Time arrow in nature: logical key to an information based universe

During the past century more and more counterintuitive, irrational or paradox mechanisms have been implemented in physics to “explain” our real world. They range from effects without causes in quantum physics and a four dimensional space time in relativity theory to inflation of empty space in cosmology. They are claimed to be fundamental, but this is contradicted now. A simple stone rolling down a hill puts hand to the plough. The stone follows the important principle of least action: the energy turned over integrated over the time always minimizes. It is demonstrated that this can only happen, when energy itself has the inbuilt drive to aim at a minimum (of available energy): The world must be fundamentally oriented, energy driven. The resulting “time” arrow is the flow of action (the same for systems of different velocity). It can be calibrated to extract clock time. A time arrow is in contradiction to present scientific understanding: All fundamental laws are defined to be time invertible. Energy is a just a number and has no interest to do work and to generate action.

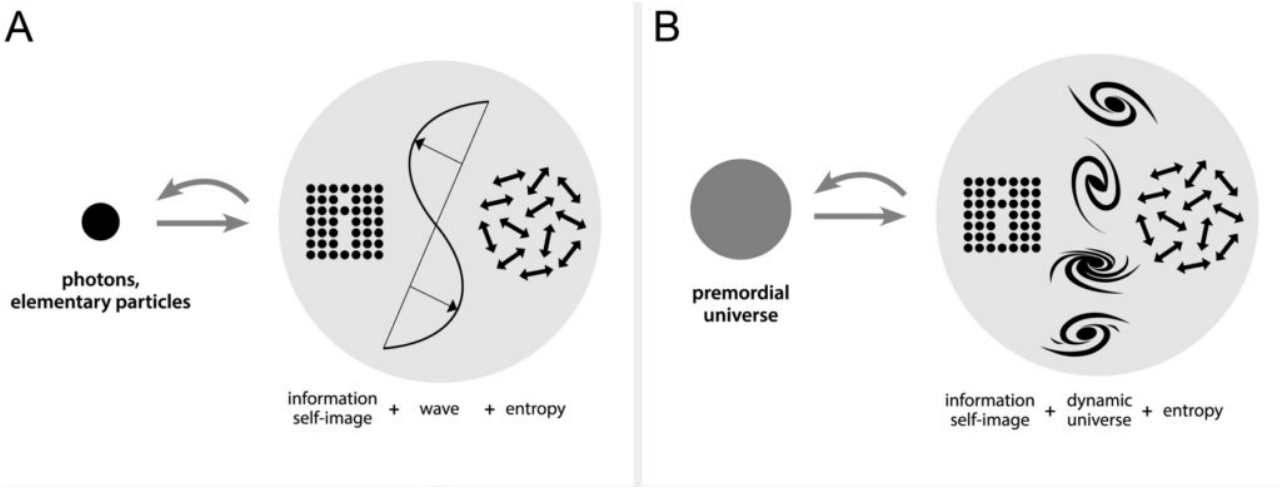

Fig. 1. A. In an irreversible world a wave with distributed energy means more disorder (entropy). Information on matter has to be provided simultaneously for reconstruction of the particle. B. In a similar way, and because information on matter can be identified with gravitation, the universe may be started and recycled via information.

If, in contrast, it is accepted that natural processes are subject to a time arrow, this applies also to quantum processes. A light particle and the corresponding wave are not any more equivalent, but a wave results from the particle by spreading out its energy creating entropy, disorder. To explain a reversible particle wave duality this requires that information is set aside to reconvert the energy distributed in the wave into energy in form of the particle (Fig. 1). Information thus becomes a fundamental property of matter. In order to describe a quantum process it is not sufficient to

describe matter. One has also to account for the information involved. It turns out that this information on matter brings rational understanding to counterintuitive quantum and cosmological phenomena. It should increase with mass and must be measurable. It is identified with the phenomenon of gravitation. A circulating satellite is simply remote controlled by this information, contained in gravitation, and follows the principle of least action.

In the theory of relativity space had to be distorted to four dimensions to account for the measured always constant light velocity, irrespective of velocities of objects involved. This is not necessary any more. Light particles with the explained information properties do the job. It is like operating a 3-dimensional printer on an airplane with signals from outside. Speed and direction of flight do not matter. A constant light velocity can be implemented via information in any system.

Since this information on matter, gravitation, is also controlling the dynamics of the universe it can be expected that the universe itself is recycled and restarted via information as proposed for the dynamic particle wave duality (Fig. 1). Because of the fundamental time arrow also the formation of complex structures in space via self- organization can well be accounted for. Information itself can also self-organize to yield a higher hierarchy of computation, meaning super-gravitation, or, with biological information, consciousness and spirit.

The paradigm change from a fundamentally reversible to a fundamentally irreversible world leads to an information controlled universe. It is logical, more intelligent, simpler, and more plausible than the Big Bang universe.

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Publications

On the Fundamental Meaning of the Principle of Least Action and Consequences for a “dynamic” Quantum Physics
H. Tributsch
Journal of Modern Physics, 2016, Feb

A Fundamentally Irreversible World as an Opportunity towards a Consistent Understanding of Quantum and Cosmological Contexts
H. Tributsch
Journal of Modern Physics, 2016, Aug