Anneal Behavior of the MIPS Ge:Ga Arrays

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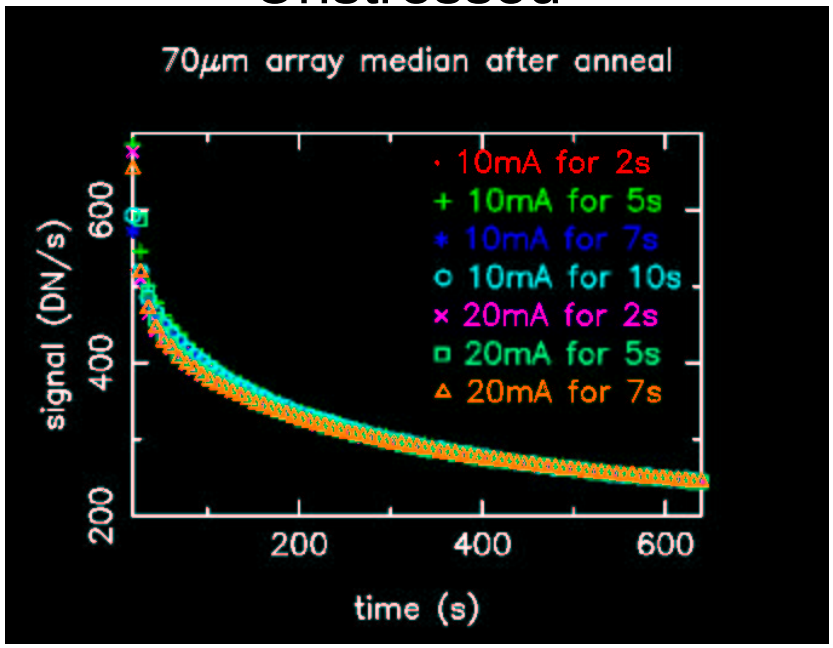
Introduction

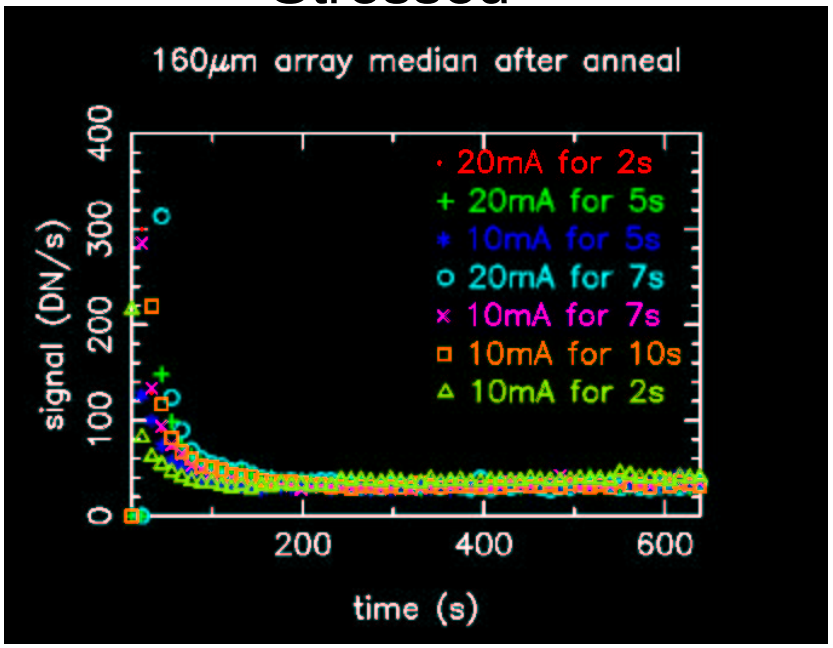
- Detector anneals repair cosmic−ray damage and restore responsivity to baseline level
- What are the differences between the unstressed (70 micron) and stressed (160 micron) arrays?
- How long should we wait after an anneal before we start taking science data?
- See detailed reports at http://rincon.as.arizona.edu/Characterization/Released/log.html

Baseline Behavior After Anneal

Unstressed



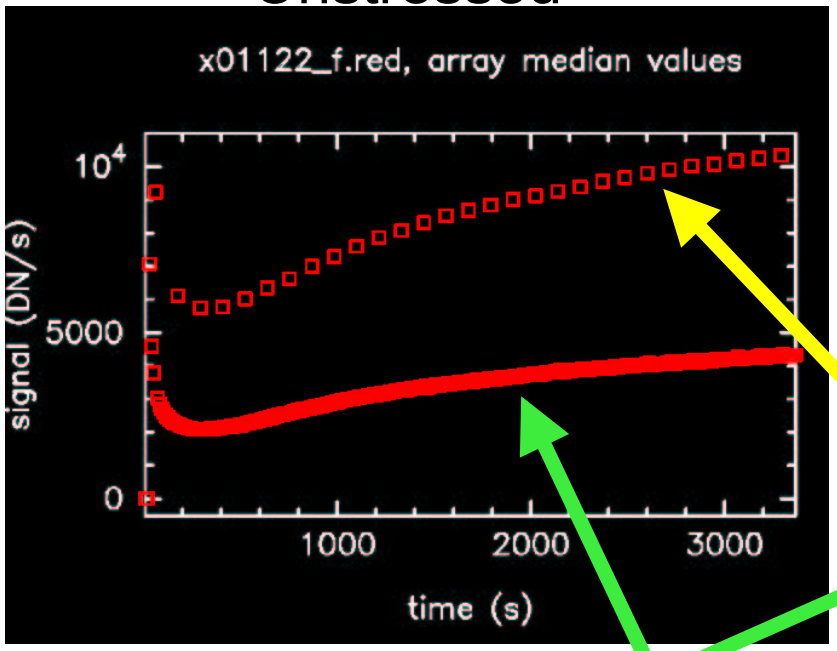
Stressed



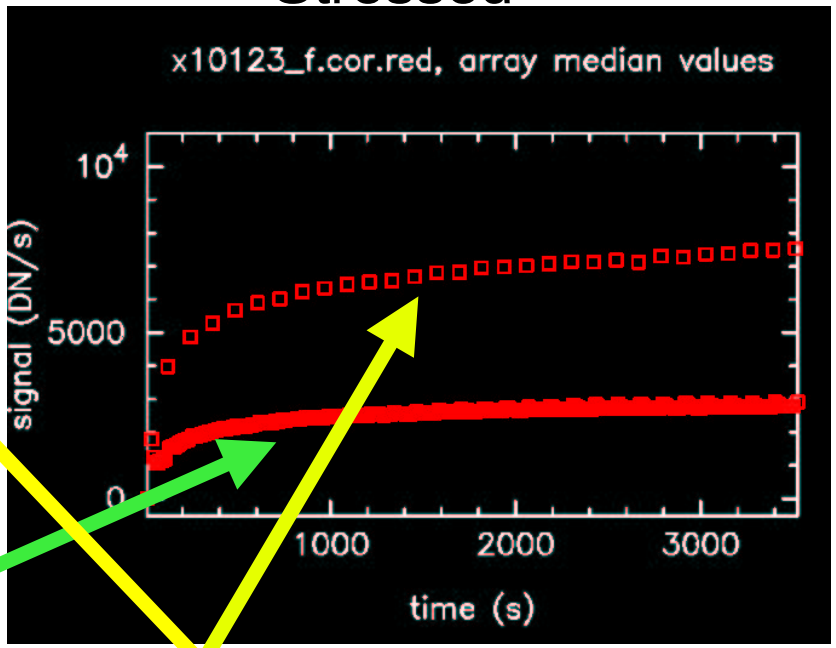
- Post−anneal behavior is independent of anneal strength
- Stressed array returns to baseline more quickly

Calibration Data After Anneal

Unstressed



Stressed



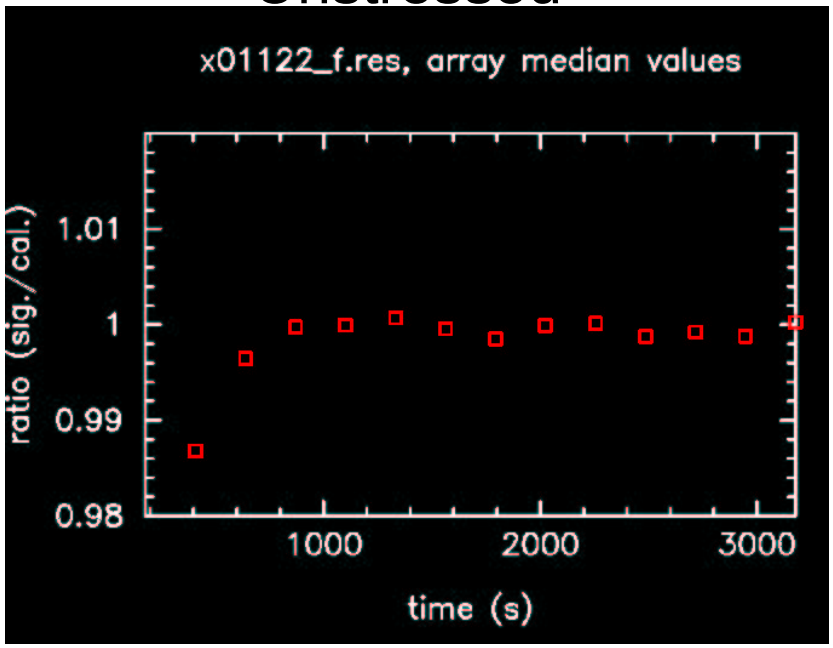
Background

Stimflashes

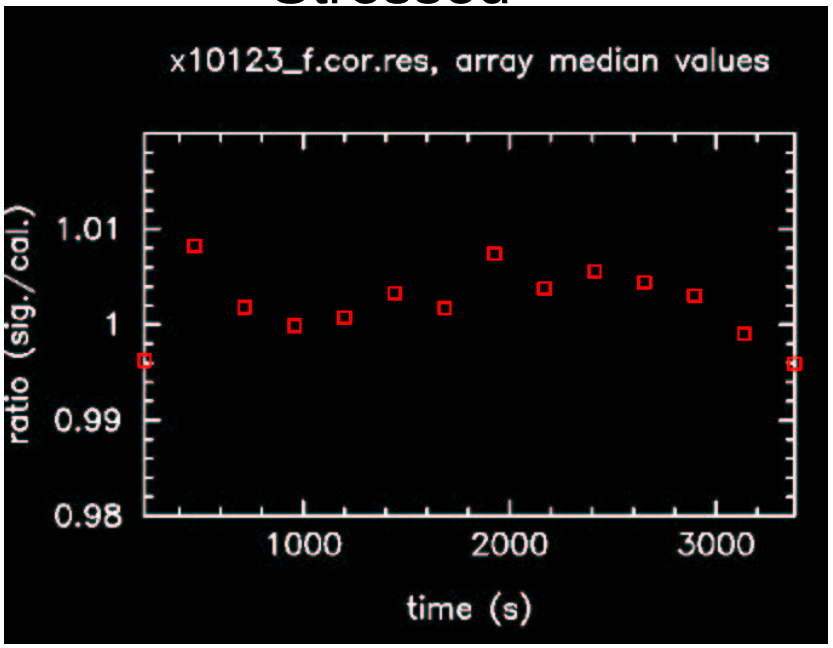
Next, these data are calibrated by dividing every 2nd stimflash by the average of the two adjacent stimflashes.

Calibration Stabilization

Unstressed



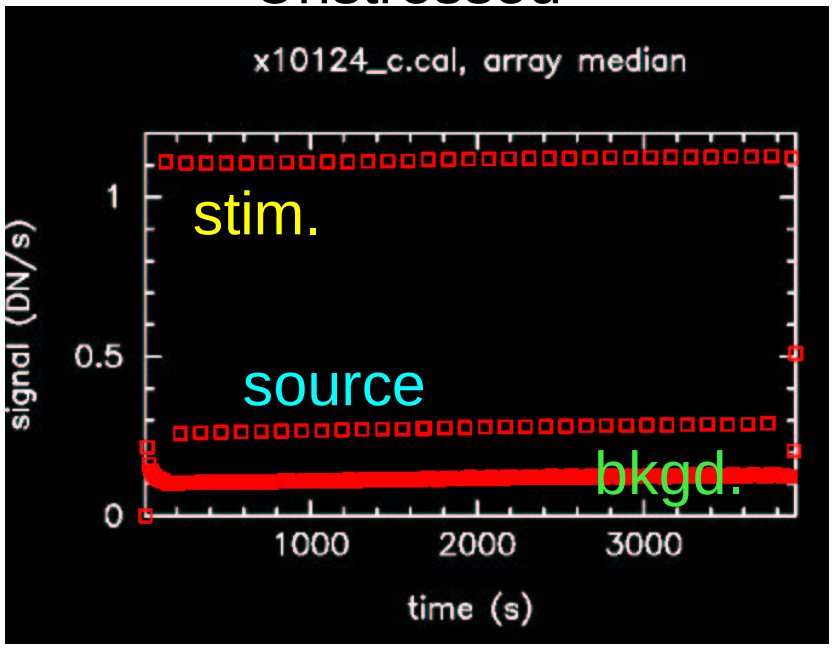
Stressed



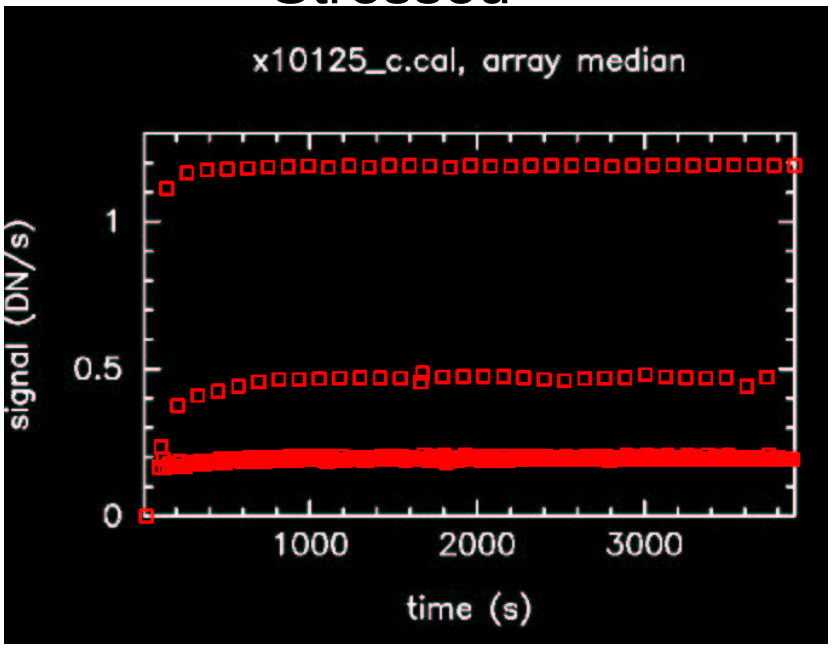
- Unstressed array stabilizes in 10−15 minutes
- Stressed array settles in < 5 minutes

Source Calibration

Unstressed



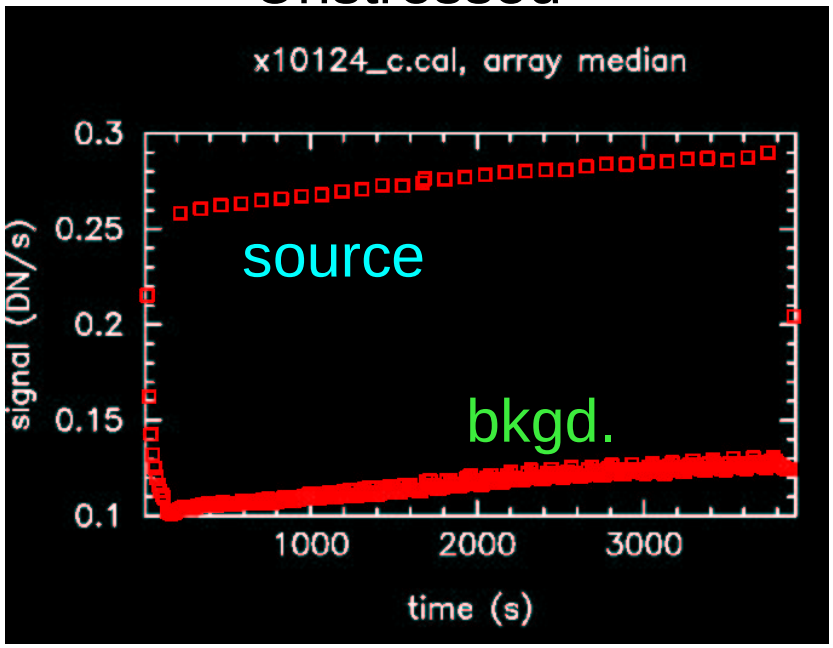
Stressed



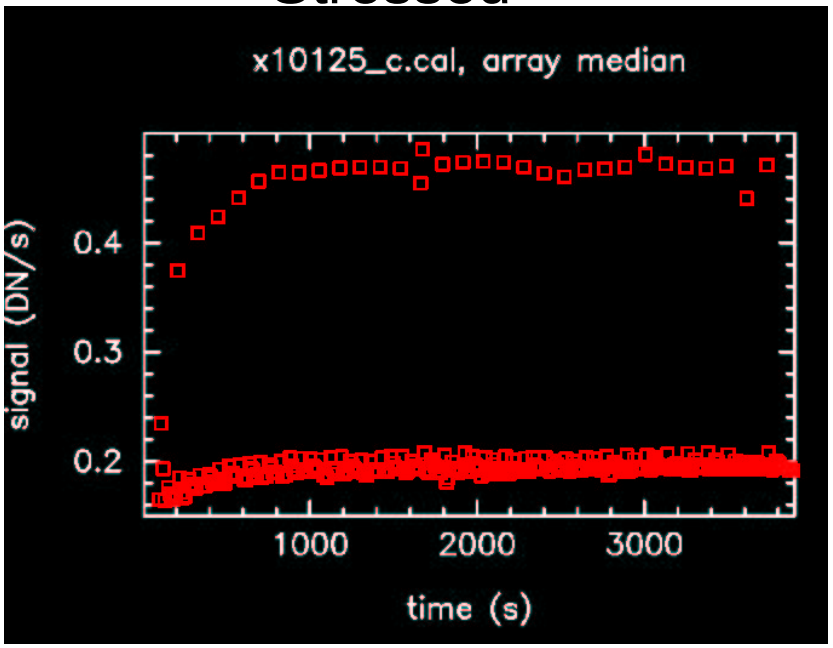
These data sets include source stims inserted in the middle of each calibration cycle. Each point has been divided by the weighted mean of the 2 nearest stimflashes.

A Closer Look

Unstressed



Stressed



- Unstressed: source/stim ratio still changing after an hour.
- Stressed: source/stim ratio stabilized after 10−15 minutes.

Conclusions

- Stressed array calibration settles faster
- Stressed array returns to baseline faster
- Calibration stabilization time does not depend on integration time or background level
  - 10−15 minutes on the unstressed detectors
  - < 5 minutes on the stressed detectors
- Pixel−to−pixel variability not yet quantified
- Slow transient effects seen in source stims