

## The Variability of Cygnus X-1 at MeV Energies

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In previous work, we have used data from the first three years of the CGRO mission to assemble a broad-band  $\gamma$ -ray spectrum of the galactic black hole candidate Cygnus X-1. Contemporaneous data from the COMPTEL, OSSE and BATSE experiments on CGRO were further selected on the basis of the hard X-ray flux (45–140 keV) as measured by BATSE. The resulting spectrum provided a consistent picture of the emission in the low energy  $\gamma$ -ray range above 100 keV for Cygnus X-1 in its canonical low soft X-ray state. This spectrum can be generally described as an exponential-type spectrum with clear evidence for emission out to at least 2 MeV and perhaps as high as 5 MeV. Here we report on a comparison of this spectrum to a COMPTEL-OSSE spectrum collected during a high soft X-ray state of Cygnus X-1 (May, 1996). This comparison results in evidence for significant variability at energies above 1 MeV. In particular, whereas the hard X-ray flux *decreases* during the high soft X-ray state, the flux at energies above 1 MeV *increases*, resulting in a significantly harder high energy spectrum. Furthermore, the combined COMPTEL-OSSE spectrum shows much less curvature and can be well-described by a single power-law form. This behavior is consistent with the general picture that has emerged over the last several years of galactic black hole candidates having two distinct spectral forms at energies above 50 keV. These data extend this picture, for the first time, to energies well above 1 MeV.