



Alien's Story: no magnetic field

Ghanshyam Jadhav, S C S College, Omerga-413606, India

Email: ghjadhav@rediffmail.com

It is story of a common teacher, teaching physics at undergraduate level. My college is located at rural area in India. Physics is my favorite subject. I feel always wonder when I teach the physics, especially topics like photoelectric effect, de Broglie's hypothesis of matter waves, uncertainty principle, Schrödinger's equation, Michelson-Morley experiment devoted to determine the aether. I usually become excited on such topics. On one day all stopped. I used to become doubtful on these things. This was happened in year 1999-2000. In the beginning of year 1999, I joined the physics department at Dr. Babasaheb Ambedkar Marathwad University, Aurangabad, India for research. My topic for research was based on classical electrodynamics, especially on Generalized Dirac-Maxwell's equations. It was theoretical. My guide was Prof. M. T. Teli. I made some calculations and one day I put for checking to the guide. He saw and rejected. The results obtained were informal, so at the first observation he rejected. I had confident but as he discarded I had no choice. I decided to wait until he calls me back. So I had no next work. Then I decided to review the classical theory of electrodynamics once again. I started from electrostatics and came at magnetostatics. While reviewing the interaction between two current carrying conductors (attraction between like currents and repulsion between unlike currents) I was unable to accept the interpretation given in terms of magnetic field. Why I don't know. It might be because; I was supposing that the electric field must be sufficient to explain these interactions, as the current is nothing but motion of the electrons. Then, why do we require the additional magnetic field? I supposed it might be because; few things in the interactions might have not been properly understood. Because of which we are being compelled to consider the additional magnetic field. If one finds the secret or true nature of magnetic field then we may get relief from it which we must get. But I could not understand where and how to start. But later I decided to verify the attraction and repulsion between current carrying conductors at first and to look for discrepancies if any. Actually I had no need not to do such experiments as they had been tested and verified periodically. But once my belief on the magnetic field was over I was on the side to observe the interactions personally. My belief was that if the electric field is responsible to produce these interactions then it will show its existence, which might have been overlooked or not understood due to the inadequate knowledge of the electric field. So to do these experiments I brought a package of motor rewinding wire from a local market and took out battery from my motorcycle. But there was a problem; I could not do such experiments openly. If I did and my friends saw surely they might have guessed that something wrong might have been happened with me. Because of that I could do the experiments in closed lab and only on Sundays and holidays. Truly I used to lock the door of my lab while making the observations. If anybody used to knock the door

I used to remove all the apparatuses from the table and tried to remain quite. I found few times friends looked doubtfully. They might have guessed that I was hiding something from them. But I used to avoid any discussion. I had no choice. I continued the observations.

While observing the interactions between the current carrying wires, I could not find any sign of the electric field. Personally, I observed the forces between current carrying wires by arranging them parallel, anti-parallel and perpendicular but could not find any sign of the electric field. I found a field but it was different from the electric field. It was magnetic field. I became nervous. Experimental results were along the side of magnetic field again. At that time my mind was in situation to accept the defeat. I was able understand that why people have been accepted the magnetic field as a fact. They understood no sign of electric field there. They understood these interactions cannot be explained with the electric field. They understood the involvement of different kind of field and they found it was a magnetic field. I too accepted the defeat and packed the apparatus. Few days passed and I overcame from the nervousness. Again my mind started to remind the same matter. At this time I believed that if I could examine motion of a single charged particle, like electron, in the field of a current carrying wire then I would be able to draw any conclusion. But this was impossible for me. At that time I used to conduct experiments of physics at M.Sc. While I was conducting experiments, one day I came across a cathode ray tube (CRT). I thought it might help me to find some conclusions. So I brought it in my lab. Same problem was again that I could do the observations only on holidays. So desperately I was waiting for the next holiday. On next holiday I hurriedly went to the lab and locked the door and started to make observations. After making continuous observations in next few holidays I came to unbelievable conclusion. I could find something that was very important, no doubt, according to my thoughts. Now I want to put these findings for discussion but in different way.

1. Hiring of alien's service

Suppose I don't know any about magnetic field or you may suppose I am alien, unaware of any kind magnetic field. Suppose few people have gathered and started to discuss about the reality of magnetic field. They believe that there should be no magnetic field as there is no any magnetic charge on the existing matter but why magnetic field is being induced, they couldn't understand. They have decided to take help of a person who knows nothing about the magnetic field. By incident they find me and decide to take my help as I am alien having zero knowledge of the magnetic field. They ask me to find out what kind of field is being produced by a current carrying wire. They suppose, as I don't know anything about magnetic field, I may be able to find the correct nature of the field produced by the current carrying wire. Previous to start of the actual work, they provide complete knowledge of the electricity, especially of electric charges, electric fields and electric forces. After the training they supply me a bundle of wires (conductors), a dc battery, and a CRT and permit me to start the work.

Due to the training of electricity my belief is that if the beam of the electrons of CRT gets deflected at any place then surely there may be electric field. If this deflection is due to the

electric nature and not due to the mass nature of the electrons then there must be electric field. In the case of current carrying conductor there is no question of consideration of gravitational field, so any deflection of the electron beam means it is a signal of the existence of electric field. I decide to make observations step by step. My aim is to find the complete field of force first, confirm the force as the electric one and then trace the whole electric field. To confirm the force is electric one the force should not depend on velocity of the electrons.

2. Observations-I

I pass a direct current through a long straight conductor or wire. Then I place CRT close and parallel to the wire such that the electrons in the beam of CRT are moving along the direction of the current through the conductor as described in figure 1. The flow of the current through the conductor causes deflection of the electron beam away from the wire. What can I guess according to my training? I conclude that the force on the electrons should be directed away from the conductor as indicated by the red arrow in the figure. Moreover, I find the force is decreased when I shift the electron beam away from the wire, which is obvious.

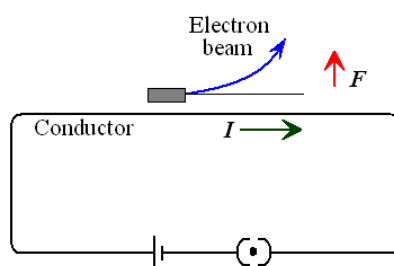
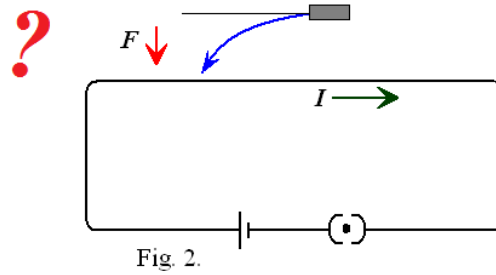


Fig. 1.

3. Observations-II

To check the force observed in observation-I is electric, it should not depend on velocity of the electrons or direction of motion of the electrons. In second observation, without changing the current through the conductor, I change the direction of CRT as shown in figure 2. Now the CRT is again parallel to the conductor but electrons in the beam are moving in opposite direction of the current through the conductor. What should I notice here? All of you know and may be waiting for my further move. I notice that the electron's beam is now being attracted towards the wire. No doubt, I am surprised. I can't believe it. The direction of the force is found to be changed. The direction of the force on the electrons is reversed as shown by the red arrow in the figure. Therefore, it is showing no sign of any electric force. I am confused. Since current through the conductor is not changed. It means that the field produced by the conductor is not altered and hence the direction of the force on the electrons must not be changed. Then why the electrons are now getting attracted towards the conductor. I can't understand. So I decide to stop the observations and go for

some relief. I am now in state which may compel me to resign the assignment, but I decide not to hurry and wait.



4. Observations-III

After getting some relief for my brain I decide not to resign the assignment and go for further observations with different arrangements. This time again, I don't change the current through the conductor but now I keep the CRT perpendicular to the conductor with electrons in the beam approaching the conductor. This time I find the electrons are being deflected in the direction of the current as shown in figure 3. I forget the impact of all previous observations and start to think about this deflection impartially. Surprisingly, first time, I become able to conclude that this force must be real one. Why? Because, initially the electrons were at very low field intensity or negligible field intensity or zero field intensity and then they are going into gradually increasing field intensity as they are approaching the conductor. Therefore, this force must be real force. The next task is to find out the exact direction of the force. Any force having nonzero component along the direction of the current can produce such deflection. Such few forces are shown by the red arrows. To find correct direction of the force, I shift the CRT in upward direction keeping it parallel to the previous plane (figure 4) and notice that the deflection is again parallel to the conductor but reduced. It suggests that the force on the electrons is exactly parallel to the conductor. Obviously, it is decreasing when we go away from the conductor. Immediately, I guess the possible electric field due to the current through the conductor. It is a parallel electric field, parallel to the straight long conductor pointing in opposite direction of the current. If I is a current through the conductor then the possible equation for the electric field would be

$$E = \frac{-kI}{r} \quad (1)$$

where k is the proportionality constant and r is the perpendicular distance of the field point from the conductor.

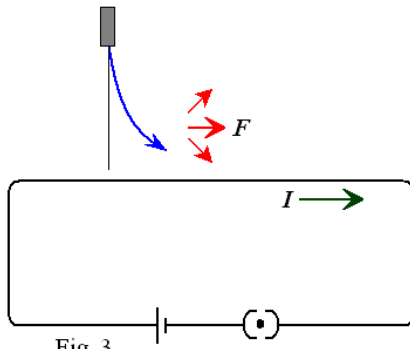


Fig. 3.

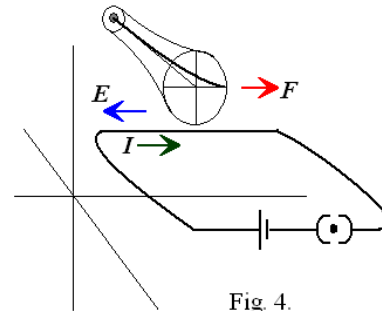


Fig. 4.

5. Observations-IV

Another possible observation left to be carried is that by keeping the CRT perpendicular to the conductor and allowing the electrons to go away from the conductor as shown in figure 5. I observe the deflection and find that the electrons are now being deflected in opposite direction of the force. This is again a surprising result. Now really I am becoming mad. But one thing good for me is that now there is no need to make any further observations. I have to stop observations and think only to correlate the observations in I, II and IV with the force concluded in observation III.

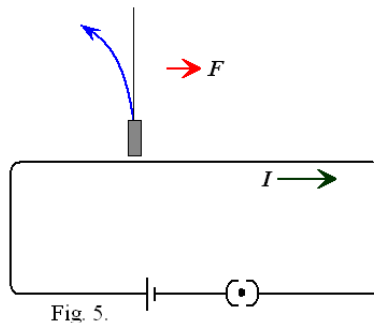


Fig. 5.

6. Task to correlate the observations

Though, in observation-III, I have concluded the possible structure of the electric field but further I can't make any progress. I am not able to correlate the observations made in I, II and IV with that field and force. Instantly I am not able to reach at any decision. But meanwhile I become stable as some period is passed. I decide to proceed step by step slowly. First I start to think about observation-I. If one has to correlate this deflection with the force concluded in observation-III, then in this case the electrons must be accelerated along the direction parallel to the conductor. Then, why they are going away from the conductor while accelerating. Actually, the force is parallel to the conductor. I concentrate on the force. At once I become surprised. O god! The force is asymmetric. The force is unidirectional but gradually decreasing when we go away from the conductor. Because of that the electron is going away from the conductor. Suppose we divide the electron into two parts, part 'A' and

part 'B' as shown in figure 6. The force on part 'A' which is closer to the conductor must be greater than the force on the part 'B' which is away from the conductor. Therefore, part 'A' must be more accelerated than part 'B'. Therefore, the electron must go away from the conductor or must be pushed into the weak field. Truly this is happening only because of the asymmetric electric force. So this deflection is obvious.

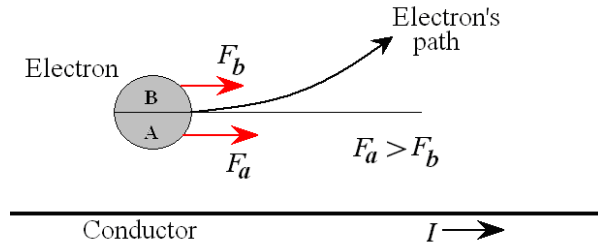


Fig. 6.

Similarly, when electron goes parallel to the conductor but in opposite direction to the force, as shown in figure 7, then the opposing force on the part 'A' of the electron must be stronger than on the other part 'B'. Therefore, speed of part 'A' must be decreasing faster than the speed of part 'B'. Hence the electron should come closer to the conductor or should be dragged into the strong field while being decelerated. This is obvious too.

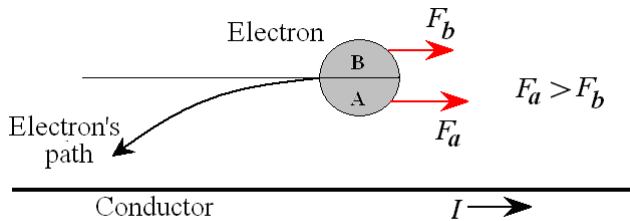


Fig. 7.

Similarly, when electron goes in perpendicular direction of the force but towards the conductor or towards the strong field, as shown in figure 8, then part 'A' of the electron must move more fast than part 'B' and as the electron has initial momentum in the direction perpendicular of the force, therefore, it must move in the direction of the force. It is again usual.

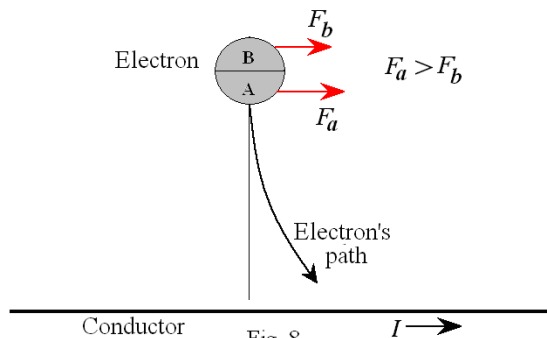


Fig. 8.

A fourth motion of the electrons which can fit in the sequence of these three motions illustrated in figure 7 to figure 8, must be the one illustrated in figure 9. In this case too, the part 'A' of the electron must move more fast than its part 'B' and as the electron has initial

momentum in perpendicular direction of the force, therefore, the electron must move in opposite direction of the force. This motion is too consistent with the above three motions.

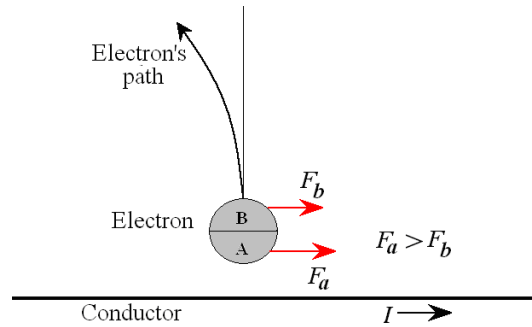


Fig. 9.

Truly the problem was solved but immediately it raises a question, what is size of the electron? Because, to calculate the asymmetric electric force one requires the size. Further one may suppose that if size of the electron goes to zero then it may move along the straight path parallel to the conductor if figure 6 and figure 7. For that I make calculations using the field equation (1) and obtain radius of the curved path followed by the electron placed in this field. The calculations show that, though the electron's size reduces to zero, the electron follows a curved path. I present the calculations in Appendix-I.

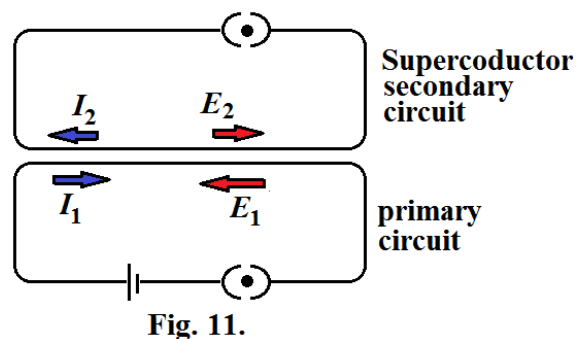
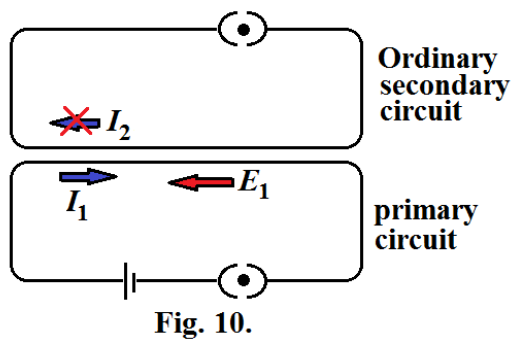
7. Space neutralization mechanism

Though the calculations in appendix-I show that, whatever may be size of the electron, it always follows a curved path in the parallel electric field produced by the straight long conductor carrying steady current, but still I think about size of the electron. Further I am not able to guess how the conductor's electric field applies force on the electron. In what terms it reacts with electron. I guess, generally an electric field around a charged particle should be one type of pressure existed around the particle. Electron's field means a pressure around the electron. Conductor's field means a pressure around the conductor, developed because of the current through it. Further the space should always try to be neutral means to have zero pressure or zero field. It may be achieved by rearranging the motions of the charged particles involved in the field. This mechanism of neutralization of space should cause to generate the electric force. If this is the fact then the electric force should be existed through a field-field interaction. Hence there should be no question of electron's size. Actually, why the current carrying conductor is producing a parallel electric field around itself is one of the questions. Perhaps its answer may be obtained by concentrating on the current through the conductor and its field.

Before passing the current through the conductor the surrounding space close to the conductor was electrically neutral means zero pressure. It means the positive and negative charged particles inside the conductor should have arranged their motions in such way that they must be able to cancel out each other's field and produce zero field or zero pressure outside the conductor. This must be done in order to keep the surrounding space neutral. When I pass a current through the conductor, using external source, it keeps few electrons in motion along one way in the conductor. But positive charged particles are not brought in

motion. Therefore, the electric field of positive as well as negative charged particles can not be balanced or canceled out and hence a residual field or pressure must be existed. This residual field must be the electric field around the conductor. Now, why the residual electric field is parallel to the conductor? It is simple. Suppose there are two parallel conductors close to each other. If I pass a direct current through the first conductor then it causes to produce a particular electric field around itself. Now, to neutralize this field, the second conductor should produce an electric field opposite to that produced by the first conductor. For that the second conductor must have opposite current. If the space neutralization mechanism exists then it will try to produce the required opposite current in the second conductor. This can be achieved if the first conductor has a parallel electric field in opposite direction of the current through itself. Thus the parallel electric field is being existed through the need of space neutralization.

If there is a continuous current in the first conductor and if I make a closed loop of the second conductor and keep some portion of it parallel to the first conductor (figure 10) then the parallel electric field produced by the first conductor should cause to produce a continuous current in the second conductor's loop. But I don't find it. I think it requires more analysis but if we use the secondary closed circuit of a superconductor then definitely we find the expected current (figure 11). Therefore, the electric field produced by the second conductor is in opposite direction of the field produced by the first conductor and hence space neutralization is achieved up to some extent. This is the reason why any conductor produces parallel electric field around itself when a steady electric current flows through it.



Moreover, the space neutralization mechanism might be responsible for the formation of different types of atoms or matters. Since formation of a matter means arrangement of charged particles in order to produce neutral electric field around itself. Even it may be responsible for the formation of pairs of electrons in atoms too. When two electrons acquire spin motions in opposite direction about the same axis then the repulsive force between them must be reduced. If an attractive core like nucleus is fixed at the central place between such electrons then there is a possibility of formation of stationary system. By adjusting spin velocities and spacing of these electrons from the central core the net attractive force due to the attraction between the central positive core and electrons and the net repulsive force due to the electron-electron repulsion can get balanced. Therefore, such electrons can remain forever at opposite sides of the nucleus with equally spaced from the nucleus and

having opposite spin velocities as shown in figure 12. This may be the reason why the electrons have spin velocities in atoms. In fact they may not require any orbital motion for their balance about the positive charged nucleus. Further, when we take out such electron from its own atom then the electron is not bounded to have the same spin. Its spin motion may come to end. Therefore, the spin motion cannot be property of the electrons. It is the motion acquired by the electron to reduce the force of repulsion, especially when two electrons are close. Any free electron when comes close to any other free electron then both will be triggered to acquire spin motions in opposite direction to reduce repulsion between them. Any positive core if tries to attract two electrons simultaneously then such moment will be most successful moment for triggering these electrons into spin motions and formation of a stationary system. Another important fact is that if we consider electrons are revolving in orbits then it is difficult to acquire any definite shape for matters.

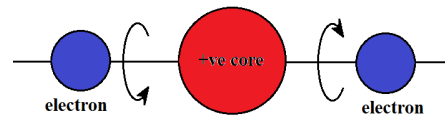


Fig. 12.

8. Field-field interaction

The above discussion demonstrates that when two charged particles interact then they should interact in terms of their fields. The force of interaction, means the usual electric force, must be exerted in terms of field-field interaction. The motions illustrated in figure 1 to figure 5 can be well explained in terms of force through field-field interaction. There will be no question of size of the electron. Figure 13 illustrates the explanation of the electrons motion observed in figure 1 in terms of force through field-field interaction. As discussed above, the current carrying conductor produces a parallel electric field opposite to the current through it. The electron too has its own electric field which can be divided into two parts, field 'A' and field 'B' as indicated in the figure. Obviously the electric field of the conductor interacts with the electric field of the electron resulting into motion of the electron. The electric field of the conductor is strong in the region of electric field 'A' than in the region of electric field 'B'. Therefore, because of field-field interaction, field 'A' should be moved faster than field 'B'. Hence electron should follow the curved path. Thus there is no question of size of the electron. Not only the remaining motions of electrons observed in the field of current carrying conductor can be understood but also the attraction and repulsion between like and unlike currents can be understood properly in terms of force through field-field interaction. A probable equation for the force through field-field interaction is still to be developed.

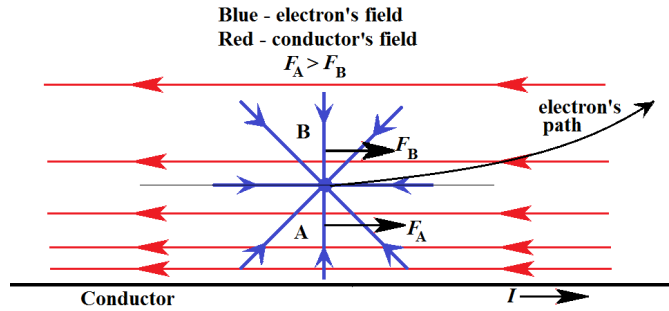


Fig. 13.

9. Attraction and repulsion between poles of bar

No doubt the subject magnetostatics is evolved from the phenomenon of attraction and repulsion between poles of bar magnets. This phenomenon is similar to the phenomenon of attraction and repulsion between electrical charges and this is the reason why the magnetostatics appears to be a parallel branch to the electrostatics. Without any magnetic charges in the magnetic bars or even in the universe too the electric charge like behavior of the ends of bar magnets, called magnetic poles, is astonishing. Therefore, proper revealing of this phenomenon is essential.

We have noticed that a long straight conductor carrying a steady electric current is really producing a parallel electric field given by equation (1). Then a current carrying circular coil and hence a bar magnet must produce circular electric field around themselves. In a bar magnet when we look from its S pole to N pole, the unpaired electrons have average spin motion in anticlockwise direction. Therefore, the net spin current constituted by these unpaired electrons is in clockwise direction. Therefore, the probable electric field produced by the bar magnet around itself must be in opposite direction of the conventional spin current. Further this electric field should decrease while we go away from the magnet. I seek this electric must be responsible for the phenomenon of attraction and repulsion between poles of bar magnets.

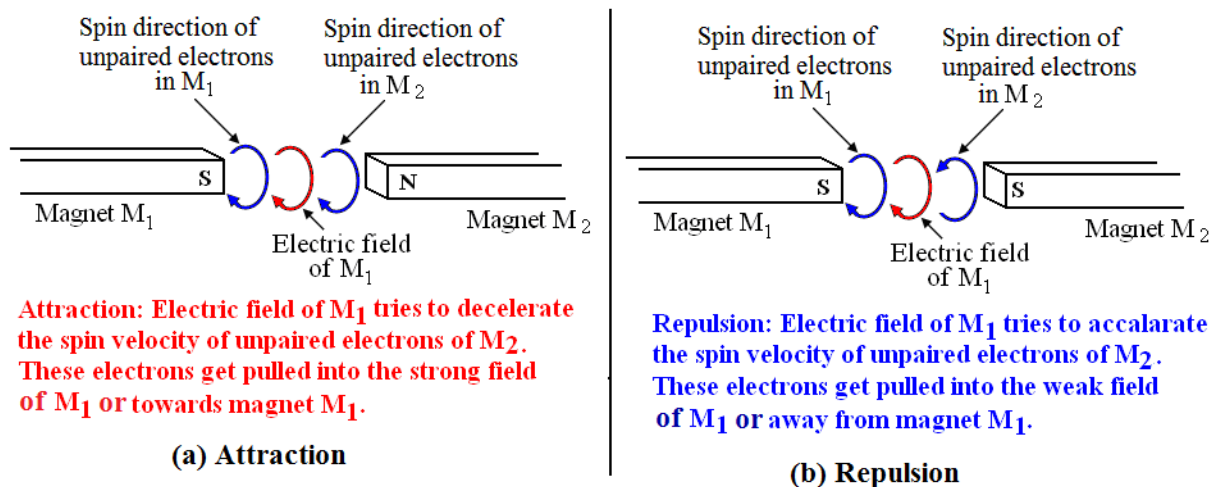


Fig. 14.

Figure 14(a) illustrates the direction of the electric field and spin motion of the unpaired electrons of bar magnet M_1 . The unpaired electrons in bar magnet M_2 are spinning in the same direction of the electric field of magnet M_1 . Therefore, the force imposed by the field of magnet M_1 should try to decelerate the spin velocity of the unpaired electrons of magnet M_2 . Because of this attempt the unpaired electrons in magnet M_2 should be pulled towards the end of magnet M_1 as the electric field near the end is strong. In the same way the magnet M_2 should react with magnet M_1 . Therefore, both ends should get dragged towards each other. This process can be understood with help of figure 7. Further when like poles are close to each other, the electric field of one bar magnet is in attempt to accelerate the spin velocity of the unpaired electrons of the other bar magnet. Because of this attempt the unpaired electrons of each bar magnet get pushed away from the other bar magnet. Therefore, they are able to produce the illusion of repulsion. In this way we can see that, though there is no any actual direct force of attraction or repulsion between the poles or ends of bar magnets, a torque, produced because of the circular asymmetric electric force, is responsible to produce such illusion. For paired electrons the net effect of asymmetric electric force is null. It also proves there is no question of existence of magnetic monopoles in the universe.

10. Concepts used by alien

The progress done by the alien up to this point is made by sticking to the philosophy provided to him initially. He hasn't made any new postulates. He showed clearly that there is no any surprising thing. All is going according to the philosophy of electricity and is connected to the space neutralization. What mistake has he done? As far as concern to the knowledge, provided to him, he is right. At any other place (planet) if the progress is made according this philosophy we shouldn't be surprised. Perhaps they will be surprised with our progress. Truly, at present too, we don't know the reason of why there is attraction between unlike charges and repulsion between like charges. We know only attraction and repulsion but don't know why. Alien's theory shows that they are related to the space neutralization. A field around a charged particle is simply a pressure. The field around a negative charged particle may be assumed as an outward pressure and that around a positive charged particle as an inward pressure. When two like charges come close to each other, the pressure gets increased; therefore, the space should try to keep them away. This is nothing but the repulsion between like charges. When two unlike charges come close to each other, the pressure gets reduced; therefore, the mechanism should always try to bring them close. This is nothing but the attraction between the unlike charges. Moreover if the pressure gets produced and gets propagated too in the form of a wave (e.g. a light wave) then there must be an elastic medium (aether). But our progress is made in opposite direction. We have discarded the aether concept. We may have to hire an alien for this subject too. In the same way what we know exactly about the gravity too. Gravity is not known yet completely. It might be related to the mechanism of space neutralization. Truly my intension is not to say that that all achieved developments might be wrong but I suppose that if we become able to review them unbiased it may be helpful to understand the

universe in proper way. I aware of that when we reveal one secret it will give birth to another secret. If we find answer of one's why, the answer itself creates another why. The process is endless. Man is curious. He can't relax. He wants answer of self existence, existence of everything. I fear he may never get that answer. He is helpless.

Appendix-I

Consider an electric field produced by a current I , described by the equation

$$E(r) = \hat{x} \frac{I}{\sqrt{y^2 + z^2}} = \hat{x} \frac{I}{r} \quad (1)$$

This field is parallel to x axis decreasing away from it. We place a charged particle having net charge $+q$, mass m with initial velocity \mathbf{v} in the direction of the field as shown in figure 1. We divide the sphere of the particle into two hemispheres A and B . Further we assume a center of charge on each hemisphere. Suppose r' is the distance between these two centers of charges and r is the distance of the center of charge of hemisphere A from x -axis (center of the field). Therefore, the net forces in magnitudes on the centers of charge of hemispheres A and B , respectively, are

$$F_1 = \frac{qE_0}{2r} \quad (2)$$

$$F_2 = \frac{qE_0}{2(r+r')} \quad (3)$$

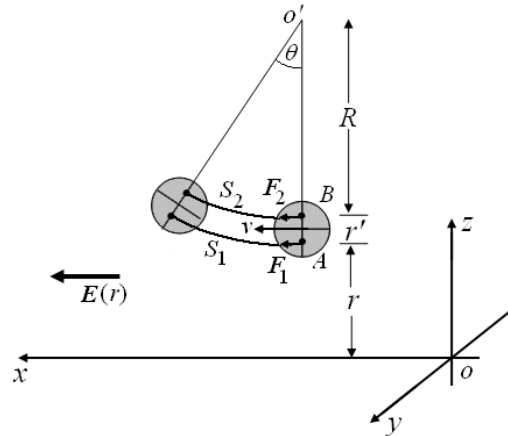


Fig. 1. Charged particle placed in electric field described by equation (1).

Distances S_1 and S_2 covered by the centers of charge of hemispheres A and B in small time t

are

$$S_1 = vt + \frac{qI}{2m} \frac{t^2}{r} \quad (4)$$

$$S_2 = vt + \frac{qI}{2m} \frac{t^2}{(r+r')} \quad (5)$$

Due to the unequal distances ($S_1 \neq S_2$) the particle must follow a curved path. The radius R of the curve is

$$R = \frac{r' S_2}{S_1 - S_2} = r \left(\frac{2mv}{qIt} (r+r') + 1 \right) \quad (6)$$

While accelerating, the particle gets pushed into the weak field.

As $r' \rightarrow 0$, the particle size reduces to zero, equation (6) gives

$$R = r \left(\frac{2mvr}{qIt} + 1 \right) \quad (7)$$

Thus, though the particle size becomes zero, the radius of the curved path followed by the particle cannot be infinite or the path cannot be a straight line.

The particle having initial velocity in opposite direction of the field gets decelerated resulting into $S_1 < S_2$. In this case the radius of the path obeys the equation

$$R = \left(\frac{2mrv}{qIt} - 1 \right) (r+r') \quad (8)$$

While decelerating, the particle gets dragged into the strong field.