CALOR 2024
第２０回 素粒子・原子核物理学
カロリメータ検出器国際会議
(つくば国際会議場, 2024年5月20日〜２４日)

Contribution ID: **91**   Type: **Poster**

Excellent Timing Cherenkov Light Detection for Dual-readout High-granularity Calorimetry (poster-ID91)

Thursday 23 May 2024 14:30 (5 minutes)

This research focuses on the development of next-generation calorimeter technology that opens access to a '5D calorimeter,' which measures not only energy but also the precise hit position and timing. This technology integrates two key techniques: the 'high-granularity calorimeter' and the 'dual-readout calorimeter,' while also incorporating picosecond-level timing resolution. Within this framework, a new detector type is being developed to read out Cherenkov light generated by charged particles. Cherenkov photons are converted into photoelectrons by a photocathode and subsequently amplified by a Resistive Plate Chamber (RPC). Notably, the amplification layer utilizes an RPC with a Diamond-like Carbon (DLC) electrode, providing high-rate capability for applications in demanding environments. This poster will describe the time resolution estimation of the Cherenkov detection layer and the operational testing of the first prototype, aiming to demonstrate the principle of this innovative detector.

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Session Classification: Poster Session (with Coffee)