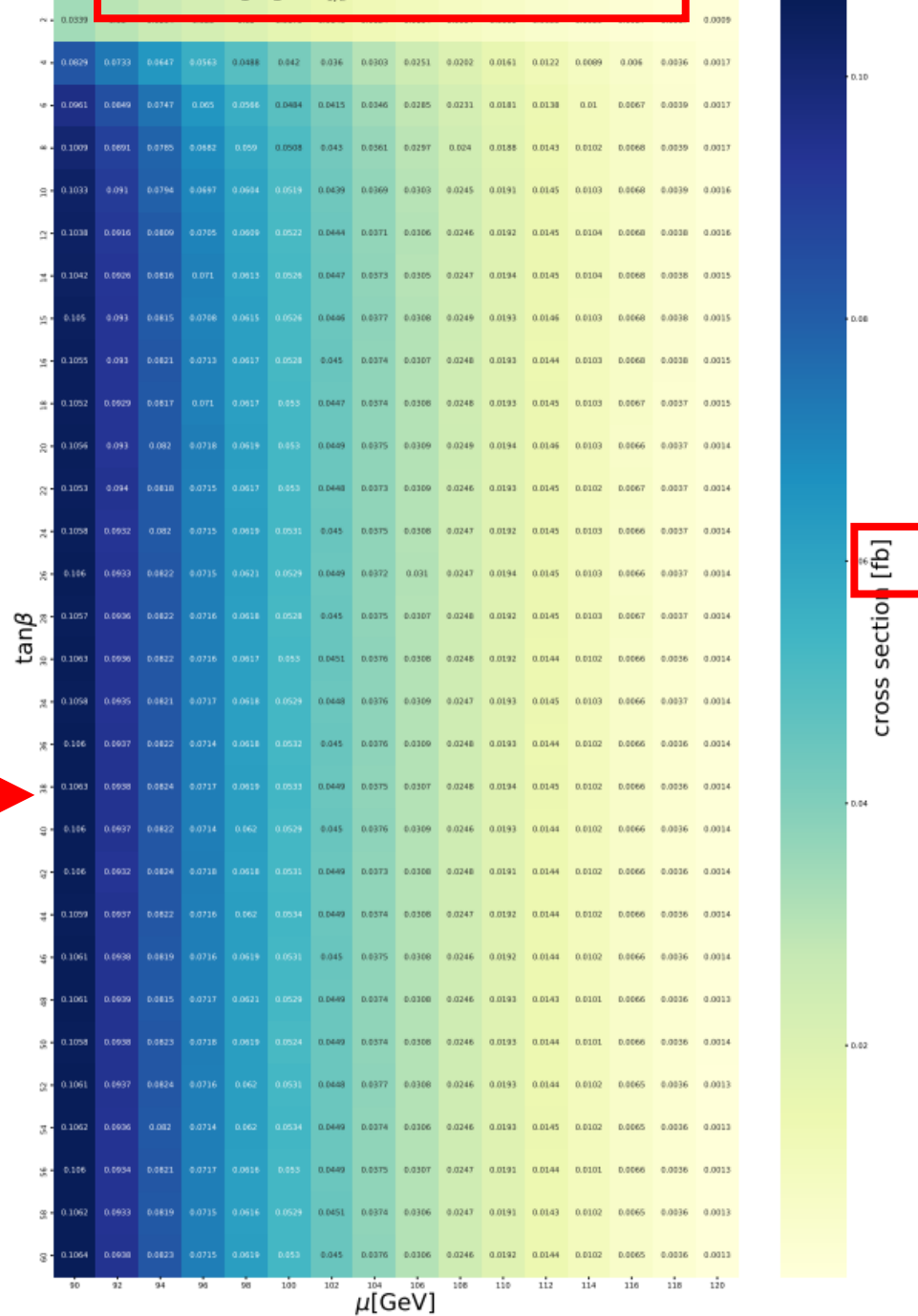
$$e^+ e^- \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_1^0$$



$$\mathcal{L} = 3000 fb^{-1}$$

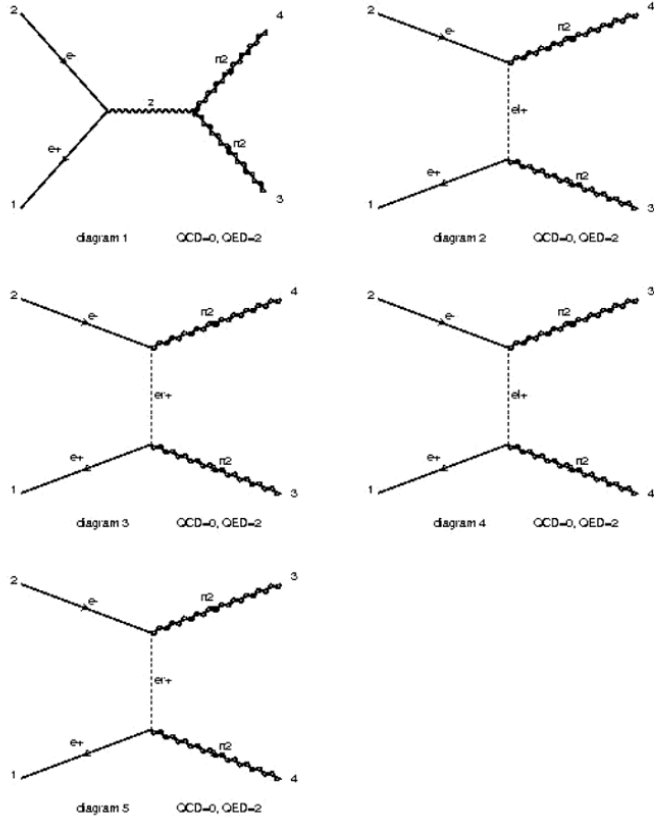
$$N_{max} = \sigma_{max} * \mathcal{L} = 319$$

$$e^+ e^- \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_1^0 (m_{1,2} = 100 GeV, CEPC@240 GeV)$$





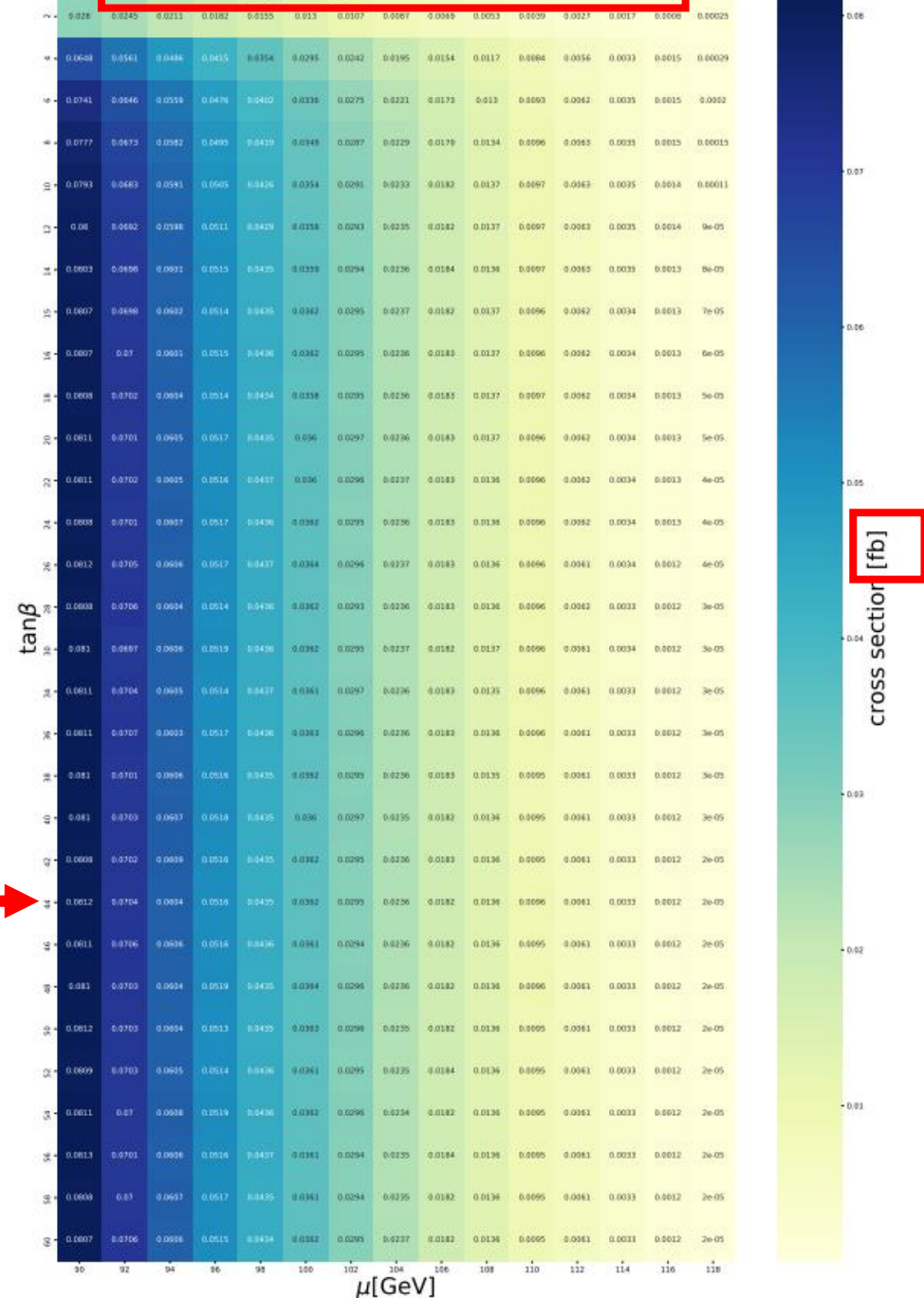
$$e^+ e^- \rightarrow \tilde{\chi}_2^0 \tilde{\chi}_2^0$$



$$\mathcal{L} = 3000 fb^{-1}$$

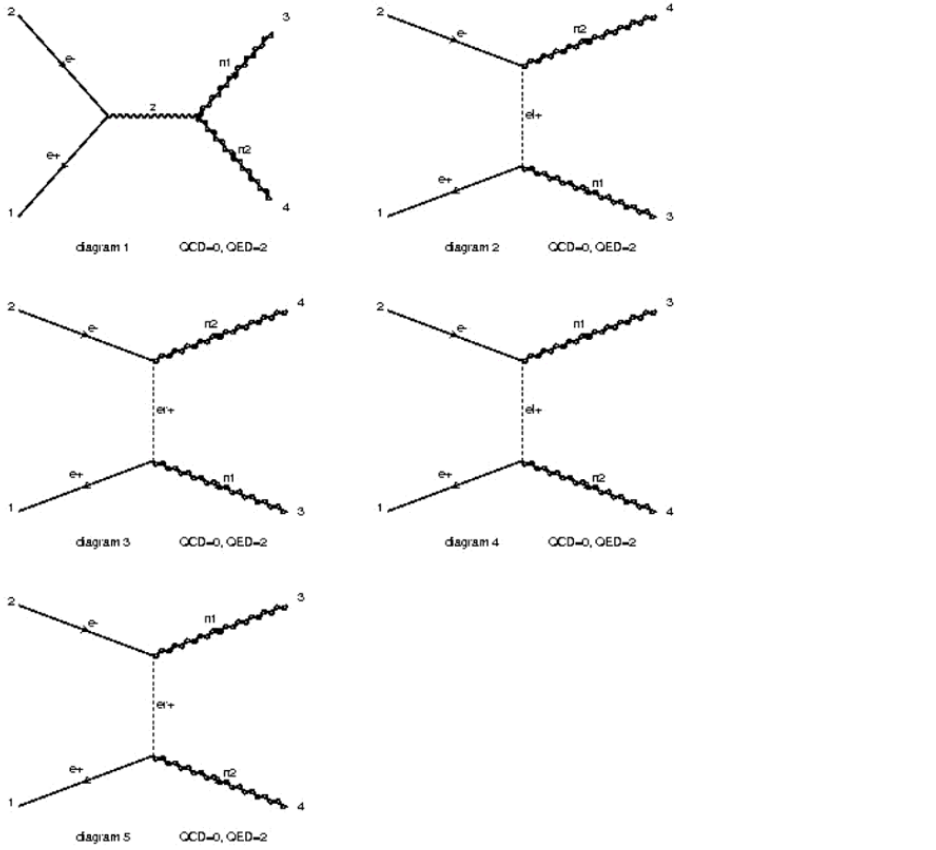
$$N_{max} = \sigma_{max} * \mathcal{L} = 244$$

$$e^+ e^- \rightarrow \tilde{\chi}_2^0 \tilde{\chi}_2^0 (m_{1,2} = 100 GeV, CEPC@240 GeV)$$



$$e^+ e^- \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_2^0 \quad (m_{h_2} = 100\text{GeV}, \text{CEPC@240GeV})$$

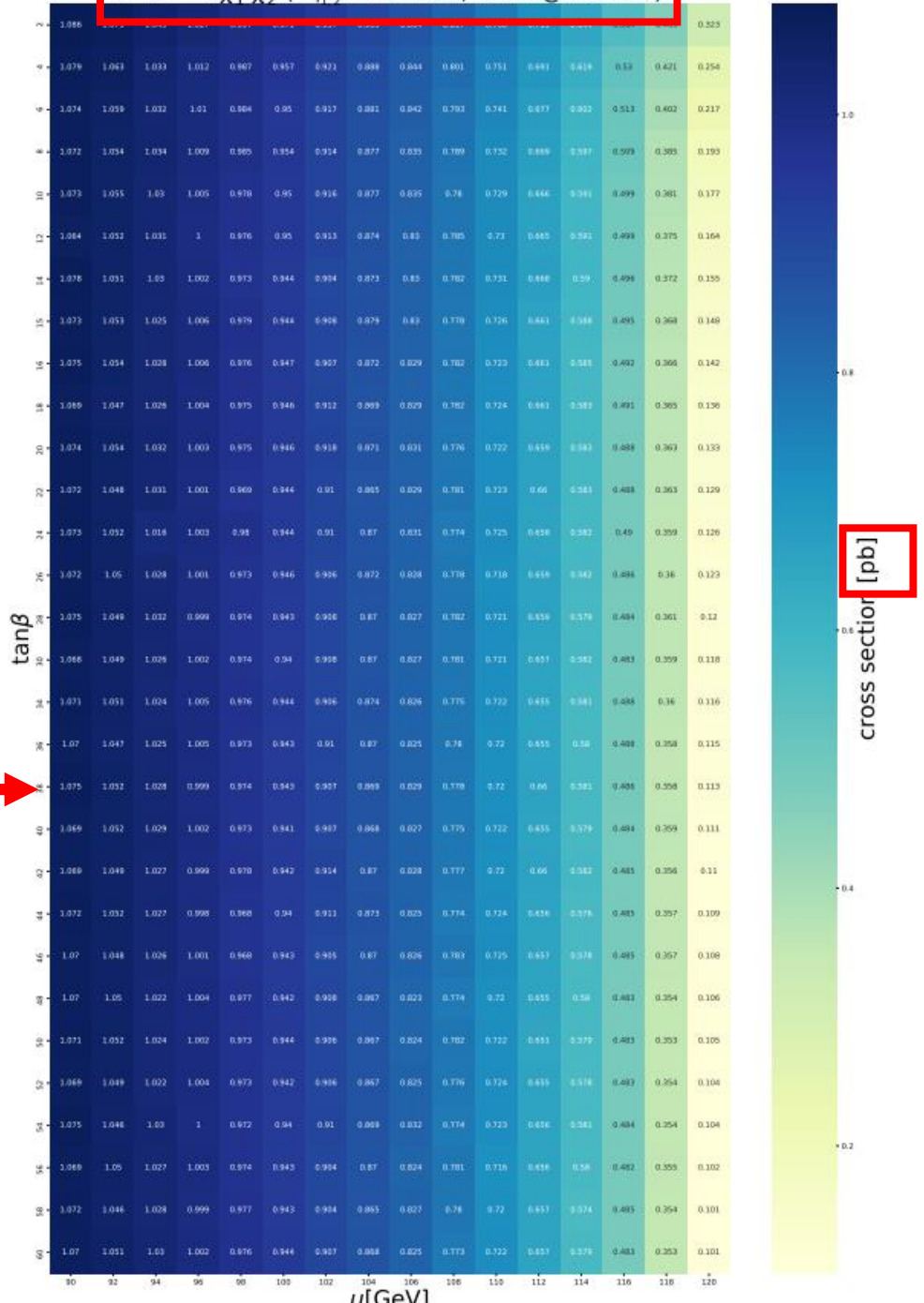
$$e^+ e^- \rightarrow \tilde{\chi}_1^0 \tilde{\chi}_2^0$$



$$\mathcal{L} = 3000 \text{fb}^{-1}$$

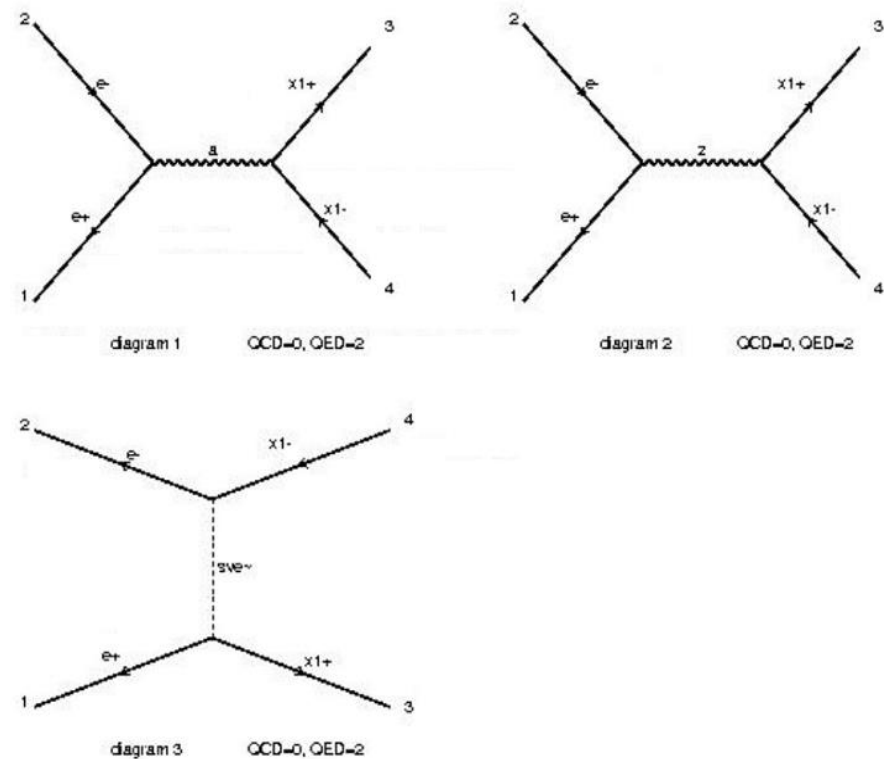
$$N_{max} = \sigma_{max} * \mathcal{L} = 3.23e6$$

1.075



cross section [pb]

$$e^+ e^- \rightarrow \tilde{\chi}_1^+ \tilde{\chi}_1^-$$

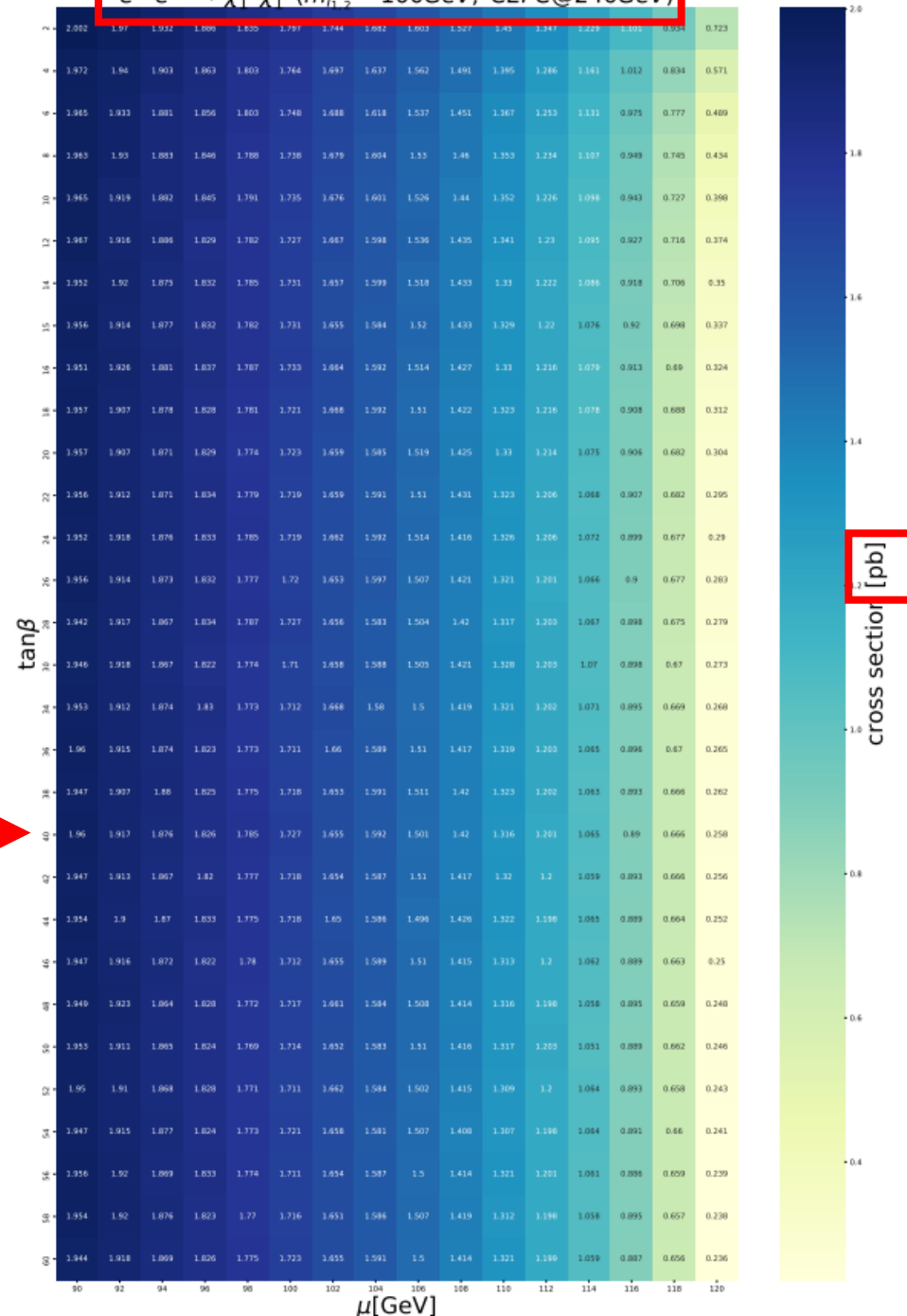


$$\mathcal{L} = 3000 \text{fb}^{-1}$$

$$N_{max} = \sigma_{max} * \mathcal{L} = 5.88e6$$

$e^+ e^- \rightarrow \tilde{\chi}_1^+ \tilde{\chi}_1^- (m_{h_2} = 100\text{GeV}, \text{CEPC@240GeV})$

1.96



**THANKS**