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BD+37^o2641, A POSSIBLE ECLIPSING BINARY SYSTEM

In 1982 we carried out a photometric study of the Delta Scuti star YZ Boo, aimed principally at determining its period of pulsation. Since the method of photometry followed was that of differential photoelectric photometry, the reference stars chosen satisfied the following conditions: The same apparent magnitude of the variable star and in its neighborhood, less than two degrees apart to minimize the effects of atmospheric extinction. Therefore, although most studies on YZ Boo utilized BD+37^o2639 or BD+37^o2634 as reference stars (Szeidl and Mahdy 1981) we chose BD+37^o2640 as a reference and BD+37^o2641 as a check star on the nights of 16-17 and 17-18 of April, 1982.

The use of at least one check star has been systematically considered in our observations since there is always the chance of utilizing a variable star as reference, thus making the obtention of the periodic content of the problem star impossible. Even more, the "quality" of the night can be directly measured by subtracting the two standard stars and evaluating their corresponding dispersion.

When this last procedure was done on the night of April 16-17 we obtained a σ of the difference of the two comparison stars, of 0.01 mag, but when the same evaluation was done on the following night, that of April 17-18, an exceedingly large scatter was obtained due, as can be seen in Figure 1, to the drop in the magnitude of the BD+37^o2641 star.

Of course, when one finds a new variable or eclipsing star one cannot be sure of which star has changed, and the variation could be attributed to any of the observed stars. In this particular case, it is hard to believe that the change can be attributed to BD+37^o2640 because both this and the variable star, YZ Boo, didn't change their magnitude so abruptly. Even more, on continuing the study of the variability of YZ Boo, it was observed this time utilizing not only BD+37^o2640, but two more reference stars, mainly BD+37^o2634 (which has also been extensively utilized as reference for YZ Boo) and a faint star, which has not been listed in the BD catalogue and that is located next to YZ Boo to the north of it; none of them changed their magnitude during four consecutive nights that were observed one month later from May 6, to 9, 1982,

establishing the constancy of BD+37°2640.

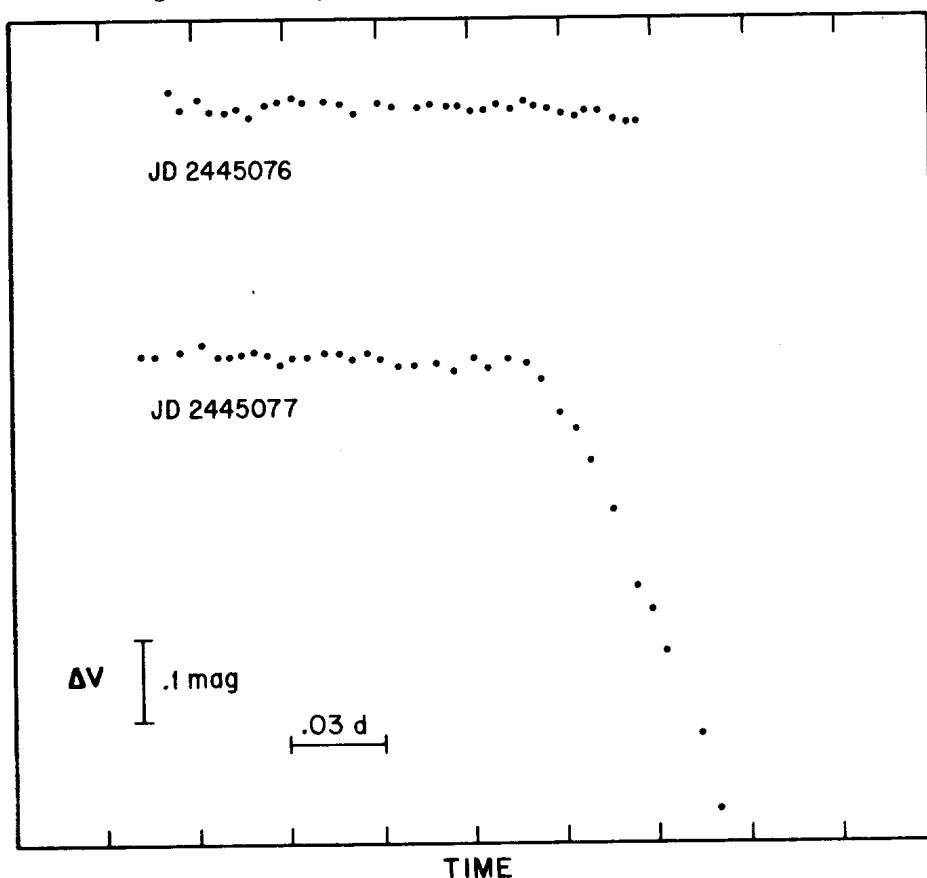


Figure 1 : Light curve of BD+37°2641. The upper part shows the difference between this star and BD+37°2640 on the night of April 17, 1982; the lower the same difference on the following night, April 18, 1982.

The observations were carried out using two telescopes. On the first night, April 17, they were carried out with the two-meter telescope whereas on the second one, April 18, the 1.5 m telescope was utilized. Both telescopes are at the Observatorio de San Pedro Mártir, México. In both cases a 1P21 cooled phototube was utilized in Johnson's V filter. Each point is an average of five ten-second integrations of the star minus one ten-second integration of the sky. Therefore, the accuracy of each point is of 0.003 mag and of 0.007^d in time. The difference in magnitude between BD+37°2641 and BD+37°2640 and the corresponding heliocentric Julian Days are listed in Table I.

One can see from the light curve of BD+37^o2641, Figure 1, that it experiences a drop in magnitude of at least 0.5 mag in a time span of about two hours, showing the characteristics of a binary system.

We plan and encourage further observations of this binary system which, as far as we know, has not been previously reported.

Table I : Photometry of BD+37^o2641 in the V filter

HEL JD	D MAG	HEL JD	D MAG
2445000.0+		2445000.0+	
76.853	-0.215	77.747	-0.193
76.856	-0.192	77.755	-0.198
76.861	-0.205	77.762	-0.207
76.866	-0.190	77.768	-0.191
76.871	-0.188	77.771	-0.191
76.875	-0.192	77.775	-0.195
76.879	-0.182	77.780	-0.198
76.884	-0.195	77.784	-0.193
76.888	-0.201	77.788	-0.182
76.893	-0.205	77.792	-0.190
76.896	-0.200	77.797	-0.192
76.903	-0.201	77.803	-0.196
76.908	-0.198	77.807	-0.194
76.913	-0.185	77.812	-0.189
76.921	-0.199	77.816	-0.194
76.925	-0.195	77.821	-0.189
76.934	-0.193	77.827	-0.179
76.938	-0.197	77.832	-0.180
76.943	-0.195	77.839	-0.183
76.947	-0.195	77.845	-0.173
76.951	-0.188	77.851	-0.189
76.955	-0.190	77.856	-0.177
76.959	-0.197	77.863	-0.188
76.964	-0.191	77.869	-0.182
76.968	-0.201	77.873	-0.163
76.972	-0.195	77.879	-0.123
76.976	-0.192	77.884	-0.102
76.981	-0.186	77.889	-0.063
76.985	-0.182	77.896	-0.004
76.989	-0.188	77.904	0.088
76.993	-0.189	77.909	0.118
76.998	-0.179	77.914	0.168
77.002	-0.174	77.925	0.268
77.005	-0.175	77.930	0.359
77.742	-0.193		

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