Magnetized wire effect and perpendicular action experiment

Peng Kuan 彭宽 titang78@gmail.com

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I have designed the Lorentz perpendicular action experiment, blogspot academia, and predicted an outcome using my corrected magnetic force law: the test coil should not rotate when its axle is parallel to y-axis (see Figure 1).

However, when I did the experiment, the test coil rotated! Was my prediction wrong? This is why I have posted **Fail of the perpendicular action experiment,** blogspot academia.

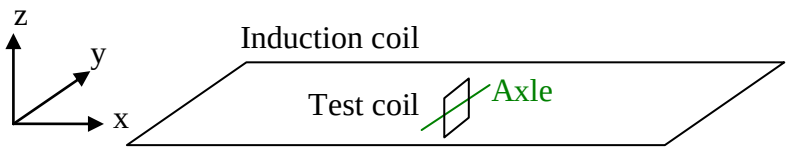

Figure 1

My prediction was based on my corrected magnetic force law below:

$$d^2\mathbf{F} = -\frac{\mu_0}{4\pi}\frac{\mathbf{r}}{r^3}\left(d\mathbf{I}_2 \cdot d\mathbf{I}_1\right) \qquad (1)$$

This law says that 2 perpendicular currents do not exert magnetic force on one another (scalar product of 2 perpendicular vectors is zero). Why the test coil rotated then? After analysis, I have found that there was a new magnetic effect in action.

In fact, the copper wires are magnetized by the magnetic field and act like strings of small magnets. Perpendicular magnets exert force on one another causing 2 magnetized segments of copper wires to create mutual radial force (see Figure 2). As this force is not direct current to current interaction, it is a new magnetic effect that my corrected magnetic force law does not cover. I name this force the "Magnetized wire effect".

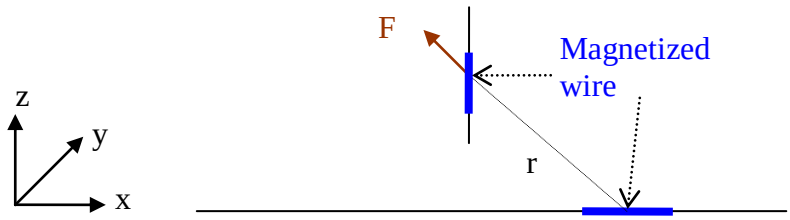

Figure 2

Because of this effect, the previous experimental setup will not give expected result. So, I have modified the design to get around this effect. Shown in Figure 3, the induction coil is the vertical coil ABCD. The test coil is placed before ABCD to test the magnetic force from AB. This experiment is similar to my experiment of **Corrected law and Perpendicular action experiment,** blogspot academia, which used a magnet to produce the magnetic field. The advantage of the new design is that it tests the force from real current AB rather then from a magnet.

Comment

The Lorentz perpendicular action experiment was a fail for demonstrating perpendicular action, but was a great discovery: that of the Magnetic wire effect. I will explain this effect in the future.

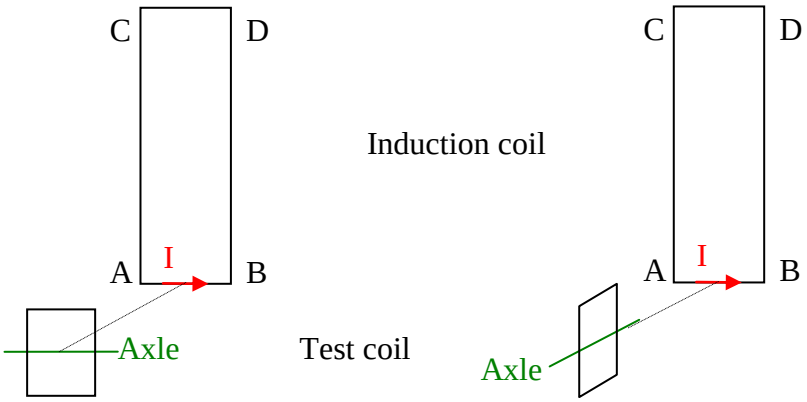

Figure 3