

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

DRAFT - February 2009

1. Introduction

2. Particle Physics and Deep Inelastic Lepton-Nucleon Scattering

1. DIS from 1 to 100 GeV
2. Status of the Exploration of Nucleon Structure
3. Tera Scale Physics

3. The Physics Programme of the LHeC

1. New Physics at Large Scales
2. Precision QCD and Electroweak Physics
3. Physics at High Parton Densities

4. Design Considerations

1. Acceptance and Kinematics
2. A Series of Measurements
3. Compatibility with the LHC
4. Proton, Deuteron and Ion Beams

5. A Ring-Ring Collider Concept

1. Injector
2. Lepton Ring
3. Synchrotron Radiation
4. Interaction Region
5. Installation
6. Infrastructure and Cost

6. A Linac-Ring Collider Concept

1. Electron and Positron Sources, Polarisation
2. Linac
3. Interaction Region
4. Beam Dump
5. Infrastructure and Cost

7. A Detector for the LHeC

1. Dimensions and General Requirements
2. Coil
3. Calorimeters
4. Tracking
5. Options for the Inner Detector Region
6. Detector Simulation and Performance

8. Summary

1. Physics Highlights
2. Parameters
3. Concluding Remarks

Appendix

1. Tasks for a TDR
2. Building and Operating the LHeC