ACIS Memo #168
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To: ACIS Team
From: Catherine Grant
Subject: Temperature Dependence of CTI for S2 and S3
Date: 19 September 1999

In order to determine the nature of the degradation suffered by the ACIS FI CCDs, a series of CTI measurements at different temperatures was taken over the period 17 - 19 Sept 1999. The S2 and S3 CCDs were illuminated by the external calibration source. I used a similar methodology as Gregory Prigozhin (ACIS Memo #163, 13 Sept), which I describe in more detail in ACIS Memo #169 (20 Sept). The data are bias-subtracted and overclock corrected and all telemetered event grades are accepted. The on-board software rejected ACIS grades 24, 66,107, 214, and 255. CTI is measured by finding the Mn-Kα peak in a spectrum of center pixel values for each of five groups of 200 rows. A linear fit to the row and Mn-Kα peak values measures the CTI. Table 1 is a listing of the observations and CTI measurements for both S2 and S3. Figure 1 presents this data graphically.

Table 1: CTI Measurements of External Calibration Source versus Temperature

Obs. ID	GMT Date		FP Temp	Quad A CTI	Quad B CTI	Quad C CTI	Quad D CTI
				— S2 —			
62535	260	(17 Sept)	-109.0	20.16±0.18	22.04±0.28	22.02±0.28	20.66±0.32
62534	261	(18 Sept)	-109.2	20.30±0.18	22.17±0.24	22.10±0.22	20.67±0.21
62533	261	(18 Sept)	-104.3	31.01±0.44	34.33±1.10	34.32±0.74	34.00±1.28
62532	261	(18 Sept)	-89.7	59.98±2.50	58.74±0.21	59.21±0.55	55.32±1.30
62531	261	(18 Sept)	-79.7	63.81±1.50	61.97±2.76	65.90±1.25	61.50±2.47
62530	261-262	(18-19 Sept)	-69.6	65.38±5.39	59.04±2.21	65.28±4.86	60.17±2.27
62529	262	(19 Sept)	-59.4	51.22±12.08	47.34±1.96	48.68±2.66	47.27±2.03
				— S3 —			
62535	260	(17 Sept)	-109.0	0.85±0.19	0.94±0.24	1.06±0.18	1.19±0.14
62534	261	(18 Sept)	-109.2	0.80±0.29	0.97±0.20	1.04±0.24	1.17±0.25
62533	261	(18 Sept)	-104.3	0.48±0.09	0.66±0.13	0.67±0.06	0.74±0.05
62532	261	(18 Sept)	-89.7	0.58±0.05	0.35±0.03	0.50±0.09	0.29±0.14
62531	261	(18 Sept)	-79.7	0.45±0.20	0.74±0.17	0.64±0.10	0.44±0.11
62530	261-262	(18-19 Sept)	-69.6	1.05±0.12	1.02±0.13	1.21±0.14	1.08±0.12
62529	262	(19 Sept)	-59.4	2.48±0.15	1.96±0.08	2.35±0.05	2.69±0.25

Note: All CTI values are multiplied by 10^5

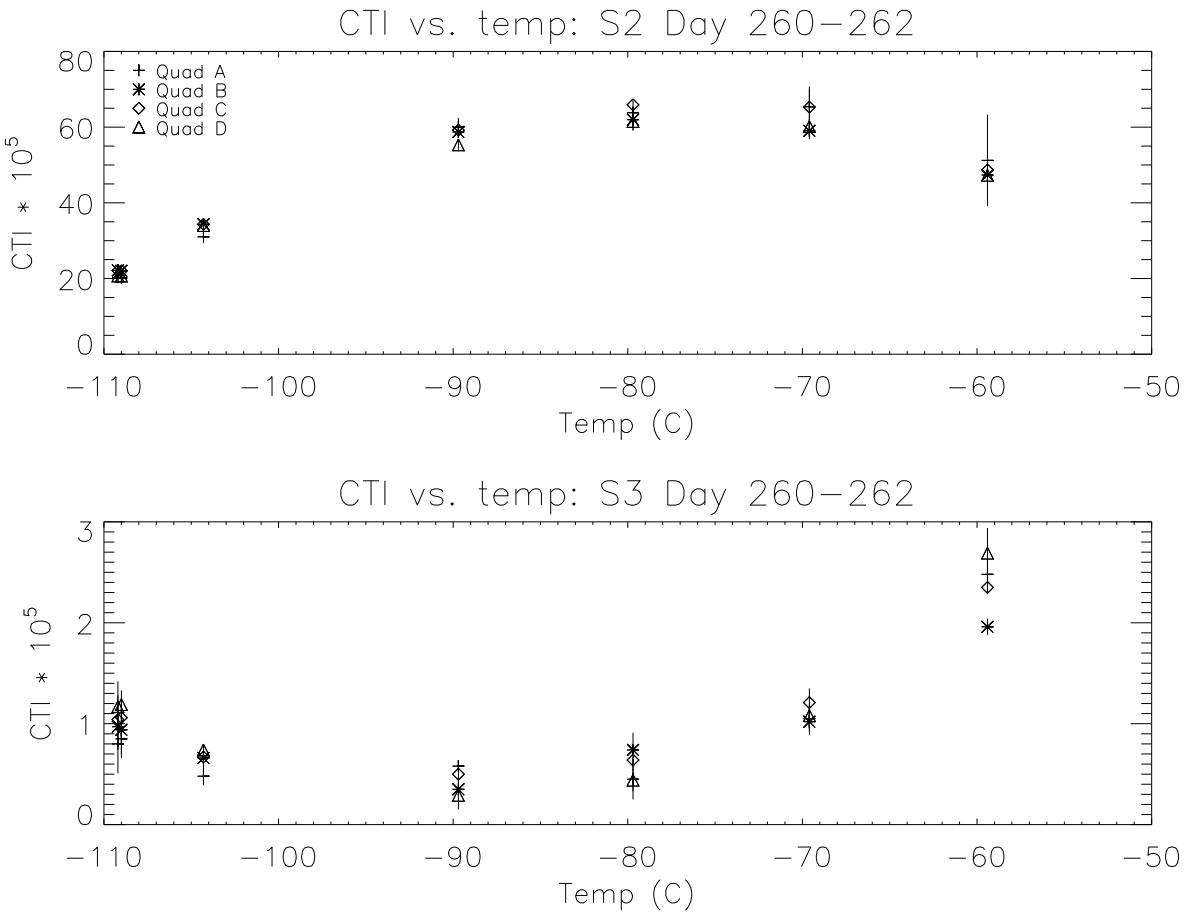

Figure 1: CTI measurements at Mn-Kα (5.9 keV) as a function of focal plane temperature.