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# O-type magnetic stars space distribution

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**Abstract.** We have compiled the measurements from Hubrig et al. (2011), Hubrig et al. (2013), Grunhut et al. (2017), Schöller et al. (2017) into a catalog of 150 stars and distinguished the "magnetic" stars according to the condition: $\langle B \rangle > 3\sigma$ at least for one measurement, and explored their space distribution. The catalog contains 28 "magnetic" stars, 91 stars with measured parallaxes, and only 15 of them are "magnetic".

**Key words:** stars: magnetic field – stars: distances

## 1. Spatial Density

The spatial density of stars is calculated as the ratio of stars number in spherical layer centered on the Sun to its volume (Fig. 1).

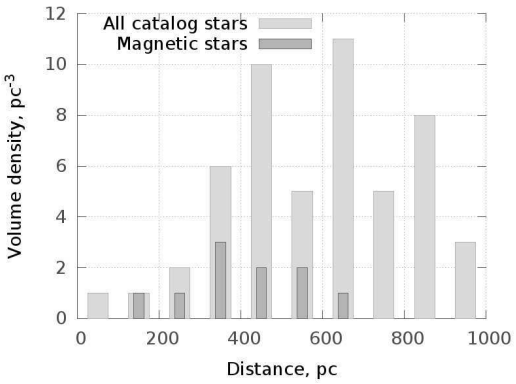


**Figure 1.** The spatial density of stars vs. their distances to the Sun. Magnetic stars are labeled by dark-gray color, all catalog stars – by light-gray. A large fraction of the catalog stars has no measured parallaxes. We suppose that they are located farther than 1 kpc from the Sun.

## 2. Surface density

We determine the stars surface density as the ratio of the number of stars in the zone of sphere to its area in steradians. Latitude and longitude distributions of the surface density are shown in Fig. 2 (a, b).

It is also useful to consider the ratio of magnetic stars density to all catalog stars density to estimate directions in Galaxy, where the magnetic stars fraction is maximal. Figure 2 (c, d) shows this ratio as function of the galactic latitude and longitude.

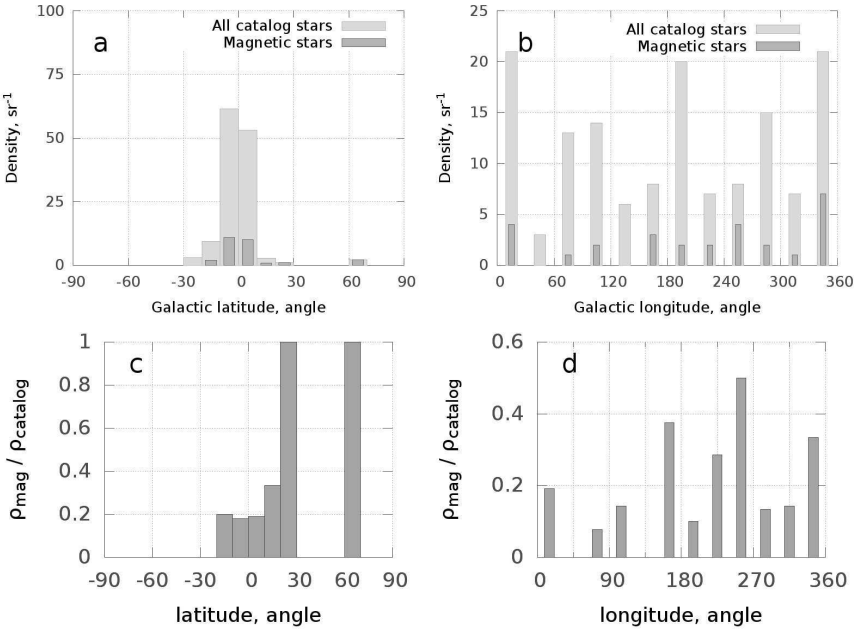


**Figure 2.** The stars surface densities (a, b) and their ratio (c, d) vs. galactic coordinate. Panel a, c: latitude distribution, panel b, d: longitude distribution.

## 3. Conclusions

There is a strong selection of the magnetic field measurements on the galactic latitude. There are no measurements for stars with $|b| > 30°$. The ratio of the angle densities of magnetic to all stars in the solar vicinity for $|b| < 30°$ is nearly constant.

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