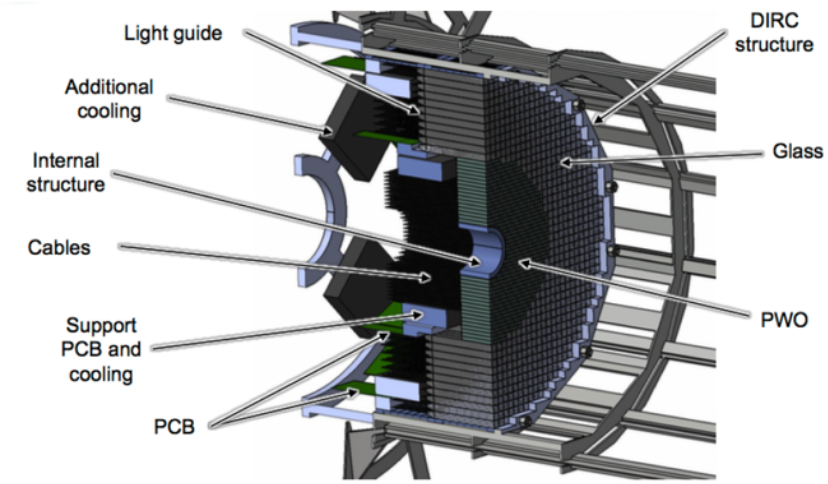

Figure 1: Design of nECal calorimeter system.

1 Electron Dir. EM Calorimeter, nECal

The nECal is a high-resolution electromagnetic calorimeter designed for precision measurements of the energy of scattered electrons and final-state photons in the region $-3.5 < \eta < -1.0$. Based on the EIC Yellow Report (YR) [1] the requirement on high energy resolution is driven by inclusive DIS where precise measurement of scattered electrons is critical to determine the event kinematics. The nECAL has been designed to address the requirements in the EIC YR. The inner part of nECal consists of 1976 20x20x200mm^3 PbWO4 (PWO) crystals ($\sim 22X_0$) [2, 3]. The expected energy resolution for PWO crystals is $2.0\%/\sqrt{E}+1.0\%$ according to the Yellow Report. Outer part of nECal consists of 1104 $40 \times 40 \times 550$ mm^3 ($\sim 20X_0$) Scintillating Glass (SciGlass) blocks [4, 5]. Expected energy resolution for SciGalss calorimeter is $2.5\%/\sqrt{E} + 1.6\%$. PWO and SciGlass blocks will be readout with arrays of SiPMs. The choice of technology and overall design concept of nECal is the same as in the EIC Yellow Report (YR). It is common for all three proto-collaborations, and has been further developed since the YR by the EEEMCAL consortium with details summarized in an Expression of Interest in 2021[6]. The EEEMCAL consortium is planning to support one or more EIC detectors as needed and is therefore part of multiple detector proposals.

The development of nECal calorimeter concept was started during generic detector for EIC [7]. During this R&D phase the team worked in close contact with producers of PWO crystals and SciGlass to establish robust QA protocols at all stages of production to ensure highest quality of blocks needed for EIC. R&D for SciGlass will continue under the auspices of the EIC Project to validate the scale up production of SciGlass blocks. Backup technology for SciGlass is

lead glass, in case SciGlass R&D is delayed. Future upgrade plan then may include substitution of lead glass with SciGlass blocks.

Design of nECal is in progress. The EEEMCAL team has begun to organize activities into mechanical design, scintillator, readout, and software/simulation among the collaborating institutions. Pre-design activities, in particular for the support structure have started in 2021. A version of mechanical integration of this detector is shown in Figure 1. This concept is based on models of existing detectors the team has constructed, and in particular, the Neutral Particle Spectrometer at JLab [8]. Final assembly of detector will be performed at BNL.

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