Even the Good Misbehave
A light hearted look at Instrument Calibration

E. Pluribus Unum

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STScI Family Night
HST Spherical Aberration

- The outer edge of the 2.4-m (8-foot)
  primary mirror was ground too flat by
  2 minutes (1/90 the thickness of a
  sheet of paper).
- Mistake discovered immediately after
  telescope launched and operated.
- Faulty test equipment had been used to
  measure mirror curvature.
- Corrective Optics Servicing
  Axial Replacement
  installed in order to meet
  the science team's
  specifications.
HST Spherical Aberration

- The outer edge of the 2.4-m (8-foot) primary mirror was ground too flat by 2 microns (1/50 the thickness of a sheet of paper).
- Mistake discovered immediately after telescope launched and operated.
- Faulty test equipment had been used to measure mirror curvature.
- Corrective Optics Space Telescope Axial Replacement (COSTAR) installed in orbit in 1993 and the telescope back to its original specifications.
HST Spherical Aberration

- 1993
  - HSP out
  - COSTAR in
- 2009
  - COSTAR out
  - COS in
Cherenkov light is a minor nuisance for WFPC2, STIS, etc due to glowing windows near detectors.

The rise came when STIS safed occasionally due to Cherenkov flashes in opto-isolators. Software work around that.

Pipes or metals of instruments can be radioactive.

Clean detectors would have been a major source of background on HST (WFC3 IR) and JWST (launch in ~5 years).

Stergetic particles again, not Cherenkov effect or luminescence, like a glow-in-the-dark solution is to reactivate phosphates after detectors...