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Modified Electric Current Theory

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Abstract—*Present theory of electric current is incomplete. There are many gaps in the present theory of electricity. Based on this theory, the present definition of "electric current", cannot explain some of the important phenomena associated with current. Even the present theory of electricity is missing some of the important happenings.*

According to the present theory " one can say that a long conductor will produce more "electric current" than any other conductor with small dimensions (length) for the same e.m.f. or potential difference. That means small battery might produce large e.m.f. when introduced to a comparatively large conductor. But we find that this is not true in reality.

Present theory of "electric current" cannot explain the "Theory of Resistivity" or the Phenomenon of Resistance associated with "electric current". Present theory defines resistance as obstacle or hurdle in the way of current.

It can't explain why there is linear decrement in the value of current when current is flowing through the length of the conductor or in other words " why there is constant and linear increment in the value of resistance".

If we consider the nature of charge carriers present in conductors, then we can understand that they are actually present in a kind of random arrangement. Thus, we simply can't say that there will be linear and systematic availability of charge carriers for the flow of current.

In the same way we can't admit that there will be linear decrement in the values of current drifted down on behalf of randomly flowing quantities. So on that basis there would have been no linear or obvious resistance for electric current.

Our Modified Electric Current Theory (MECT) can better explain the phenomenon of magnetic field associated with electric current. In Electric Current, it is not the number of electrons which matter as current rather, it's the change or disturbed magnetic field and along with this, the energy of their movement, offered by one electron to another, as current flows, actually matters.

In fact, under flowing current situation, the electrons even carry their disturbed magnetic field with them. Also this magnetic field along with the disturbed electric field together, bring the electrons into a state where they carry energy.

Thus, current could only be conducted when an electron transfers its energy to the other electron. It is to be noted that even the disturbed Electric and Magnetic fields are the form of energy for any particle. "Thus electric current does not depend upon the density of electrons present at any particular point". Here, the electron has to transfer its energy which could only be transferred to the ones near it.

For transfer of the energy of disturbed electric field – a direct contact with other particle or receiver is necessary. But, for transfer of energy of the disturbed magnetic field, its not necessary that the two bodies should be in direct contact rather, they should be in the range of their magnetic field region. Thus, on this basis we can better explain the phenomenon of mutual induction.

*Thus, with our **Modified Electric Current Theory (MECT)**, one can better explain the phenomenon of magnetic field associated with electric current. Also according to our theory, conductors i.e. metals already possess net disturbed electric field in nano extent. Also they possess net balanced magnetic field.*

Thus, the only thing we have to do, to produce electric current is to disturb the magnetic field associated with any conductor. This way, we can produce electric current with reduced cost and efforts. We are further researching on this. The most important point is that our MEC theory says, we only need to produce disturbed magnetic field in a conductor to produce electric current.

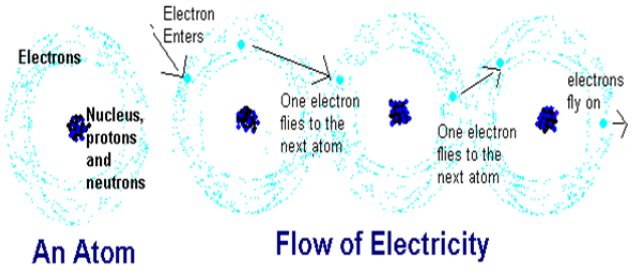
1. INTRODUCTION

Present Theory of Electricity is incomplete. There are many gaps in the present Theory of Electricity. Based on this theory, the present definition of "electric current", cannot explain some of the important phenomena associated with electric current. Even the present theory of electricity is missing some of the important happenings.

According to the present theory " one can say that a long conductor will produce more electric current than any other conductor with small dimensions (length) for the same e.m.f. or potential difference. *****That means small battery might produce large e.m.f. when introduced to a comparatively large conductor. But we find that this is not true in reality.

Present theory of electric current cannot explain the "Theory of Resistivity" or the Phenomenon of Resistance ****** associated with "electric current". Present theory defines resistance as obstacle or hurdle in the way of current.

It can't explain why there is linear decrement in the value of current when current is flowing through the length of the conductor or in other words " why there is constant and linear increment in the value of resistance".



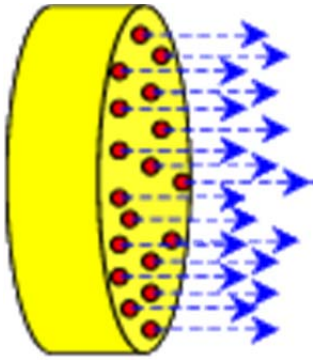
If we consider the nature of charge carriers present in conductors, then we can understand that they are actually present in a kind of random arrangement. Thus, we simply can't say that there will be linear and systematic availability of charge carriers for the flow of current.

In the same way we can't admit that there will be linear decrement in the values of current drifted down on behalf of randomly flowing quantities. So on that basis, there would have been no linear increment in resistance for electric current.

2. PRESENT DEFINITION OF CURRENT

The present theory of electricity says "number of charge carriers past a given point, at a particular time is electric current". Thus, current is flow of charge in a conductor.

i.e. I = dQ/dt (I is current in amperes, dQ/dt is number of charge carriers past a given point, at a particular time)



2.1 Condition 1 - Conductor with no current flow :

Electric field:

According to the present theory, the electric field (E-field) of whole conductor without any current, will always be balanced. Here, the electric field of its atoms is also balanced, where the E-field of their nuclei acting upon the electrons will get balanced with the electrons. While the E-field associated with their electrons will also be balanced, when no potential difference is applied to the conductor.

Magnetic Field:

According to the present theory, there will be no net magnetic field associated with a conductor which carries no current. Thus, according to the present theory when there is no potential difference applied to a conductor then the magnetic field associated with that conductor will always be zero.

2.2 Condition 2 - Conductor with current flow :

The present theory says that the current waves are "electro-magnetic waves". Thus, current means electromagnetic fields associated with a conductor.

It means, a current carrying conductor possess electro-magnetic fields associated with it or in other words, it carries "disturbed Electric and Magnetic Fields" by virtue of this phenomenon.

3. OUR MODIFIED ELECTRIC CURRENT THEORY

When some potential difference is applied to a conductor (in a closed circuit), then, the electric field energy acts upon the conductor. Our Modified Electric Current Theory (MECT) says , it is actually working on a net unbalanced electric field region. Thus, it becomes easy for applied electric field to act upon the conductor. Even this disturbed electric field better differentiates a good conductor from a bad conductor.

As an effect of the potential difference, the free charge tends to move toward the net polar (+ve) region. The ease of this action depends upon net unbalanced electric field associated with the conductor. These moving charges hinder the balanced magnetic field of the conductor. It's important to understand that the magnetic field produced by moving charges does the job to deal with the net balanced magnetic field associated with the conductor.

Now, when an electron comes so closer to the other electron, then the magnetic field of one electron is affected by the other. Remember as we have called it as a disturbed magnetic field, thus when two such fields are closer then effective net magnetic field of them remains. Thus, in this way transfer of energy takes place.

Now, this transfer of energy continues from an electron till the other electrons are available for it in nearby distance, along the linear dimension of the conductor.

In this way current flow takes place. Thus, electric current carries electro-magnetic waves, which are associated with the unbalanced electric and unbalanced magnetic fields of the conductor.

Thus, current could only be conducted when an electron transfers its energy to the other electron. As we have already understood that even the disturbed Electric and Magnetic fields are the form of energy for any particle. "Thus **electric**

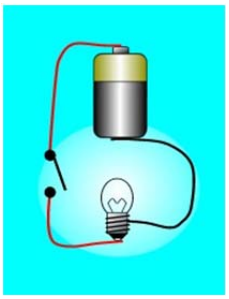
current does not depend upon the density of electrons present at any particular point". Here, the electron has to transfer its energy which could only be transferred to the ones near to it.

For transfer of the energy of disturbed electric field – a direct contact with other particle or receiver is necessary. But, for transfer of energy of the disturbed magnetic field, it is not necessary that the two bodies should be in direct contact rather, they should be in the range of their magnetic field region. Thus, on this basis, we can explain the phenomenon of mutual induction.

Thus, with our Modified Electric Current Theory (MECT), we can better explain the phenomenon of magnetic field associated with electric current.

4. PHENOMENON OF ELECTRIC CURRENT AS PER OUR MODIFIED ELECTRIC CURRENT THEORY (MECT):

4.1 Condition 1 - Conductor with no current flow



Electric Field

The electric field associated with a conductor at zero potential difference is not totally balanced, rather it's unbalanced. Here, the electrons follow their wave nature thus, they are never entirely associated with their respective atoms. Thus, in some situations, the atoms feel deficiency of electrons and at some other times, they are completely satisfied by engaging the electrons of other nearby atoms.

Even the wave theory of electron admits this property of electrons. Thus, it even admits this whole scenario of the conductive metals – with lots of electrons in their valence shells.

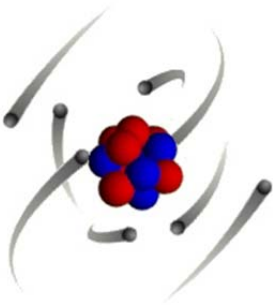
To conclude we can say that in some instances, the Electric field of metals is balanced. But, even in some instances, it's unbalanced. Thus, a conductor at zero potential even possess net " unbalanced Electric Field ".

Magnetic Field

Actually and as per our Modified Electric Current Theory (MECT), the magnetic field associated with a conductor at zero potential is not totally zero, rather – it's balanced in nature, while the present theory says the net magnetic field associated with a conductor will be zero.

The present theory explains this phenomenon this way – the electrons in the lowest shell moves around their nucleus creating a net magnetic field but it is cancelled by the magnetic field of the other electron of that shell.

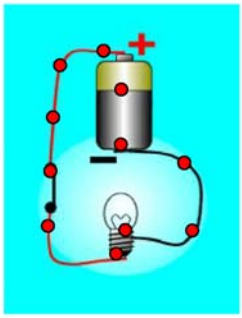
Our MECT says that the situation for the conductor is not ideal i.e. the shells of conductive metals are not ideally filled. The fact is that mostly they remain unfilled and thus contribute to the free valence electrons of the atom. Thus in this way conductive metals possess the property of conduction.



Here, the electrons follow their wave nature. Thus, we simply can't assume that at each and every instant, the shells will be completely filled to completely cancel the magnetic field of their shell partner. Thus, in this way we have to admit that conductors i.e. metals actually possess a net "balanced Magnetic Field".

4.2 Condition 2 - Conductor with current flow :

In this case, actually the conditions will be remain the same (in both – present theory and our MECT) i.e.



a current carrying conductor possesses net unbalanced or rather disturbed Electric & Magnetic Fields.

4.3 Our Explanation to the Phenomenon* in para one of 1.0 that a large conductor will produce more electric current :

In Electric Current, it's not the number of electrons which matters as current, rather it's their disturbed magnetic field in the form of energy (which came from their movement) offered by one electron to another as current flows, matters.

When one electron comes so close to the other electron, then the magnetic field of one is affected by the other. Remember, we have called it disturbed magnetic field, thus when two such fields are closer then effective net m-field of them remains. In this way transfer of energy takes place.

Thus, current is not mainly dependent on the number of electrons past a particular point. That means, current flowing at a particular point is not totally dependent on the electron density of the entire region. The current flow involves transfer of energy from electrons.

Because one electron will transfer it energy to those who are closer to it or those who are in its range and not to the whole density of electrons in that region. Thus, the current density or value of current does not change as per the change in density of charge carriers along length of the conductor.

4.4 Our Explanation to the Phenomenon of Resistance** in para two of 1.0

Under flowing current situation, the electrons even carries their disturbed magnetic field with them. Also this magnetic field along with the disturbed electric field together bring the electrons into a state where they carry energy.

Now, when one electron came so closer to the other electron, then the magnetic field of one is affected by other. Thus, in this way transfer of energy takes place. The current flow involves transfer of energy from electrons.

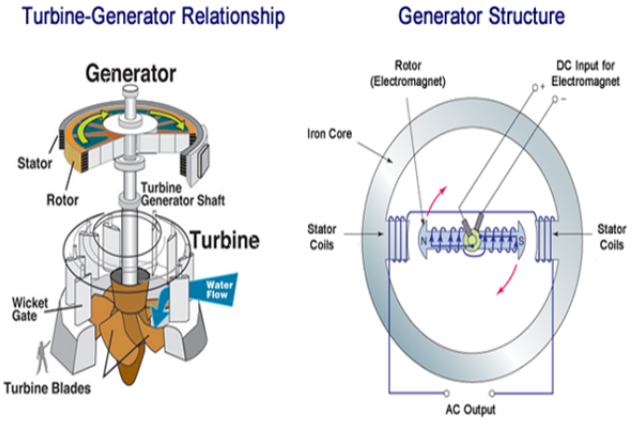
Because one electron will transfer its energy to those who are closer to it or those who are in its range and not to the whole density of electrons in that region. Thus, the linear decrement in the value of current and the increase in the value of resistance are not dependent on the density of electrons in that region.

But this phenomenon involves transfer of energy from one electron to the other one, near to it. Thus, one electron will transfer its energy to those who are closer to it or those who are in its range and not to the whole density of electrons in that region.

5. CONCLUSION

The most important point is that on the basis of our Modified Electric Current Theory (MECT), we only need to produce disturbed magnetic field in a conductor to produce electric current.

Also according to our theory, conductors i.e. metals – already possess net disturbed electric field upto some nano extent. Also they possess net balanced magnetic field.



Thus, the only thing we have to do, to produce electric current is to disturb the magnetic field associated with any conductor. This way, we can produce electric current with reduced cost and efforts. We are researching on this.

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