

Search for variable stars in the intermediate-age open cluster NGC 2539

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We present the results of UBVI CCD photometry and V-band time-series analysis for variable stars in the intermediate-age open cluster NGC 2539. The observations were performed for ten nights during February and March, 2000, using 1.8m reflector and a 2K CCD at Bohyunsan Optical Astronomy Observatory. Distance modulus of this cluster was estimated to be $(V - M_V)_0 = 10.2 \pm 0.1$ with the color excess of $E(B-V) = 0.06 \pm 0.03$ under the assumption of $E(U-B)/E(B-V) = 0.72$. Using theoretical isochrones (Girard et al. 2000, A&AS, 141, 371) with solar metal abundance, we obtained the age of $\log t = 8.8$. We examined light curves of 583 stars from the V magnitude time-series data and discovered eight variable stars (Table 1.). They turned out to be five eclipsing binaries, one δ Scuti, one field γ Doradus, and one field SPB, respectively.

Table 1. Basic parameters of eight variable stars discovered in NGC 2539.

ID	V	B-V	Period	Max. ΔV	Epoch	Type
V1	15 ^m .652	0 ^m .739	0 ^d .292	~0 ^m .30	2451591.025	Eclipsing binary
V2	14 ^m .584	0 ^m .749	0 ^d .340	~0 ^m .28	2451596.06	Eclipsing binary
V3	14 ^m .301	0 ^m .581	0 ^d .945	~0 ^m .13	2451617.99	Eclipsing binary
V4	11 ^m .050	1 ^m .603	0 ^d .982	~0 ^m .10	2451630.07	Field eclipsing binary
V5	12 ^m .527	0 ^m .250	0 ^d .700	~0 ^m .07	2451629.15	Eclipsing binary
V6	13 ^m .213	0 ^m .255	0 ^d .055	~0 ^m .03	2451597.157 5	δ Scuti star
V7	14 ^m .290	0 ^m .577	0 ^d .352	~0 ^m .05	2451585.13	Field(?) γ Dor star
V8	11 ^m .847	0 ^m .086	1 ^d .092	~0 ^m .06	2451618.05	Field(?) SPB star