Plans for fabrication of large prototype LGADs with HPK

Outcome of meeting at HPK Dec 19, 2017

Attending: ATLAS HGTD (Sadrozinski, Lange) and CMS (Cartiglia, Arcidiacono, Apresyan)

Material on https://drive.google.com/open?id=14XIxM-G71ryWSbV0CBs4DWY_xvUh-7yJ

1. **HPK presentation (Kamada-san)**
2. .**HPK Requests for testing (see Yamamura-san's presentation)**
3. **HL-LHC Experiments requests**

1. 1. **HPK presentation (Kamada-san):**

2.5 Flip Chip Bonding – under-fill resin, bump bonding very interesting

2. **HPK Requests for testing (see Yamamura-san's presentation)**

   a. **APD array "64 channel Si APD array"**

(this is the correct name we want to use for the part also shown as "S14512"):

FNAL showed interest organize the testing including providing test boards

   b. **Series of thin LGAD**

(page 5 of Yamamura-san's presentation) with varying dose of multiplication layer

"Type" B2, F, G, H (e.g. B2 is the previous "Sample B" but with different area,

"Type" F and G have shallow doping similar to previous 50D and high resistivity bulk):

UCSC will organize the testing.

In order to do proton and neutron testing and I-V, C-V, and timing tests, need > 30 parts each.

3. HL-LHC Experiments requests are captured in two parallel paths

a**. Technology Development by HPK ~ 3 month**

- Reduced inter-pad distance
- Reduced edge space
- Investigate doping profile

Production splits: 50 & 35 µm thickness, doping densities (3 splits), inter-pad distances (3 geometries).
Delivery has been estimated to be March

b. **Proto-type run shared between ATLAS and CMS** (~ 15 wafer order through HPK US)

- Possible option: carbon infused gain layer (if improvement can be shown).
- Question: how many "splits" in doping profile, thickness,
- ATLAS and CMS will each populate ½ of the wafer with their own specific geometries.
- Delivery has been estimated to be September, HL-LHC would like to advance this if possible.

Confirmation of the schedule has been requested from the HPK US rep
Ardavan Ghassemi , who will be visiting UCSC January 30, and we are organizing a vidyo conference at 11 am PST