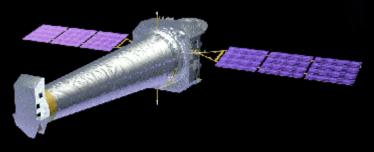
Spacecraft Stability

Scott Wolk (CXC/M&TA)

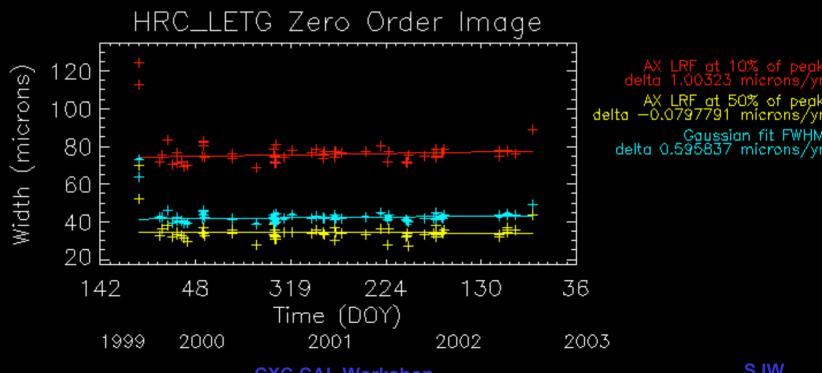




The Spacecraft

- ACIS
- HRC
- **EPHIN**
- **PCAD**

- SIM
- Chandra end to end
 - Focus
 - Spectral Resolution



SJW

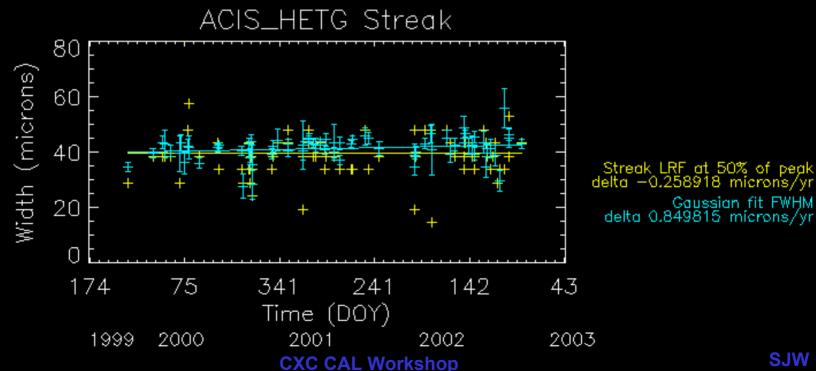
Gaussian fit FWHM



The Spacecraft

- ACIS
- HRC
- **EPHIN**
- **PCAD**

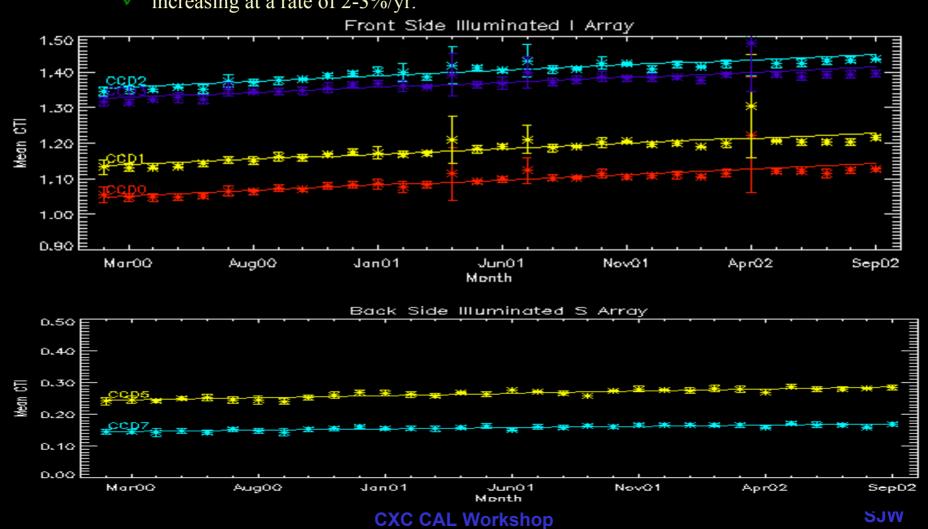
- SIM
- Chandra end to end
 - Focus
 - Spectral Resolution





ACIS

- Low Energy QE (Plucinsky)
- CTI
 - increasing at a rate of 2-3%/yr.

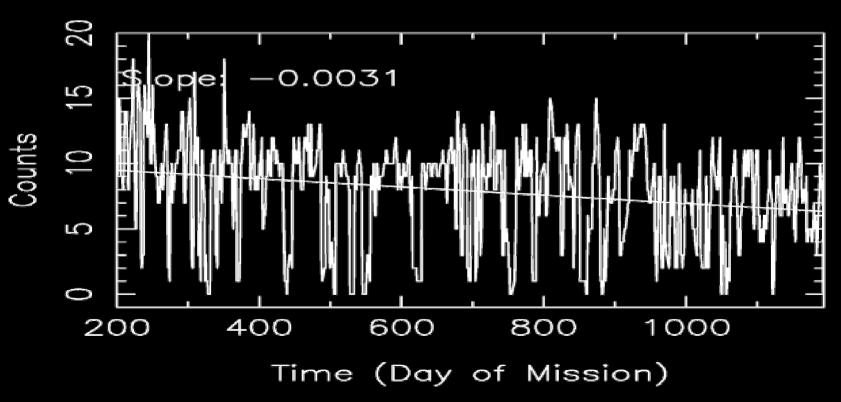




ACIS

- Low Energy QE (Plucinsky)
- CTI
 - ✓ increasing at a rate of 2-3%/yr.
- Questionable Pixels
 - √ <100 out of 10,000,000 in 3 years
 </p>

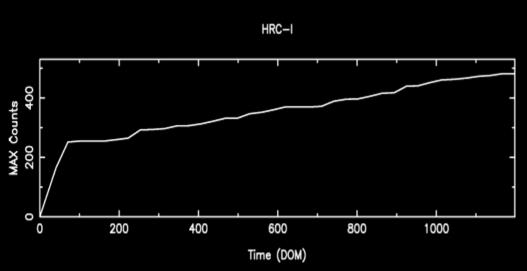
Numbers of New Warm Pixels: Front Side CCDs

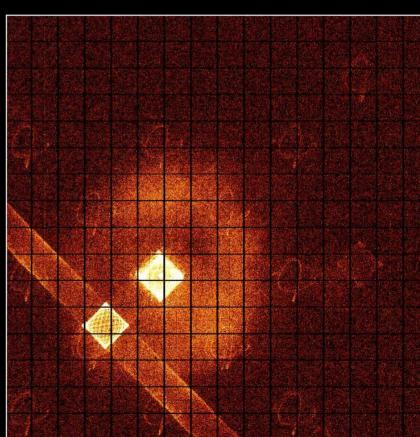




HRC

- Main concern is "dose". After ~1000 photons in a single pore gain will drop by 10%.
 - ✓ 0 pores on HRC-I have cleared this threshold.

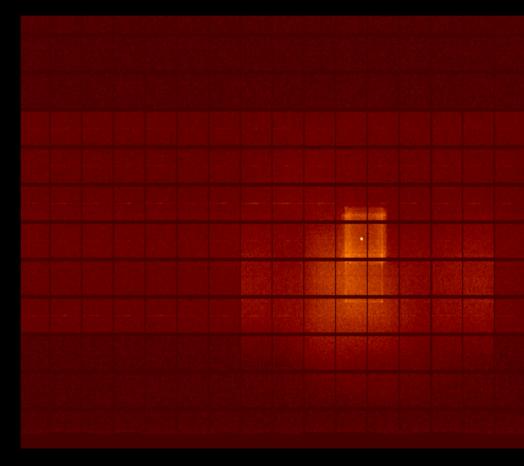






HRC

- Main concern is "dose". After ~1000 photons in a single pore gain will drop by 10%.
 - ✓ 0 pores on HRC-I have cleared this threshold.
 - Less than 0.00001 of the pores in the HRC-S center array have exceeded this threshold.





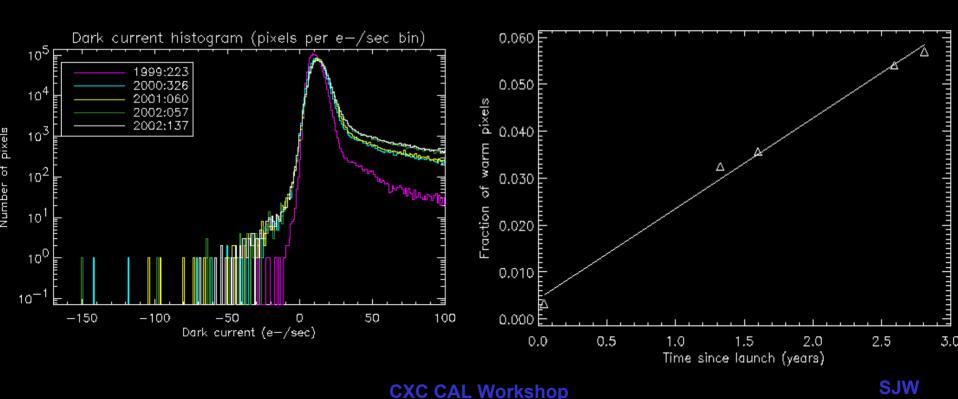
EPHIN & SIM

- EPHIN Monitors radiation environment.
 - ? Slow long-term warming
 - No effect on radiation count rates

- SIM Moves the instruments back and forth.
 - ✓ Move duration and location unchanged.
 - ? Very slow long-term warming.

Pointing Control & Attitude Determination

- Celestial Location Monitoring (Aldcroft)
 - ✓ Gyros (very occasional bias glitches)
- Warm Pixels
 - ⇒Increasing at a rate of 2-3% per year.





Long Term Prospects

- Chandra
 - ✓ Focus
 - ✓ Resolving Power
- ACIS
 - ⇔Low Energy QE
 - ✓ CTI
 - ✓ Bad Pixels
- HRC
 - Dose

- EPHIN
 - ⇔ Thermal
- SIM
 - Motions
 - ⇔ Thermal
- PCAD
 - ACA
 - ⇔dark current
 - √ offsets
 - Gyros

While we may need to change our approach in how we operate the spacecraft, there are currently no issues which indicate that the fundamental capabilities of *Chandra* will change within the next 5 years.