CCD & Backgrounds Working Groups

Activities at IACHEC 2015

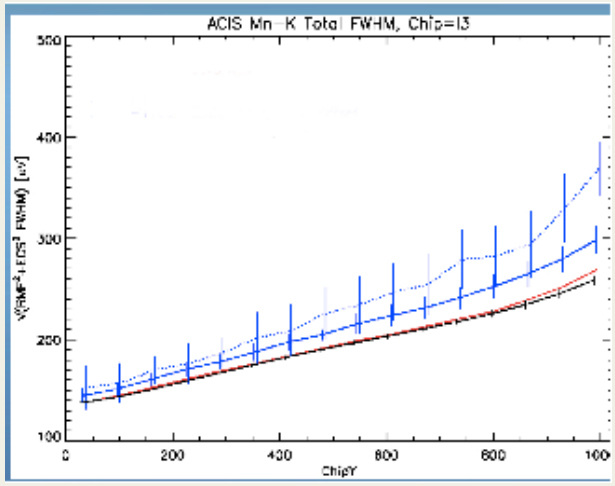
CCD & background WG

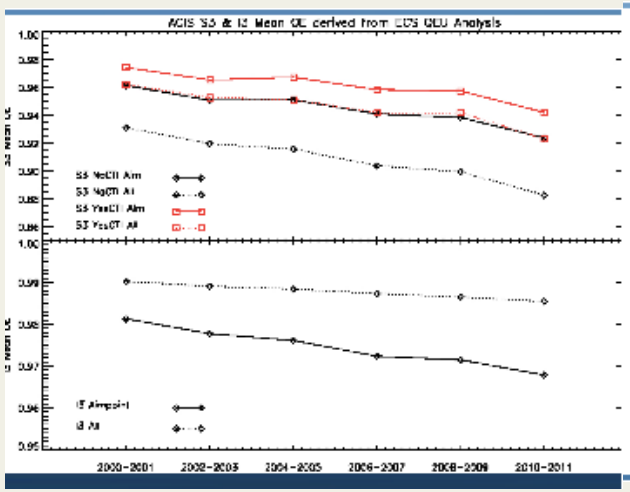
- Nick Durham: Measurements from Chandra ECS
- Terry Gaetz: Updated analysis of Chandra ACIS background
- Terry Gaetz: Current status of Chandra ACIS low energy BI CCD gain calibration
- Matteo Guainazii: Timing mode calibration with simultaneous Cyg X-3 observations: XMM
- Norbert Schulz: Timing mode calibration with with simultaneous Cyg X-3 observations: Chandra
- Michael Smith: Quiescent Background and the EPIC-pn Energy Scale

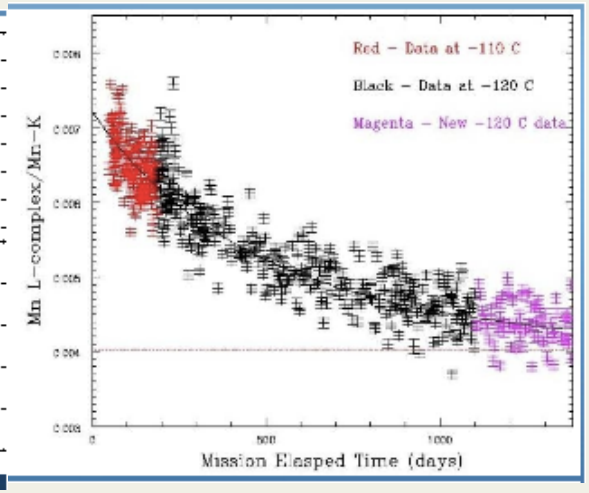
Measurements from Chandra ECS

Nick Durham

- *Energy Resolution Versus Time and Temperature*
- *Line Centroid Accuracy Versus Time and Temperature*
- *Time Dependent QEU*
- *Contamination Spatial Variations Application*

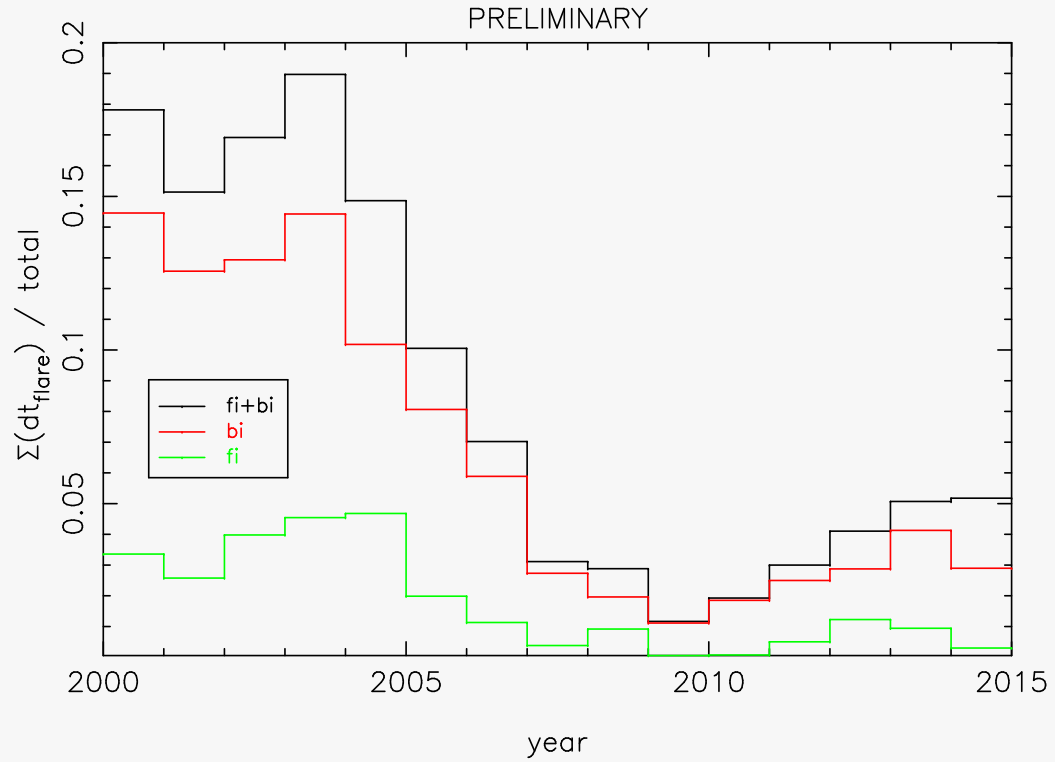






Chandra ACIS Background

Background "Flaring" Study (preliminary)



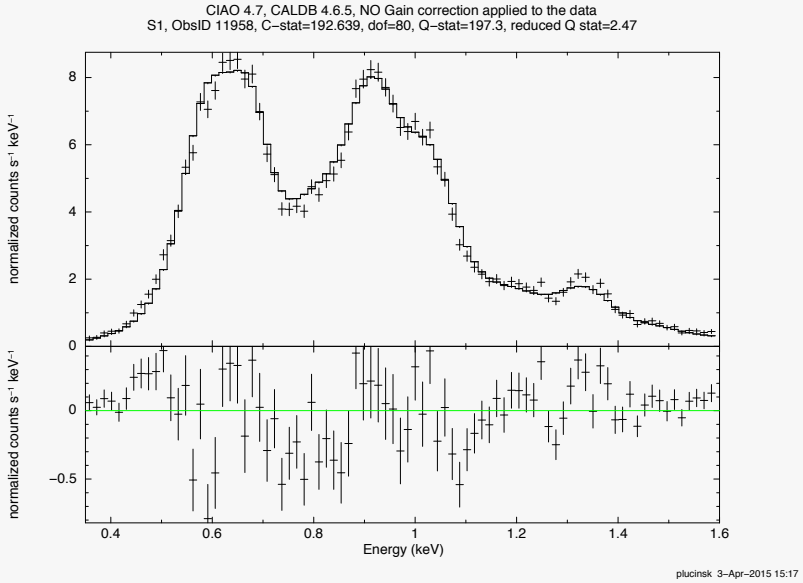
- Flaring fraction, blank sky background; 768 ObsIDs: S2 + S3, good grades only
- liberal selection; more stringent (larger excursions required) $\Longrightarrow$ smaller flaring fraction)

Chandra ACIS Low-E Gain (BI chips)

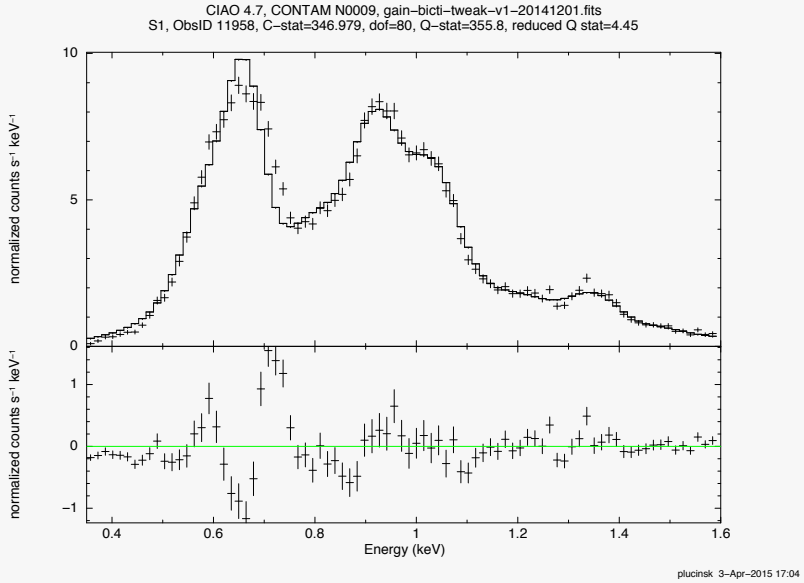
$\langle E_{grat} \rangle$ vs E_{cdd} from ACIS-LETG data

- ACIS-S1 gain tweak from $\langle E_{grat} \rangle / E_{ccd}$; test with E0102-72.3

CALDB



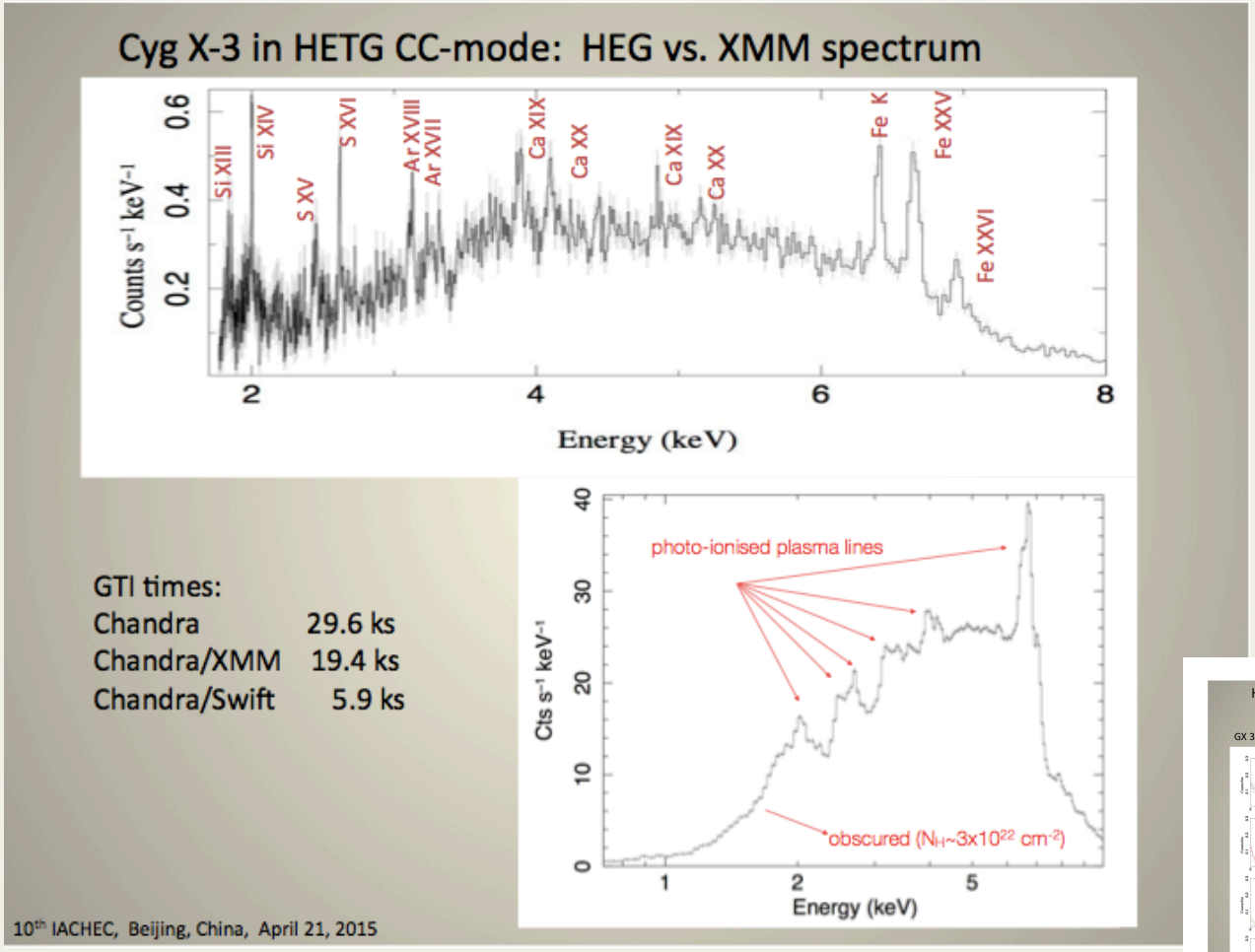
Tweak

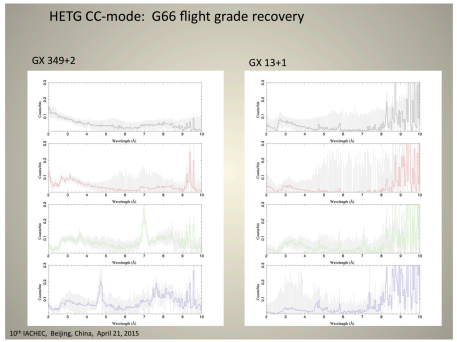


- result: $E \lesssim 0.5\,\mathrm{keV}$ better, $E > 1\,\mathrm{keV}$ ok, but O-line region issues
- need better constraints, O lines (sometimes Ne lines too)
- possibility: interpolate/blend CALDB + Tweak above $\sim 0.5\,\mathrm{keV}$?

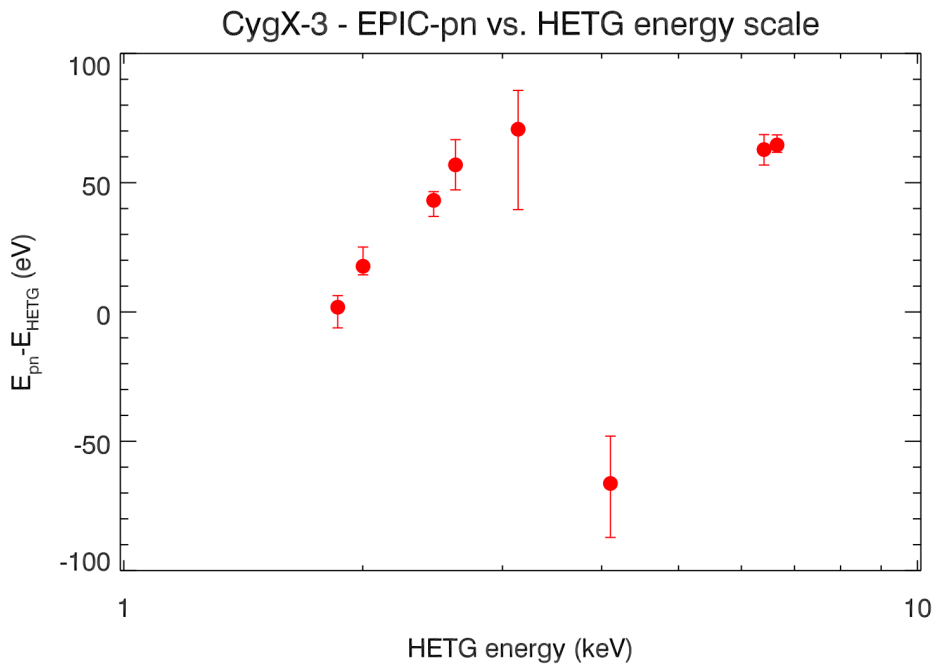
Timing mode calibration with with simultaneous Cyg X-3 observations: Chandra

Norbert Schulz

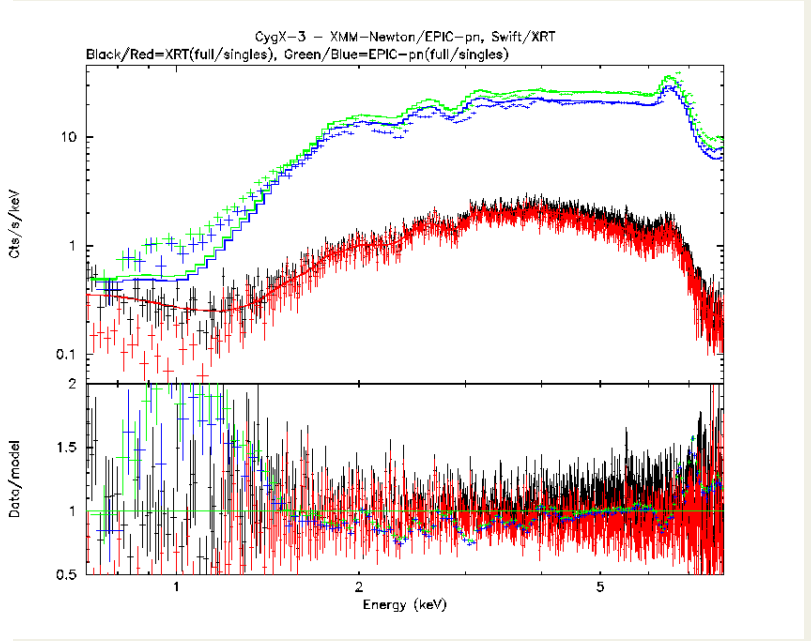




Simultaneous *Chandra*/Swift/XMM-Newton observation of CygX-3 (micro-quasars, photo ionised corona) in “fast modes”



Unexpected large inaccuracies in the EPIC-pn Timing Mode energy scale wrt *Chandra*/HETG



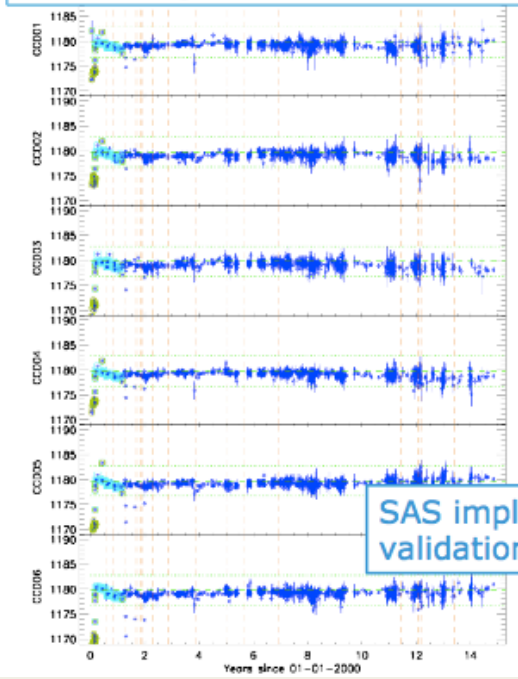
Soft excess (unseen in Swift/XRT) points to possible inaccuracy of redistribution (beyond the contribution of the dust scattering halo)

Quiescent Background and the EPIC-pn Energy Scale

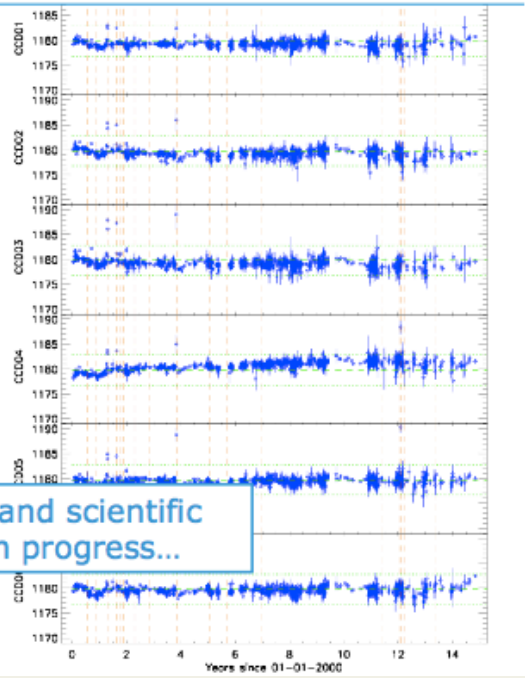
Michael Smith

- Essentially a quiescent background dependent gain effect.
- Background level correlates with data processing parameter **NDISCLIN**
- This is a proxy measure of the Minimising Ionising Particle (MIP) incidence.
- MIPs deposit substantially higher charges than those relased by X-ray photons.
- Higher charge at the CAMEX may increase the detector gain.

With Background Gain Correction



With Current Public EPN_CTI.CCF



SAS implementation and scientific validation still work in progress…