

LC Testbeam Reference Document

Summary and Results of LCTW09

November 4, 2009

Abstract

Summary of LCTW09 held in November 2009 at LAL Orsay and strategy of LC test-beam planning.

Process with `pdflatex`.

1 Role of Testbeams in Detector R&D

- What are the main questions and what is needed to meet the objectives
- **Do we need beams with ILC beamstructure???? If yes to what extend?**
- From fragmented to co-ordinated approach
- FNAL accomplishments
- SLAC test beams measurement – Time Structure
- CERN most frequented site
- DESY also largely frequented, though only low energy electrons
- Overview on Site Availabilities
- Vtx Tracking Collaboration?
- Large collaboration in calice

2 Subdetector Testbeam Plans

2.1 Calorimeter

Groups and Tasks to be listed. CALICE. SiD Groups

- Analog Ecals: SiW Completion of phys.. Prot, towards tech. Protos need ILC beam-structure
ScEcal One Layer to be integrated into SiEcal alveolar structure
Physics Protoypes
- DECAL: Major plans with DECAL in 2012
Telescope usage for calorimeters
AIDA Microstrips for calorimeter surface

- US SiEcal kPix Chip, bump bonding, time line at hand?
Testbeam Module – Time Line?
LC-like time structure, SLAC beam
Start in winter 2011
FNAL/DESY?
Together with HCAL
92% W much cheaper?
- HCALs
GRPC - electronic boards for 3 chambers in 2010
GRPC Testbeam plans beyond 2010? First PFLOW test with simple setup, **How to realise Setup for real PFA tests?**
Micromegas as much planes as possible in 2010
- US RPC 400k channels full physics prototype in 2010.
Stack ready in spring 2010. Testbeam program in 2010
- TCMT: Future plans, longer strips, need tracking system?
- AHCAL: Completed phys. prototype phase
Calice testbeam much more than three calos, understood tracking
Wish list!!!!
Prototype 2012 (DESY, FNAL, LAPP????)
- muon systems, tests together with a Hcal
- Fcal

General Question to all projects, plan for physics runs, are they are any?
Another General Question, where should the testbeam be conducted

2.2 Silicon Tracking

Groups and Tasks need to be listed. Dedicated table
SiLC and "Vertex Groups"

- Spider ?
Question: Target for high density tracks?
- SiLC Beam Test
Larger prototypes
Combined Testbeams with calorimetry mid-2010 2011?????
What kind of beams?
- KAPTAN
- Silicon Tracking
Convenient use of EUDET telescop, EUDET success needs to be continued
Mimicked or 'real' Power pulsing
"Jetty" Environment would be very desirable

2.3 Gaseous Tracking

Groups and Tasks to be listed.

LCTPC, ???

Use DESY electrons

- Silicon envelope
- advanced endplate, non-optimal choice 30% X0
- Hadron beam CERN, FNAL
Energy > 10 GeV
- Spread Ion background
Occupancy of TPC cell, 1% would be fine
- **ILC beam structure how???**
- work at padplane

2.4 DAQ

Groups and Tasks to be listed.

- David: LCIO in online monitoring
- Lots of DAQ systems
- EUDAQ for LCTPC GUI at start run, now hack a config file Database for recording, skripts for sequence of runs
- Triggerless continuous r/o, offline assignment of bunch crossing
- **Revisit the "event" concept**
- EUDAQ: Interface to TLU
Users write a producer
Easy to integrate, two days with Emlyn and you're up and running
Conversion to LCIO
Scalability, Integration with other DAQs AIDA?
Support after Middle 2010 w/o AIDA
EU-Telescope, Will continue to run at DESY and/or CERN
Evaluation phase in AIDA with othr DAQs
Usability for combined running? Already done at small scales, see scalability
Trackers use EUDAQ, interoperability with other detectors

2.5 Software

Feedback detector realism into Full detector simulation.

Development of Geometry interface.

Event Display

3 Sites

Main question to detector community 1) What requests do we have 2) How make optimal use of wealth of Testbeam facilities, care for optimising occupancy of beam lines

3.1 CERN

Two areas North and East, main area North/SPS area

- Semi permanent beam lines for LHC experiments
- LHC experiments by LHC scientific coordinator
- Negotiation on beam equipment
- irradiation facility
- RD51 semi-permanent beamline
- CERN usual very crowded, limited SPS availability due to LHC start

Semi permanent ILC beamline at CERN, oral request asap formal by mi-2010 to get a beamline by middle of 2011.

3.2 DESY

- High availability, but small room for improvements
- 1-6 GeV energy, 2 KHz rate
- Very flexible, 4 areas, arrangement on short notice possible

3.3 FNAL

- Spill options, Ping extraction
- microstructure, 7 bunches separated by 400 ns
- 2 Pixel tracker
- PiD with TOF system

2010–2013, down 2012

3.4 Asian Facilities

Low energy facilities

- J-Parc, currently unused, 1-1.5 GeV/c
- IHEP Beijing, not before 2011, low energy electrons
- Tokoku available
- KEK ATF Shutdown 2010-2012

3.5 SLAC

Restore Testbeams at SLAC

New testbeam area in Endstation A

3.6 Medium Sites

- IHEP/Protvino, e between 1-45 GeV,
- Dubna, neutron beams, neutron yield

XFEL and ILC timelike structure (XFEL is little ILC).

4 ILC Beamlines and Combined Testbeams

5 Conclusion, outlook , Recommendations and Requests

6 Appendix

Activities and Timelines