

## High-Resolution X-Ray Spectroscopy with AXAF

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**Abstract.** This paper is a very short description of the *Advanced X-ray Astronomy Facility (AXAF)* and its spectral capabilities. A more detailed description can be found at the WWW location <http://hea-www.harvard.edu/asc/SIN/SIN.html>.

### 1. AXAF

The *Advanced X-ray Astronomy Facility (AXAF)* is scheduled to be launched by NASA on 1998 August 27. The first call for proposals (NRA) is planned for 1997 September 1.

*AXAF* will observe the sky in a wide X-ray band (0.1–10 keV). The angular resolution of *AXAF* is 0".5 (FWHM). *AXAF* will then return extremely good images of the X-ray sky, and because of its small beam size will be able to achieve very deep, sensitive images.

*AXAF* is not only an imaging telescope, it also carries medium and high-resolution X-ray spectrometers.

#### 1.1. ACIS

The *AXAF* CCD Imaging Spectrometer (ACIS) is one of the two focal-plane detectors and achieves moderate spectral resolution with  $E/\Delta E \approx 10\text{--}60$ , increasing to high energies. Its effective area is a factor of  $\sim 2$  larger than that of *ASCA* (in the currently used one-CCD observing mode) between 2 and 10 keV. It is much superior at lower energies, going from 800 cm<sup>2</sup> at 1 keV to 200 cm<sup>2</sup> down to 0.2–0.3 keV. Because the *AXAF* beam size is 10<sup>4</sup> times smaller than that of *ASCA*, background is negligible for point sources. The imager field of view is 16'  $\times$  16'.

#### 1.2. Gratings

There are two sets of gratings in *AXAF*, whose dispersed spectrum will be imaged onto each of the two focal-plane detectors, the High Resolution Camera (HRC) and ACIS. The spectral resolution of the gratings is  $E/\Delta E \approx 200\text{--}3000$ , increasing at lower energies. No slit is available. This limits the use of gratings to point-like sources, and care in the choice of the satellite roll angle will have to be taken when observing crowded fields.

**LETG** The Low Energy Transmission Grating (LETG) spectra are imaged on the HRC. The effective area ranges between  $10 \text{ cm}^2$  and  $40 \text{ cm}^2$  between 0.1 and 5 keV. A two-facet reflection filter (the Drake flat) will be used for order separation.

**HETG** The High Energy Transmission Grating (HETG) spectra are imaged on the ACIS. Since the ACIS is itself a spectrometer, this provides an immediate advantage for grating spectral-order separation. The effective area ranges from  $10 \text{ cm}^2$  at 0.5 keV to  $100 \text{ cm}^2$  on average between 1 and 5 keV.

## 2. For More Information

More information on *AXAF* and its instruments can be found at the following World Wide Web addresses:

<http://hea-www.harvard.edu/asc/axaf-welcome.html>

<http://hea-www.harvard.edu/asc/SIN/SIN.html>