MIT
Center for Space Research

Chandra X-Ray Center

MEMORANDUM

January 24, 2005

To:	Background Working Group
From:	Glenn Allen, SDS
Subject:	Formulation of the *Chandra* Background
Revision:	1.0
URL:	http://space.mit.edu/CXC/docs/memo_background_1.0.ps
File:	/nfs/cxc/h2/gea/sds/docs/memos/memo_background_1.0.tex

The count spectrum for an observation can be expressed as

$$\begin{aligned} C(i) \quad = \quad & \int dER(i,E,x,y,t)A(E,x,y,t)S(E,x,y,t) + \\ & \int dER(i,E,x,y,t)A(E,x,y,t)B_{\mathrm{c}}(E,x,y) + \\ & \int dER(i,E,x,y,t)A(E,x,y,t)B_{\mathrm{G}}(E,x,y) + \\ & \int dER(i,E,x,y,t)B_{\mathrm{p}}(E,x,y,t) + \\ & \int dER(i,E,x,y,t)B_{\mathrm{f}}(E,x,y,t) \end{aligned} \tag{1}$$

where $C(i)$ is the number of events in pulse-height bin i, R and A are the RMF and ARF, respectively, S is the spectrum of the observed source, B_{c}, B_{G}, B_{p} and B_{f} are the background contributions from cosmic X rays, Galactic X rays, the quiescent flux of charged particles and flares of charged particles, respectively and E, x, y and t are the energy, x coordinate, y coordinate and time respectively. No distinction between the CCD coordinates and sky coordinates is made in this representation. The two background components due to charged particles instead of X rays should not have the ARF applied.