Using Chandra Event Histogram Data to Characterize the High-Energy Particle Background

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Abstract

In "Event Histogram" mode, ACIS (Advanced CCD Imaging Spectrometer) outputs pulse-height histograms (spectra) of events with grades of ASCA g02346 collected from 5.4 ks time intervals. ACIS utilizes "Event Histogram" mode for exposure times longer than 5 ks where HRC-I or HRC-S is in the focal plane. Since ACIS views the inside of the SIM (Scientific Instrument Module) at these times, these spectra help put limits on the high-energy particle background without contamination from the sky. Separate histogram files are produced for each node of the I1, I2, I3, S2, and S3 chips. For each observation, ACIS generates histogram files for either the top 200 rows (rows 801-1001) or the bottom 200 rows (rows 21-221) of the chip and node. We analyzed composite front-side (I3) and back-side (S3) spectra derived from these histogram files. We consider only spectra taken at a focal plane temperature of -120 K. We focus primarily on the broad energy bands from 0.3-10 keV, 5-10 keV, 0.5-2 keV, and 0.5-7 keV. From these spectra we place limits on the variability of the high-energy particle background. We find an average count rate (top and bottom of chip averaged together, corrected for the full chip) in the 0.3-10 keV band of 0.807 counts/s on S3 and 0.309 counts/s on I3.

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