

Performance of a 250L liquid Argon TPC for sub-GeV charged particle identification

J-PARC T32 collaboration

Abstract

We have constructed a Liquid Argon time projection chamber (LArTPC) detector with fiducial mass of 150 kg (250L Detector) as a part of the R&D program of the next generation neutrino and nucleon decay detector.

This paper describes a study of particle identification performance of the 250L Detector using well-defined charged particles (pions, kaons, and protons) with momentum of ~ 800 MeV/c obtained at J-PARC K1.1Br beamline.

Keywords:

1. Introduction

2. Experimental Apparatus

2.1. K1.1Br Beamline

2.2. 250L Detector

2.3. Beamline Equipment

2.4. Oct/2010 Beam Test

3. Data Sample

3.1. Collected Data

3.2. Channel-by-Channel Calibration

3.3. Liquid Argon Purity

3.4. ("Cross Talk")

4. Simulation Sample

5. Pion Result

6. Proton Result

7. Kaon Result

8. (Recombination)

9. Summary

References

- [1] O. Araoka *et al.*, J. Phys. Conf. Ser. **308**, 012008 (2011) [arXiv:1105.5818 [physics.ins-det]].
- [2] S. Mihara [MEG Collaboration], Nucl. Instrum. Meth. A **518**, 45 (2004).
- [3] S. Amoruso *et al.* [ICARUS Collaboration], Nucl. Instrum. Meth. A **523**, 275 (2004).
- [4] S. Amoruso, M. Antonello, P. Aprili, F. Arneodo, A. Badertscher, B. Baibusinov, M. Baldo-Ceolin and G. Battistoni *et al.*, Nucl. Instrum. Meth. A **516**, 68 (2004).
- [5] A. Bettini *et al.*, Nucl. Instrum. Meth. A **305**, 177 (1991).
- [6] P.V.C Hough 'Method and means for recognizing complex patterns', United States Patent Office 3069654(1962)