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The Effect of Magnetic flux Angle on the Voltage of Photovoltaic Cell

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Abstract: In this work we examined the effect of magnetic flux intensity on the current and voltage of a commercial solar panel. The work was repeated with higher magnetic flux intensity to emphasize the results found on the first attempt.

Keywords: Photo magnetic effect, solar panel, magnetic flux.

Introduction

The **photo magnetic effect** is a theoretical quantum mechanical effect discovered by the researchers Samuel L. Oliveira and Stephen C. Rand at University of Michigan 2007–2011. [1] [2] [3] The researchers have discovered a powerful magnetic interaction between the photons dynamic magnetic field – and certain isolator materials atoms magnetic moment, that is 100 million times stronger than formerly anticipated. Under the proper circumstances, the photons magnetic fields effect is as strong as their electric field – as e.g. in solar cells. The discovery is a surprise, because it is not straightforward to derive the strong magnetic effect from the physical equations, and thereby indicate that this quantum mechanical effect would be interesting enough. That is why the photo magnetic effect has been neglected for more than 100 years.

The researchers have theoretically calculated that incoherent light as e.g. sunlight, is almost as efficient as laser light, to be converted by the photo magnetic effect.

The power density should be 10 million watt per square centimeter, but the researchers will look for new photo magnetic materials, that can work with lower light intensities.

Experimental Set up

Materials

- Solar panel 14X10 cm, thickness 1 cm, output 9V.
- Digital multimeter, Voltage range: 200mV—1000V Current range: 200mA--200μA
- Magnetic sensor specifications: Leybold Didatic GmbH, 220-240V, Sensor length 8.9cm.
- Two bars of magnet, neon lamp, drown paper of angles between 20º -180º
- Connecting wires.

Method

- The panel was placed between the two bars "15cm apart, the flux intensity was **14.7mT**"
- The panel is placed over the drawn paper with angles from 20º to 180º
- The neon lamp is placed over the panel "1cm" apart; the experiment is done in darkness, the only light is of the neon-lamp, the panel makes angle of 20º-180º with the magnetic flux and the readings were taken for both voltage and current.

Results:

Table (1) the flux intensity **14.7mT**

Angle	Voltage (V)	Current (A)	Voltage (V)	Current (A)
20	9.63	0.206	8.73	0.116
30	9.52	0.196	8.73	0.116
40	9.46	0.191	8.73	0.116
50	9.75	0.202	8.89	0.115
60	9.58	0.182	8.89	0.115
70	9.64	0.184	8.89	0.125
80	9.50	0.164	8.89	0.125
90	9.61	0.184	8.92	0.141
100	9.73	0.233	8.92	0.141
110	9.70	0.254	8.92	0.140
120	9.63	0.233	9.11	0.153
130	9.55	0.223	9.11	0.153
140	9.22	0.175	9.08	0.161
150	9.17	0.199	9.16	0.163
160	9.16	0.196	9.16	0.163
170	9.02	0.197	9.16	0.163
180	9.14	0.197	8.74	0.111

With the effect of magnetic flux Without the effect of magnetic flux

To be sure of the results at table (1) a powerful magnet was used and the same procures were repeated.

Powerful magnet specifications

Two coils of 10,000 turns and 5A current.

When the coils were 15 cm apart the flux intensity was **99.3 mT**

Table (2) flux intensity **99.3 mT**

Angle	Voltage (V)	Current (A)	Voltage (V)	Current (A)
20	10.25	3.00	9.40	0.227
30	10.14	2.01	9.40	0.227
40	10.11	2.00	9.40	0.227
50	10.64	3.81	9.40	0.227
60	10.12	2.70	9.40	0.227
70	10.29	2.98	9.40	0.227
80	10.18	2.73	9.34	0.227
90	10.22	2.80	9.33	0.224
100	10.59	3.63	9.32	0.222
110	10.55	3.79	9.32	0.222
120	10.41	3.60	9.30	0.221
130	10.40	3.40	9.29	0.221
140	10.33	2.15	9.27	0.220
150	10.21	2.20	9.26	0.214
160	10.16	2.11	9.26	0.214
170	10.08	2.19	9.26	0.212
180	10.00	2.16	9.26	0.214

With the effect of magnetic flux Without the effect of magnetic flux

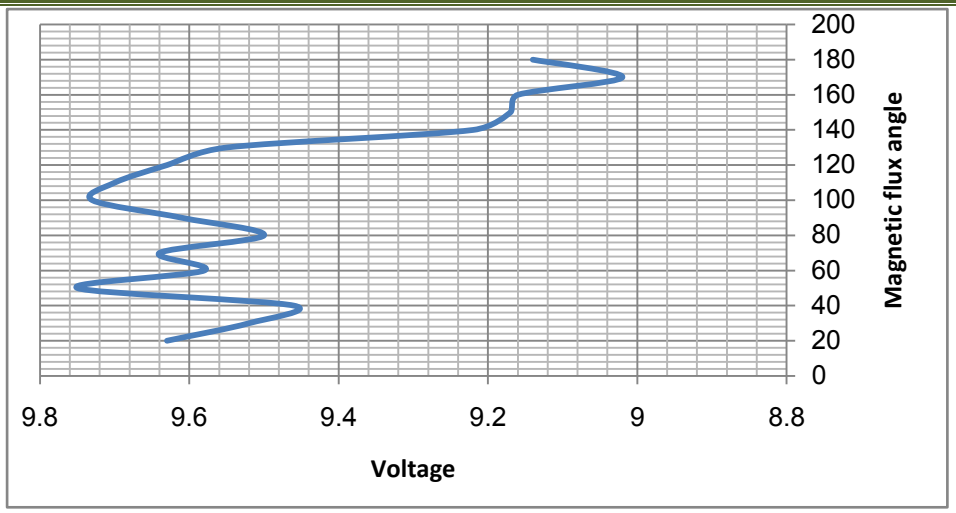

Table (1) The relation between magnetic flux (14.7mT) angle and voltage

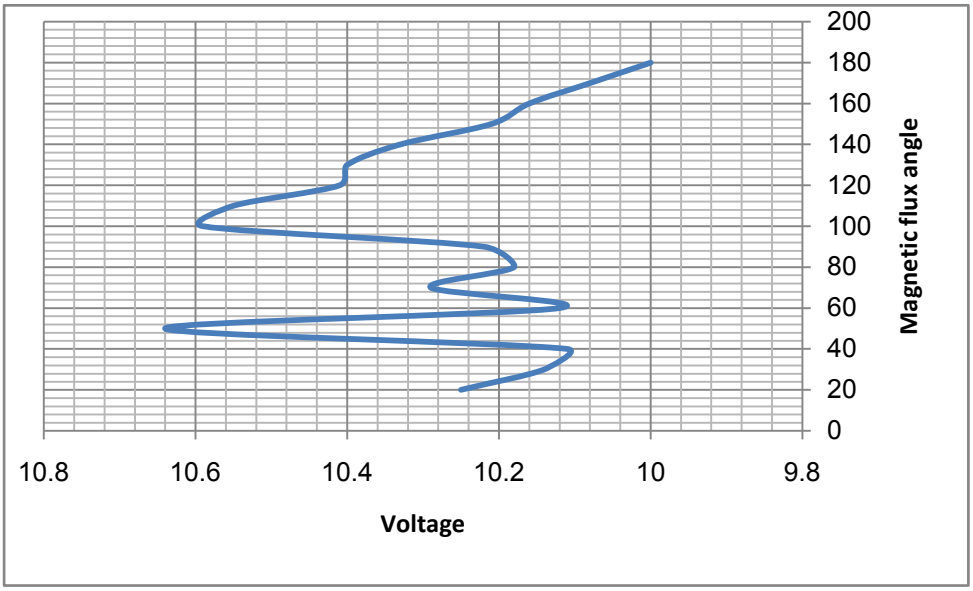

Table (2) The relation between magnetic flux (99.3mT) angle and voltage

Conclusion

-The output is maximum at angle 50º.
-The output is nearly constant without the effect of magnetic flux intensity; the variation may occur due to technical mishandling.

References

[1]. April 13, 2011, ns.umich.edu: Solar power without solar cells: A hidden magnetic effect of light could make it possible

[2]. University of Michigan (2011, April 14). Solar power without solar cells: A hidden magnetic effect of light could make it possible. Science Daily Quote: "..."You could stare at the equations of motion all day and you will not see this possibility. We've all been taught that this doesn't happen," said Rand, an author of a paper on the work published in the Journal of Applied Physics. "It's a very odd interaction. That's why it's been overlooked for more than 100 years."..."

[3]. Apr 21, 2011, physicsworld.com: Solar power without solar cells

