

Study of Al-26 in the COSI 2016 Superpressure Balloon Flight

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The Compton Spectrometer and Imager (COSI) is a balloon-borne compact Compton telescope (CCT) designed to survey the gamma-ray sky in 0.2-5 MeV. COSI's wide field of view, excellent energy resolution from cross-strip high-purity germanium semiconductor detectors, and improved angular resolution make it uniquely capable to probe this under-explored energy regime and make contributions to understanding of stellar nucleosynthesis, particularly through studies of diffuse emission from radioisotope Al-26 at 1.809 MeV. In 2016, COSI was launched from Wanaka, New Zealand on a NASA Superpressure balloon and flew for 46-days. The flight was a technologic and scientific success, boasting live detection and polarization studies of GRB160530A, imaging of the Crab Nebula and the 511-keV positron annihilation emission at the Galactic Center, and detection of Cyg-X1. This presentation details a new maximum-likelihood search for the 1.809 MeV signature of Galactic Al-26 in the 2016 data. The analysis reveals promising signs of an Al-26 signature, and further exploration is currently underway to solidify a measurement. Hence, this work demonstrates COSI's ability to reveal critical astrophysical nuclear lines and the powerful capabilities of CCTs like COSI on a balloon platform.

Keywords

Al-26; nucleosynthesis; gamma-ray detector; Compton telescope; COSI; balloon; diffuse emission; spectroscopy

Collaboration

other (fill field below)

other Collaboration

Compton Spectrometer and Imager (COSI)

Subcategory

Experimental Results

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