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MEMORANDUM

Date: May 1, 2003
From: Joe DePasquale
To: SOT/FOT
Subject: Expected Count Rates of Obsid 3505 - Sco X-1

1 Analysis and Results

This brief memo is intended to summarize the results of a measure of the predicted count rates for the upcoming CC-mode, HETG observation of Sco X-1. Obsid 3505 is scheduled to take place on 2003:128:17:17 (13:17 local time Thursday May 8). This particular observation places the 0th order HETG image just off of S3 and the top half of the dispersed spectrum is expected to land on S-array chips S0,S1,S4 and S5. Given the extremely bright nature of this source, the ACIS team would like to verify that the observation is being correctly executed in real time.

Facilitating this end, I have provided expected dosages per chip based on a uniform QE (please see http://asc.harvard.edu/acis/memos/Sco_X-1_memo.ps) and in this memo I provide expected count rates per second per chip. This required running a new marx simulation of the observation in which the default QE was used. I ran this simulation at an exposure time of 5ks and a factor of 100 scaled down normalization for the source. The method used to obtain the count rates for this CC-mode observation from a TE-mode simulation are as follows. I first filtered the resulting event list for each S-array chip; I then binned each chip in chipx and chipy to obtain a detector image; the detector image was then collapsed to a 1D image in chipx by binning all rows for each column. Using *dmstat* I found the sum of all events per chip, scaled each sum by a factor of 100 for the normalization and divided by the exposure time of 5 ks to arrive at the expected count rate.

Table 1 shows the results for this simulation. I also provide an upper limit for the expected count rate on S2 because the pointing of this observation has changed slightly since the first simulation and it is expected that the dispersed spectrum will not hit S2 at all during the observation. If, however, it does I am providing the count rate derived from my earlier simulation using uniform QE. Note also that the observer requested a spatial window on S3 that accepts 1 out of every 10 events so the actual count rate would be 50 cts/sec, but I've reduced this for the spatial window.

Table 1: Sco X-1 Count Rate Predictions

Chip	EvtSum	Scaled	AvgCR (ct/s)
S0	10555	1055500	211.10
S1	17875	1787500	357.50
S2	1229	122900	024.58
S3*	257.2	25720	005.14
S4	20167	2016700	403.34
S5	14266	1426600	285.32