MEMORANDUM

DATE: 12-20-67

TO: R. M. Wood, A-830

FROM: J. M. Brown/D. B. Harmon, A-830

SUBJECT: PROPOSAL FOR ELECTROSTATIC/MAGNETIC EXPERIMENTS

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REFERENCE:

Introduction

The kinetic particle theory of physics has indicated the existence of several types of Electrostatic/Magnetic phenomena which are not predicted to occur by Maxwell's electromagnetic equations. The specific phenomena considered here are concerned with the static interaction of magnetic and electrostatic fields. More specifically, it is conjectured that, if the kinetic particle theory of physics is correct, then the following three interactions should result:

1. There should be an axial static force pair and a couple between a single electron and a magnet under certain conditions.

2. There should be a couple between two electrons.

3. If the spin axes of two electrons are constrained in certain specific ways then an attractive force pair should occur which is approximately equal to twice the value of the usual repulsive force. Also, with a positive and a negative charge, and the same axis constraint, a repulsive force twice the usual attractive force should occur.

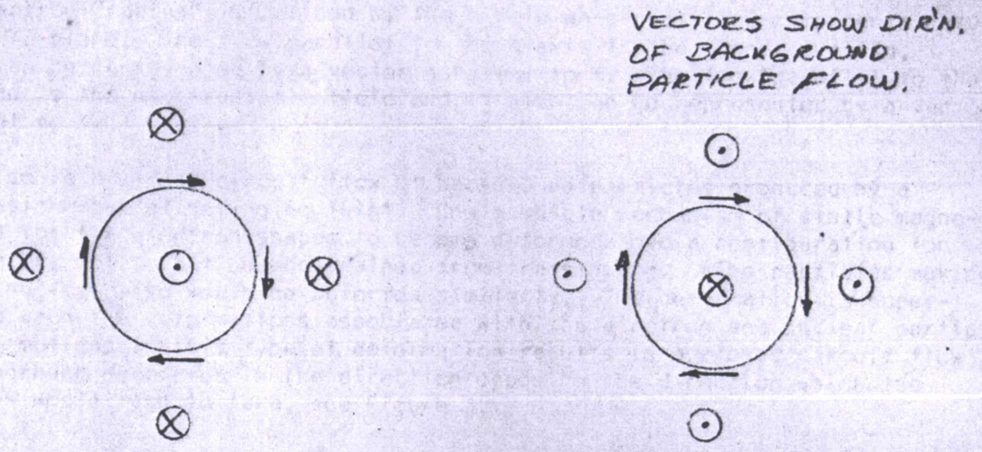
The purposes of this memorandum are to present the detailed mechanism by which these three interactions are conjectured to be produced and to define inexpensive experiments which may test these conjectures.

Background

The kinetic particle mechanisms of charge and static magnetism are presented now. In addition, the mechanism by which a magnetic field is induced by a moving electron is illustrated.

Charge is a closed circuit flow of background particles which is produced by a source-sink doublet having a twist causing a vortex motion. The flow is left-handed for a positive charge. Figure 1 shows the two types of charges.

Figure 2 is a detailed sketch of the flow patterns of an electron.



a. Negative b. Positive

FIGURE I CHARGES

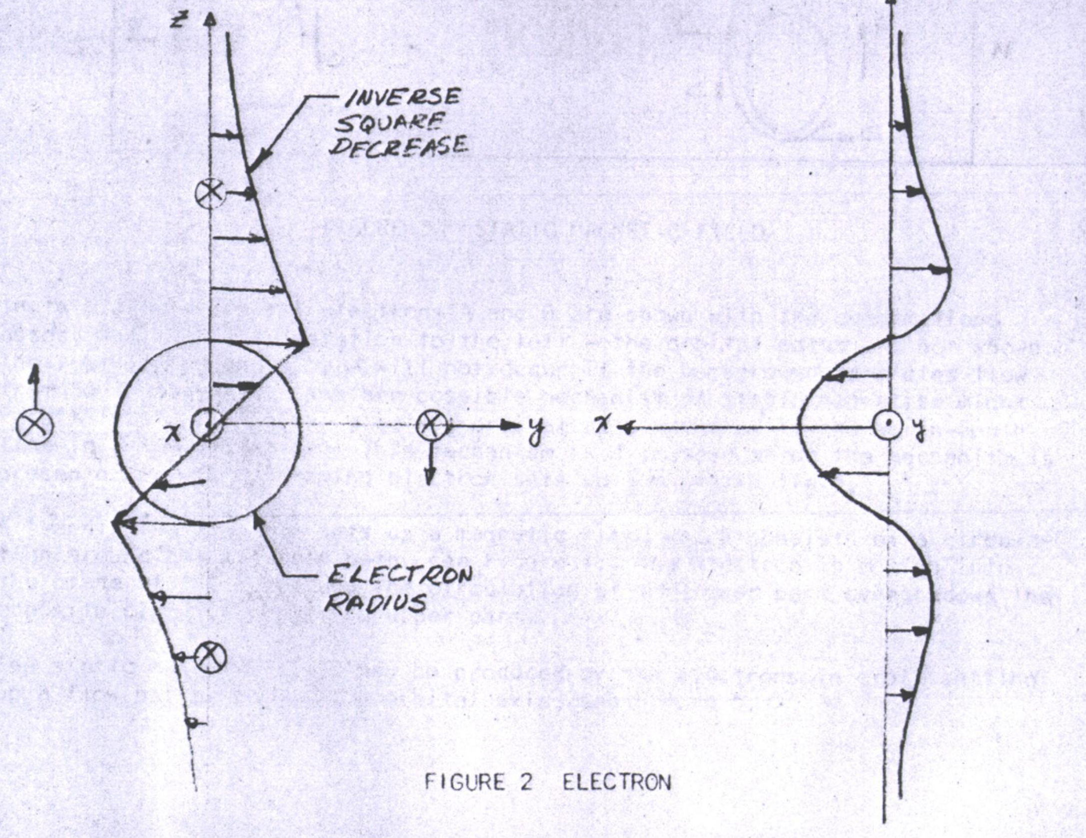


FIGURE 2 ELECTRON

The electron "radius" is defined by the circle which has flow components only in the YZ-plane. The flow parallel to the X-axis is the magnetic field, which can be represented by a vector parallel to X. The flow parallel to the YZ-plane is the electrostatic field and it also can be represented by a vector parallel to X.

Magnetism is a closed circuit flow of background particles produced by a source-sink doublet having no twist. One possible mechanism of static magnetism is for the electron shapes to become deformed into a configuration for translatory motion but be constrained from translating. (The particles making up the nucleus also would be deformed similarly. The deformation is superimposed upon the deformations associated with the electron and nuclear particle orbital motions.) This type of deformation results in a closed circuit flow of background particles in the direction opposite the direction which the electron would tend to take, see Figure 3.

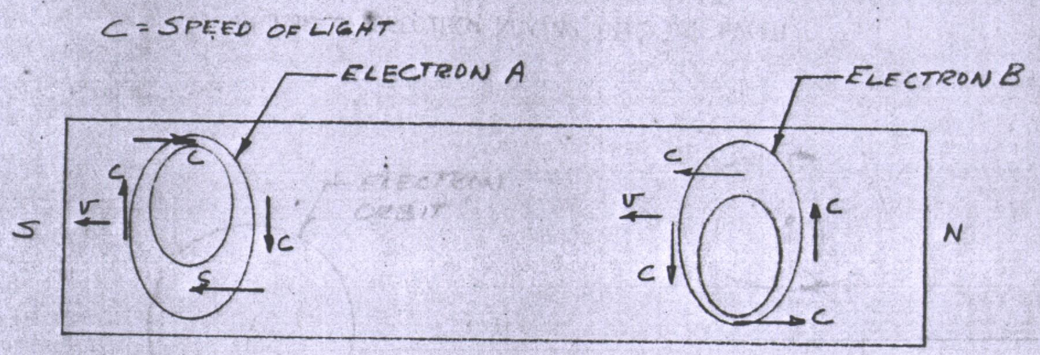


FIGURE 3 STATIC MAGNETIC FIELD

In this figure orbital electrons A and B are shown with the deformations associated with a translation to the left - the orbital paths are not shown. The translation shown by v will not occur if the background particles flow from South to North. Another possible mechanism of static magnetism might result from aligning the electron orbital axes parallel to the North-South line in a bar of matter. This mechanism is discussed after the mechanism is presented by which a moving electron sets up a magnetic field.

A translating electron sets up a magnetic field which consists of a circulation around the electron path, see Figure 4. The electron is moving into the plane of the paper and the circulation of the lower part overshadows the opposite circulation of the upper part.

The static magnetic field may be produced by the electrons in orbit setting up a flow pattern along the orbital axis, see Figure 5.

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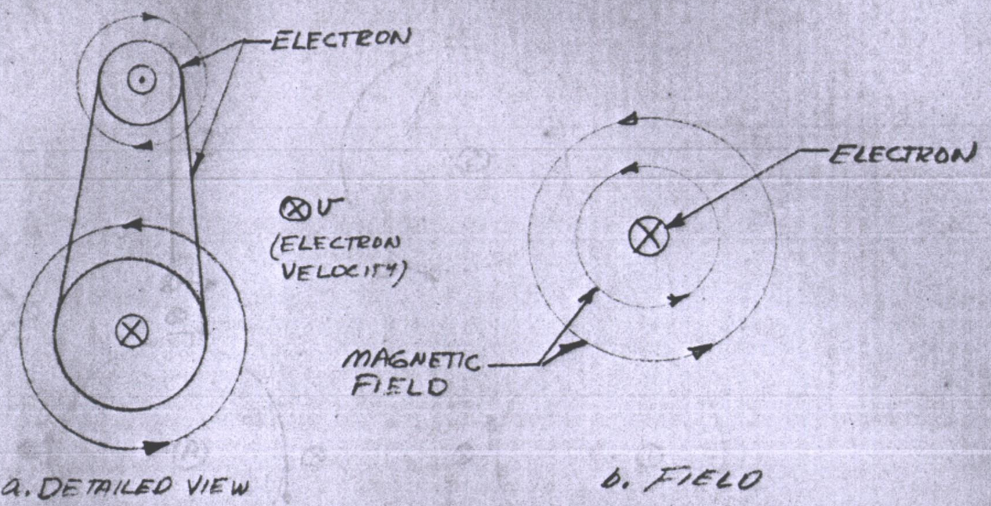


FIGURE 4 ELECTRON MOVING INTO THE PAPER

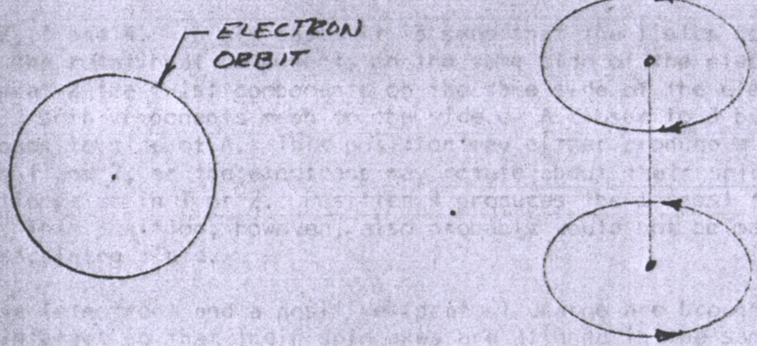


FIGURE 5 ALTERNATE STATIC MAGNETISM MECHANISM

Interaction Mechanisms

The interaction mechanisms of an electron with another electron and an electron with a magnet are presented now.

Figure 6 shows a negative electron at A and another negative electron at

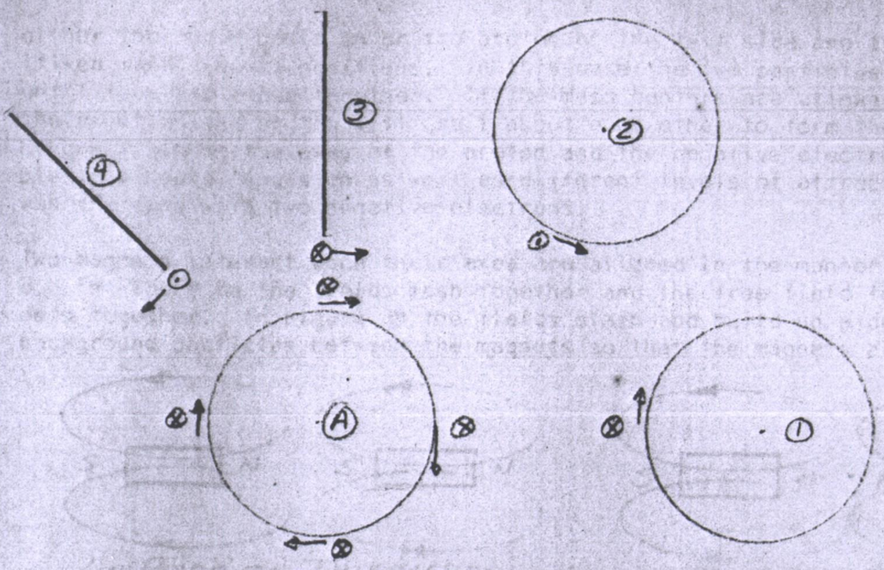


FIGURE 6 NEGATIVE ELECTRON AT CENTER WITH ANOTHER NEGATIVE NEGATIVE ELECTRON PLACED AT VARIOUS LOCATIONS

positions 1, 2, 3 and 4. In all cases it is seen that the fields do not mesh. At position 1 the rotational components on the same side of the electron do not mesh while at 2 the twist components on the same side of the electron do not mesh. At 3 both components mesh on the side of A closer to 3 but interfere on the opposite side of A. This position may either produce a lower repulsion than 1 and 2, or the electrons may rotate about their spin axis untill they are positioned as in 1 or 2. Position 4 produces the largest repulsive force of all. This position, however, also probably would not be maintained without a constraining field.

When a negative (electron) and a positive (proton) charge are brought together their fields interact so that their spin axes are aligned in the same direction, see Figure 7. A few trials at other relative locations will show that

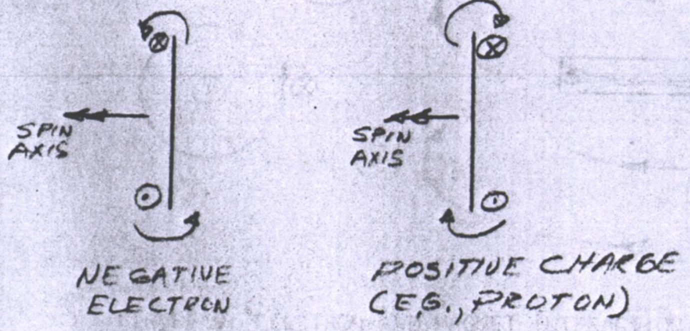
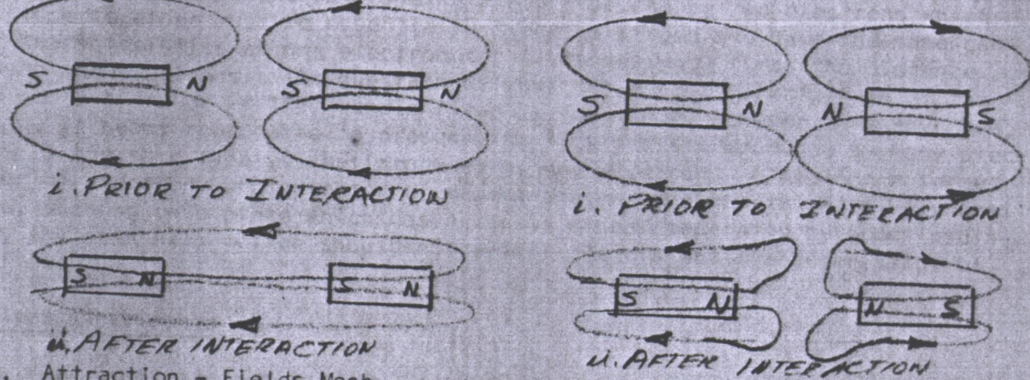


FIGURE 7 INTERACTION OF A NEGATIVE ELECTRON AND A PROTON

either the above position or the proton on the left side are the only stable (fixed mass center) positions. In this case the two particles are attracted until they are close together. If the mass centers are allowed to move then the electron and proton will orbit about each other to form the hydrogen atom. By constraining the axes of the proton and the negative electron it is possible to produce repulsion as well as different levels of attractive forces, as was the case with two negative electrons.

Two magnets interact when their axes are aligned in the manner shown by Figure 8. In Figure 8a the fields mesh together and the free field forces the magnets together. In Figure 8b the fields clash and build up a denser region of background particles between the magnets so that the magnets are forced apart.



a. Attraction - Fields Mesh

b. Repulsion - Fields Clash

FIGURE 8 MAGNET INTERACTION

Consider now the interaction of a negative electron and a magnet. If the spin axis of the electron is not constrained as it is moved toward a magnet generally, there will be no interaction, see Figure 9. At position 1 there is no

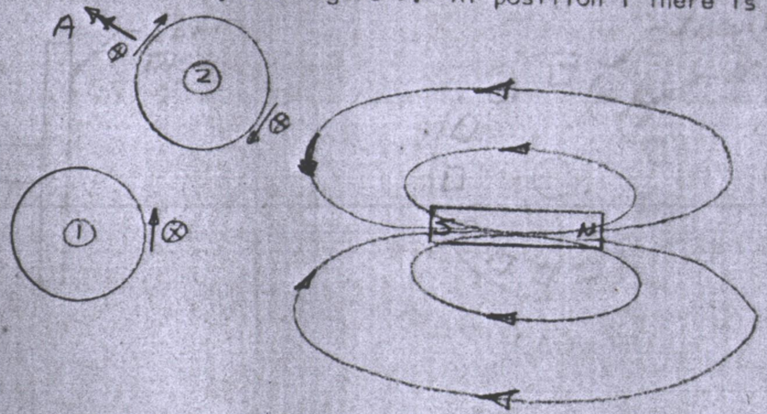


FIGURE 9 ELECTRON AND MAGNET INTERACTION

tendency to affect the spin axis. At position 2 the spin axis would tend to rotate in the direction shown by A as a result of the magnetic field on the lower right side. The interaction on the upper left side would tend to rotate the electron about its spin axis. Now, if the electron is permitted only to rotate about A then the electron should be forced toward the magnet. This attractive force should be larger than any repulsive force resulting from that produced by the interactions of the fields on the upper left side of the electron.

In order to perform inexpensive experiments it is probably necessary to use a group of charged particles rather than a single particle. Thus, it is necessary to define the electrostatic field produced by a group of like charged particles. It seems clear that the electrostatic field produced by two electrons which are close together must be essentially twice as strong and have the same general characteristics as one electron for distances many times the distance between the electrons. The question of what the actual orientations of the spin vectors are or if they remain fixed is not clear, however. In any case, though, it seems reasonable to presume the flow pattern produced by many electrons is the same type as that produced by one electron. Also, for a large number of electrons whose center of masses are constrained to relatively small areas, such as on a plate which has areas of copper separated by good insulators, any spin axis motion should not affect the distant characteristics of the field.

Proposed Experiments

Three test items are required in addition to measurement and support equipment. Two of the items are charge collectors which are alike and consist of a flat circular plate with a ring of conductors interspersed with insulators and a central support shaft as shown in Figure 10. The support shaft has a hemispherical end. The other test item is a permanent magnet.

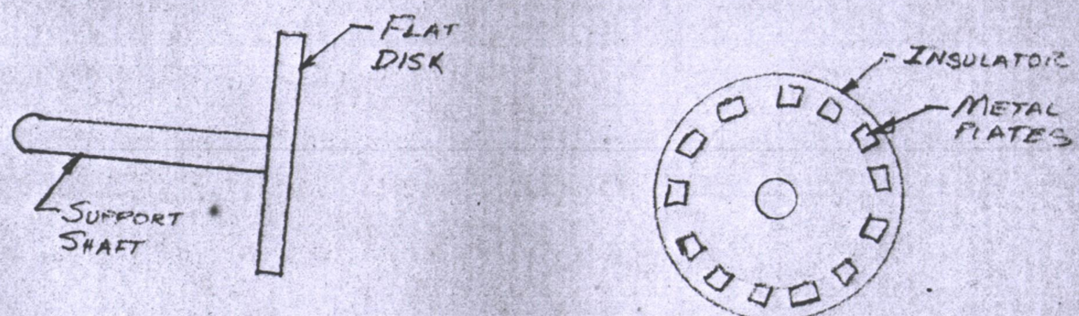


FIGURE 10 CHARGE COLLECTOR

The first proposed experiment is to place a large number of electrons on each metal plate of a charge collector. The charge collector then will be suspended by long strings. The magnet will then be brought to different positions relative to the plate and it will be noted whether or not there is any motion of the plate - either along the shaft, rotational, or any other type of displacement.

The second proposed experiment is to support the charge collectors so that they are face-to-face and so that they can only rotate. The plate will be clamped while being charged then when both are charged they will be released. The charge collectors then should rotate.

The third experiment will consist of supporting the uncharged charge collectors face-to-face by long strings and constraining the collectors from motion at the hemispherical end of the shaft. Measurements then will be made of the forces lying in the charge collector planes which result when electrons are placed on both plates.

Recommendations

It is recommended that the foregoing experimental program be initiated without delay. Concurrently with the experimental program it is recommended that the hydromechanical analogy of charge and magnetism be developed so that comprehensive mathematical descriptions of all the phenomena discussed in this memorandum will be available.

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