

Experiments with the Coler Current Generator¹

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Abstract

An attempt was made to rebuild the Coler current generator (Stromerzeuger). A full size model was built and tested. Prior to this, this group and most researchers have rebuilt and studied the other invention of Hans Coler, the Coler magnetic current apparatus (Magnetstromapparat). Here we present the first measurements and the principles of construction of the Coler current generator. The technical information to rebuild the Coler current generator was taken from the B.I.O.S. report [1], a list of items from the British archive [2] and the Norby patent [3] as described by Cyril Smith [4]. The current generator replica was designed to match the device tested by Prof Kloss and Prof Schumann in 1926. The output power level was 10 Watt. The device was powered by 3 lead acid batteries. The nominal voltage of the batteries was 6 Volt and the capacity was 7.2 Ah. The device was run with a light bulb load at an output of 7.5 Watt. The device consists of copper sheets with the dimensions 1219.2 mm by 203.20 by 3mm (8" x 48" x 0.108"). Between the copper sheets are flat coils with 10 turns. The copper sheets are connected to soft iron cores of electromagnets. The electromagnets are powered by a separate small battery. Coler and Norby claim the device shows considerable (5 times) current amplification. The original device was tested by Prof Kloss and Prof Schumann who confirm that the output power was 5 times the input power. Coler stated that the device had to be tuned and that the tuning was difficult. It was tried to tune the device so that the input from the batteries is less than the output power. So far the tuning did not achieve this over a longer period, but interesting and promising observations were made. If the load light bulb is disconnected, first the filament stops glowing, but after 1 second it lights up faintly again for a short time. This happens 8 out of 10 times, even if both leads are disconnected. A second interesting observation was that if the load is disconnected in short intervals, ca. 3 seconds, the output power sometimes exceeds the input power. These phenomena have to be studied more. The work on the Coler current generator will be continued and more levels will be added to the device. In this paper several suggestions are made as to how the Coler devices might work. It is likely that Coler had discovered a mechanism, possibly using the magneto-acoustic effect or the Barkhausen effect to convert vacuum energy into electricity. There is a strong link between magnetism and the quantum vacuum fluctuation. It is likely that zero point energy is the power source for the Coler devices.

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1. Introduction

This article will explore the working principle of a new type of electrical generator which was invented by Hans Coler. In the first part the history and the general description of the device will be given. Important historic facts are the early tests of the device by the well-known German Professors Schumann and Kloss. This is one main reason why this invention was not forgotten. Another important historical fact is the investigation of the device by the British Intelligence Objectives Sub-Committee (B.I.O.S.) and the confidential, later disclosed, positive report of this agency. The investigation was conducted by Hurst and Sandberg. Sandberg knew Coler and his work since much earlier and played a major role in convincing the British agency to take up the project. Hans Coler was contracted in 1947 to rebuild the current generator and the magnetic current apparatus. This

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work will present the technical design of a replica of such a Coler current generator device. Earlier the group built a replica with students of the Technical University of Berlin in 1998 and 1999 under the supervision of Dipl. Ing. Andreas Manthey. The construction of the Coler device was part of a course in interdisciplinary innovation learning. The student group took up the Coler device because there is a rich source of technical information on the device and another important reason was that the original device was positively tested at the same institute in 1926. An investigation to retrieve the original documents in the archives of the Technical University revealed that the documents were missing - a toll taken by a British firebomb during an air raid on Berlin in 1943. Since Coler also presented some theoretical hints on the working principle of his device, this work will also deal with the fundamental properties of magnetism and the feasibility of using electrical and magnetic resonances of ferromagnetic magnets to construct a generator. The work on the Coler generator was taken up because of the credible witnesses for a proof of principle for a device that works with permanent magnets and no other input power.

The Stromerzeuger was Coler's main invention and was the device that was tested by Kloss and Schumann in 1926. Coler and von Unruh had built a 10 Watt Model. The device was not just tested by Prof. Kloss and Prof. Schumann but also by Prof. Knudson in Copenhagen and Prof. Bragstad in Trondheim.

Later Coler made a 70 Watt and a 6 kW Model of the Stromerzeuger. The work on the Stromerzeuger was taken up by our group because of the high output power of the device and the credible witnesses of its function. The Coler current generator basically acts as a current amplifier.

Since the magnetism of the electron can be explained as a relativistic quantum effect with corrections due to the exchange of energy with the zero-point energy (ZPE) quantum fluctuations [5], and permanent magnetism is today seen as a collective electron phenomenon [6], the Coler device seems to be a good starting point for practically testing the possibility of using magnetism to convert ZPE into useable electric energy. This connection was laid out in more detail in an earlier paper [7].

A major part of the work presented here is the reconstruction and testing of a Coler current generator. To find the working mechanism of the Coler device a replica of a Coler current generator was built and modern measurements on the replica were conducted. A number of tests were done in order to understand the coupling between the magnetic, acoustic and electric oscillations in the device.

Nomenclature

M_i	Magnet
P_i, F_i	Copper plate
N	magnetic north pole
S	magnetic south pole
L	primary coil ratio

2. Coler current generator

Hans Coler invented two energy devices by which electrical energy may be derived without a chemical or mechanical source of power. The devices are called the "Magnetstromapparat" (magnetic current apparatus) and the "Stromerzeuger" (current generator). The "Magnetstromapparat" was developed by Coler and von Unruh early in 1933. With this device, consisting only of permanent magnets, copper coils, and condensers in a static arrangement, he showed that he could obtain a voltage of 450 mV for a period of some hours. This device consists of six permanent magnets wound in a special way so that the circuit includes the magnet itself as well as the winding, see figure 1. These six magnet-coil combinations are arranged in a hexagon and connected in a circuit which includes two small condensers, a switch, and a pair of solenoid coils, one sliding inside the other [1].

The "Stromerzeuger" consists of an arrangement of electromagnets, flat coils, and copper plates, with a primary circuit energized by a small battery. Coler and von Unruh built a current generator with 10 Watt output power. This device was demonstrated to Dr. F. Modersohn, who obtained from Prof. Schumann and Prof. Kloss confirmation of their tests in 1926. The device was seen by the professors Schumann (Munich), Bragstad (Trondheim) and Knudsen (Copenhagen). Reports by Prof. Kloss (Technical University of Berlin) and Prof. Schumann (Technical University of Munich) are reliable evidence that the device was real and worked. Prof. W. O. Schumann is still widely known for the discovery of the Schumann Resonances in the earth atmosphere. Coler and von Unruh made up a slightly larger model with an output of 70 watts. Coler then in 1937 built a larger version with an output of six kilowatts [1].

Coler and von Unruh built the magnetic current apparatus, which has no input power, as a demonstration unit to convince investors that this is a novel energy device.

The British intelligence started an investigation after 1945. Coler was visited and interrogated. He proved to be co-operative and willing to disclose all details of his devices. He built a "Magnetstromapparat" in 1947 using material supplied to him by the British intelligence (Ministry of Supply). The greatest voltage obtained with this "Magnetstromapparat" was stated to be 12 volts.

Coler had no complete scientific explanation for the working of his device. He stated that his researches into the nature of magnetism had led him to conclude that ferromagnetism was an oscillating phenomenon, of a frequency of about 180 kilohertz. This oscillation took place in the magnetic circuit of the apparatus, and induced in oscillations the electrical circuit. The frequency of these oscillations depended on the values of the components used. These two phenomena interacted, and gradually built up the electric potential. Coler stated that the strength of the magnets did not decrease during the operation of the apparatus. He suggested that a sort of energy hitherto unknown -"Raumenergie" (space energy)- was tapped by his device.

According to Coler the basic principle has to take into account that the electron does not just have a charge but also a magnetic moment.

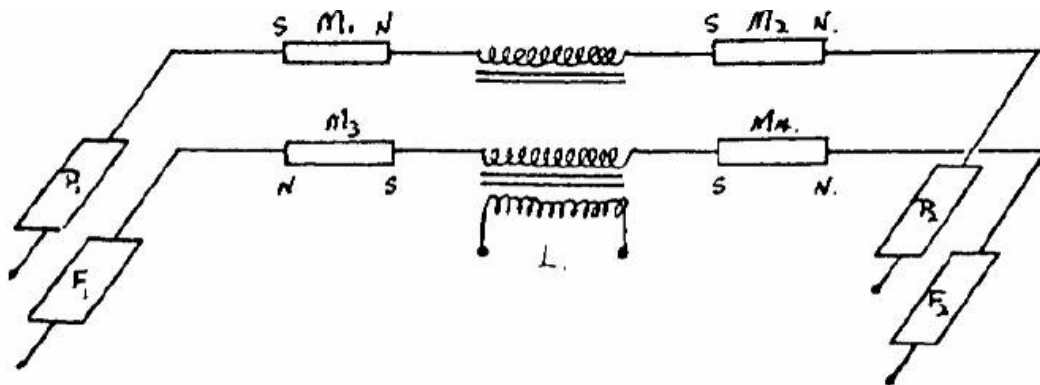


Figure 1. Schematic diagram of the working principle of the Coler current generator .

The basic element of the device is an open secondary circuit, capacity loaded, inductively coupled to a primary circuit. The novel feature is, that the capacities are connected to the secondary core through permanent magnets as shown in Figure 1. It is claimed that, on switching on the circuit, a separation of charges takes place and that these charges are magnetically polarized when they are formed, owing to the presence of the magnets. On switching of the primary circuit a revers current flows in the secondary, but the magnets do not exert a polarizing effect on the reversal.

Both Coler and Norby emphasize that high frequency interruptions of the fields is an important part and that tuning the device is difficult [1], [3].

3. Sources and technical details of the Coler Stromerzeuger replica studied in this work

The Coler generator consists of copper plates, flat coils and electromagnets with iron cores. The information for rebuilding the Stromerzeuger were taken mostly from the BIOS report, other letters and documents from the Coler file in the British archive, and from the Norby patent.

Several authors, among them Cyril Smith [4], suggest that the Swedish patent no. 159487 from Feb. 24. 1920 actually describes the same technology as the Coler current generator. Who actually made the invention, Coler, von Unruh or Norby is not clear. There are a few minor contradictions between the Coler description and the Norby patent, but the patent contains many details on the construction, assembly and the electric circuit that are not otherwise accessible.

The electric circuit includes copper plates, flat coils between the plates and electromagnet cores. The electromagnets consist of the windings around soft iron cores. The cores are connected with copper plates. The windings are powered by a separate battery. The full assembly is shown in Figure 2.

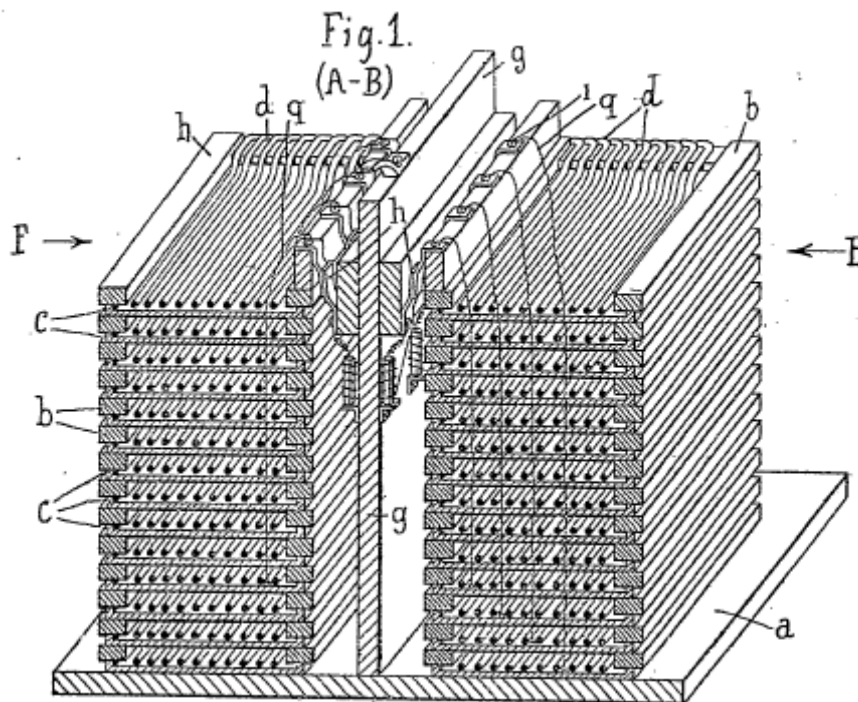


Figure 2. Schematic diagram of the device in the Norby patent, a is the base plate, c are copper plates, d are flat coils

The dimensions of the different parts were taken from a material list that was found in Colers file in the British archive. The size of the copper plates are: length 1219.2 mm, width 203.20, thickness 3mm. The Coler replica used in this work is shown in figure 2. The flat coils have 10 turns of copper wire with 1.24 mm diameter. The cores of the electromagnets made of mild steel with 20 mm diameter and 208 mm length. The coils around the cores have a resistance of 5.18 and 5.19 Ohm. They are made of a single layer of 0.75 mm copper wire. The electric properties of the coils was chosen to match the measurement data of Prof Kloss and Prof. Schumann given in the BIOS report. The separation between the copper plates is 12.5 mm.

During operation the current in the electromagnet circuit is limited by an additional resistor. The voltage across the electromagnets is 0.6 V and the current is 245 mA. The magnetic field at the top of the electromagnet cores is -2.0 mT, -1.2 mT, -1.25 mT and -1.4 mT.

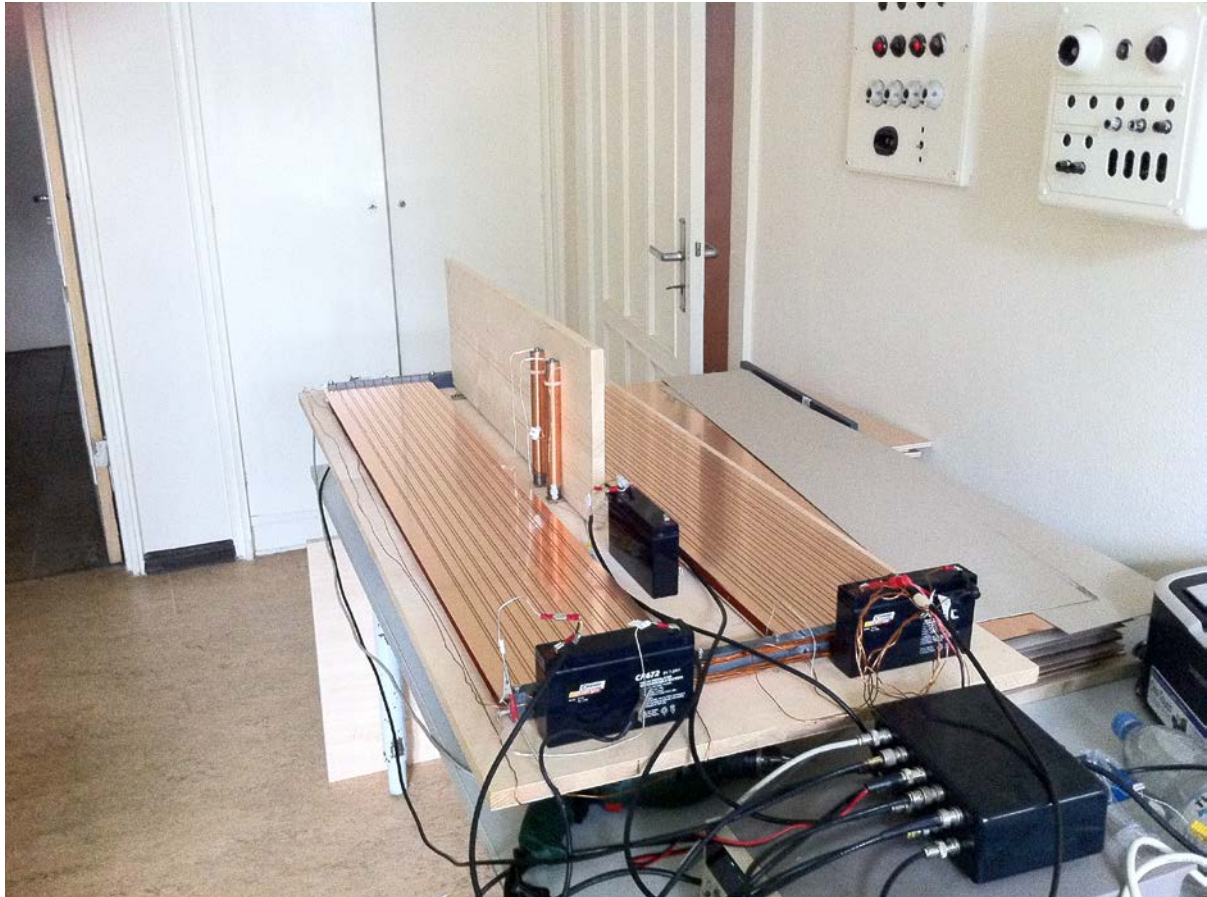


Figure 3. Coler current generator replica built by author

The magnetic remanence of the cores with out current are -0.212 mT, +0.325mT, +0.568 and +0.295 mT.

Circuit diagram taken from Norby Patent and modified for only 2 layers. The connection P is interpreted as the electro magnet cores and the connection to copper plates.

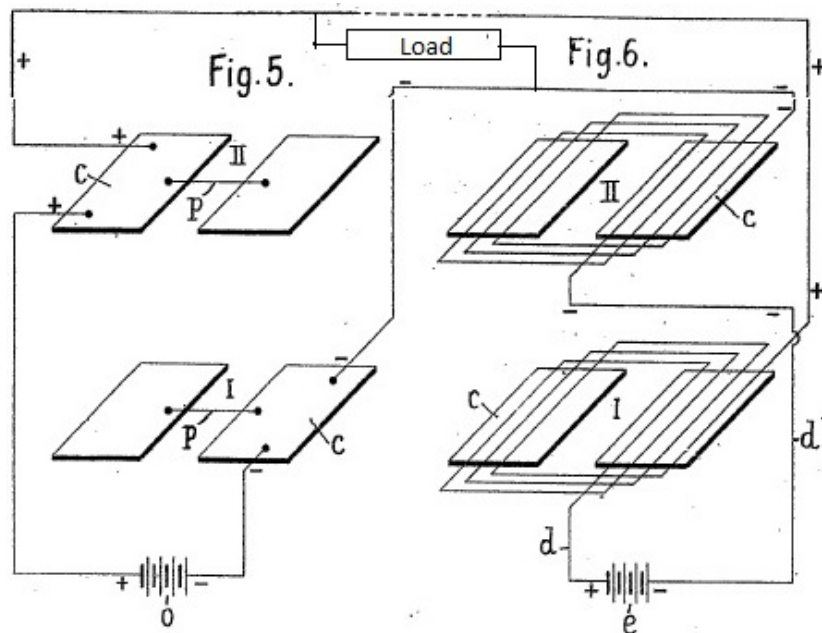


Figure 4. Electric diagram of the Coler current generator replica (Norby modified to 2 layers).

Some of the important uncertainties of the Coler generator are the material of the magnets and the construction and winding of the coils on the magnets.

4. Measurement system on the Stromerzeuger (current generator)



Figure 5. Measurements on the Coler replica with a Keithley 2000 DMM and recording and display with a Lab View program

A Keithley 2000, a 6 1/2 digit scientific digital multi meter with scanner card, was used to measure the input and output currents as well as some temperature points. To track the high frequency components a Tektronix 3034 was used. The 10 data points of the DMM are read out every second by a Lab View program. The program stores the data and displays graphs of DC currents and voltages as well as power inputs and output. The currents

from the batteries for the flat coils and the copper plates as well as the output current and the current in the electromagnets are measured. The voltages off the batteries for the copper plates and the flat coils as well as the voltage across the load and across the electromagnets are recorded. The program then calculates the power input and output as well as the power into the electromagnets. The program communicates via GPIB with the DMM.

In order to find the high frequency component a digital storage oscilloscope (Tektronix 3034) was used.

5. Experimental results

5.1. DC measurements with load

These Experiments in this section were done according to Coler's and Norby's description. The procedure to run the current generator is that first the load is connected to the output terminals. In our case we used a simple car light bulb as a load. Shortly after closing the load circuit the electromagnet circuit is turned on. The results are shown in table 1.

Table 1.

Test run no	flat coils		copper plates		electromagnets		output		
	voltage	current	voltage	current	voltage	current	voltage	current	
1	6,45	0,15	6,27	1,07	0,57		0,24	6,25	1,24
2	6,46	0,11	6,33	0,54	0,58		0,25	6,33	0,64
3	6,33	0,19	6,25	0,99	0,60		0,24	6,11	1,17

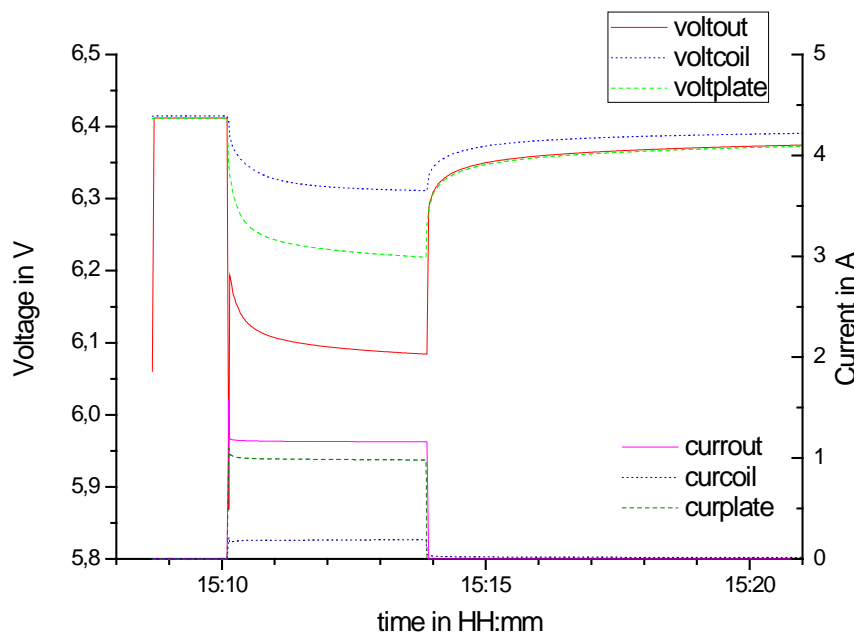


Figure 6. Electric diagram of the Coler magnetic current apparatus.

According to observers, Coler tried to connect and disconnect the electromagnet circuit in order to trigger the resonance in the device. In these experiments we have closed and opened the electro-magnet circuit many times. So far no significant difference or any type of resonance could be observed.

5.2. DC measurements with modifications on the electromagnet configuration

Since the wiring and the magnetic orientation of the permanent magnets and the electromagnets is unclear, different configurations were tried. Norby patent and B.I.O.S-report are contradictory in these aspects. The following combinations were tested:

- all electromagnets south pole up, bottom of the cores connected
- electromagnets south poles up, bottom of the cores not connected

- alternating electro-magnet north and south pole up, bottoms of the cores not connected
- alternating electro-magnet north and south pole up, bottoms of the cores connected

No significant difference between the different combinations could be detected.

5.3. DC measurements with load and interruptions

Because of the light bulb relight shortly after being disconnected, curiosity arose and we carried out a great number of fast (3 sec) disconnections and reconnections of the load. The interruptions gave rise to 2 significant effects.

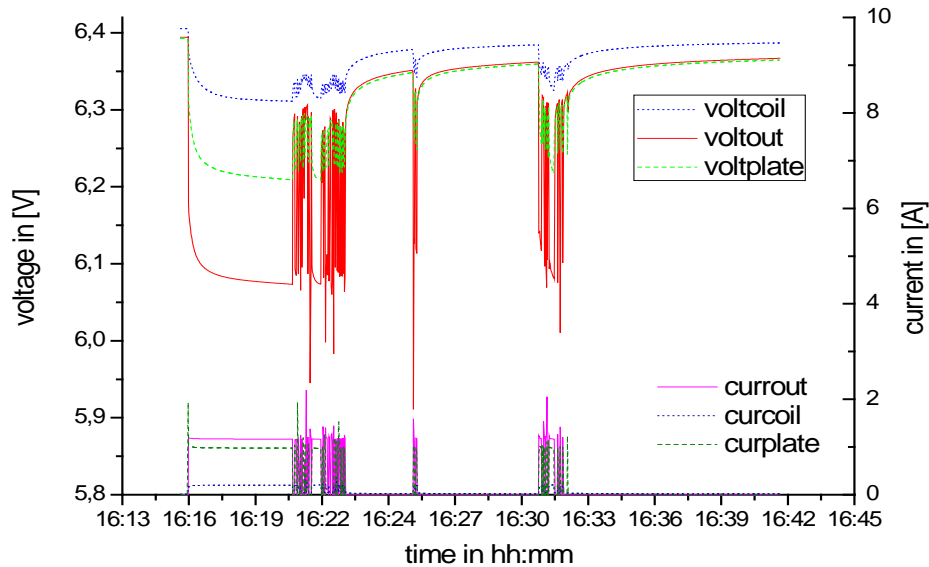


Figure 7. Voltages and currents in the device with load and with interruptions

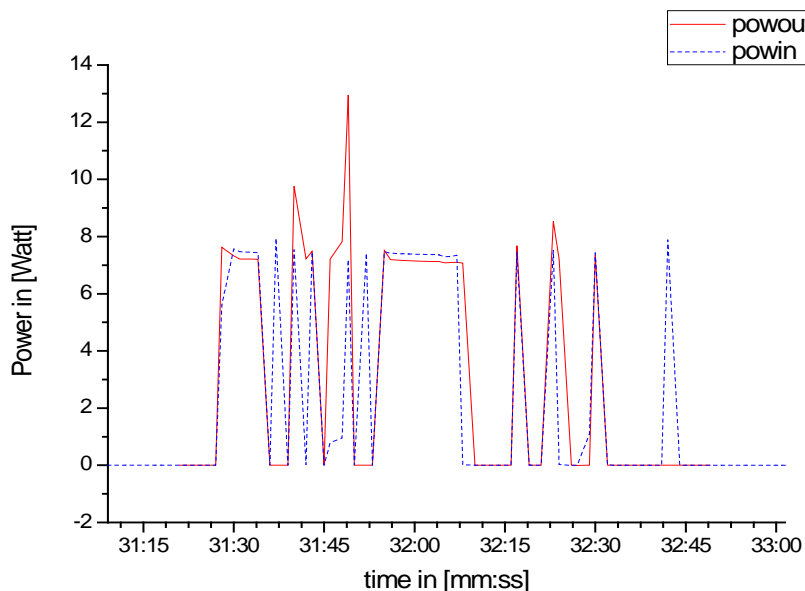


Figure 8. Blow up of the power curves from Figure 7.

Frequent interruptions, 3 to 5 seconds on and off, lead to spikes in the power curves. In Figure 8 can be seen that the output power exceeds the input power at times. This can be seen as a hint where to look more closely. The power out and input in this case has to be measured with much higher time resolution than with the current measuring system. The oscilloscope with current probes would be suitable for further investigations.

A very interesting observation was made when the load lamp was disconnected. The filament glowed up shortly about 1 sec after the lamp was disconnected. This was tried many times and the phenomena accrued about 80% of the times. The lamp was disconnected with only 15 cm of cable remaining with the lamp. the positive lead was disconnected. The effect occurred also when the negative or both lids were disconnected at the same time. A possible explanation is, that cold current gives this recoil. Because the glowing is much lower in intensity than the full-on brightness of the bulb, it is possible that the additional current is too small to be detected with our current measuring instrumentation at the moment. If the device is further tuned this effect could get much stronger and lead to the performance reported in Coler's time.

5.4. High frequency search

The high frequency search revealed first that a very dominant 50 Hz component is in the device. The 2 opposing plates had opposite polarity. The peak voltage between the two plates was 18 volts. On the screen shot of the oscilloscope a small ripple can be seen. Therefore there are higher frequency components. Because the ripple is phase locked to the 50 Hz they are likely to be harmonics of the line frequency. In operation high frequency transients were observed. The high frequency interruption that Coler and Norby mentioned was not yet found.

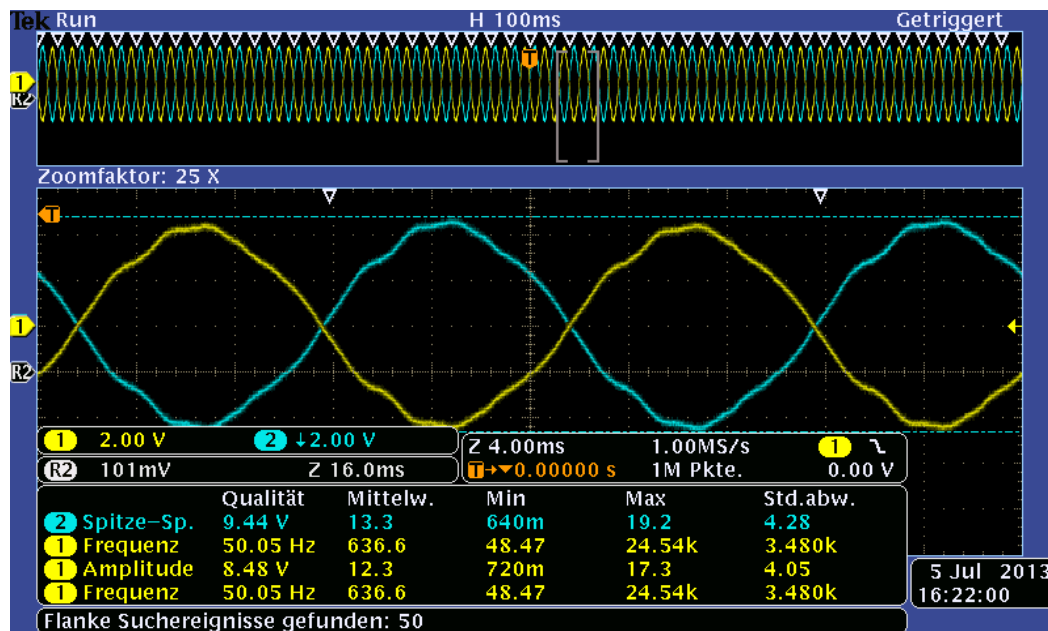


Figure 9. The screen shot from the oscilloscope shows the voltages on the tip of the left electromagnet cores.

6. Extracting energy from the vacuum state via magnetism and QED as a possible origin of the electric energy in the Coler device

In order to understand Coler's device and how electrical energy can be generated with a combination of copper plates, flat coils and soft iron magnetic cores, the origin of magnetism in general has to be explored. As discussed in detail in an earlier paper [8], magnetism is closely linked to the quantum vacuum fluctuations. Puthoff and Cole [9] have shown that in principle the energy in the quantum fluctuations field can be extracted from the vacuum. Coler may have found a mechanism that converts zero-point energy into usable electricity. He points out that he uses a special resonance of magnetic and electrical vibrations in ferromagnetic material, especially iron. Since ferromagnetism is a collective effect, it can be seen as a self-organized dissipative structure. This holds especially for the ferromagnetic resonance. Therefore ferromagnetic materials combine fundamentally vacuum fluctuations and dissipative structures. The self-structuring process of the electrons in ferromagnetic material could be a way to cohere vacuum fluctuations. This would make ferromagnetic materials ideal candidates to fulfill the requirements laid out by King [10] for processes that extract energy from the

vacuum state. In order to verify the connection between Coler current generator, magnetism and energy extraction from the quantum vacuum field it is planned to use Casimir force measurements [10], [11].

In an earlier paper on the Coler magnetic current apparatus [8] it was pointed out that the Barkhausen effect and a combination of magneto-acoustic effect, electrical oscillations in the circuit and mechanical oscillations of the magnets could play a major role in this device. The tuning of the magneto-acoustic resonance frequencies and the resonance frequency of the electrical circuit as in the Coler device might be a way to convert vacuum fluctuations into usable electrical energy. In order to understand Coler's device and to engineer technology from it, a better understanding of the dynamics of ferromagnetism and the coupling to electrical and mechanical vibrations is needed. Research in magnetic nano-structures, magnetic material, magneto-acoustic resonance, spin waves, single-spin magnetic resonance force microscopy and magnetic semiconductors is likely to lead to these needed new insights.

Another effect that might contribute to the modulation of the internal voltage of the Coler device is magnetoresistance. If the magnetization of a magnetic material is changed in many cases also the resistance changes [13]. A time varying magnetization therefore will lead to time varying amplitude of the electric current in the magnet. In Coler's design the current has to pass through the magnet. This feedback could contribute to generate an AC current from a time-varying magnetization. If the time constant of this feedback mechanism is tuned to the other resonances a build-up of amplitude could be possible.

7. Conclusions

The technical design parameters of the Coler current generator are now mostly clear. During construction it became evident that some important details are still unknown. The Coler current generator built in this work shows nearly the same output powers as the original tested by Kloss and Schumann. The information taken from the Norby patent was very helpful. So far the high frequency oscillation that causes the field lines to be interrupted was not found. What Coler means by tuning the device is not clear. So far the factor 5 current amplification by the current generator could not be observed. It has to be emphasized that some interesting phenomena were discovered in the course of this work. The light bulb used as load flashed up again slightly when the load was disconnected or interrupted. This interruption also showed interesting output power spikes in the measured power curves. The effects could lead to the working principle of the device and that would suggest what needs to be tuned.

More experiments will be necessary to totally unveil the working principle of the Coler device and to reach the power output reported by the testifying professors mentioned in the introduction.

Hints of new energy were seen, but the device was not yet tuned to give the 5 times current enhancement that Prof. Kloss and Prof. Schumann reported on the Coler current generator.

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