Gimp Testing Update

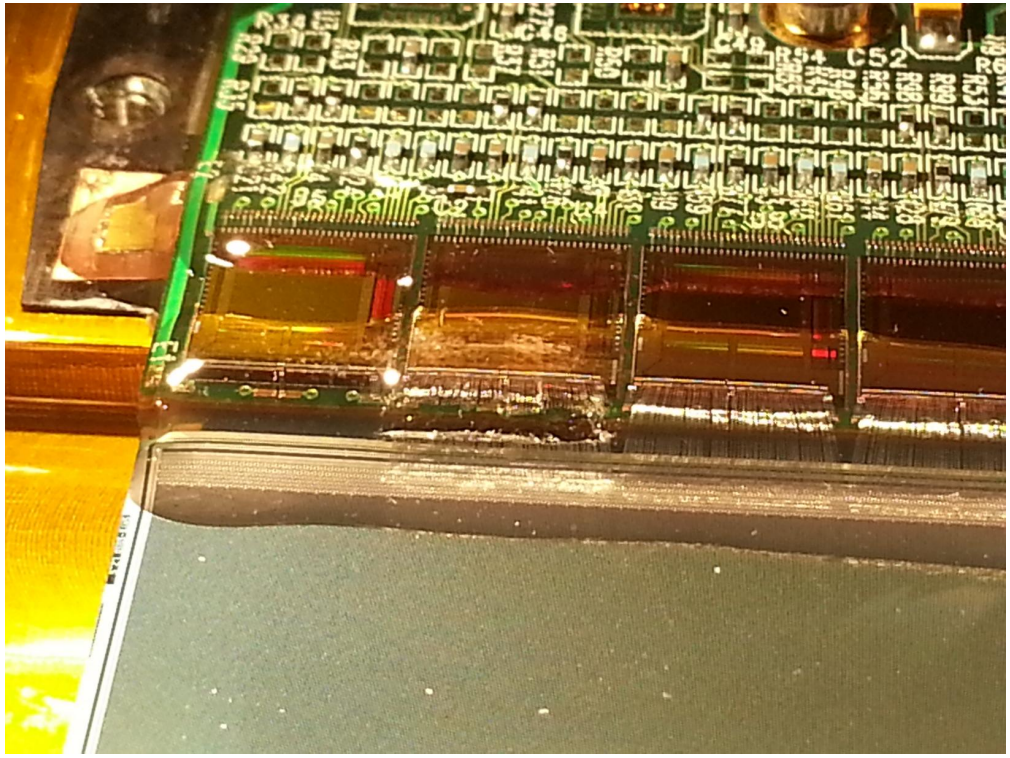
Vitaliy Fadeyev and Omar Moreno

Santa Cruz Institute for Particle Physics
University of California, Santa Cruz
omoreno1@ucsc.edu

October 28, 2013
Heavy Photon Search SVT Meeting

Testing Overview

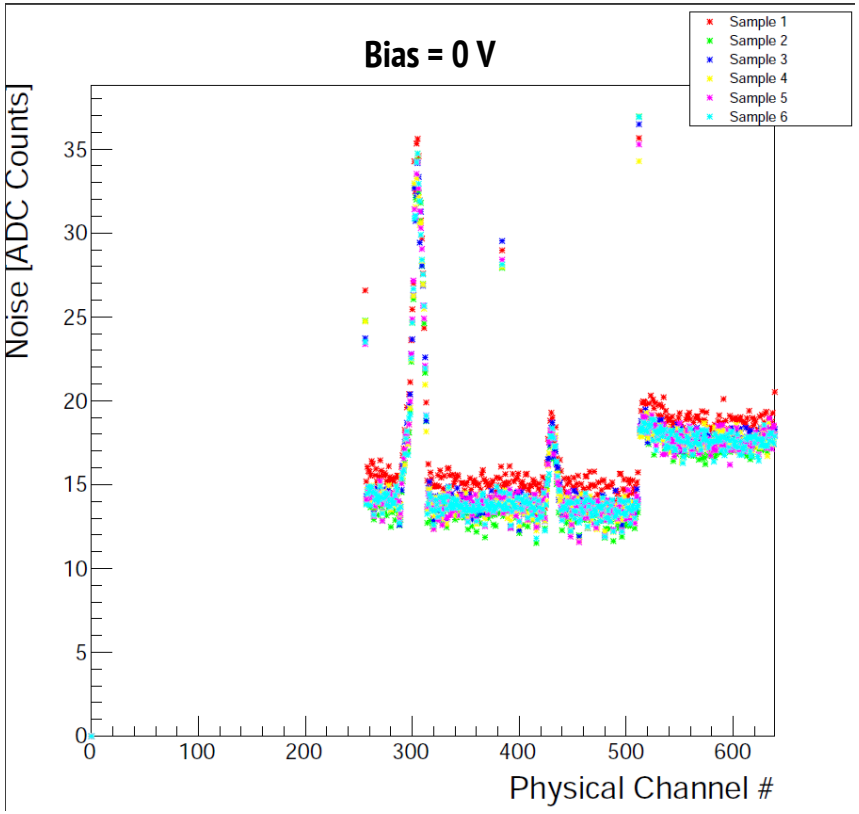
- Removed wirebonds from the APV25 nearest the unbonded APV25

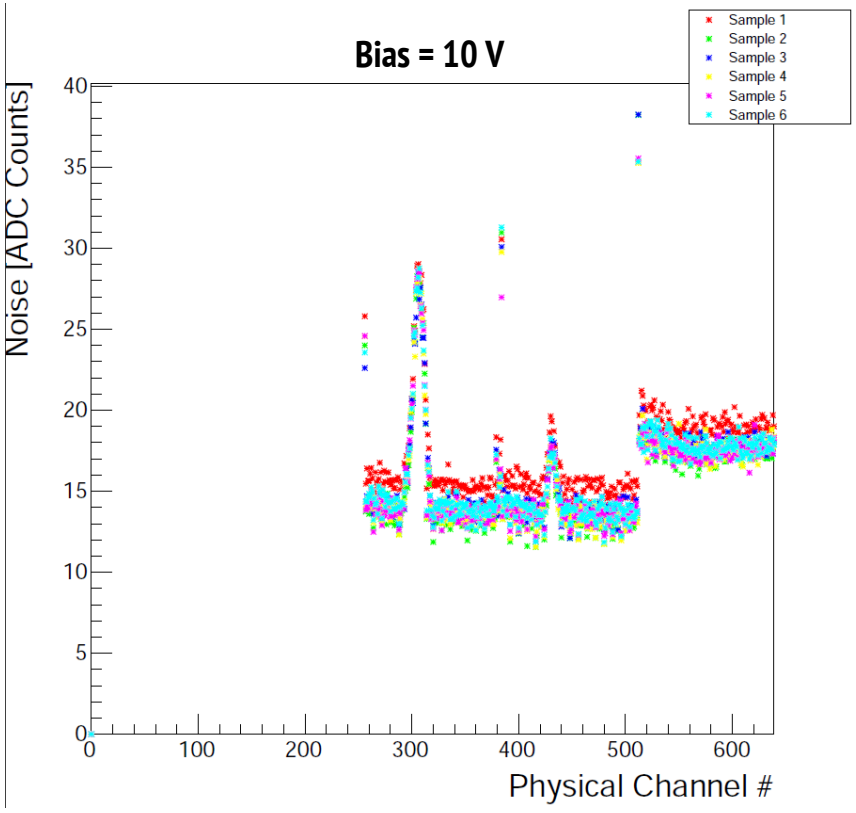


- Took baseline runs with the sensor bias ranging from 0 - 200 V
- Took single calibration run at 180 V
- Note: Only the unbonded APV25 and the two misbehaving APVs are present in the plots
- All data can be found here: http://www.slac.stanford.edu/~omoreno/hm_plots/gimp/

Run with sensor bias at 0 V and 10 V

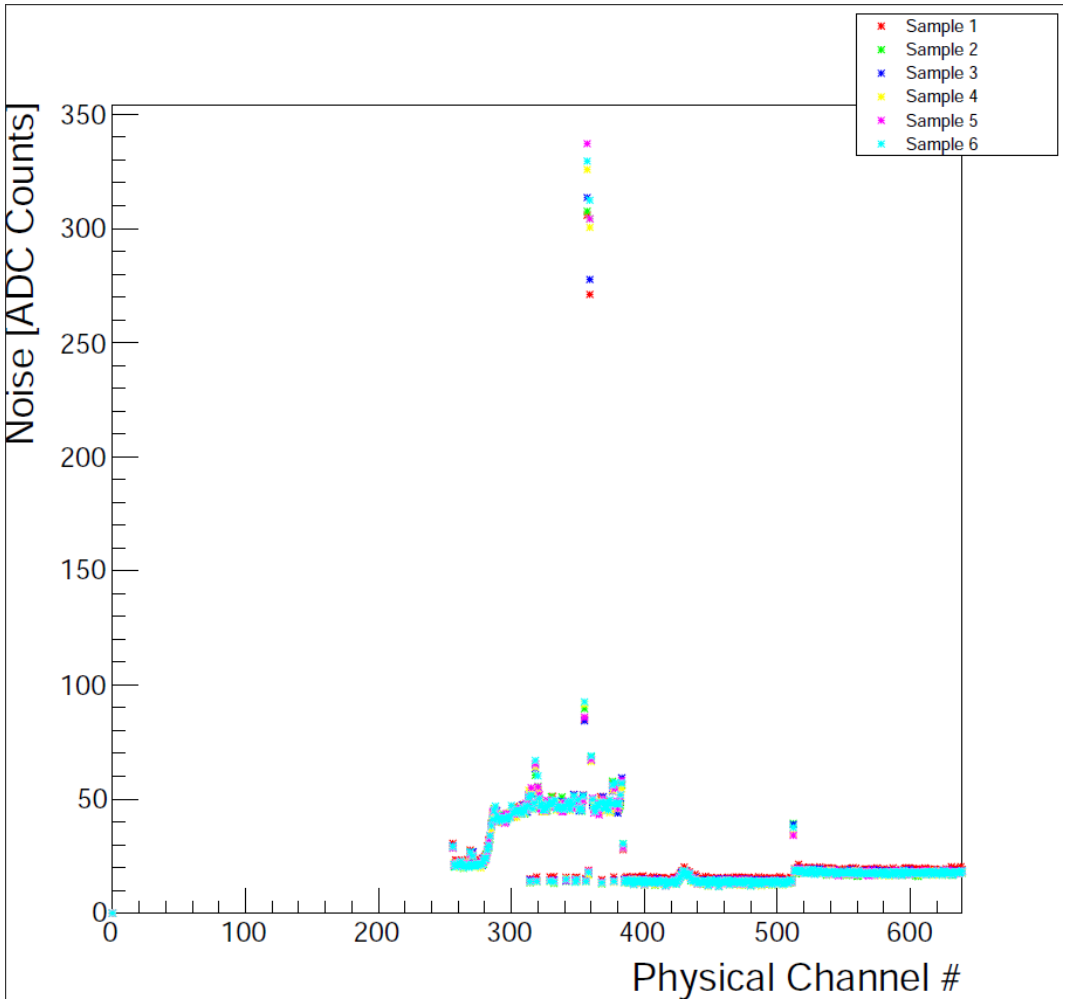
- Noise for unbonded APV is as expected at ~20 ADC counts
- Noise for misbehaving APVs is ~15 ADC counts
  - Expected the noise of the APV with the pulled wirebonds to be similar to the unbonded APV
  - Expected large noise for bonded chip
- "Noise spikes" are present in the same region on both misbehaving chips





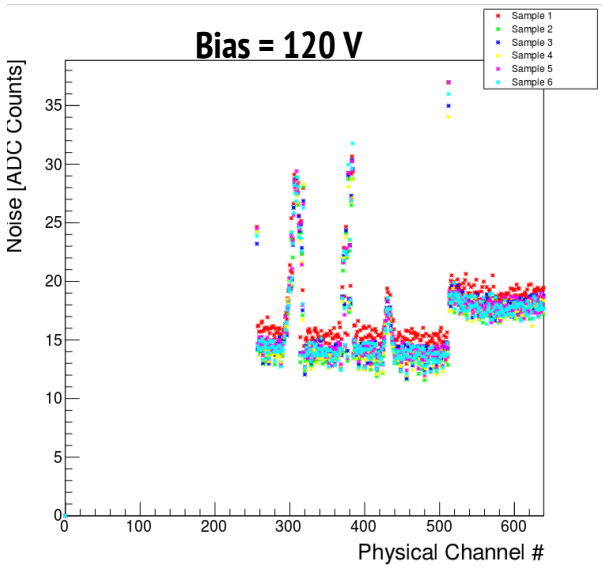
Run with sensor bias at 180 V

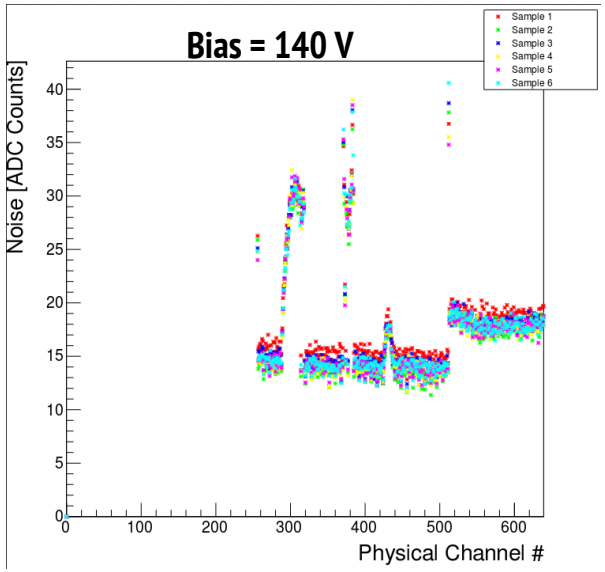
- Same noise pattern which was observed before is present on bonded chip

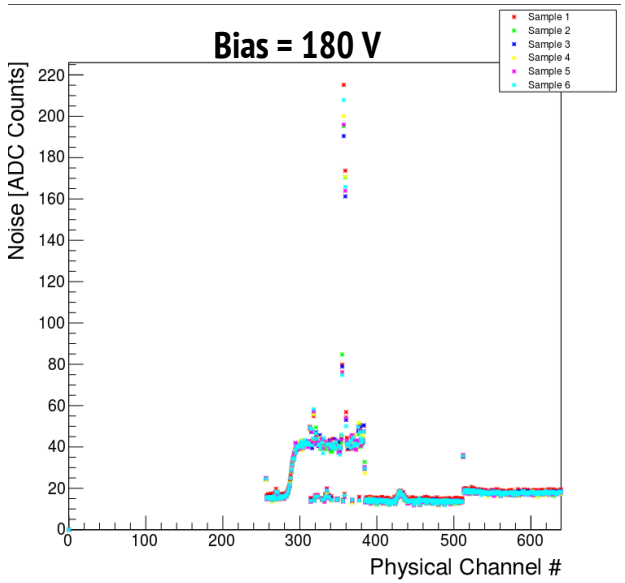


Run with sensor bias at 120 V, 140 V and 160 V

- Noise pattern is gone at 120 V and 140 V and present at bias voltages >= 160 V
  - Noise at 120 V looks like that observed at 0 V and 10 V
  - Additional noise spike has appeared at 120 V and 140 V

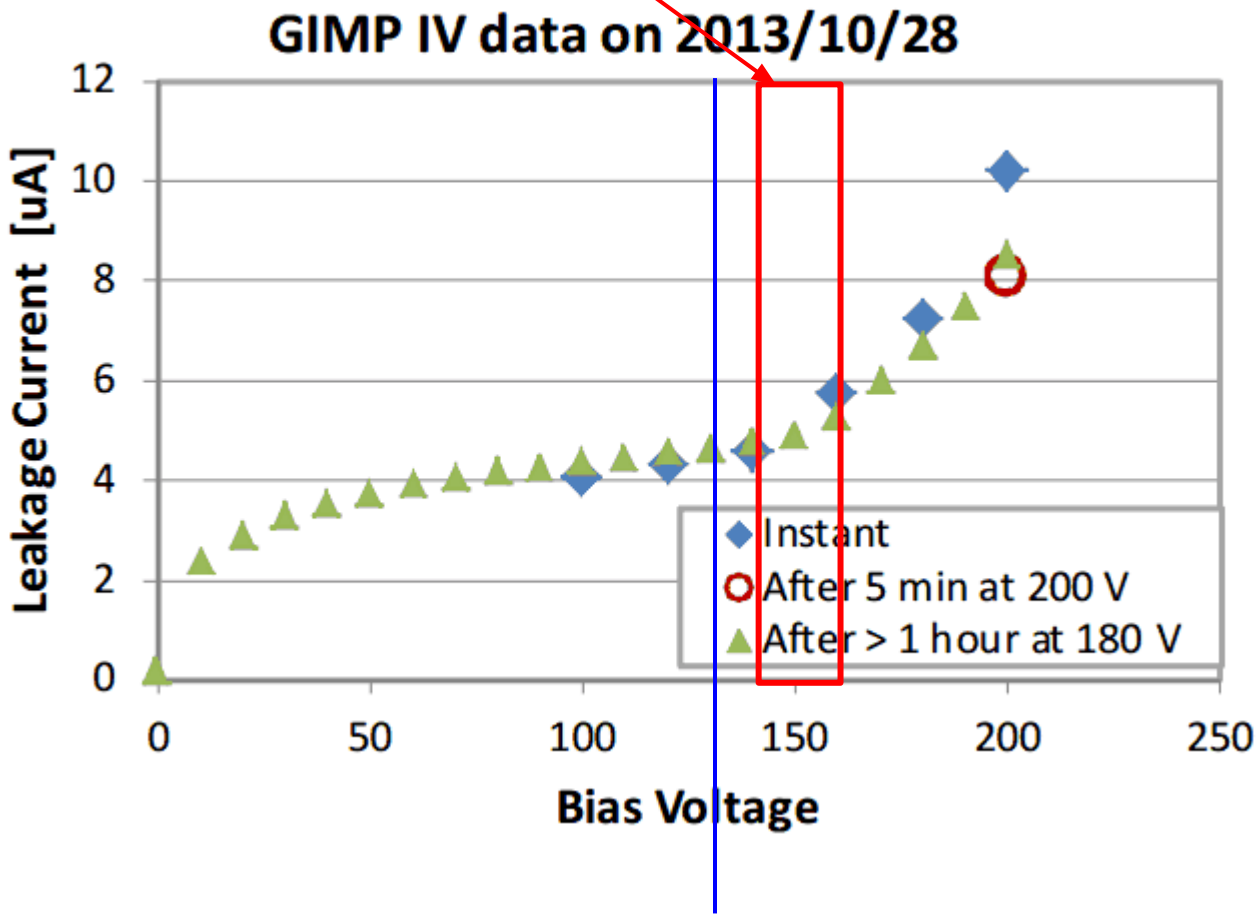






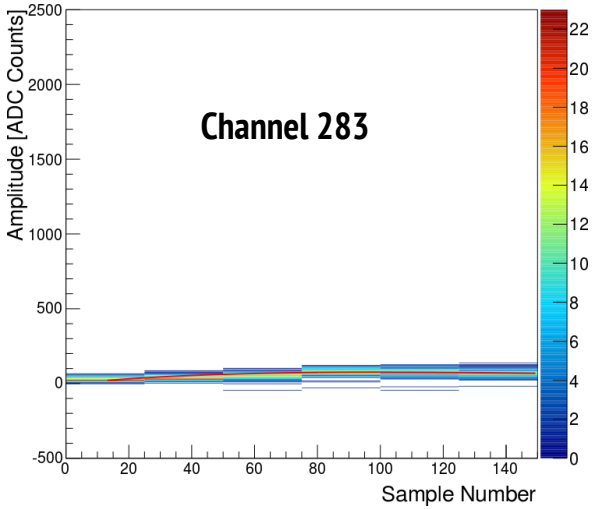
Leakage Current

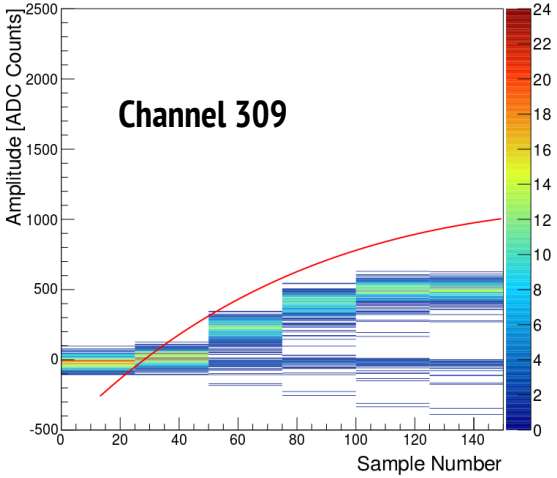
- Bias region where noise pattern emerges seems to coincide with sudden increase in leakage current

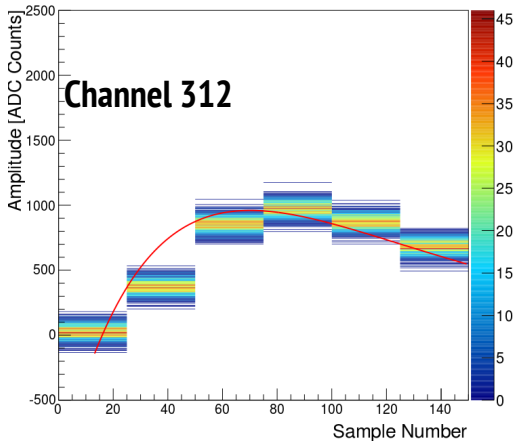


Calibration Response

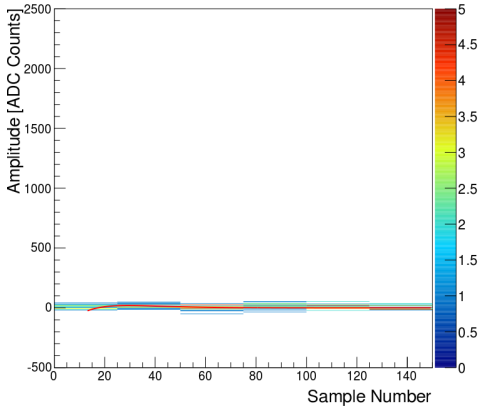
- Calibration run taken with sensor biased to 180 V
- Calibration response of unbonded channels looks as expected
- Response of the bonded chip is either ~0 or is low (~500 ADC Counts)
  - Response of calibration group 0 starts out strange but improves across the chip







- The channels of the APV with pulled wirebonds do not respond to a calibration pulse
  - Seems to be indicating that the chips are dead
    - Trying to understand the noise pattern is irrelevant at this point
  - Sensor may or may not be damaged; It's hard to tell without IV curves taken before the test



Calibration Response Overview