# DY Per: Extremely Cool Galactic RCB star?

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Theoretically, the number of cool Galactic R Coronae Borealis stars should be greater than the warm RCBs, however to date, only a few candidates have been detected. Observations of the extremely cool RCB candidate, DY Per, and the anonymous nearby star are presented to specify its fundamental parameters and evolutionary status. CCD BVRI photometry and low-resolution spectroscopy at deep light decline was carried out in 2004. A high-resolution spectrum was gathered near the maximum light in 2002 and a qualitative analysis was made relative to the typical carbon stars of various types. Near the light maximums, the nearby anonymous star with a separation of 2.5 arcsec reported by Začs et al.(2005) was outshined by DY Per. However, in the B and V band the components are resolved at deep light decline and the nearby star is somewhat brighter in B than DY Per itself. BV(R) individual magnitudes of the components were estimated using PSF photometry for the first time. The light decline in 2004 was the deepest ever observed for DY Per, B = 18.16 mag. The individual colour indices of DY Per at light decline, (B-V) = 2.35 and (V-R) $\simeq$ 1.9, are not typical for carbon stars. In the spectrum, absorption features of $C_2$ and CN molecules prevail, however, prominent $C_2$ absorption bands are significantly veiled at deep-light decline and a broad (FWHM $\sim$ 600 km s$^{-1}$) emission feature of Na I D12 is visible. Emissions are suspected in the $C_2$ (1,0) bandhead and in Ca I line at 4227 Å. Analysis of DY Per relative to the sample of carbon stars, verifies the significant hydrogen deficiency, high carbon abundance, relatively high $^{12}C/^{13}C$ ratio and solar metallicity. Thus DY Per could be a prototype of cool extreme Galactic RCBs. The nearby star does not vary appreciably in the B and V bands, B = 17.8 mag. With the observed colour indices (B-V) = 1.00 and (V-R) $\simeq$ 0.6, it may be a G0 dwarf not physically related to DY Per, although the distances to both stars are similar, d$\sim$ 1.5 kpc.