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# Variability of Stellar Magnetic Fields

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**Abstract.** We collected 190 stars with known magnetic phase curves, among them 17 stars of late spectral type. We present some statistical results on the magnetic variability of stars.

## 1 Magnetic Phase Curves

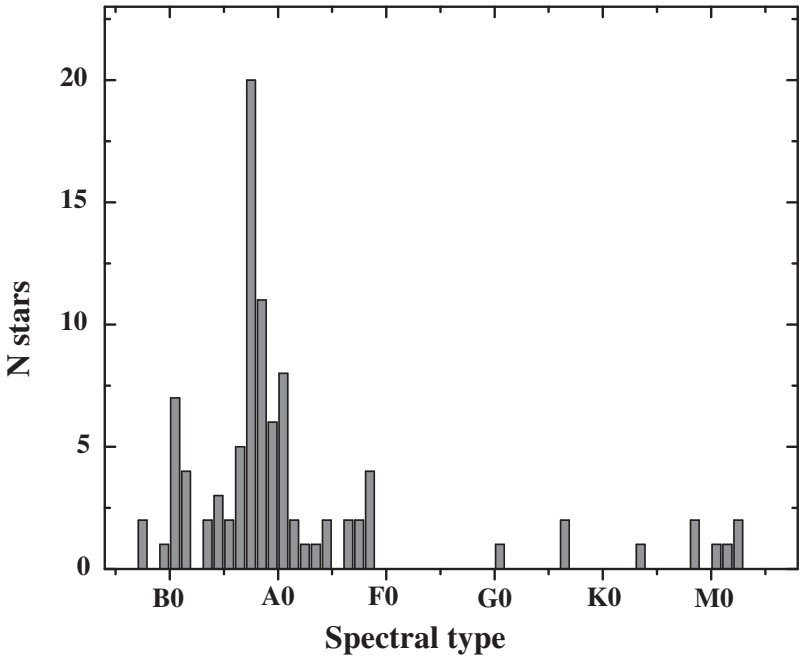


Figure 1: The distribution of number of stars with known $B_e(\Phi)$ phase curves vs. spectral type

In Figures 2 – 4 the most typical magnetic phase curves for different types of stars are shown.

All the objects with magnetic fields exhibit variability in the form of a simple sine wave. Variability of the field has not yet been studied for many objects. Nevertheless we note a big progress in studying the magnetic field variability. Basically this progress is due to an increased accuracy of measurements.

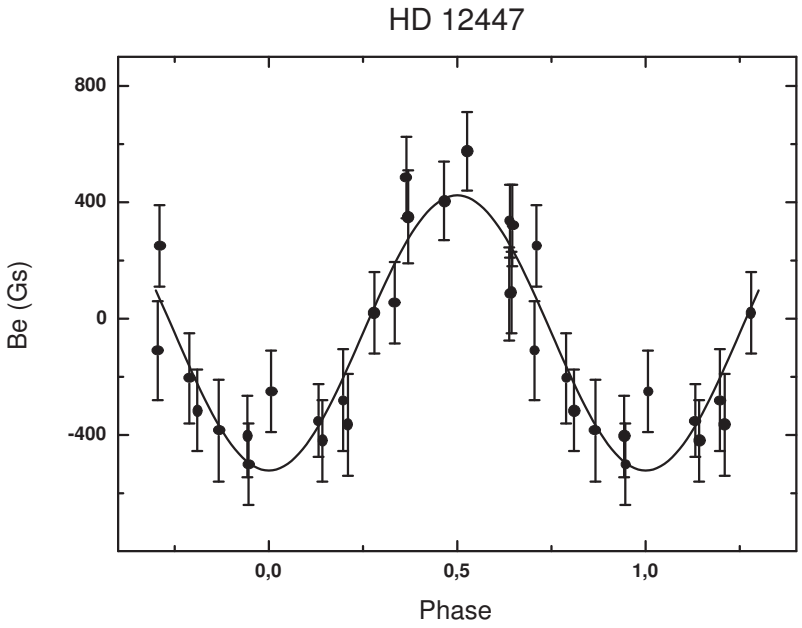


Figure 2: Magnetic phase curve for A0p star HD 12447 vs. rotational phase. This star has a simple sine wave curve.

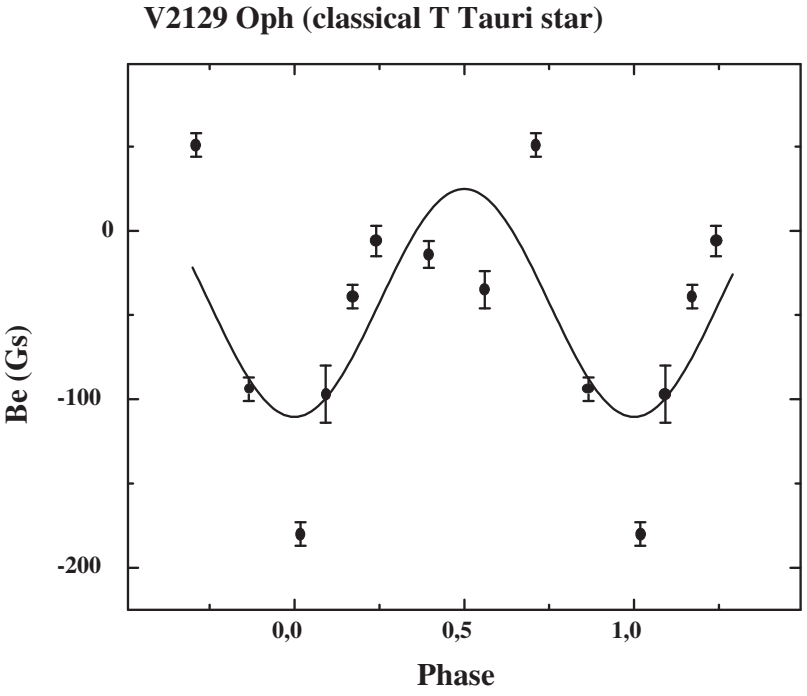


Figure 3: Magnetic phase curve for the classical T Tauri star V2129 Oph.

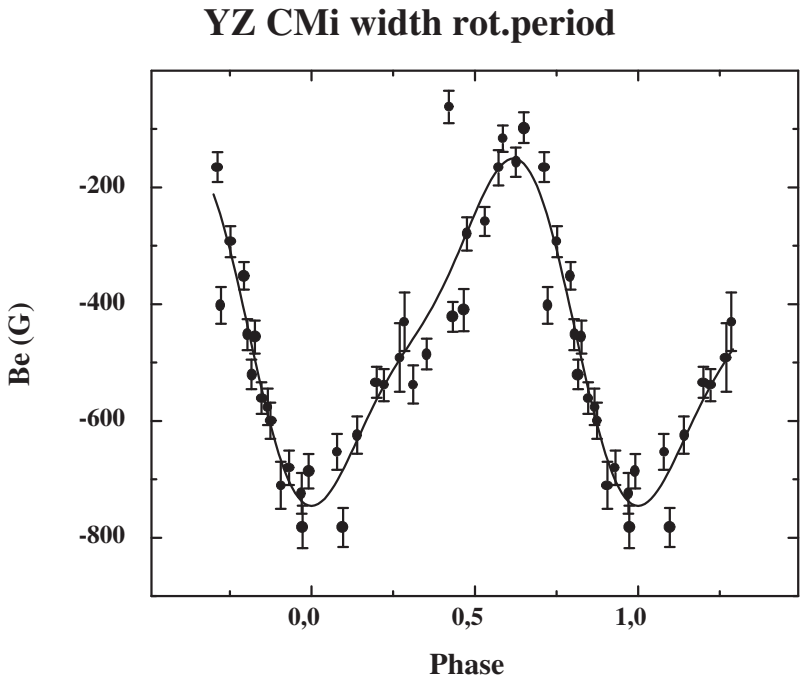


Figure 4: The magnetic phase curve for YZ CMi vs. rotational phase —low mass red dwarf M4.5. The best fit is a double wave.

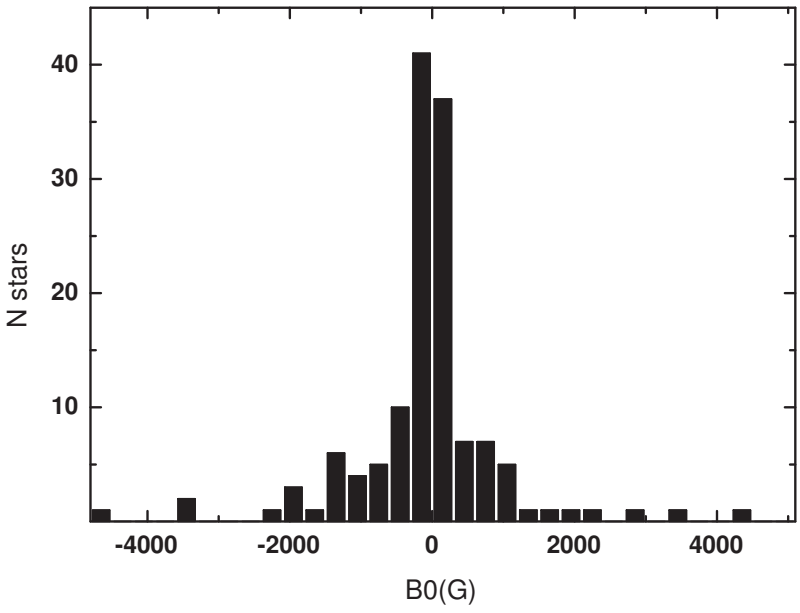


Figure 5: The number distribution of (signed) half amplitude of variability only for Ap stars with a sine wave phase function

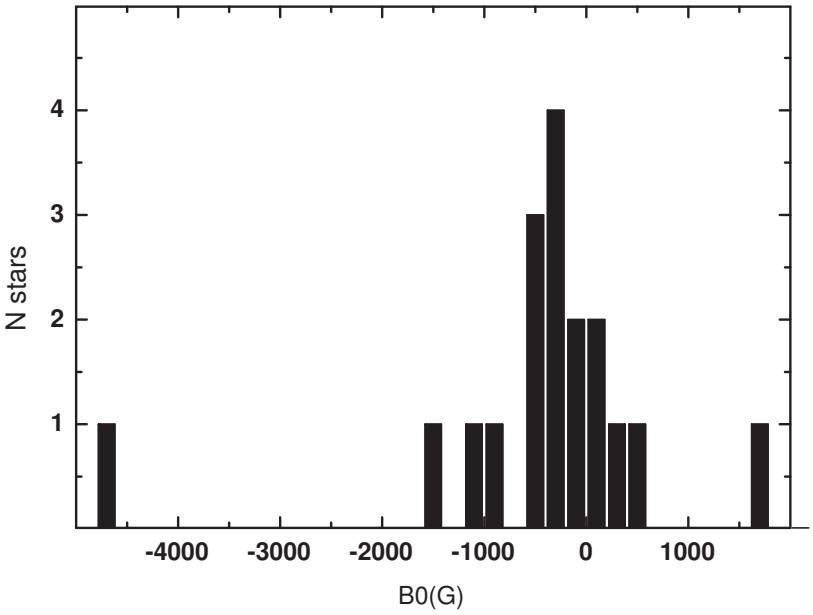


Figure 6: Same as in Fig.5, but for Ap stars with a double wave (Bychkov et al., 2005). There exists an appreciable deficit of distribution in the negative side. We believe it is due to poor statistics. We have now only 22 such objects.

## 2 Magnetic Field Variability of CP Stars

We currently have phase curves for 157 CP stars.
1. The magnetic field (MF) variability of 86% of stars displays a simple sine wave. The behaviour of these stars is fully described by the Stibbs–Preston oblique rotator model.
2. 14% of CP stars have their magnetic rotational phase curve in the shape of a double wave.
3. HD 37776. This star displays the most complex magnetic curve.
4. The variability periods are equal to the periods of rotation. They lay within the limits from 0.55 days up to 100 years. Periods are most often found in the interval from 2 to 6 days.
5. Half of the amplitude usually does not exceed 3.5 kG. In rare cases it reaches up to few tens kG.

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## References

Bychkov V.D., Bychkova L.V., Madej J., 2005, A&A, 430, 1143