ACIS Contaminant: What now?

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New Approach, Again

• Model: $\tau_C = \tau_{C0} + \tau_{C1}(t) f(x,y)$
• LETG/ACIS of blazars, ‘Big Dither’
  • measure O-K as $h(t,y)$
  • measure F-K as $k(t,y)$
• Determine $\tau_{C,\text{Henke}}$ from cluster data, corrected for $\tau_{O-K}, \tau_{F-K}$
• Adjust C-K edge

$$f(x, y) = e^{-y/a_1} + e^{(y-1024)/a_2} - e^{-512/a_1} - e^{-512/a_2}, a_1 = 106.25, a_2 = 129.62$$
Uncorrected Spectrum

\( m = -1 \)
Time Dependences

![Graph showing time dependences with data points for different rows (167, 32, 512). The graph plots τ_{C-K} against years from 2000 to 2015.]
Time Dependences
Mid-Row

Row

S1

S2

S3

Row

$\lambda$

$\mu$
Relating F-K to C-K

F/C does not vary with position or time (since 2014)
Relating F-K to C-K

Pre-2014: part of contaminant has C but no F

F/C does not vary with position or time (since 2014)
Relating O-K to C-K

Slope: O/C in spatial component does not vary
\[ \tau_{C-K}(y) = \tau_0 \cosh\left[\frac{(y - 512)}{S}\right] + C \]

(3 Free Parameters)
\[ \tau_{C-K}(y) = \tau_0 \cosh \left( \frac{(y - 512)}{S} \right) + C \]
\[ \tau_{C-K}(y) = \tau_0 \cosh\left[\frac{(y - 512)}{S}\right] + C \]
Hyperbolic Cosine + Constant, scale = 150 row

C-K Const

Year

Spatial component: still increasing but slowly
Spatial component: O-K may have leveled
Uniform component: O-K still increasing
All data, rows 135-195
Rolling 5-point fits

C-K dTau/dt (O.D./yr)

Year


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IACHEC Contamination—4/10/18
All data, rows 135-195

Rolling 5-point fits

\[ O - K \frac{d\tau}{dt} (O.D./yr) \]

Year


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IACHEC Contamination—4/10/18
Summary

- F/C now unchanging with row or time
  - Early contaminant had lower F/C
- O-K spatial variation scale matches C-K
- Growth times $T = \tau(2018) / d\tau/dt$
  - Uniform: 6-9 yr
  - Spatial = 10-15 yr
  - $T_C = 1.5 \times T_O$
- O spatial component may have leveled but statistics are poor