

VARIABLE STAR OF THE YEAR

Variable Star of the Year – U Monocerotis

U Mon is the second brightest of the RV Tauri class of variable star and the brightest of the RVb sub-classification.

RV Tauri stars are pulsating yellow supergiant stars whose light curves are characterized by alternating deep and shallow minima. They have spectral types F to G at maximum, and K to M at minimum. They appear to be old stars with masses similar to the sun varying up to 4 magnitudes in periods ranging from 30 to 150 days. There are two sub-classes of RV Tauri stars based on their photometric behavior where class RVa has a constant mean brightness and class RVb shows long-term cyclic variation.

U Mon has a spectral class of F8-K0 with physical parameters of 2.07 solar masses, an effective temperature of 5000K and lies at a distance of 1100 parsecs. So far it is the only RV Tauri star to have had X-ray emission detected.

The primary period of U Mon, that is the interval between successive deep minima caused by pulsation, is 91 days. The secondary long-term variation is in the order of 2410 days according to BAA VSS data over the 50-year interval of 1970 to 2020 although there is a hint that the period has shortened during that time. The long-term variation is still to be fully explained although the leading theory puts it down to a binary system with a dusty circumbinary disk that periodically obscures the primary star. The period of the binary system is reported to be 2451 days which is not majorly different to the long-term photometric variation.

U Mon was discovered to be variable in 1873 by Benjamin Gould's team of observers at Cordoba who were working on the *Uranometria Argentina*. The first observations in the BAA VSS database are by Markwick in 1888 observing from South Africa.

With a declination of -10° U Mon is relatively easy to locate by star hopping 13° north-following Sirius and the star lies just 2.5° preceding alpha Mon which is shown on the accompanying chart. The field is rich with stars as it is within 4° of the Galactic Equator. From the UK U Mon can be followed throughout September to April despite the fact that the star is well to the south of the Ecliptic.

U Mon normally varies between magnitude 5.5 and 7.5 which is a comfortable brightness level for visual photometry with small binoculars. When near the minimum of the longer secondary period the variations can be suppressed to a reduced range in the order of magnitudes 7 and 8 which may then require larger binoculars particularly if there is moonlight present. The light curve illustrates very well the long-term variation. It is recommended that visual observers use the chart and sequence reproduced here to make observations at 10-day intervals if practicable.

Notes: BAAVSS charts for U Monocerotis - https://britastro.org/vss/xchartcat/u-mon_.html

