

V&V Summary Report

L2 ASCDS Version : 8.4.5

Observation 1792 - L2 Version 12
Chandra X-Ray Center

L2 Processing Date : Mar 30 2019

See [axaff01792N009_VV001_vvref2.pdf](#) for the full report

V&V Scientist	Joy Nichols
V&V Date (YYYY-MM-DD)	2019.04.10
V&V Edition	1
V&V Disposition and Status	OK
V&V Charge Time	21.158

Comments

The focal plane temperature is warmer than -112.0 C during the interval 82395860.55 - 82417015.75 (MET s) of this observation. This temperature is the upper limit of the verified ACIS calibration for the back-illuminated chips. The focal plane temperature during part of this observation was warmer than the upper limit for optimum calibration of the ACIS gain and spectral resolution (i.e., -114.0 C for ACIS-I and -112.0 C for ACIS-S).

The Chandra calibration team calibrates the ACIS gain and spectral resolution using data from the external calibration source (ECS). ECS data show that the frontside-illuminated (FI) CCDs are more temperature sensitive than the backside-illuminated (BI) CCDs.

A summary of the current calibration status of the ACIS gain and spectral resolution can be found at:

http://asc.harvard.edu/cal/Acis/Cal_prods/Gain_and_Spectral_Resolution/A_CIS_response_summary.html

The main points are:

1) The gain on BI chips remains within 0.3% (i.e., the systematic uncertainty in the ACIS gain quoted on the Chandra Calibration Status

Summary web page) at all measured temperatures.

2) The gain on FI chips remains within 0.3% below row 600 at all measured temperatures.

3) The gain on FI chips above row 600 can be underestimated by as much as 1% for focal plane temperatures exceeding -116 C.

4) The spectral resolution (i.e., FWHM) on BI chips is insensitive to the focal plane temperature.

5) Warmer focal plane temperatures increase the FWHM on FI chips by up to 30 eV near row 512 and by up to 70 eV near the top of the chips.

In summary, the user should be cautious in the spectral analysis of high S/N emission lines detected on the top half of FI chips in this observation. Default processing with the current version of the CALDB will underestimate photon energies by up to 1% and broaden emission lines by up to 70 eV.

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To compensate for a few bad pixels not marked as bad that were not removed in the Level 2 processing, a custom bad pixel file with additional bad pixels at (chipx, chipy) = (232:234,322:339) in S1 was added in this processing. As a result, the user will NOT find a relatively bright square of pixels on the S1 chip for level 2 data caused by the application of the dither algorithm to the bad pixels in question, as opposed to previous processing(s).

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Zeroth order is extended. The zeroth order sky position was determined using a software tool developed by CXC called findzero, which is available in CIAO as part of the tgdetect2 tool. The tool calculates the point of intersection of the readout streak on the ACIS CCD and the meg dispersed spectral arm, rather than using a centroid position of the source. The findzero results are more accurate than source centroid in this case. =====

Target very off-axis. In tg_create_mask, the zeroth order region needs to be decreased; off-axis, the default size is too large and causes short wavelengths to be omitted from grating region. In tgextract, the off-axis source extent requires the tg_d range to be increased. ===

Reprocessed using the following method: Columns x, y, r, w give parameters for tg_create_mask Columns s1, s2, d1, d2, u1, u2 give parameters for tgextract. Customized parts of the usage are as follows:
tg_create_mask use_user_pars = yes sA_zero_x = \$x sA_zero_y = \$y
sA_zero_rad = \$r sA_width_heg = \$w sA_width_meg = \$w sA_width_leg = \$w
tgextract min_tg_d = \$s1 max_tg_d = \$s2 min_downbkg_tg_d = \$d1
max_downbkg_tg_d = \$d2 min_upbkg_tg_d = \$u1 max_upbkg_tg_d = \$u2
PKS 2155 series (LETG/ACIS): # obsid x y r w s1 s2 d1 d2 u1 u2 1791
3242.07 4497.14 47.96 598.78 -3.401e-03 3.401e-03 -2.592e-02 -3.887e-03
3.887e-03 2.592e-02.

seq_num	390010	Sequence number
obs_id	1792	Observation id
title	GRATINGS CALIBRATION OBSERVATIONS OF PKS2155-304	Proposal title
observer	Dr. CXC Calibration	Principal investigator
object	PKS2155-304	Source name
dtcycle	0	
cycle	P	events from which exps? Prim/Second/Both
ra_targ	329.716667	Observer's specified target RA [deg]
dec_targ	-30.225556	Observer's specified target Dec [deg]
ra_nom	329.55025172752	Nominal RA [deg]
dec_nom	-30.30116112742	Nominal Dec [deg]
roll_nom	27.225534305922	Nominal Roll [deg]
revision	12	Processing version of data
ontime	21158.211045042	Sum of GTIs [s]
livetime	20890.293036844	Livetime [s]
ontime4	21158.334165037	Sum of GTIs [s]
ontime5	21158.25208503	Sum of GTIs [s]
ontime6	21158.211045042	Sum of GTIs [s]
ontime7	21158.293125033	Sum of GTIs [s]
ontime8	21158.170024961	Sum of GTIs [s]
ontime9	21158.128965035	Sum of GTIs [s]
l2events	258430	Number of level 2 events

