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Generation of Electricity through Atmosphere

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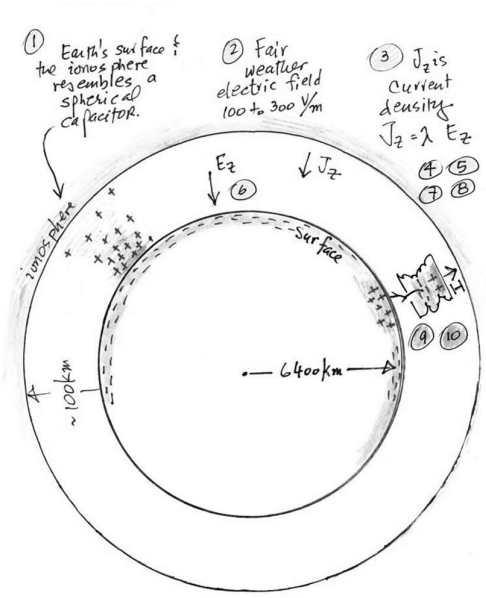
Abstract:In the recent years, we all are facing electricity crisis. It's time to harness the renewableenergy resources of the nature. This article presents discussion on the atmospheric electricity, which can be generated by utilizing geothermal energy. It also explains the theoretical procedure, to generate huge amount of electricity, at about the height of 100 meter. This procedure can help to make a new power plant, which can generate electricity of about 10Mwatt per day.
Index: Geothermal energy, steam, atmosphere, T.H Moray's device, Electricity.

I. INTRODUCTION

Discovery of electricity has changed our generation and also improved our standard way of living. But in the world, trillions of houses are still unelectrified. It's all due to lack of production of electricity. Due to increasing population in the world, needs of electricity are also increases. Our resource is very limited to satisfy the demand of electricity. In order to overcome from this problem, we need to design a "new power plant" which can generate electricity through atmosphere and Geothermal energy, which is completely a renewable source of energy.

A. Earth physiology

Earth has a totally balanced potential. It is so because earth is a good conductor of electricity.
The conductivity of earth increases as we go higher and higher in the space. Theatmosphere present near the surface of earth is a bad conductor of electricity. The best part of our atmosphere which acts as an awesome conductor is the ionosphere of earth. The ionosphere is good conductor due to the ionization of the molecules. The ionization is done by the cosmic rays present there. These rays are very high energy rays having energy of 10^{14}MeV.



On the surface of earth the value of electric field E is 100V/m. On the whole earth the direction of the electric field is towards the center of the earth i.e. in the downward direction. As we go higher the magnitude of electric field will decrease. At a distance of nearly 10 km from the surface of earth theelectric field becomes very less. Near about 50 km away from earth in the upward direction, its value becomes negligible.
The value of the potential difference between the earth's surface and the extreme top of the stratosphere is near about 4 X 10^5 V. When we will discuss this fact then we will observe that the top of the stratosphere and the surface of earth near about at a

distance of 50km from the surface are forming a spherical conductor.

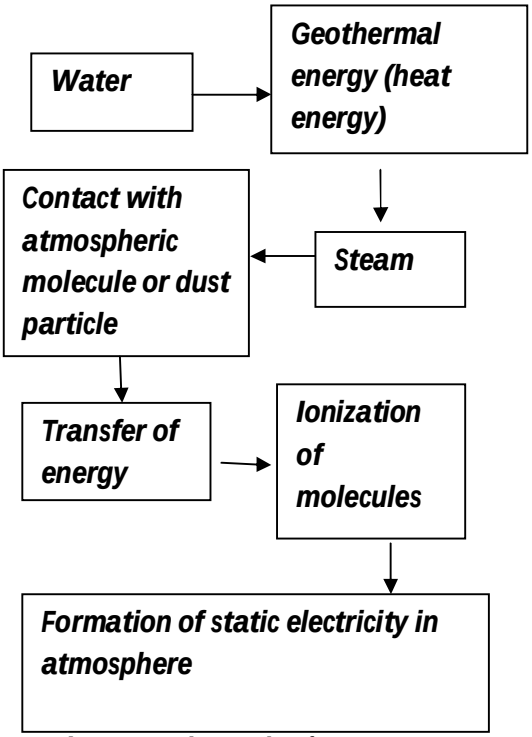
B. Effect of steam or water vapor in atmospheric dust particles

The notion of harnessing the power of electricity formed naturally has tantalized scientists for centuries. They noticed that sparks of static electricity formed as steam escaped from boilers. Workers who touched the steam even got painful electrical shocks. Famed inventor Nikola Tesla, for example, was among those who dreamed of capturing and using electricity from the air. It's the electricity formed, for instance, when water vapor collects on microscopic particles of dust and other material in the air.

Carlon (1983) has inferred that air humidified by boiling water contains abnormally high concentrations of singly charged ions. The measurement have been further interpreted by Carlon as indicating that the high concentrations of ions can be maintained in air saturated with water vapor for one hour or more after boiling has ceased. He explained these ions as decomposition products of water molecule clusters in the vapor and calculated the concentration of the ions greater than 10^6 cm^{-3}. Thus providing water vapor or steam at the height of 100metres can help us to increase the ions per unit area.

II. THEORY AND PRINCIPLE

The principle is based on the law of conservation of energy. We know that, Energy can never be created nor destroyed. It means energy always transform from one form to another. Here the same things happen in the atmosphere, radiation or heat energy is converted into electrical energy. Generally when heat is supplied to water, it is converted into water vapor or steam (under high pressure). When this steam comes into the contact with molecule or a dust particle of atmosphere, it gets ionized. This is usually happens because steam releases the energy in electron volt, which is used to ionize the dust particle in atmosphere.

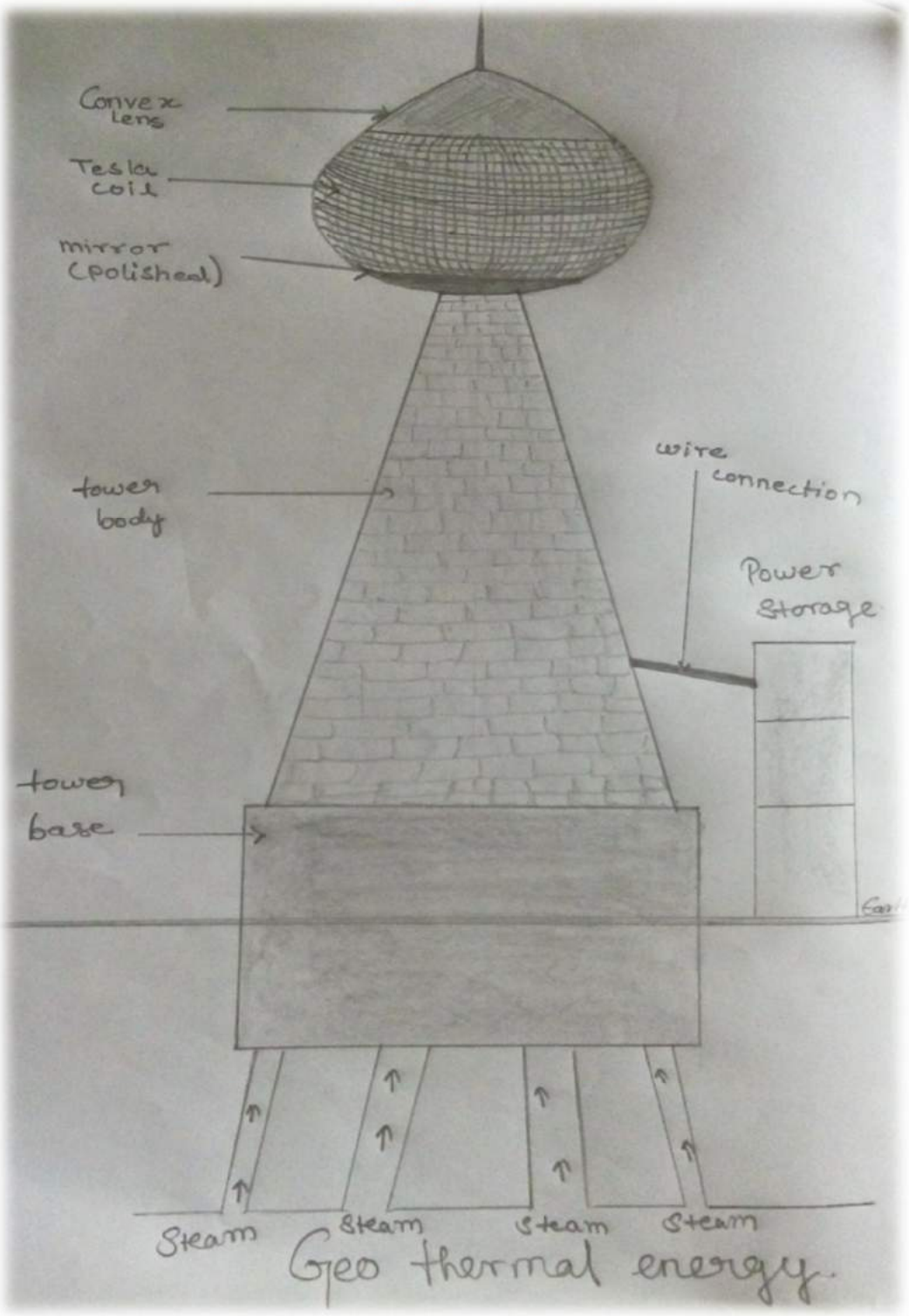


Conductivity at the Height of 100metre:

Since, on the surface of earth the value of electric field E is 100V/m. So at the height of 100metre, the voltage will be 10000v. We all know that production of electricity at this height will be very low. So in order to increase the production of electricity, we need to take following steps:

A. Increasing the ions per unit area.
B. Decreasing the resistivity of air.
C. Providing the additional magnetic field to generate more electricity.

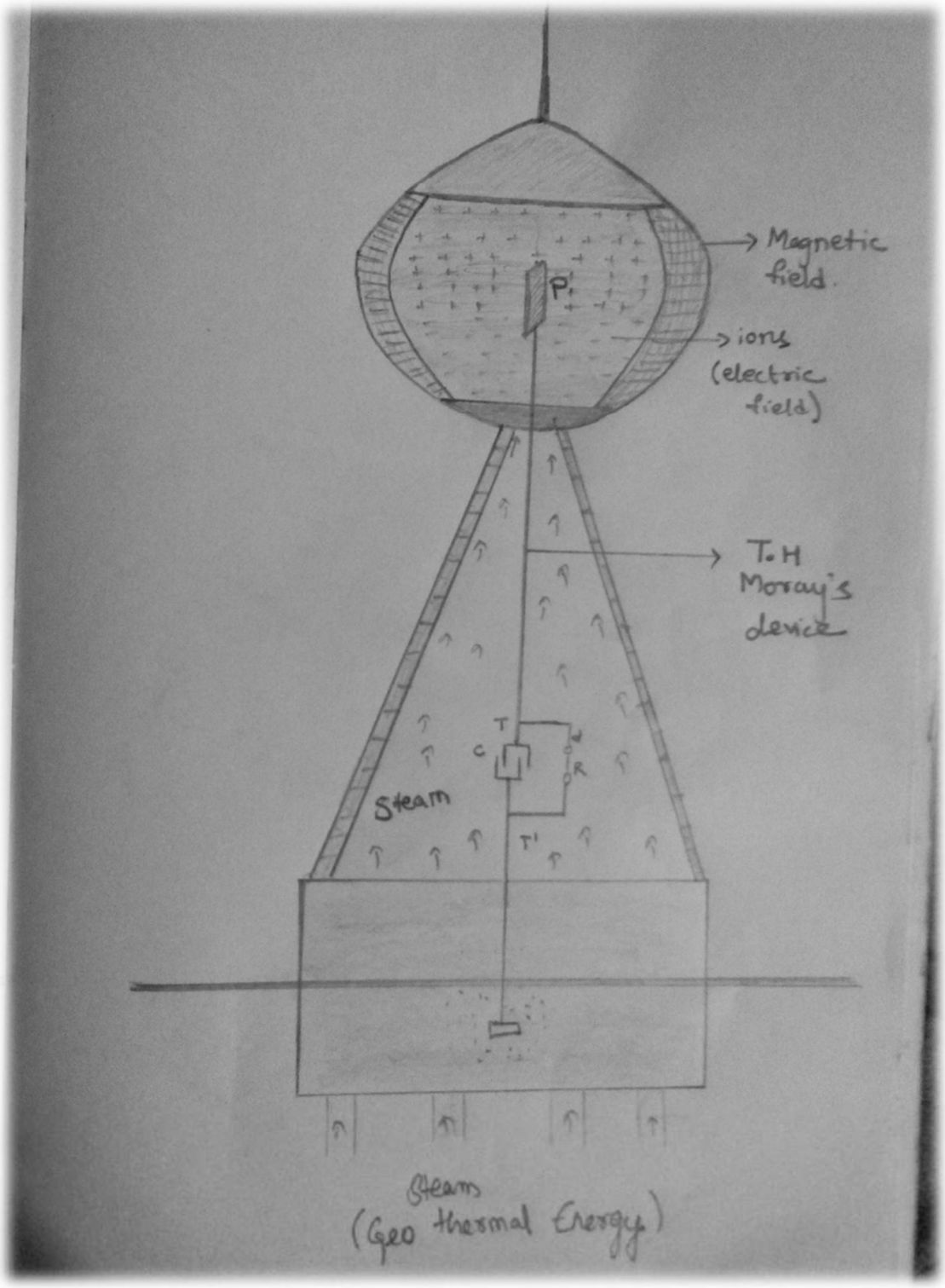
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Figures shows outside section of a tower

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Figure.2.



Figures shows inside section of a Tower

III. CONSTRUCTION OF A TOWER

A. At first, construct a geothermal energy source to get the steam for the production of electricity.
B. Then a tower of 100metre can be constructed (As shown in figure 1.). The tower is made up of concrete, so that steam should reaches the top of tower directly.
C. Top of the tower is covered with Tesla coil to generate magnetic field.
D. On the top of tower, it should be covered with convex lens and a mirror opposite, to reflect back the focused ray. (As shown in figure 1.)
E. T H Morays device is used, to capture the static electricity (As shown in figure 2.)

IV. GENERATION OF ELECTRICITY

Water is pumped up and with the help of geothermal energy it is then converted into steam. This steam is allows to flow towards the top of the tower as shown in figure 2. It is stored for some time on the top. During this, the steam will come in contact with atmospheric particles. Since steam posses of high energy, so it will release energy in electron volt. The released energy will be absorbed by the atmospheric particles. This energy will excite the electrons of the particle. Thus the particle will starts ionizing. Due to this, the ions per unit area will increase. Therefore, the static electricity will also increase. Tesla coil at the top of tower will help to generate magnetic field, which will help in producing more electricity. T.H Moray's device is used as a unique rectifier (RE-valve) to efficiently capture the static electricity from the surrounding air. It stores static electricity and converts them into usable form.

Notes: *The convex lens is provided to focus the ultra violet rays, and to increase the intensity of light. Mirror is placed opposite to the convex lens to reflect back the rays. This will provide extra energy to excite particles electron and to ionize them.*

A. Calculation of the power generated at the top of tower

Since due to presence of steam, the ions per unit area, will increased (say double). Than the voltage of that area will increase (double). If the voltage is increased than the resistivity of the air will decrease and conductivity is increased.

Let us say that the voltage at the top of tower is 20000v (due to increase of ions, voltage is doubled) and resistivity of air is 50ohm, so the current I can be calculated,

$$V = IR$$

Where V = voltage at the top of tower in volts

I = current in amp

R = resistivity of air in ohm

P = power generated in watts

$$\frac{20000}{50} = I$$

$$I = 400amp$$

Now to calculate the power generated in watts,

$$P = IV$$

$$P = 400 * 20000$$

$$P = 8000000watt$$

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$$P = 8MWatts$$

i.e., the power generated is about, 8MW. Since, it is huge amount of energy, which can be generated through it. Thus per day, the electricity can be generated about 8 to 10MWatts of energy.

V. FUTURE SCOPE

A. It can be one of good source in production of electricity.
B. Since, the source is geothermal energy, and atmosphere, it can be constructed in any areas.
C. It can help in designing a new power plant.
D. It is renewable source of energy, and can give a safe energy uses.

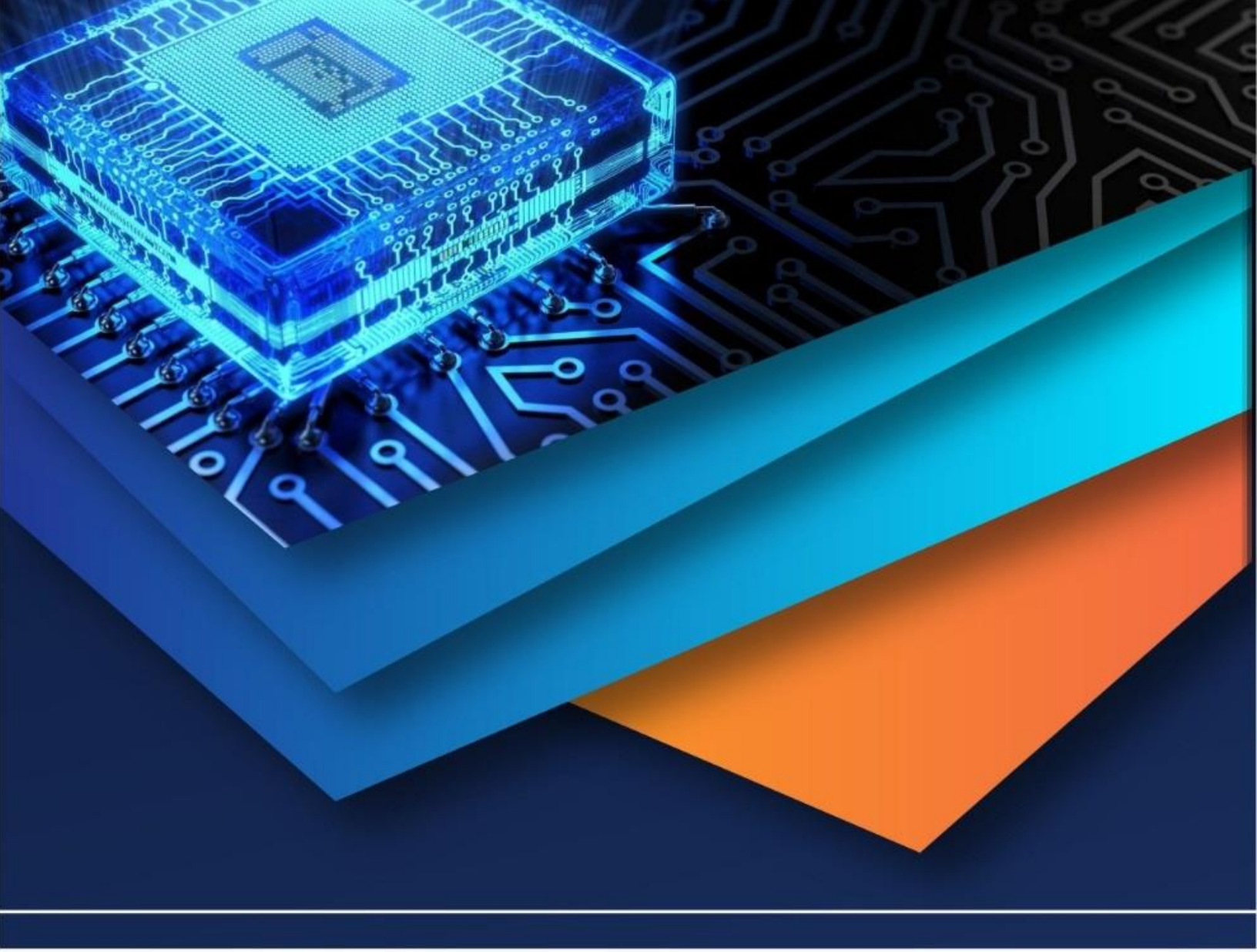
VI. CONCLUSION:

Thus with help of geothermal energy and atmosphere, the electricity can be generated. This will try to satisfy the needs of increasing demands of electricity. But before doing it in a practical way, we need to discuss a lot and a several research to be carried out, in order to generate electricity from atmosphere successfully.

REFERENCES

[1]C Champion, O Boudrioua and C Dal Cappello, "Water molecule ionization by charged particles", IOP publishing, 2008. [2]H. D. Smyth and D. W. Mueller, "The Ionization of Water Vapor by Electron Impact",APS publishing,Phys. Rev.43, 116 – Published 15 January 1933.
[3]C B Moore, "Measurement of electrical conductivities of air over hot water", American metrology society, 1998.
[4]Stefan Maus, "Conductivity of atmosphere", CIRES, University of Colorado, January 19, 2006.
[5]Feynman lectures Physics, mainly electromagnetism and matter (vol.2), Addison-Wesley Publishing Co, 1964.

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