

## Astrophysics &gt; Cosmology and Extragalactic Astrophysics

# Significant X-ray Line Emission in the 5-6 keV band of NGC 4051

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A Suzaku X-ray observation of NGC 4051 taken during 2005 Nov reveals line emission at 5.44 keV in the rest-frame of the galaxy which does not have an obvious origin in known rest-frame atomic transitions. The improvement to the fit statistic when this line is accounted for establishes its reality at >99.9% confidence: we have also verified that the line is detected in the three XIS units independently. Comparison between the data and Monte Carlo simulations shows that the probability of the line being a statistical fluctuation is  $p < 3.3 \times 10^{-4}$ . Consideration of three independent line detections in Suzaku data taken at different epochs yields a probability  $p < 3 \times 10^{-11}$  and thus conclusively demonstrates that it cannot be a statistical fluctuation in the data. The new line and a strong component of Fe K $\alpha$  emission from neutral material are prominent when the source flux is low, during 2005. Spectra from 2008 show evidence for a line consistent with having the same flux and energy as that observed during 2005, but inconsistent with having a constant equivalent width against the observed continuum. The stability of the line flux and energy suggests that it may not arise in transient hotspots, as has been suggested for similar lines in other sources, but could arise from a special location in the reprocessor, such as the inner edge of the accretion disk. Alternatively, the line energy may be explained by spallation of Fe into Cr, as discussed in a companion paper.

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