RDC #3
Solid State Tracking

Introduction
Welcome

- We are very excited to see everyone
- There are three RDC3 sessions:
  - Tuesday 1600-1800: Sensors/modules/interconnections
  - Wednesday 1100-1230: MAPs (joint with RDC4: ASICs)
  - Thursday 1600-1800: LGADs (joint with RDC11: Timing)
- There are also many sessions related to Solid State Detectors:
  - Tuesday 1330-1600: RDC4: Circuits and Architectures for 4D tracking and calorimeters
  - Wednesday 1330-1600: RDC4 Big Data Management
  - Thursday: 1100-1230: RD10: Mechanics and Cooling
  - Thursday: 1330-1600: RDC4: Methodologies, Tools, IC Block, SoCs, and Workforce Development
RDC 3: Solid State Tracking

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- **Dedicated RDC Email List**
  - cpad_rdc3@fnal.gov
  - To subscribe:
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Meetings

● We had an RDC3 Introductory Meeting on Oct. 4th:
  https://indico.fnal.gov/event/61509/

● At it, there was a series of 2-3 page flash-talks where groups got to introduce themselves, what they are doing presently, and their future interests.
  ○ If you didn’t present, please send us a few slides and we will add it to the agenda to collect everyone’s interests in one place
    ■ We are still looking for a good method to gather all our material.

● We plan to have regular ~quarterly meetings of RDC3 in order to keep in touch, communicate new information, discuss how we are interacting with DRD3,....
  ○ We may have ad-hoc meetings when necessary for grant planning,....
Goals for this week:

● Improve understanding of the size and interests of the community in order to better organize and start gathering around a few ideas for funding proposals, and common projects
  ○ RDC3 should be community driven; we want to be facilitators working towards common projects and goals

● Learn about all the great new ideas and developments in the US
  ○ There is a notable critical mass around MAPs and LGAD-based systems
    ■ At the end of these sessions, we have reserved a few minutes to start collecting thoughts on common goals, areas needing development, etc.
Longer Term R&D Priorities

- Directions encompassed in BRN and Snowmass Reports
- Areas of R&D Priorities
  - Topic Area #1: Adapting non-silicon and novel-configuration sensors
    - Improved costs, area, radiation tolerance, performance
  - Topic Area #2: Scalable, low-mass detector systems
    - MAPs based tracking
  - Topic Area #3: Trackers for Lepton Colliders
    - Similar requirements for timing and spatial resolution
  - Topic Area #4: Trackers for Hadronic Colliders
    - Extreme radiation with fine timing and spatial resolution
  - Topic Area #5: Advanced modeling
Our vision of the scope of RDC3

- Future systems will be very challenging and require co-design at the early stages to reach the targets our physics goals demand
  - Silo’d designs which worked for the LHC and HL-LHC upgrades cannot work in our opinion
- In the long term, we would like to target larger work packages which will study the topic areas on the previous slide
  - Requires working closely with other RDCs and DRDs at the beginning
    - DRC4 (Readout and ASICs), DRC10 (Detector Mechanics), DRC11 (Fast Timing), ECFA DRD3 (Solid State), ECFA DRD7 (Electronics), ECFA DRD8 (Integration)
      - How we work with the ECFA DRDs is not clear but such collaboration is welcomed on both sides
  - In addition to the sensor elements themselves, we need to make sure we can read them out, support and service the full system.
Funding in the near term

- For the foreseeable future (next 2 years), there is no new earmarked funds within CPAD from the DOE for R&D
- The presentation of the P5 report at the Dec. 7-8th HEPAP may give some guidance.
  - How to fund our work and the split between the frontiers (R&D, Energy, Intensity,…) is not clear
- In the next year, only available path is in the FOA: DE-FOA-0003177, section 5F, page 63 for multi-institutional projects
- At the first RDC3 meeting, we were encouraged to promote:
  - Blue Skies proposals
  - Teams working together more: as in ~2-3 options of common submission to foundries for CMOS MAPs, more common submissions in LGADs and electronics for it
  - Holistic (non-silo’d) design and development
- Because of the above, we propose we pull together a few multi-institutional proposals for submission before September 2024 for Blue Skies or non-experiment specific general R&D for timing and MAPs