



Study of the residual background events in ground data from the Astro-H/SXS microcalorimeter

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The measured instrumental background of the XRS calorimeter spectrometer of Suzaku had several sources, including primary cosmic rays and secondary particles interacting with the pixels and with the silicon structure of the array. Prior to the launch of Suzaku, several data sets were taken without x-ray illumination to study the characteristics and timing of background signals produced in the array and anti-coincidence detector. Even though the source of the background in the laboratory was different from that in low-earth orbit (muons and environmental gamma-rays on the ground versus Galactic cosmic-ray (GCR) protons and alpha particles in space), the study of correlations and properties of populations of rare events was useful for establishing the preliminary screening parameters needed for selection of good science data. Sea-level muons are singly charged minimum-ionizing particles, like the GCR protons, and thus were good probes of the effectiveness of screening via the signals from the anti-coincidence detector.

Here we present the first analysis of the on-ground background of the SXS calorimeter of Astro-H. On XRS, the background prior to screening was completely dominated by

coincident events on many pixels resulting from the temperature pulse arising from each large energy deposition (>200 keV) into the silicon frame around the array. The improved heat-sinking of the SXS array compared with XRS eliminated these thermal disturbances, greatly reducing the measured count rate in the absence of illumination. The removal of these events has made it easier to study the nature of the residual background and to look for additional event populations. We will compare the SXS residual background to that measured in equivalent ground data for XRS, and we will discuss the implications for the in-orbit background.