

A suborbital payload for soft X-ray spectroscopy of extended sources

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Abstract We present a suborbital rocket payload capable of performing soft X-ray spectroscopy on extended sources. The payload can reach resolutions of ~ 100 ($\lambda/\Delta\lambda$) over sources as large as 3.25° in diameter in the 17–107 Å band-pass. This permits analysis of the overall energy balance of nearby supernova remnants and the detailed nature of the diffuse soft X-ray background. The main components of the instrument are: wire grid collimators, off-plane grating arrays and gaseous electron multiplier detectors. This payload is adaptable to longer duration orbital rockets given its comparatively simple pointing and telemetry requirements and an abundance of potential science targets.

Keywords Suborbital rockets · X-ray spectroscopy · Gaseous electron multipliers · Off-plane gratings · X-ray detectors · Grazing incidence optics

1 Introduction

The ROSAT all sky survey imaged a wealth of extended soft X-ray emission and highlighted the need for a high resolution extended spectroscopic instrument [35] and [36]. Potential science includes probing the composition and evolution of supernova remnants [11, 17, 19, 31], studying the specifics of charge exchange of the solar wind with interstellar neutrals [9, 10, 21],

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