ASSA SHALLOW AND DEEP SKY BULLETIN

COSMIC LIGHT HOUSES IN THE CONSTELLATION CORONA BOREALIS

T CORONAE BOREALIS (T CrB) AND R CORONAE BOREALIS (R CrB)

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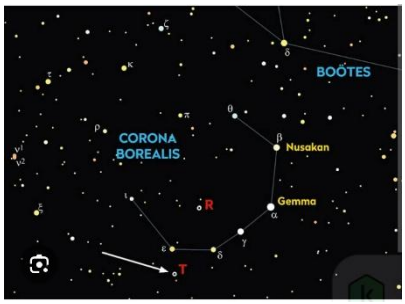
1 OVERVIEW

This Winter and Spring stargazers may witness a cataclysmic cosmic event of the first degree in the constellation Corona Borealis. Though modest in size, the Constellation Corona Borealis hosts two of the most spectacular and intriguing variable stars in the night sky, namely T Coronae Borealis (T CrB) and R Coronae Borealis (R CrB). These stars, though unrelated physically, are united by their peculiar and extreme behaviour, making them fascinating targets for long-term observational monitoring which may pay off in grand fashion before the year is out.



2 T CORONAE BOREALIS (T CrB) – "THE BLAZE STAR"

- Type: Recurrent Nova (Symbiotic binary).
- Magnitude: 10.2 (Quiescence) to 2.0 (Eruption or outburst).
- Last outburst: 1946 (also 1866).
- Distance: 2000 light years.
- Co-ordinates (J2000): RA 15h59m30.16s/Dec+25°55'12.6"

2.1 CURRENT STATUS

T CrB is a very rare class of stellar system known as a recurrent nova, one of only a handful known in our galaxy. It consists of a red giant transferring mass to a white dwarf companion. With the passage of time the accreted material on the white dwarf's surface ignites in a thermo-nuclear explosion, causing the system to flare up dramatically.

T CrB has only been observed to erupt twice: in 1866 and 1946, both times reaching second magnitude brightness. Predictions suggest the next eruption may occur in the remainder of this year, making the system a high-priority target for both amateur and professional astronomers. It should also be noted that the system has recently shown pre-eruptive behaviour, including increased UV flux and erratic optical variability.

2.2 OBSERVERS SHOULD MONITOR FOR

- Sudden optical brightening.
- Colour changes in B and V filters.
- Precursor dips in brightness similar to those observed before previous outbursts in 1866 and 1946.

2.3 OBSERVATIONAL NOTES

- T CrB is easily observable in amateur telescopes when above 10 magnitude (in quiescene).
- It lies in a rich star field, making precise identification important, use a good chart.
- The outburst rise rapidly (hours sometime days), so regular monitoring is essential.
- Record brightness estimates via visual or CCD photometry when possible. CCD and DSLR photometry are particularly valuable.
- Spectroscopic observations may detect early emission features prior to nova onset.

3 R CORONAE BOREALIS (R CrB) – THE "FADE STAR"

- Type: R Coronae Borealis variable (Hydrogen-deficient carbon star).
- Magnitude: -6.0 at maximum and can fade to >14.0.
- Distance: 6000 light years.
- Co-ordinates:
    - RA: 15h48m34.41s
    - Dec: +28°09'24.3

3.1 CURRENT STATUS

R CrB has remained in a relatively bright phase in recent months, with no major fading episodes reported as of May 2025. However, given the unpredictable nature of R CrB stars, such dimming events can occur at any time due to episodic dust ejection. This is caused by the ejection of carbon-rich material that condenses into dust clouds, temporarily obscuring the star. Fading events are irregular and unpredictable, lasting from months to years before recovery.

3.2 OBSERVERS SHOULD MONITOR FOR:

- Rapid declines in brightness over days.
- Colour index changes due to dust obscuration.
- Recovery curves, which help model dust cloud dispersal.

3.3 OBSERVATIONAL NOTES

- Naked eye visibility under dark skies during maximum brightness; small telescope required during fades.
- Use binoculars or a small telescope for brightness estimates.
- The fade is slow and recovery may be even slower, allowing ample time to track its progress.

- Note any colour changes, R CrB tends to redden during fading events.

4 RECOMMENDED PRACTICES FOR OBSERVERS

4.1 Use standard Johnson-Cousins B and V filters where possible.
4.2 Submit visual estimates to ASSA.
4.3 Keep detailed logs with date, time (UT), location, equipment and sky conditions.
4.4 Monitor both stars regularly for sudden changes.

5 CONCLUSION

With T CrB on the verge of a potential outburst and R CrB prone to sudden fades, Corona Borealis is a high-priority region for variable star observers in the last half of 2025.
Your observations could contribute valuable data to the international astronomical community and may help catch a rare nova event in real time.

Clear skies and happy observing.
Colin Steyn

ACKNOWLEDGEMENTS

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