



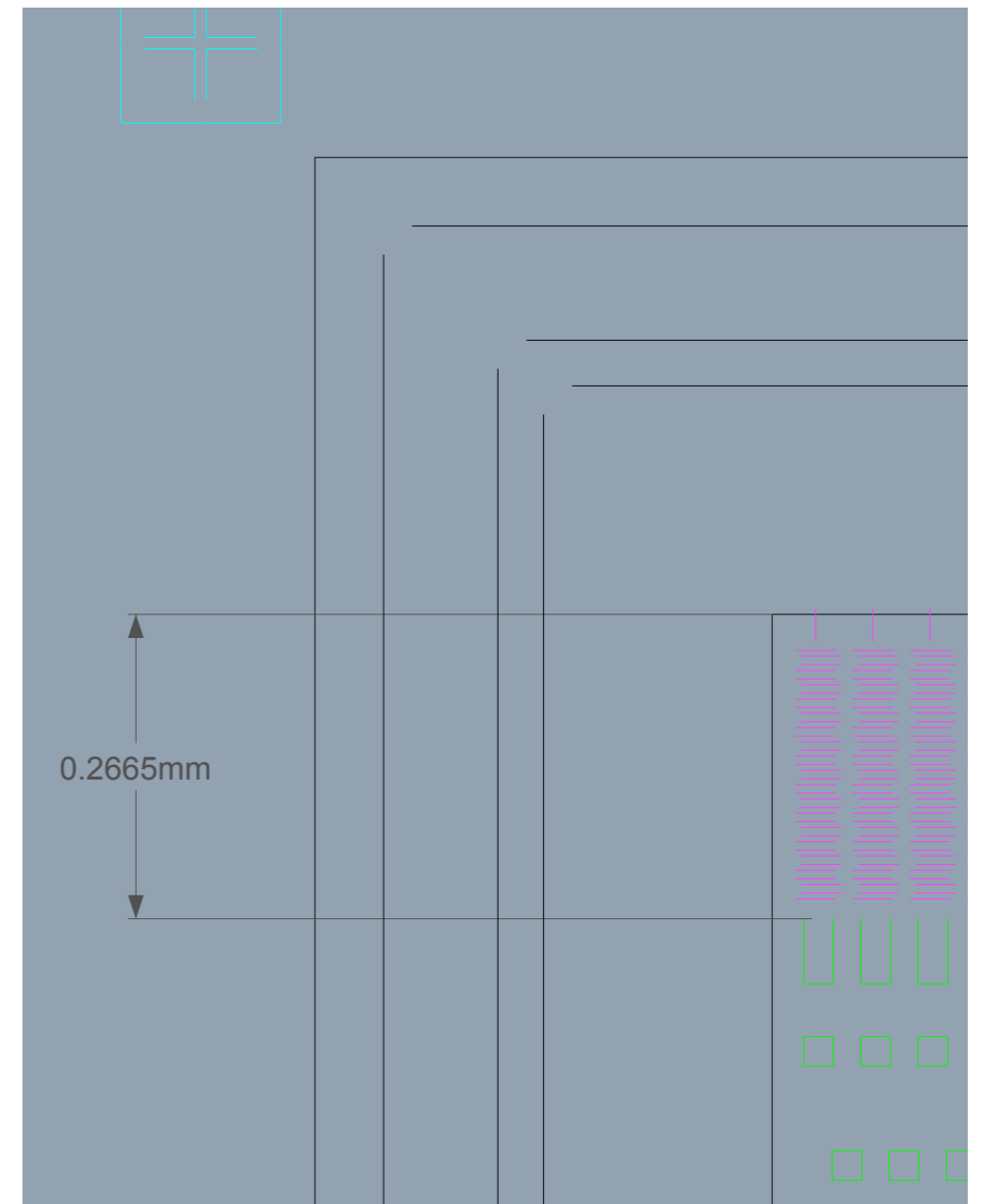
# Issues for HPK Prototype Design

Tim Nelson - SLAC - 10/05/07



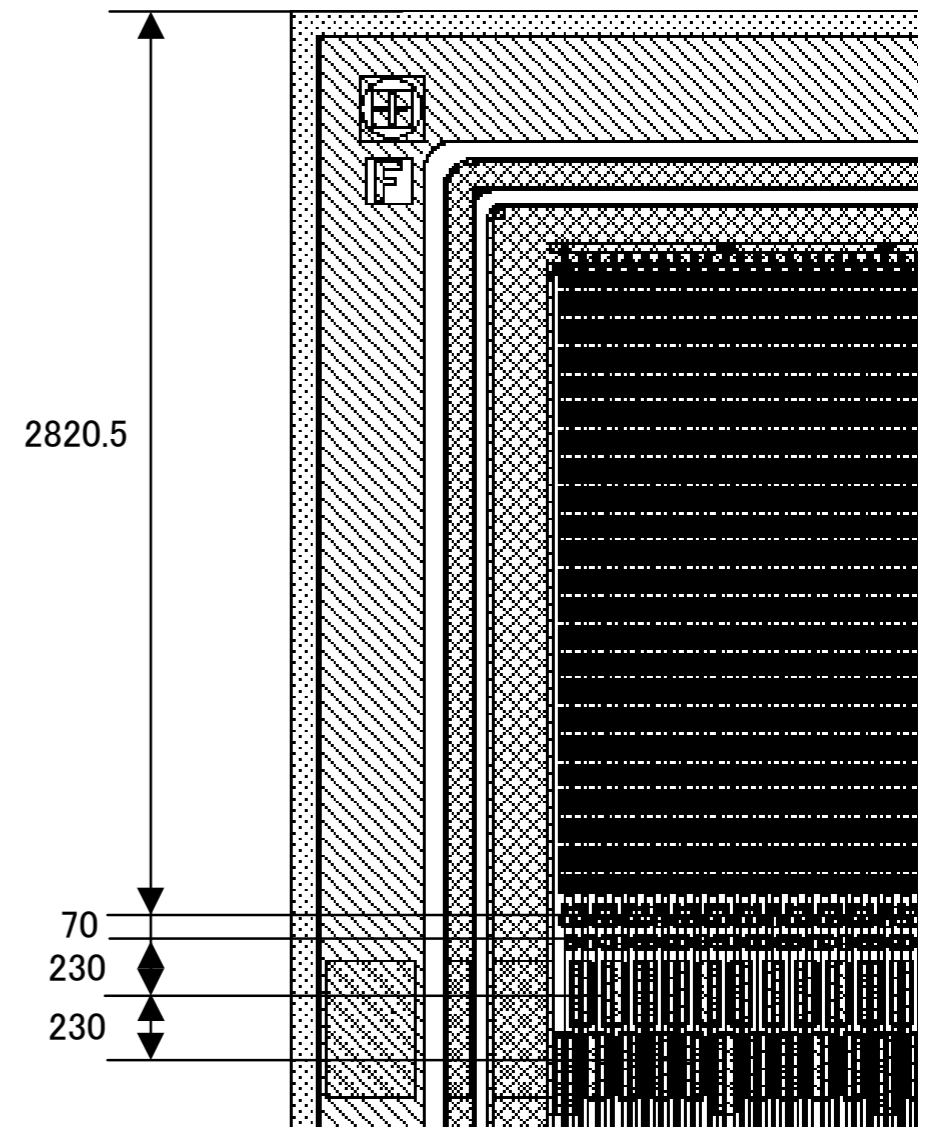
# Polysilicon Resistor Design

- Our layout was based upon the initially proposed specification, both of which descended from CDF Layer 00 sensors:
  - $4.5 \pm 0.5 \text{ M}\Omega / 0.2665 \text{ mm}$
  - $\sim 16.9 \text{ M}\Omega/\text{mm}$
- During our silicon design review, Bruce pointed out performance implications for long, daisy-chained ladders
- The resistance spec was changed to 20-40  $\text{M}\Omega$  without regard to required changes to physical layout



# HPK Proposal

- ❏ 20-40 MΩ / 2.055 mm
- ❏ ~15 MΩ/mm
- ❏ Outer-row wirebonds for sensor-to-sensor connections will be 6.8mm: too long.
- ❏ This will be the case for any design with this pitch. Larger pitch alleviates the problem at the cost of single-hit resolution: maybe necessary for very long ladders.
- ❏ An adapter could be used for sensor-to-sensor bonds: adds significant complexity and the bonds will still be > 4mm.



PolySi patten length : 2055  
 PolySi resistance spec : 20-40MΩ



# Possible responses

- ❏ Allow the change. I don't believe this is an acceptable configuration for long ladders, so I am against this approach.
- ❏ Cut the resistance in half. This would shrink the longest wirebonds for direct sensor-to-sensor connection to ~4.8mm. This may still be too long although perhaps possible based upon best processing we have seen.
- ❏ Cut the resistance to 10 ( $\pm 2?$ ) M $\Omega$  to achieve sensor-to-sensor bonds of ~4mm.

We must understand the implications for performance of various configurations and decide on a response.