The Micro-Quasar GRS 1758-258 as Seen by *Chandra*

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Abstract

GRS 1758-258 and its sister source 1E 1740.7-2942 were the first objects dubbed “micro-quasars”. Their hard X-ray spectra are typical of Galactic black hole candidates, and they are apparently associated with time variable cores of double-lobed radio sources, reminiscent of extra-Galactic radio sources. This morphology, seen on a parsec scale within the Milky Way, earned them their nickname. We observed GRS 1758-258 four times with Chandra. Two HRC-I observations were made in 2000 September-October spanning an intermediate-to-hard spectral transition (identified with the *RXTE*). Another HRC-I and an ACIS/HETG observation were made in 2001 March following a hard-to-soft transition to a very low flux state. We report results from these observations, including the accurate source position, a search for sub-arcsecond X-ray jets, and the X-ray spectrum following the low-state transition. The position is consistent at the sub-arcsecond level with the proposed radio counterpart. Despite the presence of arcminute scale radio lobes no X-ray jets are observed. The spectrum is consistent with a multi-color disk-blackbody (with inner temperature about 0.5 keV) plus a power-law. No obvious emission lines (which might indicate relativistic jets à la SS433) are detected. In the framework of a model we developed to explain *RXTE* observations, we interpret the spectrum as the direct disk flux, observed after the near-complete loss of a Comptonizing corona in the low-state transition.

CATEGORY: BLACK HOLE AND NEUTRON STAR BINARIES