EPIC Barrel ECAL review
Request for information from the proponents

GD/I conveners, 12/12/2022

It is asked that the proponents address the following questions:

1. Reminder of the proposed **detector configuration** for the use in the ePIC detector.
2. **Input information**:
    a. **R&D, prototypes and their tests**: done so far, ongoing effort, future planning (with timelines); results from prototypes and their tests
    b. Pertinent **information on similar technology/design** that is used by other experiments or R&D efforts (example reference could be literature, and or conference talks).
    c. **Simulation studies**: already performed, ongoing and planned (with timelines); results from the simulations; particular care in (i) showing how realistic the parameters used in simulations are and (ii) reporting what is missing for a fully realistic simulation (backward, specific event categories, …)
    d. Does the simulation take into account the **realistic light collection uniformity, response of the selected photosensors and related FEE**?
3. **Performances**:
    Please use the official simulation framework. Please tag all software (sim., reco., and analysis) used in these studies.
    a. Key plots to be shown:
        i. Photon and electron energy resolution σ/E as a function of E (0-18GeV) at $|\eta|$=0, 0.5, 1. Consider a minimum energy of 50 MeV.
            1. For each point, please extract FWHM and percentage of gammas/electrons within a cut window of $|E/p-1| < 1x$ FWHM. Please provide the E/p lineshape in the backup material.
        ii. Photon angular resolution (ϕ, η) as a function of E (0-18 GeV) at $|\eta|$=0, 0.5, 1
        iii. Pion rejection as a function of p (0-18 GeV/c) at 95% e-efficiency at $|\eta|$=0, 0.5, 1
        iv. Pion rejection versus e-efficiency at p = 1, 5, 10 GeV/c at $|\eta|$=0, 0.5, 1
        v. Separation of gamma from π^0 decay: separation probability as a function of p at $|\eta|$=0, 0.5, 1
        vi. Measured cluster energy response to E= 8 GeV single electron vs η & ϕ in the full acceptance
    b. Comparison of the **present assessment of the detector performance compared with the YR requirements**?

    c. In coordination with the inclusive PWG, show the performance of key high-level physics observables, g_1 and F_2 (possibly F_L), on both statistical reach and systematic uncertainty.

    d. Performance perspectives **beyond the YR requirements, if any** ?

4. **Sensors and FEE**:
   a. Status of **sensor selection** (a single consolidated option, more options under consideration) and photosensor characteristics?
   b. **Status of the sensor** validation for the specific application and related potential issues?
   c. **Perspectives of sensor mass production** and timelines for the production period?
   d. Status of **FEE selection** (a single consolidated option, more options under consideration)?
   e. **Characteristics of the FEEs** considered?
   f. Status of the **FEE development** and related potential issues?
   g. Perspectives of **FEE mass production** and timelines for the production period?

5. **Mechanical Design and Integration**:
   a. **Status of the proposed detector integration** into the current baseline detector?
   b. Status of the **design of the electrical/electronic infrastructure** (channels, power supplies, heat, rate)?
   c. **Cooling** strategies?

6. **Workforce:**
   a. **List of groups** engaged in the proposed detectors and of other groups potentially interested;
   b. **Workforce needed with timelines and qualification of the required professional profiles;** please, include also physicists needed for dedicated simulation studies;
   c. **Available workforce** (specifying: granted, expected, possible) by the groups proposing the detector;

7. **Cost and schedule**:
   a. up-to-date cost estimate for the different components and expenditure categories;
   b. In-kind contributions (specifying: granted, expected, possible).
   c. Outline the path towards and schedule for the full scale production
   d. If a baseline detector can be replaced by the proposed EMCal (e.g. last layer of MPGD), please use project cost for cost saving. And please work with the corresponding working group (e.g. tracking) to ensure the performance remains the same or better.

8. **Envisioned risk and risk mitigation strategy**