Working group 5: Instrumental effects

Gordon Hurford, Richard Schwartz, Brian Dennis, Amir Caspi, Hazel Bain, Claire Raftery, Juan Carlos Martinez Oliveros, David Smith, Jim McTiernan, Albert Shih & guests

Met only Monday evening to identify issues and assign tasks

Working group 5: Instrumental effects

Projects identified with team members and leaders

for each; monthly reporting

Testing datagap algorithms versus count rate

Standardizing pileup parameters for forward technique

Matching response matrix across attenuator state changes

  Low-energy excess (< 6 keV in A1 & A3)

  Measure resolution improvement with attenuators in

  8 & 10 keV "mystery features" in flares

Detector vs. detector area calibration for imaging

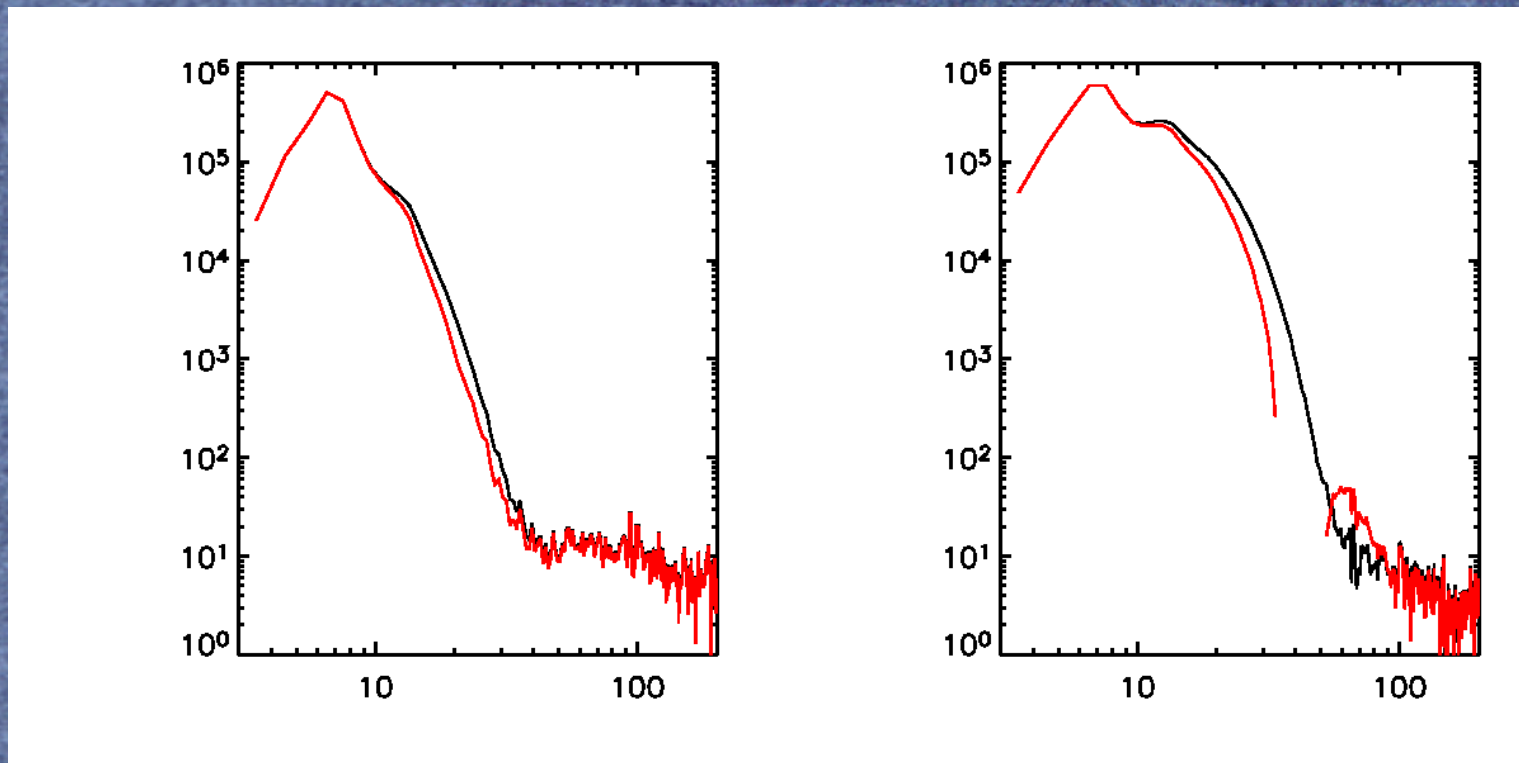Rear-grid scattering for imaging

Correcting imaging for pileup

Detector response with dead volume (front + rear)

Improved line shape for severe tailing

Implement offset (channel vs. energy) dependence on rate & orbit

+2 so esoteric I am not going to mention them

Pileup with old (reverse) method can produce
unrealistic shapes and even negative fluxes at
high deadtime:

New (forward-folding) method intrinsically better
but needs optimized parameters, as "a priori" as
possible.

Comparing different attenuator states helps with pileup calibration but also shows disagreements at lowest energies (3-6 keV and 8-10 keV).
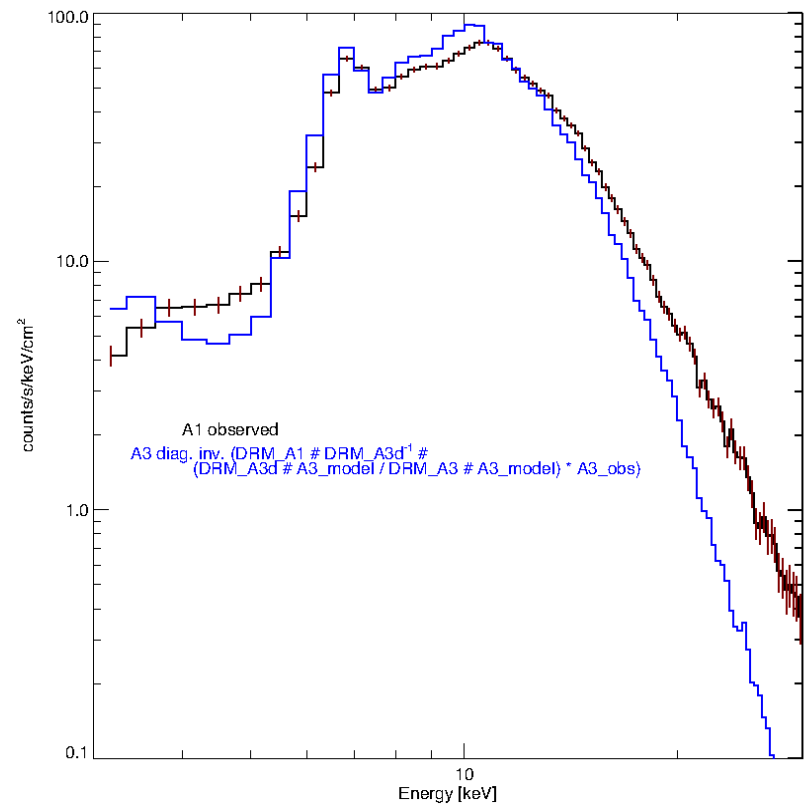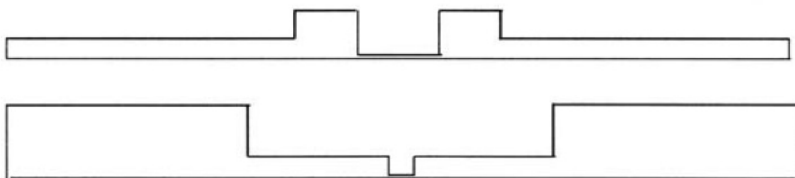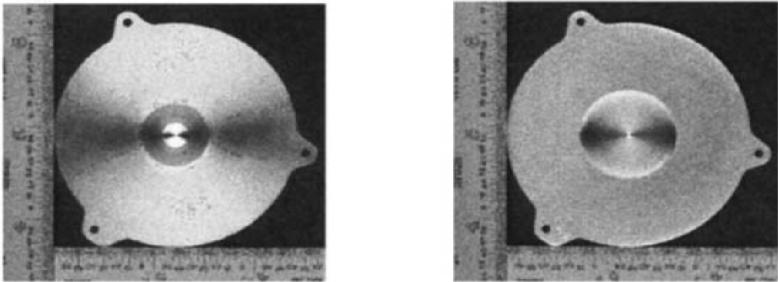
The normal channel-to-energy conversion varies slowly
but corrections have been found with count rate (largest, below),
and at orbital and daily periods. These are fairly well
characterized and should be implemented. All are << 1 keV,
but at the lowest energies this matters for applying the response
(which cuts off rapidly at the lowest energies) and getting the Fe
line centroid and emission measure right (?)

RHESSI Energy Offset

David's Lab. Data — Brian's Flare Data — Linear Trendline

$y = 0.6003x$
$R^2 = 0.9735$

Energy Change in keV

Deadtime fraction ("corrected counter")