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Published in:
The astronomer's telegram

Citation for published version (APA):

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The neutron star LMXB 1RXS J180408.9-342058 transitioned to a soft X-ray state

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Subjects: X-ray, Neutron Star, Transient

The neutron star low-mass X-ray binary 1RXS J180408.9-342058 started an accretion outburst in 2015 January (ATel #6997) and has remained active since. Around April 3, a significant drop in the hard (15-50 keV) X-rays is seen by Swift/BAT, whereas an increase in the softer X-rays (2-10 keV) is seen by MAXI. This suggests that the source has transitioned to a soft X-ray spectral state.

Pointed Swift/XRT observations show that in February-March the source was in a hard X-ray spectral state. Radio jets were detected and the 0.5-10 keV X-ray spectrum was adequately described by a simple absorbed power-law model with a hydrogen column density of N_H~5E21 cm⁻², a photon index of Gamma~1.1 and an unabsorbed flux of ~(0.5-3)E-9 erg cm⁻² s⁻¹ (ATels #7039, #7255). At the estimated distance of 5.8 kpc (ATel #4050), this translates into a 0.5-10 keV luminosity of ~(0.2-1)E37 erg s⁻¹. However, Swift/XRT observations obtained on April 3 (1.1 ks) and April 6 (1.0 ks) show that the source brightened and that its X-ray spectrum softened. The 0.5-10 keV spectrum can now be described by a combination of a kT_disk=0.09+/−0.02 keV disk black body, a hotter kT_bb=0.9+/−0.1 keV black body, and a Gamma=1.75+/−0.15 power law (with N_H=(0.8+/−0.2)E21 cm⁻²). The inferred unabsorbed flux of ~(1-1.5)E-8 erg cm⁻² s⁻¹ translates into a luminosity of ~(4-6)E37 erg s⁻¹ at 5.8 kpc (0.5-10 keV). These two Swift/XRT observations show two absorption features around ~7 and ~8 keV that could possibly correspond to ionized iron and may indicate the presence of an accretion disk wind. These properties are indeed characteristic of a soft X-ray spectral state.

Swift/XRT monitoring of 1RXS J180408.9-342058 is ongoing. Multi-wavelength observations are encouraged.
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