

$\gamma\gamma, \gamma e - \text{SUSY} \rightarrow \text{TDR}$

1. $\gamma e \rightarrow \tilde{e} \chi_i^0$ ($m_{\tilde{e}} > \chi_i^0$
 \Rightarrow larger than in e^+e^-
 accessible \tilde{e} mass)
2. $\gamma\gamma \rightarrow 2 \text{ Sfermions}$
 $\gamma\gamma \rightarrow 2 \text{ charginos}$ | large cross-sections
 and pure QED
3. $\gamma\gamma \rightarrow \tilde{t} \bar{\tilde{t}}$ - stop production
 $\{\tilde{t} \bar{\tilde{t}}\}$ - Stoponium.
 $\hookrightarrow hh$

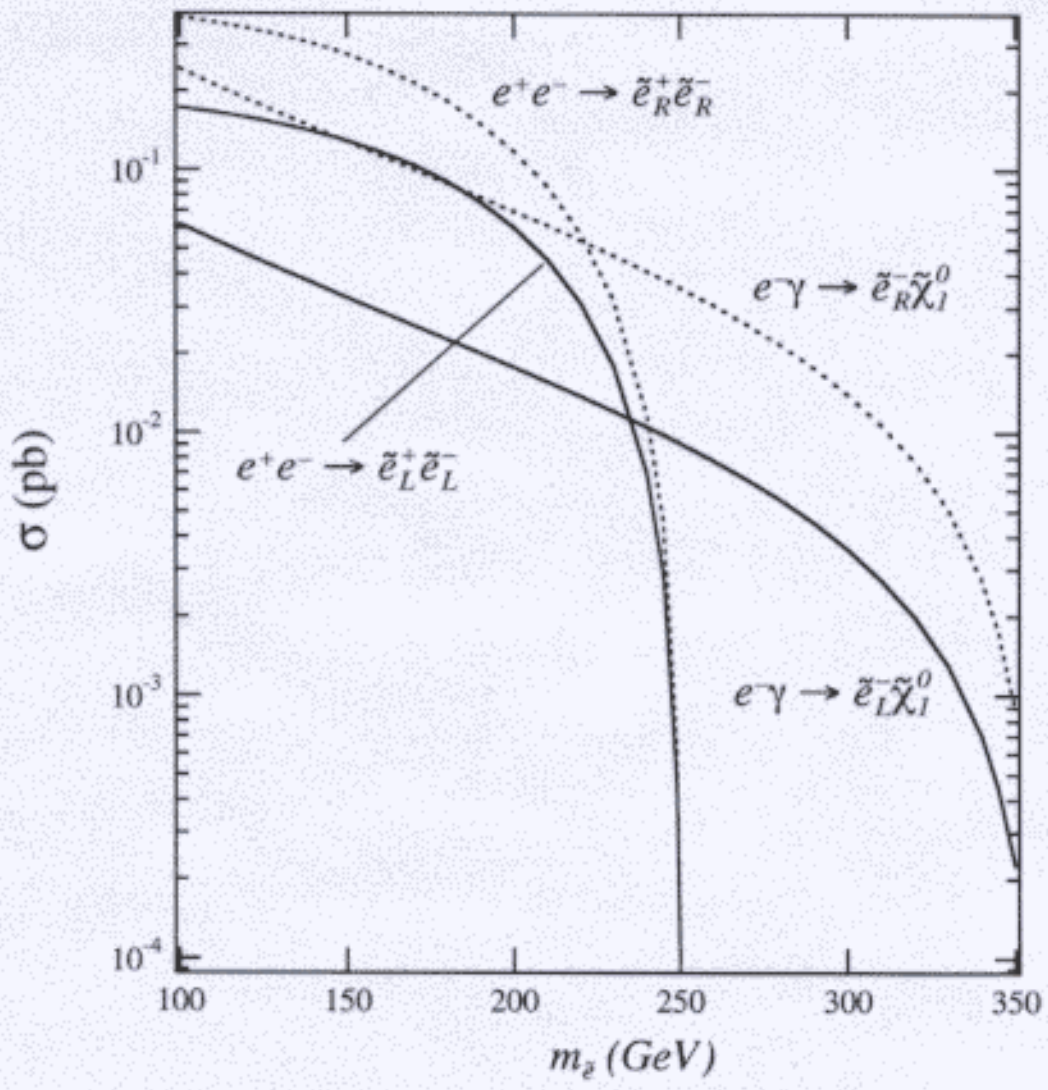
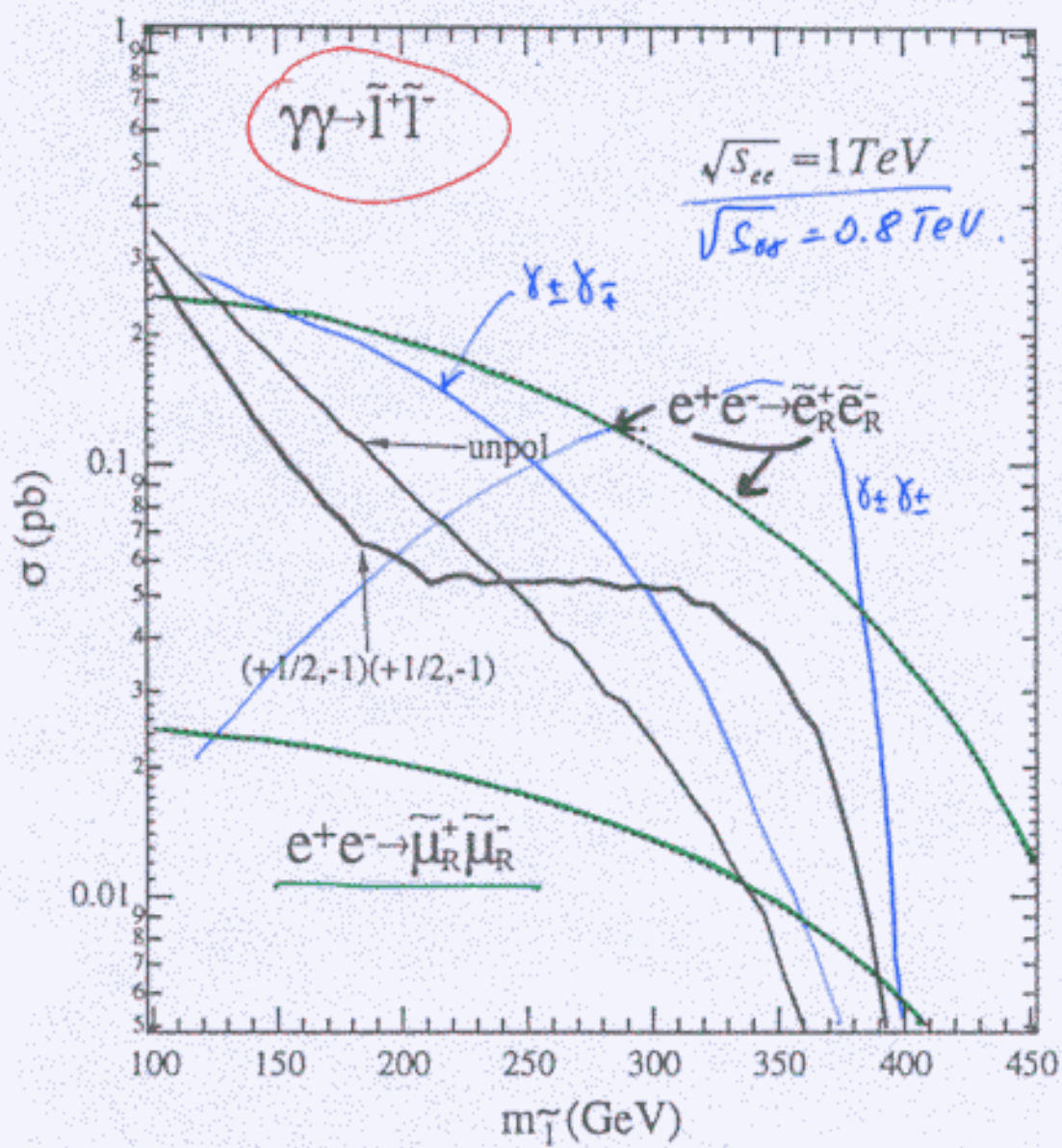


Fig.1

Slepton production in $\gamma\gamma$ and e^+e^- collisions



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— v.t.

- $\sigma_{\gamma\gamma} \sim 1/2 \sigma_{e^+e^- \rightarrow \tilde{e}^+\tilde{e}^-}$
- $\sim 10 \sigma_{e^+e^- \rightarrow \tilde{\mu}^+\tilde{\mu}^-}$

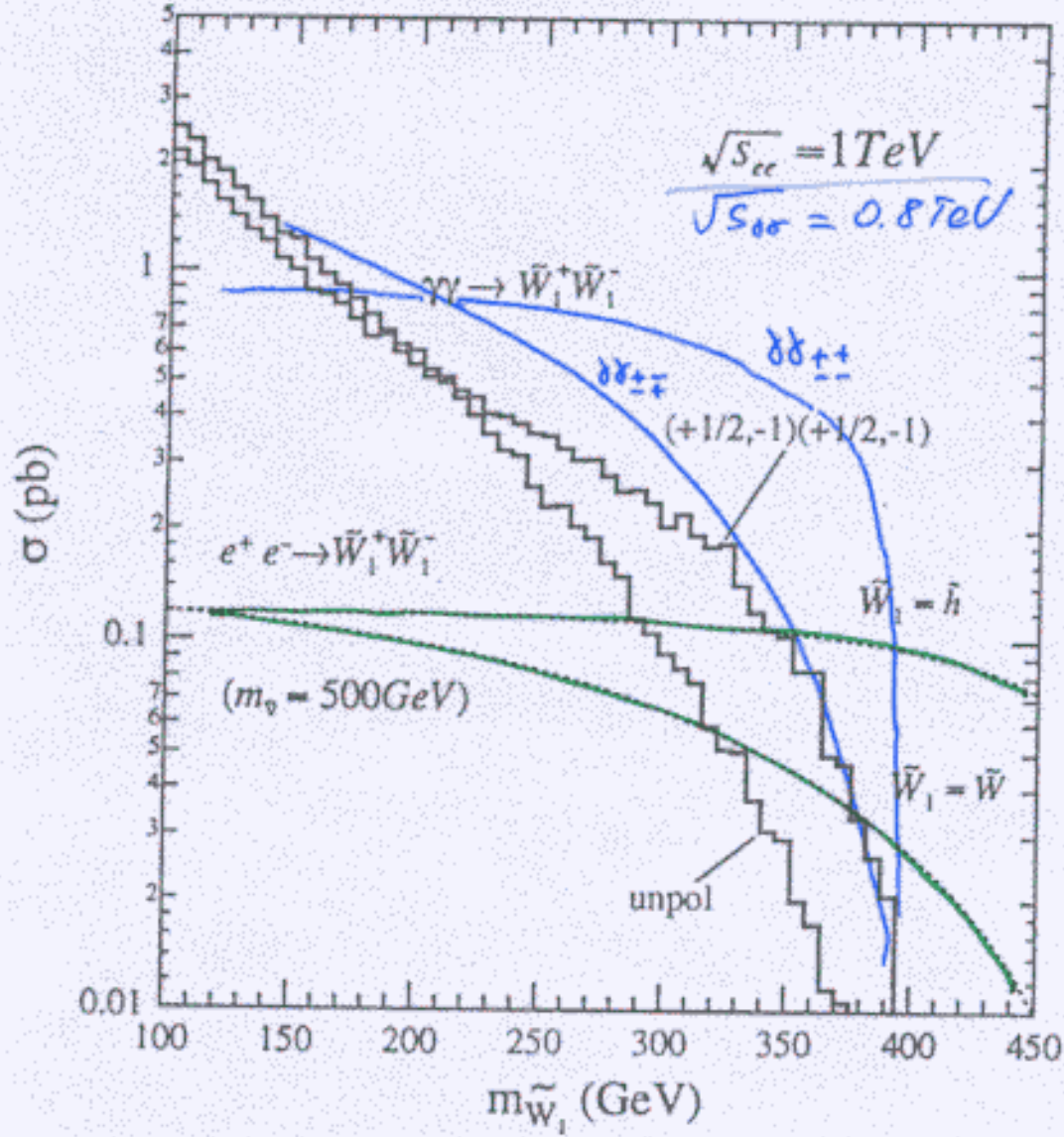
— $\sigma_{\gamma\gamma}$ "real"

— $\sigma_{\gamma\gamma}$ with some $\frac{dL_x}{dz}$ (after convolution of Compton spectra)

5 time difference at large $m_{\tilde{e}}$

Chargino production
in $\gamma\gamma$ and e^+e^- collisions

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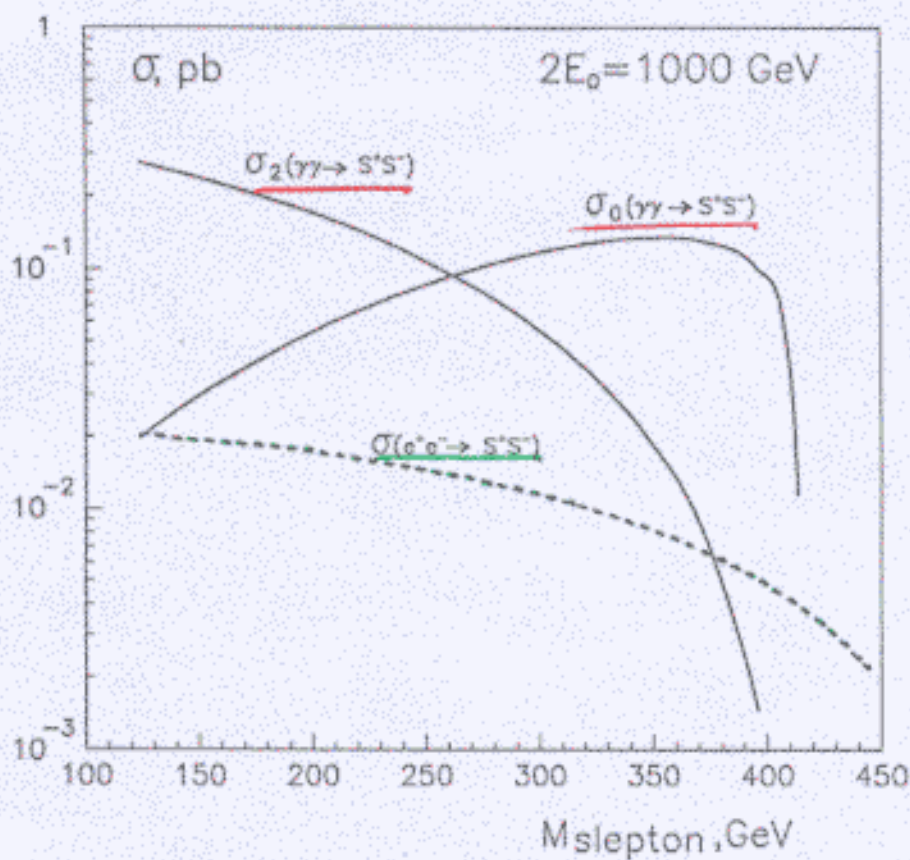
• $\sigma_{\gamma\gamma} \sim 5 \div 8 \sigma_{e^+e^-}$

— $\sigma_{\gamma\gamma}$ "real"

— $\sigma_{\gamma\gamma}$ with convoluted lum. spectrum

difference 5 times at large m .

Production of charged scalar pairs
in e^+e^- and polarized $\gamma\gamma$ collisions



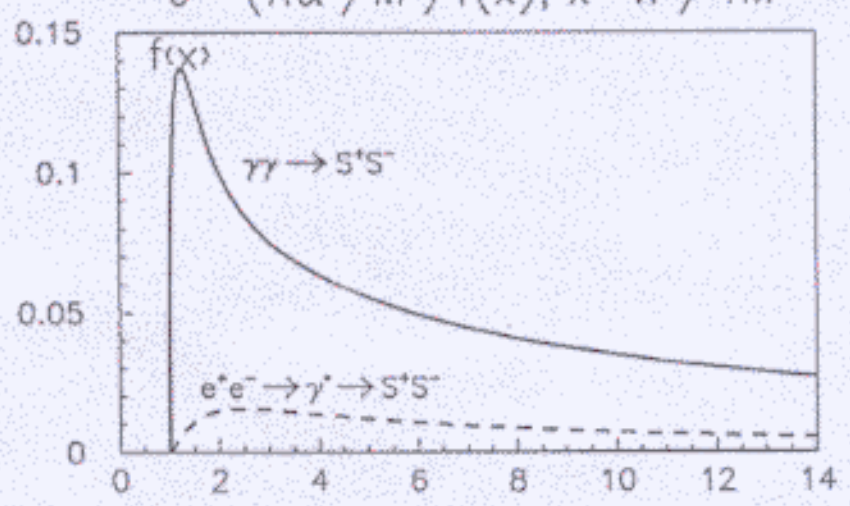
For heavy particles $\sigma_{\gamma\gamma} \sim 15-20 \sigma_{e^+e^-}$

(Note: $\sigma_{e^+e^- \rightarrow SS}$ is valid for ^{all} sleptons, except selectron)

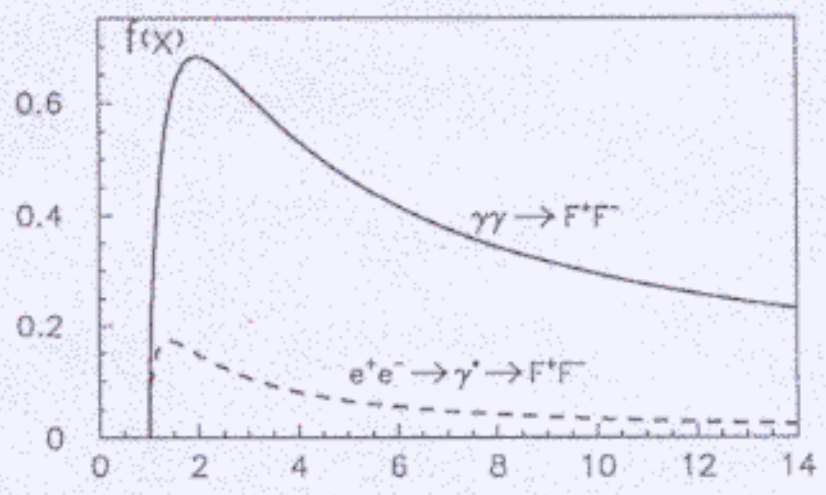
Charged particle production in $\gamma\gamma$ and e^+e^- collisions

unpolarized beams

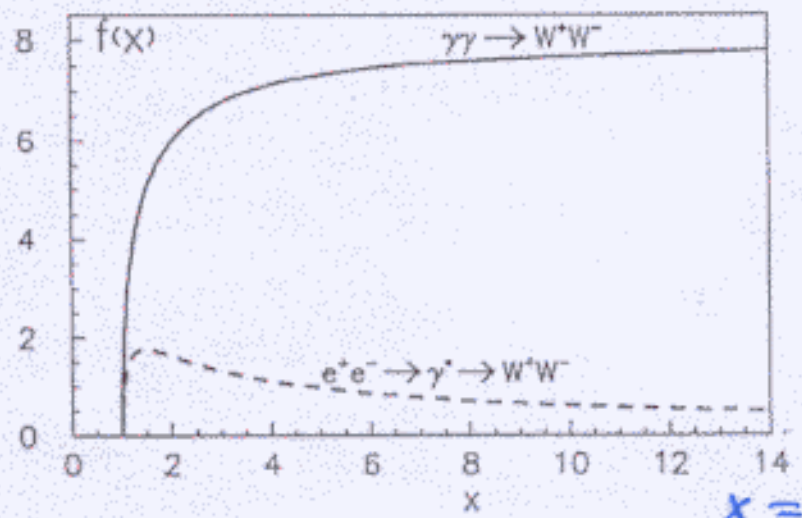
$$\sigma = (\pi\alpha^2/M^2) f(x), \quad x = W^2/4M^2$$



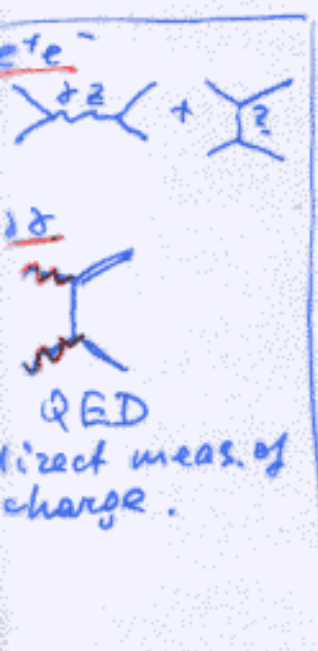
scalars



leptons



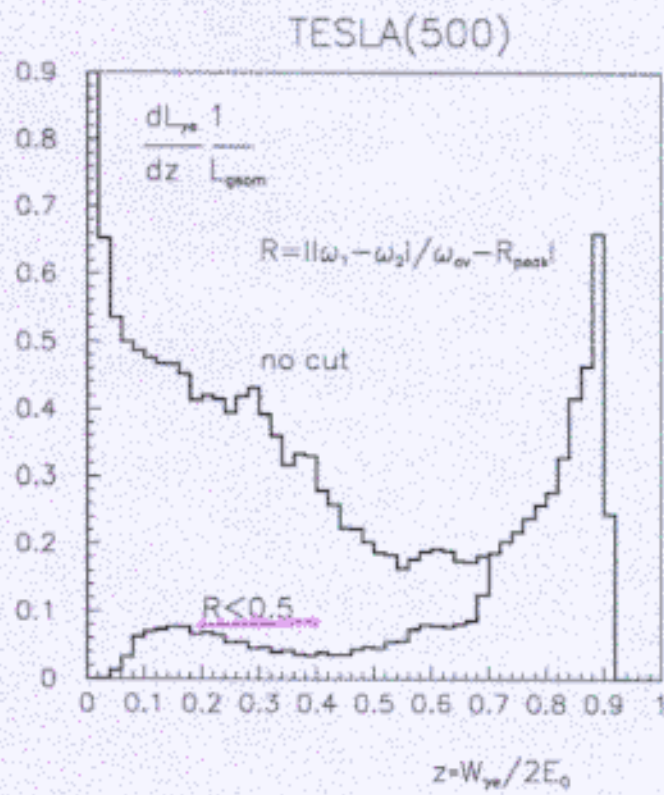
W-bosons



$$x = \frac{W^2}{4M^2}$$

$$\sigma_{\gamma\gamma} \sim 5 \div 20 \sigma_{e^+e^-}$$

γe luminosity spectrum



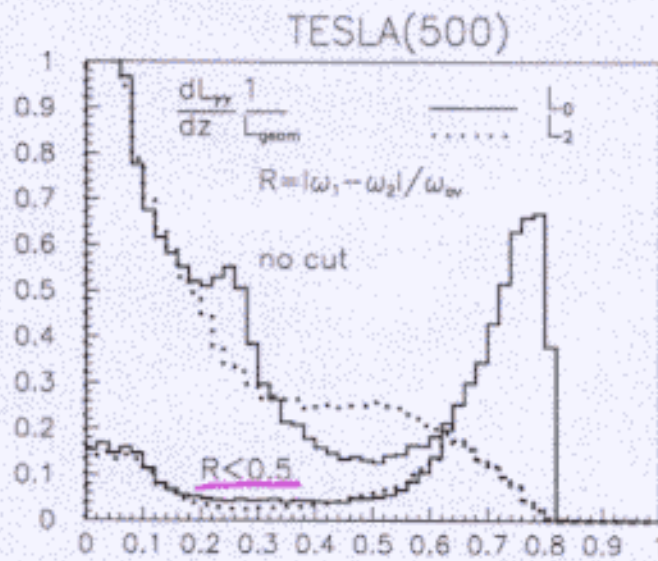
γγ luminosity spectra

with cuts on $\frac{P_{HC}}{0.5 E_{tot}} \equiv R$

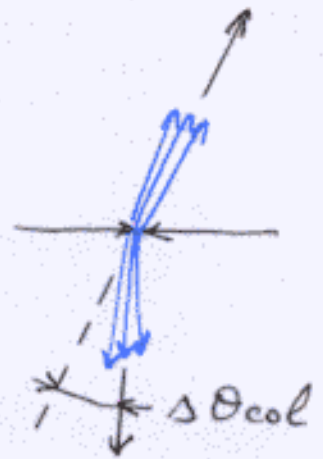
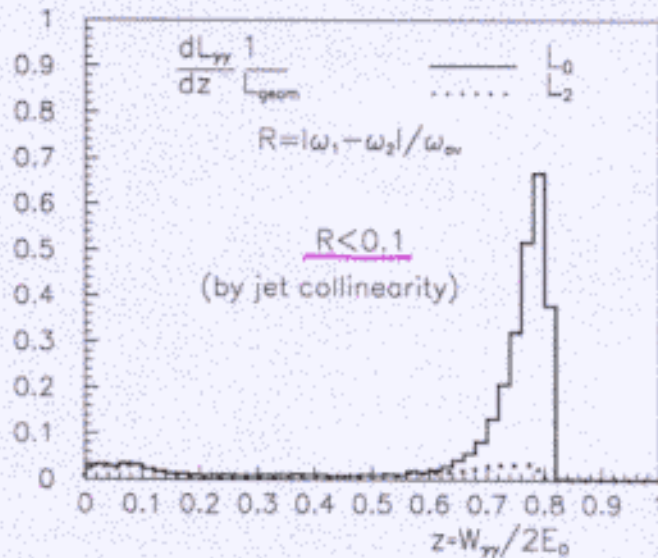
(with new beam parameters)

$E_{ex} = 2.5 \dots$
 $\beta_x = 1 \text{ mm}$

$X = 4.6$



——— L_0
 - - - L_2



$\gamma\gamma \rightarrow H \rightarrow b\bar{b}$
 $\rightarrow H \rightarrow c\bar{c}$

$\gamma\gamma, \gamma e$ colliders based on TESLA(2x250)

CDR

	1997	1998	2000
$N/10^{10}$	3.63	2	2
$\sigma_z, \text{ mm}$	0.5	0.4	0.3
$f_{rep} \times n_b, \text{ kHz}$	5.65	14.1	14.1
$\gamma\epsilon_{x,y}/10^{-6}, \text{ m}\cdot\text{rad}$	14/0.25	10/0.03	<u>2.5/0.03</u>
$\beta_{x,y}, \text{ mm at IP}$	3.2/0.5	2/0.4	$\sqrt{1/0.3}$?
$\sigma_{x,y}, \text{ nm}$	303/16	200/5	70/4.3
$b, \text{ mm}$	11.5	2.4	2.1
$L(\text{geom}), 10^{33}$	12	45	145
$L_{\gamma\gamma}(z > 0.65), 10^{33}$	1.2	4.2	14
$L_{\gamma e}(z > 0.65), 10^{33}$	2	6.5	11

$$L_{\gamma\gamma}(z > 0.65) \sim 0.5 L_{e^+e^-}$$