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A Novel Theory on Effects of Alternative Potential in Dielectric Polarization

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Abstract: This paper presents a novel theory on the electronic polarization. The intention is that whenever an alternating potential occurs, a region is developed around it. This phenomenon can be named as Electro Tele Field (ETF). The dipoles are rotated due to the application of alternative voltage. The alternative voltage consists of positive and negative half cycles. During the positive half cycle, dielectric medium is positively polarized, and during the negative half cycle, the medium becomes as a negatively polarized. Hence dipoles get rotated. A continuity tester is able to detect that field. ETF can flow in conductors and penetrate in insulators. This paper explains the effect of alternative voltage on a dielectric. The main application is that the emf can be induced from one coil to another coil without current flow and electromagnetic field.

Keywords: Electronic polarization, Electro Tele field, Dynamic polarization, dipole rotation, Transformer.

I. INTRODUCTION

The Tele field presents in all the devices, instruments, machines and all wires carrying voltages. Current does not influence the region. Insulator which does not conduct the ETF but it allows penetration. Conductor which does not allows penetration of the ETF but it conducts. It causes the current flow in several micro amperes in conductors. The continuity tester glows when it is brought nearer to the ETF. First, it was found in front of the television picture tube. So that it is named as Electro Tele field. The term Tele indicates the television picture tube.

ETF normally propagates in air (dielectric medium). It can be seen near all the electrical equipment in several areas around it. Because of dielectric polarization, positive charges are displaced towards the field and negative charges shifts in the opposite direction. This creates an internal electric field that reduces the overall field within the dielectric itself. If a dielectric is composed of weakly bonded molecules, those molecules are not reorienting itself so that their symmetry axis aligns to the field [1]. The important point is that it does not have the negative terminal. The general theory states that to make a dipole moment or polarization, both positive and negative charged plates are required but here polarization takes place by positively charged wire alone. Alternative voltage causes dipole rotation which is directly proportional to the frequency of the voltage which is briefly described in this paper. This theory states that the ETF can be considered as a loss like resistivity. If a voltage is applied to a conductor, certain potential would involve in dipole moment. This loss is directly proportional to the area of the conductor and the density of the dielectric medium or material. The concentration of the ETF decreases with increases in the distance from the source. This theory also states that a voltage can be induced from one coil to another coil without any electrical contact and transformer action takes place between them.The induced emf is directly proportional to the number of primary and secondary windings. These coils do not need core materials as transformer. The point should be noted that there is no current flow in the primary coil.

II. LITERATURE REVIEW

This paper differs from the previous theories on the electronic polarization of dielectric by two main concepts. Generally electronic polarization is carried out by two or more positive and negatively charged plates. But the novel theory of this paper states that a positively charged plate has an ability to polarize the air or a dielectric medium.

Normally induced emf of a coil takes place only by the electromagnetic field but this paper states a novel idea to induce the emf on a coil by using Electro Tele field concept and it is also experimented successfully. The alternative voltage only causes the Tele polarization. Postulate theories explain the effects on dielectric medium by DC electric field and not by AC. Here the effects by AC field are briefly explained.

III. THE PROPOSED THEORY

A. Tele polarization

In a conductor carrying alternative potential V, then the alternative polarization takes place around it. This phenomenon is named Tele polarization. Note that, the

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alternative voltage consists of positive and negative half cycles. During the first half cycle, dielectric medium is positively polarized, and during the negative half cycle, medium becomes negatively polarized. This alternative polarization causes flow of current in several micro amperes. It can be verified by the following experiment.

The continuity tester has an ability to identify the ETF. It has two terminals one (negative terminal) requires positive charge and another one (positive terminal) requires negative charge to glow. If a reverse biased diode is connected in series with either positive or negative terminal, due to the reverse bias, there is no current flow from either side as required to glow tester. But the interesting result is that the tester glows in all of the biasing options of diode. It indicates the flow of alternative current through the diode. In reverse bias diode behaves as a dielectric material due to the depletion region. As per the ETF theory, ETF can flow in conductors and penetrate in insulators. Hence the field penetrates through the depletion region. The result is that the tester glows by contact of either one terminal. It can be said that, the Tele field consists of both positive and negative charges with respect to time. The Positive and negative polarization varies alternatively.

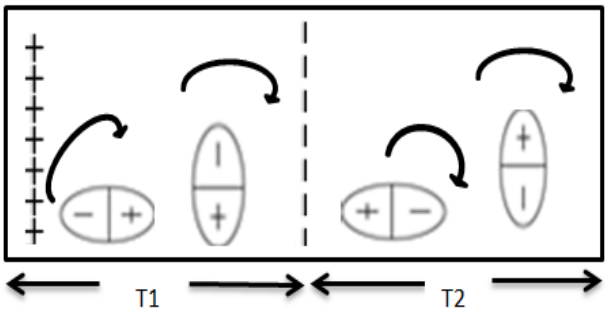

Fig.1 Dipole Rotation

The polarization is directly proportional to the electric potential and area of the conductor and inversely proportional to the distance from the charge.

$$P \alpha \frac{AV}{d} \qquad (1)$$

A – Area of the conductor; V – voltage; d- distance from the charge. The rotation of dipoles in a dielectric due to the application of the alternative potential is named dipole rotation.

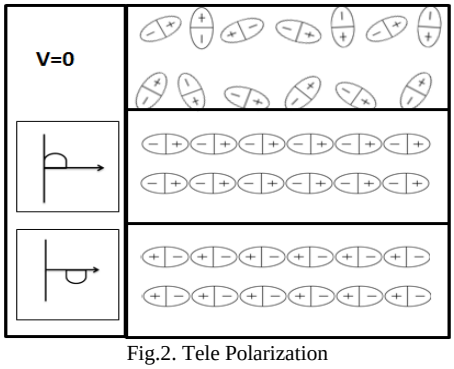

Fig.2. Tele Polarization

$$P = k\frac{AV}{d} \qquad (2)$$

K- Tele constant. The rotation has the velocity V_d it does not vary in anywhere of the ETF because it purely depends on the frequency of the AC voltage. Usually in India, the standard power line frequency is 50 Hz, means that the AC voltage oscillates at a rate of 50 complete back-and-forth cycles every second. Number of Tele rotations per second is equal to the number of cycles per second.

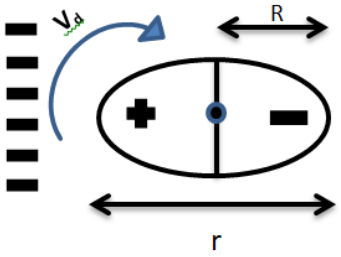

Fig.3. Dipole

Dipole rotational velocity (V_d) is equal to the product of circumference of the dipole circle and frequency Circumference ($2\pi R$) and radius, R= r /2, where r is the distance between positive and negative charges in a dipole. Circumference, $C=\pi r$.

$$V_d = Cf$$

$$\boxed{V_d = \pi rf}$$

The result is that every potential drives the dipoles around it. In DC electric field, dipoles are arranged themselves with parallel to the applied electric field. In case of dynamic electric field, dipoles are rotated according to the positive and negative half cycles. The dipole rotational velocity (V_d) is directly proportional to the frequency of the potential and the distance between the positive and negative charges in the dipole. Proportionally constant is π.

$V_d \alpha rf$, $\quad \frac{Vd}{fr} = \pi$ (constant)

Every electrical reaction requires positive and negative terminals but in case of ETF there is only a positive terminal. The surrounded air behaves as a negative terminal. Since, there is certain leakage current flow which causes polarization. If we bring the continuity tester in front of the AC voltage, the tester glows without electrical contact! There is no other way to stop the glowing of the tester. If we bring our hand in between the tester and source, it will not glow. It can be also done by placing the earth connected plate instead of our hand. The exact reason is that the electron choses low resistive path rather than high resistive path. Comparing to our hand, air is higher resistive path. Note that if the tester places in between two plates, it will glow inside the area which is

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covered by the plates. It indicates the flow of current and presence of ETF. Without this plate ETF intensity is equal at all the points around the source. The intensity decreases with increases in distance from it but in case of two plates, the intensity does not vary. It is really important experiment which gives some interesting results. A wire of 10 meter is taken. One end of the wire is placed near the source (inside ETF) and another end of the wire is placed outside the ETF. The tester is covered by an insulator and it is connected to the second end of the wire (outside ETF), note that the first end of the wire is not connected with the source (open circuited) but the result is that the tester glows! There is no current flow because of the open circuit; there is no voltage because of the air. Hence ETF can transfer through a conductor over long distances.

Insulators like plastic which do not conduct the ETF as a conductor. Only they allow penetrating with some loss due to dipole rotation. In case of conductor ETF can be conducted without loss, because there is no dipole rotation (only induction takes place). Two experiments states that the alternative movement can be identified by the continuity tester. The first one is that it has a manufacturing design to glow with contact of negative charge on one terminal and hand contact on another terminal. The glow near the ETF indicates ETF may consist of negative charges. The second thing is whether earth or hand contact is made on the conductor which is in ETF. The tester will not glow. It indicates the ETF may consist of positive charges. The final result is that the ETF contains both positive and negative charges, which means, sine wave polarization occurs in the air due to alternative potential. The tester has two terminals. One is placed inside the ETF and another one should has a hand contact to identify the ETF but if the second terminal is placed out of the ETF. It glows! The experiment states that the tester also glows when the two terminals are placed in two various concentration of ETF.

In order to identify the field intensity the continuity tester is used as a meter. The construction is very simple. A multi meter is connected across the LED in the circuit. It measures the voltage across the LED and the current through it. The current and voltage is directly proportional to the intensity of the ETF. The anode of pn junction diode is connected with cathode of the tester circuit which blocks the tester behaves as a continuity checker.

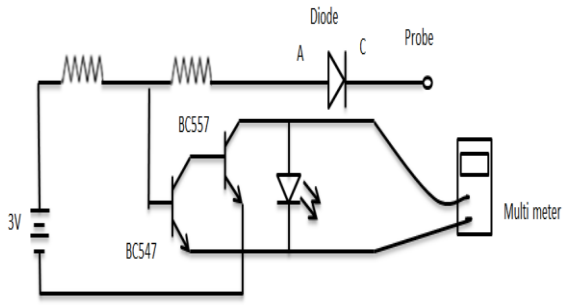
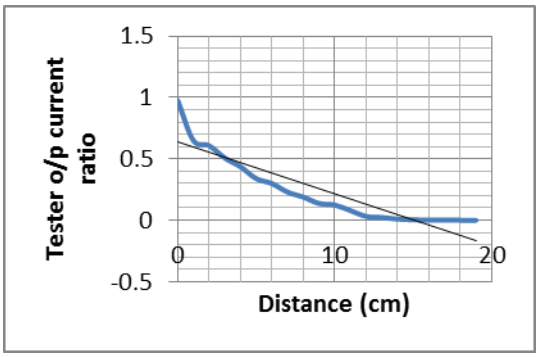


Fig.4. Circuit Diagram of Tele Meter

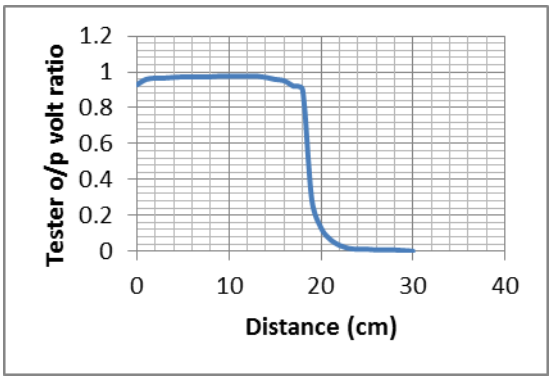
The readings are taken around the potential of 1000V AC. By using this setup the percentage of ETF in anywhere is found. The plotted graph.1 tells that Tele field intensity decreases with increases in distance from it. The graph.2 indicates that the dipole rotation. From this graph.2 the obtained result is that, dipole rotation takes place up to nearly 16 cm distance from the potential plate.



Graph 1. Distance Vs Tester output current ratio

Scale

X axis distance in cm
Y axis tester output current ratio (no units)



Graph 2. Distance Vs Tester output voltage ratio

Scale

X axis distance in cm
Y axis tester output current ratio (no units)

B. Potential induction

The main application of the ETF is that potential induction. It is possible to induce a voltage on a coil by a phase terminal alone. Consider a transformer which consists of two input and two output terminals. If a current flow in primary coil, the emf induction takes place on the secondary coil. It is done by creation of electromagnetic field. The novel experiment is that the two input terminals are connected together and an alternative voltage is applied. The secondary coil gets the voltage without any electrical contact and current flow. The output voltage is measured across anyone of the secondary coil terminals and negative terminal of the applied field or hand. The phenomenon of transmission of

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potential without neither electrical contact nor magnetic field is named as Tele effect.

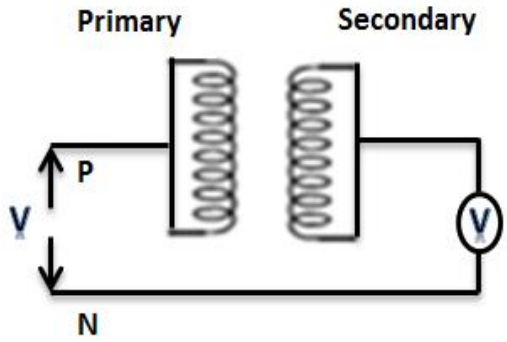

Fig.5. Potential Induction

Only alternative voltage can be induced by this method. The induced voltage is directly proportional to the number of windings of the primary and secondary coil. The step up action cannot be done but step down and ideal actions can be done. It is sure that there is no electromagnetic field. Only demerit is that the output current is too low. If it is possible to increase the current output, it can be used as a micro transformer. It does not require core as transformers. There is no heat dissipation. It is smaller in size and lower in weight. It can be used where the lower current and higher voltage is required.

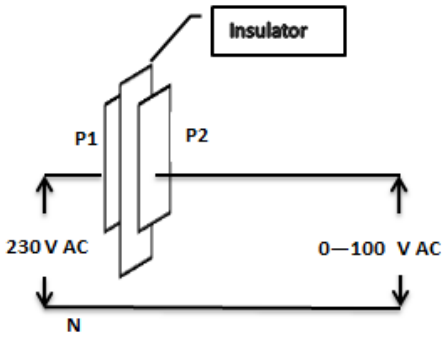

Fig.6. Tele Effect

The theory behind it is that the alternative potential in primary winding causes dipole rotation on the coating of the copper wire. This creates an internal electric field that reduces the overall field within the dielectric itself. If a dielectric is composed of weakly bonded molecules, those molecules not reorient so that their symmetric axis aligns to the field. Thus the internal electric field again induces the emf on the secondary coil. The various volts can be obtained by changing the number of primary and secondary windings. The windings increases, the contact area also increases and hence potential induction also increases.

It can be done by using two parallel plates. One of the plates is connected with the potential source and voltmeter is connected across another one plate and the neutral of the voltage source. A dielectric material like plastic sheet is placed in between the parallel plates. The potential is applied on one plate which will induce nearly same voltage on another plate with respect to the area of contact.

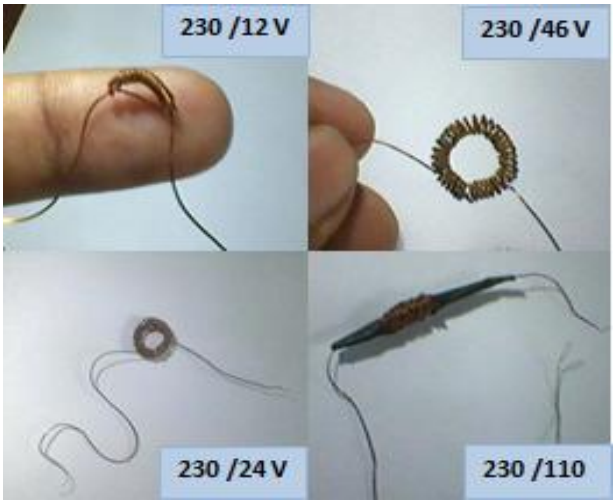

Fig.7. Tele Transformers

The output current flow is in several micro amperes. A LED can glow using that current. The output voltage is AC. It can be converted into DC voltage using rectification arrangement or simply by using a single diode. In case of air dielectric medium, potential induction is somewhat low because polarization is directly proportional to the permittivity of the dielectric and area of contact and inversely proportional to the distance between the plates.

IV. CONCLUSION

Generally, direct electric field causes dipole moment in dielectrics. This paper introduces that alternative electric field causes dipole rotation which is directly proportional to the frequency of the potential applied. Wherever the alternative potential presents which develops a region (named ETF) around it. The alternative voltage consists of positive and negative half cycles. During the first half cycle, dielectric medium is positively polarized, and during the negative half cycle, medium becomes negatively polarized. This region has the ability to induce a voltage on a conductor. This theory explains why the continuity tester glows in ETF. ETF can be considered as a type of loss like resistivity. Tele transformer (introduced by ETF) has appreciable advantages like smaller in size, lower in weight, no core, no heat dissipation, high voltage output, etc. If it is possible to increase the current output of the Tele transformers, it will make a turning point in transformer usage.

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Karthik Raja. K is pursuing Bachelor of Engineering in the discipline of Electrical and Electronics Engineering at Knowledge Institute of Technology, Salem, under Anna University, Chennai, India. He has presented number of technical papers in symposium. He got best student award from district collector in 2010, state level best junior award in Red Cross from TNPSC head. He was awarded cash prize of Rs.10000 for the district first in essay competition and Rs.5000 for the district first in painting competition. He is the acting student member of various cells and forums like Robotics Intelligent Club, Green club, I-can Club and Science club. He won prizes for project contest. His performance towards academic is excellent and he was awarded as the academic topper of the class for the past three semesters in the department. Presently he is doing minor research works on various fields like space science, embedded systems Biomedical Instrumentation and Robotics etc. He is highly appreciated by the Head of the Department.

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