

Analysis and Model-Fitting to OSSE Observations of Positron Annihilation Radiation

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Utilizing OSSE observations from eight years of operation, a dataset containing almost 1400 individual pointings has been generated of the 511 keV line and the positronium continuum that are produced when positrons annihilate with electrons. The use of this dataset to map the galactic distribution of positron annihilation radiation is presented elsewhere at this meeting, This poster concentrates upon the various quantitative analyses that have been performed using the data.

When used in its entirety, this dataset enables discrimination between potential sources of galactic positrons by model-fitting various spatial distributions; twenty models are compared singly and in combination to the data. Similarly, approximating the shape of the bulge and disk components to be gaussians, the best fit parameters of one, two and three gaussian models are shown.

Elements of this dataset are extracted to address particular emission features. The 511 keV line, the total annihilation radiation, and the 475-650 keV energy band emission from the Galactic Center has been monitored to investigate the time-invariance of this portion of the emission. A similar monitoring of Cygnus X-1 demonstrates the ability to obtain accurate fitted 511 keV line and positronium continuum values in the presence of underlying emission. Simplified 1D studies of the bulge and disk emission are shown, demonstrating the diffuse nature of the bulge and the >3 thickness of the disk. The search for evidence of emission from other locations in the sky is undertaken.