

The Study of Exclusive Pion Electroproduction reaction from Kaon-LT Experiment (E12-09-011) in Hall C

Proposed thesis Defence (Aug 2024)

1. Introduction Write-up by June 2024
 1. Overview of the topic
 2. Layout of the thesis
2. Theoretical Background Write-up by June 2024
 1. Quantum Chromodynamics (QCD)
 2. Pion in Perturbative QCD
 3. Pion in Non-perturbative QCD
 4. Past Experimental Study of Pion
 1. Electron – Pion Elastic Scattering
 2. Exclusive Pion Electroproduction
 5. Rosenbluth Separation Formulism
 1. Five term cross-section
3. Experimental Setup Write-up by Nov 2023
 1. CEBAF at Jefferson Lab
 1. 12 GeV Upgrade
 2. Hall C
 1. Co-ordinate System
 2. Beamline
 1. ARC Energy
 2. BPM
 3. BCM
 4. Raster
 3. Target System
 4. Spectrometers
 1. HMS
 1. Magnets
 2. Acceptance
 1. Angle
 2. Momenta
 3. Path length
 2. SHMS
 1. Magnets
 2. Acceptance
 1. Angle
 2. Momenta
 3. Path length
 5. Focal plane Detectors
 1. Drift Chambers
 2. Hodoscopes
 3. Cherenkovs
 4. Calorimeters
 6. DAQ Systems

1. FADC
 2. Trigger
 3. EDTM
7. Event reconstruction
 1. Track reconstruction
 2. Particle ID
 3. Target reconstruction and Delta
8. Kaon-LT Experiment (E12-09-011)
 1. Datasets
 2. Physics Kinematics
4. Data Analysis Write-up by Jan 2024
 1. Overview of Analysis
 2. Detector Calibrations
 3. Live Times
 1. CPU Live Time
 2. EDTM Live Time
 3. Uncertainties
 4. Detector efficiencies
 1. SHMS Detectors
 1. Pion Tracking efficiency
 2. Hodoscope Efficiency
 3. Aerogel cherenkov Efficiency
 2. HMS Detectors
 1. Electron Tracking efficiency
 2. Hodoscope Efficiency
 3. Cherenkov Efficiency
 4. Calorimeter Efficiency
 3. Uncertainties
 5. Luminosity Studies
 1. Carbon boiling check
 2. Hydrogen boiling correction
 6. Particle Identification and Event Selection
 1. Electron identification
 2. Pion Identification
 3. CoinTime
 4. Missing Mass Reconstruction
5. Simulation Write-up by Mar 2024
 1. SIMC overview
 2. Event Generation
 3. Elastic Scattering Reaction
 1. Heep
 2. Kinematic Offsets
 3. Elastic cross-section
 4. Physics simulation
 1. Background Estimation
 1. Pi-Delta shape study
 2. Pi-n radiative correction
6. Beam Spin Asymmetry and Cross-Sections Write-up by May 2024
 1. Normalized Yield

2. Pi-Delta Beam Spin Asymmetry
 - 1. Cross-section extraction
 - 2. Model comparison
 3. Pi-n Total Physics Cross-Section
 - 1. Simulated cross-section
 - 2. Dependence on spectrometer acceptance
 4. Model Iteration for L/T separation
 - 1. L/T separated cross-section (Preliminary)
 5. Error Analysis
 7. Results and Discussion
 - 1. Overview
 - 2. Pi-Delta BSA
 - 3. Pi-n separated cross-section (Preliminary)
 - 1. Form Factor Extraction (Optional)
 - 4. Future Measurements
 - 5. Conclusion
- Write-up by Mar 2024
- Write-up by May 2024
- Write-up by June 2024