

Comments Section

The Draft Law of Ukraine “Artificial Magnetic Field”

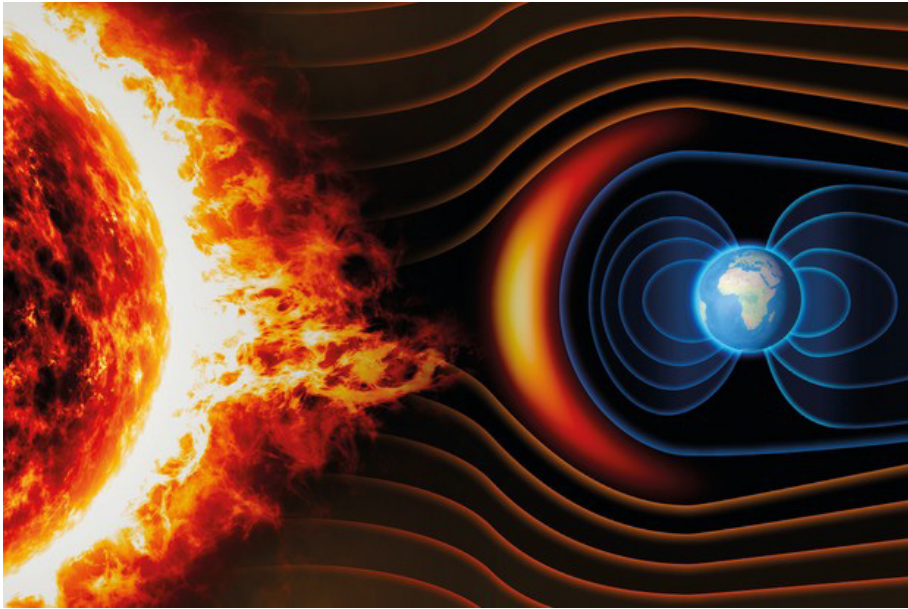
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Nowadays, people face one of the most severe dangers from space — solar wind.



Picture 1 (Green, 2020)

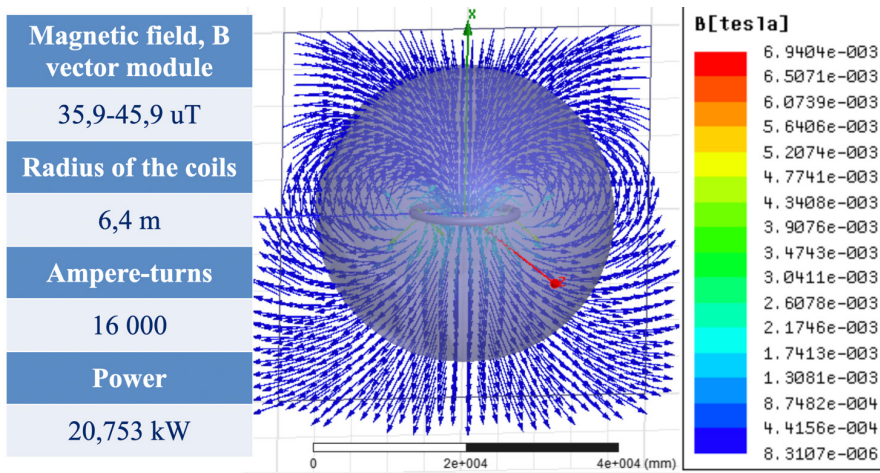
Our planet is protected from it with a magnetic field. Nevertheless, even with this natural protection, there were incidents in the past when the sunburst destroyed Earth’s infrastructure on Earth.

In the space environment, sunburst will cause fatal damage for astronauts and electrical circuits outside the Earth’s magnetic field. In order to protect ourselves, we should create our own magnetic field. The desired field can be created by placing a coil inside the station which will produce the field with the same magnitude and direction as the field on Earth.

The Mathematical model which is used in the calculation is based on two magnetic Maxwell equations from which is the Biot-Savart law derived.

The simulation of the magnetic field was done by issuing the finite element method. The calculation method was verified by comparing the results of the simpler problem with the mathematical model based on Maxwell’s equations showed above.

The specifications of the magnet are calculated based on the simulations. Simulation and specifications are shown in picture 2.



Picture 2

The main applications of the magnetically systems are space stations, but it is not limited to them. Humanity has far-going plans of colonising other celestial bodies, and the system can easily be integrated into the ground-based scientific station on Mars, Moon, or other planets or satellites.

Conclusions

The system described creates the magnetic field, which equals the Earth's magnetic field in terms of magnitude and direction.

This field solves one of the biggest problems of the long-term survival in space- solar radiation and biological magnetic background.

References

- Green, Lucie (2020) What are magnetic fields and how do they shape the Universe? *BBC Sky at Night Magazine*. Available online: <https://www.skyatnightmagazine.com/space-science/what-are-magnetic-fields-how-do-they-affect-universe/>