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NEW MIRA TYPE VARIABLE STAR IN AQUILA

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Inspecting the region of new microquasar candidate 1RXS J190333.1+104355 (Paredes et al., 2003) I have discovered a new red variable star located in the close vicinity of this X-ray and radio source. Its coordinates measured relative to eight USNO B1.0 reference stars with the accuracy of $0''.28$ are $19^{\text{h}}03^{\text{m}}31^{\text{s}}.960$, $+10^{\circ}43'53''.17$, 2000.0.

The variable star is located near the western border of ROSAT X-ray error circle (radius of $14''$), but far behind the border of the NVSS radio error circle (radius $7''$). It has a faint visual companion located $2''$ SW as seen in our R band CCD frame (Figure 1).

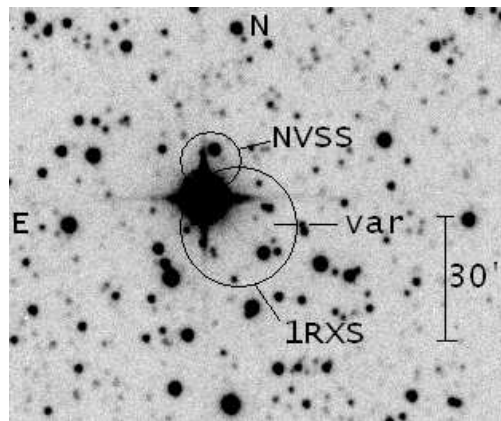


Figure 1. R band CCD image taken on 2003 September 30 showing the new variable in light minimum. X-ray and radio error circles of 1RXS J190333.1+104355 are also shown.

The sky region was monitored in June and July 2003 with CCD ST-7 in $BVRI$ bands using the 38-cm reflector of the Crimean Observatory and the 60-cm reflector of the Sternberg Institute Crimean Station. The new variable star weakened gradually from $14^{\text{m}}00$ to $14^{\text{m}}51$ in R band in the time range of JD 2452820-2452844, and from $12^{\text{m}}01$ to $12^{\text{m}}23$ in I band in the time range of JD 2452826-2452844 as seen in Figure 2. It was invisible in B and V bands. The star was detected additionally in two nights when the observations with 1-m Zeiss reflector of SAO RAN were carried out: JD 2452787, $R = 14^{\text{m}}28$, and JD 2452913, $R = 17^{\text{m}}01$, $I = 13^{\text{m}}83$. The registered range of variability is $14^{\text{m}}00 - 17^{\text{m}}01$ R . The observed slow variation with the amplitude exceeding $3^{\text{m}}R$ and red color suggest that it is a Mira type variable.

On 2003 July 30 we obtained a spectrum of the new variable star using the 6-m telescope BTA and a long slit spectrograph UAGS. The star was caught in the slit along with an optical candidate of the microquasar. The wavelength range was λ 4060-7920Å and the resolution 3Å. The fragment of this spectrum is shown in Figure 3. Numerous TiO bands, and H α emission typical for Me spectrum are identified which confirm the Mira classification.

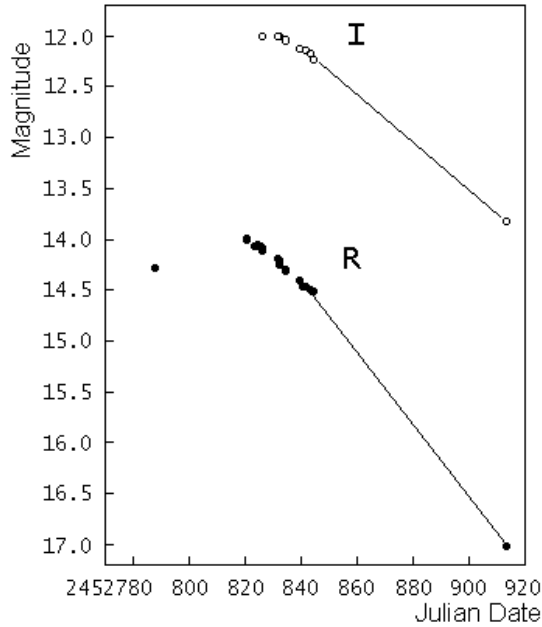


Figure 2. Light curves of new variable star in R (filled circles) and I (open circles).

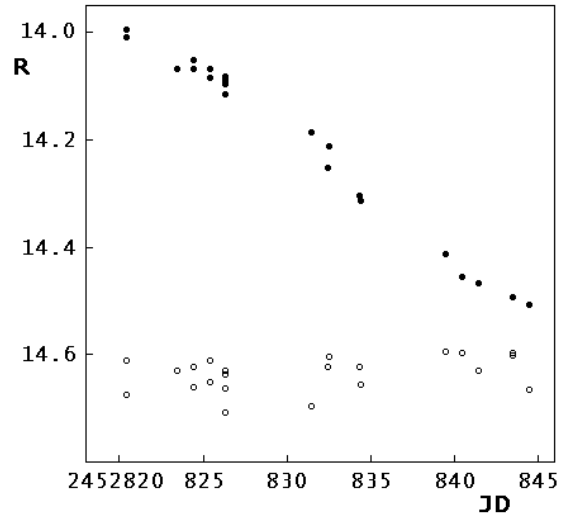


Figure 3. Fragment of light curve of new variable star (filled circles). The light curve of a red check star is shown below by open circles.

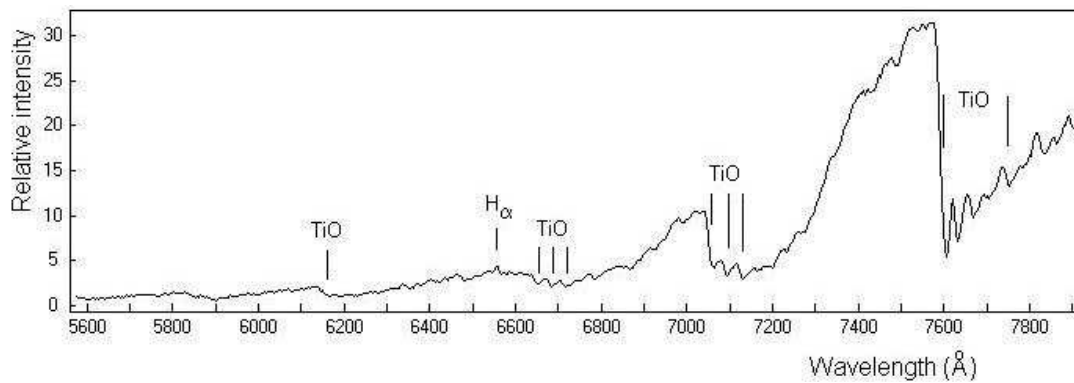


Figure 4. Spectrum of new variable star.

The observations are available through the IBVS-website as 5510-t1.txt. File includes R and I measurements of the new variable star.

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Reference:

Paredes, J. M., Ribo, M., Marti, J., 2003, *New Views on Microquasars*. Ed. Ph. Durouchoux & J. Rodriguez. Centre for Space Physics, Kolkata, India, p. 371