

In fastly-rotating massive stars with stably-stratified radiative envelopes, centrifugal flattening is known to make the poles brighter than the equator; this is the so-called gravity darkening. However, in cool stars with convective envelopes, the effect of rotation on the surface brightness distribution is more difficult to grasp because it requires us to model very turbulent flows and the potential generation of magnetic fields by dynamo effect. To answer this question, we use a large set of high-performance three-dimensional MHD simulations of rotating spherical shells. In such convective layers, the Coriolis force tends to organize the convection in columns aligned with the rotation axis, generating by nonlinear interaction a strong equatorial eastward wind at the surface. Raynaud et al. (2018) had already showed that such jets inhibit the vertical heat flux and thus reduces the brightness close to the Equator, making the pole brighter and thus mimicking a gravity darkening. In Pinçon et al. (2024), we extend these previous results adding the effect of magnetic fields generated by dynamo effect in such convective layers. In the case convection is weakly turbulent, we find that such magnetic fields can inverse the pole-equator brightness contrast compared to the hydrodynamical case. In very turbulent flows, magnetic fields tend to reduce the global pole-equator brightness contrast because Lorentz force is able to quench the equatorial wind, thus standardizing the surface luminosity. Such effects are of prime importance to interpret stellar light curves with transiting exoplanets or eclipsing binaries, and should be taken into account in a near future, as any other effect as gravity or limb darkening effects.