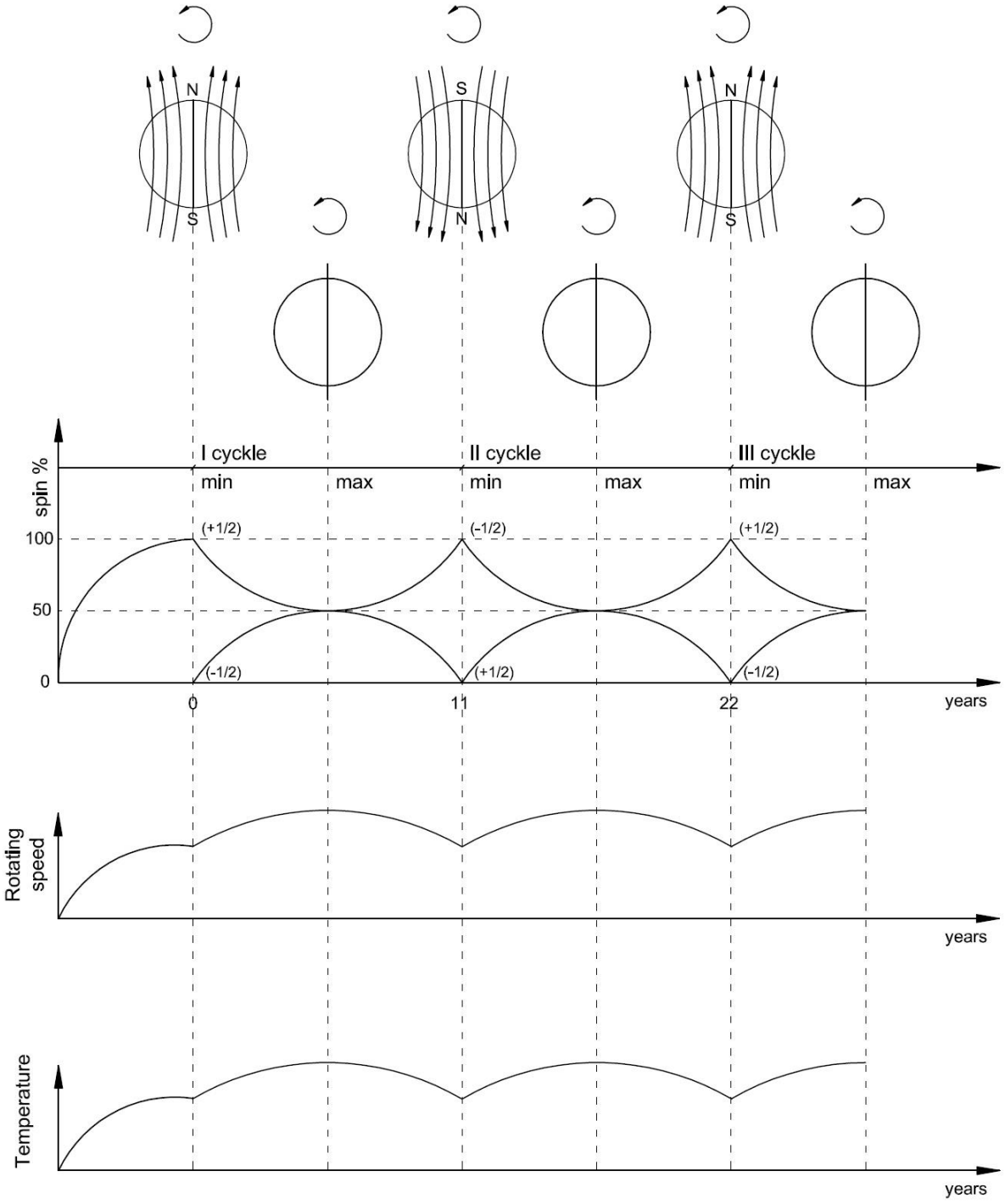
THE ROTATIONAL MOTION OF STARS (THE MECHANISM OF THE PHENOMENON ON THE EXAMPLE OF THE SUN)

The note WHAT IS THE ORIGIN OF THE UNIVERSE? presents a general mechanism of the formation of the rotational motion of stars. It appears to be a self-building up, self propelling system which results that in the sea of randomly moving plasma particles, there is formed a still growing enclave of particles being in an ordered motion. This means that this system should accelerate to infinity and lead to thermal self annihilation. Because nothing like this happens, there must be a mechanism adjusting the rotational velocity of the star, or maintaining its temperature within specified limits. This mechanism will be presented on the example of the Sun.

As shown in the main elaboration, an electron is, among others, an elementary magnetic dipole. This elementary magnetic dipole has a feature called a spin. The value of this spin can be (+1/2) and (-1/2). They are conventional values which means that an electron can have magnetic field lines directed in one way or another. Electrons with a spin (+1/2), when connecting with each other by their poles, form secondary, compound magnetic dipoles whose lines are directed in one way, while electrons with a spin (-1/2) form magnetic dipoles whose lines are are in the opposite direction. It turns out that in the process of maintenance and adjustment of the temperature of a star, the main role is played by the spins of electrons. The figure below will help to explain it.



The note WHAT IS THE ORIGIN OF THE UNIVERSE? shows that all stars emerged simultaneously at a certain period in the formation of the Universe. At the time the mass, magnetic flux, rotational velocity, and the temperature of the star were increasing. Initially, it was a quick process, much slower in the final phase, and it stopped altogether when the "resources" had run out. If the process of the star formation ended, this means that the

magnetic flux stabilized on a certain level (see cycle I, min.). According to Faraday's law of induction, the lack of changes in magnetic flux means the lack of an electric field in the current loop, thus the cause for the rotational motion of the star ceases to exist. From that moment, the star rotates by force of momentum only. Unless the value of magnetic flux has been changed in some way, the star will slow down and stop. Now, the spins of electrons of hydrogen and helium atoms enter into the action. Electrons with the same spin (+1/2) systematically change it into (-1/2). The duration of this process is specific for a particular star, for example, for the Sun it is 11 years. The change of spins of electrons means that the magnetic field lines of the star change the direction, thus the polarity of its magnetic field gets reversed. The polarity reversal proceeds in such a way that each drop in the quantity of spin (+1/2) is accompanied by an identical growth of the quantity of spin (-1/2). This means that at some point there are 50% electrons with a spin (+1/2) and 50% electrons with a spin (-1/2) (see cycle I, max.), which results in the complete lack of a magnetic field in the star. Since the change of spins continues, from 50% to 100% the quantity of spins (-1/2) is growing, and from 50% to 0% the quantity of spins (+1/2) is decreasing (see cycle II, min.). This way there emerges the magnetic field of the star as big as it was at the beginning, but with the poles reversed. Thus, the first full cycle of the polarity change on the Sun came to an end. Then there was a second cycle followed by another, and so it has continued until now.

The issue of the polarity reversal of the magnetic field of a star was explained above. There is still left another, not less important one to be explained. How does the star maintain and regulate its temperature obtained at birth? Let's go back again to the beginning of the first cycle. The process of the star formation ended. The star has 100% electrons with a spin (+1/2), 0% electrons with a spin (-1/2), and 100% magnetic field lines with a particular direction (upwards), (see cycle I, min.). The process of the change of spins begins. A decrease in electrons with a spin (+1/2) means a change in magnetic flux, a decrease in the amount of magnetic field lines. According to Faraday's law of induction, in the current loop of the nucleus of the Sun, there emerges a current whose magnetic field wants to prevent this change. Such counteraction means an increase of the current intensity in the electric field loop, which leads to an increase in the speed of charged particles, and so to an increase in the speed of rotations of the core, an increase of the friction on the core-atmosphere border, an increase in the temperature of the star. This temperature reaches its maximum when the amount of field lines is 0%, that is when the amount of electrons with a spin (+1/2) and (-1/2) is 50% each (see cycle I, max.). From that moment, the amount of electrons with a spin (-1/2) starts to grow, that is the amount of the magnetic field lines of the star with an opposite direction starts to grow. According to Faraday's law of induction, in the current loop of the core of the Sun, there emerges a current whose magnetic field wants to prevent this change. Such counteraction means a decrease of the current intensity in the electric field loop, which

leads to a decrease in the speed of charged particles, and so to a decrease in the speed of rotations of the core, a decrease of the friction on the core-atmosphere border, a decrease in the temperature of the star. This temperature reaches its minimum when the amount of electrons with a spin (+1/2) is 0%, the amount of electrons with a spin (-1/2) is 100%, and the amount of field lines is 100%, but they are lines with a direction opposite to the one which was at the beginning (downwards), (see cycle II, min.).

Now, we are already able to explain why the polarity of the magnetic field of the star gets reversed. This is a necessary condition in order for the star to always rotate in the same direction. Had this process not taken place, after half of the cycle (after maximum), according to Faraday's law of induction, in the electric loop the current would have changed the direction of the flow, thus the star would have wanted to change the direction of the rotation. In other words, at the highest speed the star would have shifted to reverse gear. It is even difficult to imagine what would have happened then.

And now, the last question is left to be explained. What makes electrons to change the spins in a specific moment. There is probably a temperature limit above which electrons have a spin (+1/2), and below which the spin of electrons changes to (-1/2), and the temperature of the star oscillates around this limit.