



Quantum Computing - a worldwide race without clear victor till now

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in cooperation with universities and scientists worldwide

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A „Quantum Computer“ is an abstract term which is much more manifold than a legacy “classical“ computer. This term is in its physical reality not systematically describable because all its quantum-physical possibilities and fundamentals are not over viewable in a unified way.

F. Plochberger (2016)

.. for my (in other areas) involved daughters Clara and Isabelle!



1. Abstract

This work can only be an actual and general overview which contains possibly staying facts in Quantum Computing. A detailed, deep research is for the author not possible but treasury Search Items and Key Words besides significant topics are interesting results by their writing down. Details can be found by every reader for himself by using Search Machines. Besides the value of scientifically Orientation is imporantn.

2. Search Items, Key Words

Information Science(s), Quantum-Information-Theory, Quantum Physics, Quantum Computer, Quantum Circuit, Quantum Gates, Quantum Algorithm, Quantum Switch Element

3. Content

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4. Introduction

In our times in Information Sciences (IS) all scientists desire to define worldwide unified terms and ways of thinking opposite to the chaotic situation before (**PLOCHBERGER Franz (2016)**). *Information and Data* as terms **g o t** unified and clear. These new scientific expressions even in Quantum Physics got clear and unique. The permanent remaining kernel is the centric role of Human Being.

Permanent changes in technical-physical realisations (mobile computer, Smartphone's, Laptops) or generally new challenges – like Quantum Computer – have to respect human rules and laws in Human Being-Machine relations.. The Human Being – bordered by his biologic-evolutional and cognition-evolutional changing times – stays as species as he/she is. He/she gets only new tools which he/she can use in his/her world of life and work. Finally he/she has to **win joy** – even by commercial revenue only. Otherwise all these computer tools get neglected and forgotten very soon (**PLOCHBERGER Franz (2014)**).

4.1. *The Human Being in his biologic evolutionary form of life*

In history of our human development 10 000 b. Chr. first human social cooperation's were founded. These agricultural communities, villages and little cities with forms of business (workshops, markets, trading associations, money as own value) are basically valid till today.

Naturally grown forms of life (family, grand family, relationships, clans) have lost their importance. Social relations and narrow bindings get geographically cutted. Only some wise mothers can form grand families around their own living area. In urban structures biologically related Human Beings don't live together in a local common house. Communication per media and easy mobility influence these facts positive. Seen out of genuine human point of view this is more a step backwards the n forwards. But nobody takes care of it, it's not in.

Our world of getting food and work is today very often separated from our living areas of our families. Even this separation is influenced positive by our up to date mobility.

4.2. *The Human Being as cognition-evolutional being*

Even IT makes it possible again to integrate human necessities in our world of work. Personal presence is not so often necessary as before IT. In Human Being- Machine-Systems the Human Being can reach his results in shorter but more mind-concentrating times.

We have to take care on **stress**. It is bad if it is too big because it causes deceases. Stress – finished in not satisfying results - has to be noticed in our world of work very carefully. If it happens it has to be solved in a socially wider community. Otherwise the motivation of working people and their leaders is going down.

The **problem of losing workplaces by IT and Globalisation** is not **solvable by bad working conditions in roboter chains**. **Whole social communities and states** have to find solutions. Personally I like to recommend making these problems to a topic for all political activities (politicians, parties, elections). The future ability for the profession politics has to be measured by these abilities to solve these coming social problems.

Places of production lost many Human Beings. We have to take this as real fact. An urge necessity is to redefine "work" new. Is it possible to unify this term? I think- no!



If work is rare it shouldn't be made to a weakness of jobless people. We have to think about how adding values by grater amount of production objects in our IT-supported factories. A not yet known adding value for all people is a fact. That's a **genuine new social problem**.

Technical progresses should be made seamless and not by revolutionary changing's. The cognition-evolutional, mental abilities of all people are not equal but all have a right to get advantage of our whole social system. We have worldwide already results in treating hunger, extreme poorness has got more seldom. But the difference between poor and rich got greater too and we can't solve this human problem satisfying for all.

Our modern communication society has still grate challenges in future.

As latest cognition-evolutional step we recognise that our whole natural surroundings are damaged by over strengthened, technically local productivity (Chemistry in agriculture, too much techniques in animal breeding and too much CO2 in air) create new dangers for whole humanity.

The knowledge of our time includes all Human Beings. We live in a society with equal rights for all – knowledge carriers and the manual workers. The balance between these main groups will define our future. Wars should happen only in order to equalize injustice and should be provided if new ones could be born. This cognitive evolution of our whole humanity has to be maintained permanently and kept on top of our interests.

5. What's the role of „Quantum Computing“ here?

The theories based on Quantum Information have been developed in the 1970th. All new knowledge out of Quantum Physics since the 20th of last century is the source.

NIELSEN Michael A. & CHUANG Isaac L. (2010) on p XVII: „This began in the 1970s and 1980s, when a few pioneers were inspired to ask whether some of the fundamental questions of computer science and information theory could be applied to the study of quantum systems. Instead of looking at quantum systems purely as phenomena to be explained as they are found in nature, they looked at them as systems that can be designed. This seems a small change in perspective, but the implications are profound. No longer is the quantum world taken merely as presented, but instead it can be created.”

Even artificial Quantum Circuits have been created and the amount is rising every month. All of them are discussed hotly and are in worldwide research. Special „Quantum Gates“ where created which obey complex mathematical and logical algorithms. Nano Technology and Quantum Physics together try to be basis for these new acknowledgements. Out of the side of usability (f. i. Kryptography, Primfactoring or Search Algorithms) mathematically abilities are already counted out.

In 2015 we can write down that classical Computers generally can't be reset. In some special areas applications with Quantum Computers may theoretically be more usable. It's better to say “Quantum Circuit” instead of „Quantum Computer“ – it agrees better with real Physics. Since 2015 Quantum Circuits are sure the leading topic in Information Science, Informatics, Physics and Mathematics. A worldwide race for the historic title „Inventor of 1.full steerable Quantum Computers“ is opened and the leading event in Informatics.

In 2017 we can't find a definitely clear victor. But we can remember the first theoretical rules of a new science : Information Science(s) which was founded around 1968. This science is not so much short



termed commercial but very important for understanding of our actual society. A neighbourhood to Philosophy is usable.

The most interesting concepts of Quantum Circuits are based on two subatomic particles: **Electron and Photon**. In arrays positioned sources of photons f. i. can be directed on electrons. They can steer their **Spine** - as a basic state. Its Up- and Down–States are the searched „switchable elements“. And latest findings of **Helicity** of single photons bring new possibilities in that direction. It's the circular movement of photons which can be valued by two states (directions) too.

6. New terms around „Quantum Computing“(QC)

- Quantum Physics
- Quantum Information Theory
- Quantum Computer
- Quantum Gate
- Quantum Algorithm
- Quantum Circuit
- Artificial Quantum Element

6.1. *What should be the benefit of QC?*

- Minimising lost of energy by heath of computer hardware
- Higher performances of special solutions
- High complexity of possibly new solution findings

6.2. *Where are the borders of QC?*

- Techno-physical ability of realisation
- Costs of new Quantum Circuits

6.3. *How actual lacks in QC are treated?*

- Conscious error handlings



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