

Measure the Gas to Dust Ratio Towards Bright Sources in the Galactic Bulge

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Abstract : Knowing the dust content in the interstellar matter is necessary to understand the composition and evolution of the interstellar medium (ISM). The metal composition of the ISM enables us to study the cooling and heating processes that dominate the star formation rates in our Galaxy. The Chandra High Energy Transmission Grating (HETG) Spectrometer provides a unique opportunity to measure element dust compositions through X-ray edge absorption structure. We measure gas to dust optical depth ratios towards 9 bright Low-Mass X-ray Binaries (LMXBs) in the Galactic Bulge with the highest precision so far. Well calibrated and pile-up free optical depths are measured with the HETG spectrometer with respect to broadband hydrogen equivalent absorption in bright LMXBs: 4U 1636-53, Ser X-1, GX 3+1, 4U 1728-34, 4U 1705-44, GX 340+0, GX 13+1, GX 5-1, and GX 349+2. From the optical depths results, we deduce gas to dust ratios for various silicates in the ISM and present our results for the Si K edge in different lines of sight towards the Galactic Bulge.

Keywords : low-mass X-ray binaries, interstellar medium, gas to dust ratio, spectrometer

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