GLUINOS LIGHTER THAN S-QUARKS AND DETECTION AT LHC

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47TH RENCONTRES DE MORIOND
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• Motivation
• Typical mass ranges considered
• Importance of limits from Kaon Physics
• Relevance at the LHC
• Recapitulation
MOTIVATION

- Test **Family SUSY** Models with definite signatures at the LHC
  \[ m_{\tilde{g}} \sim O(1) \text{ TeV} \quad m_{\tilde{f}} \sim O(10) \text{ TeV} \]

- FS could solve flavour and CP problems so models with underlying supergravity at High-Scale may be not that ugly with light gluinos and heavy scalars.

- Reassess the importance of getting limits of SUSY models using the Kaon sector at NLO QCD, despite the uncertainties in the SM determination.

- Interesting LHC phenomenology (gluino decays)
TYPICAL MASS RANGES CONSIDERED
Why?

\[ m_\tilde{g} \sim O(1) \text{ TeV} \quad m_\tilde{f} \leq O(10) \text{ TeV} \]

- FCNC controlled by gluino exchanges \( \rightarrow \) easier to pin-down flavour structures: need to worry just about kaon sector

\[ \Delta F = 2 \]

- If \( m_\tilde{f} > O(10) \text{ TeV} \) it gets difficult to probe flavour structures

- As it happens often in PP similar features have been considered with other motivations
- Gaugino Anomaly Mediation Symmetry Breaking

\[ M_i, \quad m_0 \approx 0 \approx A_0 \]

- G2-MSSM models

\[ M_i = f_3/2 m_3/2 (1 + \Delta_i) \approx 0.1 m_0, \quad m_0 \approx A_0 = m_3/2 \]

- U(2)-FS SUSY models (achieving orders of magnitude splitting among first two heavier scalar generations and a lighter one)
• Gaugino Anomaly Mediation
Symmetry Breaking

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- U(2)-FS SUSY models (achieving orders of magnitude splitting among first two heavier scalar generations and a lighter one)

Somewhat heavier \[ m_f \] than what we want

In our set ups we are interested in the case of three scalar families of the same order
References

• Gaugino Anomaly Mediation Symmetry Breaking

GIUDICE, LUTY, MURAYAMA & RATTAZZI,
JHEP 12, 027 (1998)
BAER, DE ALWIS, GIVENS, RAJAGOPALAN,
SUMMY 1002.4633

ACHARYA & DENEF, VALANDRO, JHEP 0506 TH/
0502060

ACHARYA, BOBKOV, KANE, KUMAR, SHAO PRD 76, TH/
0701034

ACHARYA, BOBKOV, KANE, KUMAR, VAMAN PRL 97, TH/
0606262

ACHARYA & BOBKOV, 0810.3285...

• G2-MSSM models

• U(2)-FS SUSY models (achieving orders of magnitude splitting among first two heavier scalar generations and a lighter one)

BARBIERI, ISIDORI, JONES-PÉREZ, LODONE, STRAUB.
1105.2296
Our scenario

High Scale

- Gaugino masses
- Scalar masses
- Trilinear masses
- $\tan \beta$

$$m_{3/2} k_\alpha (1 + \Delta_\alpha), \quad M_2 > M_1, M_3, \quad k_\alpha < 1$$

$$m_{3/2} \leq O(10) \text{ TeV}$$

Necessary to achieve a good value of $m_h$

EW Scale

$$m_{\tilde{j}_2} \approx m_{\tilde{j}_3} \sim 2m_{\tilde{j}_1} \sim O(m_{3/2})$$

$$900 \text{ GeV} < m_{\tilde{g}} < 1800 \text{ GeV}$$

$$4 < \tan \beta < 20$$

[Reference: Kersten & L.V-S in prep.]
Where could it be found?

- Effective supergravity scenarios coming from string compactifications where the overall modulus, and not the dilaton, gives the main contribution to gaugino masses

Brignole & IbAñez
IMPORTANCE OF LIMITS FROM KAON PHYSICS
The CP-violating parameter in neutral kaon mixing is defined as

\[ S = \frac{\text{Im}(K^0 |H_{\text{eff}}^{\Delta S=2}|\bar{K}^0)}{\sqrt{2} \Delta m_K} \]

\[ A_0 e^{i\delta_{0,2}} = \langle \pi\pi(0,2) | H_{\Delta F=1} | K' \rangle \]

\[ \epsilon' = \frac{e^{i\pi/4}}{\sqrt{2}} \frac{1}{\text{Re}A_0} \left( \text{Im}A_2 - \frac{\text{Re}A_0}{\text{Re}A_2} \text{Im}A_0 \right) \]

\[ S \left( \frac{m_i^2}{M_W^2} \right) \]

\[ \epsilon = (2.228 \pm 0.011) \times 10^{-3} \times e^{i43.5 \pm 0.7} \]

\[ |\epsilon^{NNLO}| = (1.90 \pm 0.26) \times 10^{-3} \]

\[ \Delta m_K^{\text{SD}} = (3.1 \pm 1.2) \times 10^{-15} \text{ GeV} \]

\[ 0 < \text{Re}(\epsilon' / \epsilon)_{\text{SM}} < 3.3 \times 10^{-3} \]

\[ \text{Re} \left( \frac{\epsilon'}{\epsilon} \right)_{\text{exp}} = (1.65 \pm 0.26) \times 10^{-3} \]

[Brod, Gorbahn, 1007.0684]
The Higgs sector behaves as an electroweak mediator. The values used here are those from \[27\].
SM

\[ \epsilon = \frac{\exp(i \pi/4)}{\sqrt{2}} \frac{\text{Im}(K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0)}{\Delta m_K} = \frac{A(K_L \to (\pi \pi)_{I=0})}{A(K_S \to (\pi \pi)_{I=0})} \]

\[ A_{0,2} e^{i \delta_{0,2}} = \langle \pi \pi| H_{\Delta F=1}|K' \rangle \]

\[ \epsilon' = \frac{\exp(i \pi/4)}{\sqrt{2}} \frac{1}{\text{Re} A_0} \left( \text{Im} A_2 - \frac{\text{Re} A_0}{\text{Re} A_2} \text{Im} A_0 \right) \]

\[ \sum_{i,j} V_{js} V_{id}^* V_{jd} V_{is}^* \]

\[ \epsilon = (2.228 \pm 0.011) \times 10^{-3} \times e^{i 43.5 \pm 0.7^\circ} \]

\[ |\epsilon^{NNLO}| = (1.90 \pm 0.26) \times 10^{-3} \]

\[ \Delta m_K^{SD} = (3.1 \pm 1.2) \times 10^{-15} \text{ GeV} \]

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Due to the unitarity of \( V \)

\[ 0 < \text{Re}(\epsilon'/\epsilon)_{SM} < 3.3 \times 10^{-3} \]

\[ \text{Re} \left( \frac{\epsilon'}{\epsilon} \right)_{exp} = (1.65 \pm 0.26) \times 10^{-3} \]

Very large hadronic uncertainties but in some SUSY models, contributions could be fairly large
**SM**

\[
\begin{align*}
    s \; V_{js} & \quad W^- \; V_{id}^* \quad d \\
    \{t, c, u\} & \quad \{t, c, u\} \\
    d \; V_{jd} & \quad W^- \; V_{is}^* \quad s
\end{align*}
\]

\[
\text{Im}(K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0) \propto \sum_{i,j} V_{js} V_{id}^* V_{jd} V_{is}^*
\]

\[
\epsilon = \frac{\exp(i\pi/4)}{\sqrt{2}} \frac{\text{Im}(K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0)}{\Delta m_K} = \frac{A(K_L \to (\pi\pi)_{I=0})}{A(K_S \to (\pi\pi)_{I=0})}
\]

\[
A_{0,2} e^{i\delta_{0,2}} = \langle \pi\pi(0, 2) | \mathcal{H}_{\Delta F=1} | K' \rangle
\]

\[
\epsilon' = \frac{e^{i\pi/4}}{\sqrt{2}} \frac{1}{\text{Re}A_0} \left( \text{Im}A_2 - \frac{\text{Re}A_0}{\text{Re}A_2} \text{Im}A_0 \right) S \left( \frac{m_1^2}{M_W^2}, \frac{m_2^2}{M_W^2} \right)
\]

Due to the unitarity of \( V \) contributions cancel (GIM mechanism)

\[
\epsilon = (2.228 \pm 0.011) \times 10^{-3} \times e^{i43.5 \pm 0.7} \circ
\]

\[
|\epsilon_{NNLO}^{\Delta S=2}| = (1.90 \pm 0.26) \times 10^{-3}
\]

\[
\Delta m_K^{\text{SD}} = (3.1 \pm 1.2) \times 10^{-15} \text{ GeV.}
\]

\[
0 < \text{Re}(\epsilon' / \epsilon)_{\text{SM}} < 3.3 \times 10^{-3}
\]

\[
\text{Re} \left( \frac{\epsilon'}{\epsilon} \right)_{\exp} = (1.65 \pm 0.26) \times 10^{-3}
\]

Very large hadronic uncertainties but in some SUSY models, contributions could be fairly large

[Brod, Gorbahn, 1007.0684]
As it is well known SUSY has plenty of CP violation sources so contributions to $\Delta m_K$, $\varepsilon$ and $\varepsilon'$ can be huge.

(a) $q_j V_{is} H^\pm V_{id} q_i$

(b) $q_j \tilde{g} q_i$

$\tilde{q}_k$

(c) $q_j \chi^0 q_i$

(d) $q_j \chi^\pm q_i$

$q=\{s,d\}$
• Given the uncertainties *, is there a point in using $\Delta m_K$,
$\varepsilon$ and $\varepsilon'$ as constraints for the models under consideration?

• Yes, because of the sensitivity of these parameters to physics BSM

Arkani-Hamed & Murayama ph/9703259
Arkani-Hamed, Dimopolous, Giudice &
Romanino ph/0409232
Giudice, Nardecchia & Romanino ph/040932
Kadota, Kane, Kersten and L. V-S. 1107.3105

SUSY contribution can go well beyond experimental limits

*Hadronic, long distance, experimental determination of CKM parameters, etc.
• **Limits on**\(\sqrt{\text{Re}(\delta_{12}^d)^2_{AB}}\)** from

\[
\Delta m_K = 2\text{Re} \langle K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0 \rangle = \frac{G_F^2 f_K^2 m_K B_K}{6\pi^2} \text{Re}[X],
\]

\[
X = \left[ (V_{td}^* V_{ts})^2 S(x_t) \eta_{tt} + (V_{cd}^* V_{cs})^2 S(x_c) \eta_{cc} + 2(V_{cd}^* V_{cs})(V_{td}^* V_{ts}) S(x_t, x_c) \eta_{tc} + C_g S(x_g) \right]
\]

• **Limits on**\(\sqrt{\text{Im}(\delta_{12}^d)^2_{AB}}\)** from

\[
\text{Im} \langle K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0 \rangle = \frac{G_F^2 f_K^2 m_k B_k}{6\pi^2} \text{Im}[X]
\]

• **Limits on**\(\sqrt{\text{Im}(\delta_{12}^d)^2_{LR}}\)** and \(\text{Im}(\delta_{12}^d)^2_{RL}\)** from \(\text{Re}(\epsilon'/\epsilon)\)
• Importance of NLO QCD Corrections

\[ (\mathcal{M}^2_{ij}) = \begin{bmatrix} M_{LL}^2 & M_{LR}^{2i} \\ M_{LR}^2 & M_{RR}^2 \end{bmatrix} \]

\[ = \begin{bmatrix} (M_Q^2)_{ij} + (M_f^2)_{ij} + D_L^f & -(a_{f,ij} v_f + \mu \tan^p \beta (M_f)_{ij}) \\ -(a_{f,ij}^* v_f + \mu \tan^p \beta (M_f^*)_{ij}) & (M_{f,R}^2)_{ij} + (M_f^2)_{ij} + D_R^f \end{bmatrix} \]

\[ \Delta m_K = 2\text{Re} \left( K^0 | H_{\text{eff}}^{\Delta S=2} | \overline{K}^0 \right) \]
\[ \Delta m_K = 2 \text{Re} \langle K^0|H_{\text{eff}}^{\Delta S=2}|\bar{K}^0 \rangle \]

- Importance of NLO QCD Corrections

\[(\mathcal{M}_f^2)_{ij} = \begin{bmatrix} M^2_{LL} & M^2_{LR}^i \\ M^2_{LR}^j & M^2_{RR} \end{bmatrix}_{ij} \quad (\delta_{XY}^d)_{ij} = \frac{(\hat{m}^2_{d XY})_{ij}}{\sqrt{(\hat{m}^2_{d XY})_{ii}(\hat{m}^2_{d XY})_{jj}}} \]

\[
= \begin{bmatrix} (M^2_Q)_{ij} + (M^2_f)_{ij} + D^f_L & -(a_{f,ij}v_f + \mu \tan^p \beta(M_f)_{ij}) \\ -(a^*_{f,ij}v_f + \mu \tan^p \beta(M^*_f)_{ij}) & (M^2_{f R})_{ij} + (M^2_f)_{ij} + D^f_R \end{bmatrix}
\]

\[
(\delta^d_{LR})_{12} = \frac{-(\mu \tan \beta m_{f 12} + a_{12}v_d)}{\sqrt{\hat{m}^2_{d 11}\hat{m}^2_{d 22}}} = \frac{A_d(m_s, m_b)\epsilon^r}{\sqrt{\hat{m}^2_{d 11}(\hat{m}^2_{d 22})}} \sim \frac{(m_s, m_b)\epsilon^r}{fm^{3/2}} \sim 10^{-2}
\]
\[ \Delta m_K = 2 \text{Re} \langle K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0 \rangle \]

- Importance of NLO QCD Corrections

\[
(M_f^2)_{ij} = \begin{bmatrix} M_{LL}^2 & M_{LR}^2 \\ M_{LR}^2 & M_{RR}^2 \end{bmatrix}_{ij} \\
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\]

Test FS
**LIMITS FROM**

\[
\Delta m_K = 2 \text{Re} \langle K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0 \rangle
\]

- Importance of NLO QCD Corrections

\[
\mathcal{H}^{\Delta F=2} = \sum_i^5 C_i O_i + \sum_i^3 C_i \tilde{O}_i, \quad X = f \left( \frac{m_{\tilde{g}}^2}{m_{\tilde{d}}^2} \right)
\]

\[
m_{\tilde{d}} \rightarrow m_{\tilde{g}} \rightarrow m_t \ldots \rightarrow 2 \text{GeV}
\]


\[ \Delta m_K = 2 \text{Re} \langle K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0 \rangle \]

- Importance of NLO QCD Corrections

\[
\begin{array}{cccc}
(\delta_{12}^d)_{LL} & (\delta_{12}^d)_{LR} & (\delta_{12}^d)_{RL} & (\delta_{12}^d)_{RR} \\
I & \mathcal{K} & 0 & 0 & 0 \\
II & 0 & \mathcal{K} & 0 & 0 \\
III & \mathcal{K} & 0 & 0 & \mathcal{K} \\
IV & 0 & \mathcal{K} & \mathcal{K} & 0 \\
\end{array}
\]

\[
\langle K^0 | Q_1 | \bar{K}^0 \rangle_{\text{VIA}} = \frac{1}{3} M_K f_K^2 \\
\langle K^0 | Q_1(\mu) | \bar{K}^0 \rangle = \frac{1}{3} M_K f_K^2 B_1(\mu)
\]
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- Importance of NLO QCD Corrections

\[
\begin{array}{cccc}
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I & \mathcal{K} & 0 & 0 & 0 \\
II & 0 & \mathcal{K} & 0 & 0 \\
III & \mathcal{K} & 0 & 0 & \mathcal{K} \\
IV & 0 & \mathcal{K} & \mathcal{K} & 0 \\
\end{array}
\]

\[
\langle K^0 | Q_1 | \bar{K}^0 \rangle_{\text{VIA}} = \frac{1}{3} M_K f_K^2
\]

\[
\langle K^0 | Q_1(\mu) | \bar{K}^0 \rangle = \frac{1}{3} M_K f_K^2 B_1(\mu)
\]

Somewhat similar to Bagger, Matchev, Zhang ph/9707225
Contino & Scimeni ph/9809437
Importance of NLO QCD Corrections

\[ \Delta m_K = 2 \text{Re} \langle K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K}^0 \rangle \]

- Somewhat similar to Limit's from

\[ \text{combining the previous two results one can determine regions where } \delta_{12} \text{ is acceptable. Here we give constraints on } \delta_{12} \text{ and } \delta_{12} \]

For fixed values of the \( m_\varphi (\text{TeV}) \) and \( m_\xi (\text{TeV}) \), \( \delta_{12} \text{ dominates the others.} \]

\( \delta_{12} \) for the operators 2-5, smaller contributions of higher order in \( \delta_{12} \). 

\[ \langle K^0 | Q_1 | \bar{K}^0 \rangle_{\text{VIA}} = \frac{1}{3} M_K f_K^2 \]

\[ \langle K^0 | Q_1 (\mu) | \bar{K}^0 \rangle = \frac{1}{3} M_K f_K^2 B_1 (\mu) \]

Somewhat similar to Bagger, Matchev, Zhang ph/9707225
Contino & Scimeni ph/9809437

Here two heavy generations \( O(10) \) > a lighter one
• At NLO

In this section, following the discussion of ref. [16], we provide a different kind of constraints.

### 4.1 Minimum values for heavy squark mass

We have checked that the uncertainties of the results due to higher perturbative orders, and (RR),

One obtains constraints about the consistency of models with a split mass spectrum and (RR) dominance of the others.

If (RR), we have

\[ m_{\tilde{q}}(\text{TeV}) \]

\[
\begin{array}{ccccc}
\delta^d_{12} \text{LL} & \delta^d_{12} \text{LR} & \delta^d_{12} \text{RL} & \delta^d_{12} \text{RR} \\
I & \mathcal{K} & 0 & 0 & 0 \\
II & 0 & \mathcal{K} & 0 & 0 \\
III & \mathcal{K} & 0 & 0 & \mathcal{K} \\
IV & 0 & \mathcal{K} & \mathcal{K} & 0 \\
\end{array}
\]

Extreme value \( \mathcal{K} = 0.3 \)
### At NLO

<table>
<thead>
<tr>
<th>$m_{\tilde{q}}$</th>
<th>$\sqrt{\text{Re}(\delta_{12}^d)^2_{LL}}$</th>
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</tr>
</thead>
<tbody>
<tr>
<td>5 TeV</td>
<td>0.2</td>
<td>$1. \times 10^{-1}$</td>
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<td>$2. \times 10^{-1}$</td>
</tr>
<tr>
<td>10 TeV</td>
<td>0.5</td>
<td>0.5</td>
<td>$1. \times 10^{-1}$</td>
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</tr>
</tbody>
</table>

Table 1: Limits on $\text{Re}(\delta_{12}^d)_{AB}$ with $m_{\tilde{g}} = 900$ GeV.
At NLO

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Table 1: Limits on $\text{Re}(\delta_{12}^d)_{AB}$ with $m_{\tilde{g}} = 900$ GeV.

Partial answer for FS models

$$(\delta_{LR}^d)_{12} \sim \frac{(m_s, m_b)\epsilon^x}{fm^{3/2}} \sim 10^{-2}$$

Typically Abelian
At NLO

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Partial answer for FS models

$$(\delta_{LR}^d)_{12} \sim \frac{(m_s, m_b) e^r}{f m_{3/2}} \sim 10^{-2}$$

Typically Abelian

Non-Abelian
**LIMITS FROM**

\[ \text{Im} \langle K^0 | H_{\text{eff}}^{\Delta S=2} | \bar{K} \rangle \]

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</tr>
<tr>
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<td>2. ( \times ) 10(^{-3} )</td>
<td>9. ( \times ) 10(^{-3} )</td>
<td>8. ( \times ) 10(^{-4} )</td>
<td>2. ( \times ) 10(^{-3} )</td>
</tr>
<tr>
<td>10 TeV</td>
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Table 2: Limits on \( \text{Im}(\delta_{12}^d)^2_{AB} \) with \( m_{\tilde{q}} = 900 \text{ GeV} \).
**LIMITS FROM**

\[ \text{Im} \langle K^0 | H^{\Delta S=2}_{\text{eff}} | \bar{K} \rangle \]

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Table 2: Limits on \( \text{Im}(\delta^d_{12})_{AB} \) with \( m_{\tilde{q}} = 900 \text{ GeV} \).

**Here: Model dependent answer to FS because of the phases in A terms**
RELEVANCE AT THE LHC
Typical decays

Primary

\[ pp \rightarrow \tilde{g}\tilde{g}, \quad \tilde{\chi}^0_1\tilde{\chi}^\pm_1, \quad \tilde{\chi}^\pm_1\tilde{\chi}^{\mp}_1 \]

Secondary

\[ \tilde{\chi}^0_2 \rightarrow \chi^\pm_1 W^* \rightarrow \chi^\pm_1 \ell\nu_\ell, \quad \chi^\pm_1 q\bar{q}' \]

\[ \chi^\pm_1 \rightarrow \chi^0_1 \ell\nu_\ell, \quad \chi^0_1 q\bar{q}' \]
\[ pp \rightarrow \tilde{g}\tilde{g}, \quad \tilde{\chi}_1^0\tilde{\chi}_1^\pm, \quad \tilde{\chi}_1^\pm\tilde{\chi}_1^\mp \]

- Typical decays

**Primary**

\[ \tilde{g} \rightarrow \tilde{\chi}_2^0 tt^- \]
\[ \rightarrow \tilde{\chi}_1^0 bb^- \]
\[ \rightarrow \tilde{\chi}_1^0 q\bar{q}^- \]
\[ \rightarrow (\tilde{\chi}_1^- d\bar{u} + h.c.) \]

**Secondary**

\[ \tilde{\chi}_2^0 \rightarrow \chi_1^\pm W^* \rightarrow \chi_1^\pm \ell\nu_\ell, \quad \chi_1^\pm q\bar{q}' \]
\[ \chi_1^\pm \rightarrow \tilde{\chi}_1^0 \rightarrow \chi_1^0 \ell\nu_\ell, \quad \chi_1^0 q\bar{q}' \]
Pre-LHC

\[ \sigma_{\text{SUSY}} \text{[pb]} \]

\[ m_{\tilde{g}} \text{[GeV]} \]

E CUT 200 GeV

\[ L \leq 200\text{pb}^{-1} \]

10 TeV

\[ L \leq 800\text{pb}^{-1} \]

7 TeV

Feldman, Kane, Lu & Nelson, 1002.2430 (G2-MSSM)
Models with wino-like LSPs, and thus nearly degenerate neutralino states in the gluino decay products will be necessary. The chargino lifetime can be of order a centimeter, and the second heavier neutralino can even have order tens of millimeters. The colored approximated effective SUSY cross section (cross section after cuts) is transferred into radiation. The modulus decays after the late decay of a modulus field. Such is possible in a unified model of such fields.

In a general setting, the relic density can be equal to the observed one with a wino-like or pure wino LSP due to the simultaneous decay approximation one obtains a reheat temperature, relative to scale values of the gaugino masses, can give rise to a wino-like LSP with a light gluino if the high scale values of the gaugino masses, lead to a LSP with a low mass.

In this section we relax the tight constraints of the -line analysis focused towards the study of the chargino and neutralino states in the gluino decay products. The chargino lifetime can be of order a centimeter, and the second heavier neutralino can even have order tens of millimeters. The colored approximated effective SUSY cross section (cross section after cuts) is transferred into radiation. The modulus decays after the late decay of a modulus field. Such is possible in a unified model of such fields.

In a general setting, the relic density can be equal to the observed one with a wino-like or pure wino LSP due to the simultaneous decay approximation one obtains a reheat temperature, relative to scale values of the gaugino masses, can give rise to a wino-like LSP with a light gluino if the high scale values of the gaugino masses, lead to a LSP with a low mass.
- Depending on $\Delta m_\chi = \chi^\pm - \chi^0$

Could be degenerated, depends on the splitting

$$\chi^\pm \rightarrow \chi^0 \pi^\pm$$

Soft pions

displaced vertex

$$\Delta \chi \leq m_\pi \rightarrow 10 \text{ m}$$
$$\Delta \chi \gtrsim m_\pi \rightarrow 0.1 \text{ m}$$

CDF dedicated study

In the models at hand one needs to first detect gluinos and then track down the chargino decays
RECAP

• LHC is already setting limits on models with light gluinos and heavy squarks

• In this work, we wanted to understand still the Flavour Problem with out too many complications

• Stressed the importance of QCD corrections in the Kaon sector

  • Ready to set limits on $m_{\tilde{d}}$ and FS parameters