

**EXPLORING THE LINKS BETWEEN THERMODYNAMICS AND SOCIAL SCIENCES:
THE CONTRIBUTION OF OUR UNDERSTANDING OF SPACE AND TIME RELATIONSHIPS**

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ABSTRACT

Enlightened by our experience of the relations between physics on the one hand, thermodynamics and geology on the other, we will begin with some general considerations on the relations that can be envisaged between the different disciplines of knowledge. Depending on the case, one can try to reduce one discipline to a more fundamental one, and aggregate the "simple" models of one to organize the other; analogies can also help to propose models. It is often possible to observe an autonomy of the disciplines with respect to the others. They can cooperate, merge into new disciplines. The notion of law, of initial conditions, the role of contingencies, may differ from one field to another.

We will then focus more specifically on our understanding of the strong link between the concepts of time and space, and the functioning of thermodynamics. The object of thermodynamics is basically to link two levels of understanding of the world, a more microscopic level and a more macroscopic level. Space and time are the other name for the comparison between phenomena, within a relational rationality. They can thus function differently from one level to another. They are given a broader meaning by freezing what is at a lower level in its most probable state (intervention of the entropy function). The choices and agreements necessary for the functioning of relational rationality make us revisit a whole series of notions such as equilibrium, the distinction between work and heat, irreversibility, etc.

In the light of the foregoing, we will make some remarks on some of the relationships that can be seen, under certain conditions, between thermodynamics and social sciences. What energy can be associated with a given social system? Energy cannot be defined on its own but only in a relational way: a variation of energy is in correspondence with a variation of movement. Thus, the question of defining time, space, movement, entropy, etc. for a social system is set accordingly. Some simple examples will be given.

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