Discussion Session

Topical Workshop on Novel Radiation Detectors

Stony Brook, 6th February 2017

Overview

- Many diverse topics have been presented
- Different applications
  - HEP
  - Photonics
  - Life science
  - Medicine
- Many commonalities among projects
- Need to split up core elements of different projects and identify common specific areas where sharing of resources is beneficial
- Sharing of resources and expertise can be key for success
- A step further: can we build common projects from these common specific interests?

General Areas of Common Interest

1. (Fast) Sensors
2. (Fast) Electronics and System Design
3. Equipment and Facilities
4. Common Projects and Applications
5. Expertise and Funding Opportunities

1. Sensors

a. Fast detectors: LGAD
b. Planar detectors
c. 3D detectors
d. HV/HR-CMOS
e. light sensitive sensors with high QE

2. Electronics

a. System Design
   - Electronics, e.g.TimePix, TDCpix chips
     - How to get access to TimePix: join TimePix5 coll.?
     - Radiation hardness of TimePix
   - Hybrids
   - Modules

b. Simulation:
   - TCAD
   - Geant-4
   - WeightField2

3. Equipment and Facilities

a. System Manufacturing for research purposes:
- Electronics
- Hybrids
- Module
- Bonding
- Metrology

b. Test benches for sensor characterization:
- TCT
- Fast cameras setups
- Probe stations
- Radiation sources

c. Facilities
- Clean rooms for fabrication
- Microfabrication
- Radiation facilities, e.g. ^{60}Co

❖ Facility access costs?

4. Common projects and Applications

a. Technology-driven projects:

- LGADs R&D for different applications
  - Timing & Tracking Detectors
  - Photon science, Photonics
  - Life Science, Medical
- 3D detectors for high radiation environments
- Photon detection technologies (SiPM, APD)
- MAPs detector development for HEP

b. Application-driven projects

- Timing and Tracking at particle colliders
- Medicine and Fundamental Physics: Time of Flight (ToF)
- Coincidence imaging mass spectrometry, molecular dynamics at laser facilities and x-ray light sources
- Photon correlation spectroscopy (XPCS)
- Fluorescent imaging microscopy (FLIM)
- Single photon imaging for quantum informatics
- More?

5. Expertise and Funding Opportunities

- Link between detector developer and end-users
- Sharing of expertise
- Funding opportunities
  - E.g. SBU-BNL Seed Grant Program, LDRD, co-funding
- Future meetings like this?
- Use this mailing as communication hub