

options

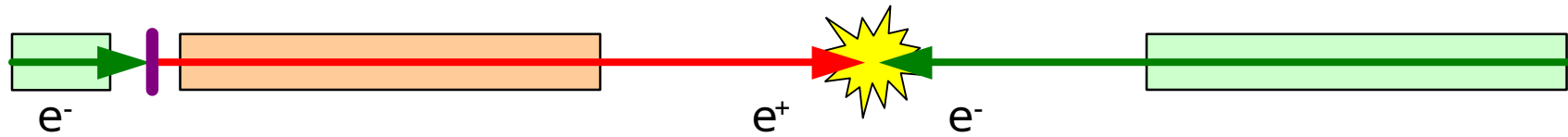
**Isamu Watanabe** (Akita Keizaihoka Univ.)

LC Physics Study Group Meeting @ KEK

April 25th 2003

# 0. What are $e^+e^-$ / $e^-e^-$ options

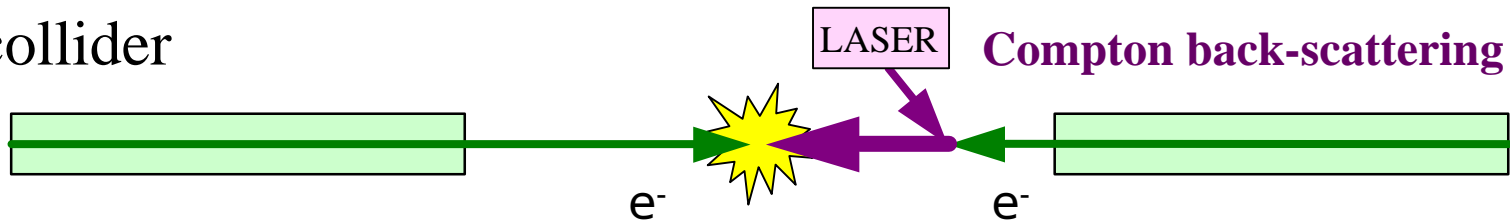
$e^+e^-$  collider



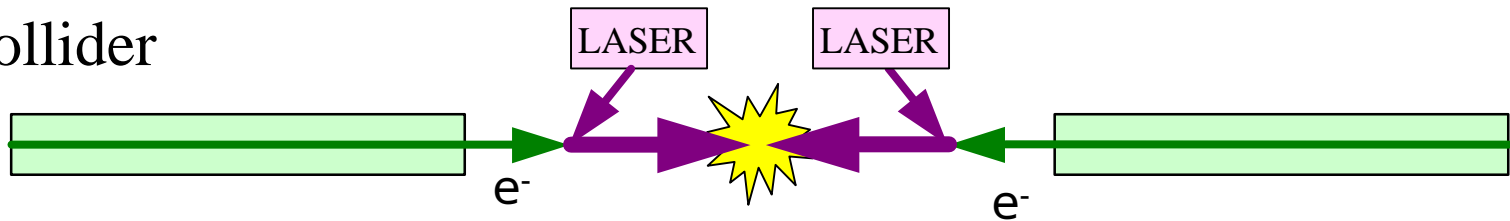
$e^-e^-$  collider

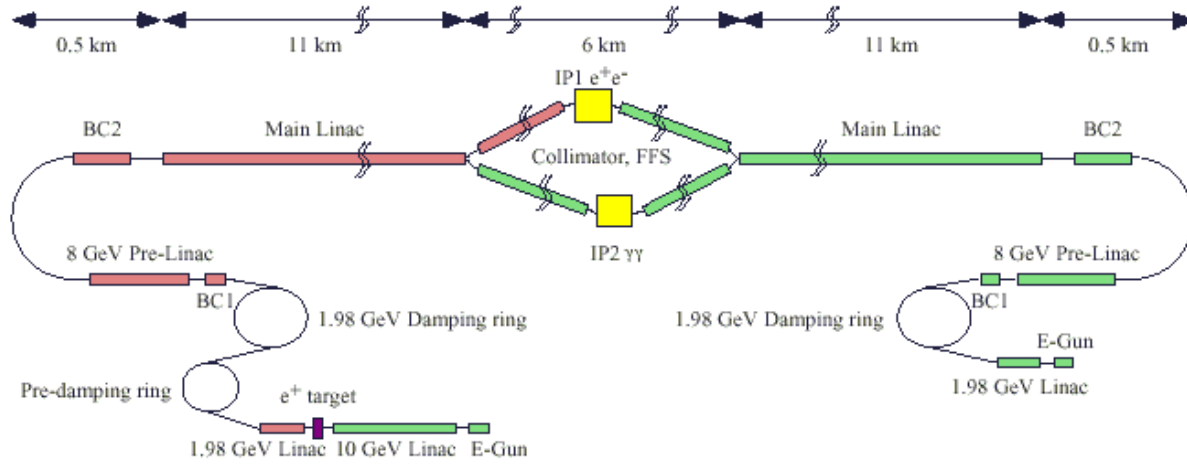


$e^-$  collider



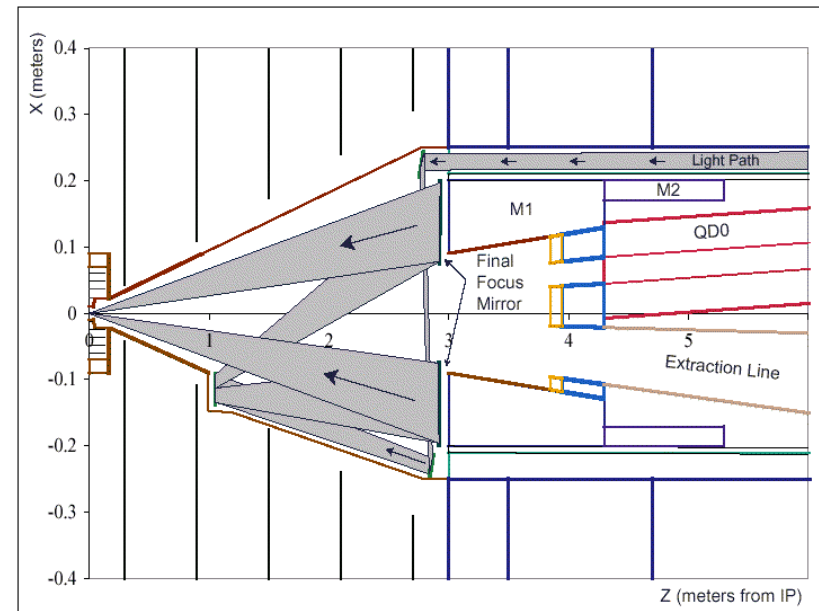
collider





**2<sup>nd</sup> Interaction Point**

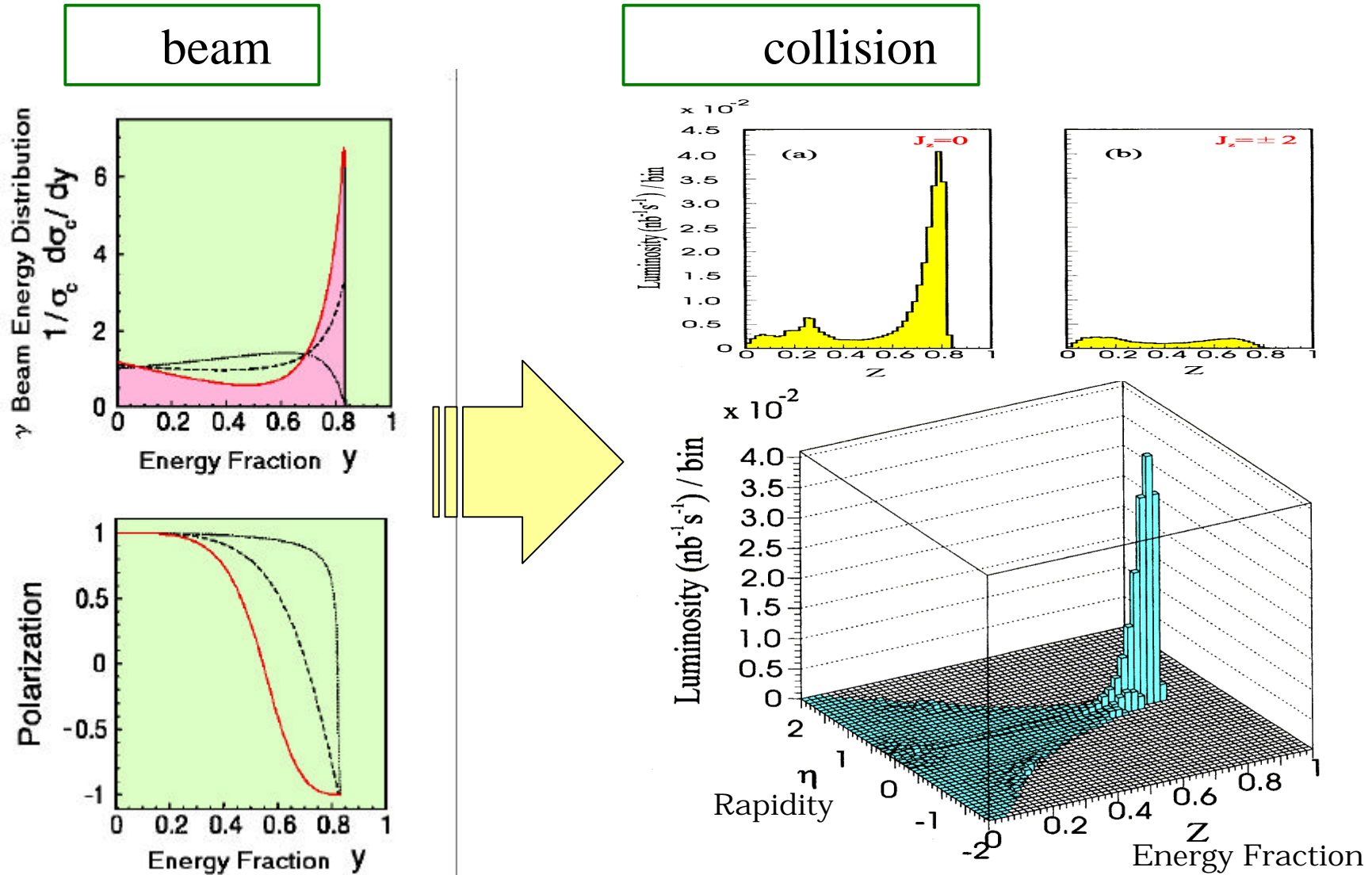
*Figure D.1: Schematic of JLC with a second interaction region.*



**Optics**

*Figure D.5: Schematic of the interaction region of the  $\gamma\gamma$  collider [22].*

# Luminosity distribution



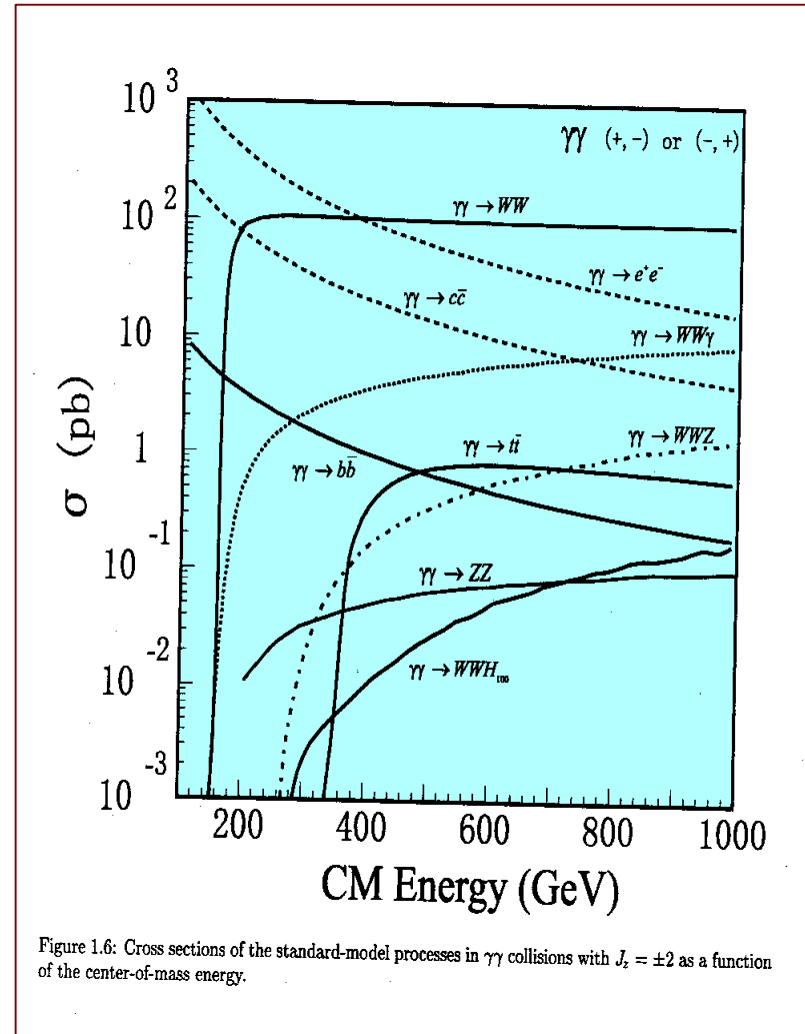
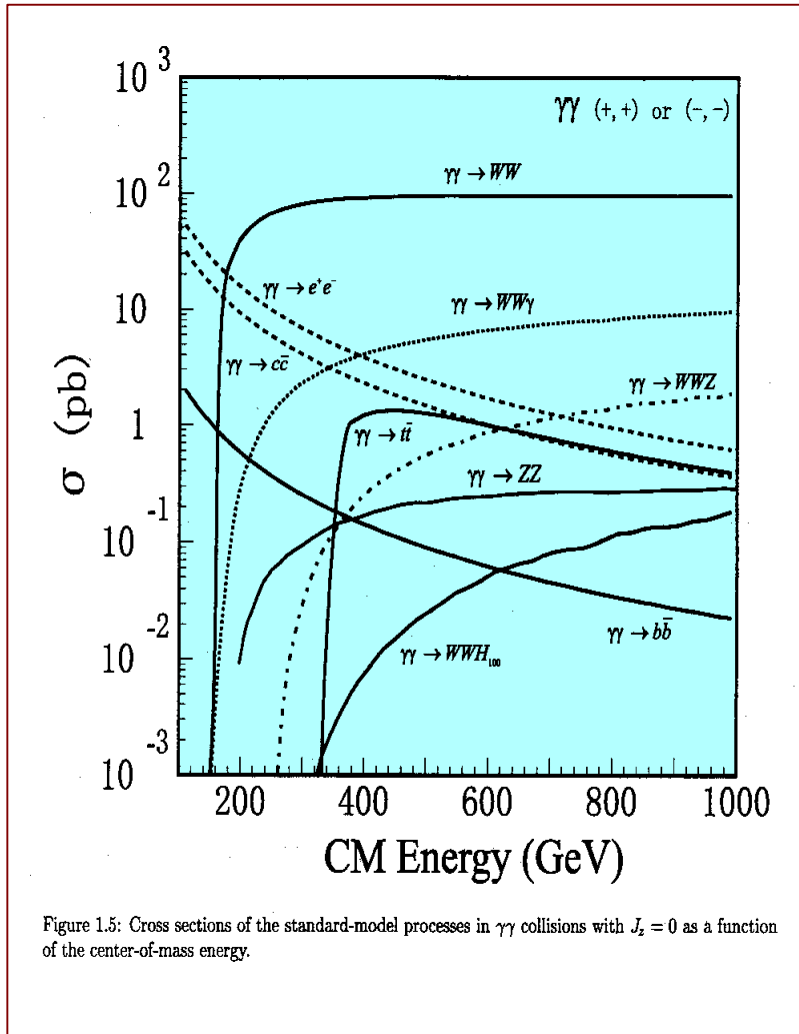
## Traits of Collider

- $E \sim 0.8 E_{ee}$
- $L \sim 0.1 L_{ee}$  (in general  $> ee$ )
- Highly Polarized beams

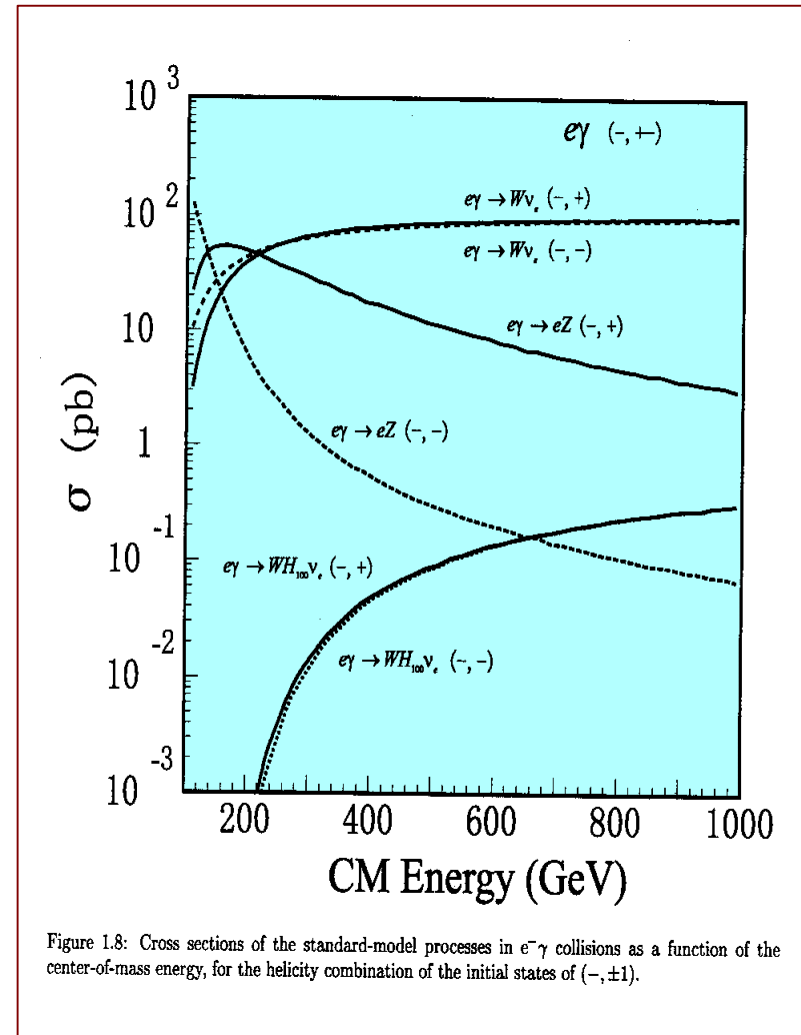
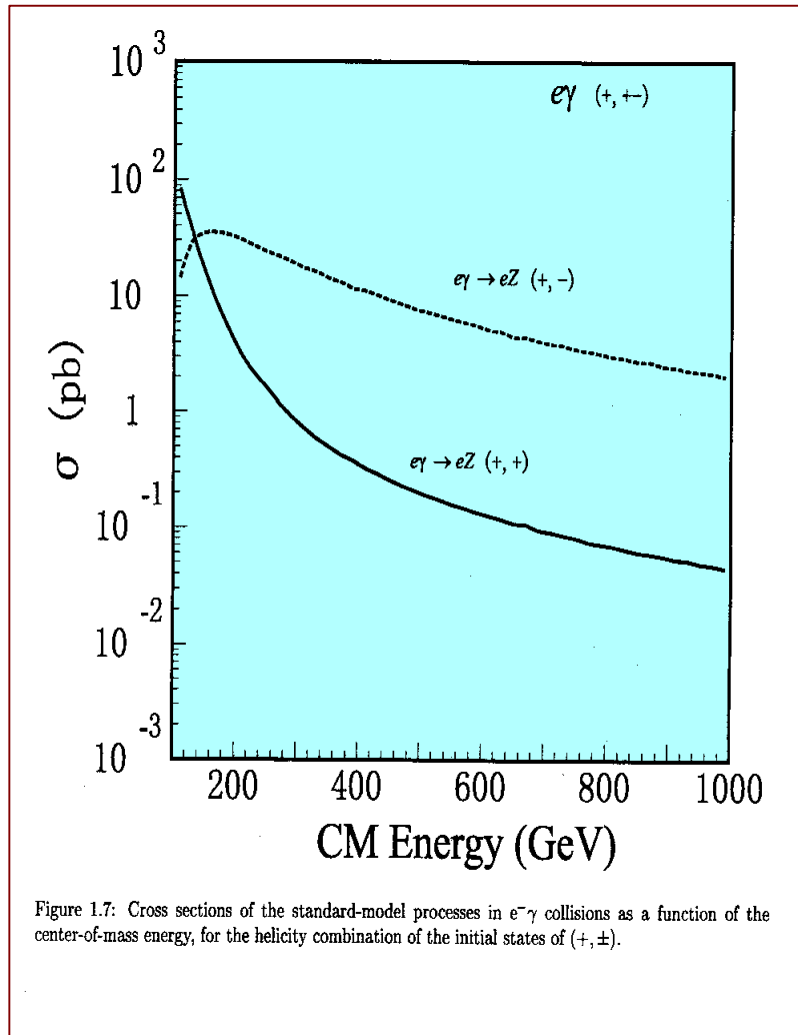
## Interesting Physics Targets

- Higgs for (H )
- Heavy Higgs bosons A/H
- Top pair production in S-wave
- Large number of W pair production
- . . . .

# Cross Sections in Collisions

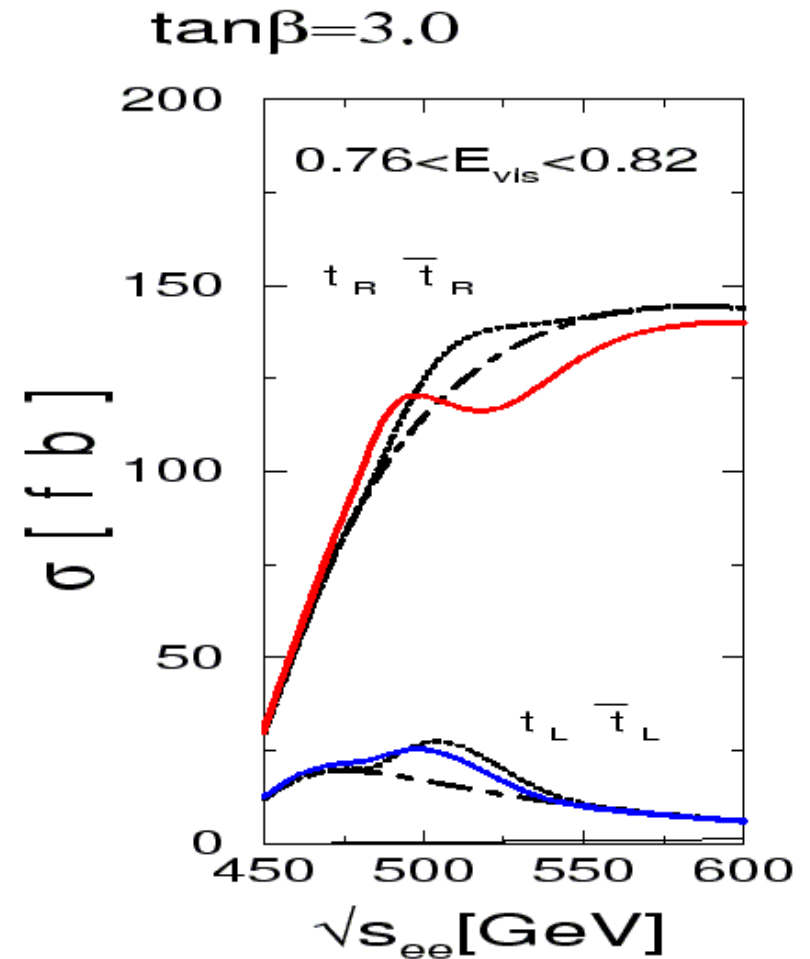
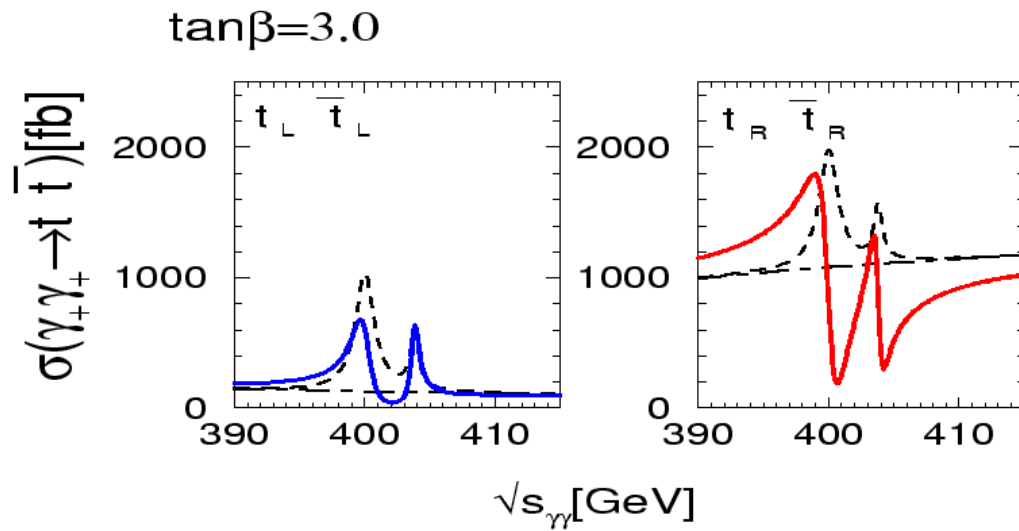
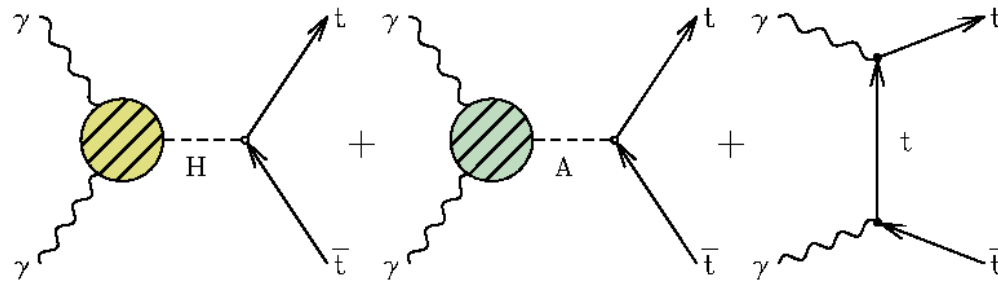


# Cross Sections in $e^- \gamma$ Collisions



Collider as an option of JLC', I.W. et al., KEK Report 97-17

# A/H $t\bar{t}$ in MSSM



**E.Asakawa-J.Kamoshita-A.Sugamoto-IW, *Eur.Phys.J C*14(2000)335-345.**



# 1. Main Members of JLC subgroup

Kobayashi, Katsuyuki (SHI)

Kon, Tadashi (Seikei)

Takahashi, Tohru (Hiroshima)

Tauchi, Toshiaki (KEK)

Watanabe, Isamu (Akita Keizaihoka)

Yokoya, Kaoru (KEK)

+ occasional participants are:

Asakawa, Eri (KEK)

Ikematsu, Katsumasa (Hiroshima)

Too COMPACT  
for the wide range  
of the subjects

# Activities in the past years

24 May 2000

Subgroup meeting @ KEK

14-17 June 2000

GG2000 workshop @ DESY

14 July 2000

Subgroup meeting @ KEK

20 Sept. 2000

Subgroup meeting @ KEK

25 Dec. 2000

Subgroup meeting @ KEK

Winter-Summer 2001

ACFA report

14-17 Mar. 2001

GG2001 workshop @ Fermilab

26 Mar. 2001

Subgroup meeting @ KEK

12 July 2001

Subgroup meeting @ ACFA LC workshop, ICEPP

17 May 2002

Subgroup meeting @ KEK

Summer 2002

Road Map report

See also, <http://photon.hepl.hiroshima-u.ac.jp/lab/jlc.html>

## 2. Tasks remaining

### **Physics:**

Detailed studies on all interesting  $/e^- /e^- e^-$  processes  
with realistic luminosity & detector simulations upto 1.5 TeV

### **Experiments:**

Photon Collider Test Facility (@ SLC ?)

Realistic IR design

### **Accelerator:**

Parameter optimization for  $/e^- /e^- e^-$

### **LASER:**

R&D

### **Other:**

Cost estimation

# 3. Constitution

Present:

## **JLC**

### Electron-Positron Linear Collider Project

The JLC (Electron-Positron Linear Collider Project) consists of the construction of an electron-positron linear collider and the experiment therewith, at an initial center of mass energy around 250 GeV which will eventually reach TeV region, along with successive machine upgrades. The JLC machine will allow us to study elementary processes that could happen only in the early very hot universe. The JLC project will bring us to a deeper understanding of nature and possibly open up a way to uncover the secrets of the creation and evolution of our universe.

- **Introduction** [JLC Roadmap Report](#)
- **Getting Started**
- **Research Group**

Physics	Detector
<a href="#">Higgs</a> <a href="#">SUSY</a> <a href="#">Top</a> <a href="#">W/Z</a> QCD Extended Gauge Sector	<a href="#">Interaction Region</a> <a href="#">Vertex Detector</a> <a href="#">Central Drift Chamber</a> <a href="#">Calorimeter</a> Muon Detector Solenoid Magnet <a href="#">Offline Analysis</a>
	Others <a href="#">Gamma-Gamma Collider Study Group at Hiroshima University</a>

- **JLC Accelerator Research**

subgroup is defined parallel to the other subgroups, and is somewhat isolated from the others.

From now on, I wish to reform the subgroup as following:

Physics:

collaborations with other physics subgroups

( subgroup should not be a parallel one to the others)

Experiments:

Photon Collider Test Facility (needs manpower & budget)

Accelerator:

being managed well now

LASER

R&D (needs manpower, more experts & budget)



Subgroup as a Information Center