ECFA Workshop

8-12 June 2008, Warsaw

Main Topics:

- **Physics**
- **Detector**
- **Machine Detector Interface**

http://llcagenda.linearcollider.org/conferenceeTimetable.py?ConfId=2643

ECFA Meeting in Warsaw

- Turn on of LHC ➔ entering an exciting phase of particle physics at the highest collision energies ever
- Expect
  - **revolutionary advances in understanding the microcosm**
  - **Results from LHC will guide the way ⇔ ILC physics potential (although there is a clear physics case without LHC)**
  - **period for decision taking on next steps in 2010 to 2012**
  - **Physics: will minimal machine fulfill requirements?**
- Need
  - **R&D and technical design work to enable these decisions and ongoing for several projects**
  - **global collaboration and stability on long timescales**
    (remember: first workshop on LHC was 1984)
  - **intensified efforts**
- How?
  - **Collaboration in network of all HEP laboratories/institutes**
  - **Mandatory to have accelerator laboratories in all regions as partners in development / construction / commissiong / exploitation**

Polarization session (1)

Advantage ILC: clean initial states with known helicity

Positron source

- e+ source status report (talk by S. Riemann)
  - **See conclusions of PS Meeting in April 2008**
- critical issue: positron production target (talk by S. Hesselbach)
  - **thermal, mech., radiation stress**
  - **shock wave studies to model target damage**

Modeling of polarization transport (electrons and positrons)

- Important to understand e+, e- spin tracking at the ILC (talk by A. Hartin)
  - **all depolarization effects have to be understood and evaluated, precise spin tracking required to meet envisaged accuracy @ IP**
    - Theoretical studies to describe spin precession in strong fields.
    - Inclusion of second order depolarization processes

Polarization session (2)

Polarimetry at the IP (talk by D. Kaefer)

- polarimetry is essential, may be THE precision limiting part in some measurements
- big challenge to reach $\Delta P/P$ ~0.25% but no fundamental show stoppers
- only the combination of upstream and downstream and using annihilation data will allow to reach the precision goal:
  - **Upstream polarimeter**
    - cleanest measurement with best time granularity;
    - gives main input for correlationas and differences in left-right polarizations
  - **Downstream polarimeter:**
    - measures depolarization effects from collisions, providing access to the luminosity weighted polarization
  - **Annihilation data:**
    - provide absolute calibration (Z-peak) when correlations are known from polarimeter measurements

Executive Summary of Workshop on Polarisation and Energy Mearurement available on ILC doc server: ILC-NOTE-2008-047

Polarization session (3)

Calibration with Z-pole data – use them for physics

(talks by K. Moenig, R. Settles, C. Damerell and G. Moortgat-Pick + discussion)

- detectors need calibration on the Z pole ($L \sim 7 \cdot 10^{32}/cm^2s$)
- corresponds to $1.8 \cdot 10^6$ hadronic Z decays per day(~3 times SLD physics)!!

  ➔ would offer the world's best measurement of $\sin^2\theta_{eff}$
- Need:
  - **Polarimetry at the Z-pole**
  - **Polarized positrons, fast helicity reversal**
  - **Frequency of push-pull**
    - Fast → required for discoveries
    - Slow → ok for precision measurements
    - Z calibration needed for each push/pull cycle?
  - **Concern: Energy spread of positron beam**
    - Need a 5MeV precision on energy measurement
    - Check the scheme of e+ production at the Z –pole

- Large interest for positron source issues
- Support to explore the polarized positron source from beginning
- Definition of minimal requirements are essential for successful development of the project

  ➔ Need good communication between working groups
- Calibration data on the Z pole for physics

  → to be discussed also with MDI, detector and machine people