

## Variable Star of the Year – V Bootis

Positioned just 44' north preceding the third magnitude star gamma Boo, lies a rare example of a variable star that has had a significant change in amplitude within the last 100 years.

V Boo was first seen by Lalande on 22<sup>nd</sup> May 1797 and catalogued as L126514 at mag 8.9 as part of his “Histoire Celeste”. It was then measured at mag 7.5 on 17<sup>th</sup> February 1857 as part of the “Bonner Durchmusterung” work and catalogued as DM+39 2773. Nils C Duner at Lund Observatory, Sweden who had initially logged the star at mag 7.0 on both 29<sup>th</sup> April and 9<sup>th</sup> May 1880, also noted its red and yellow colour through spectroscopic examination on the 18<sup>th</sup> & 19<sup>th</sup> May 1882. Duner began to monitor the star visually on a regular basis and detected steady variation and announced the variability discovery on the 21<sup>st</sup> May 1884. In 1886 Duner analysed all his observations and calculated a period of 266.2 days. Writing in 1893 Duner said that he estimated the range of the variable to be between mag 6.9 and 11.8. Using all maxima and minima reported up to 1908 Cannon refined the period to be 259 days. The spectral class is reported to be M6e.

V Boo was added to the BAA VSS programme in 1911 and good coverage of the variations has now been attained for over a Century. In the first decade of monitoring the range was typical of a high amplitude SRa or low amplitude Mira star in the order of mag 7.0 to 11.0. The amplitude has steadily decreased however, and by 2000 the variations were confined between mags 8.2 and 9.5. The mean magnitude and principle period of 258 days has remained constant throughout the amplitude reduction. The variations in the 21<sup>st</sup> Century are now more consistent with a SRb star. The accompanying light curves illustrate the drastic change which has occurred in 100 years in addition to revealing that the star often exhibits double maxima.

Analysis by Greaves & Pejcha in 2001 offered an explanation for the amplitude decrease. They claim to have detected two similar pulsation periods, one of 257.8 days and the other of 259.2 days and each has a range of 1.2 magnitudes (the 259.2 day period is less stable). Interaction between these periods suppresses or enhances the overall amplitude over long timescales. If this analysis is correct then the star has not changed classification (it is class SRa) and we can expect to see a gradual amplitude increase again in the future. This illustrates the importance of amateur astronomers continuing to systematically monitor all red pulsating variable stars and V Boo in particular.

V Boo can be followed throughout its currently reduced amplitude range with moderate to large binoculars. It can be followed all year round from the British Isles but is largely a morning object during the winter months of November through to January. As with all red pulsating stars observers are requested to secure observations at intervals of around 10 days.

