PIXELATED READOUT INTEREST AT ARGONNE

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ANL Approach

- ANL would like to contribute in a meaningful way to development of DUNE pixelated readout

  -Can contribute to critical items
  -Capabilities and expertise in multiple areas

- At high level we would like to support the ArgonCube development and testing for ND, with the goals to develop novel pixelated readout for DUNE Far Detector

  -Support the development of ND
  -Looking for a leadership roles in DUNE science, FD R&D, design, testing, fabrication, installation, operation

- ANL phlosophy is to couple expertise in neutrino science, DAQ systems, electronics and mechanical design with detector R&D and computing resources to support these goals

For collaboration on ArgonCube/ND, we have expertise and capabilities in the following technical areas:

- System engineering (our primary choice to contribute to technical aspects of pixelated R&D)
  - Define interfaces
  - Define specifications & protocols
  - Oversee system tests, vertical slice tests
  - Production readiness reviews
  - Grounding plans
- ASIC testing
  - bench testing
  - identify changes for production
- Front end board/mixed signal design
- DAQ/timing/control
- Power system design
- Mechanical Design of Anode and other components
  - Fabricate anode frames
  - Tile support
  - Cable support

On DUNE FD, we are interested in the following areas

- Study physics reach of pixelated APA with respect to CP-violation, SN, proton-decay physics
  - -Demonstrate pixelated readout solution with respect to physics goals
- Study alternate readout technologies compared with LArPIX
  - -"Combine" Q-Pix and LArPIX?
  - -Compare/contrast cost vs. performance.
- System Engineering of pixelated readout
- Mechanical design of anode structure
  - -mechanical and electrical tests, fabrication
- Demonstrate LArPIX or alternate readout architectures in test setups
  - -ProtoDUNE-SP phase 2 is an option
- Characterize reliability/robustness of pixelated readout
  - -electrical and mechanical
- HV distribution system design
- Photo-detector design
  - -Dielectric light readout in E-field?
  - -"Same" readout for pixels?
- FELIX-based DAQ system development for pixelated readout

On DUNE FD, we are interested in the following areas

- List of ANL capabilities could be further expanded by addition of HPC, considerations of new materials for detectors, hi-bay areas, particle beams

  -Above listed resources to be shared with collaborators

- We would like to receive a feedback from collaborators on how to get involved