At the International Congress of Mathematicians at Paris in 1900 David Hilbert delivered a lecture about 23 fundamental problems in both physics and mathematics that weren't solved at that time.

(The original text can be found at:
http://quantumuniverse.eu/Tom/Hilberts%2023%20Mathematische%20Probleme.pdf).

In this lecture David Hilbert investigates the axioms of physical models with the profound wish to derive these "axioms" geometrically. And in his view all theoretical mathematical physicists almost always use their "logical" intuition as a starting-point for the assumed axioms instead of a logical straightforward mathematical derivation, i.e.:

The system of axioms assumed to be the starting-point of a physical model.

These assumptions do of-course not satisfy real understanding of used physical models and always keep a physicist feeling like "*What am I actually talking about!?!*"!

Examples of used not-understood axioms of the **SM** are given quite easily. The most obvious are the following two characteristics:

1. Spin, i.e. "*intrinsic angular momentum*".
2. *Intrinsic* energy E is proportional to a detectable frequency f: E = hf. And this property is valid for all elementary particles as already *assumed* by De Broglie in 1924.

Here it should be noted that these axioms are not usually called as such, but are most often called characteristic quantities to describe elementary particles correctly in the microscopic world of QM. In the **SM** of SR QFT the given two examples are *NOT* assumed related and also in general assumed completely independent of one another. And this is simply because up-to-this very day scientists still do not understand QM! And as a result of this fact, physicists treat spin and E = hf in their analyzes as *NOT*-understood axioms!

And all this frustrating neglect of knowledge among physicists on microscopic level is mainly the result of not understanding the beautiful theory of GR! GR is only used on macroscopic level, for example to describe the motion of the planets of our solar-system around our major source of existence, the sun.

Albert Einstein himself already discovered around 1920 that any valid mathematical descrip-tion of our reality, i.e. any valid scientific model, *MUST* always comply to the **CAP**! And QM as used in the (SR) **SM**, does *NOT* comply to the **CAP**! **CAP** compliance implies on linear-mathematical grounds also including curvature of 4D-spacetime in the description. I.e. curvature of space-time is not only required on macroscopic scales, but ALWAYS, so also on microscopic scales (QM). Now, of course the following question arises: "*Why use a 4D-spacetime analysis to describe our reality?*"! This easily answered question causes important problems in all so-called String-theories because it shows that these analyzes can *NOT* describe our reality on a deeper-level!

As shown by Grigori Perelman somewhere between 2003 and 2005 at the Stonebrook university in New York together with Richard Hamilton, mathematical described knots are

only possible in 3D-space (4D-spacetime). It is also a generally known fact that all so-called "*matter*"-particles called fermions ALWAYS have rest-masses m > 0! Fermions are the primary sources of force-particles, called bosons. I.e. without fermions also no bosons, so nothing at all!

All elementary particles must be re-written to comply to the **CAP**, and this compliance seems more difficult than it actually is. The only mathematical demand is inclusion of curvature in the exact linear description. In Curvature and QM this is explained. As a result of the **CAP** all possible elementary particles must be described as harmonic oscillating points in the 2D-plane orthogonal to the direction of motion, i.e. the SR-worldline. The frequency of oscillation represents the wave-like energy described in example 2 above (E = hf). The oscillating path is travelled with a speed and consequently also momentum with a constant angular-momentum. This angular-momentum is nothing more then the spin of the described elementary particle. This explanation of spin at once shows that elementary particles without spin are *NOT* able to carry energy proportional to a wave-like frequency, so *MUST* be not-understood "human-fiction".

When solving the DE for the oscillating motion in the 2D-plane orthogonal to the direction of motion, two BC's are needed. These needed BC's are either open or closed. Open-BC's have one extra degree of freedom, which is an integer n > 0. This degree of freedom specifies the particle-family of the described elementary particle. Open-BC's describe particles that allow interactions with other elementary particles in all 3D-directions with at least always the graviton, i.e. open-BC's describe *ALWAYS* massive fermions. Closed- BC's appear to describe force-particles, i.e. bosons. Such particles, when analyzed as elementary particles, do *NOT* allow more so-called particle-families.

The primary sources of any possible existance are *ALWAYS* massive fermions. A fermion must be described in compliance with Einstein's **CAP**, i.e. as an harmonic oscillating mathematical point in the 2D-plane orthogonal to the direction of motion. This harmonic oscillating entity is massive, so in an easy SR analysis the actual travelled path of the harmonic oscillating point *MUST* allow knots in the described mathematical path.

As a direct result of this *easy* mathematical analysis the *ONLY* space that can be used to analyze our reality *MUST* be 4D-spacetime-like! And this *SIMPLE* mathematical fact at-once yields *ALL* **STRING-THEORIES** useless!

If anyone wants to learn more from CAP compliant QM, please contact me at the following address:

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