Flight Device	Event† Grades	Fraction of Events per Event Grade				
		Quad A	Quad B	Quad C	Quad D	Mean
		(%)				
S1*	...	...	...	...	...	...
S3	0	5.667	5.579	5.148	5.678	5.518
	1	0.000	0.070	0.071	0.000	0.035
	2	8.000	9.275	9.944	8.754	8.993
	3	2.917	3.138	2.186	2.839	2.770
	4	2.250	2.650	2.680	2.050	2.408
	5	5.250	4.393	4.443	5.836	4.981
	6	14.250	11.018	13.329	12.145	12.685
	7	61.667	63.877	62.200	62.697	62.610
	157	66.917	68.340	66.714	68.533	67.626
	B255	4.333	3.835	4.020	4.180	4.092

† All event grades except B255 are ASCA grades. Here B255 stands for ACIS bit grade code 255 (i.e., all pixels above threshold).
* See note for detector S1 in Table 4.70.

Table 4.74: Fraction of Background Events per Event Grade Measured at XRCF in the Passband 0.1–10 keV for Detectors S1 and S3

4.10.3 Predicted On-orbit Background Rates

To obtain predicted on-orbit instrumental background rates from the rates measured at XRCF, we scaled the XRCF count rates by the ratio of the on-orbit cosmic-ray flux to the cosmic-ray flux at the Earth's surface. As a first step, we analyzed simultaneous high-speed tap and telemetry data from sequence 1 of science runs 113 and 127 for detectors I3 (FI) and S3 (BI), respectively. To determine the cosmic-ray (CR) flux incident on each detector we plotted the ACIS events frame-by-frame, examined the distribution of events by eye, and decided how many cosmic rays were responsible for creating the events. Using this method the observed cosmic-ray flux, averaged over the upper hemisphere, was $(4.08 \pm 0.10) \times 10^{-3}$ CR cm^{-2} s^{-1} sr^{-1} in both I3 and S3.

According to Reinhold Müller-Mellin, principal investigator of the EPHIN instrument on AXAF, the cosmic-ray flux at the Earth's surface is fairly constant over a timescale of a day, with day-to-day variations of less than 1%. Interplanetary transients from solar events (called Forbush decreases) can cause decreases in the flux by 3–10%, while increases of a few percent are sometimes seen due to rare ground-level events. Long-term variations over the 11 year solar cycle result in variations of 15–20%. Thus, we can obtain a reasonably good check on our estimate of the cosmic-ray flux at XRCF by comparing it to the cosmic-ray flux measured by the EPHIN instrument during the AXAF thermal vacuum tests at TRW in 1998 June. Müller-Mellin analyzed 2 hours of EPHIN data on 1998 June 7 and