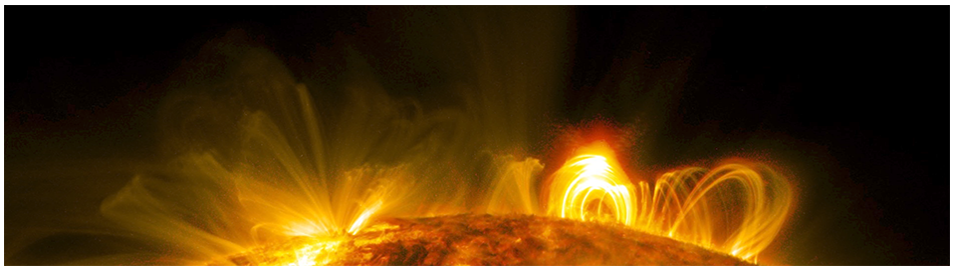

Contribution ID: **36** Type: **Poster**

Electroformed X-ray Optics Development for the FOXSI-4 Rocket Project

Wednesday 17 November 2021 09:45 (1 hour)

We have been developing X-ray optics for a fourth FOXSI (Focusing Optics X-ray Solar Imager) sounding rocket experiment, FOXSI-4, which will be launched in 2024 and part of a flare campaign to elucidate of the acceleration / heating mechanism of solar flares. Because much brighter X-ray emissions are expected, high imaging performance rather than effective area is essential. To achieve the requirement of FOXSI-4 on the angular resolution, we introduced our original electroforming technique. Our idea is to apply our original ultra-precise electroforming technique which has been developed for X-ray focusing systems in synchrotron radiation facilities to X-ray optics for astrophysics. Technologically, to fabricate larger mirrors in diameter and height (typically 10 /100 mm in diameter / height for ground X-ray focusing systems) is the most difficult challenge. As a first step, we fabricated a Wolter- I full-shell Ni test sample with height, diameter, and, thickness of 60, 60, and, 1 mm whose design parameters are optimized for FOXSI-4. We conducted X-ray irradiation tests at 15 keV and obtained focused images from the entire area successfully for the first time. Even though the resultant angular resolution in HPD is >30 arcsec due to remaining low- / mid-frequency figure errors in an axial direction, a sharp inner core with an FWHM value of ~4 arcsec is observed because of a very low figure error in a circumferential direction as expected from the inner surface profiles. It is also found that spot scan measurements with a beam size of 1 mm x 5 mm reveal a spatial variation in their performances and some of the areas achieved ~20 arcsec in HPD. Design, fabrication, and evaluation of the mirror module assembly are currently in progress and the impact of the mounting process will also be evaluated using Xray. We will show recent status of our development and future plans.

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