IFJ PAN Potential Activities

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Potential activities

1. Development of precision event generators for electroweak physics at the FCCee (ref. 2.3.2 and 2.3.3).
   - MC generators: collection, validation, identyfying missing items - Z-pole, WW physics and luminosity determination, S. Jadach
   - theoretical uncertainties in non-standard Z decay (gamma, neutrinos) , S. Jadach
   - software related with tau decays : for precesion studies of rare dacays of heavy flavors, Z. Wąs

2. Studies of the FCCee sensitivity to the electroweak observables (ref. 2.4.1 and 2.4.5).
   - EW observables : forward-backward production asymmetry of heavy quark pair (bb(bar),tt(bar), T. Lesiak

3. Studies of the FCCee sensitivity to the Higgs boson production associated with a vector boson (ref. 2.4.1 and 2.4.3).
   - processes with Higgs production associated with W/Z production, Higgs is couplings to bb(bar) pair M. Kucharczyk

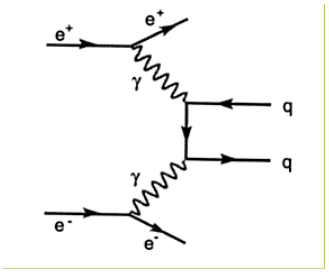
4. Gamma- Gamma (ref. 2.4.6).
   - collection MC generators for $\gamma\gamma$ processes : Whizard, Pythia, Herwig , other , adopted from LEP ?
   - studies of the Photon structure and properties of the hadronic final state, L. Zawiejski

5. Studies of location, geometry and composition of the luminosity monitor (ref. 2.6.2).
   - studies on possible setup of the LUMI monitor inside the FCCee detector – based on MC simulation and experience of the FCAL collaboration work, L. Zawiejski

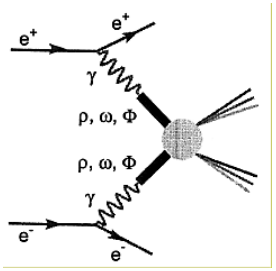
γγ Physics

Photon structure functions and hadrons production studied via two-photon exchange:

QPM, direct



VDM



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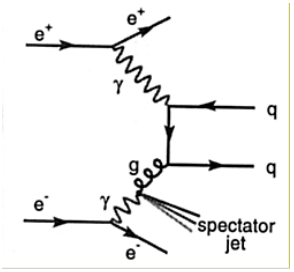

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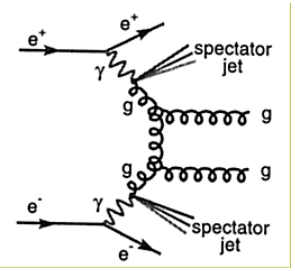
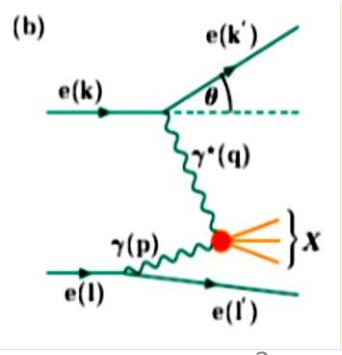


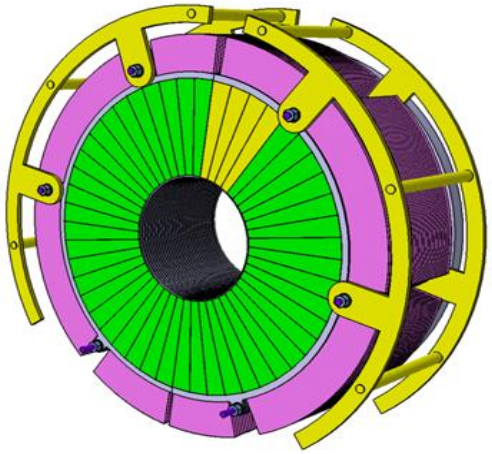
- Highly virtual and quasi-real photons
- The extended kinematic region of (x, Q^2) variables in respect to LEP
- QED and QCD tests
- Photon structure function can sensitive to top quark participation

Currently work : FCAL studies on photon structure functions (QED and Hadronic) at ILC energy using forward detectors with tagged and untaged the scattered beam electrons (positrons)
Deep inelastic eγ scattering events from interactions : $e^+e^- \rightarrow e^+e^-X$



Luminosity (LUMI) detector

It is a good chance that detector for luminosity measurement (LUMI) for FCCee can be based on the project prepared for the ILC / CLIC by FCAL collaboration.



This electromagnetic calorimeter will contain
Tungsten (3.5 mm) and silicon sensors (330 μm)
30 layers

The results of the previous test beam measurements of the LUMI prototypes fully confirmed:

- the correctness of the concept of the detector,
- the proper operation of complete multichannel detector modules including sensors and readout-electronics,
- observed electromagnetic shower development agreed in reasonably way with Monte Carlo predictions.

Further, more edvanced test beam studies will be done this year in October.

Summary

- The IFJ PAN group is currently in the transitional period...
- In particular we hope
  to reinvigorate involvments,
  strengthen in manpower
  and possibly also
  extend our activities to FCC issues.

The group has a lof of experiences from work in several experiments and projects:
ZEUS, H1, DELPHI, LHCb, ILC, CLIC