

# **Studying hard X-rays from solar flares with the FOXSI rocket**

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Bremsstrahlung hard X-rays (HXR) are one of the best diagnostics of electron acceleration and evolution in solar flares. In principle, HXR can reveal where and how electrons are accelerated, map out their evolution in the solar corona, and assess the capabilities of flares (including small “nanoflares”) to provide the energy input necessary to heat the corona to its curiously high temperature (the coronal heating problem).

In the last 11 years, the RHESSI spacecraft has been remarkably successful in characterizing high-energy aspects of flares. However, RHESSI employs an indirect Fourier imaging method that is intrinsically limited in dynamic range and so can only rarely image faint coronal flare sources in the presence of bright footpoints. Further investigation requires X-ray instruments with far greater sensitivity and dynamic range.

The Focusing Optics X-ray Solar Imager (FOXSI) sounding rocket payload is an effort to meet these technological requirements by demonstrating the use of HXR focusing optics for solar observation. FOXSI flew for the first time on November 2, 2012, producing images and spectra of a microflare from 4-15 keV and performing a search for nonthermal X-rays from nanoflares in the quiet regions of the Sun. This talk will describe FOXSI's scientific motivation, the instrument, and preliminary results from its first flight. Future plans for FOXSI as well as planned solar observations by the NuSTAR astrophysics X-ray observatory will also be discussed.