

# Summary of Far-Forward Detectors

Detector	Proposed Technology	What R&D is needed?	Who is working on it?	Costing?
Zero-Degree Calorimeter (ZDC)	Combined-function EMCAL* + HCAL based on ALICE FoCal	More detailed simulations with realistic considerations.	EIC R&D Group 27 (eRD27) – Kansas, RIKEN	Not yet, but can leverage experience from ALICE FoCal to make baseline estimates.
Roman Pots	AC-LGADs	Mostly engineering considerations (cooling, structural support, impact of materials on the other detectors). **	eRD24, LGAD consortium	Preliminary costs available from eRD24 available (just for the silicon and ASICs).
Off-Momentum Detectors (OMD)	AC-LGADs	Optimal placement – possible dual implementation as horizontal RP system near B1apf, and outside of pipe near B2pf. **	eRD24, LGAD consortium	Same as for RP.
B0 Spectrometer	Fine granularity silicon for tracking (MAPS or similar); silicon preshower, compact EMCAL.	Need to better understand the radiation load in the bore, and what technology can handle it. Need to set requirements on the preshower* for photons (some input from physics WG could help here).	LANL on the silicon sensors, a few others on the simulations for requirements.	Not yet.

\*Potential overlap in technology for FF and FB EMCAL subsystems.

\*\*Some of these considerations require more progress on the vacuum design, so only reasonable estimates can be made at this stage while that process is ongoing for CD-2.

# A Few Detailed Considerations

- The Roman Pots and B0 detector have the most challenging engineering constraints.

## Roman Pots

- Cooling for sensors in a “potless” design.
  - Currently investigating an option for thermal cooling.
  - Could also consider following a similar approach to the LHCb velo.



*Fig. 1: VELO module with a half-circular silicon sensor, 16 Beetle readout chips, five cooling blocks and the capillaries for the CO<sub>2</sub> supply.*

## B0 Spectrometer

- Rail system for support, insertion, and removal of detector package.
- Some basic assumptions for cooling, cabling, services (all must come in/out on side closest to detector).

