ILC capability of measuring SUSY-contrib. to $(g\text{-}2)_\mu$

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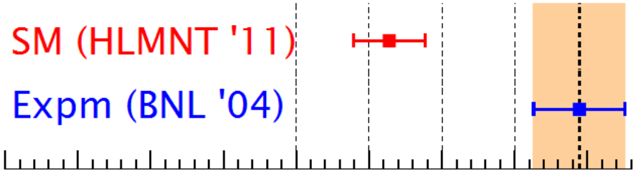
Reference)

M. Endo, K. Hamaguchi, SI, T. Kitahara, T. Moroi [1310.4496].

$$\left(a_\mu := \frac{g_\mu - 2}{2}\right)$$

Muon g-2 (anomalous magnetic moment)



Hagiwara, Liao, Martin, Nomura, Teubner [1105.3149]

$$a_\mu^{\mathrm{SM}} = (116\,591\,828 \pm 49) \times 10^{-11}$$

$$a_\mu^{\mathrm{exp}} = (116\,592\,089 \pm 63) \times 10^{-11}$$

3.3σ discrepancy

New Physics?

can be explained with **SUSY**.

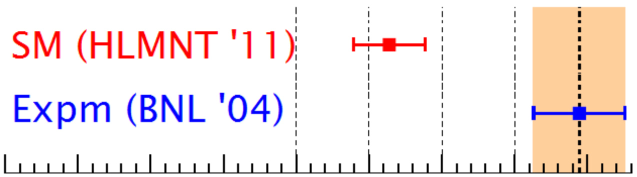
Lopez, Nanopoulos, Wang [ph/9308336]
Chattopadhyay, Nath [ph/9507386]
Moroi [ph/9512396]

SUSY!

- ✓ Dark matter problem,
- ✓ Hierarchy problem,
- ✓ Muon g-2 problem,
- ✓ Grand unification,
- ✓ **will be discovered at LHC.**

$$\left(a_\mu := \frac{g_\mu - 2}{2}\right)$$

Muon *g*-2 (anomalous magnetic moment)



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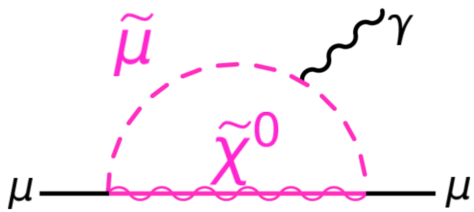
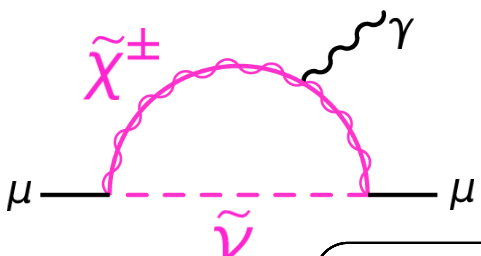
can be explained with **SUSY**.

$$\left[\rightsquigarrow\ (\tilde{\chi}^0, \tilde{\mu}) \text{ or } (\tilde{\chi}^\pm, \tilde{\nu}) = \mathrm{O}(100)\mathrm{GeV}\right]$$



$$a_\mu^{\mathrm{SUSY}}(\tilde{\chi}^0, \tilde{\mu}) \approx \frac{g_Y^2}{(4\pi)^2} \frac{m_\mu^2}{m_{\mathrm{soft}}^2} \operatorname{sgn}(\mu) \tan\beta + \cdots,$$



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$W \ni \mu H_{\mathrm{u}} H_{\mathrm{d}}$ (Higgsino mass term), $\tan\beta = \dfrac{\langle H_{\mathrm{u}} \rangle}{\langle H_{\mathrm{d}} \rangle}$,

m_{soft} : SUSY-particle mass-scale, g_i : Gauge couplings.

$$\left(\quad := \frac{g_\mu - 2}{2} \right)$$

Muon g-2 (a

SM (HLMNT

Expm (BNL

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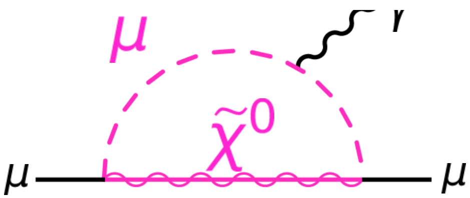
201X : SUSY discovery @ LHC

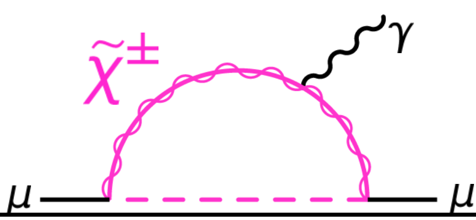
⇩

202X : SUSY measurement @ ILC

Can we measure these contribution?



$$a_\mu^{\rm SUSY}\left(\tilde{\chi}^0, \tilde{\mu}\right) \approx \frac{g_Y^2}{(4\pi)^2} \frac{m_\mu^2}{m_{\rm soft}^2} \,\mathrm{sgn}(\mu) \tan\beta + \cdots,$$



$$a_\mu^{\rm SUSY}\left(\tilde{\chi}^\pm, \tilde{\nu}\right) \approx \frac{g_2^2}{(4\pi)^2} \frac{m_\mu^2}{m_{\rm soft}^2} \,\mathrm{sgn}(\mu) \tan\beta.$$

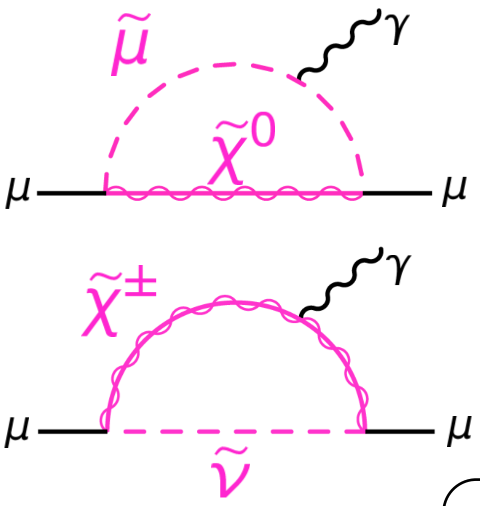
Note: We consider MSSM; R-parity conserved.

(Minimal SUSY Standard Model)

$m_{\rm soft}$: SUSY-particle mass-scale, g_i : Gauge couplings.

$$\left(a_\mu := \frac{g_\mu - 2}{2}\right)$$

reconstruct



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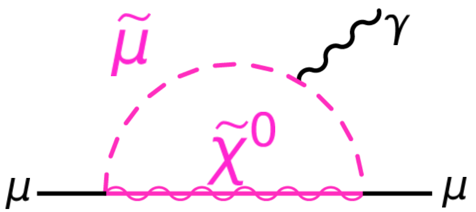
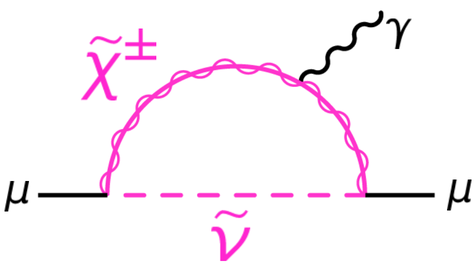




$$a_\mu^{\mathrm{SUSY}}(\tilde{\chi}^0, \tilde{\mu}) = f_{\mathrm{N}}\left(m_{\tilde{\mu}_a}, m_{\tilde{\chi}^0_i}, \frac{g_Y N^*_{1i} + g_2 N^*_{2i}}{\sqrt{2}} E^*_{1a} - Y_\mu N^*_{3i} E^*_{2a}, -Y_\mu N_{3i} E^*_{1a} - \sqrt{2} g_Y N_{1i} E^*_{2a}\right)$$

$$a_\mu^{\mathrm{SUSY}}(\tilde{\chi}^{\pm}, \tilde{\nu}) = f_{\mathrm{C}}\left(m_{\tilde{\nu}_\mu}, m_{\tilde{\chi}^{\pm}_i}, -g_2 D_{1i}, Y_\mu C_{2i}\right)$$

where
$$f_{\mathrm{N}}(M, M_{\tilde{\chi}}, g_{\mathrm{L}}, g_{\mathrm{R}}) = \frac{1}{16\pi^2}\left[-\frac{|g_{\mathrm{L}}|^2 + |g_{\mathrm{R}}|^2}{6}\frac{m_\mu^2}{M^2} N_1\left(\frac{M_{\tilde{\chi}}^2}{M^2}\right) - \mathrm{Re}\,(g_{\mathrm{L}}^* g_{\mathrm{R}})\frac{m_\mu M_{\tilde{\chi}}}{M^2} N_2\left(\frac{M_{\tilde{\chi}}^2}{M^2}\right)\right],$$

$$f_{\mathrm{C}}(M, M_{\tilde{\chi}}, g_{\mathrm{L}}, g_{\mathrm{R}}) = \frac{1}{16\pi^2}\left[+\frac{|g_{\mathrm{L}}|^2 + |g_{\mathrm{R}}|^2}{6}\frac{m_\mu^2}{M^2} C_1\left(\frac{M_{\tilde{\chi}}^2}{M^2}\right) - \mathrm{Re}\,(g_{\mathrm{L}}^* g_{\mathrm{R}})\frac{m_\mu M_{\tilde{\chi}}}{M^2} C_2\left(\frac{M_{\tilde{\chi}}^2}{M^2}\right)\right],$$

$$N_1(x) := \frac{1 - 6x + 3x^2 + 2x^3 - 6x^2 \log x}{(1-x)^4}, \quad N_2(x) := \frac{1 - x^2 + 2x \log x}{(1-x)^3},$$

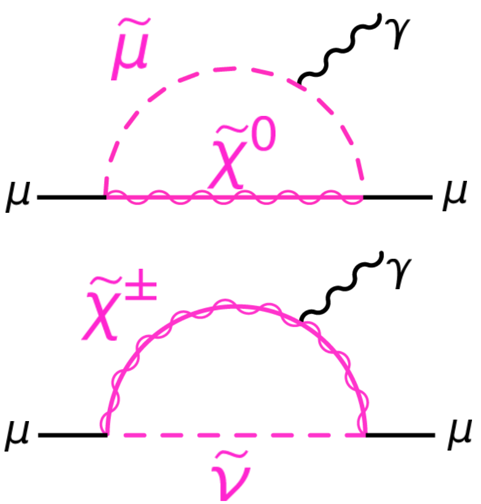
$$C_1(x) := \frac{2 + 3x - 6x^2 + x^3 + 6x \log x}{(1-x)^4}, \quad C_2(x) := \frac{3 - 4x + x^2 + 2 \log x}{(1-x)^3}.$$

$$\left(a_\mu := \frac{g_\mu - 2}{2}\right)$$

Why so complex?

$$\because\ \tilde{\chi}^0 = \left(\tilde{B}, \widetilde{W}^0, \tilde{H}^0_{\rm u}, \tilde{H}^0_{\rm d}\right),$$
$$\tilde{\chi}^\pm = \left(\widetilde{W}^\pm, \tilde{H}^\pm\right),$$
$$\tilde{\mu} = \left(\tilde{l}_{\rm L}, \tilde{l}_{\rm R}\right).$$

→ We consider $\mu \gg 100\,\text{GeV}$, $M_2 \gg 100\,\text{GeV}$, $M_{\text{colored}} \gg 100\,\text{GeV}$.



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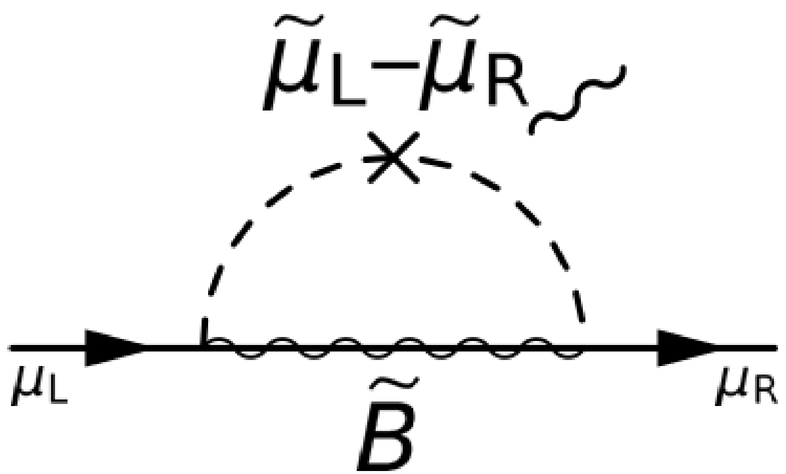
$a_\mu^{\mathrm{SUSY}} \simeq$



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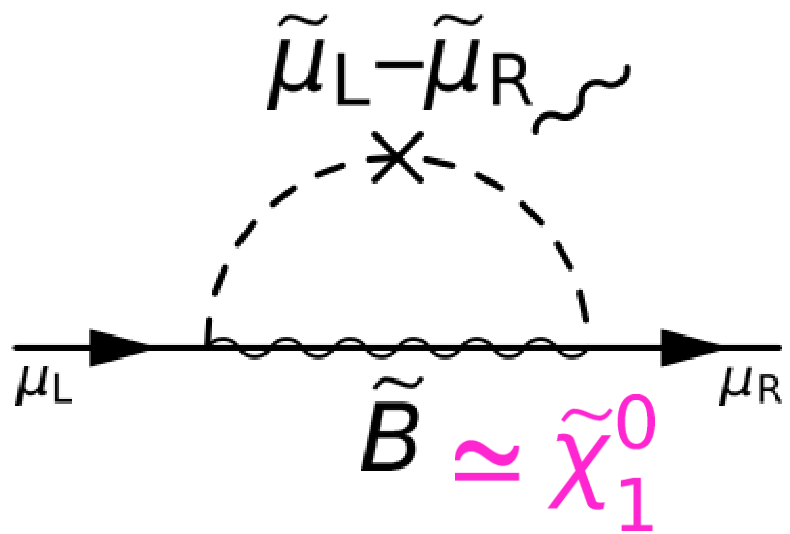

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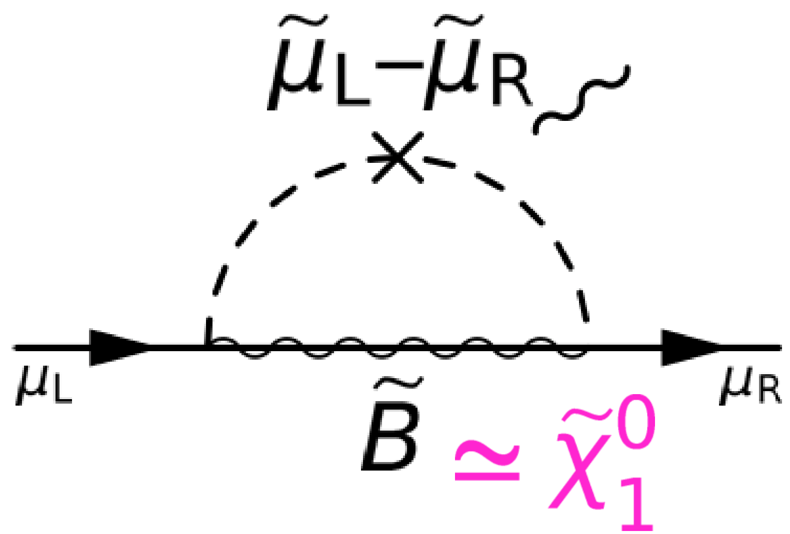
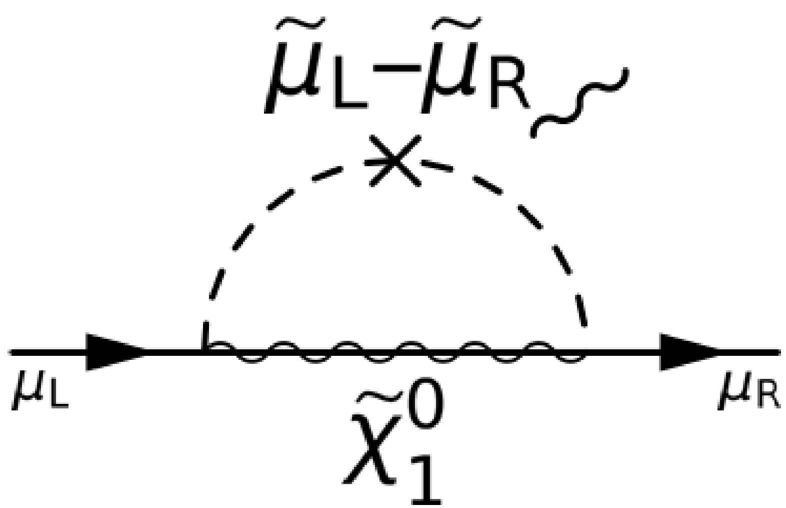


- Let's measure a_μ^{SUSY}!

What should be measured?

$a_\mu^{\mathrm{SUSY}} \simeq$



$$\left(\propto \frac{m_\mu \cdot M_{\mathrm{LR}}^2 \cdot \tilde{g}_{\mathrm{L}} \tilde{g}_{\mathrm{R}}}{(\mathrm{mass})^3} \right)$$

- Let's measure a_μ^{SUSY}!

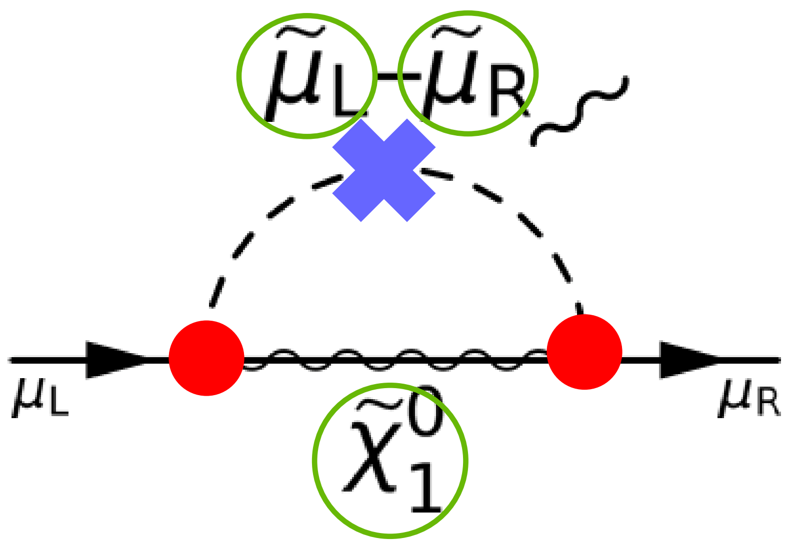
What should be measured?

- Mass of $\tilde{\mu}_1, \tilde{\mu}_2, \tilde{\chi}_0^1$
- Mixing M_{LR}^2
- Coupling $\tilde{g}_{\text{L}}, \tilde{g}_{\text{R}}$

$$\boxed{\begin{array}{c}\mathcal{M}_{\tilde{\mu}}^2 = \begin{pmatrix} m_{\text{L}}^2 & M_{\text{LR}}^2 \\ M_{\text{LR}}^2 & m_{\text{R}}^2 \end{pmatrix} \\ \left(M_{\text{LR}}^2 \simeq m_\mu \mu \tan\beta\right)\end{array}}$$

$$\boxed{M_{\text{LR}}^2 = -\frac{1}{2}\left(m_2^2 - m_1^2\right)\sin 2\theta}$$

$\left(\neq g_Y \text{ because } \right.$
- ~~SUSY~~ effect.
- $\tilde{\chi}_1^0 \neq$ "pure" $\tilde{B}$. $\left. \right)$

$a_\mu^{\text{SUSY}} \simeq$ 

$$\left(\propto \frac{m_\mu \cdot M_{\text{LR}}^2 \cdot \tilde{g}_{\text{L}} \tilde{g}_{\text{R}}}{(\text{mass})^3} \right)$$

$$\mathcal{M}^2_{\tilde{\mu}} = \begin{pmatrix} m^2_{\mathrm{L}} & M^2_{\mathrm{LR}} \\ M^2_{\mathrm{LR}} & m^2_{\mathrm{R}} \end{pmatrix}$$

$$\left(M^2_{\mathrm{LR}} \simeq m_\mu \mu \tan\beta\right)$$

- Let's measure a_μ^{SUSY}!

What should be measured?

- Mass of $\tilde{\mu}_1, \tilde{\mu}_2, \tilde{\chi}^1_0$
- Mixing M^2_{LR}
- Coupling $\tilde{g}_{\mathrm{L}}, \tilde{g}_{\mathrm{R}}$

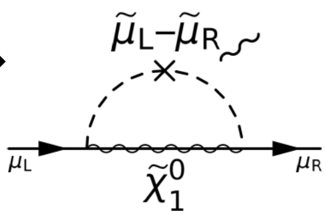
$$M^2_{\mathrm{LR}} = -\frac{1}{2}\left(m_2^2 - m_1^2\right)\sin 2\theta$$

$\left(\neq g_Y\right.$ because
- ~~SUSY~~ effect.
- $\tilde{\chi}^0_1 \neq$ "pure" $\tilde{B}$. $\left.\right)$

What we will see:

$\tilde{e}_1, \tilde{e}_2, \tilde{\mu}_1, \tilde{\mu}_2, \tilde{\tau}_1, \tilde{\tau}_2$ (& $\tilde{B}$-LSP) observed @ ILC

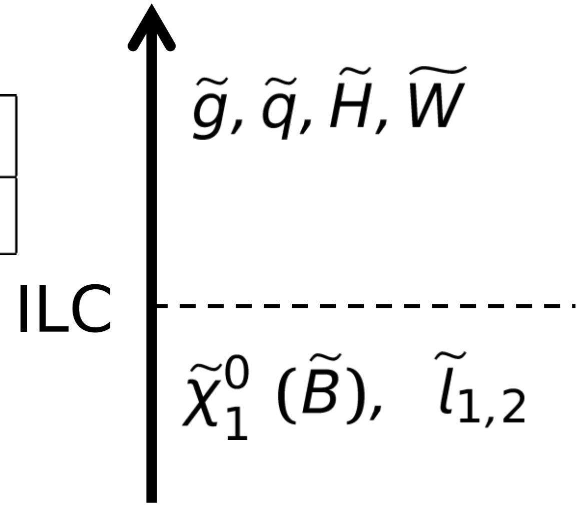
→ Mass, mixing, couplings can be measured.

→ 

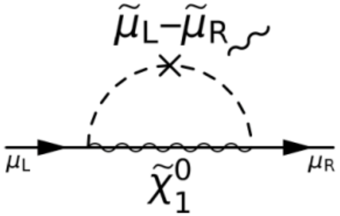
($\simeq a_\mu^{\mathrm{SUSY}}$) can be reconstructed.

$\tilde{e}_1, \tilde{\mu}_1$	$\tilde{e}_2, \tilde{\mu}_2$	$\tilde{\tau}_1$	$\tilde{\tau}_2$	$\tilde{\chi}^0_1$	$\mu \tan\beta$
126	200	108	210	90	6.1×10^3

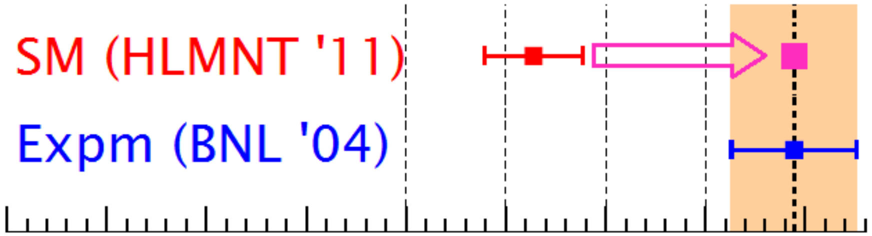
[in GeV]



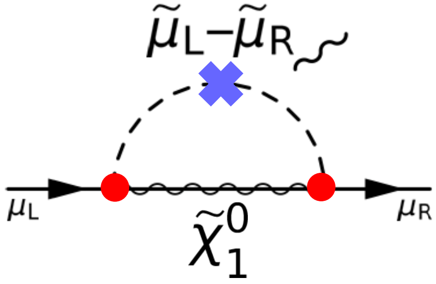
$\rightsquigarrow \sin\theta_{\tilde{\mu}} = 0.027, \sin\theta_{\tilde{\tau}} = 0.36,$



$\approx 2.6 \times 10^{-9}$



- Satisfies LEP/LHC constraints.
- Close to SPS1a(')
  - → We can consult Previous works! Don't call us lazy :)



How can we measure

- Mass of $\tilde{\mu}_1, \tilde{\mu}_2, \tilde{\chi}^1_0$
- Mixing M^2_{LR}
- Coupling $\tilde{g}_L, \tilde{g}_R$ **?**

and How accurately?

How can we measure

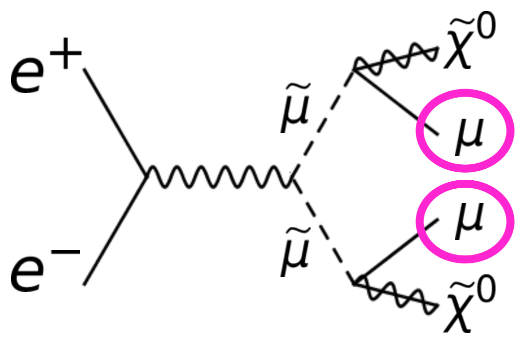
- Mass of $\tilde{\mu}_1, \tilde{\mu}_2, \tilde{\chi}_0^1$

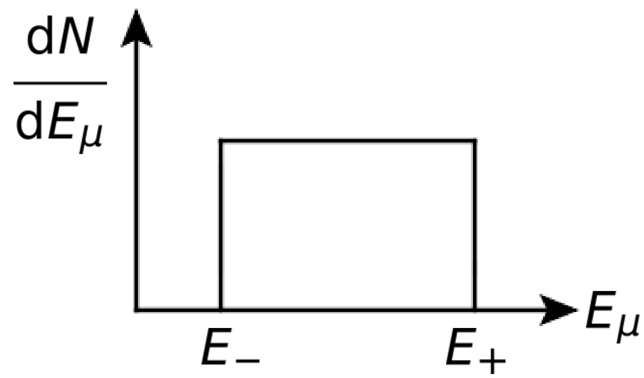
End-point analysis → $\Delta m_{\tilde{\mu}}, \Delta m_{\mathrm{LSP}} \sim 100\text{–}200\,\mathrm{MeV}$

(dominated by **stat.** unc.) $(\sim 0.1\%)$

$@\sqrt{s} = 500\,\mathrm{GeV}, \int \mathcal{L} = 500\,\mathrm{fb}^{-1}$

[ILC-TDR Vol.2 Sec.7.5.4]





$$E_\pm = \frac{\sqrt{S}}{4}(1 \pm \beta)\left(1 - \frac{m^2}{M^2}\right); \quad \beta = \sqrt{1 - \frac{4M^2}{S}}.$$

$\sin\theta_{\tilde{\mu}} = 0.027$, $\sin\theta_{\tilde{\tau}} = 0.36$, $M^2_{\mathrm{LR}} = -\frac{1}{2}\left(m_2^2 - m_1^2\right)\sin 2\theta$

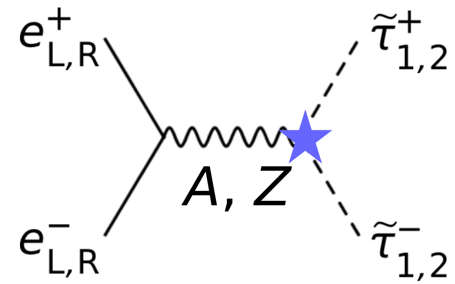
How can we measure

- Mixing M^2_{LR}

$$\mathcal{M}^2_{\tilde{\mu}} = \begin{pmatrix} m^2_{\mathrm{L}} & M^2_{\mathrm{LR}} \\ M^2_{\mathrm{LR}} & m^2_{\mathrm{R}} \end{pmatrix}$$

$$\left(M^2_{\mathrm{LR}} \simeq m_\mu \mu \tan\beta\right)$$

$$\sigma(e^+e^- \to \tilde{\tau}_A^+ \tilde{\tau}_B^-)$$



$\Rightarrow$ $\tilde{\tau}$ mixing $M^2_{\mathrm{LR}}(\tilde{\tau})$ measured.

$$\Rightarrow \quad M^2_{\mathrm{LR}} = \frac{m_\mu}{m_\tau} M^2_{\mathrm{LR}}(\tilde{\tau}) \qquad \left(\text{as long as } A_{\tilde{l}} \simeq 0.\right)$$

$$\sigma(e^+e^- \to \tilde{\tau}_i\tilde{\tau}_j) = \frac{8\pi\alpha^2}{3s} v^3 \Big[c_{ij}^2 \frac{\Delta_Z^2}{\sin^4 2\theta_W}(\mathcal{P}_{-+}L^2 + \mathcal{P}_{+-}R^2) + \delta_{ij}\frac{1}{16}(\mathcal{P}_{-+} + \mathcal{P}_{+-}) + \delta_{ij}c_{ij}\frac{\Delta_Z}{2\sin^2 2\theta_W}(\mathcal{P}_{-+}L + \mathcal{P}_{+-}R)\Big];$$

$$v^2 = [1-(m_{\tilde{\tau}_i} + m_{\tilde{\tau}_j})^2/s][1-(m_{\tilde{\tau}_i} - m_{\tilde{\tau}_j})^2/s], \quad \Delta_Z = s/(s-m_Z^2),$$

$$c_{11/22} = \frac{1}{2}\left[L + R \pm (L-R)\cos 2\theta_{\tilde{\tau}}\right], \qquad c_{12} = c_{21} = \frac{1}{2}(L-R)\sin 2\theta_{\tilde{\tau}},$$

$$L = -\frac{1}{2} + \sin^2\theta_W, \qquad R = \sin^2\theta_W.$$

$\sin\theta_{\tilde{\mu}} = 0.027,$ $M^2_{\mathrm{LR}} = -\frac{1}{2}\left(m_2^2 - m_1^2\right)\sin 2\theta$
$\sin\theta_{\tilde{\tau}} = 0.36,$

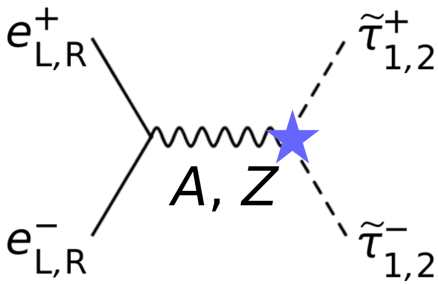
How can we measure

- Mixing M^2_{LR}

$$\mathcal{M}^2_{\tilde{\mu}} = \begin{pmatrix} m^2_{\mathrm{L}} & M^2_{\mathrm{LR}} \\ M^2_{\mathrm{LR}} & m^2_{\mathrm{R}} \end{pmatrix}$$

$$\left(M^2_{\mathrm{LR}} \simeq m_\mu \mu \tan\beta\right)$$

$$\sigma(e^+e^- \to \tilde{\tau}^+_A \tilde{\tau}^-_B)$$



$\Rightarrow$ $\tilde{\tau}$ mixing $M^2_{\mathrm{LR}}(\tilde{\tau})$ measured.

$$\Rightarrow \quad M^2_{\mathrm{LR}} = \frac{m_\mu}{m_\tau} M^2_{\mathrm{LR}}(\tilde{\tau}) \qquad \left(\text{as long as } A_{\tilde{l}} \simeq 0.\right)$$

$$\sigma(\tilde{\tau}_A \tilde{\tau}_B) = \begin{cases} (\cdots) + (\cdots)\cos 2\theta + (\cdots)\cos^2 2\theta & (A = B) \\ (\cdots)\sin^2 2\theta & (A \neq B) \end{cases}$$

$\sin\theta_{\tilde{\mu}} = 0.027$, $\sin\theta_{\tilde{\tau}} = 0.36$, $M^2_{\mathrm{LR}} = -\frac{1}{2}\left(m_2^2 - m_1^2\right)\sin 2\theta$

$$\sigma(\tilde{\tau}_A\tilde{\tau}_B) = \begin{cases} (\cdots) + (\cdots)\cos 2\theta + (\cdots)\cos^2 2\theta & (A = B) \\ (\cdots)\sin^2 2\theta & (A \neq B) \end{cases}$$

How can we measure

- Mixing M^2_{LR}

$$\sigma(e^+e^- \to \tilde{\tau}_A^+\tilde{\tau}_B^-)$$

$$\Rightarrow \quad \tilde{\tau} \text{ mixing } M^2_{\mathrm{LR}}(\tilde{\tau}) \text{ measured.}$$

$$\Rightarrow \quad M^2_{\mathrm{LR}} = \frac{m_\mu}{m_\tau} M^2_{\mathrm{LR}}(\tilde{\tau}) \qquad \left(\text{as long as } A_{\tilde{l}} \simeq 0.\right)$$

$$\Delta M^2_{\mathrm{LR}} = \underbrace{\Delta m_{\tilde{\tau}1}}_{\sim 0.1\%} \oplus \underbrace{\Delta m_{\tilde{\tau}2}}_{\sim 3\%} \oplus \Delta\sigma\left(\tilde{\tau}_A^+\tilde{\tau}_B^-\right)$$

$\left(\text{@500 GeV, 500 fb}^{-1}; \ (P_+, P_-) = (-0.3, +0.8)\right)$

ILC-TDR Vol.2 Sec.7.5.4 (and Bechtle, Berggren, et al. [0908.0876])

[All values are for the sample mass spectrum.]

$\sin\theta_{\tilde{\mu}} = 0.027$, $\sin\theta_{\tilde{\tau}} = 0.36$, $M^2_{\mathrm{LR}} = -\frac{1}{2}\left(m_2^2 - m_1^2\right)\sin 2\theta$

$$\sigma(\tilde{\tau}_A\tilde{\tau}_B) = \begin{cases} (\cdots) + (\cdots)\cos 2\theta + (\cdots)\cos^2 2\theta & (A = B) \\ (\cdots)\sin^2 2\theta & (A \neq B) \end{cases}$$

How can we measure

- Mixing M^2_{LR}

Not precise...

$$\Delta\sigma(\tilde{\tau}_1\tilde{\tau}_1) = \frac{1.8\,\mathrm{fb}}{54\,\mathrm{fb}} = 3.4\% \implies \Delta M^2_{\mathrm{LR}} = 12\%$$

(stat. dominated)

$$\Delta M^2_{\mathrm{LR}} = \underset{\sim 0.1\%}{\Delta m_{\tilde{\tau}1}} \oplus \underset{\sim 3\%}{\Delta m_{\tilde{\tau}2}} \oplus \Delta\sigma\left(\tilde{\tau}_A^+\tilde{\tau}_B^-\right)$$

(@500 GeV, 500 fb^{-1}; $(P_+, P_-) = (-0.3, +0.8)$)

ILC-TDR Vol.2 Sec.7.5.4 (and Bechtle, Berggren, et al. [0908.0876])

[All values are for the sample mass spectrum.]

$$\sin\theta_{\tilde\mu} = 0.027, \quad \sin\theta_{\tilde\tau} = 0.36, \qquad M^2_{\mathrm{LR}} = -\frac{1}{2}\left(m_2^2 - m_1^2\right)\sin 2\theta$$

$$\sigma(\tilde\tau_A\tilde\tau_B) = \begin{cases} (\cdots) + (\cdots)\cos 2\theta + (\cdots)\cos^2 2\theta & (A=B) \\ (\cdots)\sin^2 2\theta & (A \neq B) \end{cases}$$

How can we measure

- Mixing M^2_{LR}

Not precise...

$$\Delta\sigma(\tilde\tau_1\tilde\tau_1) = \frac{1.8\,\mathrm{fb}}{54\,\mathrm{fb}} = 3.4\% \implies \Delta M^2_{\mathrm{LR}} = 12\%$$

(stat. dominated)

$$\Delta\sigma(\tilde\tau_1\tilde\tau_2) = \frac{???\,\mathrm{fb}}{2.7\,\mathrm{fb}} = \cdots$$

→ should be studied!

$$\Delta M^2_{\mathrm{LR}} = \underset{\sim 0.1\%}{\Delta m_{\tilde\tau 1}} \oplus \underset{\sim 3\%}{\Delta m_{\tilde\tau 2}} \oplus \Delta\sigma\left(\tilde\tau_A^+\tilde\tau_B^-\right)$$

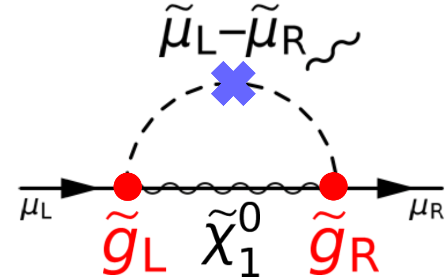
$\left(@500\,\mathrm{GeV}, 500\,\mathrm{fb}^{-1};\ (P_+, P_-) = (-0.3, +0.8)\right)$

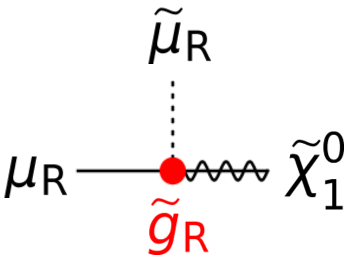
ILC-TDR Vol.2 Sec.7.5.4 (and Bechtle, Berggren, et al. [0908.0876])

[All values are for the sample mass spectrum.]

How can we measure

- Coupling $\tilde{g}_L, \tilde{g}_R$





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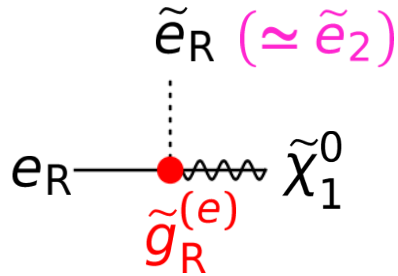
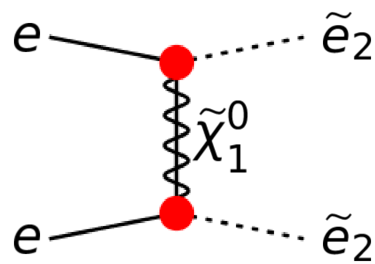


+ $\tilde{H}^0$-contribution

$(\propto Y_\mu)$

measured via



$<$ 0.4% contrib.
for $\tilde{H} > 500\,\mathrm{GeV}$

$$\Delta\sigma \sim \frac{4.7\,\mathrm{fb}}{316\,\mathrm{fb}} = 1.5\% \rightsquigarrow \Delta\tilde{g}^{(e)}_R \sim 0.4\%$$

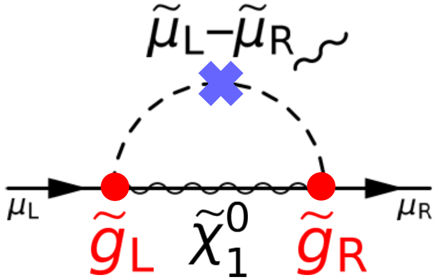
$$\therefore \Delta\tilde{g}_R \lesssim 1\%$$

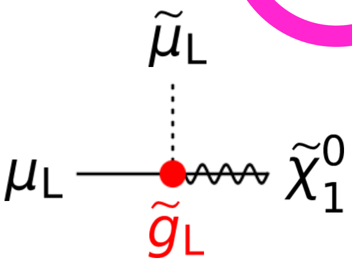
Freitas, Kalinowski, et al. [ph/0211108]
Freitas, Manteuffel, Zerwas [ph/0310382]
Kilian, Zerwas [ph/0601217]

$$\begin{pmatrix} @500\,\mathrm{GeV}, 500\,\mathrm{fb}^{-1}; \\ (P_+, P_-) = (-0.3, +0.8) \end{pmatrix}$$

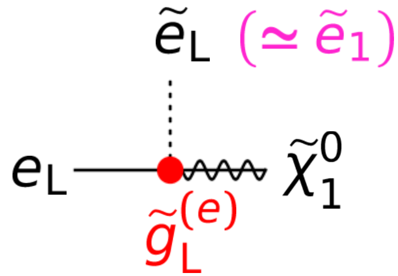
How can we measure

- Coupling $\tilde{g}_L, \tilde{g}_R$





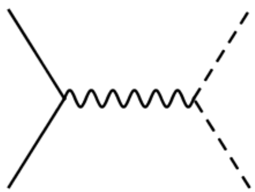
$=$



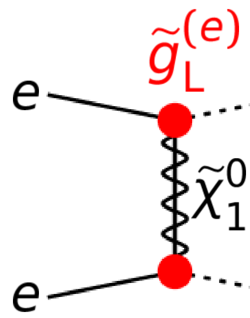
$+$ $\widetilde{H}^0$-contribution $(\propto Y_\mu)$

However

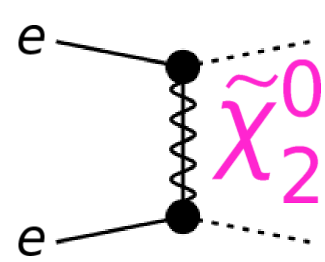
$\sigma(\tilde{e}_L\tilde{e}_L) \approx$



$+$



$+$



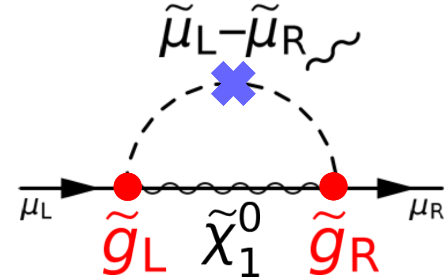
$(\simeq \widetilde{W})$

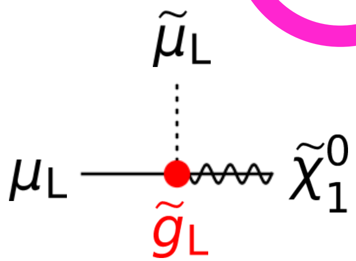
cannot be neglected.

We use $\sigma(\tilde{e}_L\tilde{e}_R)$.

How can we measure

- Coupling $\tilde{g}_{\mathrm{L}}, \tilde{g}_{\mathrm{R}}$





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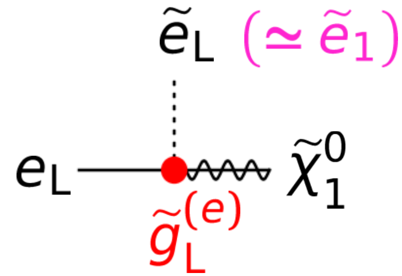
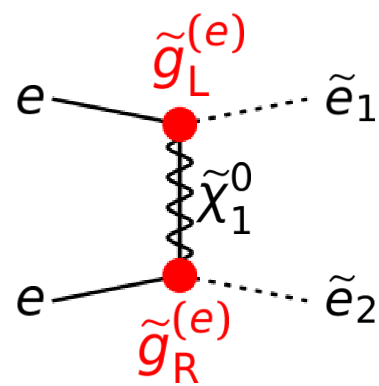


+

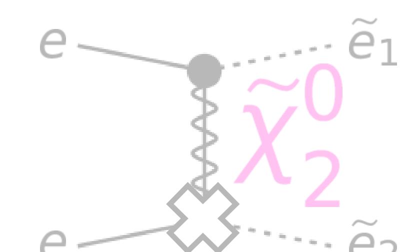
$\tilde{H}^0$-contribution
$(\propto Y_\mu)$

< 0.9% contrib.
for $\tilde{H}, \widetilde{W} > 500\,\mathrm{GeV}$

$$\sigma(\tilde{e}_{\mathrm{L}}\tilde{e}_{\mathrm{R}}) \approx$$



+



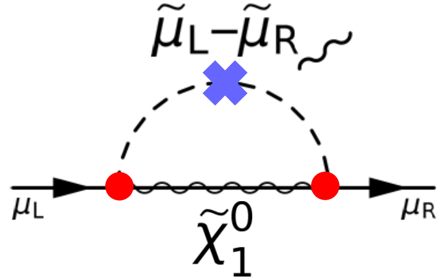
$$\Delta\sigma \sim ???\% \quad (\sigma = 5.5\,\mathrm{fb})$$

should be studied…

Here we use $\Delta\tilde{g}_{\mathrm{L}}^{(e)} \sim$ a few%

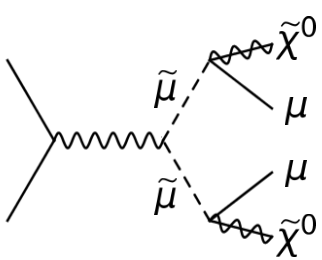
$\therefore \Delta\tilde{g}_{\mathrm{L}} \sim 1 +$ a few%

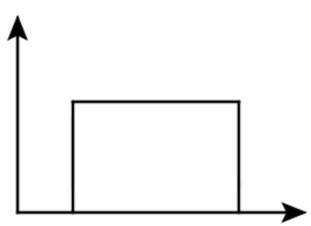
$$a_\mu^{\mathrm{SUSY}} \simeq$$

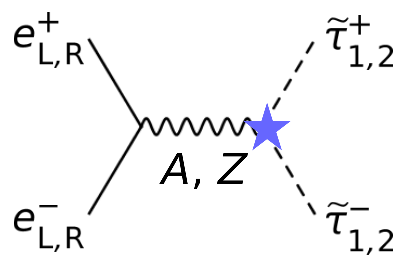


$$\therefore \Delta a_\mu^{\mathrm{SUSY}} = 13\%$$

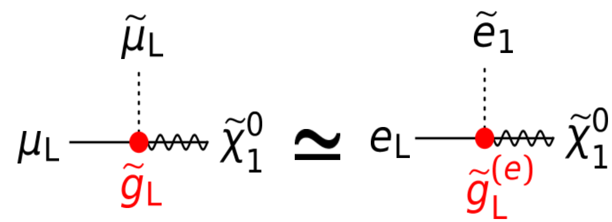
Mass of $\tilde{\mu}_1, \tilde{\mu}_2, \tilde{\chi}_0^1$	Mixing M_{LR}^2	coupling $\tilde{g}_{\mathrm{L}}, \tilde{g}_{\mathrm{R}}$
$e^+e^- \to \tilde{\mu}^+\tilde{\mu}^-$ end-point	$\sigma(ee \to \tilde{\tau}_1\tilde{\tau}_1)$	$\sigma(ee \to \tilde{e}_R\tilde{e}_R)$, $\sigma(ee \to \tilde{e}_L\tilde{e}_R)$
→ ~0.1%	→ ~12%	→ R: ~1% L: (a few + 1)%

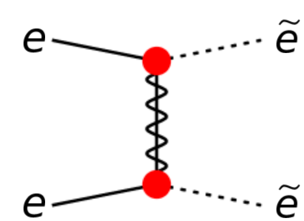






$$M_{\mathrm{LR}}^2 \simeq m_\mu \mu \tan\beta$$
$$\simeq \frac{m_\mu}{m_\tau} M_{\mathrm{LR}}^2(\tilde{\tau})$$

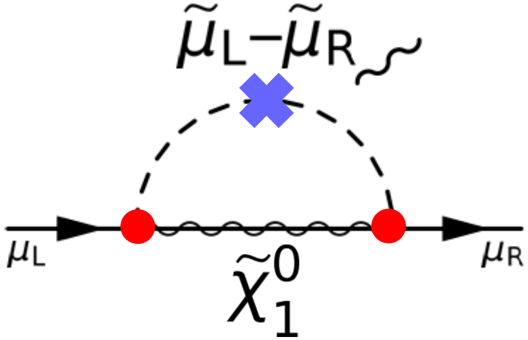




For the scenario

- $\tilde{g}, \tilde{q}, \tilde{H}, \widetilde{W} \gg 100\,\mathrm{GeV}$,
- $\tilde{e}, \tilde{\mu}, \tilde{\tau} <$ ILC reach,

$$a_\mu^{\mathrm{SUSY}} \simeq$$



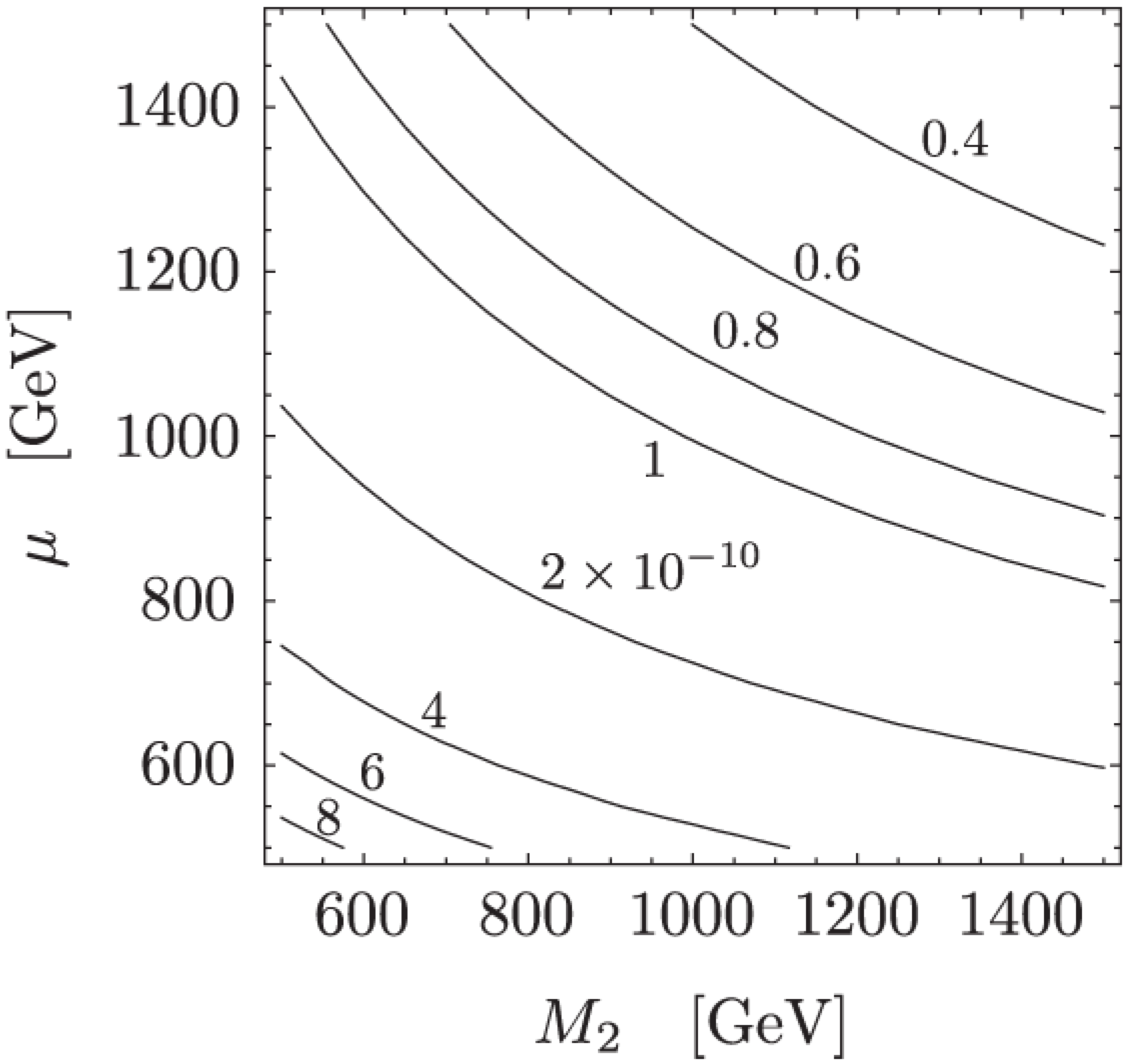
a_μ^{SUSY} can reconstructed via

Mass of $\tilde{\mu}_1, \tilde{\mu}_2, \tilde{\chi}_0^1$	Mixing M_{LR}^2	coupling $\tilde{g}_{\mathrm{L}}, \tilde{g}_{\mathrm{R}}$
$e^+e^- \to \tilde{\mu}^+\tilde{\mu}^-$ end-point	$\sigma(ee \to \tilde{\tau}_1\tilde{\tau}_1)$	$\sigma(ee \to \tilde{e}_R\tilde{e}_R)$, $\sigma(ee \to \tilde{e}_L\tilde{e}_R)$

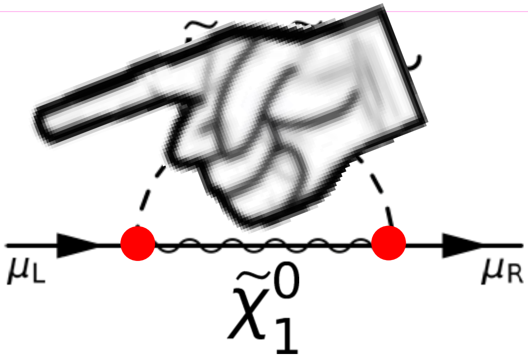
with the precision 13% (at our sample point).

can be improved if we use $\sigma(ee \to \tilde{\tau}_1\tilde{\tau}_2)$.

Largely depends on mixing.



$a_\mu^{\mathrm{SUSY}} \simeq$



$= 2.6 \times 10^{-9}$