



### Limit on the gravitino mass

- **BFZ model:** cross section for  $f\bar{f} \rightarrow \tilde{G}\tilde{G}\gamma$  proportional to  $\frac{s^3}{|F|^4}$  or to  $\frac{s^3}{m_{3/2}^4}$

- The photon Phase-Space  $\approx$  ISR

- At  $e^+e^-$  machines  $\sigma_{meas}$  depends on the integral over part of PS

$I(E_{\gamma,min}, E_{\gamma,max}, \cos\theta_{\gamma,max})$

$$m_{3/2} > 3.8 \cdot 10^{-6} \text{ eV} \left[ \frac{\sqrt{s}(\text{GeV})}{200} \right]^{2/3} \left[ \frac{I}{\sigma_{limit}(\text{pb})} \right]^{1/4}$$

### Limits

	$m_{3/2}$ (eV)	$\sqrt{F}$ (GeV)
<b>ALEPH</b>	$1.10 \cdot 10^{-5}$	213
<b>DELPHI</b>	$0.87 \cdot 10^{-5}$	190 <span style="color: magenta;">95%</span>
<b>L3</b>	$0.98 \cdot 10^{-5}$	202 <span style="color: magenta;">C.L.</span>

- See  $m_{3/2} > 1 \times 10^{-5}$  from Tevatron <sup>a</sup>

<sup>a</sup>no influence on sparticle lifetime

## WHICH LIMIT AT LC ?

- $E_{cm} = 850$      $L = 500 \text{ fb}^{-1}$  ~ SIMILAR ACCEPT.

- SENSITIVITY : DEPENDS ON THE NUMBER OF BACKGROUND EVENTS

$$\sigma_{\text{LIMIT}} \propto \delta \sigma_{\text{BACK}} \propto \frac{\sqrt{N_{\text{ev}}^{\text{back}}}}{L} \propto \frac{\sqrt{\frac{1}{S} L}}{L}$$

$$\propto \frac{1}{E_{cm} \sqrt{L}}$$

- THE LIMIT :

$$\frac{M_{3/2}^{\text{LEP}}}{M_{3/2}^{\text{LC}}} = \left( \frac{E_{cm}^{\text{LEP}}}{E_{cm}^{\text{LC}}} \right)^{3/2} \cdot \left( \frac{\sigma_{\text{LIMIT}}^{\text{LC}}}{\sigma_{\text{LIMIT}}^{\text{LEP}}} \right)^{1/4}$$

$$M_{3/2}^{\text{LC}} \gtrsim 3.4 \cdot 10^{-4} \text{ eV}$$