



## [Astronomy Department Faculty Publication Series](#)

# [The Galactic Central Diffuse X-Ray Enhancement: A Differential Absorption/Emission Analysis](#)

[Download](#)

[Find in your library](#)

[Y Yao](#)

[QD Wang, University of Massachusetts - Amherst](#)

[Follow](#)

Publication Date

2007

Comments

This is the pre-published version harvested from ArXiv. The published version is located at [http://iopscience.iop.org/0004-637X/666/1/242?v\\_showaffiliations=no](http://iopscience.iop.org/0004-637X/666/1/242?v_showaffiliations=no)

Abstract

The soft X-ray background shows a general enhancement toward the inner region of the Galaxy. But whether this enhancement is a local feature (e.g., a superbubble within a distance of 200 pc) and/or a phenomenon related to energetic outflows from the Galactic center/bulge remains unclear. Here we report a comparative X-ray emission and absorption study of diffuse hot gas along the sight lines toward 3C 273 and Mrk 421, on and off the enhancement, but at similar Galactic latitudes. The diffuse 3/4 keV emission intensity, as estimated from the *ROSAT* All Sky Survey, is about 3 times higher toward 3C 273 than toward Mrk 421. Based on archival *Chandra* grating observations of these two AGNs, we detect X-ray absorption lines (e.g., O VII K $\alpha$ , K $\beta$ , and O VIII K $\alpha$  transitions at  $z \sim 0$ ) and find that the mean hot gas thermal and kinematic properties along the two sight lines are significantly different. By subtracting the foreground and background contribution, as determined along the Mrk 421 sight line, we isolate the net X-ray absorption and emission produced by the hot gas associated with the enhancement in the direction of 3C 273. From a joint analysis of these differential data sets, we obtain the



Included in

[Astrophysics and](#)

[Astronomy Commons](#)

[SHARE](#)

Enter search terms:

in this series



[Advanced Search](#)

 [Notify me via email or RSS](#)

[Browse](#)

[Collections](#)

[Disciplines](#)

[Authors](#)

[Author Corner](#)

[Author FAQ](#)

[Links](#)

[University Libraries](#)

[UMass Amherst](#)

[Contact Us](#)



**UMASS  
AMHERST**

temperature, dispersion velocity, and hydrogen column density as  $2.0$  ( $1.6, 2.3$ )  $\times 10^6$  K,  $216(104, 480)$  km s $^{-1}$ , and  $2.2(1.4, 4.1) \times 10^{19}$  cm $^{-2}$ , respectively (90% confidence intervals), assuming that the gas is approximately isothermal, solar in metal abundances, and equilibrium in collisional ionization. We also constrain the effective line-of-sight extent of the gas to be  $3.4(1.0, 10.1)$  kpc, strongly suggesting that the enhancement most likely represents a Galactic central phenomenon.

Pages  
242-

Volume  
666

Issue  
1

Journal Title  
The Astrophysical Journal



This page is sponsored by the [University Libraries](#).

© 2009 [University of Massachusetts Amherst](#) • [Site Policies](#)

 DIGITALCOMMONS<sup>®</sup>  
powered by bepress