News

- **EIC Project Detector R&D (page 2-3)**
  - Collect interests in R&D and construction query
  - Latest updates: May 16 June 6 June 20
  - FY23 report and FY24 proposal due on **July 7 (internal deadline June 20)**: Overleaf view link (for editing, please contact Zhenyu)
- **EIC Project Review on ePIC PID detectors on July 5-6 8am-2pm EDT (page 4-6)**
- **TOF DSC organization (page 7-9)**
  - Connect institutions with working groups/tasks list

- **ePIC Simulation (next campaign starts on June 1, next next one on July 1)**
  - TOF in tracking – Nicolas: fix the issue with full forward TOF geometry in tracking
  - TOF PID reconstruction – Oskar/Zhenyu: reconstruction, validation plots
  - TOF digitization – Adam/Souvik: charge sharing and detector noise
  - TOF service in simulation – TBD: implement the missing material for mechanical support structure, cooling and cabling
- **EIC Project Engineering Design**
  - Presentation on electrical engineering proposal by Tonko April 6
  - Presentation on updated mechanical engineering proposal by Andy May 30
  - Meeting on integration with project engineer team **to be scheduled**
- **EIC User Group Meeting @ Warsaw on July 23-31** https://indico.cern.ch/event/1238718/

Call for FY24 R&D Proposals

Dear current and future R&D participants,

It is time to discuss the next steps in our path, i.e., the FY24 projects. We are trying to get the R&D program fully in sync with the FY boundaries.

Proposals

1. Please submit your proposals and progress reports (where applicable) to us by July 7, 2023. We aspire to have a DAC meeting well in time to prepare for contracts at the beginning of FY24.
2. We expect progress report from all ongoing projects eRD101 to eRD113. What milestones were achieved. How did our understanding improve. What is left to do?
3. eRD102, eRD103, eRD104, eRD106, eRD107, eRD108, eRD109, eRD110, eRD111, eRD112, and eRD113 may submit continuation proposals if and only if technical risk milestones remain.

These new proposals should be relatively straightforward to write. Keep them short and concise. List whatever technical risks remain, the milestones, deliverables, and two money matrices showing cost/item and funding/institution to close those remaining risks. Also list the representatives for each institution. List all participating members and institutions on the front page. Please also give, if applicable, an outlook for the years past FY24.

Be aware that R&D should not be mixed with PED. If you are not sure, talk to us. The proposals should concentrate on detector R&D tasks that mitigate project detector technical, risk.

DAC Review Meeting

With the project detector R&D expected to dwindle down at CD-2, we will limit the meeting to a two-day review meeting in the July-August period. The FY24 proposal goals of all continuation projects should be presented as well as a short status report of all FY22/FY23 proposals. More details on this meeting will be announced soon.

Best regards,
Elke, Rolf, and Thomas

Institution	Contact	R&D Interest
Brookhaven National Laboratory	Alessandro/Zhangbu	Sensor prototyping, ASIC testing, Electronics development
Fermi National Accelerator Laboratory	Artur Apresyan	Sensor testing, ASIC prototyping
Los Alamos National Laboratory	Xuan Li	Sensor testing, simulation
Rice University	Wei Li	Sensor testing, Electronics development
Oak Ridge National Laboratory	Oskar Hartbrich	Sensor testing, ASIC testing, Electronics development, Simulation
Ohio State University	Daniel Brandenburg	Electronics testing, Simulation
Purdue University	Andreas Jung	Mechanical structure and cooling system prototyping
University of California, Santa Cruz	Matthew Gignac	Sensor testing, ASIC testing
University of Illinois at Chicago	Zhenyu Ye	Sensor testing, sensor-ASIC integration, ASIC testing, Simulation
Hiroshima University	Kenta Shigaki	Sensor prototyping and testing, Simulation
RIKEN	Yuji Goto	
Shinshu University	Kentaro Kawaide	
University of Tokyo	Taku Gunji	
South China Normal University	Shuai Yang	Simulation
Univ of Science and Technology of China	Yanwen Liu	Sensor prototyping, Electronics development, Simulation
Indian Institute of Technology, Mandi	Prabhakar Palni	Sensor testing, Simulation
National Inst. of Sci. Education Research	Ganesh Tambave	Sensor prototyping and testing
National Cheng-Kung University	Yi Yang	Mechanical structure prototyping
National Taiwan University	Rong-Shyang Lu	Sensor prototyping, ASIC testing, Electronics testing

EIC Project Review of PID Detectors on July 5-6, 2023

Incremental Design and Safety Review of the EIC Particle Identification Detectors

Charge to the Committee

The scope of this review includes all aspects of particle identification detectors (but not those that are calorimetry-based) in the central EIC detector, which includes the barrel, the forward endcap, and the backward endcap regions. This includes five detector systems. In particular, a proximity-focusing RICH in the backward region, a high-performance DIRC and AC-LGAD to augment particle identification with TOF in the barrel region, and a dual RICH and AC-LGAD in the forward region. The review may include design and fabrication choices and their cost-effectiveness, the construction schedule, considerations for safety and quality assurance, levels of redundancy, front-end electronics and interface to the data acquisition system, commissioning and calibration procedures, considerations for materials and labor, operational reliability and longevity, and any other considerations that may influence the construction, maintenance and operation of these particle identification detectors.

You are asked to address the following questions:

1. Are the technical performance requirements appropriately defined and complete for this stage of the project?
2. Are the plans for achieving detector performance and construction sufficiently developed and documented for the present phase of the project?
3. Are the current designs and plans for detector and electronics readout likely to achieve the performance requirements with a low risk of cost increases, schedule delays, and technical problems?
4. Are the fabrication and assembly plans for the various particle identification detector systems consistent with the overall project and detector schedule?
5. Are the plans for detector integration in the EIC detector appropriately developed for the present phase of the project?
6. Have ES&H and QA considerations been adequately incorporated into the designs at their present stage?

Please address these questions point-by-point.

You will be supplied with the detailed schedule and manpower assumptions, drawing packages, copies of presentations relevant to this subject material, and the project milestones extracted from the most current EIC resource loaded P6 schedule as part of the pre-brief material.

Note that several aspects of the EIC detector including its electronics, and data acquisition systems have been reviewed previously. Along with your briefing materials, you will also be supplied with the reports from earlier reviews (e.g., on the magnet design, electronics and data acquisition, calorimetry).

Review Committee:

Peter Krizan (U Ljubljana), Chair peter.krizan@ijs.si

Floris Keizer (CERN) floris.keizer@cern.ch

Ana Amelia Machado (UniCamp) aameliabm@gmail.com

Koji Nakamura (KEK) koji.nakamura@cern.ch

Justin Stevens (W&M) jrsteven@jlab.org

Dates: July 5 + 6. Each day from 8 am to 2 pm EDT, or 2 pm to 8 pm CET.

Conveners: Elke Aschenauer and Rolf Ent

EIC Project Review of PID Detectors on July 5-6, 2023

Agenda:

(Note that each talk time assumes more than 1/3 of time for questions and discussion)

July 5

8:00 (30 min) Executive Session (Closed Session)

8:30 (30 min) Welcome and Introduction (introduce the general project status) – Elke/Rolf

9:00 (30 min) Particle Identification Systems Overview and Requirements – Beni Zihlmann (JLab)

9:30 (20+10 min) Detector Integration Status and CAD Design – Alex Eslinger

10:00 (15+5 min) Flow of Requirements, Interfaces and system engineering– TBD Walt Akers (JLab)

10:20 (20 min) Break

Each detector talk addressees: requirements (see eic.jlab.org), interfaces, tech. Details, status of R&D w.r.t. milestones and current project R&D plans, open points, plans for construction, 1 slide on ES&H/QA plans and hazards, current simulation performance vs. requirements, organizational structure of work packages for sub-systems and schedule/timeline w.r.t. P6. Include reference to charge that is addressed in each slide and in the outline.

10:40 (30+20 min) Backward Region: proximity-focusing RICH – TBD

11:30 (30+20 min) Forward Region: dual RICH – TBD

12:20 (30+20 min) Barrel Region: high-performance DIRC – TBD

include MA-PPD readout option

13:10 (50 min) Executive Session – Discussion

July 6

8:00 (20+10 min) Barrel and Forward TOF: AC-LGAD – TBD

8:40 (15+5 min) AC-LGAD readout systems – TBD

requirements of ASCI, milestones and current project R&D plans and expected future work

9:00 (15+5 min) Readout and Sensors Status SiPMs – TBD

requirements for sensor, operation and readout, technical solutions, milestones and current project R&D plans and expected future work

9:20 (15+5min) Readout and Sensors Status LAPPD/HRPPD – TBD

requirements for sensor, operation and readout, technical solutions, milestones and current project R&D plans and expected future work

9:40 (15+5 min) DAQ streaming readout Overview – TBD

10:00 (20 min) Break

10:20 (60 min) Discussion as needed, Follow-ups, or start of Executive Session

11:20 (140 min) Executive Session

13:40 (20 min) Closeout

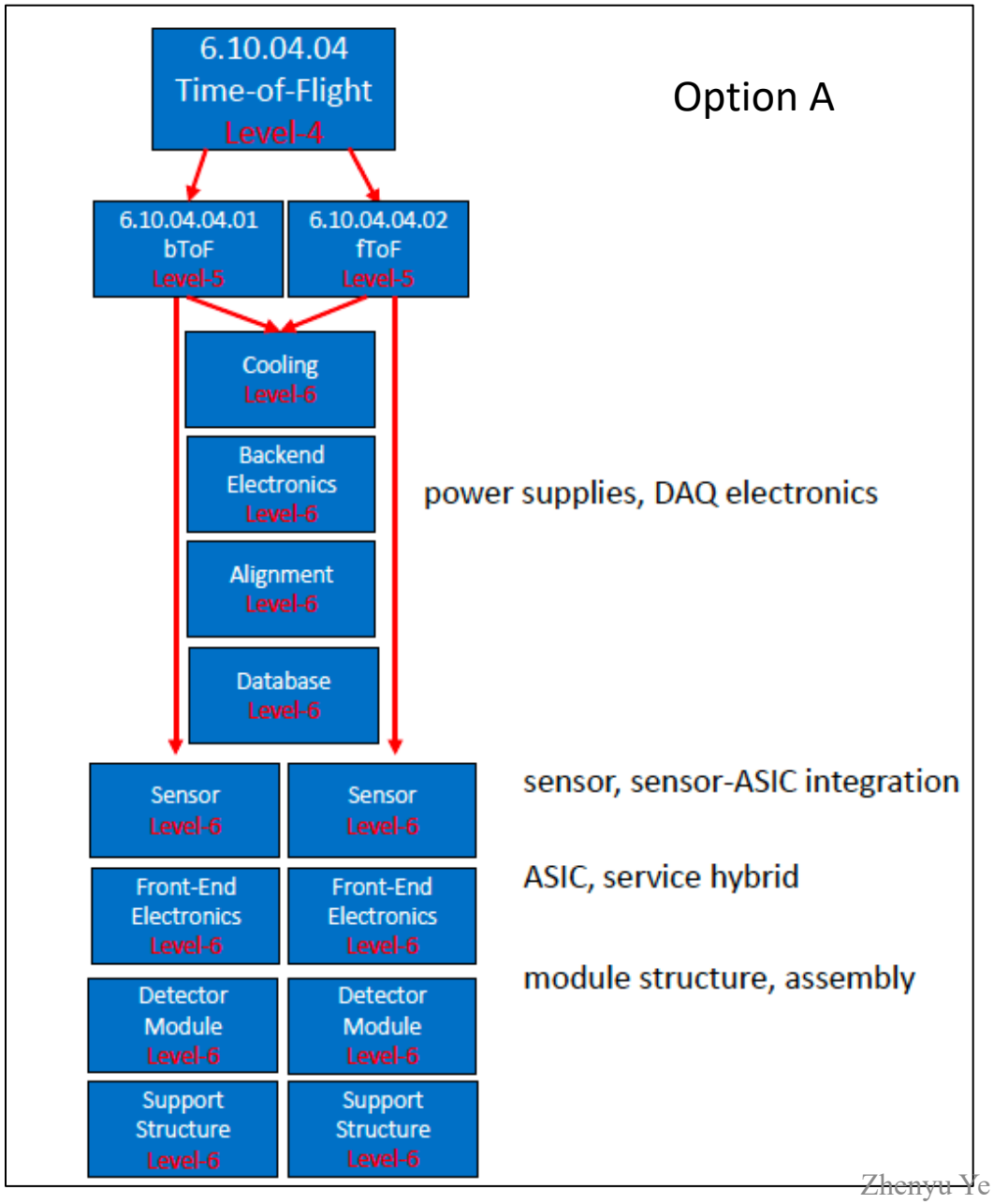
EIC Project Review of PID Detectors on July 5-6, 2023

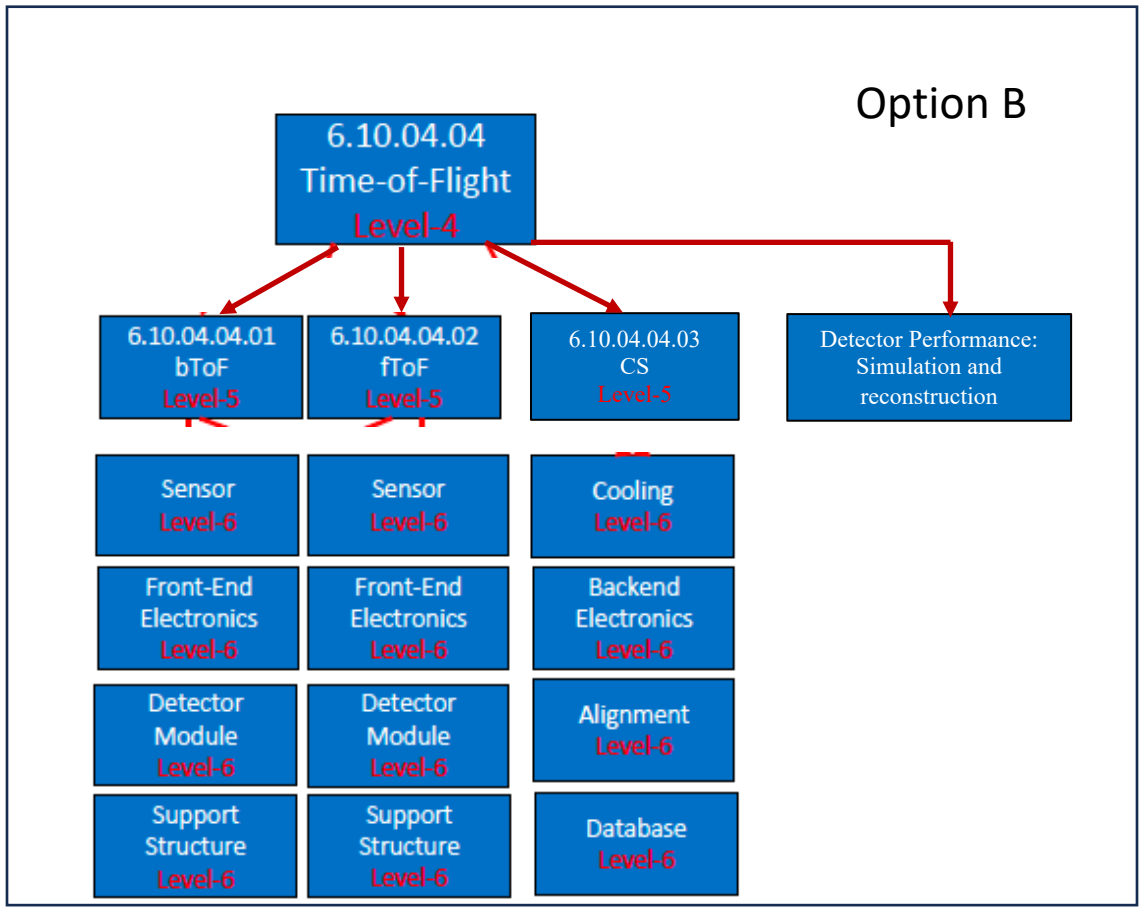
- It is a formal DOE review. Attendees are limited to speakers and a few experts.
- Two talks on TOF on July 6:
  - **Barrel and Forward TOF**
    - My proposal: ZY on Intro & BTOF, Wei on FTOF, Satoshi on organization etc.
  - **AC-LGAD Readout System**
    - My proposal: Dominique on ASIC, Tonko cover the rest
  - Other experts:
    - General: Artur, Carlos, Ken, Zhangbu
    - Sensor: Gabriele, Simone (or someone else from SCIPP)
    - ASIC and electronics: Christopher
    - Mechanics: Andy
    - Simulation/Performance: Oskar
- Preparation
  - page-turner on June 16 8am-1pm
    - 25 slides with at least title, reference to review charges to
    - pre-brief material like preliminary TDR(by PID detector), P6 excerpt(by CAM)
  - All talks posted June 23

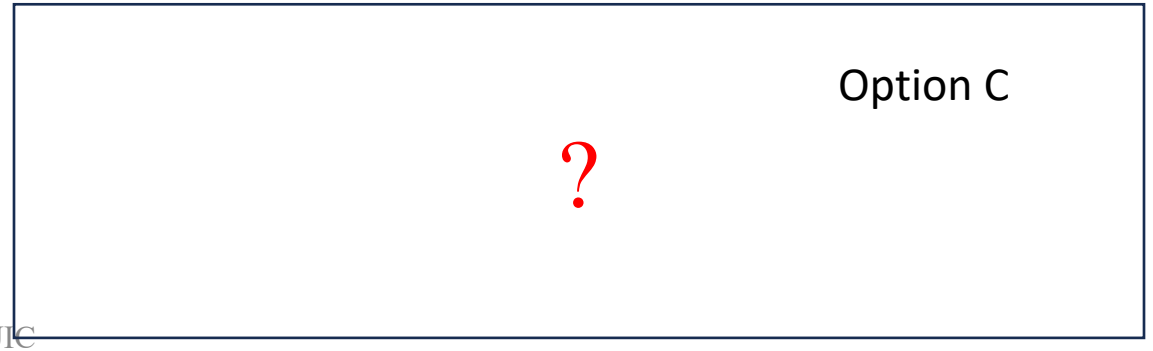
Working Packages/Tasks

- **Barrel TOF (BTOF)**
  - Sensor: sensor, sensor-ASIC integration
  - Frontend electronics: ASIC, service hybrid
  - Detector Module: module structure, assembly
- **Forward TOF (FTOF)**
  - Sensor: sensor, sensor-ASIC integration
  - Frontend electronics: ASIC, service hybrid
  - Detector Module: module structure, assembly
- **Common System (CS)**
  - Backend Electronics: power supplies, DAQ electronics
  - Mechanics: support structure, cooling system
  - Alignment system
- **Detector Performance (DP)**
  - Simulation and reconstruction
  - Database

Possible Working Package Structures for TOF

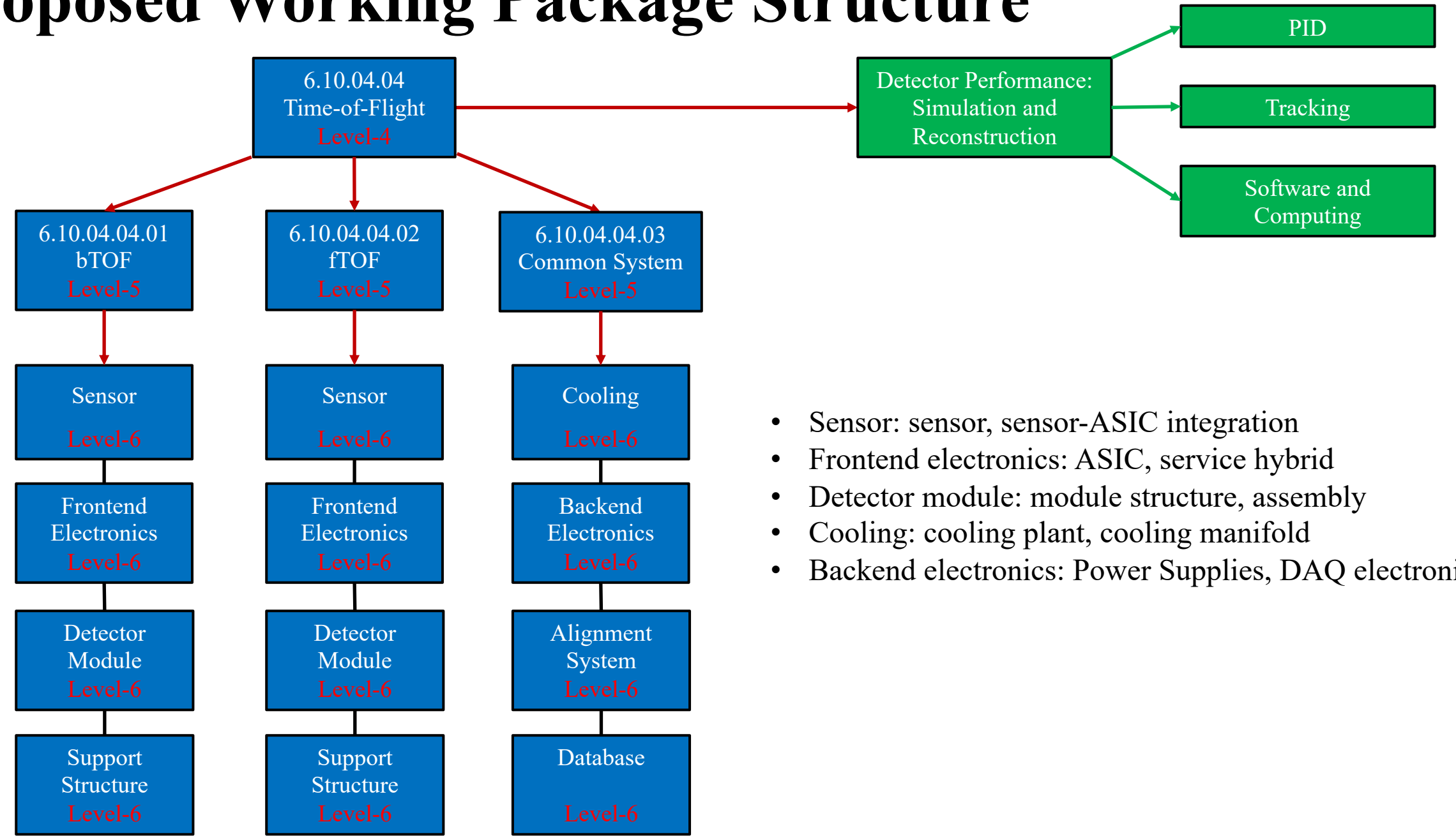






Institution	Working Group and Tasks
Brookhaven National Laboratory	**CS**: backend electronics; **DP**: simulation and reconstruction
Fermi National Accelerator Laboratory	
Los Alamos National Laboratory	**FTOF**: sensor, module assembly; **CS**: support structure, cooling system; **DP**: simulation and reco.
Rice University	**BTOF/FTOF**: Front-end electronics; **CS**: backend electronics; **DP**: simulation and reconstruction
Oak Ridge National Laboratory	**BTOF/FTOF: s**ensor, sensor-ASIC integration, frontend electronics, module assembly
Ohio State University	**BTOF/FTOF:** module assembly; **CS**: backend electronics, alignment system; **DP**: simu. and reco.
Purdue University	**BTOF/FTOF**: module structure; CS: support structure, cooling system
University of California, Santa Cruz	**BTOF**: sensor, sensor-ASIC integration, module assembly
University of Illinois at Chicago	**BTOF/FTOF**: sensor, sensor-ASIC integration, module assembly; **DP**: simulation and reconstruction
Hiroshima University	**BTOF**: sensor, module assembly; DP: simulation
RIKEN	
Shinshu University	
University of Tokyo	
South China Normal University	
Univ of Science and Technology of China	
Indian Institute of Technology, Mandi	**DP**: simulation and reconstruction
National Inst. of Sci. Education Research	
National Cheng-Kung University	**BTOF/FTOF**: module structure; **CS**: support structure, cooling system
National Taiwan University	**BTOF**: sensor-ASIC integration, frontend electronics, module assembly

Proposed Working Package Structure



- Sensor: sensor, sensor-ASIC integration
- Frontend electronics: ASIC, service hybrid
- Detector module: module structure, assembly
- Cooling: cooling plant, cooling manifold
- Backend electronics: Power Supplies, DAQ electronics