

Photometric Classification of Carbon-Rich Stars

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The Vilnius seven-color photometric system with the mean wavelengths of bandpasses at 345, 374, 405, 466, 516, 544, and 656 nm is intended for photometric determination of spectral classes, absolute magnitudes, and metallicities of stars and the amount of interstellar reddening. At the same time, different reddening-free diagrams of the system make it possible to recognize stars with different peculiarities. Carbon-rich stars are among these types of objects. For separation of carbon, barium, and CH stars from normal stars, the diagram Q (345, 374, 466, 544), Q (405, 516, 656) is the best. Its merit is based on sensitivity of the 405 magnitude to the violet depression and of the 374 magnitude to the absorption of the C₃, SiC, and CN bands. This diagram can be used to estimate the C/O abundance ratio with corresponding calibration at hand.

A method for simultaneous determination of metallicities and O/C ratios for late-type giants is developed. This method may be used after exclusion of the interstellar reddening effect.