

Calibration Uncertainties NuSTAR

Kristin Kruse Madsen

Effective Area Perturbations

- 1) Phone call with Jeremy Drake about the perturbations for CHANDRA.
 - NuSTAR is a simpler system because it is more complicated...
 - More than 3000 slight different mirror coatings makes it impossible to exactly generate reflectivity files that precisely “reflect” reality.
 - Sharp features from a single mirror recipe gets smeared out.
 - The physical errors we know about
 - Surface roughness
 - Material composition, optical constants (Pt, W)
 - Absorption layers (Carbon layer on the top)
 - Scattering: Curling of mirror edges, large figure errors at edges
 - Optical axis location: known to $\sim 20\text{-}30''$ (because of mast motions, $1'$ offaxis at one location may not be $1'$ at another location)
 - However, the empirical crab correction to the vignetting files outweighs the above errors, and therefore it is likely the error envelope of this correction that dominates.

Time line

- Phone call with Jeremy – Done
- Generate a routine that applies perturbations to the NuSTAR effective areas – May 2015
- The NuSTAR set will be sent to Jeremy D. and put into the correct format – TBD
- Test run - TBD