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Small Space Science Missions (2)

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THE IXRD ON SHARJAH-SAT-1 CUBESAT, THE SCIENCE MISSION AND GROUND
CALIBRATION

Abstract

The Sharjah-Sat-1 3U CubeSat is designed and realized together with the Sharjah Academy for Astronomy, Space Sciences, and Technology (SAASST), the University of Sharjah (UoS), Istanbul Technical University (ITU), and Sabanci University (SU). It has two scientific objectives: Performing X-ray astronomy observations and capturing remote sensing and Earth observation images of the United Arab Emirates. The CubeSat is to be launched by the third quarter of 2022 and is currently in the Flight-Model integration Phase.

The primary science payload is the iXRD (Improved X-Ray Detector) with the main objective of observing very bright transient and persistent galactic hard X-ray sources. It will use a pixelated 5 mm CdZnTe-based crystal as an active material with an energy range of 25 keV to 300 keV, and a spectral resolution between 5 keV-10 at 60 keV depending on the pixel size. A Tungsten collimator with a field of view of 4.26 degrees and a tungsten shield at the back decrease the cosmic X-ray background and Earth albedo background. Its' second objective is the solar observations to study the hard X-ray spectra of flares and coronal holes. Transient bright events (e.g. GRBs and magnetar bursts) are other potential targets. This presentation will show the results of laboratory calibration, TVAC tests as well as sensitivity analysis based on in-orbit background simulations to support its science objectives.