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ALLEGRO FCC-ee detector concept & Noble-liquid calorimetry

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ALLEGRO is a proposed FCC-ee general-purpose detector concept with a noble-liquid electromagnetic calorimeter as a central feature. Calorimetry based on liquefied noble gases is a well proven technology that has been successfully applied in numerous high-energy physics experiments. Noble liquid calorimeters provide excellent energy resolution, linearity, stability, uniformity and timing properties at a reasonable cost. These attributes make it a strong candidate for future particle physics experiments - in both hadron and lepton colliders. By using multi-layer PCB's as read-out electrodes, we can build a calorimeter with almost arbitrarily high granularity. This in turn allows for four-dimensional imaging, machine learning algorithms and particle-flow reconstruction to be fully exploited. In this talk we give an overview to the ALLEGRO concept and present the ongoing R&D work for adapting noble liquid sampling calorimetry to an electromagnetic calorimeter of a lepton collider experiment. In addition to simulation studies and expected performance, we will show results on signal extraction and noise mitigation studies made with readout electrode prototypes and compare the measurements to simulations, as well as discuss test results of absorber prototypes. In addition we will present progress of the mechanical design project, cryostat development and status of the full test-beam prototype module development of the barrel ECAL.

Collaboration

ALLEGRO

Role of Submitter

The presenter will be selected later by the Collaboration

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