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The alignment of the Marshall Grazing Incidence X-Ray Spectrometer (MaGIXS)

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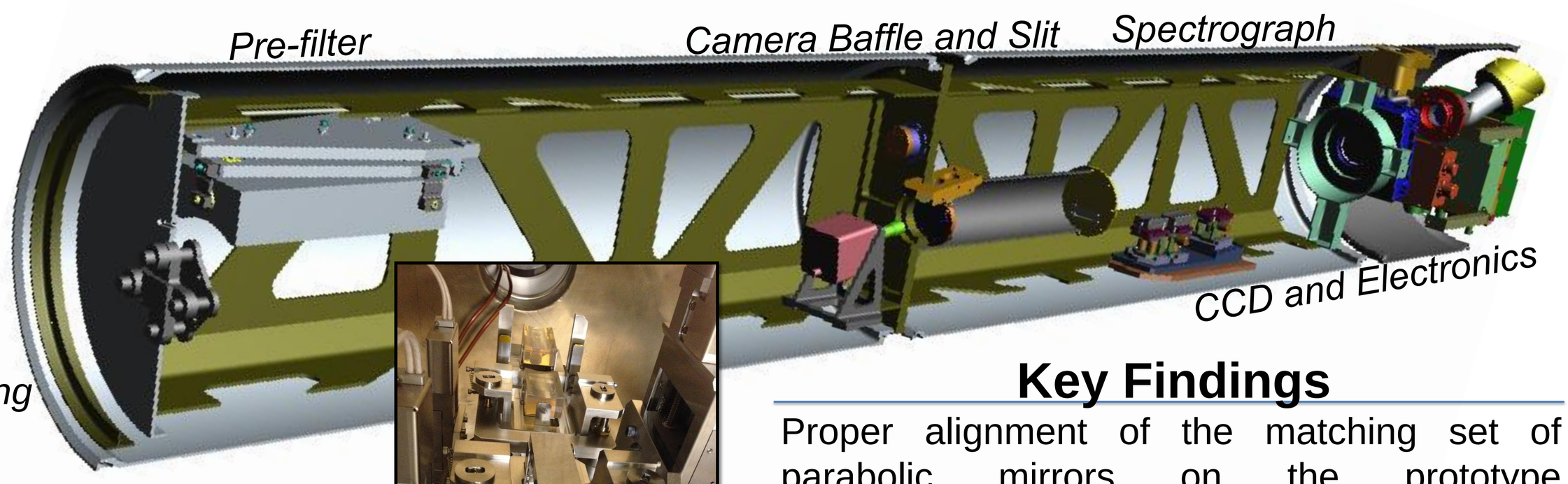
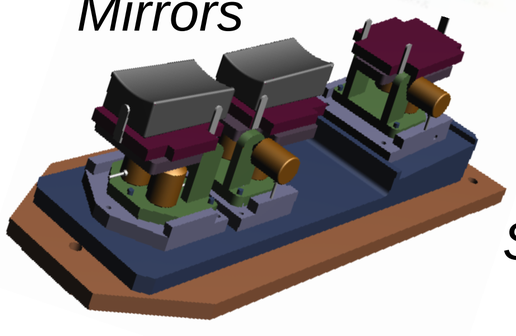
Overview of Project

The proposed sounding rocket experiment, MaGIXS, journeys into the unknown to provide essential insight into enigmatic components of coronal heating mechanisms. Unlike previous x-ray instruments flown in the past, MaGIXS is designed to be the first spectrometer to take instantaneous, astigmatism corrected, spatially resolved spectra of magnetic field structures in an active region on the Sun.

Impact on Society

Observing the fundamental operations of the Sun's active regions is key in predicting space weather and its implications on Earth's communications networks which are principally satellite based. MaGIXS will provide insight on the frequency of energy release to update current coronal mass ejection and active region structure models; of which have roles in determining the behavior of space weather.





Two Matching Parabolic Mirrors

MaGIXS Prototype Spectrometer

Explanation

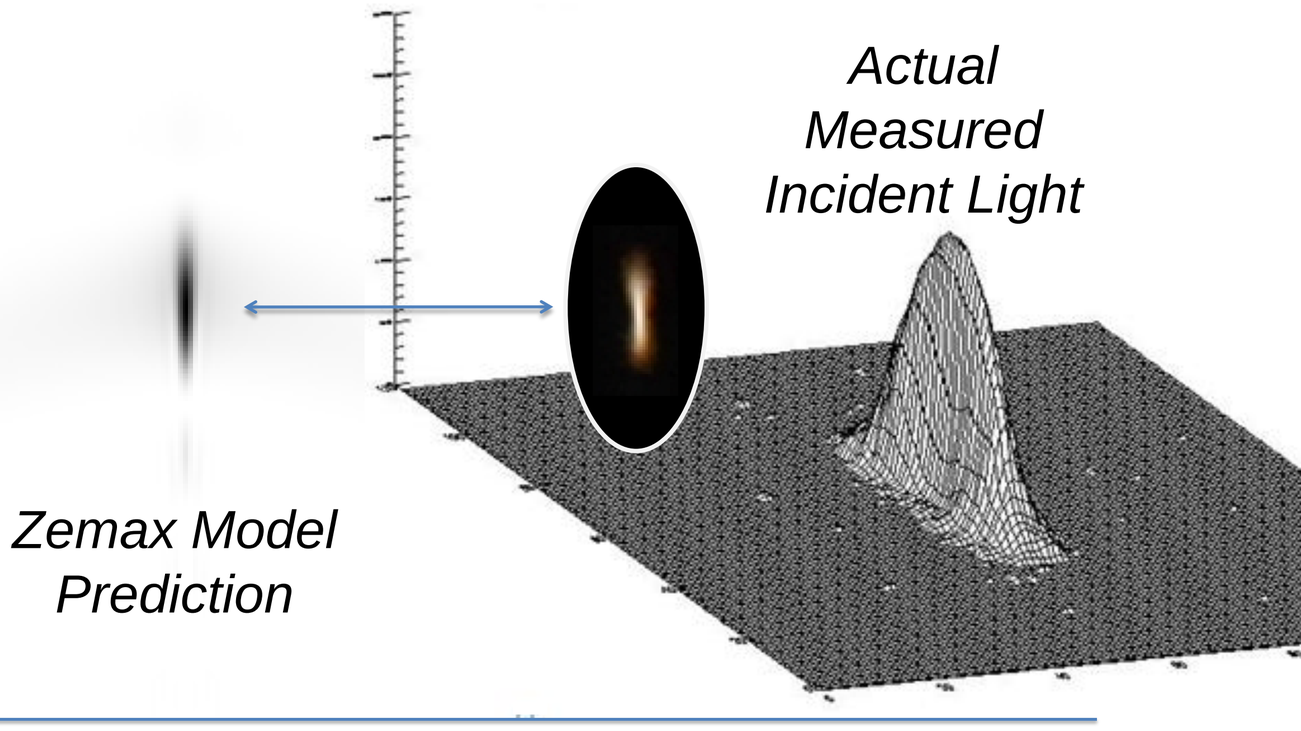
To understand near-Earth plasma dynamics and their effects on our atmosphere, it is vital that new instruments are developed to measure complex structures on the Sun. MaGIXS seeks to improve on and build upon proven technology while expanding space science and exploration; thereby increasing scientific understanding of the mechanisms that drive the Sun's activity.

MaGIXS Specs

Spectral Range	0.6 - 2.4 nm
Spectral Resolution	2.0 pm
Spatial Resolution	5"
Energy Range	0.5 – 2.0 keV

Key Findings

Proper alignment of the matching set of parabolic mirrors on the prototype spectrometer required a comprehensive characterization of the first parabolic mirror. An alignment procedure was established to determine the limits of focus of the spectrometer. We scanned through the range of motion available and recorded the images of a few hundred positions. We found an ideal focus via our analysis that matched the model within error.



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