

Variable Star of the Year - SV Sagittae

SV Sagittae (SV Sge) has been known to astronomers since its variability was discovered photographically by Russian astronomer Vladimir Albitsky in 1928. He published twenty observations from 1904 to 1926, revealing a rise in brightness from 13.9 to 11.6 during 1926. He didn't, however, speculate on the type of variable star SV Sge might be, due to a lack of observations. In 1938 SV Sge was included in a list of suspected RCB type variables by Celia Payne and Sergei Gaposchkin – with some reservations – and finally included in the third supplement of the General Catalogue of Variable Stars (GCVS) as type RCB in 1976. [1]

RCB stars (or R Coronae Borealis Stars) are F-G type supergiants and are some of the rarest types of star known to astronomers, wherein they contain very little or no hydrogen whatsoever (99.9% of stars do). Carbon and cyanogen are the dominant lines in the spectrum, along with helium and various metals. SV Sge itself is a rare carbon RCB star of spectral type C. Only 126 confirmed RCB stars are listed in [VSX](#) [2], of which 23 of them are type C. Fifty RCB stars can be found in Sagittarius (33) and Ophiuchus (17) alone!

The name RCB derives from the prototype star in the constellation Corona Borealis – R CrB, the first to be recognised and also the brightest in its class (see [VSOTY 2003](#)) [3].

The light curves for RCB stars are instantly recognisable, as long periods of inactivity are interrupted with sharp declines in brightness (sometimes by as much as ten magnitudes) followed by a much slower rise to maximum brightness, which on occasions can take many years to complete. These sudden fades are thought to be caused by 'clouds' of dusty carbon ejected at random which reduces the light from the star if the observer happens to lie in the line of sight. After time, these clouds thin out and disappear, resulting in a return to maximum brightness of the star. The fades and recoveries are totally unpredictable in nature, thus making the RCB stars wonderful targets for amateur variable star observers.

SV Sge can be found at 19h 08m 11.8" +17d 37' 42" (2000.0) and be seen at a maximum brightness varying between magnitudes 10 and 11. At minimum, SV Sge can fade by nearly seven magnitudes to below magnitude 17, but the depth of fade can vary quite a bit (see accompanying light curve). The field can be easily located and is a simple 3.8-degree North East star hop from the naked eye star zeta Aql (mag. 2.9) for those who use manual telescopes. The field is a rich star area, and care should be taken to correctly identify the variable when observing for the first time. That area of sky is also heavily reddened, contributing to the red appearance of SV Sge itself, and resulting in reddened stars with a high B-V value being used in the comparison star sequence. The BAAVSS have produced two finder charts with sequences – 30 arc minute and 10 arc minute fields – to help identify and measure the brightness of SV Sge [4].

The BAAVSS has been observing SV Sge since 1988, and in that time have observed nine fades in all. The most recent period of activity started in September 2018, after which SV Sge reached an historical low level of brightness in December '18 when it faded to V magnitude of 17.14. This extreme low state followed a period of 13 years at maximum brightness and was detected by BAAVSS observers who continued to monitor the star to its new record minimum despite its poor sky location in the winter of 2018-19. The star has been slowly recovering during 2019, and observers are encouraged to monitor closely for future fading episodes.

1: SV Sagittae 1899-1979, J.F Manella JAAVSO, 1980, 9 18.

2: VSX <https://www.aavso.org/vsx/>

3: BAA Handbook 2003 http://www.britastro.org/vss/VSOTY_2003_rcrb.pdf

4: BAAVSS charts for SV Sge http://www.britastro.org/vss/xchartcat/sv-sge_.html

