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Corryvreckan Framework Integration for μ-RWELL Tracking Detectors

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This study is dedicated to enhancing the Corryvreckan framework [1], a versatile platform designed for the reconstruction and analysis of test beam data, by integrating an interface for the Scalable Readout System (SRS)+APV25 Front End Electronics (FEE) [2,3]. The SRS+APV25 represents the initial stages of a very popular readout chain for acquiring and processing Micro Pattern Gaseous Detectors (MPGD) signals.
Initially, Corryvreckan was optimized by its developers for use with pixelated silicon-based detectors. This project, for the first time, aims to exploit all the potentialities of the Corryvreckan framework for the analysis of gaseous detectors data, specifically the μ-RWELL tracking detectors with strip readout. Detectors with different readout layouts were rigorously tested, thanks to the Test Beam carried out in June 2023 by the collaboration of RD_FCC, LHCb and CLAS12 groups. The analysis performed with Corryvreckan was benchmarked against the analysis conducted using the GRAAL framework [4], which is the standard tool currently employed, proving that Corryvreckan's modular approach not only simplifies the process of adapting it to various types of detectors but also enhances the efficiency of data analysis by providing a streamlined, user-friendly interface.

[1] D. Dannheim et al., "Corryvreckan: a modular 4D track reconstruction and analysis software for test beam data", J. Instr. 16 (2021) P03008, doi:10.1088/1748-0221/16/03/P03008, arXiv:2011.12730

[2] SRS: JINST 8 (2013) C03015

[3] APV25: Nucl.Instrum.Meth.A 466 (2001) 359-365

[4] R. Farinelli et al., GRAAL: Gem Reconstruction And Analysis Library, DOI: 10.1088/1742-6596/1525/1/012116, J.Phys.Conf.Ser. 1525 (2020) 1, 012116

Collaboration

Role of Submitter

I am the presenter

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