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SHORT PERIOD VARIATIONS OF LQ AND

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RESUMEN. Se presentan los datos de fotometría diferencial de la estrella Be HD 224559, obtenidos en campañas de colaboración.

ABSTRACT. We present the differential photometric data of the Be star BS 9070, obtained in different coordinated observing runs.

Key words: STARS-Be — STARS-LIGHT CURVE

.-Introduction.

LQ And has been a classical and controversial short period variable tar. It is an emission B star, having a 'slow' variation of the emission ntensity. Its Hα line is bright with two peaks of equal intensity V/R => 1.0 tarting on 1969, its emission has decreased, reaching a minimum on 1974, Hubert and Hubert-Delplace, 1979), The 13-color photometry shows it as a possible' variable star with Δm(58)= 100 mmag. between 1977 and 1979 Alvarez and Michel, 1987). Its spectral class (B3IV, B4V ne), puts it close o the cold limit of the 'clasical' β Cephei type of pulsators. The period eported (0.310037 d. or its double 0.622832 d.), could make it possible to hysically differentiate between rotation or pulsation as being the basic echanism of the variability, according to the most likely period. This makes his star particularly interesting for further study.

Some spectroscopic observations reported by Sareyan et al. 1988, upport the pulsation hipothesis (i.e. P=0.31 d.), although more recent bservations obtained in 1985, do not seem to show the same periodicity. Is he observed photospheric period of the star inhibited by a different activity tage of the envelope?.

.-Observations.

The photometric data where obtained at different epochs, at San Pedro Mártir, México and Pico Veleta, Granada, Spain, observatories, during a coordinated campaign. We used two sets of filters especially chosen to avoid he Hydrogen lines and consequently obtain a good determination of the ontinuum of early type stars.

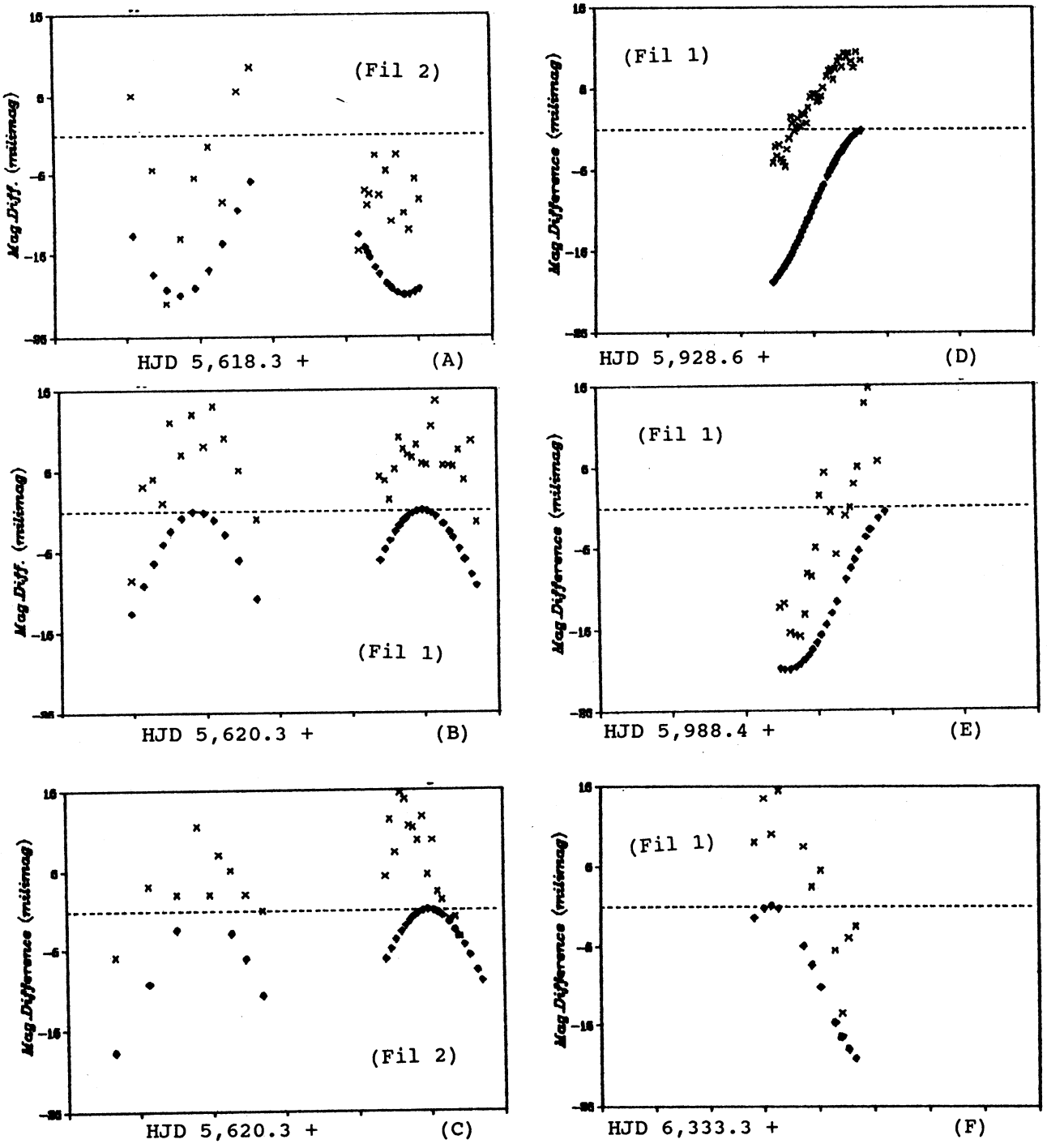
Most of the nights, we used as comparison the following stars: ID 224166 (C1), HD 223229 (C2) and HD 487 (C3). HD 224166 has been reported as variable star (Harmanec, 1984) and in some nights, a very irregular ehaviour is present on that star. However, the use of the other comparison tars and the fact that on most nights, this star was constant has allowed us o reduce the data that we present here. We will re-analize it to determine ome of the properties of 'C1', that seems to be erratic and complicated.

We were able to observe at both observatories only on a few onsecutive nights, and we show some of these curves, with the corresponding 'sinusoidal fit' (displaced by 10 mmag. for figure clarity).

.- Presentation of Results.

We followed the 'classical' method for analysing differential hotometry. The observing sequence was: C2, V, C1, V, ... with the three ilters (During a few nights, we observed only with one or two filters). Using 'mean' extinction coefficient, we obtained the 'corrected' magnitude ifference between the stars.

LQ ANDROMEDAE Differential Photometry.



Some examples of the difference LQAND-C1 for Filter 1 (3750 A)
A (fil 2), B and C (fil 2) measurements of Granada (left) and SPM (right).
Vertical scale 10 mmag. Horizontal scale 0.1 HJD
x Magnitude difference. • Sinusoidal fit (displaced by 10 mmag.)

LQ ANDROMEDAE [V=6.52 B3 V] Filter 2 (4571 A)
Differential Photometry 1983-1985.

45,618.+(11 oct.83)			45,619.+(Oct.12 83)			45,621.+(14 oct.83)			45,987.+(14 oct 84)			46,326.+(17 Sep.85)		
HJD	C1-V	C2-V	HJD	C1-V	C2-V	HJD	C1-V	C2-V	HJD	C1-V	C2-V	HJD	C1-V	C2-V
** 5618	Granada		** 5619	SPM(Obs)		** 5621	SPM(Obs)		** 5987	SPM(Obs)		** 6326	Granada	
.4080	5.0		.8569	5.9	11.1	.7521	2.8	5.7	.7470	-13.0		.4930	11.5	
.4360	-4.5		.8636	3.8	8.8	.7585	4.4	4.3	.7524	-13.3		.5070	8.0	
.4540	-21.0		.8696	5.9	10.5	.7667	1.7	1.8	.7585	-5.9		.5200	3.0	
.4730	-13.0		.8774	4.5	7.3	.7749	-.8	-.6	.7686	-17.0		.5330	2.0	
.4930	-5.5		.8845	8.7	8.8	.7825	-1.2	3.9	.7743	-.7		.5480	-.5	
.5120	-1.5		.8949	6.2	3.6	.7893	2.0	-7.5	.7860	-1.4		.5610	-5.0	
.5310	-8.5		.9013	9.7	7.4	.7952	-.8	-3.9	.7955	-.70		.5750	-7.0	
.5520	5.5		.9076	3.5	2.2	.8015	.2	-3.9				.6020	-8.0	
.5700	8.5					.8081	1.3	-4.0	45,988.+(15 oct 84) ?			.6150	-5.0	
			45,620.+(13 oct.83)			.8148	-1.7	-1.3	** 5988	SPM(Obs)		.6290	-5.0	
** 5618	SPM(Obs)		** 5620	Granada		.8207	-2.0	-5.6	.6731	.0		.6420	-4.0	
.7176	-14.6	4.7	.3970	-8.5	7.9	.8272	-3.8	-6.7	.6772	-4.7				
.7264	-7.2	7.8	.4140	3.0	10.6	.8338	-3.2	-8.2	.6818	-9.3		46,327.+(18 Sep.85)		
.7298	-9.0	4.4	.4280	4.0	9.8	.8413	-7.2	-5.2	.6860	-4.4		** 6327	Granada	
.7328	-7.6	4.3	.4410	1.0	9.4	.8483	-8.5	-5.0	.6902	-2.3		.3930	4.0	
.7407	-2.7	6.2	.4520	11.0	10.7	.8546	-5.7	-7.7	.6942	1.4		.4090	8.0	
.7464	-7.7	2.7	.4670	7.0	4.0	.8610	-5.6	-3.9	.6984	-7.6		.4220	7.0	
.7562	-4.6	-3.9	.4820	12.0	11.1	.8671	-7.0	2.9	.7024	-4.5		.4350	4.0	
.7628	-10.9	-13.8	.4980	8.0	8.8	.8731	-6.7	2.6	.7068	.4		.4490	2.0	
.7704	-2.7	-6.2	.5110	13.0	10.5	.8786	-5.4	-2.0	.7107	-1.3		.4620	-3.0	
.7799	-9.9	-11.6	.5260	9.0	7.3	.8848	-10.2	.3	.7151	-4.0		.4740	-1.5	
.7867	-12.0	-13.4	.5450	5.0	8.8				.7195	-.3		.4900	-7.5	
.7948	-5.7	-9.1	.5690	-1.0	3.6	45,984.+(11 oct 84)			.7243	-.8		.5020	-5.0	
.8008	-8.2	-13.2				** 5984	SPM(Obs)		.7286	-2.2		.5140	-6.0	
			** 5620	SPM(Obs)		.6646		-7.5	.7338	-2.2		.5260	-4.0	
45,619.+(Oct.12 83)			.7393	4.2	14.8	.6902	-.9	-.5	.7393	4.4		.5370	-12.0	
** 5619	SPM(Obs)		.7467	3.6	14.1	.7059	4.4	2.8	.7439	3.8		.5500	-9.5	
.6776	-3.4	-15.2	.7533	1.4	15.3	.7245	1.6	.7	.7480	2.0		.5620	-9.5	
.6852	-2.1	-14.2	.7606	5.1	13.6	.7382	8.5	2.7	.7529	-.8		.5930	-6.0	
.6915	1.5	-10.4	.7665	9.1	10.6	.7518	5.7	.1	.7575	1.0		.6170	1.5	
.7033	-.9	-16.2	.7725	7.6	10.3	.7639	9.8	8.0	.7619	3.1		.6290	.0	
.7103	5.1	-6.5	.7782	6.8	9.6	.7774	11.6	9.9	.7672	3.3		.6410	2.0	
.7191	-2.6	-7.2	.7842	6.5	8.1	.7904	10.3	11.8	.7722	5.2		.6520	-.5	
.7259	-2.1	-4.8	.7907	8.1	5.3	.8043	12.3	11.2	.7773	4.1		.6640	2.5	
.7341	.6	-2.3	.7978	5.8	8.9	.8177	11.0	8.4	.7821	4.0		.6780	4.0	
.7429	-.1	1.0	.8043	5.6	12.0	.8307	11.8	13.8	.7865	7.0		.6890	2.0	
.7490	-1.4	1.9	.8108	10.4	8.6				.7916	6.2				
.7576	-8.1	.6	.8166	13.5	5.4	45,987.+(14 oct 84) ?			.7971	7.9		46,333.+(24 Sep.85)		
.7640	-3.4	5.5	.8266	5.5	10.8	** 5987	SPM(Obs)		.8016	8.4		** 6333	Granada	
.7737	-1.9	6.7	.8347	5.5	5.6	.6697	2.5		.8060	9.6		.5490	2.0	
.7831	-.1	9.0	.8398	5.4	3.6	.6758	-5.7		.8104	10.3		.5620	7.5	
.7900	3.9	12.6	.8480	7.5	2.0	.6822	-6.6		.8155	8.1		.5750	13.0	
.7994	1.4	9.2	.8552	3.7	6.0	.6872	4.1		.8211	11.0		.5860	3.5	
.8078	-2.9	7.9	.8647	8.6	.3	.6929	-1.5		.8269	15.4		.6250	6.5	
.8137	-.1	10.6	.8714	-1.5	8.0	.6987	-5.0		.8320	9.1		.6380	1.5	
.8204	-.5	9.8				.7050	-1.2					.6520	6.0	
.8298	.7	9.4	45,621.+(14 oct.83)			.7127	-3.2		46,326.+(17 Sep.85)			.6640	2.0	
.8382	2.9	10.7	** 5621	SPM(Obs)		.7202	-11.2		** 6326	Granada		.6750	.0	
.8500	-2.1	4.0	.7287	6.0	6.8	.7270	-8.6		.4450	4.0		.6860	-8.0	
			.7386	3.0	3.8	.7305	-17.8		.4620	9.5		.6970	-4.0	
			.7460	.0	8.2	.7407	-11.0		.4790	12.0		.7080	-5.5	

This difference (for Filter 2 : 4571 A), is given in tabular form at the observing time of the variable. There is no evident color variation on our data. For those interested, we can furnish a copy of the measurements for filters 1 (3750 A) and 3 (5160 A).

Using the ephemeris recently published by Sareyan et al.(1988), obtained from our measurements and all the available and published data on this star, we show the phase plot of all our data, both for UV and visible filters.

We expect to continue the monitoring of this star, both in photometry and spectroscopy, in order to understand the physical mechanism responsable for its behaviour. During the Autumn of 1986, we had a new common international campaign which is in the reduction process. As the observations where coordinated from different longitudes, this analysis has to be specially careful: It is rather difficult to 'match' with precision the observations from different observatories when the variations are only about 2% in light amplitude and the time scale involved (between 6 to 8 hours), of the same order as a night of observation.

In fact, most Be stars show similar time scales or periods and low (or threshold) amplitudes, making it a challenge to detect the actual photospheric continuum variations integrated on the disk.

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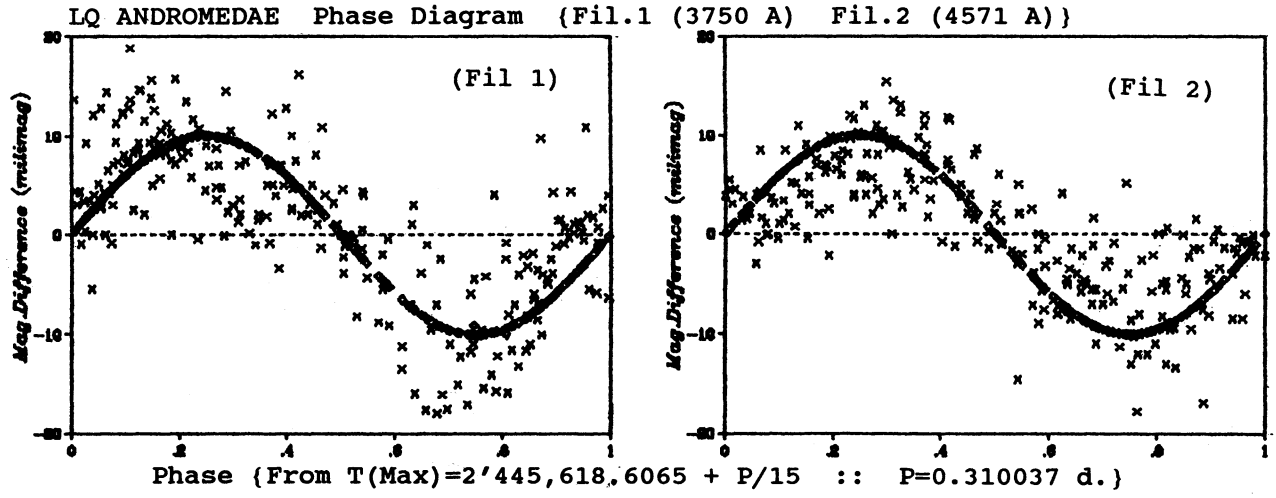

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