EDITORIAL

Equivalence of information flow and time

Friedhelm M. Joge

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ABSTRACT

A formula is developed that describes a quadratic relationship between information and time and at the same time the equivalence of information flow and time.

Key Words: *Information, Time, Energy, Entropy*

INTRODUCTION

In today's information age, the term „Information" has become more and more important. We are living in a time of renewed paradigm shift, away from the traditional concepts of energy and matter to the prevailing concept of information in today's information age. Although the concepts of energy and matter are still present and important in our world, they are increasingly being replaced by the concept of information. This applies not only to biology with its deeper biochemistry and molecular biology but also to physics. This is where the term information "plays an increasingly important role alongside energy and matter as the third fundamental quantity. The American physicist John Archibald Wheeler considers an information-theoretical reformulation of quantum theory, in general, to be promising. He once said: Tomorrow we will have learned how to understand all physics in the language of information and how to express it in this language. The experimental physicist Anton Zeilinger, Vienna, even equates information with reality. Even if reality is not a concept of physics and the concept of effect has no particularly descriptive meaning physics, one can understand physical reality as a single effect or as the sum of all effects.

The publication of the article Equivalence of Energy and Time is only a small step to the writing of the article Equivalence of Information Flow and Time [1-2]. This will be explained below:

Derivation of the formula

De Broglie developed a formula for the first time within the framework of the thermodynamics of the isolated particle [1]:

$$\frac{A}{h}=\frac{S}{k}$$

with

$$S=k.\ln 2.H$$

follows

$$A=h.\ln 2.H$$

Since

$$A = E.t$$

it follows that

$$E=h.\ln 2.H/t$$

Now, on the other hand, Energy E is equivalent to time t, as published [2]:

$$E = (\frac{h}{t_p^{\,2}}).t$$

This results

$$\ln 2.t_p^{\,2}.H=t^2$$

which shows the quadratic relationship of information and time and at the same time the equivalence of information flow and time.

$$t=\ln 2.t_p^{\,2}.H/t$$

If one inserts the age of the universe t_u = 13.8 billion years for the time t, then one obtains the information of the universe with $1.35 \cdot 10^{122}$ bit, as published in excellent agreement [3-6].

DISCUSSION

The concept of information has found its way into physics at various points. So it is not surprising that the concept of information can also be related to the concept of time. It is astonishing that the equivalence of information flow and time could be found in this way.

CONCLUSIONS

Information and Time are two fundamental key concepts to describe reality. They enable the calculation of information and dark energy in the universe. A better understanding of reality is thereby achieved.

Definition of the symbols used in the formulae

H = Shannon information entropy

H/t = information flow

t = time

t_u = age of the universe

E = energy

Ohm Polytech college Nurnberg, Germany

Correspondence: Friedhelm M. Joge, Ohm Polytech College Nurnberg, Germany. e-mail: F.Joege@web.de

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S = thermodynamic entropy
k = Boltzmann constant
A = action
h = Planck quantum of action
t_p = Planck time

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