# A Catalog of Averaged Magnetic Phase Curves. Version 2.1

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**Abstract.** In the latest version, the catalog contains magnetic phase curves for 356 stars of various types.

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The study of stellar magnetic fields is one of the most important directions in modern astrophysics. As techniques and techniques improve measurements of magnetic fields of stars, as well as commissioning of a number of large optical instruments significantly increased accuracy of magnetic field measurements stars. The magnetic fields of stars are periodically variable in time, according to this, magnetic phase curves (MPC) must be obtained for their description. To describe the observed variability of the magnetic fields of stars a catalog of average phase curves was created Bychkov et al. (2005, 2020). The main goals of creating a catalog are:

1. Review and synthesis of accumulated observation material on periodic magnetic behavior of stars of different types.
2. The collected measurements will allow statistical analysis of magnetic fields of stars.
3. Information is presented in a convenient form for verification of various kinds theoretical models.
4. The catalog will be useful for developing observation programs.
5. There is another important direction that develops the creation of this catalog - studies of orientation of axes of rotation stars in space.
6. Allows efficient investigation of mechanisms of generation and evolution of magnetic fields of stars.
7. Allows you to obtain estimates of the energy of the magnetic fields of stars.

8. Investigate interactions of magnetic fields of stars with interstellar medium.
9. Investigate the mechanism of "magnetic braking" of rotation of stars.
10. Study of global magnetic field generation as a superposition of local magnetic fields in late stars.
11. Determination of rotation period of magnetic stars.
12. Study of the orientation of planetary orbits in stars with planets and planetary systems.

Usually, MPCs are described by a simple or double sinusoid inscribed least squares method. It should be noted that at the moment, relatively good statistics exist only for Ap/Bp stars — 221 objects. MPCs was published in Bychkov et al. (2020).

**Table 1.** Number of stars with MPC depending on type

| | | | |
|---|---|---|---|
| Ap/Bp | 221 | Stars hosting planets | 8 |
| Var. $\beta$ Cep type | 14 | Normal chem.comp.stars | 5 |
| Slowly Pulsating B stars | 6 | Be stars | 6 |
| High Proper Motion stars | 7 | Var. $\delta$ Sct type | 1 |
| Var. $\delta$ Cep type | 1 | Semi-regular var.pulsating | 2 |
| Multiple star | 13 | Flare stars | 14 |
| Pulsating star | 2 | Ae/Be Herbig stars | 9 |
| Var.BY Dra | 7 | T Tau stars | 3 |
| Var.Ori type | 2 | Pre-main sequence | 2 |
| Rotationally var.star | 8 | EB Algol type | 1 |

## Bibliography

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Bychkov, V. D., Bychkova, L. V., & Madej, J. 2020, arXiv e-prints, arXiv:2004.14099

**Table 2.** Estimates of maximum values of half-amplitudes $B_1$ and $B_2$ depending on from the type of stars. N1 — number of stars with simple sinusoid, N2 — number of stars with double sinusoid

| Type of star | N1 | $B_1 max$ in G | N2 | $B_1 max$ in G | $B_2 max$ in G |
|---|---|---|---|---|---|
| Ap/Bp | 166 | 3000 | 62 | 5000 | 1200 |
| Var.$\beta$ Cep type | 14 | 500 | | | |
| Slowly Pulsating B stars | 6 | 350 | | | |
| High Proper Motion stars | 2 | 10 | 5 | 200 | 50 |
| Var.$\delta$ Cep type | 1 | 80 | | | |
| Multiple star | 11 | 1050 | 3 | 5000 | 750 |
| Pulsating star | 2 | 650 | | | |
| Var.BY Dra | 3 | 10 | 4 | 35 | 15 |
| Var.Ori type | 2 | 870 | | | |
| Rotationally var.star | 5 | 2900 | 3 | 3500 | 350 |
| Stars hosting planets | 7 | 10 | 1 | 3 | 2 |
| Normal chem.comp.stars | 4 | 1350 | 1 | 50 | 40 |
| Be stars | 5 | 750 | 1 | 650 | 170 |
| Var. $\delta$ Sct type | 1 | 3000 | | | |
| Semi-regular var.pulsating | 2 | 10 | | | |
| Flare stars | 10 | 400 | 5 | 700 | 150 |
| Ae/Be Herbig stars | 7 | 450 | 1 | 650 | 170 |
| T Tau stars | 3 | 330 | 1 | 300 | 80 |
| Pre-main sequence | 1 | 150 | 1 | 20 | 10 |
| EB Algol type | | | 1 | 35 | 10 |
| In Cluster | 5 | 850 | 2 | 3300 | 1000 |