Notes from the Meeting Dec 19, 2017 between HPK experts and HL-LHC physicists.

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

The request are captured in two parallel path

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).

Testing by ATLAS and CMS will help determining the best solution: ~ 3 months

Delivery has been estimated to be March

b. Proto-type run mainly of large-scale sensors (~ 15 wafer order through HPK US)

- ATLAS and CMS will each be represented by a single contact to coordinate the submission.
- Possible additional option: carbon infused gain layer (if improvement can be shown).
- ATLAS and CMS will each populate ½ of the wafer with their own specific geometries.
- ATLAS will supply geometry of UBM.

Delivery has been estimated to be September, HL-LHC would like to advance this if possible.