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Demography of Faint X-ray Sources in Galactic Bulge and Globular Clusters

We have studied the luminosity functions (LFs) and X-ray Spectra of faint X-ray sources in four Galactic globular clusters (GCs, including 47 Tuc, NGC 6266, NGC 6397 and ω-Cen) and a field toward the Galactic Bulge (GB), using deep {\it Chandra} observations. Our analysis of the LFs statistically accounts for the detection incompleteness and Eddington bias as well as the background source contamination. The LF of the GB is consistent with that of such sources in the field (solar neighborhood), whereas those of the GCs appear substantially flatter. The flattening of the LFs is correlated with the stellar encounter rates of the GC, suggesting a dynamical origin for many of the X-ray sources. We further find that the specific source number of X-ray sources is generally smaller for those with luminosities less than 5×10^{30} erg s^{-1}. The exception is ω-Cen, the LF slope of which is similar to that of the field/GB, but the specific source number is about a factor of $\sim 3-10$ lower than that in the GB/field, apparently due to a low initial binary fraction, as well as the old age and the dynamically un-evolved nature of the cluster. We extract individual and accumulated spectra for X-ray sources in each of the targets. The fitting results show the hardness of the spectra is related to the luminosity ranges and the environments. We further build a log-normal distributed, partially ionized warm absorber model and apply to the CVs in the GCs and in the Bulge, the results can help us understand the masses of WDs and the properties of accreted matter in CVs

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