Neutron-Star Low-Mass X-ray Binaries with High Neon Abundance

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Abstract

There are three NS/LMXBs (4U 0614+091, 4U 0918-549, and 4U 1543-624) whose low-resolution X-ray spectrum shows a soft excess residual near 0.7 keV that has been attributed to unresolved line emission. However, a recent Chandra/LETGS observation of 4U 0614+091 failed to detect this feature, although it did show an unexpectedly strong Ne-K absorption edge, indicating an unusually high Ne/O ratio along the line of sight. Our archival study of ASCA spectra of LMXBs has identified a fourth soft excess source, 4U 1850-087. We show that, for all four of these sources, the soft excess residual in the ASCA spectra is eliminated if a high Ne/O ratio is allowed. We propose that, for each of these binaries, the excess neon is local to the source, and we discuss implications for the nature of the mass donor and the evolutionary history of the binary.

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