Multiwavelength Observations of the RV Tau Variable U Monocerotis

Vega, L. D. ; **Montez, R., Jr.** ; **Stassun, K. G.** ; **Kaminski, T.** ; **Sabin, L.** ; **Principe, D.** ; **Boyd, P. T.** ; **Schlegel, E. M.**

RV Tau variables are a subclass of post-Asymptotic Giant Branch stars in binary systems surrounded by a circumbinary disk. Their signature light curves display alternating deep and shallow minima due to pulsations. The RVb-type subset exhibits an additional longer brightness modulation due to disk occultation. It has been established that binarity plays a key role in the dynamics and evolution of this short-lived post-AGB phase however the interconnection of the different physical components in these systems is still not well understood. We present multiwavelength observations of the prototypical RVb variable U Mon (mean Vmag ~6.4; D ~1 kpc) from XMM-Newton, SMA, DASCH, and AAVSO. U Mon has a pulsation period of 91.48 days and a longer brightness modulation period of 2451 days, consistent with the radial-velocity binary orbital period. We estimated the mass of the binary and the orbital semi-major axis which is consistent with the interaction of the binary with the inner edge of the circumbinary disk. U Mon hosts a 10 G magnetic field at its stellar surface which may be linked to X-rays detected by XMM-Newton. The X-ray emission is characteristic of a hot plasma (10 MK) with L_X/L_{bol}~10^{-7}. Based on our SMA observations, U Mon has a highly-inclined extended disk. From U Mon's combined DASCH and AAVSO data, there is evidence that U Mon has an even longer trend possibly due to inner-disk precession. We predict that the next deepest long-term minimum will be within the next decade.

Publication:	American Astronomical Society meeting #235, id. 106.07. Bulletin of the American Astronomical Society, Vol. 52, No. 1
Pub Date:	January 2020
Bibcode:	2020AAS...23510607V