About the HISTORY function of time, or the transition from statistics to reality.

- **Principal idea**

maybe the Bible can be taken literally by the word at least in its German translation it begins with "am Anfang war das Wort" what may be translated, - in the beginning was information in the shape of language -.

Why that?

If you define "language" as the means to express and transport ideas and information, it is necessary to distinguish different kinds of language.

- **Chemistry** = molecular information as the eldest form, used already by single cells to regulate their system, and as matter of communication with other systems. We still use it today intern and extern as "smell" it seems to have even a very strong impact in finding a partner without the parties being conscient of it.
- **Images** = all what we see and as means of communication facial expression and gestures, - already used by insects for complex communication i.e., bees dancing to show other bees the way to good food sources.
    - We also use it as abstract form in the shape of painting and nowadays all forms of art.
- **Language** = spoken words to think and carry information to others.
  Words have generally a big range of possible meanings, and grammar is not totally strict, so the information carried by words does not have a totally distinct meaning.
    - A very special form of language is mathematics. Here abstraction for the words and grammar for their combination is highest so that words have only on precise meaning that is understood round the world in the same precise way,- 1+1=2 -.
      This precision satisfies one of the greatest wishes of mankind, security = to know what is and what will be, so science loves math as it's the best way to express precise results and give reliable foretelling's.
      The most modern form uses binary code, 1 and 0 or yes and no, what opens up the possibility to transfer calculations to transistor systems = computers. It also shows the greatest weakness of that system, it knows only yes and no but no may be. To deal with maybe it refers to big numbers of similar systems to open up statistic means to cope with the individual incertitude. For more about that see the next paragraph.
- **Writing** = a combination of language and abstract images to transfer the information on a lasting material. It can be used for words and math and permits to carry abstract thinking to the highest possible levels to yield miracle results of understanding.

More about why not math

There is another issue, this text is in language without math, Mathematics is another language to describe the world, it creates images, but no realities. In the film "der Stoff aus dem der Kosmos ist" Arte 2011 with Brian Greene, he presents for time the concept of a now slice, because it's calculable, they don't distinguish in past presence and future. As I see it and understand the relativity of Einstein time is strictly local. Yes, there is no universal time, every object has its own time, for example me, writing this text, if I die before I succeed to bring these ideas to interact with others, they will die with me, and all particles that interact to create, - me -, will leave this context and leave behind all the information that was created within this context of my existence, and enter in another totally new context in the future.

What does it mean, - in the beginning there is information?

=> only with information / interaction / measurement time begins to exist.

If you regard the double slit experiment it shows what I would call a historic moment. In its first version without measurements at each slit it shows the well-known interference image created out of the interaction of possibilities.

When you put two measuring units at each slit you reduce all possibilities to one state, and therefore you will see only two lines on the screen behind the slits. This marks the transition of a non-defined multiple and as I will call it here, timeless state of quantum reality, by loading each passing particle with a distinct information about locality into a time bound state of historic reality. This transition that makes perish the indefinite multitude of possibilities cannot be described by an equation but only by an inequation. It marks the transition from the world of statistics and incertitude into a world where time systems have a defined relation throughout the equations of the general relativity theory.

So, you could write: T Relativity # T Quantum

The consequence is that in quantum state there is no time because there is no history, nobody knows wherever and how fast the particle is, it carries no information and therefore no story and therefore no time. If you force it to carry information by measurement or by lasting conjunction with other particles it becomes part of the story and part of the time system in which the story happens. The particle may leave this context and return to quantum state by leaving the story. It's a bit like with us humans, our story begins by birth, we accumulate knowledge by learning throughout our lifetime and everything of this knowledge that wasn't given away / shared with other people either by recording it or telling it to others by means of oral history, will definitely end with our death and in this case needs to be found again by others.

This is no contradiction to the perfectly working Schrödinger equations, because these show only statistic means to calculate when and where this transition from statistics to reality will happen which means a particle will take part in a defined time system. So, if beforehand it may be anywhere and nowhere and may even be at two places at a time, it would be a clear violation of the relativity world to give that particle time, because that would give it speed and maybe even speed above the speed of light, which is impossible in the world of relativity. So, measurement marks the transition from the world of quantum reality without history and without time into the world of relativity with history and time.

- **Some more ideas written down thinking about that topic**
  the following numbers only show the line of time when these ideas have been written down, and do not necessarily mark any logical line.
  It's more like ideas hopping around like quantum particles.

1. **Time**
   time as I understand it here is strictly relative, that means every particle has its own time, and you can calculate the transition between time systems by the equations of Einstein's general and special relativity. It is also strictly local; I will write about that below.

2. **Now** /this moment (maybe more precisely described with the German word „jetzt")
   now defines the transition of the necessary Incertitude of future as defined by Heisenberg to

become a party into a well-defined line of events called history.

3. **Interaction makes history= time**
   when and as long particles interact, they form a system that has its own time, that persists as long as the system can maintain its own organisation.

   For instance every human being is such a system, that has its time from the moment of the conjunction of egg and semen, when the possibility of organisation of biomaterial starts, until his very death, when there is no longer enough energy to maintain the living organisation of material.

4. **Also lose organisations** like families, enterprises, states and even the world, all of them have its own time, that partially overlaps.

5. **Organisation is destined by the rules of interaction of the participating particles**. These rules can have multiple forms:
   a. strictly physics
      e.g. when a few QUARKS organize to form a proton or neutron, or if an electron and a proton organise itself to build a hydrogen atom.
   b. Chemical
      when a few atoms organise themselves to form a molecule, and following many molecules organised themselves to form a substance.
   c. Biological
      when a big multitude of molecules organised themselves to form a cell, and following many cells organised themselves to form a multicellular organism.
   d. Mixed forms
      i. physics and chemistry make the rules of
         1. crystals
         2. rocks
         3. liquids
         4. gases
         5. stars
         6. planets

      ii. physics chemistry and biology form
         1. ecosystems
         2. all worlds with life in it

6. complex organisations can only be maintained by information and communication of its parts, and quite often energy is needed to maintain the organisation.

7. parts can leave the time of one organisation and change into the time of another one, like for instance a carbon atom can leave your body through breath as carbon dioxide and can become part of the plant by photosynthesis, that in constitution is eaten by a cow and been made part of the milk that is drunk by your baby. This being the clearly defined history of this carbon atom it cannot leave this story especially not by travelling throughout time.
   Like that biological organisms only exist by continuously exchanging material through breath and nourishment. They need to do this to get the energy that is needed to maintain the

organisation.

8. **Organisation needs energy**
   the energy can be created by conjunction of particles like in chemistry,
   or can be taken from the outer world like in biology.

9. **In the beginning was the word means time starts when the History starts**, when the first thing happens that creates or contains information.
   That means for the genuine quantum state that before there is any measurement, information, interaction that marks the beginning of the story there is no time. This allows the particle in quantum state to be anywhere and nowhere.

   This might even be the way how inflation came about after the Big Bang. In the beginning of this period all participating particles were in the mere quantum state, having no time and being able to be anywhere and nowhere and so being able to expand the surrounding space at any rate.

10. If 9 is correct there is space before the story begins because in that primary stage the particle can be anywhere and nowhere and therefore must have space.

11. **The concept of now=present needs to be local in consequence.**
    The information contained in distant instances of now needs time to travel because it cannot travel faster than light because of relativity. So, we can only see what has already happened in the past and by travelling throughout space due to the effects of gravity red shift that information is changed into warmer temperatures of light. Therefore even physics knows no universal present.

12. **The direction of time follows directly out of the mathematics of quantum mechanics,**
    because in this mathematics past can only be calculated with imaginary numbers that means square roots out of minus X.
    Because past is definite and no longer governed by incertitude, everything has realised itself to a fixed and certain history during all these already gone presents that are called past. For instance, if a radioactive molecule has decayed into two new chemical elements and some few other particles and radiation this can ‘t be turned back, its definite. This is also valid for chemical reactions were concrete defined atoms and molecules have taken part for instance, to form this person that writes this idea, as other particles have joined together to form the paper or the screen you read this text on. The conjunction to form a new entity equals the measurement concept in quantum mechanics and creates a clearly defined state that as line of presents forms really happening history.
    Therefore there is no possibility for any material to travel into the past, because all these atoms that form this material already have a well-defined role in that past history being part of another reality. For instance, if you travel into past there need be some atoms torn out of the body of Einstein or any other living person during that time and lots of other things that existed during this past, because all these particles have organised themselves to form your body during that history you intend to travel back. The bread I‘m eating can only reform to bread or something else when all of these particles that form this bread have entirely left my body. This may well mean that it can only totally regenerate to its old form when I‘m dead, because some of the particles may have become part of the longer living members of my body.

Imaginary numbers therefore don‘t create new realities as their name already tells. They only help to explain how this reality could have happened and out of what probability it has realised itself.
There is no way back in time, because this would violate past and fixed organisations. I cannot travel back with atoms in the past that in this past were definitely part of other systems that would be destroyed if these particles that form myself would be ripped out. There is only a limited and definite number of particles in the system that are continuously new organised during the run of history to form new entities. Some water molecules that are part of my body now, have been in the depths of the ocean during past.

13. **Because time extends /runs slower in moving objects and the speed of light is constant the measurement of distances must become bigger in these moving objects** so that light can travel the same distance in this dilated time.

14. Redshift as result of faster running time in spaces with low gravity?

15. **Only systems/stories know time, particles do not.**

16. **There are only local defined now moments**, but no time slices in space, no extended now because everything that happens is local. Otherwise, the uncertainty principle of Heisenberg would be violated, because that influence changes the system and therefore needs time and speed to happen and therefore cannot happen at two places in the same time.
The same factors expressed with the very old proverb, „you never step twice as the same person in the same river “. This is another example for strictly local now. It is a consequence of the principal that every interaction must follow the rules of relativity, that means limited speed, and that of quantum mechanics especially uncertainty.
A dislocal now only exists with quantum mechanically entangled particles. This does ‘t violate the above quoted principle because to be entangled the two particles have to have a common locality in the past where the entanglement happened in the past and as long as these particles remain in quantum state even though they are entangled they cannot be used to exchange information with a higher speed than the speed of light, because the distant localities need to communicate about the character of these particles when they leave their state of uncertainty.
    a. **Time in defined systems**
    for side-by-side and „relatively“independent existing time systems we see that to mark a defined system that means to define a system in that time system that consists of a entangled multitude of particles. The entanglement is created by a multitude of interactions/ measurements and so lifts the uncertainty of quantum mechanics for this whole system and creates a well-defined state that is ruled by the equations of Maxwell and Einstein. With a constant speed of light, it is necessary to have a multitude of time systems because this constant speed of light sets a definite boundary for influence and interaction between different systems and can disentangle them.
    b. This means that for quantum mechanically entangled particles they cannot create a joint system, because these particles exist in the indefinite state of quantum mechanics and therefore have no time because the uncertainty forbids that they carry information between the systems.
    c. Not everything can be calculated back to the time of the Big Bang
    for instance quantum jitters in space and Hawking radiation cannot because they are

created locally in a new time and with their extinctions and their time

17. **What does mean now under these circumstances?**
    If you accept the reasoning of this paper, now can only be thought as related to a certain system.
    Now is the moment /the event that marks or creates in this system the transition from uncertainty to the certainty of a historic event/moment with the means of interaction/measurement. Therefore, there are no now slices in space. The fact that right now we can receive radio waves that have their origin in the time of the Big Bang has no relevance and no influence for this event, it may only influence the actual system that receives these waves. This influence depends of the configuration of the system at the moment of reception. For instance for me it‘s relevant because it makes part of the thoughts that I write down in this very moment, for my wife it‘s not relevant because she looks TV at the same time and doesn‘t take notice of this ideas.
    In big systems like my family there can be different moments of now that not necessarily need to interact as shown above.
    a. In the system of our cosmos the first moment of now was the Big Bang. Afterwards the cosmos broke apart into multiple different systems that have their own now, and where this now of the local system doesn‘t interfere with the cosmos as a whole. As a whole it‘s only affected by the extension that continually happens, and it might be affected by a reverse contraction if there will be any in the future.
    b. What we see right now of this Big Bang moment as cosmic background radiation has to be interpreted including the interactions that this background radiation experienced during the time of travel through space until it reached the earth or the satellite that does take the picture. Parts of this radiation may have gotten too near to a black hole and therefore have been sucked up. Other parts may have changed direction due to the influence of gravity so that they also cannot reach us.
    I cannot calculate this but this might be a part of the explanation of the wavelengths differences we see in this background because radiations that have experienced multiple changes of way due to gravity may have had a much longer way to reach us and suffered a gravitational red shift in comparison to other waves so the image of this horizon doesn‘t give the image of common now moment.
    c. Not entangled time systems without any bidirectional influence could also be regarded as multi-verse. And as information needs time to travel there may never be any exchange of information between these systems

18. (**A jump to another topic related to black holes)** Hawking radiation would only give black holes a temperature when there is a inequality that means that more anti matter particles are being sucked up by the black hole than matter particles. Otherwise if there is equality in total the black hole won‘t lose mass because the sum of anti-matter and matter being sucked up out of quantum jitters would equal out to 0.

Who am I to start this text:

I was always fascinated by physics but I never studied it at the University. I‘m working as lawyer accountant mediator and sculptor so this text might not fit the classical demands on scientific writing, as for example shows this introduction.

I always tried to stay in touch with some of the modern developments of physics and like to read books of famous authors like Bryan Green, Stephen Hawking, Brian Cox and Geoff Forshaw, Roger Penrose and Richard A Muller, and I read the related articles in quanta magazine to stay in touch with new ideas, and foremost to test if there is any information that proves all of the here exposed ideas as invalid.

That way I‘ve got the idea that one of the main obstacles to unify the world of Einstein‘s relativity and quantum mechanics lies hidden in the understanding of time. In all of these works, even in Muller‘s book “now the physics of time“ ,which I read in its German translation, time is only dealt with as a means to measure movements, whereas as I understand it it‘s foremost or genuine function is to tell stories or as I name it a historic function, that‘s to say to bring an order to all that happens to a specific object from cradle to grave.

To develop one of the most famous quotations of Albert Einstein he made against quantum theory a little bit further on,- “Gott würfelt nicht” / = god doesn’t dice -, god creates possibilities and in that range it is ours to choose the right ones.