

Conceptual Design Report Large Hadron Electron Collider (LHeC) at CERN

Chapter 7

Alessandro Polini, Peter Kostka, Rainer S. Wallny

VeryFirstStructure

- 1 General Design Description
- 2 Magnet of L1
 - 2.1 Field homogeneity
 - 2.2 Magnet concept
- 3 Tracker
 - 3.1 Technical Requirements
 - 3.2 Capabilities of the Tracking
 - 3.3 Front-end Electronics and Readout
 - 3.4 Infrastructure Detector Construction and Prototyping
- 4 Inner Tracker
 - 4.1 Physics to be addressed with the low Q^2 tracker
 - 4.2 Physics to be addressed with the high Q^2 tracker
 - 4.3 Occupancy and False Hit Rates Estimation
- 5 Particle Identification / π^0 Suppression
 - 5.1 Identification of Particles
 - 5.2 Detector Design
 - 5.3 Mechanical Construction of fwd/bwd Planes
- 6 Electromagnetic Calorimeter
 - 6.1 Design Considerations
 - 6.2 Spagetti Calorimeter (H1 type)
 - 6.3 Photodetector

Structure 1. page

LHeC 2009

- 6.4 Calibration and Monitoring
- 6.5 Read-Out Electronics
- 6.6 Crystal Option of ECal
- 6.7 CALICE Type ECal
- 6.8 Layout of the ECal Parts
- 7 Hadronic Calorimetry
 - 7.1 Design Considerations
 - 7.2 Cu/Brass/Tungsten Calorimeter Spagetti Type
 - 7.3 Photodetector - see above
 - 7.4 Calibration and Monitoring - see above
 - 7.5 R/O Electronics - to be evaluated
 - 7.6 Crystal option - to be worked out
 - 7.7 CALICE Type of Hadronic Calorimeter
 - 7.8 Layout of the HCal Parts
- 8 Si-Pix, -Strip, -Strixel, -Pad Tracker
 - 8.1 Technical Requirements
 - 8.2 Tracker Design Consideration
 - 8.3 Different Types of Si-tracker Characteristics
 - 8.4 Material Budget
- 9 Removable fwd/bwd Si-Tracker - (or Gossip)
- 10 Muon Detection -Tail Catcher -Magnet Config. Dependent
 - 10.1 Design Considerations
 - 10.2 Removable fwd/bwd Parts
- 11 Beam-Beam Counter - Level-0 Trigger
 - 11.1 Requirements and Detector Configuration
 - 11.2 Triggering Capabilities
- 12 Fast Forward Detector
 - 12.1 Aim and Detector Position
 - 12.2 Forward detector Performance

- 12.3 Very Forward Detector in Trigger**
- 13 Zero Degree Calorimeter**
 - 13.1 Requirements of ZDC Construction**
 - 13.2 Simulation of ZDC**
 - 13.3 Technical Design**
- 14 Forward Magnetic Spectrometers - Muon**
- 15 Trigger, DAQ and Computing**
 - 15.1 Data Acquisition System and Trigger**
 - 15.2 Computing**
 - 15.2.1 Data Processing Model*
 - 15.2.2 Computer Resources for the Experiment*
- 16 Integration and Services**
 - 16.1 Hall Facilities and Services**
 - 16.1.1 Facility Integration*
 - 16.2 Mechanical Integration**
 - 16.2.1 Subsystems Dimension Control*
 - 16.2.2 Cables, Utilities - Routing*
 - 16.3 Detector Assembly**
 - 16.4 Detector Interface (Machine Interface)**
 - 16.5 Environmental Safety and Health**
 - 16.5.1 Safety Analysis Report*
 - 16.6 Electronics integration**
 - 16.7 Software Integration**
 - 16.8 Detector Control System**
 - 16.8.1 Technical Requirements*
 - 16.8.2 L1 DCS Architecture*
- 17 Simulation and Detector Performance**
 - 17.1 Detector Simulation Software Packages**

Structure 3. page

17.2 Event Reconstruction

17.3 MC Simulation

18 Cost and Timelines(?)

19 Conclusions

References