

Non-Lorentzian Magnetic force and Aharonov–Bohm effect in CRT

Peng Kuan 彭寬 titang78@gmail.com

27 June 2013

Today, magnetic force is described by the Lorentz force law. But from theoretical and experimental research I have found strange magnetic forces that do not respect this law. For example, magnetic force that is parallel to current, magnetic force with irregular magnitude and non-zero magnetic force in zero magnetic field, see:

Current and parallel action <http://pengkuanem.blogspot.com/2013/06/current-and-parallel-action.html>

Lorentz perpendicular action experiment and Lorentz force law

<http://pengkuanem.blogspot.com/2013/02/lorentz-perpendicular-action-experiment.html>

Macroscopic Aharonov–Bohm effect experiment and theory

<http://pengkuanem.blogspot.com/2013/06/macroscopic-aharonovbohm-effect.html>

I name these forces “non-lorentzian magnetic forces”.

Non-lorentzian magnetic force in materials

Non-lorentzian magnetic force exists also in materials. I have done an experiment using a bar magnet, iron sticks and aluminum scraps. The video of this experiment is here <http://youtu.be/PnR4GkQACUU>.

The first sequence shows the attraction of iron stick in zero magnetic field. In the Macroscopic Aharonov–Bohm effect Experiment <http://youtu.be/ugxmtT4FUME>, the nails were not attracted by the middle part of the bar magnet. This is true when nails are at some distance from the bar. But the present experiment shows that when the iron stick touches the surface of the middle part, it stays stuck on the surface, revealing a short range attraction with very weak strength.

This attraction is different from the classical one. The ends of the bar magnet attract iron sticks at long distances, which stand upright (see Figure 1) along magnetic field lines (see Figure 3). But the new attraction acts at much shorter distances and the iron stick lies down on the surface (see Figure 2). As the magnetic field in the middle region has neither north nor south pole, it is a non-lorentzian magnetic force.

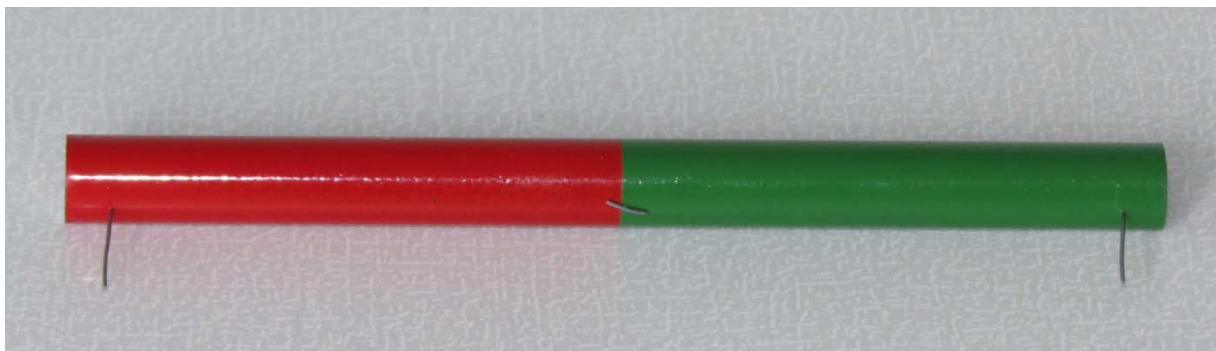


Figure 1

The second sequence shows that the middle part of the bar magnet attracts small scrap of aluminum. The small triangular foil of aluminum stays attached to the surface against gravity. The third sequence shows that all the surface of the bar magnet attracts small scraps of aluminum. We can explain this

non-lorentzian attraction by induction of a non-lorentzian magnetism inside paramagnetic material like aluminum or ferromagnetic material, which is attracted by the bar magnet.

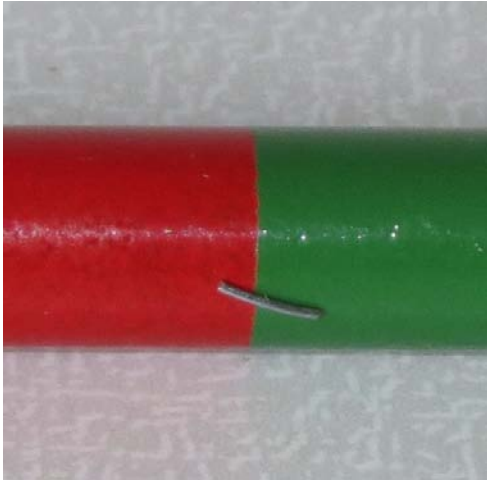


Figure 2

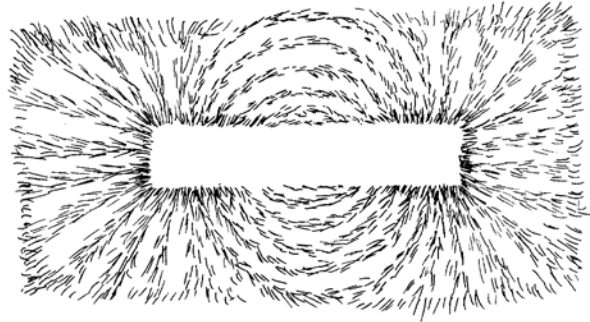


Figure 3

Non-lorentzian magnetic force in CRT

In “Macroscopic Aharonov–Bohm effect experiment and theory”

<http://pengkuanem.blogspot.com/2013/06/macroscopic-aharonovbohm-effect.html>

I have shown theoretically that the current in a long solenoid exerts a force on current and experimentally, a current carrying wire feels a force near the middle of the bar magnet (see the video <http://youtu.be/ugxmtT4FUME>). In consequence, electron beam in a cathode ray tube (CRT) will no doubt be deflected by long solenoids.

This phenomenon can be shown in the following experiment. Figure 4 shows the proposed setup which is a CRT with 2 parallel long solenoids on either side of the neck. The electrostatic plates will deflect the beam vertically; the non-lorentzian magnetic force from the 2 long solenoids will deflect the beam horizontally. By imposing the voltage in the plates and the currents in the solenoids as follow, the beam will draw an ellipse on the screen:

$$v(t) = v_0 \sin(\omega t), I(t) = I_0 \cos(\omega t)$$

Comment

The point of the “non-lorentzian magnetic force in materials experiment” is the materialization of the non-lorentzian magnetic force. The attraction of material is strongest on the surface in the middle of the bar magnet. It cannot be a leftover of classical magnetic force since the classical magnetic field diminishes to zero near the surface.

The CRT experiment’s impact will be great, because it will give a reasonable explanation to Aharonov–Bohm effect and will discard the suspected quantum nature to this effect, while showing non-lorentzian magnetic force on isolated electrons. This will be an important breakthrough for quantum and classical physics. So I call for experimenters to carry it out. Do not hesitate to announce your result through TV or press conference to secure the first place, waiting for professional publication is too long.

In developed countries scientific achievement is only a personal issue, but it may be a matter of national pride in developing country. The CRT experiment does not need expensive material, so this experiment is particularly suitable to laboratories in developing countries.

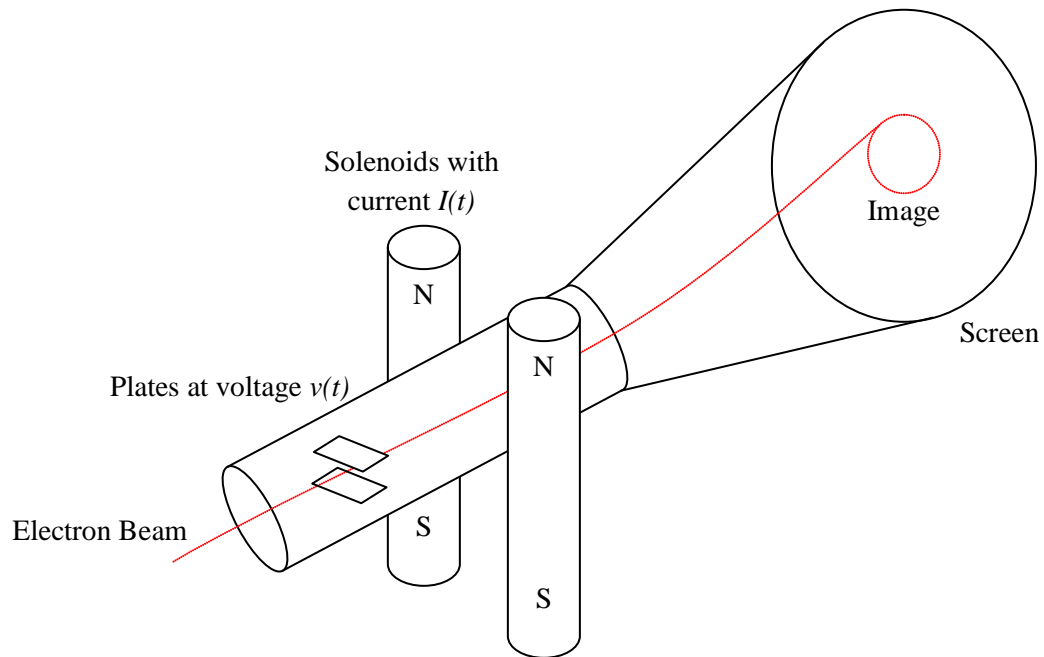


Figure 4