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Degenaar, N.; Altamirano, D.; Deller, A.; Heinke, C.; Hessels, J.; Jaodand, A.; Miller-Jones, J.; Moldon, J.; Wijnands, R.

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

ATel #7352; *N. Degenaar (Cambridge), D. Altamirano (Southampton), A. Deller (ASTRON), C. Heinke (Alberta), J. Hessels (Amsterdam/ASTRON), A. Joadand (ASTRON), J. Miller-Jones (Curtin), J. Moldon (ASTRON), R. Wijnands (Amsterdam)*
 on 7 Apr 2015; 14:53 UT

Credential Certification: *Nathalie Degenaar (degenaar@ast.cam.ac.uk)*

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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 $N_H \sim 5E21$ cm⁻², a photon index of $\Gamma \sim 1.1$ and an unabsorbed flux of $\sim (0.5-3)E-9$ 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 $\sim (0.2-1)E37$ 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 $kT_{\text{disk}} = 0.09 \pm 0.02$ keV disk black body, a hotter $kT_{\text{bb}} = 0.9 \pm 0.1$ keV black body, and a $\Gamma = 1.75 \pm 0.15$ power law (with $N_H = (0.8 \pm 0.2)E21$ cm⁻²). The inferred unabsorbed flux of $\sim (1-1.5)E-8$ erg cm⁻² s⁻¹ translates into a luminosity of $\sim (4-6)E37$ 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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rrutledge@astronomerstelegam.org

dfox@astronomerstelegam.org

mansi@astronomerstelegam.org