



Detectors For Science WG

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WG Charge

- Come up with a list of possible goals related to your topic that the lab could consider
 - Aimed at next P5 process in 2020, so the timeframe for the goals is 2021 and beyond
 - Also: What input will inform the whether we want to pursue this goal before P5?
- What changes would need to be made to lab capabilities (ie accelerator complex, computing facilities, technical expertise)?
- Present a summary of your group discussions at the retreat on May 4th (15'+10')

Detector R&D Organization at Fermilab

1. Most detector R&D and construction is being performed within project scopes
2. Some initial project directed R&D and generic R&D funded by KA25
3. LDRD and ECA important to bring some R&D to a more mature stage

→ Do we need more of 2. or 3.?

Detector Test Facilities and Infrastructure

- Fermilab operates eight world-class facilities which play a key role in supporting operations, detector R&D activities, and detector construction for Projects.
- These facilities provide modern equipment and the expertise of scientists, engineers and technicians in the design, construction, commissioning and maintenance of detectors.
- These facilities promote and benefit from partnership with universities and other national laboratories.
- Previous construction projects at Fermilab either created or contributed to these facilities enabling subsequent Projects and research efforts to capitalize on these investments.
- Current projects and laboratory operations co-fund these facilities.

Current Detector Facilities and Infrastructure

- ASIC Development Facility
- Common Detector Test Facility Systems
 - Silicon Detector Facility
 - Precision Metrology
 - Scintillation Detector Development Facility
 - Thin Film Facility
 - Noble Liquid Detector Development
 - Rapid Prototyping and Special Materials
- Fermilab Test Beam Facility (FTBF)

The Future:

Integrated Engineering Research Center (IERC)

- IERC will provide state-of-the-art detector R&D and engineering facilities by providing:
 - Laboratory space for facilities, detector R&D and construction
 - Office space for engineers and technicians to give members of the science community better access to engineering and technical teams
 - Proximity to Wilson Hall reestablishes vital connections between communities (science, engineering, and international user community)
 - Brings together development teams who perform similar functions at the lab and are currently scattered across the site
- DOE-SC is investing in HEP by providing funding for IERC at Fermilab
 - Total Project Cost is \$86M
 - Science Laboratories Infrastructure (SLI) funded project (i.e. not OHEP funded)
- IERC Project CD-1 DOE Review February 7-9, 2017
 - Science requirements for the building flow down from P5 science drivers
 - Preliminary design will begin after CD-1 approval and receipt of FY17 funding
 - DOE Level 1 CD-3 milestone (construction start) is 3QFY19.

IERC Conceptual Design

- 97,500 square feet of combined laboratory, technical, and office building
- Approximately 200 people will have offices in the building
- 3 stories – laboratory space on the ground floor, and two floors of technical and office space
- Physical connection to Wilson Hall at the ground floor and atrium level

West View



East View



North View



Future Facility Needs

- Will the IERC be sufficient?
- We need to make sure we play an active role in the design of the IERC
- Need to identify future needs for
 - Clean rooms (Class, Size)
 - Cryogenic facilities (CO₂ plant, ADRs, DilFridges, ?)
 - Cryogenic Teststands (LAr, LXe, ?)
 - Wirebonders, bump bonders, etc.
 - Precision Meterology
 - Special Materials, Thin Films, Scintillator Extrusion, etc.
 - Testbeam needs
 - Irradiation facility?!
 - Underground cleanroom and teststands
 - PREP: needs modernization

Topics for discussion

- Facility needs
- Funding models
- Collaboration with TD and AD on instrumentation and facilities
- DAQ and computing needs for detector R&D and construction
- How to strengthen cross fertilization of energy, precision, intensity, cosmic frontiers at the lab
- Collaboration with other labs and universities is being discussed in context of KA25 funding