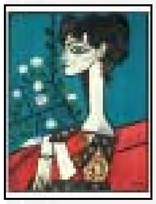
Coaxial Bar Magnet Experiment



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Abstract

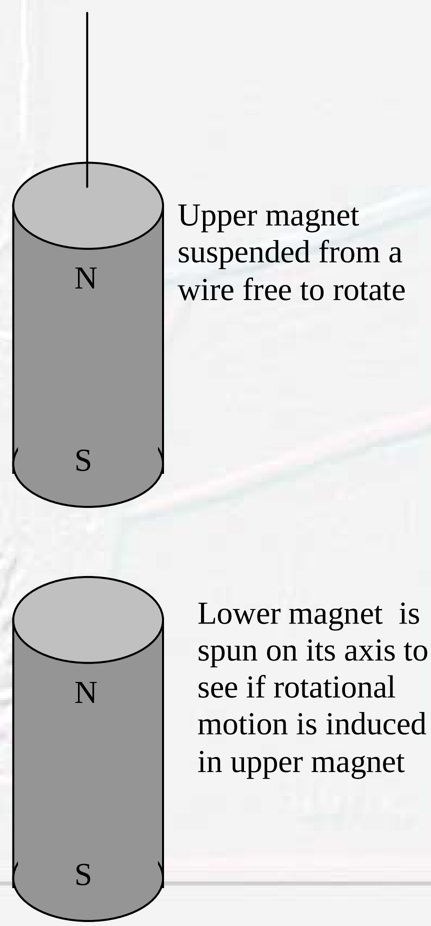
The following experiment (shown in picture below) was published in the prestigious American Journal of Physics Volume 63 #3 for March of 1995. This experiment was brought to our attention from a subscriber of our New Electromagnetism News Letter (NENEWS).

The intent of the experiment is to demonstrate if magnetic fields move with the rotating magnet. When the lower magnet is spun on its axis, there is no rotational effect observed in the upper magnet. This non-motion in the experiment has been used by theorists to suggest that magnetic field lines are stationary even when the magnet is in motion. This interpretation of the result is in direct conflict with both New Electromagnetism and Einstein's predictions about magnetic fields.

This paper rescues classical theory from the so-called experts by showing that classical theory predicts no rotational motion in the upper magnet whether or not the field rotates with respect to the lower magnet.

In other words, you can not prove or disprove the rotation of a magnetic field from this experiment. If the field does rotate, classical theory predicts no rotation in the upper magnet and if the field does not rotate, then classical theory also predicts no rotation in the upper magnet.

It is ironic that the non-motion result is used by Relativistic Theorists to question some aspect of Classical Electromagnetic Theory when in fact both Relativity Classical EM theories would be invalidated if there was motion detected in the upper magnet since neither provides a mechanism which could explain it.



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1 Introduction

We here at www.distinti.com were long time experts in classical electromagnetic field theory long before our venture into New Electromagnetism. New Electromagnetism was born from attempts to reconcile what the models tell us and what is seen in the lab.

One of the largest problems with classical theory is the very models we use to describe it. Many of you have heard flux lines called "Lines of Force"; which is accurate for electric field lines and quite misleading for magnetic field lines which are not "Lines of Force." We have worked with researchers from many prestigious institutions; we have found very few who properly understand how to apply classical theory. This is not a problem with the people; to be sure, they are all very bright and intelligent. The problem is with the false notions that the models and terms convey.

To carry this point further, consider a common simplification of classical theory and Relativity which treats a magnetic field as a solitary entity about a magnet. This leads to the very problem about whether a magnetic field follows the magnet or not. Here is a passage from the book New Magnetism (Chapter 9) which sheds light on the true nature of magnetic fields:

New Magnetism resolves this by restating Einstein's prediction. Instead of saying that a magnetic field moves with the magnet, we now say that a magnetic field moves with its source. In the case of a magnet, each charged particle is its own source of magnetic field energy. When the effect of each charge is considered separately, the proper operation of the Homopolar Generator is revealed without violating Einstein's Relativity. –New Magnetism by Robert J Distinti.

From a New Electromagnetism point of view the term stationary magnetic field, used abundantly in classical theory and Relativity, is an oxymoron. Magnetic fields are the product of charges in motion; therefore, there is really no such thing as a stationary field.

If you want to know more than that you have to buy our book. Also, see our paper Rules of Nature for more examples of models and simplifications that lead to confusion, paradoxes and shield us from seeing the inherent simplicity of Mother Nature's mechanisms.

Now that the sermon is complete, it is time to rescue classical theory from the classical theorists.

2 Back to the problem

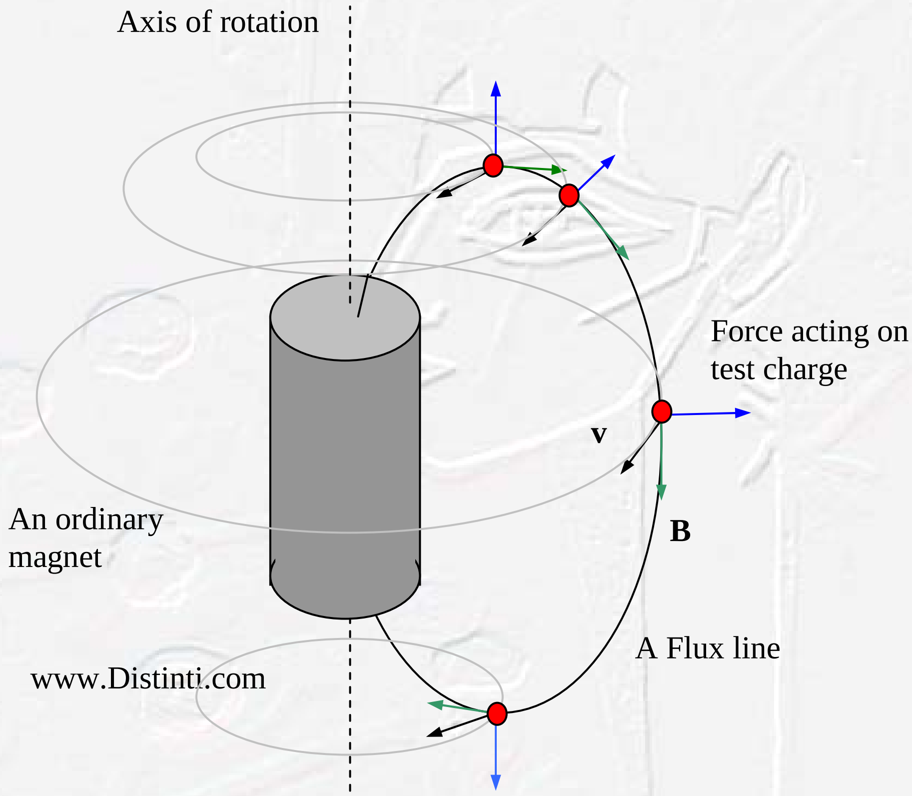

Figure 2-1: The lower magnet rotating

Because the flux model looks like strings emanating from the ends of a magnet, it is understandable why people to come to the false notion that flux lines drag things. So let us rescue classical Electromagnetic theory by restating facts present in the mathematical models which have been around for over 100 years:

1) Flux does not drag things.
2) Flux only acts on charges
3) The force generated on a charge (BLUE arrows in diagram) by flux is orthogonal to both the direction of flux (GREEN arrows) and the relative motion (BLACK arrows) or F=QVxB ← You know this guy

Remember, we are going to apply classical theory here using the classical notions of a magnetic field. Within that framework, we are trying to determine if a field rotates or if it doesn't.

For the first case, if the magnetic field is stationary (using classical notions) then the V term is zero and there is no force developed.

For the second case where the field moves with the magnet, if the lower magnet is spun to the right, then the magnetic field moves to the right (CCW looking down). The charges that comprise the upper magnet are then effectively moving into the oncoming field with velocity (v) as shown by the black arrows in the diagram. Since the force felt by the charges that comprise the upper magnet are a cross product between the relative velocity of the charges and the direction of the magnetic field lines, then the only possible component of force is in a direction radial to the axis of rotation. In other words, there is no component of force that could cause the upper magnet to rotate.

By application of classical field theory and classical field notions, we deduce that this experiment is not capable of answering the question "does the field move with the magnet."

It is ironic that if the upper magnet did rotate when the lower magnet is spun, there is no mechanism in Classical theory or Relativity which could explain that effect.

This is why www.Distinti.com is the World Leader in Electromagnetic Physics.

