

CONVERTING RADIATIONS IN FORM ELECTROMAGNETIC WAVES INTO ELECTRIC CURRENT

Alankit Dey and Naman Jain

Supervisor: Mrs.Neha Sharma, M.Sc. Physics, Faculty of Practical and Theoretical Physics, Vikas Bharati Public School, Rohini, Sector-24, New Delhi, India, nehadhamija06@gmail.com

1. Introduction

The extra and unused radiations are one of the excruciating global problems which must be solved. These radiations from mobile phones, cell towers, UV rays, etc., pose a great threat to the biodiversity as they can easily penetrate the human body, damaging cells and causing fatal cancer or genetic defects [1]. Although there are the several ways to reduce this adverse effect, they are not much efficient. In this research, the principle of electromagnetic induction due to changing magnetic flux has been used, in a different way, as a probable solution of the concerned problem. The aim of this study is to examine the possibility of conversion of the cellular radiations into electric current.



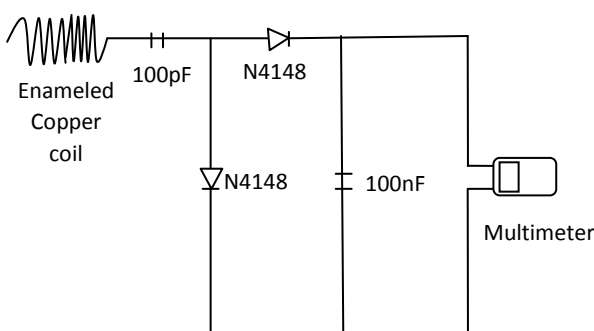
2. Experimental Setup

Initial test was conducted using a simple and small gold wire ring, which verified the working principle. Then the radiations from cell phone, while making phone call and using internet, were made to pass through ferrite cores, binded by enameled copper wire, and the readings were taken on a multimeter. The dependencies of direction of waves (orientation of phone), number of ferrite cores and turns of copper wire have been examined. The experiment was conducted using 1,2,3,4 and 5 ferrite cores in series, and 25 and 50 turns for each respective number of cores. The electromotive force (E) induced from the radiation is given by,

$$\Phi_B = \int_{\Sigma} \mathbf{B} \cdot d\mathbf{A},$$

$$\mathcal{E} = - \frac{d\Phi_B}{dt}$$

CIRCUIT DIAGRAM:



3. Results

| No. of turns per coil | No. of coils | Voltage (V) | | Current (A) | |
|-----------------------|--------------|-------------|----------------|-------------|----------------|
| | | Max Reading | Stable Reading | Max Reading | Stable Reading |
| 25 | 1 | 2.2mV | 0.5mV | 1.3mA | 0.5mA |
| | 2 | 4.8mV | 1.6mV | 1.5mA | 0.8mA |
| 50 | 1 | 0.2V | 30mV | 10.1mA | 2mA |
| | 2 | 0.25V | 32mV | 10.5mA | 2.5mA |
| | 5 | 0.41V | 56mV | 29mA | 5.4mA |

On bringing the source of radiations to an appropriate distance from the setup, potential difference was found to be induced. The magnitude of potential difference depends on proximity to source, number of coils per turn, number of coils connected in series, orientation of the object with respect to the series of the coil.

4. Conclusion

Direct dependency was found to be on the direction of waves, orientation of phone, number of turns of copper wire, ferrite cores used in series and their quantity. In further research, it is important to study the effects of amount of humidity in air. This project has multiple applications such as collection of radiations from cell phones and towers can reduce the harmful effects on biodiversity. UV rays coming through hole in ozone layer can be converted to electric current and also prevent skin cancer.

5. References

[1] Article from "Hindustan Times"

