Probing the Dusty Warm Absorbers in MCG–6-30-15 & Mrk 766 with the Chandra HETG

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[Contributed talk, 15min.]

Abstract

HETG spectra of the Seyfert 1 galaxy MCG–6-30-15 show numerous narrow, unresolved (FWHM $< 200\ \mathrm{km\,s^{-1}}$) absorption lines from a wide range of ionization states of N, O, Mg, Ne, Si, S, Ar, and Fe. The initial analysis of these data, presented in Lee et al. (2001), shows that a dusty warm absorber model adequately explains the spectral features > 0.48 keV (< 26 Å). We attribute previous reports of an apparently highly redshifted O VII edge to the $1\mathrm{s}^2 - 1\mathrm{s}n\mathrm{p}$ $(n > 5)$ O VII resonance lines, and a neutral Fe L absorption complex. The implied dust column density needed to explain the Fe L feature agrees with that obtained from earlier reddening studies, which had already concluded that the dust should be associated with the ionized absorber (given the relatively lower observed absorption by cold gas). Our findings contradict the interpretation of Branduardi-Raymont et al. (2001), based on XMM-Newton RGS spectra, that this spectral region is dominated by highly relativistic soft X-ray line emission originating near the central black hole. Here we review these issues and present more detailed measurements of the absorption lines, constrain the implied range of ionization in the warm absorber, and present the HETG spectrum of the Fe K line region. In addition, we present preliminary results on the HETG spectrum of another reddened Seyfert galaxy, Mrk 766, which Branduardi-Raymont et al. also reported as containing relativistic soft X-ray lines.

CATEGORY: ACTIVE GALAXIES AND QUASARS