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Understanding the Higgs Boson with the Large Hadron Electron Collider

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The Large Hadron Electron Collider (LHeC) at the European Laboratory, CERN, is expected to collide electrons and protons at high energy. Studies pertaining to the feasibility of observing the Higgs boson in this environment were reported in the Conceptual Design Report. Here the effect of decreasing the electron energy in an ep collision to find the optimal, economic electron energy for the study of the Higgs boson in the future LHeC is studied. Two production mechanisms are studied: one with and the other without the production of the Higgs boson in an ep collision. The electron energy was varied between 10 GeV and 100 GeV in increments of 10 GeV. This project's results showed that using electron energies between 40 GeV and 60 GeV would be sufficient to measure the properties of the Higgs boson without compromising on the validity of obtained results.

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