Study of ^{26}Al in the COSI 2016 superpressure balloon flight

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What is this contribution about?

This contribution presents the first search for Galactic emission of ^{26}Al in the Compton Spectrometer and Imager (COSI) 2016 superpressure balloon flight, expanding COSI's notable portfolio of flight achievements to include measurement of important nucleosynthesis signatures.

Why is it relevant / interesting?

In an effort to elucidate the true sources of ^{26}Al emission, probe stellar nucleosynthesis, and study feedback of synthesized elements into the ISM, additional measurements ^{26}Al are required to augment the existing observations by HEAO-3, COMPTEL, and SPI; measurement of ^{26}Al by COSI is one such contribution and is key proof-of-concept for future MeV gamma-ray missions.

What have we done?

We have conducted a maximum likelihood search of COSI's 2016 balloon flight data, focusing our signal region to the Inner Galaxy (where the diffuse emission is concentrated) and modeling the background using flight data from outside of the expected signal region.

What is the result?

We report a measurement of ^{26}Al with 3.7σ significance above background at an energy of 1811.3 ± 1.9 keV and rate of 6.8×10^{-4} counts s^{-1}; within 2σ uncertainties, the measured flux of $(17.0 \pm 4.9) \times 10^{-4}$ ph cm^{-2} s^{-1} is consistent with expectations from simulations.

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