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A NOTE ON THE MAGNETIC VARIABILITY OF THE MAGNETIC STARS

If we accept the model of the inclined rotator for the magnetic stars, it ensues that the amplitude of the change of the magnetic field is given by the expression $\Delta H_e \sim H_{oe} \sin \alpha_o \sin i$, where α_o is the angle between the axis of rotation and the magnetic axis of the star, i is the angle between the line of sight and the axis of rotation, and H_{oe} is the effective field. It is evident that H_{oe}, α_o and the equatorial linear velocity v do not depend on i. In such a case the diagram (ΔH_e, v sini) must represent a dispersion of the points which correspond to the stars with respective parameters about a straight line passing through the beginning. Fig.I shows this diagram, where we have made use of 21 stars, for which the necessary data are available in [1,2]. On this diagram one can see two well represented linear concentrations of the points with an interval of ΔH_e between them of about 500-1000 gauss. There is a tendency for the decrease of ΔH_e with v sini, but the fact, that at v sini = 0 km/s one observes stars with very large ΔH_e and that both linear concentrations of the points do not tend toward the beginning of the diagram, is in favour of the conclusion, that the hypothesis of the inclined rotator is not able to cope with the observational data.

Besides, Fig.2 shows the diagrams (ΔH_e, B-V) and (ΔH_e, U-B), where we have made use of the data from [1,3]. Both diagrams present three well outlined zones in which the points are concentrated. While on the diagram (ΔH_e, B-V)

these zones are almost concentric with an approximate centre B-V $\simeq$ 0,01 and $\Delta H_e \sim$ 500 gauss, on the diagram (ΔH_e, U-B) these zones stretch in the direction of the negative values of U-B. It is logical to group in zones the stars on these diagrams. From the 40 stars we have made use of, they are distributed on the diagram (ΔH_e, B-V) as follows: in the I. zone 21 stars, in the II. zone 14 stars, in the III. zone 2 stars, in the intermediate position between the I. and the II. zones there are only 3 stars. They are set low and maybe they represent the way of the passage of the stars from one zone of the diagram into another. It is worth noting that all stars attached to one of the groups α, β and γ, according to Babcock [4], lie in the same zone on both diagrams and only 5 stars lie in different zones, i.e. the zones are comparatively steady. These two diagrams allow us to associate the amplitude of the change of the magnetic field ΔH_e with the colour indices B-V and U-B and, hence, with the temperature which supports the above mentioned conclusion, that the change of the magnetic field is rather a function of the astrophysical parameters of the stars and not of the geometrical ones.

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RACHO RADKOV

Astronomical Observatory,
University of Sofia

Fig.1

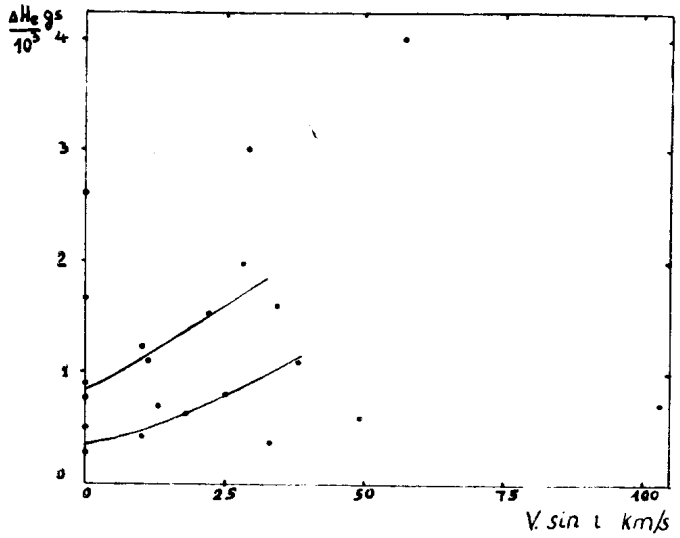
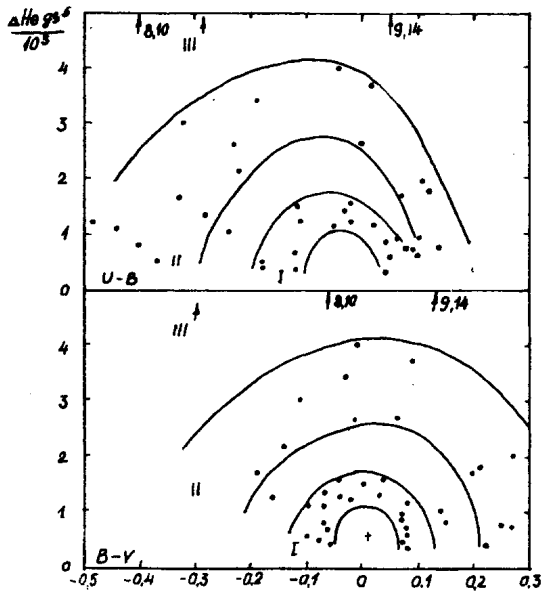

ΔHe gs / 10^5
4
3
2
1
0
0
25
50
75
100
V. sin i km/s

Fig.2


ΔHe gs / 10^5
8,10
9,14
III
II
I
U-B
4
3
2
1
0
-0,5
-0,4
-0,3
-0,2
-0,1
0
0,1
0,2
0,3
B-V