Monitoring the ACIS contamination layer with the IACHEC model for 1E0102.2-7219

An Assigned Talk
**E0102 over Time**

E0102 is observed once a year in 3 positions on S3
We fit it with the standard IACHEC model to verify the contamination model
If the model is correct, the line normalizations should be constant with time even though the effective area at low energies is changing by a large amount

**S3 2003**

**S3 2018**
**E0102 over Time**

E0102 is observed once a year in at the aim point position on I3

Only 5 parameters are free in the fits, a global normalization and the normalizations for O VII, O VIII, Ne IX, and Ne X

I3 fits would benefit if the Mg XI normalization were free

### I3 2006

- ObsID 6756, C-stat=157.157, dof=80, Q-stat=164.1, reduced Q stat=2.05

### I3 2018

- ObsID 20638, C-stat=145.888, dof=80, Q-stat=145.8, reduced Q stat=1.82

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IACHEC 2018
It is getting progressively more difficult to constrain the OVII normalization given the low number of counts.
E0102 O VII Line Normalizations

- both S3 and I3 show an increase in the apparent normalization in 2017-2018
E0102 O VIII Line Normalizations

- S3 shows an increase in the apparent normalization in 2018, largest effect in the middle of the CCD, bottom of the CCD is consistent with previous measurements
- I3 shows an increase in the apparent normalization in 2017-2018
E0102 Ne IX Line Normalizations

- only I3 shows an increase in the apparent normalization in 2017-2018

S3

I3

![Graphs showing the best-fit normalization over time for S3 and I3 subarrays.]
E0102 Ne X Line Normalizations

- only I3 shows an increase in the apparent normalization in 2018

![Graphs showing Ne X line normalizations for S3 and I3 subarrays]
E0102 Global Normalizations

- S3 global normalization is higher for the high chipy positions
- I3 global normalization starts increasing in 2017
Comparison to IACHEC Values

S3 subarray, N0010, CIAO 4.9, CALD 4.7.8

Node 0 △ Node 1 □ Node 2 × Node 3

Low ChipY ≈ Mid ChipY □ High ChipY

Date


IACHEC value
**WHY???

- Why is the contamination apparently over-estimated on S3 and I3?
- Why is it over-estimated by the largest amount at the center of I3?

Could it be? **Vaporization Rate > Deposition Rate**??

*Stay Tuned for IACHEC 2019 in Shonan Village !!!*