MAGNETIC FIELDS OF STARS

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ABSTRACT. Now it is known about 1212 stars of the main sequence and giants (from them 610 stars — it is chemically peculiarity (CP) stars) for which direct measurements of magnetic fields were spent (Bychkov et al.,2008). Let's consider, what representations were generated about magnetic fields (MT) of stars on the basis of available observations data.

Key words: Stars: magnetic fields of stars: basic properties

1. The store observations data about measurements of magnetic fields of stars

For all 1212 stars have been received in the sum of 15240 estimations of a magnetic field. Observers investigated basically Ap stars as the most interesting objects. Magnetic field it was measured at the others basically with survey objective no more than 5 times.

Dependence of quantity of stars in from number of measurements for them made on Fig.1 is represented. Stars are divided on bins by quantity of measurements with step 5. The first bin contains stars with number of measurements from 1 up to 5, the second from 6 up to 10 and etc. In the first bin (no more than 5 measurements) 1061 star that makes 88% from total namber (on fig.1 the first bin is cut off from above). In figure also not put 5 stars the magnetic field for which was measured more than 200 times. All 5 stars are magnetic CP stars with very well studied magnetic behaviour.

Distribution is represented on fig.2 for the measured stars on visible star sizes. Apparently from this figure, bright stars approximately up to m_v $6m$, have been rather in regular intervals investigated.

On fig.3 show quantity of individual measurements of a magnetic field (MF) received in current of each year since the moment of the first measurements of MT on stars. It is necessary to pay attention that for construction of the histogram the published estimations were used only. And as not all the estimations received last years are published, it is necessary to expect increase in number of estimations for last years. Figure testifies that stable, escalating interest to research of stars magnetism is observed.

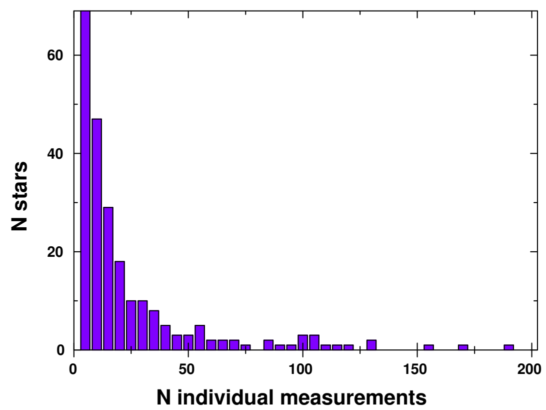

Figure 1: N stars vs. N individual measurements.

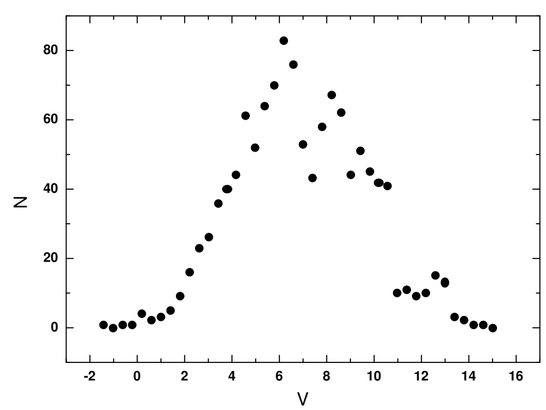

Figure 2: N stars vs.m_v of stars.

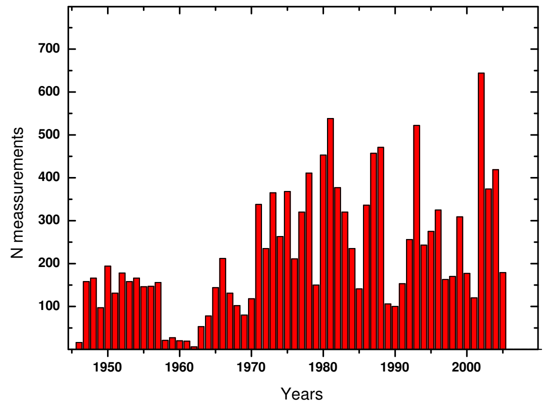

Figure 3: N measurements vs. years.

2. Magnetic field of stars

Accessible data of observations have allowed to generate the next representations about magnetic fields of stars:

1. Strong magnetic global fields has some part CP of stars.
2. Exponent the law is observed in distribution of intensity of magnetic fields CP of stars (Bychkov et al., 2003, 2008). As an example such distributions we will show on fig.4 distribution for SrCrEu (strontium-chromium-europium) CP of stars.
3. Magnetic variability for 157 stars is studied (Bychkov et al., 2005).
4. Variability of magnetic field for 86% CP stars looks like a simple harmonic. Hence MF has simple dipolar structure for these stars. For 14% stars —changeability carries complex, more often two-componental character, and, possibly, MT has multipolar structure (Bychkov et al., 2005). It is possible influence dissimilar distributions of a chemical composition on a surface (Lebedev et al., 2006).
5. Changeability of MT with small amplitude (up to several tens G) is known for 6 stars of solar type and 3 early supergiants.
6. The stars of main sequence G, K, M spectral classes have local magnetic field spots structures.

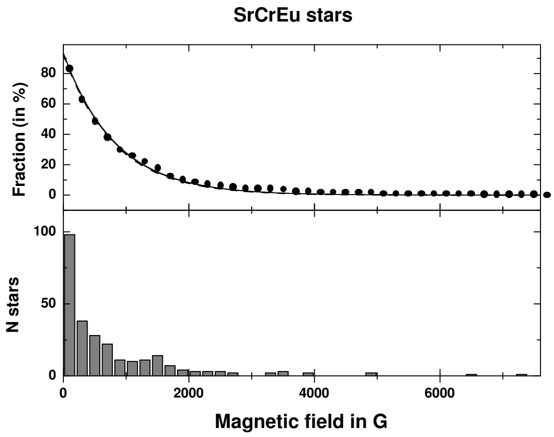

Figure 4: Integrated distribution function $N_{int}(B)$ in percent (upper panel), and the number distribution function $N(B)$ (lower panel) for SrCrEu stars vs. magnetic field in G.

Acknowledgements. This work was supported by grant No.N203 4061 33 from the Polish Committee for Scientific Research.

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