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THE VARIATION OF THE LIGHT CURVES OF AU Ser

The binary AU Ser was observed visually and photographically by Soloviev (1951) and Huth (1964) respectively. The first photoelectric observations were performed by Binnendijk (1972). The light curves show different heights of the primary and secondary maximum and rather rapid variation in the shape. Kaluzny (1986) analysed Binnendijk's data and found this binary to be poor thermal contact system although the uniqueness of the solution was not sufficiently discussed. It is important to monitor such an interesting binary. Unfortunately, because AU Ser is rather faint, there is few photometric observation carried out for this system since 1970.

We observed this star photoelectrically, using the 1-meter reflector of the Yunnan Observatory, China, on two nights, 9-11 April 1991. The coordinates (1950) of the binary, the comparison and the check star are  $15^{\text{h}}54^{\text{m}}39^{\text{s}}+22^{\circ}24'3$ ,  $15^{\text{h}}55^{\text{m}}01^{\text{s}}+22^{\circ}17'5$  and  $15^{\text{h}}54^{\text{m}}33^{\text{s}}+22^{\circ}24'9$ , respectively. A finder chart is given in Fig. 1 where 1, 2 and 3 represent the variable, the comparison and the check star. A total of 264 yellow (Table 1) and 264 blue (Table 2) observations were obtained. The probable error of a single observation was estimated to be  $\pm 0.015$  mag. The moment of the primary minimum is  $\text{JD } 2448356.3364 \pm 0.0003$  which corresponds to phase of 0.93 according to Binnendijk's ephemeris

$$\text{Min. I} = \text{JD}2440748.8592 + 0.38650124E.$$

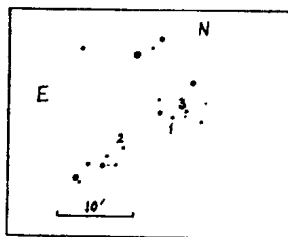


Figure 1. Finder chart for AU Ser(1), the comparison(2) and the check star(3)

The light curves are plotted in Figure 2 where zero point corrections of +1.538 for V light and +2.000 for B light were introduced so that the maximum of magnitude difference in V band is equal to zero. Figure 2 shows that the maximum following secondary minimum is 0.05 mag higher than the other one in contrast with the light curves obtained by Binnendijk in 1969 where the maximum following the primary minimum is 0.05 mag higher than the other. Regarding the displacement of the minimum time, we are not sure if it suggests the change of the period.

Table 1. Yellow observations of AU Ser

JD 2448000+	$\Delta V'$	JD 2448000+	$\Delta V'$	JD 2448000+	$\Delta V'$	JD 2448000+	$\Delta V'$	JD 2448000+	$\Delta V'$
356.1665	-1.183	356.2679	-1.450	356.3896	-1.356	357.2179	-1.495	357.3088	-0.885
356.1678	-1.212	356.2691	-1.429	356.3906	-1.357	357.2212	-1.496	357.3122	-0.962
356.1688	-1.214	356.2693	-1.438	356.3941	-1.387	357.2221	-1.497	357.3136	-0.981
356.1700	-1.239	356.2706	-1.420	356.3954	-1.406	357.2224	-1.490	357.3139	-0.997
356.1724	-1.237	356.2733	-1.412	356.4002	-1.406	357.2233	-1.501	357.3152	-0.974
356.1733	-1.256	356.2744	-1.417	356.4017	-1.115	357.2254	-1.497	357.3179	-1.064
356.1735	-1.251	356.2747	-1.428	357.1485	-1.223	357.2265	-1.492	357.3191	-1.089
356.1744	-1.274	356.2757	-1.409	357.1491	-1.223	357.2307	-1.502	357.3194	-1.097
356.1768	-1.307	356.2856	-1.349	357.1500	-1.226	357.2317	-1.500	357.3229	-1.147
356.1777	-1.313	356.2867	-1.332	357.1502	-1.211	357.2320	-1.502	357.3256	-1.168
356.1779	-1.318	356.2869	-1.327	357.1522	-1.247	357.2333	-1.493	357.3265	-1.192
356.1788	-1.327	356.2880	-1.331	357.1531	-1.247	357.2360	-1.481	357.3267	-1.190
356.1853	-1.387	356.2921	-1.284	357.1533	-1.248	357.2370	-1.471	357.3275	-1.198
356.1862	-1.402	356.2932	-1.280	357.1542	-1.254	357.2372	-1.476	357.3341	-1.296
356.1864	-1.390	356.2936	-1.282	357.1576	-1.296	357.2381	-1.469	357.3349	-1.309
356.1873	-1.404	356.2948	-1.262	357.1584	-1.318	357.2406	-1.461	357.3352	-1.310
356.1902	-1.427	356.3050	-1.173	357.1586	-1.312	357.2415	-1.470	357.3396	-1.314
356.1912	-1.439	356.3060	-1.155	357.1595	-1.323	357.2417	-1.464	357.3407	-1.335
356.1914	-1.434	356.3062	-1.157	357.1628	-1.326	357.2427	-1.456	357.3409	-1.340
356.1926	-1.437	356.3074	-1.132	357.1637	-1.332	357.2496	-1.436	357.3418	-1.360
356.2069	-1.502	356.3104	-1.038	357.1639	-1.328	357.2506	-1.444	357.3476	-1.407
356.2079	-1.507	356.3113	-1.042	357.1647	-1.333	357.2508	-1.440	357.3478	-1.401
356.2081	-1.499	356.3116	-1.021	357.1668	-1.373	357.2548	-1.424	357.3487	-1.400
356.2090	-1.510	356.3128	-1.019	357.1674	-1.377	357.2550	-1.421	357.3522	-1.465
356.2116	-1.504	356.3161	-0.961	357.1676	-1.380	357.2559	-1.424	357.3539	-1.464
356.2126	-1.528	356.3174	-0.937	357.1686	-1.393	357.2586	-1.400	357.3542	-1.453
356.2129	-1.531	356.3177	-0.931	357.1714	-1.366	357.2595	-1.397	357.3566	-1.482
356.2141	-1.520	356.3191	-0.918	357.1722	-1.378	357.2598	-1.391	357.3579	-1.491
356.2168	-1.520	356.3286	-0.724	357.1724	-1.385	357.2611	-1.377	357.3582	-1.482
356.2236	-1.535	356.3295	-0.717	357.1733	-1.373	357.2641	-1.338	357.3592	-1.488
356.2239	-1.528	356.3298	-0.685	357.1808	-1.418	357.2650	-1.324	357.3685	-1.520
356.2248	-1.541	356.3307	-0.683	357.1819	-1.406	357.2653	-1.331	357.3693	-1.515
356.2271	-1.524	356.3341	-0.630	357.1821	-1.404	357.2662	-1.323	357.3696	-1.526
356.2281	-1.535	356.3359	-0.624	357.1831	-1.395	357.2685	-1.300	357.3704	-1.531
356.2283	-1.533	356.3363	-0.634	357.1860	-1.434	357.2696	-1.284	357.3731	-1.513
356.2293	-1.535	356.3379	-0.631	357.1870	-1.434	357.2699	-1.277	357.3739	-1.536
356.2318	-1.534	356.3419	-0.657	357.1873	-1.447	357.2707	-1.272	357.3741	-1.526
356.2428	-1.520	356.3430	-0.670	357.1884	-1.447	357.2740	-1.260	357.3749	-1.522
356.2430	-1.524	356.3432	-0.672	357.1918	-1.464	357.2749	-1.244	357.3862	-1.532
356.2438	-1.533	356.3442	-0.687	357.1927	-1.448	357.2751	-1.236	357.3870	-1.536
356.2465	-1.522	356.3471	-0.734	357.1936	-1.476	357.2759	-1.232	357.3872	-1.534
356.2477	-1.514	356.3485	-0.752	357.1938	-1.473	357.2828	-1.124	357.3882	-1.543
356.2480	-1.515	356.3487	-0.769	357.2007	-1.474	357.2841	-1.093	357.3916	-1.536
356.2490	-1.507	356.3499	-0.772	357.2016	-1.481	357.2846	-1.084	357.3924	-1.548
356.2517	-1.496	356.3535	-0.868	357.2018	-1.487	357.2862	-1.047	357.3997	-1.527
356.2575	-1.500	356.3549	-0.888	357.2026	-1.486	357.2924	-0.931	357.4005	-1.530
356.2584	-1.495	356.3552	-0.906	357.2046	-1.491	357.2926	-0.898	357.4007	-1.531
356.2586	-1.511	356.3566	-0.923	357.2058	-1.509	357.2937	-0.882	357.4017	-1.521
356.2597	-1.492	356.3599	-0.980	357.2060	-1.513	357.2996	-0.836	357.4101	-1.518
356.2622	-1.468	356.3610	-1.010	357.2069	-1.494	357.3007	-0.819	357.4109	-1.530
356.2635	-1.469	356.3615	-1.016	357.2156	-1.492	357.3010	-0.819	357.4111	-1.527
356.2637	-1.462	356.3867	-1.321	357.2167	-1.511	357.3063	-0.871	357.4119	-1.530
356.2649	-1.460	356.3892	-1.349	357.2170	-1.507	357.3074	-0.885		

Table 2. Blue observations of AU Ser

JD 2448000+	$\Delta B$	JD 2448000+	$\Delta B$	JD 2448000+	$\Delta B$	JD 2448000+	$\Delta B$	JD 2448000+	$\Delta B$
356.1671	-1.303	356.2642	-1.578	356.3961	-1.506	357.2229	-1.632	357.3143	-1.078
356.1674	-1.291	356.2646	-1.581	356.3964	-1.526	357.2257	-1.616	357.3146	-1.060
356.1694	-1.348	356.2683	-1.553	356.4009	-1.514	357.2259	-1.612	357.3184	-1.159
356.1697	-1.346	356.2688	-1.539	356.4010	-1.517	357.2269	-1.606	357.3186	-1.178
356.1773	-1.428	356.2697	-1.533	356.4025	-1.537	357.2271	-1.600	357.3197	-1.194
356.1782	-1.427	356.2699	-1.520	356.4027	-1.535	357.2314	-1.623	357.3199	-1.205
356.1784	-1.448	356.2859	-1.427	356.4144	-1.634	357.2326	-1.605	357.3260	-1.280
356.1813	-1.485	356.2862	-1.428	356.4146	-1.641	357.2363	-1.589	357.3262	-1.300
356.1816	-1.478	356.2874	-1.416	357.1487	-1.344	357.2365	-1.589	357.3270	-1.296
356.1824	-1.492	356.2876	-1.411	357.1489	-1.341	357.2375	-1.591	357.3272	-1.292
356.1827	-1.482	356.2926	-1.378	357.1495	-1.353	357.2377	-1.579	357.3301	-1.340
356.1856	-1.518	356.2928	-1.382	357.1497	-1.353	357.2409	-1.584	357.3303	-1.361
356.1859	-1.517	356.2940	-1.359	357.1525	-1.337	357.2411	-1.598	357.3312	-1.363
356.1867	-1.522	356.2944	-1.359	356.1527	-1.347	357.2420	-1.598	357.3314	-1.360
356.1869	-1.530	356.3054	-1.262	357.1579	-1.373	357.2422	-1.589	357.3344	-1.437
356.1905	-1.573	356.3056	-1.243	357.1581	-1.376	357.2542	-1.550	357.3346	-1.445
356.1919	-1.577	356.3068	-1.242	357.1590	-1.404	357.2544	-1.549	357.3399	-1.458
356.1921	-1.571	356.3070	-1.226	357.1592	-1.410	357.2553	-1.542	357.3402	-1.471
356.2022	-1.620	356.3107	-1.145	357.1632	-1.467	357.2556	-1.536	357.3413	-1.491
356.2024	-1.617	356.3110	-1.145	357.1634	-1.458	357.2590	-1.532	357.3415	-1.509
356.2120	-1.646	356.3121	-1.133	357.1642	-1.461	357.2592	-1.519	357.3451	-1.507
356.2122	-1.662	356.3123	-1.124	357.1644	-1.465	357.2606	-1.515	357.3455	-1.503
356.2134	-1.655	356.3166	-1.042	357.1671	-1.481	357.2608	-1.508	357.3482	-1.532
357.2137	-1.651	356.3169	-1.041	357.1679	-1.503	357.2645	-1.487	357.3484	-1.522
356.2230	-1.681	356.3182	-1.012	357.1681	-1.499	357.2647	-1.482	357.3514	-1.572
356.2233	-1.682	356.3186	-0.994	357.1683	-1.497	357.2656	-1.474	357.3518	-1.582
356.2243	-1.686	356.3289	-0.776	357.1716	-1.484	357.2658	-1.475	357.3530	-1.552
356.2245	-1.697	356.3292	-0.760	357.1719	-1.490	357.2688	-1.410	357.3535	-1.576
356.2275	-1.674	356.3301	-0.740	357.1726	-1.483	357.2693	-1.409	357.3572	-1.614
356.2277	-1.684	356.3304	-0.748	357.1728	-1.480	357.2702	-1.395	357.3576	-1.617
356.2287	-1.681	356.3353	-0.677	357.1866	-1.543	357.2704	-1.396	357.3589	-1.622
356.2289	-1.676	356.3371	-0.680	357.1868	-1.542	357.2743	-1.373	357.3591	-1.623
356.2324	-1.667	356.3373	-0.691	357.1875	-1.572	357.2746	-1.365	357.3699	-1.624
356.2328	-1.668	356.3424	-0.723	357.1877	-1.573	357.2754	-1.337	357.3701	-1.636
356.2341	-1.686	356.3426	-0.733	357.1921	-1.579	357.2756	-1.339	357.3733	-1.674
356.2343	-1.680	356.3436	-0.750	357.1924	-1.559	357.2833	-1.214	357.3736	-1.671
356.2423	-1.666	356.3438	-0.752	357.1931	-1.576	357.2835	-1.189	357.3744	-1.684
356.2425	-1.653	356.3476	-0.818	357.1933	-1.567	357.2855	-1.145	357.3746	-1.673
356.2434	-1.652	356.3480	-0.836	357.2010	-1.606	357.2857	-1.133	357.3823	-1.680
356.2436	-1.652	356.3491	-0.851	357.2012	-1.617	357.2918	-1.062	357.3825	-1.688
356.2468	-1.646	356.3494	-0.871	357.2021	-1.613	357.2920	-1.059	357.3865	-1.662
356.2473	-1.630	356.3540	-0.987	357.2023	-1.610	357.2931	-1.028	357.3867	-1.670
356.2483	-1.638	356.3543	-0.990	357.2051	-1.637	357.2934	-1.025	357.3875	-1.669
356.2486	-1.631	356.3555	-1.013	357.2066	-1.635	357.3002	-0.885	357.3878	-1.675
356.2522	-1.632	356.3558	-1.023	357.2096	-1.617	357.3004	-0.891	357.3909	-1.673
356.2526	-1.621	356.3604	-1.081	357.2102	-1.618	357.3013	-0.908	357.3911	-1.676
356.2535	-1.615	356.3607	-1.090	357.2115	-1.612	357.3016	-0.922	357.3919	-1.680
356.2537	-1.610	356.3619	-1.096	357.2118	-1.610	357.3068	-0.962	357.3921	-1.706
356.2578	-1.607	356.3621	-1.087	357.2160	-1.649	357.3070	-0.967	357.4000	-1.686
356.2581	-1.604	356.3885	-1.471	357.2175	-1.640	357.3080	-0.972	357.4002	-1.678
356.2592	-1.614	356.3888	-1.474	357.2216	-1.619	357.3082	-0.980	357.4012	-1.680
356.2627	-1.590	356.3946	-1.496	357.2218	-1.624	357.3130	-1.075	357.4014	-1.685
356.2629	-1.585	356.3949	-1.498	357.2227	-1.631	357.3133	-1.071		

Note that the previous minimum times listed by Binnendijk (1972) seem to indicate no significant variation in period occurred from 1936 to 1970. It is necessary to monitor this object in different wavelengths. We will continue the photometry for it and a spectroscopic observation has been planned.

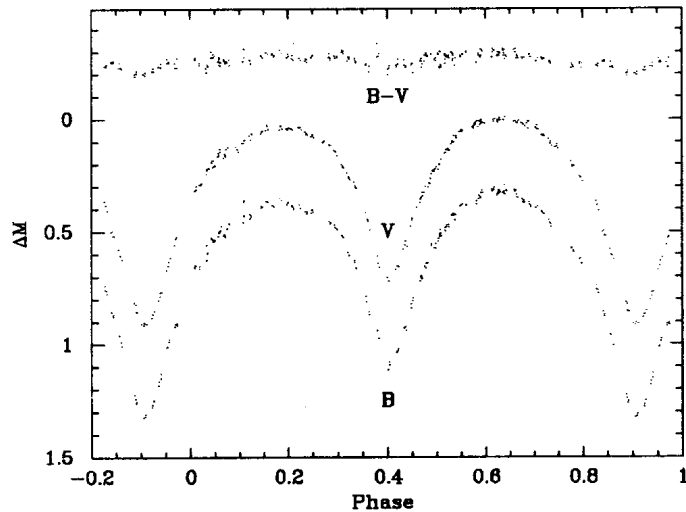


Figure 2. The light and color curves of AU Ser

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