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ON THE CHARACTER OF LIGHT VARIATIONS OF THE INFRARED CARBON STAR CIT 6

The object CIT 6 = IRC + 30219 = RW LMi (1) represents the carbon star with the largest colour index I-K in the catalogue of Neugebauer and Leighton (2). In order to find out the character of the light variation of CIT 6 photographic observations in red passbands R' (plate ORWO ZP3, filter RG1) or R (plate ORWO ZP1, filter RG1) similar to that of W. Becker's system, as well as in V-, and less frequently in B- and U- band have been carried out with the Schmidt camera of the Radioastrophysical Observatory since the spring 1970.

According to 42 observations in R- band the star CIT 6 seems to belong to the long period variable stars with a period of about 570 days and an amplitude of about 1,5 mag. (see Fig.)

Besides general long period changes the observations in V- band, only 14 in number, show a rapid decrease of brightness by approximately 1 mag. within a time interval not more than seven days between J.D. 2441053 and 2441060, followed by a slower return to the "normal" value. Judging by the scanty R' - magnitudes a brightness drop has taken place in the red light, as well.

In the following cycle of the light variation of CIT 6 we have very few observations at the same phase (0.8 P). Nevertheless, a decrease of brightness in noticeable.

Fortunately, polarimetric and photometric observations of the star made by Kruszewski happened to coincide with what seemed to be a similar phenómenon in the second cycle, and a sudden decrease of brightness in V-, B- and U- bands with amplitude of around 1 mag. as well as a large and fast change of the degree of polarization during only three days was established (3).

One more short minimum was observed in the light variation around J.D. 2441765 near the maximum brightness of the long period variations.

Possibly, in the case of CIT 6 we deal with an extremely sharply expressed phenomenon inherent in many Mira-type stars, so called bump or wave or secondary minimum, connected with a more or less definite phase of long period variations for a particular star (4). If so, the

next interval of time favorable for observations of such a phenomenon in CIT 6 might be expected in Febr.-March 1976. Some other explanations of the phenomenon and a different time of its next appearance cannot be exluded, the more so because CIT 6 has some other photometric peculiarities.

Compared to other infrared or late type carbon stars (e.g.CIT 5, CIT 13, IRC + 10216) the colour indices B-V=1,2 and U-B=1,0 are unusually small. If the anomaly of CIT 6 is due to the presence of a bluer unresolved companion (5) the radiation in B- and even more so in U-band refers mainly to the latter. The long period variations observed in R-band, on the other hand,are due to the very red carbon star. If the observed fast decreases of brightness, indeed, depend on long period variations, then their cause is connected with the carbon star component. Evidently, both components are influenced by the same process, e.g., sudden ejection of dust shall. Detailed continuous observations of the fast changes in CIT 6 might give some more definite conclusions.

The two first of our observations in B do not agree with long period variations in R magnitudes. The mean colour index B-R=4,1 for these two measurements is considerably larger than for the latest observations (B-R=2,7). Possibly, this may reflect brightness changes of the bluer companion.

The alternate explanation of CIT 6 as a single star leads to unusual distribution of energy in its spectrum: in the ultraviolet and visible part it corresponds to an early C-star. In the near infrared strong bands of CN discovered by Wisniewski et al. testify to the fact that CIT 6 belongs to the late C-stars.

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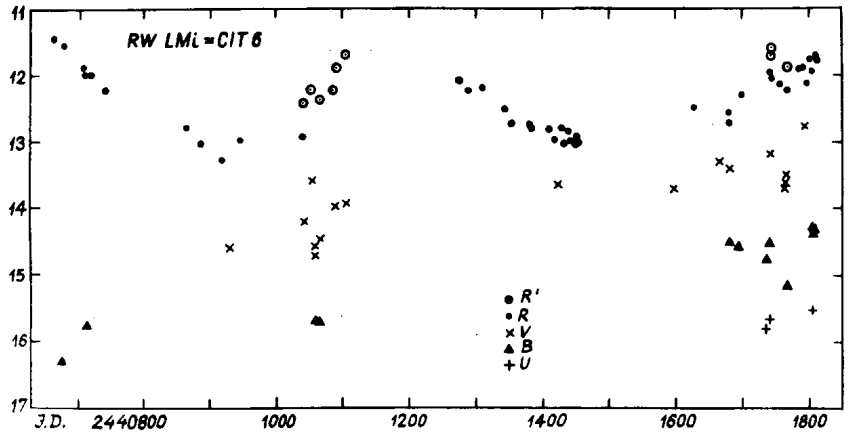

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