FCAL Worlshop in Tel Aviv

W. Lohmann, DESY

Physics Requirements

Input From Theory

Lessons from LEP

LumiCal Simulations

BeamCal

Hardware

Next steps

Requirements from Physics

Susy top production- Instrumentation of the forward region for background suppression (C. Milstein)

Input from theory

- **Two loop ew corrections to Bhabha scattering (T. Riemann)**
  → **complete treatment of higher order contributions in the Bhabha MC geberators to approach 10^{-4} precision**
- **Impact of polarisation on the Bhabha cross section (P. Starovoitov)**
  → **corrections on the % level, need next order**

Lessons from LEP

Experience with the OPAL detector (D. Strom)
→ control of the inner radius, phi symmetry
→ be careful with material in front of the detector
→ importance of testbeam measurement
→ Lumi at 20 mrad crossing angle

LumiCal simulations

- Beam- beam interactions, analytic relationships (S. Kananov)
- Pad and strip design (R. Ingbir, B. Pawlik)
- Background for LumiCal (L. Suszycki, I. Bozovic-Jelisavcic)
  → Design for small crossing angle is stable
  → first look to 20 mrad case, background from beamstrahlung
  → two photon events in the calorimeters, to be clarified

BeamCal simulatons

- Optimal segmentation for electron detection (A. Elagin)
- Comparison of the performance for different ILC parameters (V. Drugakov)
  - → ½ R_M gives best results
  - → electron veto for different accelerator settings, geometries, pushed to high efficiency

Background estimates

Background in the inner detector (K. Buesser)
→ amount of hits is larger for 20 mrad
→ depositions on LumiCal (cover front-face with carbon?)

Hardware developments

- SiD forward region (D. Strom)
- R&D with diamond sensors (K. Afanaciev, Ch. Grah))
- FE electronics (W. Lange)
- Si sensors (W. Wierba, Z. Krumstein)
  - → first design for 20 mrad crossing angle
  - → new results from diamond sensors
  - → electronics concept
  - → Si sensor design, offer from JINR

Beam diagnostics and position monitoring

- Positioning monitoring with a laser beam (W. Wierba)
- Beam diagnstics with BeamCal (Ch. Grah)
  - → monitoring on a few mum level is demonstrated
  - → fast lumi estimate on bunch-by-bunch level for feedback

What has to be done:

We need a similar design for 20 mrad crossing angle
-repeating the studies on critical parameters
 (as done by achim)
-feasibility of beam diagnostics (magnetic field!)
-Studies of background

We have to understand Bhabha phenomenology
-Status of the theory, radiative effects and detector
  performance (clustering)

- Comparison of different generators (BHLUMI,
  SamBha….)
- Background studies
- Realistic readout scheme

What has to be done:

Sensor and Readout

-Continuation of diamond studies (more samples
 with promising diagnostics, linearity, homogeneity,
 high radiation doses.)
-Si sensor studies (to learn to work with them).
-Si sensor radiation test.
-Assembly of full sensor planes → prototype test.
-Readout electronics concept, manufacturing of
 prototypes.
-Concept Design for the 'fast readout' and
 fast diagnostics (related to Eurotev).

General remark

-It was a perfectly organised meeting
-We learned a lot on
            Physics (Y. Grossman ……)
            Culture, history, restaurants ….
thank you, Halina, Aharon, Ronen .. All the others

Next steps

-ECFA WS in Vienna, Nov. 2005
contributions on: theory inputs,
                    detector performmance,
                    background studies,
                    hardware,
                    beam diagnostics…..