EPIC-MOS Contamination Monitoring

- Primary Monitoring Source: SNR E0102
- Properties:
  - Have standard source spectral model
  - Known to be stable (EPIC-pn)
  - Regularly observed throughout mission
- Multiply standard source model by contamination model (VARABS)
- Contaminant: C8H8 (c.f. RGS)
- Derive predicted model hardness ratio
- Compare with observed data hardness ratio to derive contaminant depth
- Validate contaminant model by XCAL comparison of selected sources (RXJ1856, Blazars) with EPIC-pn
Use IACHEC standard model of 1E0102 as calibrator. Model based on input from several missions but dominated by RGS.
Choose low and high energy bands which are relatively insensitive to shape of RMF.

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C depth versus model hardness ratio compared with observed (horizontal lines) data ratios for MOS1 (white) and MOS2 (red).
Last year’s result:

MOS1 stable!

MOS2 increasing
This year’s result:

MOS1 stable!

MOS2 increasing

Rev 2910

Obs 0412982401
Comparison with RGS: Epoch Dependent C8H8 layer ($\rho = 1.11 \text{ g/cm}^{-3}$)

MOS2 now slightly more than 50% of RGS model.

MOS1 no strong evidence for trend.
Consistent with fixed low energy QE adjustment.
Transmission curves at current epoch C8H8 layer ($\rho = 1.11 \text{ g/cm}^{-3}$)

Transmission curves for C8H8

0 500 1000 1500 2000
Energy (eV)

0.0
0.2
0.4
0.6
0.8
1.0

Transmission

RGS: depth = 0.21 microns

MOS2: depth = 0.13 microns
Comparison between on-axis obs (2909) and off-axis (2910)
EPIC-MOS Contamination Monitoring

Summary

- MOS2 trend continues upwards. Layer depth now ~50% as seen on RGS
- MOS1 little evidence for trend.
- XMM-Newton contamination much less than Chandra or Suzaku
  (see IACHEC contamination WG for latest results)
- Still no idea why MOS2 is different from MOS1
- General response model (rmf/arf) looks “ok”.
Column energy offset to be fixed (see Martin’s talk);
Bigger problem in MOS1