Calibration Uncertainties
NuSTAR

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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 ~20-30” (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