$g-2_\mu$, $\mu \to e\gamma$, and $\mu \to e$ in MRSSM

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28. Apr. HARMONIA, Warsaw, 2018

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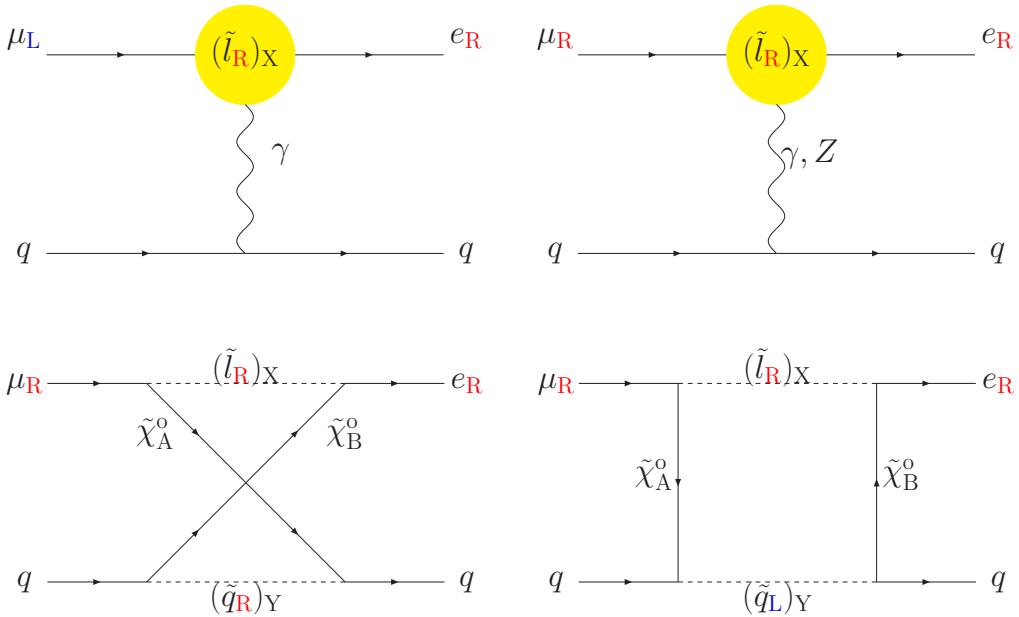
from **MSSM** to **MRSSM**

No L-R mixing, but gen.1 and 2 mixing

$$\begin{pmatrix} \tilde{l}_1 \\ \tilde{l}_2 \end{pmatrix}_{L/R} = \begin{pmatrix} c_\theta & s_\theta \\ -s_\theta & c_\theta \end{pmatrix} \begin{pmatrix} \tilde{e} \\ \tilde{\mu} \end{pmatrix}_{L/R}$$

$\rightarrow \sin 2\theta$ enhancement in $\mu \rightarrow e\gamma$ and $\mu \rightarrow e$
No $\tan\beta$ enhancement but "limited" λ_D enhancement.
Separate Feynman rules for L and R sleptons (different R-charge)

$\mu \to e$



$$\mathcal{L}_{\text{eff}} = \sum_{q=u,d} -Q_q e^2 \bar{e}\left[\frac{m_\mu}{k^2} i\sigma^{\mu\nu} k_\nu (A^L_{\gamma dip} P_L + A^R_{\gamma dip}) P_R\right] \mu \bar{q} \gamma_\mu q$$

$$\sum_{q=u,d} -Q_q e^2 \bar{e}\left[\gamma^\mu (A^L_\gamma P_L + A^R_\gamma P_R)\right]$$

$$\sum_{q=u,d} e^2 \bar{e} \gamma^\mu \left[(A^L_Z + A^{q,L}_{box}) P_L + (A^R_Z + A^{q,R}_{box}) P_R\right] \mu \bar{q} \gamma_\mu q$$

$\mu \to e\gamma$

$$BR(\mu \to e\gamma) = \frac{48\alpha\pi^3 m_\mu^2}{G_F^2}\left[|A^L_{\gamma dip}|^2 + |A^R_{\gamma dip}|^2\right] \leq 1.2 \times 10^{-11}$$

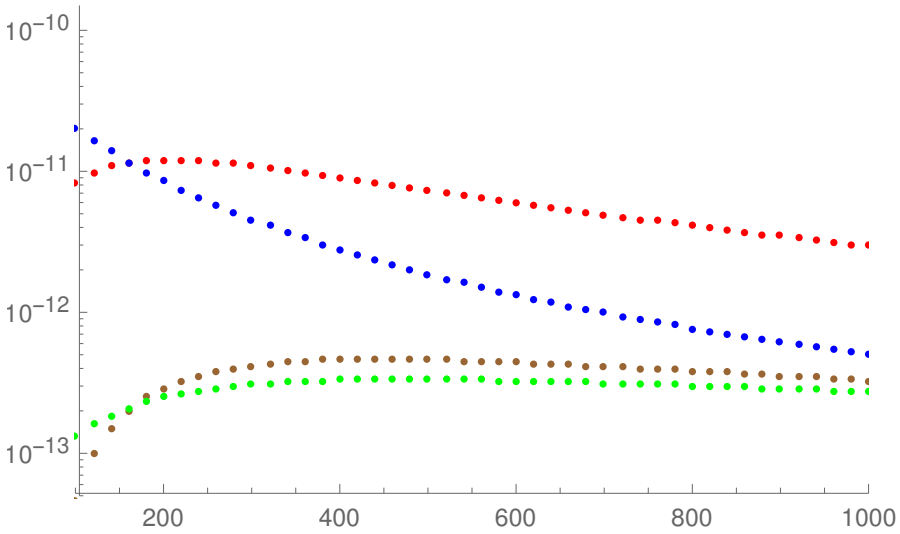
$$\Gamma_{\mu\to e} = 4m_\mu^5 e^4 |\mathcal{A}^L_{\gamma dip} + \mathcal{A}^R_\gamma + \mathcal{A}^R_Z + \mathcal{A}^R_{box}|^2 + (L \leftrightarrow R)$$

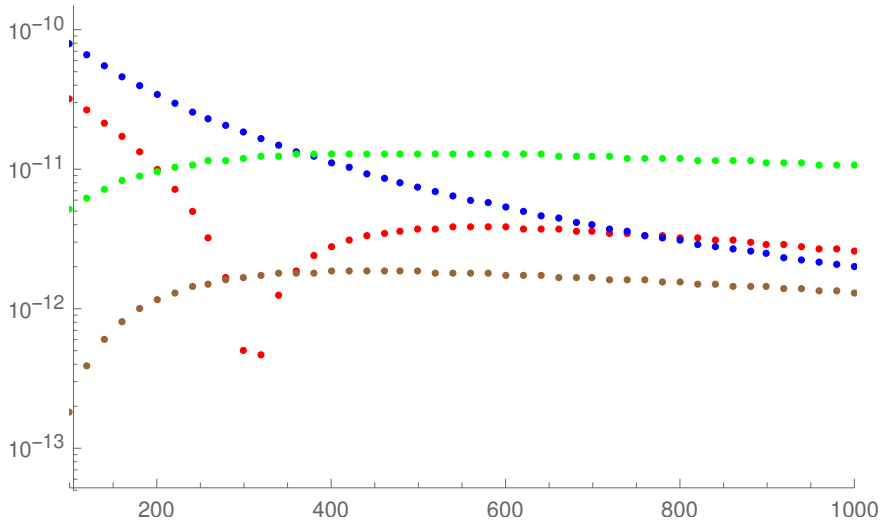
$$\begin{aligned}
\mathcal{A}^L_{\gamma dip} &= -\frac{1}{8e} D A^L_{\gamma dip}, \quad \mathcal{A}^R_\gamma = A^R_\gamma V^{(p)}, \\
\mathcal{A}^R_Z &= [(2Z_u + Z_d)V^{(p)} + (2Z_d + Z_u)V^{(n)}]A^R_Z, \\
\mathcal{A}^R_{box} &= -(2A^{uR}_{box} + A^{dR}_{box})V^{(p)} - (A^{uR}_{box} + 2A^{dR}_{box})V^{(n)}
\end{aligned}$$

for Gold, $D = 0.167$, $V^{(p)} = 0.0859$, $V^{(n)} = 0.108$

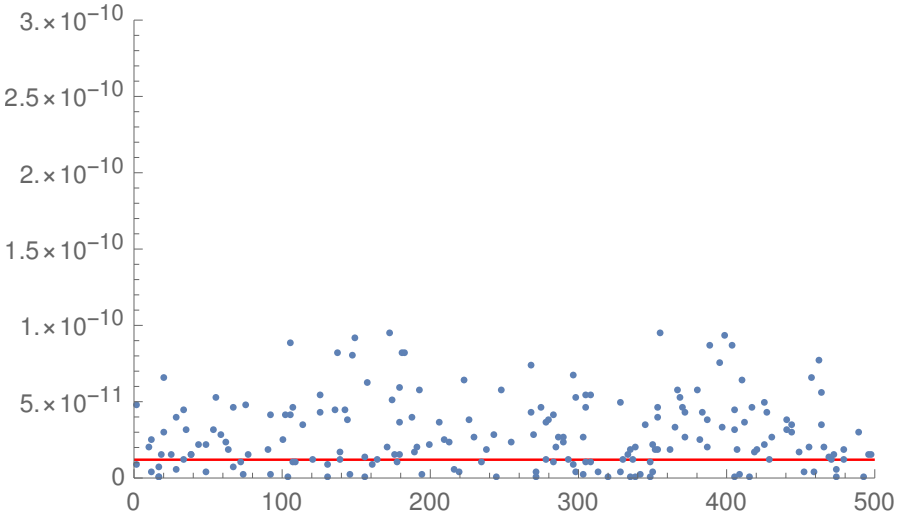
$$BR(\mu \to e)_{Au} = \frac{\Gamma(\mu^- Au \to e^- Au)}{\Gamma(\mu\, Au)_{capture}} \leq 7 \times 10^{-13}$$ SINDRUM II

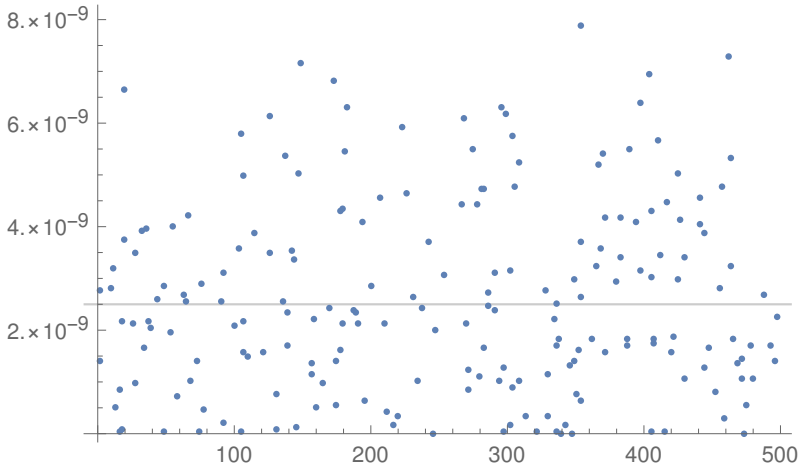
Numerical analysis





left: Left-slepton mixing, Right: Right-slepton mixing
Red=-$\mathcal{A}_{dip}$, Blue=$\mathcal{A}_{\gamma}$, Brown=$\mathcal{A}_{Z}$, Green=-$\mathcal{A}_{box}$
Right: Right-slepton mixing
Red=-$\mathcal{A}_{dip}$, Blue=$\mathcal{A}_{\gamma}$, Brown=$-\mathcal{A}_{Z}$, Green=$\mathcal{A}_{box}$





$\lambda_D = [0, 10]$
Large MDW, x-axis μ_D
Left $\mu \to eg$, Right $\mu \to e$
$g - 2 < 20 \times 10^{-10}$