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LARGE POLARIZATION VARIATIONS IN CIT 6

An infrared object CIT 6 = IRC +30219 is known to have large, variable, intrinsic polarization (Kruszewski 1971, Dyck et.al.1971). It was classified as a cool carbon star (Wisniewski et al.1967, Pesch 1967, Lockwood 1970). New set of observations was obtained with the Steward Observatory 230 cm and Lunar and Planetary Laboratory 154cm reflectors.

The following table lists new polarimetric measurements together with estimates of brightness.

J.D.	Filter	m	P%	m.e.	θ°
2441000+					
635.948	I	9.6	7.6 \pm	1.1	116
651.057	I		8.1	0.6	114
655.828	I		8.1	0.5	115
635.957	R	10.2	6.3	0.5	117
651.047	R		6.1	0.3	117
655.847	R		6.7	0.4	117
635.973	O	12.3	2.7	0.7	154
651.052	O		4.2	0.8	146
655.838	O		2.7	0.7	146
651.018	V	13.4	4.9	0.2	176
653.955	V	14.8	11.5	0.3	181
653.982	V	14.7	11.5	0.5	183
655.860	V		10.5	0.3	180
657.922	V		7.7	0.4	178
658.000	V	14.0	7.8	0.2	182
657.962	G	14.3	8.5	0.4	179
657.989	G	14.3	9.1	0.5	179
651.023	B	14.4	6.4	0.2	180
653.988	B	15.7	14.0	0.6	186
654.020	B	15.7	15.2	0.6	187
654.039	B	15.7	16.3	0.5	186
655.866	B		13.2	0.3	182
657.955	B	15.2	10.3	0.5	182
657.991	B	15.1	10.8	0.7	180
651.531	U	15.5	12.2	1.6	177
654.004	U	16.3	16.5	3.5	179
657.939	U	16.0	22.9	4.1	188
657.994	U	16.0	21.3	9.4	183

The most striking feature is a large and fast variability of the degree of polarization. This fast variability is very pronounced in the yellow-ultraviolet spectral region but seems to be absent in the infrared. An extreme example is an increase of the degree polarization by 9 % during only 3 days. Such short time scale of the polarization variability is unprecedented among red variables. It should be noted that the brightness variability is also present with the same time scale and an amplitude of around 1 mag. Smaller variations on a time scale of an hour may be also present but the observations were not accurate enough for establishing it with certainty.

The wavelength dependence shows a minimum in the degree of polarization and a rotation of the position angle by almost 90° . Such features were already observed in other red variables like VY CMa, L₂ Pup and V CVn (Dyck et al. 1971). However in 1968 the wavelength dependence was entirely different. It is demonstrated in the Figure where the present observations obtained in 1972 (filled squares) are compared with 1968 observations (open squares) after Kruszewski (1971). The infrared observations from 1967 (open circles) and from 1971 (filled circles) are also plotted after Dyck et al. (1971).

CIT 6 is relatively bright in the ultraviolet what indicates that either it has CH characteristics or there is an unresolved hotter component present.

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A. KRUSZEWSKI
Institute of Astronomy
Polish Academy of Sciences
Warsaw.

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