

Physics involvement in Information technologies

I start this topic with the following question:

When has Information Technologies been nothing to do with physics?

The electricity theory is one part of physically theories.

Let us go back some centuries ago, the electricity was first time mentioned, when the history told about Benjamin Franklin, who had flown a kite during a thunderstorm. As a result a thunder hit him. He recognized the power of electricity and went on developing. So we still use his developed terms like charge, battery, negative, plus, minus or conductor an electric shock. Last two facts are important during production of computer components, especially these parts that can easily destroyed by electric shock. Person who handle with them and are in nearly direct contact, have to use a kind of conductor to preserve damages, they simply have to connect themselves with the ground by a similar way like Franklin did. A thin cord going from e.g. their arm to something of metal, that's part of the floor. By doing that the electricity is in a closed circuit and a short will be prevented.

Another physicist had been Thomas Alva Edison. He invented next to the electric lamp, which does not matter in our case but is well known you might remember which, the person I mention. This Edison had invented another important thing, the phonograph, something you can call the first memory using electricity. This is the way by which nowadays CDs, DVDs or Hard disks save information. They divided into hills and valleys, which become smaller and thinner until today. But one sign stayed, you need something what is searching through the valley for the information. CD and DVD technology uses a laser, but the hard disk still have a reading head like the phonograph, but just much smaller.

Another important invention had been made by Edison, called carbon telephone transmitter, a possibility of sending and receiving information over great distances. The Internet is using this principle, also the smaller network systems. In short, the communication between computers is based on this way of transmitting information.

The nowadays printer industries, is also using a kind of Edison's invention. Edison called it electronic pen copying system a similar working machine. So you can see that each information-technique has on physics based roots, let it only be the inventor who had been a physicist. But everything what happened in a Computer system based on physically processes and can be explained by these. A newer physical invention had been the transformer, an invention which uses physical caused processes of merging which result an electrical field what leads to his finally properties, which him make useful and very important for the computer-industry, because it is quite simple structure and the possibility to build it very small.

Another points of physics in Information technologies are the physically border they are subjected. So a memory device can only be designed or built in that way that it based on the smallest physically particle. So you cannot build a computer who is smaller than an atom and expect that you can have equal conditions. Another fact is the transmitting velocity; you cannot build a computer that works faster than electrons velocity, except you change the transmitting particles, away from the electric circuit based system. So you have the physical border in the transmitting technology.

The borders in the memory device technology, you have to think about the natural magnetic field which contain on earth, so you have to be sure that maybe your hard disk can save the information and is not more than necessary influenced by that effect. So you cannot use it forever, because the magnetically effect will not last forever. The same problem do you have with CD or DVD, but here it is not the magnetically effect, here the

physically consistence of the material, these device are made of have also a limited duration of life.

So what else could I explain? You just cannot describe the deepest information technologically processes without have an eye on physics. Every hit on you keyboard releases a physically reaction, starting with transmitting the information from this by cable via electrical transmitting or maybe you uses an infrared or wireless one then the transmission takes place via infrared light or radio wave. But here you need a transmitter, which converts the electric signals into infrared or radio ones. And bye using a cordless keyboard (or mouse), you have to use another invention of physically background, the battery or better today an accumulator. These both store energy, which is needed for a well functionality of them. So it is used the ability of these devices to spend or to store electrons. Well, the battery, once full stored with electron at factory, just can spend ones, while the accumulator is able to store and spend electrons several times.

At the moment it is not possible to transmit enough energy to keep on running a keyboard (or mouse) via infrared or radio signals.

If you think about the cables which are today still used to connect most computer components you have also to mention, that here is used the good ability of the metal, usually copper, easily transmit electrons because of its structure. I.e. metals are very good conductors because their conductor bands and valence bands let them transmit very well. Further more let us come to the visual device, the monitor, which is full of physically processes. Not only that colours are just a effect of light, reflected by a thing, or better said that colour which is not absorbed is reflected and reaches the eye of the person who looks at. The colour are created by electricity, that means here takes place also a transformation of energy, electrical energy is transformed into intended light and the inadvertently heat energy.

So you can conclude the whole process of working with a computer, is nothing else than a lot of transforming and converting processes. The kinetic energy of the user which is applied to press a key will be transformed into electrical inner the keyboard which leads to the motherboard which decide how to handle with this signal, e.g. if the letter "a" should be written, the signal will be send to the monitor in that form that he can display it at the intended position, so the electrical energy will be transformed into light energy.

So I ask again, when does anything you do not lead to a physical reaction, I think none. Information technologies can be described as a part of physics, not obviously for every, especially those who do not care or think about but it started with physical inventions and still there is physic everywhere.

With these words I will end my text, I wrote it out of my mind and used the following sources for exacter information:

<http://www.top-biography.com/0008-Thomas%20Alva%20Edison/discoveries2.htm>

<http://www.uni-ulm.de/uni/studenten/fs-et/fachschaft/elektrizitaet.html>

<http://www.invent.org/book/book-text/38.html>

<http://www.energieinfo.de/eglossar/node10.html>

Thank you for reading I hope I fulfil your request
Yours sincerely

Maik Schuster